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EFFECTS OF GROUP COHESION, BELIEFS OF OWN DESERVING,
AND BELIEFS OF OTHER'S DESERVING ON
COOPERATION IN SOCIAL DILEMMAS

By

David Nathan Sattler

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ABSTRACT

EFFECTS OF GROUP COHESION, BELIEFS OF OWN DESERVING, AND BELIEFS OF OTHER'S DESERVING ON COOPERATION IN SOCIAL DILEMMAS

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An experiment investigated how group cohesion, an individual's belief that s/he deserved to obtain a resource, and an individual's belief that his/his partner deserved to obtain a resource affects cooperative behavior in a two-person simulated social dilemma. Based on Deutsch's (1975) equity and equality distribution principles and Clark and Mills' (1979) theory of communal and exchange relationships, it was hypothesized that different allocation norms or distribution principles would be employed in cohesive and non-cohesive groups. Beliefs of own and other's deserving were manipulated by varying the amount of time an individual and his/her partner participated in a task. Subjects harvested lumber from a simulated community forest and shared equal responsibility for fines levied for overzealous resource use. The hypotheses were supported. Individuals in cohesive groups appeared to employ the equality distribution rule and individuals in non-cohesive groups appeared to employ the equity distribution rule. Implications of the findings are discussed, and future research is proposed.

To my family

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CHAPTER I

INTRODUCTION

Individuals in a myriad of situations frequently must choose between actions that will either promote their self-interest and in turn harm the collective or promote the collective-interest but at personal expense. Examples abound. A conflict between individual and collective interests exists in labor organizations, where individuals can gain the benefits of a union without paying dues, on sinking ships, where individual rationality dictates that people rush to save themselves while risking the lives of everyone, and in resource use (e.g., petroleum), where individuals can gain from using as much of the resource as possible even though this actions leads to pollution and elimination of the resource. Such situations, known in social psychology as social dilemmas, exist when self-interested behavior appears rational from an individual's perspective, but if all act in their self-interest, then the result is a less desirable outcome than if all had acted in the collective-interest (Dawes, 1980). Social dilemmas are characterized by two properties: (a) each individual receives a higher outcome for choosing a self-interested option than for selecting a collectively-interested option, no matter which options the other individuals in the group select, but (b) all individuals in the group receive higher outcomes if they select the collectively-beneficial option than if they choose the self-interested option (Dawes,

1

1980).

The conflict between individual and collective interests was characterized by Garrett Hardin (1968) in his classic article "The Tragedy of the Commons." Hardin explored the situation in which a number of herdsmen, sharing use of a common pasture, must decide how many cattle to graze on the commons. Each herdsman reasoned that it is in his best interest to keep adding animals to his herd, for the personal gain from adding animals outweighs his proportionate share of the damage inflicted on the commons, which is shared equally by all. Since the commons is finite, the day must come when the total number of cattle will cause the pasture to deteriorate and eventually destroy the resource on which the herdsmen depend. And therein lies the tragedy: the logic of the commons dictates that the collective consequences of self-interested behavior result in an undesirable outcome for everyone.

Social Dilemma Research Paradigms

Prisoner's Dilemma and N-person Dilemma

Social psychologists have invoked two main research paradigms to study the conflict between individual and collective interests: the prisoner's dilemma (Luce & Raiffa, 1957) and the N-person dilemma (or social dilemma) (e.g., Kramer & Brewer, 1984; Orbell & Dawes, 1981). In both paradigms, (a) an individual may make a choice that benefits either him or herself or the collective, (b) an individual's outcomes are influenced by his or her own choice and the choices made by the other group member(s) (i.e., both paradigms are considered to be a class of outcome interdependent situations (Kelley & Grzelak, 1972)), (c) it is assumed that individuals

are "rational" and attempt to maximize their own interests, and (d) the main dependent variable is whether an individual acts in his or her own interest or in the collective-interest. In addition, several psychological factors may lessen any incentives to act in the collective-interest, especially when it is not clear whether others will act in their self-interest or in the collective-interest. Examples of such factors include motivation losses (Kerr, 1983), social loafing (Latané, Williams, & Harkins, 1979), diffusion of responsibility (Latané & Darley, 1970), and feelings of inefficacy (Kerr, 1989).

There are at least three differences between the prisoner's dilemma and the N-person dilemma. First, in the prisoner's dilemma, negative consequences resulting from self-interested behavior are focused on one individual but are spread out among at least two individuals in the N-person dilemma. Second, choices are not anonymous in the prisoner's dilemma, whereas choices may be anonymous in the N-person dilemma. Finally, in the prisoner's dilemma each individual has some degree of influence over the other individual, but in the N-person dilemma it is difficult, if not impossible, for one individual to influence or control either another's behavior or fate (Thibaut & Kelley, 1959; Dawes, 1980; Komorita, 1976).

Social and Temporal Traps

In addition to the conflict between individual and collective interests, many social dilemmas also contain a conflict between short-term and long-term interests. Platt (1973) refers to the conflict between individual and collective interests as a social trap, and Messick and McClelland (1983) refer to the conflict between short-term and

long-term interests as a temporal trap. Real world examples of situations where the pursuit of short-term self-interested goals can adversely affect long-term collective-outcomes are commonplace (Schelling, 1971). As an example, Schelling (1971) describes the decay of rail service when individuals began using their own automobiles. As more individuals drove their own automobiles, traffic congestion increased and the quality of the railroad decreased. In time, it appeared that the efficient railroad of the past was preferred to the automobile.

Messick and McClelland (1983) investigated how social and temporal traps affect collectively-interested behavior in a social dilemma by manipulating the number of individuals sharing a resource. Subjects experienced either a temporal trap (those in the one-person condition; since there was no group in this condition, a social trap did not exist) or both a social trap and a temporal trap (those in the three- and six-person conditions). Fifty-six introductory psychology students were told that their task was to withdraw as many points as possible from a regenerating resource pool without depleting the pool over a series of trials. The pool was replenished at the end of each trial by one-third the number of points withdrawn on the proceeding trial. The results showed that the subjects in the one-person condition maintained the pool longer than those experiencing both the social and temporal traps. The findings suggest that social and temporal traps have differential effects on collectively-interested behavior and either may or may not occur concurrently in either a prisoner's dilemma or a social dilemma.

Nontechnical Solutions to Social Dilemmas

In an excellent review of the social dilemma literature, Messick and Brewer (1983) identified two types of "strategies" to solve social dilemmas. These strategies, or nontechnical solutions, attempt to persuade individuals to consider collective outcomes in their decision-makings. Structural solutions attempt to eliminate or alter the incentive structure for self-interested behavior by making either self-interested behavior more costly than collectively-interested behavior or collectively-interested behavior more attractive than self-interested behavior. For example, high electricity and water rates can be considered structural solutions since they quantitatively change the incentives for use of the resource (Pope, Stepp, & Lytle, 1975). Hardin's (1968) "mutual coercion, mutually agreed upon" solution in which group members agree to establish a strong central authority to constrain self-interested behavior also can be considered a structural solution.

Individual solutions attempt to influence individuals to voluntarily act in the collectively-interest. For example, providing information about the consequences of self-interested behavior (Stern, 1976) and making appeals to individuals to conserve a resource such as water (Orbell & Dawes, 1981; Maki, Hoffman, & Berk, 1978; Sattler & Kerr, in press) can be considered individual solutions since they attempt to influence an individual's decision-making. Ingroup or social identity may be an individual solution variable, for "the sense of membership in a common group or social category probably...influence[s] individuals' willingness to exercise personal restraint in the interests of the collective welfare" (Messick & Brewer, 1983, p. 27).

Another individual solution variable may be individual differences in orientation to maximize an individual's own outcomes or collective outcomes. Such differences, known by a variety of names including social motives (McClintock, 1972), motivational orientations (Kuhlman & Marshello, 1975), and value orientations (Liebrand, 1983) have been found to influence behavior in both the prisoner's dilemma (e.g., Kuhlman & Marshello, 1975) and the N-person dilemma (e.g., Knight & Dubro, 1984; Liebrand, 1984; Messick & McClintock, 1968). The composition of the group with regard to social motives has been found to influence the likelihood that an individual will act in the collective interest. For example, Kelley and Stahelski (1970) found that competitors (competitors attempt to maximize the difference between their own and others' outcomes) tend to act in their own interest regardless of their partner's behavior, whereas cooperators (cooperators attempt to maximize their own and others' outcomes) assimilate to their partner's behavior. Thus, the composition of the group with regard to social motives (i.e., the symmetry of social motives within a group) appears to affect collectively interested behavior.

Focus of Present Research

Many theoretical approaches to social dilemmas assume that "individuals affected by common pool problems are self-interested, rational" (Ostrom, 1977, p. 174), and attempt to realize the largest outcomes possible for themselves. With some exceptions (e.g., Messé, Kerr, & Sattler, in press; Wilke, de Boer, & Liebrand, 1986), few social dilemma studies have manipulated self-interest. Typically, social dilemma studies have investigated groups whose members have the same inputs or beliefs of

deservingness for the shared resource. The present study investigates how individuals might act in a social dilemma when self-interest (e.g., beliefs of deserving) is particularly salient for one or more group members (e.g., symmetric beliefs of deserving: own and others' beliefs are high; own and others' beliefs are low; and asymmetric beliefs of deserving: own belief high, others' low; own belief low, others' high). Do individuals always assign more weight to their own outcomes (i.e., act in their self-interest), or are there conditions in which individuals will assign equal or more weight to others' outcomes in a social dilemma? Might intragroup social relations moderate the degree to which individuals act (a) to further only their own interest, (b) to further the interests of all group members, including themselves, or (c) to further the interest of only their fellow group members? Thus, the main focus of the present research are the interactive effects of intragroup social relations, an individual's beliefs of his or her own deserving for a resource, and an individual's perception that his or her fellow group member deserves a resource on cooperative behavior in a social dilemma.

Situations in which some portion of individuals sharing use of a resource (ranging from zero to 100%) believe that they deserve to obtain the resource are related to situations involving resource scarcity. Scarcity exists when there is an insufficient supply to meet demand for the resource. The perception that resource scarcity exists is usually created when the supply available dwindles and is no longer able to meet demand. A handful of social dilemma studies have manipulated scarcity by varying the resource supply (e.g., Rutte, Wilke, & Messick, 1987). These studies tend to

demonstrate that self-interested behavior increases as the resource supply decreases.
However, scarcity is also created when demand to acquire the resource exceeds the
available supply. If scarcity can be manipulated by keeping the resource supply
constant and varying demand (i.e., by creating beliefs that either all or a subset of
group members deserve to obtain the resource whose supply is fixed), then would
self-interested behavior increase as when demand remains constant but supply
decreases? A review of the literature did not reveal any social dilemma studies
manipulating scarcity by varying demand for the resource.

<div align="center">Deserving for a Resource, Resource Distribution,</div>

<div align="center">and Distributive Justice</div>

Social dilemmas and the domain of distributive justice are concerned with how
individuals distribute goods that affect an individual's own and others' psychological,
physiological, economic, and social well-being (cf. Deutsch, 1975). Distributive
justice refers to the <u>fairness</u> of resource allocation among individuals and can be
characterized by three properties: (a) the fairness of allocation decisions are
determined by comparing an individual's own outcome to another's outcome
(Festinger, 1954), (b) to make meaningful comparisons between an individual's own
outcome and another's outcome, the other individual must be perceived as similar on
relevant dimensions, and (c) if an individual's own outcome is not equal to others'
outcomes, then it is expected that the individual allocating the resource will justify the
allocation decision (Karniol & Miller, 1981). Thus, one aspect of distributive justice
is concerned with whether an individual allocates resources in his or her own

self-interest or in the collective interest.

Several theorists have speculated about the conditions that influence resource distribution. For example, Deutsch (1975, 1982) and Schwinger (1981, 1986) suggested that the values or principles an individual employs to distribute resources is influenced by (a) the type of interpersonal relationship existing among group members, and (b) the environmental circumstances facing the group. In addition, Deutsch (1975) indicated that "there are undoubtedly some minimal conditions of individual well-being and human dignity which are necessary to sustain continued cooperative participation in a group's activities and vice versa. An individual can tolerate only a certain degree of inconsistency, rejection, isolation, abuse, or terror from his [or her] group before he [or she] no longer will be willing or competent to cooperate; his [or her] threshold of tolerance for such practices will undoubtedly decrease if he [or she] sees that others are not treated similarly" (p. 141) (see Perelman, 1967, p. 51).

Deutsch (1975), Lerner (1975), and Leventhal (1976) proposed three principles regarding the conditions--environmental circumstances and interpersonal relations--that affect the just or fair distribution of resources. Each principle addresses the degree to which individuals may weigh their own and others' inputs and outcomes in their decision-making. The first principle states that in impersonal and competitive social situations in which economic productivity is a primary goal, equity will be the dominant principle used to distribute resources. The equity principle states that individuals should receive outcomes in proportion to their respective contributions to the group. For example, all other variables being equal, an individual who works at a

task longer than another individual should receive more wages. Individuals might also

consider outcomes to be equitable when higher status individuals--who supposedly

have higher inputs--obtain larger outcomes than lower status individuals--who

supposedly have lower inputs--in a social dilemma (see Messé, Kerr, & Sattler, in

press).

The second principle states that in social situations that can be characterized by

"face-to-face contact" (Deutsch, 1975, p. 148) between group members--provided that

none of the group members are considered to be dependent upon another--in which the

fostering or maintenance of enjoyable social relations is the common goal, the

dominant principle to distribute resources will be equality. The equality principle

states all group members should share equally the group's outcome. For example,

consider the situation in which two individuals are neighbors and are working together

to paint a house for pay. The equality principle would indicate that payment for

painting should be distributed in equal amounts to both individuals, even if one

individual worked a few more hours than the other.

The third principle states that in social relations in which a strong degree of

friendship exists within the group in which the fostering of personal development and

personal welfare is the common goal, the dominant principle to distribute resources

will be need. The need principle states that all individuals should receive outcomes in

proportion to their respective need for the resource. For example, consider the

situation in which a married couple becomes lost on a backpack trip and have a

limited supply of water. The need principle would indicate that the thirstiest person

should be allotted the most water. "Heightening the relative needs of group members, heightening the sense of responsibility in relation to the needs of the others, etc. would lead to the use of need rather than equality or equity as the principle of distributive justice" (Deutsch, 1975, p. 149).

For Deutsch, Lerner, and Leventhal, the way in which resources will be distributed among group members is largely influenced by the social ties or relations existing among the group members. If social ties among group members range from weak to strong, then as social ties become stronger, individuals should become less concerned about their own outcomes and more concerned about the outcomes of their fellow group members.

Distribution Principles and Norms

The equity, equality, and need principles may be considered as defining different types of standards, rules, or norms for appropriate behavior in various conditions. A norm is an expectation about how one ought to act that is enforced by the threat of sanctions or the promise of reward (Schwartz & Howard, 1982) (see Kerr (in press) for an excellent discussion on the role of norms in social dilemmas). Two types of social norms--norms in which the consequences of adherence to and violation of norms are administered by an actor's fellow group members (Schwartz, 1977)--are relevant to these principles.[1] First, benevolence norms prescribe actions that benefit others directly and may "prescribe cooperation, sacrifice, and trust within a group...[and are] implicit in such notions as 'teamwork,' 'allegiance,' 'loyalty,' 'patriotism,' 'nationalism,' 'solidarity,' and 'community' (Kerr, in press). Second,

general interaction norms "promote group member welfare indirectly, by providing fairly general rules of interaction and exchange" (Kerr, in press). Examples of general interaction norms include the norm of equity, equality, and reciprocity. The norms of equity and equality also may be considered to be types of allocation norms that involve "a social rule which specifies criteria that define certain distributions of rewards and resources as fair and just" (Leventhal, 1976, p. 94). Such allocation norms have also been referred to as justice norms (cf. Sampson, 1969, 1975; Deutsch, 1975; Leventhal, 1976; Lerner, 1975, 1977). The equity and equality general interaction norms are most relevant to the equity and equality principles.

The equity, equality, and need principles suggest that situational and social factors will influence the allocation or justice norms utilized. As Leventhal (1976) suggested, "Prevailing rules and practices may encourage the allocator to follow certain norms and ignore others" (p. 95). Thus, different allocation or justice norms may be more appropriate in some situations than in other situations (e.g., equity norm in social relations with weak social ties and the equality norm in social relations with strong social ties).

Clark and Mills' (1979) theory of communal and exchange relationships--stimulated by Goffman's (1961, p. 275) differentiation between social and economic relationships--also explores how interpersonal relations moderate interpersonal behavior. According to Clark and Mills (1979), in an exchange relationship members assume that an individual who receives a benefit from another individual accepts a debt or obligation to repay the individual. "A benefit can be anything a person can

choose to give to another person that is of use to the person receiving it" (Clark &

Mills, 1979, p. 12). In a communal relationship, each individual is concerned with the

welfare of the other and observes the "norm of mutual responsiveness" (Pruitt, 1972).

"In a communal relationship, the receipt of a benefit does not create a specific debt or

obligation to return a comparable benefit" (Clark & Mills, 1979, p. 13). In addition,

"when a communal relationship does not yet exist but is desired, the receipt of a

benefit should have the same effect as when a communal relationship is assumed to

exist" (Clark & Mills, 1979, p. 13). These researchers conducted two experiments that

explored how exchange and communal relationships and the benefits received

influence interpersonal attraction. The results indicated that interpersonal attraction

decreased when an individual treated a communal relationship as an exchange

relationship (e.g., in a communal relationship it was inappropriate for a receiver of a

benefit to respond by giving a benefit). That is, counter-normative behavior resulted

in decreased attraction for the individual.

Other researchers have highlighted additional forces that may influence

individuals to act in their self-interest at the expense of fair or just resource

distribution. Mikula (1974) and Leventhal and Anderson (1970) speculated that if

resource allocation is conducted by only one individual in a group, then motives such

as self-interest may influence the allocation decisions. Others have speculated the

existence of a self-maximizing justice motive (e.g., Walster, Berscheid, & Walster,

1973). Such self-interest motives may influence an individual to attempt to maximize

his or her own outcomes, even if it means distributing resources inequitably.

Tomblom (1977) speculated that people are motivated to avoid injustices to themselves more than to others. Lenski (1966) suggested that when individuals are forced "to choose between their own [interest], their group's interest, and the interests of others, they nearly always choose the former" (p. 30). Finally, Homans (1961) stated that individuals are likely to emphasize the worth of the characteristics and the behavior in which they are most outstanding. A variety of forces may be present in any given situation to influence individuals to act in their self-interest.

Experimental Research on Deservingness

Research in the domain of distributive justice has investigated how beliefs about deservingness effects resource distribution. These studies typically manipulate beliefs of deservingness by varying either the amount of time various group members work at a task or the amount of money an individual initially receives (e.g., Pepitone, 1971; Lane & Messé, 1971; Wilke et al., 1986). Individuals who work longer at a task or initially receive more money purportedly believe they deserve more of the resource than those who work less or initially receive less money. Typically, the dependent variable is how an individual distributes a resource (e.g., money) between him or herself and another individual.

Pepitone (1971) investigated how resources are distributed among group members when one member of a dyad believes s/he deserves to obtain the resource (i.e., asymmetric beliefs of deservingness existed within the group). One member of a dyad initially received a payment of money either as a reward for success at a task (i.e., the merit condition) or due to random chance (i.e., the arbitrary condition). On each of 50

trials, subjects were presented with various distributions of money to self and another individual. Subjects then selected the distributions that were most preferable to them. Thus, within the merit and the arbitrary conditions, for each dyad one subject was rewarded and the other subject was not rewarded. The results indicated that the rewarded subjects distributed more resources to themselves than did the non-rewarded subjects in the merit condition. In contrast, non-rewarded subjects distributed more resources to themselves than did the rewarded subjects in the random change condition. The results illustrate how different conditions influence the way in which individuals distribute resources and attempt to achieve equitable outcomes.

Lane and Messé (1971) investigated how resources are distributed as a function of the amount of time individuals work at a task and the available monetary resources to pay the individuals for their work. Seventy-nine male undergraduate students worked on a task for either 90 minutes (high-input condition), 30 minutes (low-input condition), or 30 minutes in which subjects were told that they were expected to perform poorly (explicit low input condition). After working on the task for the allotted time, subjects were given money to distribute between themselves and one co-worker. The money served as payment for working on the task. A pretest determined the amount of pay introductory psychology students considered fair for the type of work performed in the study (i.e., the standard of fair pay). The results indicated that when the amount of money available for distribution was congruent with the subject's standard of fair pay, subjects with co-workers who worked an equal amount of time at the task divided the money equally between themselves and the

co-worker. In contrast, when the amount of money available was either substantially more or substantially less than the subject's standard of fair pay, subjects allocated more money to themselves. That is, when there was a sufficient amount of money to pay both workers, subjects distributed the money equally. But when there was either an insufficient amount of money or too much money to pay both workers, subjects took more money for themselves. The results suggest that several factors influence resource distribution, including internal standards (e.g., norms) of justice, comparisons with others (i.e., time inputs), and circumstances external to the group (i.e., the resource supply). Whereas the dictates of the principle of equity were clear when the individuals had equal inputs and the resource supply was congruent with the individuals' internal standard of fair pay, when the resource supply was not congruent with the internal standards it is possible that subjects simply did not have a relevant norm or principle to guide their distribution. If so, then under such conditions self-interest appears to be employed. In addition, the findings suggest that when the supply of a resource is insufficient to meet demand (e.g., if own beliefs of deserving for a resource are high), individuals act in their self-interest.

Other researchers have explored how beliefs concerning group members' need for a resource, as opposed to an individual's own need, effects resource distribution. Karuza and Leventhal (1976) investigated the effect of need of another person on allocation decisions. Subjects allocated food to hypothetical children who had either low need or high need for food. The results showed that subjects gave more food to children with high need than to children with low need. Leventhal and Weiss (1975)

explored how the need of a co-worker influenced the distribution of monetary payments for work performed. Subjects were paired with a bogus co-worker and worked on a task. The money the subjects earned was shared by both individuals. Upon completion of the task, subjects were presented with feedback indicating that they and their co-worker had performed similarly on the task. Additional information indicated that the bogus co-worker had either low need or high need for the money. Subjects then distributed the money between themselves and their co-worker. The results showed that subjects distributed more money to co-workers with high need than to co-workers with low need for the money. Although the studies investigating need did not manipulate subjects own need for the resource, the findings suggest that under certain conditions, subjects may distribute more resources to another individual, even though it may not be equitable to do so.

Together, these studies raise a fascinating question regarding resource distribution: (a) are the equity and equality principles relevant to behavior in social dilemmas, and if so, (b) which principle will be used to distribute resources in a social dilemma when group members' deservingness for the resource is either symmetric or asymmetric and the social ties existing among group members are either strong or weak?

Social Ties and Social Dilemmas

The majority of social dilemma researchers assume that individuals are "rational" and as such attempt to realize the greatest outcome possible for themselves. Thus, most researchers assume that self-interest occurs at the individual level, as opposed to

the group level. For example, Coleman (1961) noted that "classic economic theory always assumed that the individual will act in his [or her] interest; but it never carefully examined the entity to which his [or her] refers...in many situations men [and women] act as if the his [or hers] refers to some entity larger than themselves. That is, they appear to act in terms, not of their own interest, but in the interests of a collectivity" (p. 24). Are individuals in groups with strong social ties or bonds more likely to act in the collective interest than in their own self-interest?

Brewer and Kramer (1986) suggest that individuals in groups with high social identity may act in the collective interest because they may assign "greater weight...to joint (collective) gains over individual gains alone...making it less likely that they will make sharp distinctions between their own and others' welfare" (p. 545) (see Brewer, 1979, 1981; Tajfel & Turner, 1986). Research tends to support this position. For example, field studies conducted by Levine and Campbell (1972) and Brewer and Campbell (1976), and Brewer's (1979) laboratory studies demonstrated that individuals who are part of a social group tend to perceive other group members in a generally favorable or positive light. Brewer and Silver (1978) found that individuals perceived other members of their group as more likely to possess traits such as trustworthiness, honesty, and cooperativeness.

Campbell (1958) proposed a second possible explanation for the group enhancing effects of social identity. He suggested that collectively interested behavior may be a consequence of cognitions associated with unit formation, as opposed to evaluative biases and expectations of behavior associated with ingroup favoritism. Research by

Brewer (1979) lends support to this speculation. Brewer (1979) found that when individuals are part of a "common social boundary," the social distance among group members is reduced and they are less likely to make sharp distinctions between their own welfare and others' welfare. As such, an individual may assign equal weight to his or her own outcome and to his or her fellow group members' outcomes. In addition, being identified as part of a social category may function as a "rule for defining the boundaries of low risk interpersonal trust [e.g., depersonalized trust] that bypasses the need for personal knowledge and the costs of negotiating reciprocity with individual others" (Brewer, 1981, p. 356). One consequence of depersonalized trust may be that individuals are more likely to act in the collective interest because they believe other group members will reciprocate with cooperative behavior (see Messick, Wilke, Brewer, Kramer, & Zemke, & Lui, 1983).

Experimental Research on Social Identity

Social dilemma researchers exploring the effects of social ties on cooperation have typically done so by manipulating social identity. The social identity manipulations usually involve varying whether or not an individual identifies with a social category, such as a college or club. Although only a handful of studies have been conducted, they tend to show that individuals who identify with their group are more likely to act in the collective interest. Kramer and Brewer (1984) performed a series of three experiments to investigate the effects of social identity on collectively interested behavior in a social dilemma. Social identity was manipulated with commonplace social categories such as age, association with an institution, and

common fate of the group members. In all experiments, subjects participated in a simulation of a commons dilemma in which all decisions were anonymous. Subjects were told that their goal in the task was to withdraw as many points as possible from a resource pool in such a way that the resource would last as long as possible. The initial size of the resource pool was 300 points and the pool size could not exceed 300 points. The pool was regenerated at the end of each trial by multiplying the number of points remaining in the pool by 1.1. Each subject could withdraw between 0-10 points on each trial. The results of these experiments tended to indicate that individuals acted in the collective interest under conditions of high social identity more than under conditions of low social identity, even when the size of the resource pool decreased. Kramer and Brewer concluded that high social identity increases cooperative behavior when the supply of a shared resource is insufficient to meet demand. Note that scarcity was created in this paradigm by manipulating the resource supply, not demand for the resource. As was suggested earlier, it is not clear whether the effects of resource scarcity on collectively interested behavior are the same when the cause of scarcity is due to a decrease in supply or an increase in demand.

Brewer and Kramer (1986) investigated how social identity, group size, and framing of a social dilemma affect collectively interested behavior. Subjects in either eight or 32-person groups participated in either a public goods task in which they made investments in order to provide a resource or a commons dilemma task in which they withdrew points from a resource supply that was shared by all members. Social identity was manipulated by varying the common fate of the group members. The

task was similar to the one used by Kramer and Brewer (1984), although the initial pool size varied as a function of group size. The results showed that subjects participating in the commons dilemma task were more cooperative than those participating in the public goods task. Social identity influenced behavior when the resource became depleted for subjects in the large group conditions. Specifically, compared to subjects in the low social identity condition, subjects participating in the commons dilemma acted in the collective interest more when they were in the high social identity condition. In contrast, subjects participating in the public goods task and small group condition acted in the collective interest when they were high and low in social identity.

Fewer researchers investigating how social ties affect cooperation in a social dilemma have done so by manipulating group cohesion (for a review of research investigating cohesion on behavior in the prisoner's dilemma, see Pruitt and Kimmel, 1977). Group cohesion may be defined as "the resultant of all the forces acting on the members to remain in the group" (Cartwright & Zander, 1960, p. 74). "Thus, the members of a highly cohesive group, in contrast to one with a low level of cohesiveness, are more concerned with their membership and are therefore more strongly motivated to contribute to the group's welfare, to advance its objectives, and to participate in its activities. Cohesiveness contributes to a group's potency and vitality" (Cartwright, 1968, p. 91).

While similarities exist between social identity and group cohesion, there clearly are differences. For example, social identity may be considered as mainly a cognitive

phenomenon. For social identity to exist, there need not been any interaction between members of the "group." Indeed, "group members" need not see the others or expect future interpersonal interaction. The perception that an individual is part of a social category is the sufficient condition for social identity. In contrast, group cohesion contains more of an affective component than social identity and usually involves social interaction among group members, in addition to numerous other components that may stem from interaction (e.g., success/failure on a task, interpersonal attraction, etc.). Such differences between social identity and group cohesion raise the possibility that the way in which social ties are operationalized in a social dilemma might effect cooperative behavior. For example, various norms might be more salient for members of cohesive groups than for individuals who identify with a social category (e.g., Clark & Mills, 1979).

Studies investigating group cohesion in social dilemmas and in the prisoner's dilemma do not provide a definitive answer regarding the effect of cohesion on cooperation. As discussed below, many of these studies suffer from methodological problems that confound the cohesion manipulation with other powerful factors. Baird (1982) explored how group cohesion and previous experiences in which individuals shared a resource affects cooperation in a commons dilemma. Cohesion was manipulated by using Back's (1951) technique in which subjects are provided with bogus test results that indicate group members are either very similar and congenial or are not similar and scored very differently on most items. Prior sharing was manipulated by having subjects work alone on a crossword puzzle. In the prior

sharing condition, a monetary reward for the number of correct words was determined by averaging words across group members, whereas in the no prior sharing condition the reward was determined by an individual's own performance. The commons task was a modified version of Edney and Harper's (1978) game in which three-person groups withdrew quarters from a bowl of quarters that was replenished at the end of each trial by a factor of two. The results indicated that the manipulation check for cohesion was not significant. Thus, there was no main effect for cohesion on withdrawals from the commons. The main effect for prior sharing was significant. Those in the prior sharing condition were more cooperative than those in the no prior sharing condition. Since the cohesion manipulation was not successful, the role of cohesion on behavior in a commons dilemma is unclear.

Oskamp and Perlman (1966) explored the effects of friendship on cooperation in the prisoner's dilemma. They predicted higher levels of cooperation in strong friendships than in weak friendships. A questionnaire that was designed to identify an individual's best friend, acquaintances, and individuals who were disliked was administered to introductory psychology classes at two colleges. Based on responses to the questionnaire, two person groups were formed. Unfortunately, the experimenters took "care...to insure that [subjects] saw each other clearly before entering the experimental room" (p. 223). This procedure may have confounded the type of relationship with identifiability. Identifiability has been found to increase cooperative behavior in a variety of contexts, including the prisoner's dilemma (Bixtentine, Levitt, & Wilson, 1966; Jerdee & Rosen, 1974; Fox & Guyer, 1978).

Subjects were then separated and no communication was allowed. Subjects

participated in a multi-trial prisoner's dilemma. Veridical feedback was presented.

The results indicated that there was no main effect for friendship on cooperation.

Additional analyses revealed that friends selected from Pomona College, but not from

Claremont Mens College, were more cooperative than acquaintances, disliked

individuals, and a fourth condition in which subjects did not know the individual.

Although the Pomona students were more cooperative, it is not clear whether these

effects were due to the strong social ties or to identifiability.

Swingle and Gillis (1968) explored the effects of emotional relationships on

behavior in the prisoner's dilemma. Using a procedure that was similar to Oskamp

and Perlman's, Swingle and Gillis had male junior high school students indicate three

individuals whom they liked the most and whom they liked the least. Unfortunately,

like Oskamp and Perlman, these researchers may have confounded type of relationship

with identifiability. Although confidentiality of choices was stressed and subjects were

not allowed to communicate, subjects were told that their partner was informed of

their identity. Subjects participated in a 100 trial prisoner's dilemma in which false

feedback indicated the partner was making either 95% cooperative or 95% competitive

choices for the first 50 trials and then switched to the other strategy for the last 50

trials. The results indicated that the partners who liked each other were generally

more cooperative than those who disliked each other. In addition, individuals who

liked their partner were more likely to match the behavior of their partner than those

who did not like their partner. These researchers concluded that under certain

conditions, cooperation in friendly dyads may not be stable. The evidence indicating the group cohesion and positive affective ties influence cooperative behavior in the social dilemma and the prisoner's dilemma is not conclusive.

Hypotheses

The present study explores how an individual's beliefs that s/he deserves to obtain a shared resource, an individual's perception that a fellow group member deserves to obtain a shared resource, and the social ties existing among the group members affect cooperative behavior in a social dilemma. There are three predictions stemming from previous research that do not directly bear on the main focus of the present study. It was predicted that there would be a main effect for beliefs of own deservingness, beliefs of partner deservingness, and group cohesion. First, individuals who believe they deserve more of the resource should take more of the resource than those who are low in own beliefs of deserving. Second, individuals who believe their partner deserves more of the resource should take less of the resource than those who believe their partner is low in deserving for the resource. Third, individuals in cohesive groups should take less of the resource than those in less cohesive groups.

It was also expected that the composition of the group with regard to an individual's beliefs of own deservingness and an individuals beliefs of his or her partner's deservingness would interact to influence cooperation. This expectation is in a vein similar to Kelley and Stahelski's (1970) findings (presented earlier) regarding group composition and social motives. However, specific predictions are not advanced regarding the nature of this interaction. It is not clear whether individuals will

withdraw resources in a similar manner when symmetry exists between group members--both group members have either high or low in beliefs of deserving. However, when asymmetry exists, it is expected that individuals with high beliefs of deservingness who believe their partner is low in deserving should take more of the resource than individuals with low beliefs of deservingness who believe their partner is high in deserving.

Finally, it was predicted that an individual's beliefs of own deserving, an individual's perception of his or her partner's deserving for the resource, and the social ties among group members would affect jointly interested behavior. The following predictions are based on the equity and equality principles. In cohesive groups, individuals should be less concerned about achieving equitable outcomes and should take similar amounts of the resource, regardless of their own or their partners deserving. In contrast, in low cohesive groups individuals should act to achieve equitable outcomes for all group members. Individuals who believe they deserve to obtain the resource should take more of the resource when their partner is low in deserving than when their partner is high in deserving. In contrast, individuals who believe they are low in deserving should take less of the resource when their partner is high in deserving than low in deserving.

CHAPTER II

METHOD

Design

The design was a four-way (2 x 2 x 2 x 8) mixed analysis of variance (ANOVA) with repeated measures on the last factor. The variables were group cohesion (high, low), beliefs of own deserving (high, low), beliefs of other's deserving (high, low), and trials. The dependent variable was the number of acres of lumber harvested by each subject.

Subjects

Subjects were 151 (48 male, 96 female, 7 unknown) psychology students at Michigan State University. Of these, 91 (31 male, 58 female, 2 unknown) were from introductory psychology courses, and 60 (17 male, 38 female, 5 unknown) were from an introductory statistics course that was taught by the author. Slightly different procedures were used to recruit subjects from the two courses. Students in both courses were told that the session would last for 1 1/2 hours. Students in the introductory psychology course were told they would receive two 1/2 hour credits plus have an opportunity to earn money for the additional 30 minutes. In contrast, students in the introductory statistics course were told they would receive three credits for their participation and that they would have an opportunity to earn money. However, the statistics students were not told that each credit represented 30 minutes. This is relevant because the instructions in the study were designed for the two credit plus

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money scenario. Thus, subjects recruited from the introductory statistics course for three credits who were expecting three credits heard the pre-recorded instructions indicate they would receive two credits. Of course, all introductory statistics students received three credits for their participation.

Experimental Task

The experimental task was a multi-trial two-person take-some social dilemma (Orbell & Dawes, 1981). A take-some game is an experimental game used to study the conflict between individual and collective interests. In a take-some game, group members acting in their self-interest receive larger outcomes than those acting in the collective interest, but all group members receive larger outcomes if all act in the collective interest. In addition, all group members are penalized (e.g., fined) if one or more individuals acts in his or her self-interest.

The take-some game was simulated with a paradigm in which group members share access to a 200 acre forest (cf. Sattler & Kerr, in press). On each of a series of trials, group members decide how many acres of lumber to harvest (i.e., withdraw) for private use (i.e., the acres an individual group member harvests are not shared with the other group member). Each member could withdrawal between 20 and 100 acres. The goal of each subject was to make withdrawals in such a way to acquire the largest personal outcome possible.

The conflict between individual and collective interest was achieved through a fine system that penalized overzealous harvesting. The fine was based on the total number of acres harvested by both group members. The function of the fine was

linear and the fine increased as the total number of acres harvested increased. For example, no fine would be imposed if both members took 20 acres, whereas a fine of 200 acres would be imposed if the total taken by the group was 200 (the maximum withdrawal allowed). Group members equally shared responsibility for paying the fine. For example, if the fine was 60 acres, then each member would be fined half this amount.

Group member interdependence was stressed to illustrate that each group member's choices affected both his or her own outcome as well as the other group member's outcome. Trials were independent such that a withdrawal on one trial did not affect the size of the forest on subsequent trials (i.e., the number of acres in the forest was constant across trials). Trial independence minimizes concern with short-term and long-term consequences of withdrawal decisions (i.e., a temporal trap (see Messick & McClelland, 1983)). There were eight no feedback trials. Subjects did not receive information regarding the partner's harvests, his or her own fine, the partner's fine, or the group outcome. Subjects were told that there would be between five to 10 trials.

Procedure

Subjects were randomly assigned to condition. Subjects were never referred to by name and personal identities were not revealed. Rather, subjects were referred to only by color code. These procedures attempted to increase feelings of anonymity, for identifiability has been found to influence an individual's decisions in group interdependence situations (see Bixtentine et al., 1966; Jerdee & Rosen, 1974; Fox &

Guyer, 1978). Each subject was asked to give his or her written consent to participate

in the study. A copy of the consent form is presented in Appendix A.

The manipulation of beliefs of own deserving occurred during the first part of the

session. Four subjects were run in each session, and for each session two of the

subjects were scheduled to arrive 30 minutes earlier than the other two subjects. On

arrival at the lab, subjects were placed in individual rooms and told that the study

would be conducted in several parts. Subjects were reminded that the length of the

experiment was 1 1/2 hours but that they only received 1 hour of credit. Subjects

were also told that they would have the opportunity to earn money in one of the tasks.

The money they earned in the task would be the way in which they would be

compensated for the 1/2 hour for which they were not going to receive class credit.

The first two subjects to arrive were then told that the first part of the session involved

completing a battery of questionnaires. The questionnaires contained open-ended

questions dealing with issues facing Michigan State University students (cf. Lane &

Messé, 1971)). Subjects had 30 minutes to work on the questionnaires. The

questionnaire is presented in Appendix A.

At the end of the 30 minute period, the questionnaires were collected and the

second pair of subjects scheduled to arrive late were escorted into individual rooms in

the lab. With all four subjects now present, the subjects were told that four people

were participating in the session and that the two people who just arrived would

participate in the session for only 1 hour. The instructions stressed that two people

already had been working for 1/2 hour on a task and did not receive credit for

participating so far, but would be compensated for the 1/2 hour by earning money in one of the tasks. However, all subjects were told that everyone had the opportunity to earn money in one of the tasks.

Group cohesion was then manipulated. Subjects were told that the next part of the session involved working on a winter survival problem. While the subjects were in their individual rooms, tape recorded instructions described a winter survival problem that required participants to imagine that everyone in the session was in a light plane that crash-landed in the woods of northern Minnesota in mid-January (Johnson & Johnson, 1975). The plane crash scenario indicated that 12 items were salvaged from the plane (e.g., gun, extra clothing, newspaper, compass, candy bars). Each of the 12 items were shown on a poster in each subject's room. Subjects were then told that they should think about how they would rank order the items in terms of their importance for survival for two minutes, and to indicate their ranking on a form titled "Initial Ranking Form." The Initial Ranking Form is presented in Appendix A. After the Initial Ranking Form was completed, all subjects were asked to assemble their chairs in a circle. Subjects in the low cohesion condition once again were asked to think about the best way to rank the 12 items in terms of importance for survival for the next five minutes and were instructed not to talk with any of the other participants. In contrast, those in the high cohesion condition were instructed to discuss with the other group members the best way to rank the items in order of importance for survival for the next five minutes. After the five minute period, subjects returned to their rooms. All subjects then individually re-ranked the items

and indicated their ranking on a form titled "Final Ranking Form." The Final Ranking

Form is presented in Appendix A. Subjects were told that their final ranking solution

would be compared to the solutions made by experts and participants who worked on

the winter survival problem a previous term. In addition, subjects in the high cohesion

condition were told that their ranking solution would be averaged with the solutions of

the other group members to form a group solution. After a two minute period

allegedly to score the solutions, subjects in the high cohesion condition were told that

their group solution was better than 82% of the groups run the prior term, and those in

the low cohesion condition were told that their own individual solution was better than

82% of those from the prior term.

A questionnaire titled "Winter Survival Questionnaire" that was designed to

assess the effectiveness of the group cohesion manipulation was then administered.

The instructions stressed that all responses on the questionnaire would be anonymous

and would not be shared with anyone. Items were answered on 7-point scales. The

questions included evaluation ratings of the other participants and how much they

liked being part of the group (cf. Gaertner, Mann, Murrell, & Dovidio, 1989). The

Winter Survival Questionnaire is presented in Appendix A.

The tape recorded instructions then indicated that the next part of session was

ready to begin. For this part, two person groups would be formed. Subjects were told

that for efficiency, there would be two separate two-person groups and that the two

groups would not be competing against one another. Subjects were randomly assigned

to a group, and subjects would not know which room their fellow group member

occupied.

Subjects then were made aware of their partner's deserving. Subjects were given a sheet of paper indicating whether or not their partner worked on the questionnaire task at the beginning of the session. This sheet is presented in Appendix A. It was stressed that those who were present for the first 1/2 hour of the session did not receive credit for that time. Further, although everyone would have the opportunity to earn money in one of the tasks, those individuals who worked on the questionnaire task during the first 1/2 hour would be compensated for their time through money they may earn during the next task.

Subjects were then told that the instructions to the next task would be presented. The harvesting task was then described. To familiarize subjects with the task, four screens on the video monitors in each room presented sample harvests and outcomes. Each example screen presented example harvests, example fines, and example outcomes for both group members. The examples summarized the outcomes that could result when group members made self-interested and collectively-interested choices. For example, one example screen indicated that if both group members made large harvests, then the fine would be severe and both individuals would receive very small outcomes. Another screen indicated that if both members made small harvests, then the fine would be minimal and both would receive moderate outcomes. The third and fourth example screens indicated that if one group member made a large harvest and the other member made a small harvest, then the fine would be moderate and the individual making the large harvest would receive a moderate outcome but the

individual making the small harvest would receive very small outcomes.

Subjects were told that could earn money in the task in addition to two 1/2 hour experimental credits they would receive for their participation in the session. The amount of money each subject could earn was determined by the total number of acres each individual harvested from the forest and the fine imposed on the group's harvest. Subjects would receive one penny for each acre of lumber s/he accumulated. The instructions again stressed that although everyone had the opportunity to earn money in the harvesting task, the money earned would serve as compensation for those who completed the questionnaires at the beginning of the session.

The eight harvest trials then began. No feedback was presented concerning the final number of acres either subject received or the amount of the fine imposed. At end of the eight trial sequence, subjects completed a questionnaire. The questionnaire included items that checked (a) the manipulation of the own beliefs of deserving and beliefs of partner deserving factors, (b) subject suspiciousness about any of the experimental procedures, and (c) asked subjects to provide impressions of their partner on a variety of evaluation items. The questionnaire is presented in Appendix A. After completing the questionnaire, subjects were debriefed, received any money they earned, thanked for participating, and excused. The experimental instructions are presented in Appendix B.

CHAPTER III

RESULTS

Manipulation Checks

Group Cohesion. The responses on the six-item questionnaire that was designed to measure the effectiveness of the group cohesion manipulation were evaluated by a principle components factor analysis with varimax rotation. The results showed that one principle factor was present. Table 1 shows the factor loading for each of the six items. The loadings for the first four items ranged between .84 and .90. Item six also had a high loading of .63, and item five had the lowest loading of -.36.

The five items with the highest factor loadings were then used to create a factor to evaluate the effectiveness of the cohesion manipulation. Each item was weighted by multiplying the subject rating by the item's factor loading. The fifth item on the questionnaire was not included because it had a loading less than .40. The cohesion manipulation was evaluated in relationship to the subjects' class (introductory psychology, statistics) and sex (male, female). Ideally, these two variables should be included in one analysis (ANOVA design). However, because of the small cell size for some of the variables, separate ANOVAs were performed. The first ANOVA examined the subjects' class. The design was a 2 x 2 x 2 x 2 between-subjects ANOVA. The independent variables were group cohesion (high, low), beliefs of own deserving (high, low), beliefs of partner deserving (high, low), and class (introductory psychology, statistics). The dependent variable was the five item factor. There was

only a significant main effect for cohesion, $F(1, 135) = 22.57$, $p < .0001$. The second

ANOVA examined the subjects' sex. The design was a 2 x 2 x 2 x 2

between-subjects ANOVA. The independent variables were group cohesion (high,

low), beliefs of own deserving (high, low), beliefs of partner deserving (high,

Table 1

Factor Loadings on Questionnaire Designed

to Measure Group Cohesion

Item	Loading
"To what extent would you like to meet with these same people again?"	.84
"How much did you enjoy being in a group with these people?"	.88
"How much do you like the people in the group?"	.90
"How much would you like to participate in another experiment with the same people in the group?"	.86
"How much would you like to be in a different group in today's session?"	-.36
"How much do you feel as though you are a member of a group?"	.63

low) and sex (male, female). The dependent variable was the five item factor. There

was only a significant main effect for cohesion, $F(1, 135) = 31.87$, $p < .0001$.

Another between-subjects ANOVA was used to evaluate the cohesion manipulation without regard to subjects' class or sex. The design was a 2 x 2 x 2 ANOVA. The independent variables were group cohesion (high, low), beliefs of own deserving (high, low), and beliefs of partner deserving (high, low). There was only a significant main effect for group cohesion, $F(1,149) = 37.71$, $p < .0001$. Subjects in the high cohesion condition ($M = 4.02$) were more favorable toward their group than those in the low cohesion condition ($M = 3.20$).

Ratings on the five individual questionnaire items were also evaluated in relationship to cohesion, beliefs of own deserving, and beliefs of other's deserving. Five separate 2 x 2 x 2 between-subjects ANOVAs were performed. For each of the five ANOVAs there was only a significant main effect for cohesion, such that subjects in the high cohesion condition gave more favorable ratings than subjects in the low cohesion condition. The ANOVA means and results for each item are summarized in Appendix C. The ANOVA results indicate that the group cohesion manipulation was successful.

Beliefs of Own Deserving. The belief of own deserving manipulation was evaluated with two questions that were presented on the post-experimental questionnaire. The first question was, "How much time have you been in the lab today?" Since own deserving was manipulated in part by varying the amount of time the subject was in the session, it was important to assess whether subjects were cognizant of the amount of time they spent in the lab. Unfortunately, this question

was added to the questionnaire only after two-thirds of the subjects had participated in the study. Forty-nine subjects responded to this question. Ideally, this question should be evaluated in relationship to subjects' class. However, because of the small cell size for some of the variables, such an analysis could not be performed. The question was evaluated in relationship to cohesion, belief of own deserving, and belief of other's deserving. The design was a 2 x 2 x 2 between-subjects ANOVA. There was a significant main effect for own belief of deserving, $F(1, 41) = 183.70$, $p < .0001$. Subjects in the high own deserving condition who participated in the session for 90 minutes indicated they were in the lab longer ($M = 88$ min) than did those participating for 60 minutes in the low own deserving condition ($M = 54$ min).

The second question was, "How much money do you think would be fair for you to receive for participating in the study?" This item was evaluated in relationship to the subjects' class. The design was a 2 x 2 x 2 x 2 between-subjects ANOVA. The independent variables were group cohesion (high, low), belief of own deserving (high, low), beliefs of partner deserving (high, low), and class (introductory psychology, statistics). The class main effect and the belief of own deserving x class interaction were not significant. Another ANOVA was used to evaluate this question without regard to class. The design was a 2 x 2 x 2 between-subjects ANOVA. The independent variables were group cohesion (high, low), beliefs of own deserving (high, low), and beliefs of partner deserving (high, low). There was a significant main effect for belief of own deserving, $F(1, 143) = 10.76$, $p < .001$. Subjects in the high own deserving condition indicated a higher amount of money would be fair compensation

($\underline{M}$ = \$4.46) than those in the low own deserving conditions ($\underline{M}$ = \$3.03). The

ANOVA results indicate that the belief of own deserving manipulation was successful.

Beliefs of Other's Deserving. The manipulation for beliefs of other's deserving

was evaluated with two questions that were presented on the post-experimental

questionnaire. Each question was evaluated in relationship to cohesion, beliefs of own

deserving, and beliefs of other's deserving. The first question was, "How much time

has your partner been in the lab today?" Since other's deserving was manipulated in

part by varying the amount of time the subjects were told their partner was in the

session, it was important to assess whether subjects were cognizant of the amount of

time their partner spent in the lab. Unfortunately, this question was added to the

questionnaire only after two-thirds of the subjects had participated in the study.

Forty-nine subjects responded to this question. Ideally, this question should be

evaluated in relationship to subjects' class. However, because of the small cell size

for some of the variables, such an analysis could not be performed. The question was

evaluated in relationship to cohesion, belief of own deserving, and belief of other's

deserving. There was a significant main effect for belief of other's deserving, $\underline{F}(1, 41)$

= 141.37, $\underline{p}$ < .0001. Subjects in the high partner deserving condition indicated that

their partner had been in the lab longer ($\underline{M}$ = 87 min) than those in the low partner

deserving condition ($\underline{M}$ = 54 min).

The second question was, "How much money do you think would be fair for

your partner to receive for participating in the study?" This item was evaluated in

relationship to the subjects' class. The design was a 2 x 2 x 2 x 2 between-subjects

ANOVA. The independent variables were group cohesion (high, low), belief of own

deserving (high, low), beliefs of partner deserving (high, low), and class (introductory

psychology, statistics). The belief of other's deserving x class interaction was

significant, $F(1, 135) = 7.41$, $p < .01$. The means underlying this interaction are

presented in Table 2. Post hoc contrasts (Winer, 1971) showed that subjects from the

introductory psychology class believed high deserving partners deserved more money

than low deserving partners, $F(1, 135) = 7.79$, $p < .01$, but there was no significant

difference for partner deserving, $F(1, 135) = 2.22$, $p > .10$.

Table 2

ANOVA Means (M) and Standard Deviations (SD) for Partner Deserving

x Class Interaction on Partner Deserving Manipulation Check

| Partner Deserving | Class | | | | | |
| | Introductory Psychology | | | Introductory Statistics | | |
	N	M	SD	N	M	SD
High	45	472.53¢	264.87	18	294.44¢	175.64
Low	46	312.22¢	259.43	42	409.02¢	318.15

This interaction suggests that the belief of partner deserving manipulation was not

as effective for students from the introductory statistics class as for students from the

introductory psychology class. This finding may be due to the slightly different

procedures that were used to recruit subjects from the two courses. Although students

in both courses knew that the session would last one and one half hours, students in the introductory psychology course were told they would receive two half hour credits plus the opportunity to earn money for the additional 30 minutes. In contrast, students in the introductory statistics course were told they would receive three credits for their participation in the session and have the opportunity to earn money, but were not told that each credit represented 30 minutes. Since the pre-recorded instructions presented during the session were designed for the introductory psychology students and indicated that all subjects would receive two credits for their participation, it is possible that for the introductory statistics students expecting three credits, these instructions may have in some way altered their perception of partner deserving. For example, the introductory statistics students may have been more concerned about receiving proper credit and this distraction may have caused these subjects to focus more on their own situation. Thus, there is not conclusive evidence that the manipulation of other's deserving was effective.

Check for Sample Differences and Sex Differences on Harvest Trials

A preliminary analysis was conducted to determine whether the class from which students where drawn interacted with group cohesion, belief of own deserving, and belief of other's deserving on the harvesting trials. A 2 x 2 x 2 x 2 x 8 mixed ANOVA with repeated measures on the last factor were performed on the eight harvest trials. There were no significant main or interaction effects involving class in either the between-subjects or repeated measures portions of the analysis. Since there was no evidence that the class from which subjects were drawn qualified any of the

effects on the harvesting trials, class was not included in subsequent analyses involving the harvesting dependent variable.

The next analysis was conducted to determine whether subjects' sex interacted with group cohesion, belief of own deserving, and belief of other's deserving on the harvesting trials. A 2 x 2 x 2 x 2 x 8 mixed ANOVA with repeated measures on the last factor were performed on the eight harvest trials. There were no significant main or interaction effects involving sex in either the between-subjects or repeated measures portions of the analysis. Since there was no evidence that sex qualified any of the effects on the harvesting trials, sex was not included in subsequent analyses involving the harvesting dependent variable.

Harvesting Behavior

The hypotheses concerning subjects' harvesting behavior were evaluated in a 2 x 2 x 2 x 8 mixed ANOVA with repeated measures on the last factor.[2] The independent variables were group cohesion (high, low), beliefs of own deserving (high, low), beliefs of partner deserving (high, low), and trials. Based on the equity principle, it was expected that there would be a main effect for beliefs of own deserving and for beliefs of other's deserving. However, the main effect for beliefs of own deserving was not significant, $F(1, 143) = 1.06$, p = ns. Individuals who believed they deserved to obtain the resource did not take more than those low in beliefs of own deserving. In addition, the main effect for beliefs of other's deserving was not significant, $F(1, 143) = .40$, p = ns. Individuals who believed their partner deserved more of the resource did not take less of the resource than whose who believed their partner was

low in deserving.

It was also expected that there would be a main effect for group cohesion. However, the main effect for cohesion was not significant, $F(1, 143) = .95$, $p = $ ns. Subjects in cohesive groups did not take less of the resource than those in low cohesive groups. An additional analysis was performed to further explore the non-significant group cohesion main effect. A one-way ANOVA was performed on the group cohesion variable for subjects in the low beliefs of own deserving and low beliefs of partner's deserving conditions, where the direct effect of cohesion, uncomplicated by relative deserving considerations could be examined. The group cohesion main effect was not significant. Table 4 presents the summary table for the between-subjects portion of the ANOVA.

The next hypotheses focused on how group cohesion might moderate equity concerns. It was hypothesized that individuals in low cohesive groups would be more concerned about equitable outcomes than those in high cohesive groups. Thus, individuals in low cohesive group should be more influenced by their own deserving than those in high cohesive groups. This hypothesis was supported. The Cohesion x Own Deserving interaction was significant, $F(1, 143) = 5.63$, $p < .05$. The means underlying this interaction are shown in Table 3. Simple effects tests (Winer, 1971) indicated that in the low cohesion groups, high deserving subjects made larger harvests than low deserving subjects, $F(1, 143) = 5.59$, $p < .05$, but in the high cohesion groups subjects made similar harvests regardless of their own deserving, $F(1, 143) = 0.97$, $p = $ ns. Individuals in low cohesive groups appeared to be more concerned with equitable

outcomes than those in the cohesive groups.

Table 3

ANOVA Means and Standard Deviations for Cohesion

x Own Deserving Interaction on Harvest Trials

Cohesion		Own Deserving High				Low	
	N	M	SD	N	M	SD
High	40	52.98	16.61	36	56.74	16.42
Low	43	61.63	17.31	32	52.48	14.89

The corresponding hypothesis predicted that individuals in low cohesive group should be more influenced by their partner's deserving than those in high cohesive groups. However, the Cohesion x Partner Deserving interaction was not significant. As discussed earlier, the partner deserving manipulation check suggested that the manipulation may have been more effective for students selected from the introductory psychology courses than from the statistics course. Thus, an analysis was performed only with students from the introductory psychology course to determine whether this interaction was significant for this group. A 2 x 2 x 2 x 8 mixed ANOVA with repeated measures on the last factor was performed. The independent variables were group cohesion (high, low), beliefs of own deserving (high, low), beliefs of other's deserving (high, low), and trials. The Cohesion x Partner Deserving interaction was

Table 4

ANOVA: Cohesion x Own Deserving x Partner

Deserving on Harvest Trials: Between-Subject Factors

Source of Variation	df	Mean Square	F	sig. of F
Cohesion (C)	1	2089.14	.95	.331
Own Deserving (OD)	1	2327.231	.06	.305
Partner Deserving (PD)	1	874.05	.40	.529
C x OD	1	12396.7	5.63	.019
C x PD	1	1230.88	.56	.456
OD x PD	1	328.14	.15	.700
C x OD x PD	1	49.09	.02	.881
Error	143	2199.97		

Table 5

ANOVA: Cohesion x Own Deserving x Partner

Deserving x Trials: Effects of Repeated Measures

Source of Variation	df	Mean Square	F	sig. of F
Trials (T)	7	941.12	3.29	.002
Cohesion (C) x T	7	203.19	.71	.663
Own Deserving (OD) x T	7	105.11	.37	.921
Partner Deserving (PD) x T	7	381.89	1.34	.230
C x OD x T	7	478.46	1.67	.112
C x PD x T	7	544.09	1.90	.066
OD x PD x T	7	585.20	2.05	.047
C x OD x PD x T	7	182.84	.64	.724
Within Cells	1001	286.06		

not significant. Together, these analyses suggest that the manipulation for partner

deserving may have been too weak (as suggested by the manipulation check) and/or

individuals may be more concerned with their own deserving than other's deserving.

Although the Cohesion x Partner Deserving interaction was not significant, there were two unexpected 3-way interactions involving the partner deserving and trials factors in the analysis performed on all subjects. These interactions indicate that under some conditions individuals may be sensitive to other's deserving. The analysis revealed a marginally significant Cohesion x Partner Deserving x Trials interaction, $F(7, 1001) = 1.90$, $p = .066$, and a significant Own Deserving x Partner Deserving x Trials interaction, $F(7, 1001) = 2.05$, $p < .05$. Table 5 presents the summary table for the repeated measures portion of the ANOVA.

The next analyses were performed to explore the Cohesion x Partner Deserving x Trials interaction and the Own Deserving x Partner Deserving x Trials interaction that indicated under certain conditions individuals may be sensitive to others' deserving when making their harvesting decisions. It was first suspected that both interactions might be manifest in an early versus late trial pattern. Such a pattern might show subjects initially making smaller or larger withdrawals on later than earlier trials (e.g., making larger withdrawals because the trial sequence and the opportunity to harvest would be over soon vs. making smaller withdrawals because the desired harvest has been achieved). An analysis was performed on a block consisting of the first four trials and a block consisting of the last four trials. The design was a 2 x 2 x 2 x 2 mixed ANOVA with repeated measures on the last factor. The independent variables were group cohesion (high, low), own deserving (high, low), partner deserving (high, low), and trials. There were no significant interactions involving the trials factor. It was concluded that the two 3-way interactions were not due to an early versus late

trial effect.

It was also possible that the interactions were localized in an early versus middle versus late trial pattern. Such a pattern might show subjects making different harvests during the middle trials than the early or late trials. An analysis was performed on a block consisting of the first three, second three, and final two trials. The design was a 2 x 2 x 2 x 3 mixed ANOVA with repeated measures on the last factor. The independent variables were group cohesion (high, low), own deserving (high, low), partner deserving (high, low), and trials. There were no significant interactions involving the trials factor. It was concluded that the two 3-way interactions were not due to an early versus middle versus late trial effect.

The Cohesion x Partner Deserving x Trials interaction and the Own Deserving x Partner Deserving x Trials interaction were plotted across trials to assist in identifying the nature of the interactions. Visual inspection of the means underlying the Cohesion x Partner Deserving x Trials interaction presented in Figure 1 suggested a sawtooth alternation pattern on the first six trials for high cohesion subjects. High cohesion subjects with high deserving partners appeared to make smaller harvests on odd numbered trials than on even numbered trials. In contrast, high cohesion subjects with low deserving partners appeared to make smaller harvests on even numbered trials than on odd numbered trials. Low cohesion subjects did not appear to make alternating harvests. Visual inspection of the means underlying the Own

Figure 1
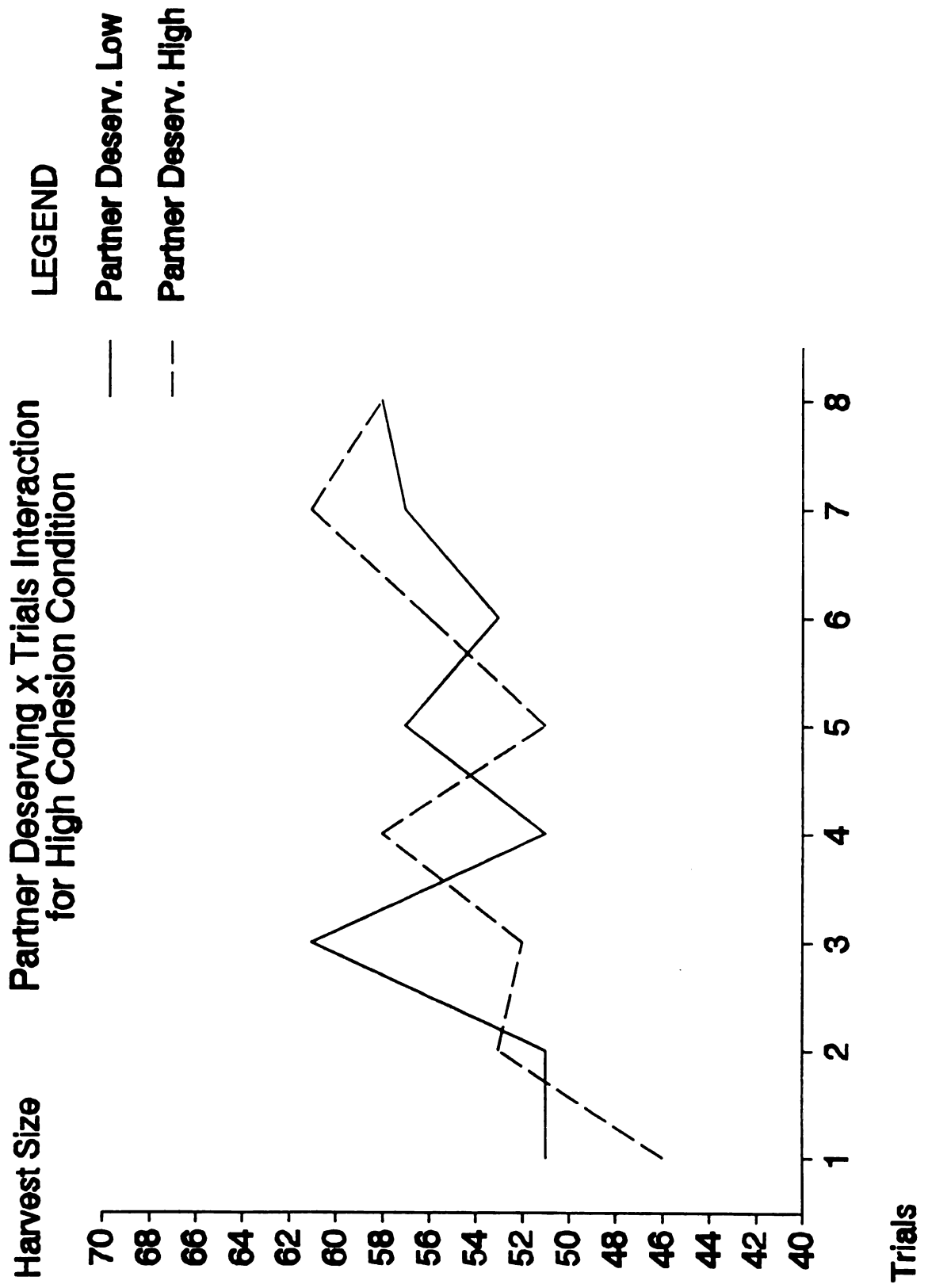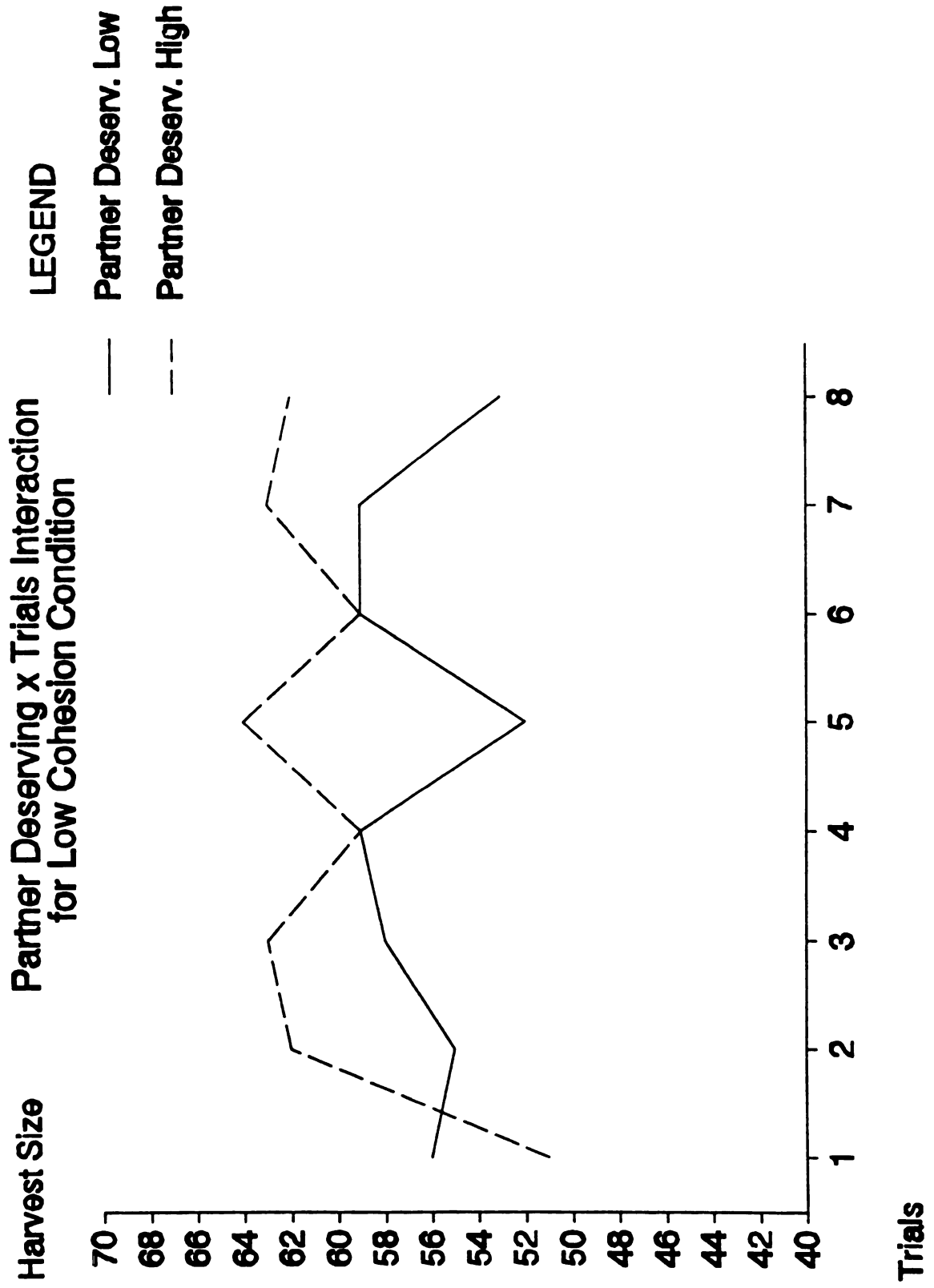
Partner Deserving x Trials Interaction
for High Cohesion Condition

Figure 1 (cont'd)

Partner Deserving x Trials Interaction for Low Cohesion Condition

Figure 2

Partner Deserving x Trials Interaction
for High Own Deserving Condition

Harvest Size

70
68
66
64
62
60
58
56
54
52
50
48
46
44
42
40

Trials

1 2 3 4 5 6 7 8

LEGEND

—— Partner Deserv. Low

— — Partner Deserv. High

Figure 2 (cont'd)

Partner Deserving x Trials Interaction
for Low Own Deserving Condition

Deserving x Partner Deserving x Trials interaction presented in Figure 2 also

suggested a sawtooth alternation pattern, but here it is for high own deserving subjects

on the first five trials. High own deserving subjects with high deserving partners

appeared to make smaller harvests on odd numbered trials than on even numbered

trials. In contrast, high deserving subjects with low deserving partners appeared to

make smaller harvests on even numbered trials than on odd numbered trials. Low

deserving subjects did not appear to make alternating harvests.

The next analyses were performed to determine if the two 3-way interactions
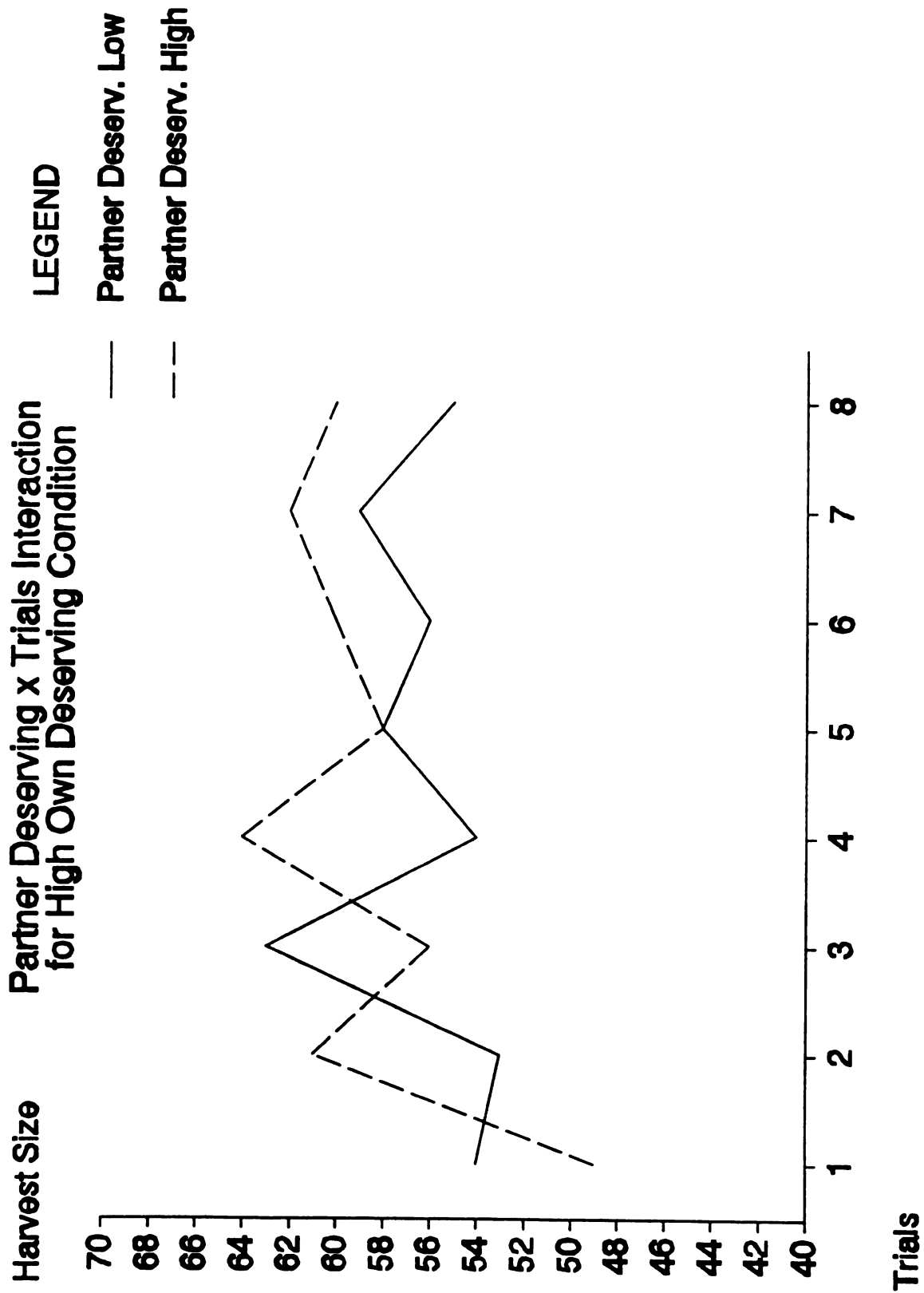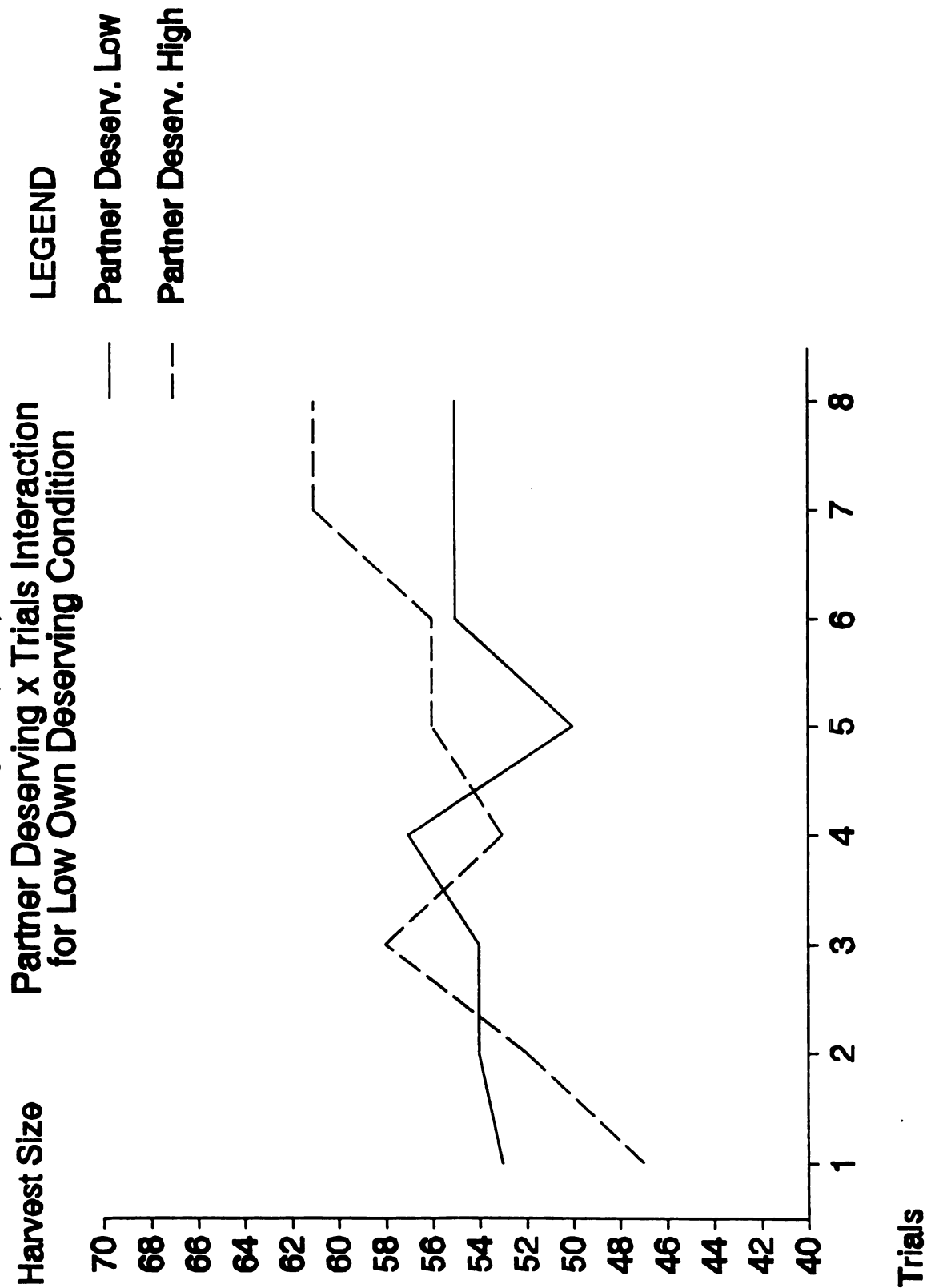
were manifest in an odd versus even trial alternation pattern. The first analysis was

performed on a block consisting of all odd numbered trials (trials 1, 3, 5, 7) and a

block consisting of all even numbered trials (trials 2, 4, 6, 8). The design was a 2 x 2

x 2 x 2 mixed ANOVA. The independent variables were cohesion (high, low), own

deserving (high, low), partner deserving (high, low), and trials. The Own Deserving x

Partner Deserving x Trials interaction was significant, $F(1, 143) = 6.71$, $p < .01$.

Simple interaction effects were calculated for high own deserving and low own

deserving conditions. There were no significant effects for the low own deserving

condition. In the high own deserving condition, the Partner Deserving x Trials

interaction was significant, $F(1, 81) = 10.44$, $p < .01$. The means underlying this

simple interaction are presented in Table 6. Further simple effects tests revealed that

when own deserving was high, subjects with partners high in deserving made smaller

harvests on odd trials than on even trials, $F(1, 81) = 5.11$, $p < .05.$, whereas subjects

with partners low in deserving made larger harvests on odd trials than on even trials,

$F(1, 81) = 4.98$, $p < .05$. The Cohesion x Partner Deserving x Trials interaction was not significant.

Table 6

Means and Standard Deviations for Partner Deserving x Trials

Simple Interaction for High Own Deserving Condition for Eight Trials

	Trial					
Partner Deserving	Odd			Even		
	N	M	SD	N	M	SD
High	34	56.41	18.59	34	61.04	20.48
Low	49	58.49	16.89	49	54.69	18.37

Although the Cohesion x Partner Deserving x Trials interaction was not significant in the odd versus even trial analysis for all eight trials, visual inspection of the interaction in Figure 1 suggested that both the interaction effects were localized in the first six trials. The next analysis was performed to determine if the Cohesion x Partner Deserving x Trials interaction was localized in the first six trials. A 2 x 2 x 2 x 2 mixed ANOVA was performed on a block consisting of odd trials 1, 3, and 5 and a block consisting of even trials 2, 4, and 6. The independent variables were cohesion (high, low), own deserving (high, low), partner deserving (high, low), and trials. The Cohesion x Partner Deserving x Trials interaction was significant, $F(1, 143) = 5.44$, $p < .05$, and the Own Deserving x Partner Deserving x Trials interaction was significant, $F(1, 143) = 8.17$, $p < .01$. Simple interaction effects were first calculated for the

Cohesion x Partner Deserving x Trials interaction for the high cohesion and low cohesion conditions. There were no significant effects for the low cohesion conditions. In the high cohesion conditions, the Partner Deserving x Trials simple interaction was significant, $F(1, 74) = 7.95$, $p < .01$. The means underlying this interaction are presented in Table 7. Further simple effects tests revealed that when cohesion was high, subjects with high deserving partners made smaller harvests on odd trials than on even trials, $F(1, 74) = 4.66$, $p < .05$, whereas subjects with low deserving partners tended to make larger harvests on odd trials than on even trials, $F(1, 74) = 3.31$, $p < .10$. This finding suggests that high cohesion subjects were influenced by partner deserving on the first six trials.

Next, simple interaction effects were calculated for the Own Deserving x Partner Deserving x Trials interaction for the high and low own deserving conditions. There were no significant effects for the low own deserving conditions. In the high own deserving conditions, there was a significant Partner Deserving x Trials simple interaction, $F(1, 81) = 11.46$, $p < .001$ The means underlying this interaction are presented in Table 8. Further simple effects tests revealed that when own deserving was high, subjects with high deserving partners made smaller harvests on odd trials than on even trials, $F(1, 81) = 8.24$, $p < .01$, whereas subjects with low deserving partners tended to make larger harvests on odd trials than on even trials, $F(1, 81) = 3.33$, $p < .10$. This finding suggests that high own deserving subjects were influenced by partner deserving.

Table 7

Means and Standard Deviations for Partner Deserving x Trials

Simple Interaction for High Cohesion Condition for First Six Trials

| Partner Deserving | Trial | | | | | |
| | Odd | | | Even | | |
	N	M	SD	N	M	SD
High	36	50.20	17.00	36	55.74	20.20
Low	40	56.14	18.46	40	51.71	17.11

Table 8

Means and Standard Deviations for Partner Deserving x Trials

Simple Interaction for High Own Deserving Condition for First Six Trials

| Partner Deserving | Trial | | | | | |
| | Odd | | | Even | | |
	N	M	SD	N	M	SD
High	34	54.49	18.30	34	61.45	20.75
Low	49	58.22	17.82	49	54.46	19.90

Another analysis was performed to determine whether the Own Deserving x

Partner Deserving x Trial interaction was localized to the first six trials and non-

significant on trials 7 and 8. A 2 x 2 x 2 x 2 mixed ANOVA was performed on a

trials 7 and 8. The independent variables were cohesion (high, low), own deserving (high, low), partner deserving (high, low), and trials. There were no significant interactions involving trials. It was concluded that the interaction was localized to the first six trials.

Even though the group means suggested an alternation pattern, it is possible that individual subjects did not engage in the odd versus even trial alternation patterns found in the Cohesion x Partner Deserving x Trials interaction and the Own Deserving x Partner Deserving x Trials interaction. Instead, the mean alternations may have been a congruence of some other pattern(s) among individual subjects. Several analyses explored whether individual subjects alternated their harvests as implied by the group mean data. These analyses were performed on the first six trials.

The alternation patterns present in both of the 3-way interactions involving the trials factor appeared to be mirror images of each other. In one pattern, the sawtooth alternation appeared to begin with smaller harvests on the first trial than on the second trial. This pattern will be referred to as alternation pattern A. In the other pattern, the sawtooth alternation appeared to begin with larger harvests on the first trial than on the second trial. This pattern will be referred to as alternation pattern B. The first set of analyses were performed to determine if individual subjects engaged in the making alternating harvests. These analyses calculated the number of times an individual made harvests that were compatible with each leg of alternation pattern A and B. For example, a harvest would have been considered compatible with the first leg of alternation pattern A if the subject (a) made a smaller harvest on the first trial than on

the second trial, and (b) the change was large enough to assume that they were not simply small chance fluctuations (i.e., the harvest change between trials was equal to or greater than 5 acres of lumber). The first analysis was performed on pattern A. The design was a 2 x 2 x 2 ANOVA. The independent variables were cohesion (high, low), own deserving (high, low), and partner deserving (high, low). The dependent variable was the number of alternations on the first six trials that were consistent with pattern A. The Cohesion x Partner Deserving interaction was significant, $F(1, 143) = 3.78$, $p < .05$. Simple effects tests indicated that high cohesion subjects made more harvests that were consistent with alternation pattern A when their partner was high in deserving than low in deserving, $F(1, 74) = 5.17$, $p < .05$. In addition, the Own Deserving x Partner Deserving interaction was significant, $F(1, 143) = 11.82$, $p < .001$. Simple effects tests indicated that high own deserving subjects made more harvests consistent with alternation pattern A when their partner was high in deserving than low in deserving, $F(1, 81) = 6.43$, $p < .05$.

The second analysis was performed on pattern B. The design was a 2 x 2 x 2 ANOVA. The independent variables were cohesion (high, low), own deserving (high, low), and partner deserving (high, low). The dependent variable was the number of alternations on the first six trials that were consistent with pattern B. The Cohesion x Partner Deserving interaction was significant, $F(1, 143) = 4.13$, $p < .05$. Simple effects tests indicated that high cohesion subjects made more harvests that were consistent with alternation pattern B when their partner was low in deserving than high in deserving, $F(1, 74) = 6.32$, $p < .05$. In addition, the Own Deserving x Partner

Deserving interaction was marginally significant, $F(1, 143) = 3.29$, $p < .10$. Simple effects tests indicated that high deserving subjects made more harvests consistent with alternation pattern B when their partner was low in deserving than high in deserving, $F(1, 81) = 5.97$, $p < .05$. These analyses suggest that subjects were engaging in the alternation patterns.

Although the two previous analyses suggest that individuals were engaging in the alternation patterns, they do not make any allowance for the possibility that subjects may have exhibited a linear trend in harvests over trials. Such a linear trend superimposed on simple alternation might mask the latter, at least in the previous method of analysis. To explore this possibility, for each subject a regression line between trial numbers 1-6 and harvest was computed and the residual between the actual and predicted harvest was obtained. A harvest was considered compatible with the alternation pattern if (a) the residual was equal to or larger than the criterion of eight acres of lumber, and (b) was in the direction that was compatible with each leg of the alternation pattern. The Cohesion x Partner Deserving interaction was marginally significant, $F(1, 143) = 3.65$, $p = .058$. Simple effects tests indicated that high cohesion subjects with high deserving partners tended to engage in the alternation pattern, $F(1, 74) = 2.82$, $p < .10$. In addition, the Own Deserving x Partner Deserving interaction was significant, $F(1, 143) = 6.99$, $p = .01$. Simple effects tests indicated that high own deserving subjects made engaged in the alternation pattern, $F(1, 81) = 4.60$, $p < .05$.

Impressions of Partner

Subjects provided their impressions of their partner after the trial sequence on seven items. The responses to these items were evaluated by a principle components factor analysis with varimax rotation. The results showed that one principle factor was present. Table 9 shows the factor loading for each of the seven items. The loadings ranged between .74 and .81. All seven item were then used to evaluate partner impressions. Each item in the factor was weighted by multiplying the item score by its factor loading.

Partner impressions were evaluated in relationship to subjects' class. The design was a 2 x 2 x 2 x 2 between-subjects ANOVA. The dependent variable was the seven item factor score. There were no significant main or interaction effects involving class. Another between-subjects ANOVA was used to evaluate partner impressions without regard to subjects' class. A 2 x 2 x 2 ANOVA was conducted on the seven item factor. There was a significant Cohesion x Partner Deserving interaction, $F(1, 143) = 3.98$, $p < .05$. Simple effects analyses showed that when cohesion was high, subjects rated high deserving partners more favorably than low deserving partners, $F(1, 143) = 4.30$, $p < .05$, but when cohesion was low, subjects did not differentiate between high deserving and low deserving partners, $F(1, 143) = .33$, $p = $ ns.

Additional Finding

Subjects provided their impressions of the experiment after the trial sequence. For the question asking how much an individual wanted to avoid the fine, there was a marginally significant Cohesion x Own Deserving interaction, $F(1, 143) = 3.65$, $p = $

.06.

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.06. Simple effects tests indicated that when an individual was high in deserving,

Table 9

Factor Loadings for Partner Impression

Items	Loading
generous/selfish	.77
concerned for others/concerned for self	.77
responsible/very irresponsible	.73
honest/dishonest	.81
friendly/unfriendly	.76
trusting/not trusting	.81
cooperative/competitive	.74

those in the high cohesion groups tended to want to avoid the fine more than those in low cohesive groups, $F(1, 81) = 3.48$, $p < .10$. For the question asking how much an individual's partner wanted to win money, there was a significant Cohesion x Partner Deserving interaction, $F(1, 143) = 5.81$, $p < .05$. Simple effects tests indicated that when partner deserving was high, compared to those in low cohesive groups, subjects in cohesive groups believed their partner wanted to win the money more, $F(1, 63) = 6.54$, $p < .05$. Finally, compared to low deserving subjects, subjects high in deserving believed their partner found the harvesting task easier, $F(1, 143) = 5.77$, $p < .05$.

CHAPTER IV

DISCUSSION

The harvest data support the hypothesis that interpersonal relations moderate the influence of an individual's beliefs of own deserving and beliefs of other's deserving for a resource on cooperative behavior in a social dilemma. Different distribution rules or allocation norms appeared to be employed in the cohesive and non-cohesive groups. Deutsch's (1975) equity distribution rule and Clark and Mills' (1979) classification of exchange relationships prescribe that in situations in which social ties among group members are weak or non-existent, individual group members should receive outcomes in proportion to their respective "contributions" to the group. Note that the term "contribution" in the present study refers to an individual's belief of his or her own deserving and partner's deserving for the resource as determined by the amount of time an individual worked at a task. The equity rule implies that individuals should consider the contributions of all group members when making their harvest decisions, for doing so allows an individual to determine how to behave equitably (i.e., what outcomes each group member should receive). Subjects in low cohesive groups appeared to behave equitably, but only with regard to their own contributions--they were not influenced by the contributions of other group members. Low cohesion subjects made larger harvests when they believed they deserved to obtain the resource than when they believed they were low in deserving. Low cohesion subjects did not make smaller harvests over all trials when they believed

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their partner was high in deserving than when they believed their partner was low in deserving. Subjects in the low cohesive groups were aware of their partners' deserving (especially subjects from the introductory psychology courses), but this awareness did not influence their harvest decisions.

One explanation for this finding is that in a social dilemma, the equity rule may be valid only for an individual group member's decisions in relation to his or her own contributions and outcomes, not for an individual group member's decisions in relation to the contributions and outcomes of all group members. There are two alternative methodological explanations for this finding. First, the equity rule indicates that individuals should receive equitable outcomes for their respective contributions to the group. It is possible that the type or nature of the contribution is critical to an individual's concern with others' outcomes. One definition of contribution for the equity rule is the amount of effort an individual contributes toward achieving a common group goal. For example, an equitable outcome for individuals working together to achieve a goal, for pay, would be one where the individuals who performed the most received the largest outcomes. The present study manipulated individual contributions by varying the length of time individuals worked on a task that was unrelated to the social dilemma task. Although individuals who worked longer at this task may have been more deserving of money than those who did not work as long, it is possible that subjects did not consider it to be contribution. Therefore, although low cohesion subjects were aware of others' deserving for the resource, they may not have believed it was relevant to the social dilemma task.

Second, the manipulation of deserving/contribution may have been too weak. This possibility is suggested by lack of an overall effect for partner deserving. Subjects recruited from the introductory psychology courses were more aware of their partner's deserving than were subjects recruited from the introductory statistics course.

Clark and Mills' (1979) classification of communal relationships and Deutsch's equality distribution rule prescribe that in situations in which social ties among group members are strong and enjoyable social relations exist, all individual group members should share equally in the group's outcome regardless of their respective contributions to the group. And indeed, subjects in high cohesive groups appeared to be less concerned about equitable outcomes and appeared to consider overall their own and their partner's contribution when making their harvest decisions. However, the strategies high cohesion subjects used to make cooperative withdrawals were sometimes somewhat complex. First, high cohesion subjects who believed they deserved to obtain the resource harvested amounts similar to those who believed they were low in deserving. The strategy used was direct and simple--on every trial these individuals consistently made moderately-sized harvests. Although the present design did not allow for a direct test of the equality distribution rule--since subjects did not provide their expectations regarding their partner's harvesting behavior--these results provide indications that equality may have been a factor in subjects' harvesting behavior.

Second, high cohesion subjects considered the contributions of their partner but engaged in a fairly complex strategy. Subjects engaged in a sawtooth alternation

strategy in which they alternated between making smaller and larger harvests on each of the first six trials. Subjects tended to make (non-significantly) smaller harvests on the first trial when they believed their partner deserved to obtain the resource than when they believed their partner was low in deserving. This difference in harvest size on the first trial was related to nature of the alternation pattern. Subjects who believed their partner deserved to obtain the resource made smaller harvests on odd numbered trials than on even numbered trials. In contrast, subjects who believed their partner was low in deserving made larger harvests on odd numbered trials than on even numbered trials. Thus, individuals who withdrew a little more on the first trial compensated for doing so on the following trial by withdrawing a little less, and so on. Likewise, individuals who withdrew a little less on the first trial compensated for doing so on the following trial by withdrawing a little more, and so on.

The complex alternation patterns suggest that the strategy individuals in cohesive groups may use when others' deserving is salient is not straightforward. Although high cohesion subjects were influenced by partner deserving, they did not consistently make moderately-sized harvests as in the Cohesion x Own Deserving interaction. One explanation for this alternation pattern is that high cohesion subjects may have experienced a conflict between not exploiting a partner who they liked versus the risk of being exploited by their partner if they consistently made small harvests (i.e., the sucker effect (see Kerr, 1983)). Alternating harvest size may have been a resolution to this problem. An alternative explanation is that own deserving may be more salient and have more direct and powerful influences than other's deserving. A third

explanation is the same methodological issue raised earlier for contribution (i.e., the contribution manipulation may have been too weak). The manipulation may have been strong enough to influence behavior initially but not strong enough to sustain its influence over time.

The present results, theory advanced by Deutsch (1975, 1982) and Schwinger (1986), and the findings of Clark and Mills (1979) highlight the important role of situational and social influences on distribution norms (viz., that interpersonal relations moderate the type of allocation norm that may be utilized) (see Greenberg & Cohen, 1982). In addition, Walster, Walster, and Berscheid (1978) have speculated that individuals in intimate relationships, "through identification with and empathy for their partners, come to define themselves as a unit; as one couple. They see themselves not merely as individuals interacting with others, but also as part of a partnership, interacting with other individuals, partnerships, and groups. This characteristic may have a dramatic impact on intimates' perceptions of what is and is not equitable" (p. 152-153). This speculation is consistent with theory and the present research by suggesting that in relationships that are characterized by strong social ties, individuals may seek to distribute resources based on equality or need (see Schwinger (1986) for a discussion of resource distribution based on need), rather than distributing benefits or resources in an equitable manner.

The present results and theory discussed above also provide a clearer picture of the conditions in which the norm of equity is salient and may be acted upon in a social dilemma. First, when the social relations of individuals sharing a resource are

characterized by weak social ties among group members "in which economic productivity is a primary goal [e.g., low cohesive groups or an exchange relationship], equity rather than equality or need will be the dominant principle of distributive justice [i.e., the dominant allocation/justice norm]" (Deutsch, 1975, p. 143). Second, when the social relations of individuals sharing a resource are characterized by strong social ties and "fostering or maintenance of enjoyable social relations" (Deutsch, 1975, p. 146) is emphasized (e.g., cohesive groups or a communal relationship), concerns for equity will be minimal. As Leventhal (1976) asserts, equality occurs when "maintenance of harmony and solidarity among receivers is important" (p. 218) (cf. Lerner, Miller, & Holmes, 1976).

These findings have important implications for collectively interested behavior in social dilemmas and for solutions to social dilemmas. First, as suggested by Kerr (in press), norms "can and do have important effects on behavior in social dilemmas." Second, when the appropriate social conditions exist, certain norms may increase the likelihood that individuals will seek to promote the collective interest. Although equality per se may not insure collectively interested behavior, it may inhibit individuals from competing with one another. Third, discussion among group members may further generate norms that alter the collective welfare. In the present study, discussion about topics unrelated to the social dilemma was a factor leading to social ties among group members, which in turn appeared to promote group welfare norms under certain conditions.[3] Further, these social ties appear to endure and carry over to new situations (i.e., in the present research, they developed during the winter

survival situation and carried over to the social dilemma situation).

It is interesting to consider the possible ramifications if group members do not adhere to the dominant norms in a group facing a social dilemma. As Clark and Mills (1979) demonstrated, counter-normative behavior may result in decreased attraction for the individual and/or decreased acceptance of an individual by other group members. Bonner (1959, p. 69) suggested that deviants from group norms are not accepted by the group. In a social dilemma, what might be the consequences of behavior that is counter to the dominant justice norm? For example, if the norm of equality was dominant in a cohesive group and one group member acted competitively, would the other group members continue to adhere to or reject the norm. Possibilities include the following: the group members might (a) dislike the competitive individual, allow him or her to remain in the group, but continue to act in an equitable manner, (b) reject the individual from the group, or (c) reject the equality norm and act in a competitive manner. This issue could be explored in future research with a design similar to the present one, with the addition of a feedback variable. Feedback could indicate whether a fellow group member was acting in line with the norm. In essence, this issue is similar to one raised by Kerr (1983) is his studies on the free-rider, sucker, and social loafing effects in social dilemmas.

It should be noted that several theorists have argued that norms may not be an effective solution for social dilemmas. Orbell and Dawes (1981) speculate that when acting in one's self-interest is particularly attractive in a social dilemma, internalized norms such as conscience "might be a thin reed for a society to lean on" (p. 50).

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Hardin (1977), the proponent of the "mutual coercion mutually agreed upon" solution in which individuals are coerced into collectively interested behavior, recommends "never ask a person to act against his [or her] own self-interest" (p. 2). Hardin believes that in a social dilemma, voluntary cooperation is ineffective, self-interested behavior is inevitable, and if a few individuals act in their self-interest, then others will follow.

The findings also raise a very important issue regarding the influence of interpersonal relationships on cooperative behavior in social dilemmas. In the present study the main effect for group cohesion was not significant. Contrary to Brewer and Kramer's social identity findings and group cohesion research and theory in domains other than social dilemmas, in the present study subjects in cohesive groups were not more cooperative than those in low cohesive groups. One explanation for this finding may lie in the distinction between social identity and group cohesion. Social identity involves cognitions associated with unit formation, categorization, and shared fate (e.g., Campbell, 1958). In contrast, a substantial component of group cohesion is the affect that individual group members feel for one another. Brewer and Kramer (1984, 1986) did not find an increase in positive feelings for other group members in high than in low social identity conditions, whereas research indicated that individuals in cohesive groups feel more positive affect for their fellow group members than do individuals in low cohesive groups. The distinction between the cognitive and affective components of social identity and group cohesion, and the findings of the present research and Brewer and Kramer's (1984, 1986) research, suggests that it may

be the cognitions associated with unit formation and shared fate, not positive affect, that influences cooperation in social dilemmas.

Why might cognitions concerning shared fate and unit formation, rather than affect for group members, increase cooperation? A clue to the answer is provided by French and Raven's (1959) concept of referent power and Kelman's (1958) concept of identification. Referent power involves an individual's desire to compare and evaluate him or herself to an individual with whom s/he identifies. An individual may gain a sense of intrinsic personal satisfaction from identification with another individual. Identification refers to a form of influence that stems from a relationship between two individuals. In such a relationship, an individual may not agree completely with the others' beliefs, but may still "adopt the induced behavior because it is associated with the desired relationship" (Kelman, 1958, p. 33). Although an individual may admire or feel positive affect for another individual, it does not necessarily follow that the individual's actions will be influenced by the other individual. In contrast, an individual who identifies with another individual and who wants a relationship (i.e., a unit relationship) with the individual may see his or her behavior as closely tied to the other individual (i.e., shared fate may be very salient). Wit (1989) has shown how factors that break up a unit relationship decrease cooperation in a social dilemma. Subjects who believed that their fellow group members either had made their decisions three weeks earlier or would make their decisions three weeks in the future were less cooperative than subjects who believed they were making their decisions concurrently with others. Thus, the variable driving cooperation may be the cognitions associated

with shared fate and the unit rather than affect (cf. Campbell, 1958). This suggests a critical test between shared fate and positive affect in a social dilemma. We (Kerr, Sattler, and Kaufman, 1990) are currently conducting a study to explore this issue.

The present results also indicate that scarcity may be created by increasing demand for a resource when the supply remains constant. It is interesting to note that strong social ties among group members did not moderate self-interested behavior when beliefs of own and other's deserving were high, for an interaction between beliefs of own deserving, beliefs of other's deserving, and group cohesion was not observed. Might individuals in groups with even stronger social ties than those in the present study exercise restraint under conditions of demand induced scarcity? What factors might moderate the effects of demand induced scarcity on cooperative behavior? These important questions remain unanswered and it is strongly suggested that future research attempt to answer these questions.

It is also interesting to speculate about the role of Deutsch's (1975) need principle in a social dilemma. The present author found no research exploring how need for a resource affects cooperative behavior in a social dilemma. Real world situations exist in which individuals sharing scarce resource need to obtain the resource. An example of such a situation is that of shipwreck survivors who are stranded on a lifeboat that contains limited rations. Some survivors may have a greater physical need to obtain food and water than others. It is conceptually possible that need may be distinguished from deserving. An individual may physically need to obtain food but not believe s/he deserves to obtain it. Likewise, an individual may

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believe s/he deserves to obtain food but not physically need to obtain it. This distinction suggests that the effects of need and beliefs of deserving for a resource could have different impacts on behavior in a social dilemma. The present author is currently planning an experiment to explore the need principle in a social dilemma. Subjects will share a supply of 7-Up (the commons), social relations will be manipulated with a procedure similar to the one used in the present study, and need for the resource will be created by manipulating group members' thirst. The dependent variable will be the amount of liquid withdrawn from the commons.

Conclusion

A growing number of theorists and researchers in a growing number of disciplines have predicted a world experiencing a dwindling resource supply and commons problems on a vastly larger scale than the commons scenario painted by Hardin (1968). "If present trends continue, the world in [the year] 2000 will be more crowded, more polluted, less stable ecologically, and more vulnerable to disruption than the world be now live in. Serious stresses involving population, resources, and environment are clearly visible ahead" (Global 2000 Report, p. 11). So concluded the Global 2000 report that was commissioned by President Jimmy Carter to project world conditions at the turn of the century. The Worldwatch Institute's yearly "state of the world" assessment reached conclusions similar to the Global 2000 report (Brown, 1989). Projections indicate that in the coming years there will be too few resources to meet projected demand (cf. Meadows et al., 1972). Ophuls (1977) predicts "shortages of energy and mineral resources (e.g., petroleum and coal) necessary to keep the

engines of industrial production running" (p. 8). For example, in the United States, half of the petroleum reserves were consumed by 1975 and 80% of the supply may be depleted by 2000. The world will experience a depletion of half of the petroleum reserves by 2025 and an 80% depletion by 2050 (Hubbert, 1976) (see Miller, 1980). Confronted with a future in which resource scarcity will play a predominant role-- resource scarcity, for the most part due to increases in demand (i.e., population)--it is critical to understand psychological, individual, and social responses to scarcity. The present study may be considered as an attempt to understand psychological and social responses to resource scarcity.

FOOTNOTES

FOOTNOTES

[1]Note that the distinction between the characteristics of each class of norms are not necessarily sharp and the classes may overlap with each other. For example, the general interaction norms presented below have similarities with social norms (i.e., they operate in a similar manner).

[2]Researchers interested in computing strength of relationship effects may refer to the ANOVA summary tables to obtain the appropriate information.

[3]Since the cohesion manipulation in the present study presented feedback indicating that the group successfully solved the problem, it cannot be stated conclusively that discussion alone created cohesion.

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APPENDIX A

EXPERIMENTAL MATERIALS

DEPARTMENTAL RESEARCH CONSENT FORM
TITLE OF RESEARCH PROJECT: THE GROUP STUDY

1. I have freely consented to take part in a scientific study being conducted by David N. Sattler, under the supervision of Norbert L. Kerr, Professor of Psychology.

2. This study is designed to investigate how various conditions affect the decisions that people make. I may be asked to perform several tasks. One of these tasks involves deciding how much of a resource to harvest from a resource pool.

3. I understand that the study does not involve any risks or discomforts.

4. I understand that the results of the study will be treated in strict confidence and that I will remain anonymous. Within these restrictions, results of the study will be made available to me at my request.

5. I understand that my participation in the study does not guarantee any beneficial results to me.

6. I understand that I have the right to refuse to participate or to withdraw from this study at any time and without penalty. I may also stop working temporarily on any task at any time I choose. Because of the scientific nature of the study, the experimenter may suspend the experiment at any time.

7. I understand that, at my request, I can receive additional explanation of the study after my participation is complete.

Date _____   Signed _____

AFTER YOU HAVE READ AND SIGNED THIS FORM, PLEASE SLIDE IT OUT UNDER THE CURTAIN TO YOUR BOOTH. THEN WAIT QUIETLY FOR FURTHER INSTRUCTIONS.

QUESTIONNAIRE BOOKLET

Your color code: _____

<u>Instructions</u>: Your answers to the open-response questions in this booklet will be used to help us create a closed-response questionnaire that will be used on campus. Please answer the questions as completely and in as much detail as you can. You should spend out 5 minutes on each of the six questions. Try not to spend too much time on any particular question. For your convenience, you will be told of the time remaining every 5 minutes. <u>This questionnaire booklet will be collected in 30 minutes</u>. Please try to answer all six questions.

1A. In deciding which of two companies to work for, what five factors would be the most important ones influencing your decision?

1B. Why did you select these five? Explain fully.

2A. What do you believe will be your job when you finish your education?

2B. What were the major factors influencing your career choice?

2C. What college courses do you believe are the most beneficial to you?

3A. Do you agree or disagree with the new semester system? Why?

3B. What do you believe are the advantages and disadvantages of the quarter system?

3C. What do you believe are the advantages and disadvantages of the semester system?

4A. Do you believe that your ability to learn in a college class is affected by the class size? Do you think you would perform better if the class size was more than 250 students or less than 250 students? Why?

4B. What do you believe is the ideal class size? What are the benefits to a smaller class than a larger class?

4C. What qualities make a good teacher?

5A. Suppose you had to put together a campaign to encourage Michigan State University students to participate in Health Week activities (such as attending talks about eating healthy foods, and participating in various physical activities). How might you structure the campaign. What key factors would you focus on?

5B. How would you publicize the events?

5C. Do you think students would participate, even after all your efforts to encourage them to do so? Why?

6A. Do you think freshmen should be required to live on campus in a dorm? Why?

6B. What are the advantages and disadvantages to living in a dorm, rather than living in an apartment?

6C. Do you think most students prefer to live in a dorm for their entire college career? Why?

INITIAL RANKING FORM

<u>Instructions</u>

Indicate your solution to the winter survival task below. Rank the items in order of importance for survival (i.e., 1 = most important, 12 = least important).

_____ Ball of steel wool

_____ Newspapers (one per person)

_____ Compass

_____ Hand ax

_____ Cigarette lighter (without fluid)

_____ Loaded .45-caliber pistol

_____ Sectional air map made of plastic

_____ Twenty-by-twenty foot piece of heavy-duty canvas

_____ Extra shirt and pants for each survivor

_____ Can of shortening

_____ Quart of 100-proof whiskey

_____ Family-size chocolate bar (one per person)

FINAL RANKING FORM

<u>Instructions</u>

Indicate your solution to the winter survival task below. Rank the items in order of importance for survival (i.e., 1 = most important, 12 = least important).

_____ Ball of steel wool

_____ Newspapers (one per person)

_____ Compass

_____ Hand ax

_____ Cigarette lighter (without fluid)

_____ Loaded .45-caliber pistol

_____ Sectional air map made of plastic

_____ Twenty-by-twenty foot piece of heavy-duty canvas

_____ Extra shirt and pants for each survivor

_____ Can of shortening

_____ Quart of 100-proof whiskey

_____ Family-size chocolate bar (one per person)

WINTER SURVIVAL QUESTIONNAIRE

Your name: _____

Your color code: _____

Please answer the following questions concerning your impressions of the winter survival problem.

(All responses are confidential and will not be shared with anyone).

1. To what extent would you like to meet with these same people again?

    not at all:__:__:__:__:__:__:__:very much

2. How much did you enjoy being in a group with these people?

    not at all:__:__:__:__:__:__:__:very much

3. How much do you like the people in the group?

    not at all:__:__:__:__:__:__:__:very much

4. How much would you like to participate in another experiment with the same people in the group?

    not at all:__:__:__:__:__:__:__:very much

5. How much would you like to be in a different group in today's session?

    not at all:__:__:__:__:__:__:__:very much

6. How much do you feel as though you are a member of a group?

    not at all:__:__:__:__:__:__:__:very much

YOUR PARTNER

DID NOT WORK ON THE QUESTIONNAIRE

TASK AT THE BEGINNING OF THE SESSION

YOUR PARTNER

<u>WORKED</u> ON THE QUESTIONNAIRE

TASK AT THE BEGINNING OF THE SESSION

QUESTIONNAIRE

Your name: _____

Your color code: _____

Please answer the following questions concerning your impressions of the experiment.

1. How much money do you think would be fair for you to receive for participating in the study?

    $_____._____

2. How much money do you think would be fair for your partner to receive for participating in the study?

    $_____._____

3. How responsible do you feel for your group's outcome?

    very little:__:__:__:__:__:__:__:very much

4. How many persons were in your group, including yourself?

    _____

5. Do you think that if you made cooperative harvest decisions, then the other group member would also make cooperative harvest decisions?

    other would   other would
    harvest cooperatively:__:__:__:__:__:__:__:harvest competitively

6. Do you think that if you made competitive harvest decisions, then the other group member would also make competitive harvest decisions?

    other would   other would
    harvest cooperatively:__:__:__:__:__:__:__:harvest competitively

7. There was a fine imposed for harvesting too many acres of lumber. How much did you want to avoid this fine?

    not at all:__:__:__:__:__:__:__:very much

8. Do you think that you made cooperative or competitive harvest decisions?
    cooperative _____   competitive _____

One of the things we are interested in is how people in a group form impressions of other group members. Although you don't know your fellow group member, you still may have formed some impressions of him or her just by being a member of the same group. Please indicate your impressions of your fellow group member on the following scales. We realize that this may sometimes be difficult; just do the best you can. (These responses are confidential, and will not be shared with the other group member).

9. You and your fellow group member had the chance of winning some money in today's experiment. How much do you think your fellow group member wanted to win this money?

       very little:__:__:__:__:__:__:__:very much

10. How difficult do you think your fellow group member found the task?

       very easy:__:__:__:__:__:__:__:very difficult

11. How responsible do you think your group member felt for your group's outcome?

       not at all:__:__:__:__:__:__:__:very much

12. Please indicate your impressions of your group member on the following scales.

       selfish:__:__:__:__:__:__:__:generous

       concerned for others:__:__:__:__:__:__:__:concerned only for self

       very irresponsible:__:__:__:__:__:__:__:very responsible

       honest:__:__:__:__:__:__:__:dishonest

       friendly:__:__:__:__:__:__:__:unfriendly

       trusting:__:__:__:__:__:__:__:not trusting

       cooperative:__:__:__:__:__:__:__:competitive

Please use the following rating scale for items 13 and 14.

1   definitely not applicable

2   not applicable

3   somewhat inapplicable

4   neither applicable nor inapplicable

5   somewhat applicable

6   applicable

7   fully applicable

13. If the size of the forest was 200 acres and you withdrew 32 acres--considered to be a small harvest--how do you think your fellow group member would perceive you?

A.	good	_____	I.	sincere	_____
B.	weak	_____	J.	pliable	_____
C.	aggressive	_____	K.	powerful	_____
D.	dishonest	_____	L.	unjust	_____
E.	kind	_____	M.	helpful	_____
F.	timid	_____	N.	wimpy	_____
G.	forceful	_____	O.	dominant	_____
H.	unfair	_____	P.	mean	_____

14. If the size of the forest was 200 and you withdrew 88 acres--considered to be a large harvest--how do you think your fellow group member would perceive <u>you</u>?

A.	good	_____	I.	sincere	_____
B.	weak	_____	J.	pliable	_____
C.	aggressive	_____	K.	powerful	_____
D.	dishonest	_____	L.	unjust	_____
E.	kind	_____	M.	helpful	_____
F.	timid	_____	N.	wimpy	_____
G.	forceful	_____	O.	dominant	_____
H.	unfair	_____	P.	mean	_____

15. Please describe in your own words what you understand the purpose of this experiment to be.

16. Please give us your general impressions of the experiment so far.

THANK YOU VERY MUCH. PLEASE <u>SLIDE</u> <u>THIS</u> <u>FORM</u> <u>OUT</u> <u>UNDER</u> <u>THE</u> <u>CURTAIN</u> <u>TO</u> <u>YOUR</u> <u>BOOTH</u>. THEN WAIT QUIETLY. WE WILL CONTINUE SHORTLY.

APPENDIX B

INSTRUCTIONS

INSTRUCTIONS

<u>EXPERIMENTER</u> <u>SAYS</u>:

"AS YOU REMEMBER WHEN YOU SIGNED UP FOR THE EXPERIMENT, THE EXPERIMENT LASTS FOR 1 1/2 HOURS BUT YOU ONLY RECEIVE 1 HOUR OF CREDIT. YOU'LL HAVE THE OPPORTUNITY TO EARN MONEY IN ONE OF THE TASKS TODAY, AND THIS MONEY WILL BE THE WAY IN WHICH YOU'LL BE COMPENSATED FOR THE 1/2 HOUR THAT YOU DON'T RECEIVE CREDIT FOR. FOR THE FIRST 1/2 HOUR, YOU WILL NOT GET ANY EXPERIMENTAL CREDIT, AND THE HOUR OF CREDIT WILL BE FOR THE LAST HOUR."

[CURTAIN IS CLOSED AND PRE-RECORDED INSTRUCTION TAPE IS STARTED.]

<u>TAPE</u>:

"First of all, I would like to thank each of you for coming today. During today's session you will be working on several different tasks. During the session, you will never be referred to by name and your personal identity will never be revealed or known to any of the other people. Rather, you will be referred to only by color code. A sign in your room indicates your own color code.

For the first part of the session, we would like you to complete a battery of

questionnaires concerning various issues. You will have 30 minutes to work on the questionnaires. As you work on the questionnaire, the experimenter will inform you every five minutes of the amount of time remaining to complete the booklet. Please read the instructions on page one. You may begin working now."

[30 MINUTE PERIOD. EVERY FIVE MINUTES THE EXPERIMENTER SAYS, "THERE ARE X MINUTES LEFT."

EXPERIMENTER SAYS:

"OKAY, I WILL NOW COLLECT THE QUESTIONNAIRE BOOKLETS. PLEASE SIT QUIETLY IN YOUR BOOTH. THE NEXT PART OF THE SESSION WILL BEGIN SHORTLY."

[2 ADDITIONAL SUBJECTS ARE ESCORTED INTO THE LAB. THE POSTERS CONTAINING THE 12 ITEMS IN THE WINTER SURVIVAL TASK ARE PLACED IN EACH BOOTH.]

EXPERIMENTER SAYS:

"WE ARE NOW READY TO CONTINUE THE SESSION. BEFORE WE BEGIN, I WOULD LIKE TO TELL YOU THAT THERE ARE NOW FOUR PEOPLE HERE. THE TWO PEOPLE WHO JUST ARRIVED WILL BE HERE FOR ONLY 1 HOUR. THE OTHER TWO PEOPLE HAVE ALREADY BEEN PARTICIPATING IN THE STUDY FOR 1/2 HOUR AND DID NOT RECEIVE AND CREDIT FOR BEING HERE, SO FAR. THIS IS BECAUSE WHEN YOU SIGNED UP FOR THE STUDY IT WAS WORTH ONLY 1 HOUR OF CREDIT, BUT SOME OF YOU ARE HERE FOR 1 1/2 HOURS. BUT FROM THIS POINT ON,

EVERYONE WILL RECEIVE ONE HOUR OF CREDIT. YOU SHOULD BE

AWARE THAT THE PEOPLE WHO WERE HERE FOR THE FIRST 1/2 HOUR

DID NOT RECEIVE ANY CREDIT FOR THAT TIME. INSTEAD, THE WAY

THEY'LL BE COMPENSATED FOR THIS FIRST 1/2 HOUR IS BY EARNING

MONEY IN ONE OF THE TASKS TODAY. HOWEVER, ALL OF YOU WILL

HAVE THE CHANCE TO EARN MONEY IN ONE OF THE TASKS TODAY."

[INSTRUCTION TAPE IS STARTED.]

TAPE:

"Okay, we are now ready to continue the study. The remainder of the study will

take one hour. All four subjects will receive two credits for participating in the

session. Those of you who arrived earlier and worked 30 minutes will have a chance

of getting cash for the task you performed earlier. I would like to thank those of you

who just arrived for coming today. This study is interested in how people make a

variety of decisions, and in fact, one part of this study is interested in how a number

of different conditions affect decisions that have real monetary significance. During

the session, you will never be referred to by name and your personal identity will

never be revealed or known to any of the other people. Rather, you will be referred to

only by color code. A sign in your room indicates your own color code.

Today you will be working on several different tasks. We are now ready to

begin the next task. You will be working on a winter survival problem. You will be

using a poster in your booth for this task. I will now describe the survival problem.

You have just crash-landed in the woods of northern Minnesota and southern

Manitoba. It is 11:32 a.m. in mid-January. The light plane in which you and the others were traveling crashed on a lake. The pilot and copilot were killed. Shortly after the crash the plane sank completely into the lake with the pilot's and copilot's bodies inside. None of the four passengers are seriously injured and you are all dry.

The crash came suddenly, before the pilot had time to radio for help or inform anyone of your position. Since your pilot was trying to avoid a storm, you know the plane was considerably off course. The pilot announced shortly before the crash that you were twenty miles northwest of a small town that is the nearest known habitation.

You are in a wilderness area made up of thick woods broken by many lakes and streams. The snow depth varies from above the ankles in windswept areas to knee deep where it has drifted. The last weather report indicated that the temperature would reach -25 degrees Fahrenheit in the daytime and -40 at night. There is plenty of dead wood and twigs in the immediate area. You are dressed in winter clothing appropriate for city wear--suits, pantsuits, street shoes, and overcoats.

While escaping from the plane the four passengers salvaged 12 items. These items are shown on the poster in your booth. Your task is to rank these 12 items according to their importance to your survival, starting with one for the most important item and ending with 12 for the least important one.

You may assume that the number of passengers is the same as the number of persons here today, which is four, and that the group has agreed to stick together."

For the next two minutes, think about how you would rank these 12 items according to their importance for survival, and indicate your ranking on the form in

your booth titled "Initial Ranking Form." You may begin to rank the items now."

[TAPE IS STOPPED. SUBJECTS ARE GIVEN THE "INITIAL RANKING FORM."]

[2 MINUTE PERIOD.]

EXPERIMENTER SAYS:

"YOU HAVE 30 SECONDS LEFT TO FINISH RANKING THE ITEMS."

[LOW GROUP COHESION CONDITION - NO TALKING CONDITION]

EXPERIMENTER SAYS:

"OKAY, WE WOULD NOW LIKE TO TAKE SOME MORE TIME TO THINK ABOUT THE WINTER SURVIVAL PROBLEM. PLEASE OPEN THE CURTAIN TO YOUR BOOTH AND PLACE YOUR CHAIRS IN THE CENTER OF THE ROOM. YOU SHOULD TAKE THE POSTER AND THE INITIAL RANKING FORM WITH YOU. [WAIT]. WE WOULD LIKE YOU TO THINK ABOUT THE SURVIVAL PROBLEM FOR THE NEXT FIVE MINUTES. PLEASE DO NOT TALK TO THE OTHER PEOPLE HERE. YOU SHOULD THINK ABOUT HOW BEST TO RANK THE ITEMS."

[HIGH GROUP COHESION CONDITION - TALKING CONDITION]

EXPERIMENTER SAYS:

"OKAY, NOW THAT YOU HAVE HAD A CHANCE TO GET WARMED UP, WE WOULD LIKE YOU TO DISCUSS THE WINTER SURVIVAL PROBLEM AS A GROUP. PLEASE OPEN THE CURTAIN TO YOUR BOOTH AND PLACE YOUR CHAIRS IN A CIRCLE IN THE MIDDLE OF THE ROOM. [GET 1 POSTER]. "WE WOULD LIKE YOU TO DISCUSS THE SURVIVAL PROBLEM

WITH THE OTHER GROUP MEMBERS FOR FIVE MINUTES. YOU SHOULD

TRY TO IDENTIFY THE BEST RANKING OF THE 12 ITEMS IN TERMS OF

THEIR IMPORTANCE FOR SURVIVAL."

[5 MINUTES PERIOD.]

EXPERIMENTER SAYS:

"EXCUSE ME. THERE ARE 30 SECONDS LEFT."

(AFTER THE 30 SECONDS, EXPERIMENTER SAYS:

"OKAY, I WOULD NOW LIKE YOU TO RETURN TO YOUR BOOTHS."

[CURTAINS ARE CLOSED AND THE TAPE IS STARTED.]

TAPE:

"Okay, at this time we would like you to once again rank the 12 items in terms

of their importance for survival. Please indicate your ranking on the "Final Ranking

Form." Your final ranking will be scored. Your ranking will be compared to the

rankings made by experts and participants who worked on the winter survival task last

term. After you have indicated your ranking, please slide the "Final Ranking Form"

out under the curtain to your booth. Then wait quietly. We will score your rankings

by determining how close the average group ranking agreed with the expert rankings,

and will give you the results in a few moments."

[TAPE IS STOPPED. SUBJECTS ARE GIVEN THE FINAL RANKING FORM.

AFTER 1 1/2 MINUTES, THE FEEDBACK SHEETS ARE GIVEN TO SUBJECTS.]

[LOW GROUP COHESION CONDITION - NO TALKING CONDITION]

EXPERIMENTER SAYS:

"THE NUMBER ON THIS SHEET SHOWS HOW WELL YOU DID ON THE

TASK COMPARED TO THOSE LAST TERM. THE NUMBER SHOWS YOU

YOUR PERCENTILE--THAT IS, THE PERCENT OF PEOPLE YOU SCORED

HIGHER THAN."

[HIGH GROUP COHESION CONDITION - TALKING CONDITION]

EXPERIMENTER SAYS:

"YOUR GROUP SCORED AT THE 82ND PERCENTILE. THIS MEANS

THAT YOUR GROUP DID BETTER THAN 82% OF THE GROUPS LAST TERM."

[WINTER SURVIVAL QUESTIONNAIRE IS GIVEN TO SUBJECTS.]

EXPERIMENTER SAYS:

"PLEASE COMPLETE THIS SHORT QUESTIONNAIRE AND SLIDE IT

UNDER THE CURTAIN WHEN YOU HAVE FILLED IT OUT."

[POSTERS ARE REMOVED FROM BOOTHS AND TAPE IS STARTED].

TAPE:

"Okay, the next part of the session is now ready to begin. For this part of the

session we have formed two separate groups with two persons in each group. In order

to provide complete anonymity, you will not know which booth your fellow group

member is in. I need to emphasize that these two groups are not competing against

one another in any way. There will be no interaction between groups and the outcome

of each group depends only on its own performance, not on the performance of the

other group. The only reason we are running two groups at the same time is because

we can complete our study faster with two groups at once, rather than just testing one

group at a time.

Your group member is determined at random, and each of you have an equal chance of being paired with one of the other persons here today. The experimenter will give you a sheet of paper that indicates whether or not your partner worked on a questionnaire task at the beginning of the study."

[PAUSE]. [SUBJECTS ARE GIVEN THE PAPER WITH PARTNER'S QUESTIONNAIRE STATUS].

EXPERIMENTER SAYS:

"THIS SHEET TELLS YOU WHETHER OR NOT YOUR PARTNER WAS HERE FOR THE FIRST 1/2 HOUR. REMEMBER, THOSE WHO WERE HERE FOR THE FIRST 1/2 HOUR DID NOT RECEIVE ANY CREDIT FOR THE FIRST 1/2 HOUR. IN THE NEXT TASK, EVERYONE WILL HAVE THE OPPORTUNITY TO EARN MONEY, BUT FOR THOSE WHO WERE HERE FOR THE FIRST 1/2 HOUR, THE TASK WILL ALSO SERVE AS A WAY YOU ARE COMPENSATED FOR PARTICIPATING DURING THAT TIME."

[TAPE IS STARTED.]

TAPE:

"Each of you have the opportunity to earn money in the next part of today's session. In fact, this amount could be rather large. The amount of money you may earn depends in part on the decisions made by you and by the other member of your group. I would like to stress that all the money you earn today will actually be paid to you at the end of the study. Since we are interested in how people make decisions

when they know those decisions will affect how much money they earn, it is important that you really do earn money as a result of your choices.

Now let me describe the task you will perform in the next part of the session and the rules of the task. We are simulating a situation in which members of a group harvest acres of lumber from a forest that the group members share use of. Your task is to harvest as many acres of lumber from the forest for yourself as possible. The forest contains 200 acres, and each person may harvest any number between 20 and 100 acres during each "season" or trial. Each group member will individually and privately decide how many acres to harvest.

Since the group members will be harvesting acres of lumber from the same forest and overharvesting can destroy the forest, the government regulates the harvesting. A government agency discourages overuse of the resource through a fine system. Since harvesting is regulated, the number of acres of lumber you finally end up with on each trial is determined by your own harvest and also by your group member's harvest. The government's fine or confiscation system works in the following way. As the total number of acres harvested by your group increases, the government fine increases. Each member shares equal responsibility for the fine. For example, if the total number of acres harvested by both you and your group member were 104 acres, then a fine of 80 acres would be imposed, and each member of your two-person group must pay half of the fine, or 40 acres. It does not matter which person harvested a larger share of the 104 acre total. Each group member must pay an equal part of the fine. As you can see, the number of acres you finally end up with is in part

determined by the fine imposed on each trial. Each group member will receive the number of acres he or she harvests from the forest minus his or her share of the fine. If the fine is larger than the number of acres you have, then the total number of acres you have will become zero. The number of acres of lumber you have cannot go below zero.

There are two purposes for the harvesting task. First, we are interested in how people make decisions when money is involved. All subjects will participate in the harvesting task and all have the opportunity to get money, but for those who also worked on the 30 minute task at the beginning, this is how you will get compensated for working at the task. You may earn money in the following way. Each acre of lumber you accumulate during the study will be worth one penny. At the end of the study you will be paid, in cash, one penny for each acre of lumber you end up with. There will be between 5 - 10 trials. I want to stress that the number of acres of lumber you accumulate and the amount that you are paid for the acres of lumber will not be revealed to or known to any of the other people here today. Furthermore, each of you will be paid in private and will leave the room at separate times.

In a moment four example screens will be presented on the screen on your desk to familiarize you with the task. The example screens are similar to the screen on the actual trials and present four hypothetical trials in which members of a two person group harvest acres of lumber from a forest. Since the example screens are only examples, you will not receive the amount of lumber indicated on your screen.

EXAMPLE SCREEN 1

This is the first example screen. Let's look at the way the screen is set up. The first line shows the trial number, located on the left, the clock in the middle, and your booth color on the right. The second line shows information about your group. The third line shows information about your own current status. And the fourth line shows information relating to your group member's status.

Let's look more closely at the third line. The amount you harvest is shown at the left. In this example, you take 65 acres of lumber. Immediately below on the fourth line shows the amount your group member harvests, which in this example is 55 acres. The total taken by your team is indicated on the second line at the left. In this example, your group harvests 120 acres. And how much is the team fined? The second line in the middle shows that the group is fined 100 acres of lumber. The portion of the fine that you owe is shown below the team fine, on the third line in the middle, and the portion of the fine that the other member of your group owes is shown below your fine, on the fourth line in the middle. Remember that the group members share the fine equally. So just how much would you get on this trial? On the third line on the right, you can see that you would get 15 acres of lumber. The amount that your partner would receive, five acres, is shown at the far right on the fourth line.

EXAMPLE SCREEN 2

Here is another example screen Notice again that the trial number is indicated in the upper left corner, and the time remaining for you to indicate how many acres you would like to harvest is indicated in the middle. When the clock begins you will have 15 seconds to indicate your harvest decision by rotating the knob on the game

paddle on your desk. The clock will count down as is now shown. Your booth color is indicated on the far right.

In this example, you take 20 acres, as is shown at the left on the third line, and your partner also takes 20 acres, as is shown at the left on the fourth line. The number of acres your group takes, that is, the combined harvest by you and your group member, is 40 acres, as is shown at the left on the second line. Now look at the middle of the second line. Here, you can see that the team is fined zero acres. The middle of the third and fourth lines show that you and the other group member would not be fined. The total amount you would receive, 20 acres, is shown at the right side of the third line, and the amount your partner would receive, 20 acres, is shown at the right side of the fourth line. In this example, both group members made small harvests and there was no fine.

EXAMPLE SCREEN 3

In this next example screen, you harvested a lot of acres whereas your group member harvested a small number of acres. The left side of the third line shows that you took 100 acres, and the left side of the fourth line shows that your partner took 20 acres. The left side of the second line shows the group harvested 120 acres, and the middle of the second line shows the group is fined 100 acres. Because the fines are equally shared by the group members, both group members are fined 50 acres, as is shown on the middle of the third and fourth lines. To find out how much you and the other group member receive, look at the third and fourth lines, respectively. Here, you would receive 50 acres and the other group member would receive -30 acres. If either

you or your partner end up with a negative amount, as did your partner in this example, you just end up with zero points. The total number of acres you end up with cannot be negative.

EXAMPLE SCREEN 4

Here's the last example screen. In this example, both you and the other group member make large harvests. At the left side of the third line you see that you took 100 acres, and right below on the fourth line you see that your partner took 100 acres. And the group, that is, you and your group member, took a total of 200 acres, as you can see at the left of the second line. The middle of the second line shows that the team is fined 200 acres, and the middle of the third line shows you are fined 100 acres and right below on the fourth line you see your partner is fined 100 acres. In this example, you would get zero acres, as is shown at the right of the third line, and your partner would get zero acres, as is shown just below on the fourth line.

Again, the trial number, the time remaining to make your harvest decision, and your booth color are indicated on the first line. The second line shows the number of acres harvested by the group, the group fine, and the number of acres the group receives. The third line shows your harvest selection, your fine, and the number of acres you receive. The fourth line shows the selection of your group member, the fine, and the amount the other member receives.

In a few moments, we will begin the actual trials. To indicate how many acres you would like to harvest, turn the knob on the game paddle on your desk back and forth. As you turn the knob, the number of acres of lumber you would like to harvest

will change on your screen. You will have 25 seconds to indicate the number of acres of lumber you would like to harvest from the forest. The amount of time you have left to indicate this decision is indicated on the first line of your screen. When 25 seconds have elapsed, the computer will record the number of acres indicated on your screen as your harvest decision.

The computer will signal you on your screen when to make you harvest decision. Just before each trial begins you will see the number of the trial and a "READY" signal on the screen. Then, in a second or two, a "GO" signal will appear on the screen. You should then make your harvest selection. There will be a brief period before the next trial begins.

Remember, to indicate the number of acres you would like to harvest, turn the knob. Again, you will be paid one penny for each acre you finally end up with. The trials will now begin."

[STOP TAPE.]

EXPERIMENTER SAYS:

YOU SHOULD ALSO BE AWARE THAT IN SOME SESSIONS THERE IS A FEEDBACK CONDITION AND IN OTHER SESSIONS THERE IS A NO FEEDBACK CONDITION. YOU ARE IN THE NO FEEDBACK CONDITION AND WILL NOT RECEIVE ANY INFORMATION ABOUT YOU PARTNER'S CHOICES.

ALSO REMEMBER THAT THE TWO PEOPLE WHO WERE HERE FOR THE FIRST HALF HOUR AND WHO WORKED ON THE BATTERY OF

QUESTIONNAIRES DID NOT RECEIVE ANY CREDIT FOR THE FIRST 1/2
HOUR. THE HARVESTING TASK WILL SERVE AS THE WAY IN WHICH
THESE TWO PEOPLE ARE COMPENSATED FOR PARTICIPATING DURING
THAT TIME, ALTHOUGH EVERYONE WILL HAVE THE OPPORTUNITY TO
EARN MONEY DURING THE TASK.

[HARVEST TRIALS BEGIN.]

"That completes the series of trials on this task. Before continuing, we would
like to quickly get some of your impressions of the study to this point in the session.
In a moment, the experimenter will slip an envelope containing a short questionnaire
into your booth. Please fill it out completely. Then put it back into the envelope, slip
it out under the curtain to your booth, and wait quietly for further instructions."

APPENDIX C

ANOVA RESULTS ON THE GROUP COHESION

MANIPULATION CHECK ITEMS

ANOVA RESULTS ON THE GROUP COHESION

MANIPULATION CHECK ITEMS

1. To what extent would you like to meet with these same people again?,

   $F(1, 143) = 6.13$, $p < .01$. (high, $M = 4.68$; low, $M = 4.15$).

2. How much did you enjoy being in a group with these people?, $F(1, 143) =$

   25.63, $p < .0001$. (high, $M = 4.91$; low, $M = 3.84$).

3. How much do you like the people in the group?, $F(1, 149) = 18.55$, $p < .0001$.

   (high, $M = 4.89$; low, $M = 4.23$).

4. How much would you like to participate in another experiment with the

   same people in the group?, $F(1, 143) = 11.90$, $p < .001$. (high, $M = 5.01$; low,

   $M = 4.36$).

5. How much would you like to be in a different group in today's session?,

   $F(1, 143) = 7.74$, $p < .01$. (high, $M = 3.00$; low, $M = 3.53$).

6. How much do you feel as though you are a member of a group?, $F(1, 143) =$

   83.06, $p < .0001$. (high, $M = 4.99$; low, $M = 2.53$).