THE EFFECT OF PERSONAL AND GROUP GOAL SETTING ON AN INDIVIDUAL'S BEHAVIOR IN SMALL AND LARGE GROUPS IN A SOCIAL DILEMMA

by

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A thesis submitted in conformity with the requirements for the Degree of Doctor of Philosophy
Graduate Department of Management
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ABSTRACT

THE EFFECT OF PERSONAL AND GROUP GOAL SETTING ON AN INDIVIDUAL’S BEHAVIOR IN SMALL AND LARGE GROUPS IN A SOCIAL DILEMMA

Doctor of Philosophy, 1998
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The effect of personal and group goals on an individual’s behavior in three-person and seven-person groups in a social dilemma was investigated. High school students (N = 274) were paid $2.30 to $4.94 for 70 minutes of decision making. The results showed that students put their self-interest ahead of that of the group. The setting of a specific group goal had no direct effect on cooperative behavior or group performance. However, self-set personal goals that were compatible with the group goal led to higher group performance than the setting of personal goals that were incompatible with the group goal. Individual and group performance suffered when individuals were not committed to a specific group goal and tenaciously held out for high individual performance. Toward the end of the simulation, cooperation with other group members increased. Members in seven-person groups (N = 28),
however, were less cooperative than participants in three-person groups (N = 26). In addition, they had lower self-efficacy in making money, lower outcome expectancies that cooperation with other group members would lead to the attainment of the group goal, and lower collective-efficacy that they would make money than did the members of three-person groups.
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- Group goal
- Personal goal
- Group size

Dependent variable
- Group performance

Moderator variables
- Goal commitment
- Dispositional variables

Mediator variables
- Self-efficacy
- Collective-efficacy
- Outcome expectancies

Manipulation checks
- Clarity of instructions
- Goal specificity

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Manipulation checks
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Among the most robust findings in the behavioral science literature is that setting a specific, difficult goal increases performance significantly over that of urging individuals to "do their best" (e.g., Locke & Latham, 1990; Lee & Earley, 1992; Miner, 1984). However, a relatively unexplored area of goal setting is its effect on the individual in a group setting as well as on the performance of the group itself.

Of the studies that have been conducted, it appears that the effect of group goals on group performance is similar to that obtained when the individual is the unit of analysis. For example, a factor analysis revealed that setting a specific production goal correlated positively with cords per employee hour of logging crews (Ronan, Latham, & Kinne, 1973). Subsequent field experiments showed that logging crews with specific high goals had higher productivity than crews who were urged to "do their best" (Latham & Kinne, 1974; Latham & Locke, 1975; Latham & Yukl, 1975). A meta-analysis involving 10 studies and 163 groups supported these findings. The mean performance level of groups with specific difficult goals was almost one standard deviation higher \((d = .92)\) than the performance of groups for which no goals were set (O’Leary-Kelly, Martocchio, & Frink, 1994).

Laboratory experiments by Weldon and her colleagues (Weingart, 1992; Weingart & Weldon, 1991; Weldon, Jehn, & Pradhan, 1991) identified the variables that mediate the effects of group goals on performance. These include effort and
persistence, identification of strategies to attain group goals, performance monitoring, goal commitment, morale building communication, and extra-role behaviors.

In virtually all goal setting studies, working to attain the goal has been beneficial to both the individual and the group. Yet in organizational settings, goals are often in conflict so that working to attain the group’s goal may be detrimental to the individual and vice versa. For example, managers are often rewarded monetarily for doing what is in the best interest of their respective divisions rather than what is in the best interest of the overall organization. This phenomenon is referred to in the social psychology literature as a social dilemma, where one’s personal interests are in conflict with those of the group to which the person belongs.

There are two important properties of a social dilemma. First, there is a clear strategy that enables a maximum payoff for the individual at the expense of others. Second, if everyone chooses this strategy there will be a deficient outcome whereby everyone will lose more than that which would have occurred if everyone had worked toward the attainment of the group’s goal. Thus a social dilemma may be a boundary condition for the normally positive effect of specific high group goals on subsequent group performance.

A robust finding in the social dilemma research is that cooperation declines as groups become large (e.g., Messick & Brewer, 1983; Van Lange, Liebrand, Messick, & Wilke, 1992). This is because specific “tit for tat” strategies to induce group members into mutual cooperation are less effective; the extent to which a group member feels accountable for the welfare of the group declines as group size
increases; and the extent to which personal choice is identifiable decreases as group size increases. As group size increases beyond seven, however, the lack of cooperation in a social dilemma is relatively unaffected (Liebrand, 1984).

Contrary to the prediction of goal setting theory, moderately difficult goals in a social dilemma may lead to higher group performance than the setting of a highly difficult goal. Huber and Neale (1986, 1987) found that in bargaining situations, negotiators are more likely to use problem solving behaviors necessary to develop solutions or strategies to achieve high profits when a moderately high goal is set. When both negotiators set high goals, a level of conflict exists that precludes the problem solving behaviors necessary for an integrative solution. Instead negotiators focus on individual gain rather than on joint profitability. Over time, however, negotiators may realize the penalty of everyone pursuing their personal goals and change their behavior to work toward the attainment of the group’s goal.

A moderator variable influencing the effect of goals on performance is goal commitment (Locke & Latham, 1990). The correlation between goal level and performance is higher among individuals and groups with high commitment than among those with low commitment to goals. If, in a social dilemma, individuals have high personal goals and they are unwilling to compromise at anything less (i.e., high commitment) then a deficient outcome for all group members will occur. If, however, individuals reconcile their interests and focus on the interest of the group, they may obtain joint benefits that are higher than those that would be created by focusing on self-interest only.
Three potential mediators of the effect of group goals on performance are outcome expectancies regarding a person’s estimate that a given behavior will lead to certain outcomes; self-efficacy regarding judgment of one’s capability to execute a course of action; and collective-efficacy regarding one’s estimate that the group can execute a course of action. In a social dilemma, an individual may not commit to a specific high group goal because one’s outcome expectancies regarding cooperating with others to attain the group goal may be low. This is because an individual’s decisions alone do not ensure that the group will attain its goal. Moreover, whether a person benefits financially from doing what is in the best interest of the group depends on what the other group members do. Similarly, one can have high self-efficacy and low collective-efficacy regarding the amount of money that can be made.

Two dispositional variables that may affect the dependent variable are general trust and social value orientation (e.g., McClintock & Liebrand, 1988; Yamagishi, 1986; Van Lange & Kuhlman, 1994). Locke and Latham (1990) argued that dispositional variables moderate the relationship between goal level and performance. These two dispositions were measured in the present study for three reasons. First, initial propensities may influence the extent to which group members cooperate with others. Propensity to cooperate has been shown to be a strong predictor of behavior in subsequent trials. Second, knowledge of the social orientation of individual group members may increase understanding of group behavior in solving a social dilemma. Third, goal setting and group size may affect individuals with different dispositions differently.
In summary, the purpose of this study was two-fold. First, answers to the question of whether there is a main effect for personal goal setting, group goal setting, and group size on performance in a social dilemma situation were sought. Second, the following variables were examined to determine whether they explained why main effects, if any, were obtained: goal commitment, self-efficacy, collective-efficacy, outcome expectancies, social value orientation, and general trust. The literature supporting the choice of these variables and the resulting hypotheses are presented in Chapter 2.
CHAPTER 2

Literature review

Goal setting at the individual level

Locke and Latham (1990) identified three motivational mechanisms by which specific, difficult goals produce their effects, namely, choice, effort, and persistence. A goal directs attention toward actions which are relevant to it at the expense of actions that are not goal relevant; people adjust their effort to the difficulty level of the goal; and people persist in their effort until the goal is attained.

These three motivational mechanisms, however, are not always sufficient to attain a goal. Locke and Latham (1990) argued that a fourth benefit of goal setting is cognitive rather than motivational on tasks that are complex for the individual. That is, goal setting stimulates the development of task specific strategies to attain the goal. For example, Latham and Baldes (1975) observed that truck drivers assigned a specific difficult goal to increase the total weight of the logs they were carrying made minor modifications to their trucks so that they could judge the truck weight accurately. Similarly, Latham and Saari (1982) examined the performance of truck drivers assigned a specific difficult goal in terms of an average number of trips per day from the logging sites to the mill. Following the goal setting program, truck drivers started to use their radios to coordinate their efforts so that there would always be a truck at the logging sites when timber was ready to be loaded. Consequently, productivity increased.
Goal setting effects generalize across a wide range of individuals, tasks, settings, countries, criteria, and time spans. The results have been replicated: (1) with more than 40,000 individuals; (2) in both laboratory and field settings; (3) on tasks ranging from simple addition to performance appraisals of engineers and scientists; (4) in at least 9 countries; (5) using performance criteria ranging from response reaction time to job attendance; and (6) for time spans ranging from a few minutes to several years (Latham & Locke, 1990). The overall validity and usefulness of the theory has been supported by enumerative reviews (e.g., Latham & Locke, 1991; Locke, Shaw, Saari, & Latham, 1990; Locke & Latham, 1990), meta-analyses (e.g., Mento, Steel, & Karren, 1987; Tubbs, 1986; Wood, Mento, & Locke, 1987), peer evaluations from the behavioral science community (e.g., Lee & Earley, 1992), and comparative assessments of goal setting with other motivational theories (e.g., Kanfer, 1990; Miner, 1984; Pinder, 1984).

Goal setting at the group level

Though the evidence for the practical benefits of setting goals is strong, a relatively unexplored area is the usefulness of goal setting techniques on the individual within a group setting as well as for the group in which the individual is a member (Locke & Latham, 1990; O'Leary-Kelly, Martocchio, & Frink, 1994). A focus on the group's performance in addition to an individual's performance is necessary in that performance in organizations is, in many instances, group-based (e.g., Campion, Medsker, & Higgs, 1993; Guzzo & Dickson, 1996; Guzzo & Shea,
Group based activities such as management teams, cross-functional teams, quality circles, autonomous work groups, and task forces are commonplace in European and North American organizations. For example, a survey of FORTUNE 1,000 companies conducted by the Center for Effective Organizations revealed that 68% use teams. Scholars have concluded that learning how to work in a team setting "is the wave of the future" (e.g., Galbraith, & Lawler, 1993; Lawler, 1992).

Though empirical research on the effect of group goals is not as extensive as that on individual goal setting, the studies that have been conducted support goal setting theory. That is, groups working toward specific, hard goals perform better than groups with abstract goals such as "do your best." For example, as noted in Chapter 1, Ronan, Latham and Kinne (1973) factor analyzed a survey measuring supervisory practices and found that setting specific production goals correlated significantly with productivity (i.e., cords of wood harvested per employee hour) of logging crews.

In a field experiment, Latham and Kinne (1974) examined the effects of a one-day training program on goal setting. Consistent with Ronan, Latham and Kinne (1973), they found that cords per saw-hand hour and cords per crew-hour were significantly higher for logging crews that had been assigned a specific hard goal than that of crews in the control group. These results were replicated with educationally disadvantaged logging crews who had participatively set goals (Latham & Yukl, 1975).

Studies by Weingart and Weldon (Weingart, 1992; Weingart & Weldon, 1991;
Weldon, Jehn, & Pradhan, 1991) examined the underlying (social) psychological and behavioral processes that enhanced group performance as a result of group goals. As noted in Chapter 1, their laboratory experiments revealed that the following factors mediate the effects of group goals on performance: (1) effort and persistence; (2) planning and the identification of task strategies; (3) performance monitoring; (4) goal commitment; (5) morale building communication; and (6) extra-role behaviors.

Klein and Mulvey (1995) showed that the magnitude of the group goal is an important determinant of the level of performance achieved. Specifically, they found that the difficulty of a self-set group goal (i.e., a score on a group assignment that required investigating a human resource subfunction of an organization) correlated positively and significantly with group performance.

A meta-analysis (O’Leary-Kelly, Martocchio, & Frink, 1994), based on 10 studies and 26 usable effect size values, suggested that the mean performance level of groups that had goals was almost one standard deviation higher (d = .92) than the performance of groups that did not have goals. This finding is based on 163 groups that involved 1,684 individuals. The tasks ranged from a complex tinker-toy task to work in a silvermine.

Contrary to goal setting theory, however, moderately difficult group goals may lead to higher group performance than highly difficult group goals in a social dilemma situation. Support for this assertion can be found in the bargaining literature.
The effect of goal setting on bargaining performance

In a bargaining study, Huber and Neale (1986, 1987) found that moderately high goals typically result in a more profitable negotiation than when low goals or high goals are set. An explanation for this finding is that negotiators are more likely to employ problem solving behaviors necessary to develop solutions or strategies to achieve high profits when a moderately high goal is set (Pruitt, 1981, 1983). But, as Huber and Neale (1987) pointed out, if both negotiators have specific, high goals, they may focus on individual gain rather than on joint profitability. When both negotiators set specific high goals, a level of conflict exists that precludes the problem solving necessary for an integrative solution and high joint profit.

Negotiators may come to realize the futility of noncooperative behavior when they are locked into a noncooperative situation due to the pursuit of their high personal goal. For example, in 1986, Chrysler engaged in a rebate program designed to increase its sales volume and market share. The rebate it offered swiftly escalated when other auto companies did likewise. The rebates (competitive behavior) led to a loss of money on every car sold. Finally, Lee Iacocca, Chrysler’s CEO, told the press that the rebate program was scheduled to expire in the near future and that Chrysler had no plans to continue it. However, he also stated that if another company did not cooperate with Chrysler by discontinuing its program, Chrysler would reinstate its rebate program. Other companies got the message regarding the value of cooperative rather than competitive behavior, and the rebate programs stopped.
The effect of goal setting on group performance in social dilemmas

Nearly all goal setting studies have used goals for performance on a single task. However, in many situations, individuals and/or the groups to which they belong must pursue goals on multiple tasks. Two or more goals often differ in perceived importance, and hence commitment to them differs. For example, in a bank loan simulation conducted by Edmister and Locke (1987), groups consisting of bank lending officers were required to set their own weights for each of five performance goals: portfolio yield, portfolio size, net income, net charge-offs to loans, and credit file deficiency. They found that, with the exception of portfolio size, the correlations between goal weights and performance were significant. The participants performed better with respect to a given goal when its weight or importance was high than when it was low.

Closely related to the issue of commitment is that of conflict. Locke, Smith, Erez, Chah and Schaffer (1994) found that perceived conflict between teaching and research was negatively related to research productivity (but not teaching) of university professors.

A phenomenon unique to groups that has yet to be studied systematically with regard to goal setting is the social dilemma. A social dilemma, sometimes referred to as a prisoner's dilemma, is a situation in which one's personal interests or stakes are in conflict with those of the group to which the person belongs (e.g., Dawes, 1980; Messick & Brewer, 1983; Van Lange, Liebrand, Messick, & Wilke, 1992). Personal goals and group goals are compatible when working toward one ensures progress
towards the other; they are incompatible when investing resources in one goal has a deleterious effect on the attainment of the other goal (Weldon & Weingart, 1993).

The prisoner’s dilemma provides a motive to cooperate as well as an incompatible motive, namely, to pursue one’s personal interest. Each member of a group must decide whether (or how much) to cooperate with other members of the group to attain a goal.

The following anecdote, provided by Luce and Raiffa (1957), illustrates both the name and the structural properties of the prisoner’s dilemma.

Two individuals are accused of robbing a bank. Both suspects are separated and interrogated. The police are unable to prove that these two individuals have committed the crime. Both prisoners are confronted with two options: either confess or not to confess to the crime. If both suspects confess, each will receive a 5-year sentence. If neither suspect confesses, both will be tried on some minor charge and receive a 1-month sentence. If one confesses and the other does not, the suspect who does not confess will be locked away for 10 years while the other will be set free (p. 95).

The so-called "Tragedy of the Commons" (Hardin, 1968) is a historical example of a social dilemma that occurred more than a century ago. The commons was a plot of pasture land in early New England villages, where livestock owners could graze
their sheep. The pasture land was jointly held by all. It was in the interest of the individual herdsman to increase the size of his herd because the profit accrued to him would increase. The cost, measured as damage to the commons, was shared equally by all herdsmen. As long as consumption did not exceed regeneration rates, the system worked well. That is, each individual benefited from use of the pasture. But eventually, several members of the community wanted to maximize their personal profit. They did so by increasing their livestock that grazed on the pasture. As others noticed the extra sheep, they, too, added sheep to the pasture. The herdsmen who restrained expansion of their herd did not capitalize on the short-run exploitation of the commons. The commons, of course, was doomed to ruin by this expansion. The decreased capacity of the commons to support overgrazing resulted in all the sheep dying from starvation.

There are two important properties of a social dilemma. First, each individual has a dominating strategy, namely, one that is prescribed by the principle to maximize personal payoff. Second, if all individuals choose their dominant strategy, a deficient outcome occurs. Thus, a social dilemma is a result of two conflicting definitions of rationality (e.g., Kahan, 1974; Olson, 1965). Individual rationality prescribes noncooperation because this action leads to individual outcomes that are better than those following from cooperation within the group. However, collective rationality prescribes cooperation because each individual is better off when all individuals cooperate than when all pursue their personal interests.

Although research has indicated that goal setting is as effective with groups
as it is with individuals for increasing performance, a boundary condition of goal setting theory may be a social dilemma. Although individuals may be fully capable of exhibiting behaviors that support the attainment of a specific, challenging group goal, the structure of a social dilemma may discourage behaviors that lead to goal attainment by the group (e.g., "I can allocate all my resources to the joint account, however, in doing so I set myself up for exploitation").

In organizational settings, senior managers often need to encourage divisional managers to take a company-wide perspective as opposed to that of their division only. For example, Stentor, the Canadian alliance of the 10 provincial telephone companies, is constantly searching for strategies that will get each member company to attain the alliance's goal rather than pursue a company goal at the expense of the alliance. Weyerhaeuser, a forest products company, constantly looks for ways that will get its divisions to attain goals that enhance the overall company's profitability rather than that of an individual division. Digital Canada is constantly confronted with the dilemma of whether to pursue its national goal or to pursue what is in the optimal interest of Digital Worldwide.

There is evidence to suggest that a number of variables may act to moderate and mediate the relationship between goal level and performance. A crucial moderator variable is goal commitment. Without goal commitment, a goal is meaningless. Group size and dispositional variables may also moderate the relationship between goal level and performance. Possible mediator variables include self-efficacy, collective-efficacy, and outcome expectancies.
Moderators

Goal commitment. Commitment refers to the degree to which an individual is attached to a goal, considers it significant or important, is determined to reach it, and keeps it in the face of setbacks and obstacles (Locke, Latham, & Erez, 1988). When goals are challenging, high commitment leads to higher performance than low commitment (Erez & Zidon, 1984). This is because less committed individuals often abandon challenging goals in favour of easy ones.

Hollenbeck and Klein (1987) concluded that "despite the fact that the earliest discussions of goal setting (Locke, 1968) specified commitment to goals as a necessary condition for goal setting to work, the majority of studies in this area have completely ignored goal commitment" (p. 218). Furthermore, they argued that "few investigators examined the effects of goal commitment in a fashion consistent with the conceptualization of commitment as a moderator" (p. 218).

Locke and Latham (1990) stated that it has been difficult for goal setting researchers to demonstrate an effect of goal commitment on performance because, in the majority of studies, goal commitment has easily been achieved. However, the effect of goal commitment on performance may be more evident when individuals are confronted with a dilemma such as choosing between their personal goal and the group's goal.

Group size. The majority of studies of behavior in mixed-motive situations have focused on the two-person prisoner's dilemma (Molander, 1992). However, Dawes (1980) argued that the two-person prisoner's dilemma is not representative
of most social dilemmas. This is because in a two-person dilemma, the harm from noncooperation is focused on one person rather than spread across individuals. If the social dilemma is iterated, an individual in a two-person dilemma is able to shape the other person’s behavior by his or her own behavioral strategy.

A robust finding in the social dilemma literature is that cooperation declines as groups become large (e.g., Dawes, 1980; Messick & Brewer, 1983; Van Lange, Liebrand, Messick, & Wilke, 1992). This is because specific strategies (e.g., "tit-for-tat") to induce group members into mutual cooperation are less effective (Dawes, 1980). Second, the extent to which a group member feels accountable or responsible for the welfare of the group declines as group size increases due to diffusion of responsibility (e.g., Fleishman, 1980; Latane & Darley, 1968; Latane, Williams, & Harkins, 1979). If other group members are contributing to the attainment of a group goal, it is often easy to diffuse responsibility and feel less personally obligated to cooperate with others. Individuals may conclude that the actions and decisions of others will ensure the attainment of the group goal. They are thus free to redirect their efforts to pursuing their personal goal. Third, the extent to which personal choice is identifiable often decreases as group size increases. Identifiability promotes feelings of social control that encourages people to cooperate or to exercise personal restraint (e.g., Fox & Guyer, 1978; Kerr & Bruun, 1981; Williams, Nida, Bacca, & Latane, 1989).

Marwell and Schmitt (1972) found that individuals cooperated more in two-person social dilemmas than in three-person social dilemmas. Hamburger, Guyer
and Fox (1975) found higher levels of cooperation in three person groups than in groups consisting of seven persons. As group size becomes larger than seven or eight persons, the level of cooperation is relatively unaffected by an increase in group size (Liebrand, 1984). Because cooperative behavior is more difficult to obtain when group size increases, the effects of setting a group’s goal may be stronger for a small as opposed to a large group.

Dispositional variables. The study of behavior in social dilemma situations has shown that two dispositions, namely, social value orientation and general trust, account for a significant amount of variance in the dependent variable. Social value orientation is defined as a tendency to choose consistently that which will enhance the collective welfare in the hope of obtaining a desired combination of own - other outcomes (McClintock, 1978; McClintock & Liebrand, 1988). There is empirical support for three distinct orientations, namely, (1) cooperation, that is, the tendency to maximize joint welfare; (2) individualism, that is, the tendency to maximize own welfare with little regard for the welfare of others; and (3) competition, that is, the tendency to maximize relative advantage over the welfare of other individuals.

While individuals with a cooperative orientation may be more inclined to consider the interests of their fellow group members, it may not be sufficient to fully cooperate with them. Individuals should also expect cooperation from other group members. A disposition relevant to understanding this expectation is the level of general trust (e.g., Edney, 1980). Yamagishi (1986) defined trust as the belief that others will not exploit one’s goodwill. Research has shown that high trusting
individuals are more likely to invest in collective goods than low trusting individuals (e.g., Parks, 1994; Parks & Hulbert, 1995; Yamagishi, 1986).

Some evidence exists to suggest that there is a relation between social value orientation and trust. For example, Kuhlman, Camac, and Cunha (1986) found that competitors scored significantly lower on a trust questionnaire than cooperators and individualists (who were not significantly different from each other). Parks (1994), however, found that the measure of trust was not related to social value orientation suggesting that trust and social values are distinct concepts.

**Mediators**

**Self-efficacy.** Latham and Locke (1991) stated that individuals consider not just what they want when setting performance goals, but also what they think they can attain. Two potential mediating variables of the effects of goals on performance are self-efficacy and outcome expectancies (Bandura, 1986; Locke & Latham, 1990). Self-efficacy refers to task-specific self-confidence. Bandura (1986) defined self-efficacy as "people’s judgments of their capabilities to organize and execute courses of action required to attain designated types of performances. It is concerned not with the skills one has but with the judgments of what one can do with whatever skills one possesses" (p. 319).

It has been shown consistently that self-efficacy has both a powerful, direct effect on performance (Bandura, 1986) as well as an important indirect effect via goal choice and goal commitment (Locke & Latham, 1990; Locke, Frederick, Lee, & Bobko,
Thus goal choice and goal commitment mediate the relationship between self-efficacy and performance (Locke & Latham, 1990).

**Collective-efficacy.** Bandura (1986; 1997) suggested that the concept of self-efficacy can be extended to groups. Collective or group-efficacy has been defined as "an individual's estimate concerning a group's capability" (Earley, 1993, p. 323) and group members' belief that "they can solve their problems and improve their lives through concerted effort" (Bandura, 1986, p. 449). Collective-efficacy influences the goals people seek to attain, how they manage their resources, the strategies they construct, how much effort they put into their group endeavour, and their vulnerability to discouragement when collective efforts fail to produce quick results or encounter forcible opposition (Bandura, 1997). Thus group perceptions of efficacy may be related to group performance. Support for Bandura's argument can be found in several studies.

Riggs, Warka, Babasa, Betancourt and Hooker (1994) developed and validated a seven item 5-point Likert scale for collective-efficacy (e.g., "This department is not able to perform as well as it should"). They found that collective-efficacy correlated positively and significantly with group performance of retail, public education, banking, mental health rehabilitation, and community service employees.

In a laboratory study involving Chinese, Israeli, and American managers performing simulated managerial activities, Earley (1993) found that perceptions of collective-efficacy mediated the effects of the interaction between group membership and individualism - collectivism on task performance. In this study, collective-
efficacy was measured by asking managers to rate their expectations for five levels of group performance.

Prussia and Kinicki (1996) examined the performance of four-person groups on two brainstorming tasks. They found that performance feedback affected perceptions of collective-efficacy. Furthermore, collective-efficacy completely mediated the relationship between feedback and group performance, and partially mediated the linkage between vicarious experience (manipulated through the use of a group modeling videotape) and group performance. Collective-efficacy was assessed with two scale indicators, namely, confidence in output quantity and confidence in process behavior.

Researchers (e.g., Bandura, 1986; 1997; Lindsley, Brass, & Thomas, 1995) have suggested that perceptions of collective-efficacy emerge from exposure of group members to objective stimuli (including group performance and aspects of the environment that facilitate or inhibit performance) and the processes of social comparison (modeling) and social influence (persuasion). For example, the belief that the group is able to perform at a certain level may decrease if individuals learn over repeated occasions that other group members do not cooperate with others or perform their share of the work. Thus it is possible for individuals to have high self-efficacy and low collective-efficacy.

**Outcome expectancies.** An outcome expectancy is defined as "a person's estimate that a given behavior will lead to certain outcomes" (Bandura, 1977, p. 79). These outcomes may hold both practical (e.g., increasing profit for the department)
as well as psychological (e.g., a good feeling that one did not cheat other group members) benefits to the individual (Bandura, 1986). Individuals are more likely to translate self-efficacy into action if they believe such action will lead to beneficial outcomes (Bandura, 1982).

In a social dilemma, an individual may not commit to a specific, high group goal for at least two reasons. First, one’s outcome expectancies regarding the group attaining its goal may be low because one’s decisions and effort alone cannot ensure the attainment of the group’s goal. Whether a given herdsman, for example, benefited financially by doing what was in the best interest of the group depended on what the other herdsmen decided to do. Because of this uncertainty, individuals do not know whether it is worthwhile for them to abandon their individual goal and to pursue the group’s goal.

Second, one’s outcome expectancy that others will be committed to a highly difficult group goal may be low. In other words, an individual may believe that other group members’ willingness to act on the group’s behalf is unlikely. This belief is reinforced when individuals learn through feedback that fellow group members did not choose the group’s goal. In a social dilemma, trying to attain the group’s goal can interfere with personal goal attainment. Because individuals may attempt to protect themselves from being the "sucker" (Orbell & Dawes, 1981), they may focus on their personal goal that will bring them desired outcomes at the expense of attaining the group’s goal.

The belief that other group members are willing to act on the group’s behalf
and perceptions of collective-efficacy are usually related, but they are distinct constructs. For example, if the group goal is perceived as too high to be attainable, no matter how cooperative an individual believes fellow group members are, he or she may still believe that the group has little chance of success. Conversely, if the goal is perceived as moderately difficult, individuals may believe that the group is capable of succeeding despite a low expectation of other’s cooperation.

Hypotheses

Based on the literature review, this study examined the following hypotheses:

H1(a): When faced with a dilemma to choose between one’s self-interest and the interest of the group, individuals initially put their self-interest ahead of that of the group. They contribute less than the amount of money that is required to attain a high, but attainable group goal on block 1 (trials 1, 2, and 3).

H1(b): When faced with a dilemma to choose between one’s self-interest and the interest of the group, individuals sacrifice their self-interest for that of the group on block 3 (trials 7, 8, and 9).

H2(a): The correlation between personal goal level and the amount of money made by the individual is positive and significant.

H2(b): There is a main effect for group goal setting. Groups assigned a specific goal make significantly more money than groups assigned a "do best" goal.
H2(c): Groups assigned a moderately high goal make significantly more money than groups assigned either a difficult goal or a "do best" goal.

H2(d): Groups on later blocks make significantly more money than they do on early blocks.

H2(e): There is a main effect for group size. Individuals in three-person groups contribute significantly more money to the common good than individuals in seven-person groups.

H2(f): The correlation between monetary contributions to the common good and the amount of money made by the individual is positive and significant.

H3(a): Commitment to the personal goal decreases with time.

H3(b): Goal commitment moderates the relationship between the level of the personal goal and the amount of money made by the individual.

H3(c): The correlation between commitment to the personal goal and the amount of money made by the groups is negative and significant.

H3(d): Commitment to the group goal increases with time.

H3(e): The correlation between commitment to the group goal and the amount of money made by the groups is positive and significant.

H3(f): Goal commitment moderates the relationship between the level of the group goal and the amount of money made by the group.
H4(a): When faced with a dilemma to choose between one’s self-interest and the interest of the group, individualists and competitors put their self-interest ahead of that of the group more so than cooperators.

H4(b): Cooperators contribute significantly more money to the common good than individualists and competitors.

H5(a) When faced with a dilemma to choose between one’s self-interest and the interest of the group, low-trust individuals put their self-interest ahead of that of the group more so than high-trust individuals.

H5(b): High-trust individuals contribute significantly more money to the common good than low-trust individuals.

H6(a): The correlation between self-efficacy in making money and the amount of money made by the individual is positive and significant.

H6(b): Self-efficacy in making money mediates the relationship between personal goal level and the amount of money made by the individual.

H7(a): The correlation between collective-efficacy in making money and the amount of money made by the group is positive and significant.
H7(b): Collective-efficacy in making money mediates the relationship between group goal level and the amount of money made by the group.

H8(a): The correlation between outcome expectancies of cooperating with others to attain the group goal and the amount of money made by the group is positive and significant.

H8(b): Outcome expectancies of cooperating with others to attain the group goal mediate the relationship between group goal level and the amount of money made by the group.

The method for examining these hypotheses is explained in Chapter 3.
CHAPTER 3

Method

Experimental design and participants

The hypotheses were tested using a 3 (moderate group goal, high group goal, and "do best" group goal) x 2 (three-person group, and seven-person group) x 3 (blocks) factorial design. A total of 274 Ontario Academic Credit (OAC) high school students participated in the experiment.

High school students were chosen because group based activities are commonplace in educational settings. Yet there are a plethora of school-related situations in which the interest of the student is at odds with that of the group of which he or she is a member (e.g., investing time and effort in group assignments, and withholding relevant information in classroom discussions). Thus the issue of group conflict and the setting of specific performance goals to improve group performance is of high relevance to educators and students.

The participants were recruited in a two-step process. First, letters were sent to social science department heads of secondary schools in the Metro Toronto Board of Education. This letter explained both the purpose and the specific procedures of the study (see Appendix I). Second, two weeks after the letters were sent, department heads were contacted to inquire about their interest in the study. If department heads and their students were willing to participate in the study, a time-period to conduct the experiment was arranged. The experiment was conducted
during class-time; classes lasted between 65 and 80 minutes.

The participants were randomly divided into either three-person (N = 26) or seven-person groups (N = 28). One-hundred-and-forty-five participants were male, and 115 were female. Fourteen participants did not indicate their sex on the research materials. The mean age of the participants was 17.3 years (S.D. = 1.8 years).

**Experimental task**

The social dilemma was based on a paradigm proposed by Marwell and Ames (1979) and subsequently used by Fleishman (1980; 1988) and Komorita, Parks and Hulbert (1992). Each participant was asked to assume the role of division manager in a large business named El-Tek Inc. The instructions stated that each division manager was responsible for: (1) determining and implementing policies and practices related to the development of new electrical products; and (2) the costing, pricing, and selling of these electrical products. The design of this organization thus reflected that of a decentralized and product centered organization (see Appendix II).

The participants were told that they would be working, as a group, on a decision-making task that measures their ability to make money. The amount of money that they could earn was dependent on their own decisions as well as the decisions of the other group members. The participants were also told that they would be working with two (six) other division managers of El-Tek Inc. on a project to generate money for a mutual research and development project, namely, designing audio equipment.
Consistent with the social dilemma literature, there were 9 trials (e.g., Fleishman, 1980; 1988). Nine trials allowed participants to form and revise perceptions of the moderator variable (i.e., goal commitment) and mediator variables (i.e., outcome expectancies of contributing to the joint account, self-efficacy in making money, and collective-efficacy in making money), after observing fellow group members make allocation decisions, and experience the consequences of those decisions.

On each trial, participants were required to make a decision regarding the investment of money into the mutual research and development project. Specifically, each participant had to decide how to invest 25 cents. There were two options, namely, investing the money (1) in one’s own division, that is, the personal account, or (2) in the mutual research and development project, that is, the joint account shared with the other two (six) division managers. Participants were not told there were 9 trials because such knowledge can influence cooperative behavior (Rutte, Wilke, & Messick, 1987).

Contributions to the personal account were not shared with the others. The participants were told that if they invested money in the research and development project, their contribution would be doubled in value (e.g., 15 cents becomes 30 cents). Moreover, they were told that each division manager would receive an equal share of the money regardless of how much money he or she put into the joint account. At the end of each round, therefore, the amount of money that each participant earned was the amount of money in his or her personal account plus a
share from the joint account.

This procedure established a social dilemma. For any participant it was potentially more profitable to allocate all of one's money to the personal account, and to take advantage of those participants who contributed to the joint account. However, if too many participants decided to do likewise, each participant's payoff would be less than if all the money had been allocated to the joint account. The minimum and maximum amount of money that individuals in three-person groups could earn was $1.50 and $5.25. The corresponding values for individuals in seven-person groups were $0.75 and $6.25. The amount of money that three-person groups could earn was between $6.75 and $13.50. Seven-person groups could earn between $15.75 and $31.50.

To ensure that the participants understood the consequences of their decisions, they were shown a detailed example illustrating the operation of the personal and joint account (see Appendix II). In addition, a manipulation check was included that tested the participant's comprehension of the reward structure (see Measures).

This task was chosen for three reasons. First, a simulation compresses time allowing participants to experience the short- and long-term effects of their actions in a social dilemma setting. Second, the task provides participants with an understanding of social dilemmas and motivates them to discuss possible solutions to it (Powers, 1992). Thus the simulation had high potential for learning, and hence was an educational exercise for students. Third, working as a team to make money for it and oneself is a requirement of many organizational settings. Using
organizationally relevant tasks enhances the generalizability of findings from simulations to field settings (Latham & Lee, 1986; Latham & Seijts, 1995).

Not only did participants work for money (i.e., they were facing a real dilemma), their reputation was at stake as well. The students interacted with one another on a daily basis. Anecdotal evidence indicated that task involvement was high and that the participants were motivated to find the best way to earn money. Therefore the experiment contained both mundane (e.g., communication was allowed, and all choices were public) and experimental realism. This minimizes the probability that participants perceive social dilemma tasks as a game and make provocative (non-cooperative) choices to relieve boredom (e.g., Nemeth, 1972; Pruitt & Kimmel, 1977; Van Lange, Liebrand, Messick, & Brewer, 1992).

**Procedure**

Each participant received a package explaining the task requirements. This package also contained questionnaires (see Measures). After a brief introduction, participants were asked to study the task requirements and encouraged to ask questions to clarify the instructions. At the end of the instructions, the importance of setting a group goal was explained.

In order to ensure that both moderately difficult and highly difficult group goals were set, the goal was assigned by the experimenter. This procedure is not unlike goals that are assigned by an instructor in an educational setting or a manager in a work setting. Moreover, numerous studies (e.g., Latham, Erez, & Locke, 1988)
have shown that goals assigned with a rationale have the same effect on performance as participatively set goals.

Wood and Locke (1990) stated that a moderate goal is one that 50% of the participants can attain. Similarly, a difficult goal is one that only 10% of the participants can attain. Therefore, a pilot study was conducted to establish both a moderately difficult group goal and a highly difficult but attainable group goal. The resulting group goal instructions were as follows:

**Do Best Group Goal** (three-person and seven-person):

To make money typically requires groups to think strategically. Hence, it is important that this group does its best to think of ways to make as much money as possible.

**Moderately Difficult Group Goal** (three-person):

To make money typically requires groups to think strategically. Hence, it is important that the group commits to a specific difficult yet attainable goal to make money. In previous sessions, the average amount of money that groups made was $12.00. This group’s goal should be to think of ways to make $12.00 or more.

**Moderately Difficult Group Goal** (seven-person):

To make money typically requires groups to think strategically. Hence, it is
important that the group commits to a specific difficult yet attainable goal to make money. In previous sessions, the average amount of money that groups made was $26.00. This group’s goal should be to think of ways to make $26.00 or more.

**Highly Difficult but Attainable Group Goal** (three-person):
To make money typically requires groups to think strategically. Hence, it is important that the group commits to a specific difficult yet attainable goal to make money. In previous sessions, the average amount of money that groups made was $13.00. This group’s goal should be to think of ways to make $13.00 or more.

**Highly Difficult but Attainable Group Goal** (seven-person):
To make money typically requires groups to think strategically. Hence, it is important that the group commits to a specific difficult yet attainable goal to make money. In previous sessions, the average amount of money groups that made was $31.00. This group’s goal should be to think of ways to make $31.00 or more.

In addition to assigning a group goal, each participant was asked to set a specific personal goal regarding the amount of money that he or she intended to earn by the end of the work period. This was done in order to create a dilemma for
participants to choose between the goal of the group and that of their own.

Each trial was identical in format. All participants received a decision slip on which to write the amount of money allocated to the personal account and to the joint account. Once the contributions had been entered, the experimenter collected the slips. The experimenter then announced the amount of money allocated to both the personal account and the joint account by the group members, and calculated the amount of money that comprised each participant’s share of the payoff from the joint account. Providing this feedback was necessary because goals in the absence of feedback have little or no effect on performance (e.g., Erez, 1977). In addition, knowledge of other’s cooperation was expected to influence one’s own cooperative behavior (e.g., Messick, Wilke, Brewer, Kramer, Zemke, & Lui, 1983; Schroeder, Jensen, Reed, Sullivan, & Schwab, 1983).

All choices were public. That is, after each trial, participants knew how much the other two (six) division managers had allocated to the joint account. Research has shown that removing the element of anonymity by providing feedback about each group member’s choices can increase cooperation (Sell & Wilson, 1991). Furthermore, participants were allowed to discuss progress with the other division managers three times during the task: prior to trials 1, 4, and 7. This discussion was allowed to last up to three minutes. Intragroup communication has been found to promote cooperation in social dilemma situations (e.g., Komorita & Parks, 1995; Orbell, Van de Kragt, & Dawes, 1988). Discussion-induced commitments to cooperate is the most powerful explanation for this phenomenon (Kerr & Kaufman-
Gilliland, 1994). These two procedures (public choices and communication) enhanced the generalizability of the findings to organizational settings.

After the ninth trial, participants completed a questionnaire that included manipulation checks (see Measures). Participants were debriefed (see Appendix III) and thanked for their participation.

**Measures**

**Independent variable**

**Personal goal.** Prior to trial 1, all participants were asked to set a specific personal goal (i.e., "Please, specify the amount of money that you yourself intend to earn by the end of this task"). Participants were asked not to communicate this goal to the other two (six) group members. The instructions stated that a realistic personal goal would fall between $1.50 and $5.25 for three-person groups, and $0.75 and $6.25 for seven-person groups (see Appendix IV).

**Group size.** Individuals were randomly assigned to either three-person or seven-person groups.

**Group goal.** Groups were randomly assigned to one of three group goal conditions, namely, do best group goal, moderately difficult group goal, and highly difficult group goal. There were eight groups in the three-person / moderately difficult group goal, three-person / highly difficult group goal, seven-person / moderately difficult group goal, and seven-person / highly difficult group goal conditions; ten groups in the three-person / "do best" group goal condition; and
twelve groups in the seven-person / "do best" group goal condition.

**Dependent variable**

**Group performance.** The dependent variable was the amount of money allocated to the joint account by each group member on each trial. This measure allows one to calculate: (1) the average amount of money allocated to the joint account by the group on each trial; (2) the amount of money earned by each group on each trial as well as on aggregated trials; and (3) the amount of money earned by each group member on each trial as well as on aggregated trials.

**Moderator variables**

**Goal commitment.** Both commitment to the self-set personal goal and the assigned group goal were measured. Commitment to the personal goal was measured three times (i.e., prior to trials 1, 4, and 7) using five 5-point Likert-type items. These items (e.g., "I think my personal goal is a good goal to shoot for") were taken from Hollenbeck, Klein, O'Leary, and Wright (1989) (see Appendix IV). Scores could range from "completely disagree" (1) to "completely agree" (5). This scale has been shown to have adequate internal consistency (Hollenbeck, Klein, O'Leary, & Wright, 1989; Wright, O'Leary-Kelly, Cortina, Klein, & Hollenbeck, 1994).

Commitment to the group goal was also measured three times (i.e., prior to trials 1, 4, and 7) using seven 5-point Likert-type items taken from Hollenbeck, Klein, O'Leary, & Wright (1989) (see Appendix V). Consistent with the studies conducted by Weldon and Weingart (Weingart, 1992; Weingart & Weldon, 1992; Weldon, Jehn, & Pradhan, 1991), the items were modified to refer to group goals rather than
individual goals (e.g., "It is quite likely that this group goal may need to be revised" (reverse scored)). Scores could range from "completely disagree" (1) to "completely agree" (5). Weldon (1992) reported a Cronbach alpha of .79 for the measurement of goal commitment.

Dispositional variables. The measure of social value orientation consisted of nine questions adapted from Messick and McClintock (1968) and Van Lange and Kuhlman (1994) (see Appendix VI). These questions consisted of a decision between a specific monetary outcome for oneself and another, imaginary, person. Each decision situation contained 3 allocation options. One option proposed an equal distribution of outcomes, and represents the value orientation of cooperation (e.g., $4.80 - $4.80). Another option proposed a distribution which maximized own outcome irrespective of the outcome of the other, and represents the value orientation of individualism (e.g., $5.40 - $2.80). A third option advanced a distribution which maximized the difference between own outcome and that of the other, and is representative of the value orientation of competition (e.g., $4.80 - $0.80).

This scale has been shown to have adequate internal consistency (Parks, 1994), and test-retest reliability (Eisenberger, Kuhlman, & Cotterell, 1992). The measure of social value orientation was counterbalanced. Approximately half of the participants completed the items prior to reading the experimental instructions; the others completed the questions after finishing the experimental task.

The level of general trust was measured using a scale developed by Yamagishi (Yamagishi, 1986; Yamagishi & Sato, 1986). The trust scale contains eight items (e.g.,
"In these competitive times, one has to be alert or someone is likely to take advantage of you," and "In dealing with strangers, one is better off to be cautious until they have provided evidence that they are trustworthy") (see Appendix VII). Scale scores could range from "completely disagree" (1) to "completely agree" (5).

This scale has been shown to have adequate internal consistency, and test re-test reliability (Parks, 1994; Yamagishi, 1986; Yamagishi & Sato, 1986). The measure of general trust was counterbalanced. That is, approximately half of the students completed the trust questionnaire prior to reading the experimental instructions; the others completed the questionnaire after finishing the simulation.

Mediator variables

Self-efficacy. Measures of self-efficacy were taken three times, namely, prior to trials 1, 4, and 7. Fifteen levels were assessed, ranging from earning $1.75 to $5.25 for three-person groups, and earning $2.75 to $6.25 for seven-person groups (see Appendix VIII). Both self-efficacy magnitude and self-efficacy strength were measured. This was because both magnitude and strength contribute to the prediction of task performance (Bandura, 1977; Lee & Bobko, 1994; Locke, Frederick, Lee, & Bobko, 1984). Self-efficacy magnitude was operationalized as the total number of "Yes" answers. The strength of self-efficacy was the sum of the rating scores across the 15 performance levels. The ratings were made in terms of a 10-point scale ranging from "no confidence at all" (1) to "total confidence" (10).

Collective-efficacy. Gist (1987) suggested three methods for assessing collective-efficacy. These methods include: (1) aggregating perceptions of individual
self-efficacy; (2) averaging of individual's responses to perceptions of collective-efficacy; and (3) asking group members to collectively fill out a single questionnaire. Though there is no consensus on which method to use (Gist, 1987; Lindsley, Brass, & Thomas, 1995), Bandura (1997) argued against measuring perceived collective-efficacy by having group members make the judgment together because group members are rarely of one mind in their appraisals of matters. A group belief is, therefore, best characterized by a representative value for the beliefs of its members and the degree of variability or consensus around that central belief. Forming a consensual judgment of a group's efficacy by group discussion is subject to the vagaries of social persuasion and conformity pressures, and hence masking the variability in members' beliefs concerning their group's capabilities. Similarly, other researchers (e.g., Lindsley, Mathieu, Heffner, & Brass, 1996) have argued that while collective-efficacy may represent the group equivalent of individual self-efficacy, it is not simply the sum of individual group members' self-efficacies.

In the present study, the second method suggested by Gist (1987) was used. Consistent with Earley (1993) and Prussia and Kinicki (1996), participants were asked their individual perceptions of collective-efficacy (e.g., "I feel my group can make $12.00 on this task") (see Appendix IX). Measures of collective-efficacy in making money were taken three times, namely, prior to trials 1, 4, and 7. Fifteen levels were assessed, ranging from earning $6.75 to $13.75 for three-person groups, and $18.00 to $32.00 for seven-person groups. Both collective-efficacy magnitude and collective-efficacy strength were measured.
**Outcome expectancies.** The anticipated outcomes of contributing to the joint account were measured using nine 5-point Likert-type items. Outcome expectancies of cooperative behavior, that is, allocating money to the joint account, were identified in a pilot study. Examples of these items include the following: "I believe that we will be able to increase the profit of the group," and "I believe that a feeling of trust will arise so that each division manager will allocate money to the joint account" (see Appendix X). Scale scores could range from "completely disagree" (1) to "completely agree" (5). Measures of outcome expectancies were taken three times, namely, prior to trials 1, 4, and 7.

**Manipulation checks**

**Clarity of instructions.** Clarity of instructions was measured using two items (i.e., "The instructions were clear to me," and "I had a full understanding about the procedures of the experiment") (see Appendix XI). Scores could range from "very much so" (1) to "not at all" (5).

In addition, based on a scenario in which three (seven) division managers allocated money to both the personal account and the joint account, participants were asked to answer four questions: (1) How much money did you receive from the joint account?; (2) How much money did you earn in this round?; (3) How much money did the other two (six) managers earn in this round?; (4) How much money did the group earn in this round? (see Appendix XI). Answers to these four questions regarding the scenario were checked before participants made their first allocation decision. Thus if an incorrect answer was given to any of these four questions, the
experimenter could explain the correct answer in detail.

**Goal specificity.** Goal specificity was measured using three 5-point Likert type items (e.g., "To what extent was there uncertainty as to the amount of money to be earned by the group") adapted from Winters and Latham (1996) (see Appendix X). Scale scores could range from "very much so" (1) to "not at all" (5).
CHAPTER 4
Results

In this chapter the tests of the hypotheses are described and the outcomes are reported. Specifically, manipulation checks, main effects, moderator effects, and mediator effects are explained.

Manipulation checks

Clarity of instructions. The coefficient alpha for the two-item scale was .84. A 3 (group goal) x 2 (group size) analysis of variance indicated that there were no significant differences in perceived clarity of the instructions across the 6 experimental conditions. The grand mean was 4.50 (S.D. = 0.75). This indicates that the participants found the instructions clear, and that they understood the experimental procedures.

Goal specificity. The coefficient alpha for the three-item scale was .73. An analysis of variance indicated there was a significant difference in perceived specificity of the group goal between participants in the "do best" condition (M = 2.82, S.D. = 0.94) and participants assigned a specific group goal (M = 3.47, S.D. = 0.98), F(1, 245) = 26.72, p < .001.

Hypotheses

Main effects

Pursuing the interest of the group was operationally defined as
contribute 24 cents or more to the joint account; a smaller contribution was defined as pursuing self-interest. This is because if each group member contributed at least 24 cents per trial to the joint account, then three-person groups would have earned $12.96, the high but attainable group goal. Similarly, the seven-person groups would have earned $30.24, the high but attainable group goal. Table 1 shows the results. Also indicated in Table 1 is the number of individuals who contributed 10 cents or less to the joint account.

A chi-square one-sample test for block 1 (trials 1 thru 3) indicated that the frequency of individuals who pursued their self-interest was significantly greater than the frequency of individuals who pursued the group's interest, $\chi^2(1) = 18.71, p < .001$. This finding is consistent with the social dilemma literature. Support was thus obtained for hypothesis 1(a). The frequency of individuals who pursued their self-interest during block 2 (trials 4 thru 6) was also significantly greater than the frequency of individuals who pursued the group's interest, $\chi^2(1) = 26.32, p < .001$. Conversely, the frequency of individuals who pursued the group's interest was significantly greater than the frequency of individuals who pursued their self-interest during block 3 (trials 7 thru 9), $\chi^2(1) = 32.71, p < .001$. Thus support was obtained for hypothesis 1(b).

Generally, cooperation tended to go down within each block (see Table 1). Anecdotal evidence suggested that participants started to cooperate and felt betrayed when others did not reciprocate their behavior. Consequently, they stopped pursuing the interest of the group as well.
Table 1: Frequencies of participants who pursued the interest of the group ("cooperate") and their self-interest ("non-cooperate") per trial (T1 thru T9).

<table>
<thead>
<tr>
<th>Trial</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>T5</th>
<th>T6</th>
<th>T7</th>
<th>T8</th>
<th>T9</th>
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</tr>
<tr>
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<td>133</td>
<td>116</td>
<td>100</td>
<td>145</td>
<td>120</td>
<td>109</td>
<td>162</td>
<td>143</td>
<td>147</td>
<td>1175</td>
</tr>
<tr>
<td>non-cooperate</td>
<td>141</td>
<td>158</td>
<td>174</td>
<td>129</td>
<td>154</td>
<td>165</td>
<td>112</td>
<td>131</td>
<td>127</td>
<td>1291</td>
</tr>
<tr>
<td>Total sample</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>less than 10 cents</td>
<td>51</td>
<td>67</td>
<td>78</td>
<td>44</td>
<td>68</td>
<td>69</td>
<td>55</td>
<td>69</td>
<td>52</td>
<td>553</td>
</tr>
</tbody>
</table>
**Personal goals.** Table 2 shows the mean values for the personal goals across experimental conditions. The mean values for individual performance across experimental conditions are shown in Table 3. The minimum and maximum amount of money earned by individuals in three-person groups was $3.02 and $4.50, respectively. The corresponding values for individuals in seven-person groups were $2.30 and $4.94. The total amount of money earned by the participants was $1,052.56.

The correlation between personal goal level and the amount of money made by the participants was .03 (p > .05) for individuals in three-person groups and .05 (p > .05) for participants in seven-person groups. Therefore no support was obtained for hypothesis 2(a).

A follow-up analysis revealed that nineteen participants (24%) in three-person groups and 109 participants (56%) in seven-person groups set a personal goal that was incompatible (personal goal > $4.50) with that of maximizing performance of the group. An analysis of variance on the level of the personal goal showed that participants in the three-person groups assigned a specific group goal set themselves a significantly higher personal goal ($M = 4.13, S.D. = 0.85$) than did the participants in groups urged to "do their best" ($M = 3.58, S.D. = 1.06$), $F(1, 76) = 6.33, p < .05$. Though no significant differences in personal goals were obtained for participants in seven-person groups across goal conditions, it should be noted that the mean values for personal goals were all higher than $4.50$. A chi-square test indicated that participants in seven-person groups adopted personal goals that were incompatible
**Table 2:** Mean self-set personal goal (in dollars) for each experimental condition. Standard deviations in parentheses.

<table>
<thead>
<tr>
<th>Assigned Group Goal Level</th>
<th>Do best</th>
<th>Moderate</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-person</td>
<td>$3.58</td>
<td>$4.16</td>
<td>$4.11</td>
</tr>
<tr>
<td></td>
<td>(1.06)</td>
<td>(0.85)</td>
<td>(0.87)</td>
</tr>
<tr>
<td>7-person</td>
<td>$4.71</td>
<td>$4.53</td>
<td>$5.09</td>
</tr>
<tr>
<td></td>
<td>(1.11)</td>
<td>(1.27)</td>
<td>(1.30)</td>
</tr>
</tbody>
</table>
**Table 3:** Mean individual performance (in dollars) for each experimental condition. Standard deviations in parentheses.

<table>
<thead>
<tr>
<th>Assigned Group Goal Level</th>
<th>Do best</th>
<th>Moderate</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-person</td>
<td>$3.96</td>
<td>$4.03</td>
<td>$4.01</td>
</tr>
<tr>
<td></td>
<td>(0.45)</td>
<td>(0.40)</td>
<td>(0.43)</td>
</tr>
<tr>
<td>7-person</td>
<td>$3.97</td>
<td>$3.84</td>
<td>$3.96</td>
</tr>
<tr>
<td></td>
<td>(0.52)</td>
<td>(0.62)</td>
<td>(0.44)</td>
</tr>
</tbody>
</table>
with that of maximizing group performance more often than participants in three-person groups, $x(1) = 46.52, p < .001$.

**Group goals.** Table 4 shows the average amount of money made by groups across experimental conditions. The minimum and maximum amount of money made by three-person groups was $9.23 and $13.50, respectively. The corresponding values for seven-person groups were $19.54 and $31.50. An analysis of variance indicated that neither in three-person groups ($F(1, 25) = 0.84, p > .05$) nor in seven-person groups ($F(1, 27) = 0.22, p > .05$) did the setting of a specific group goal increase performance significantly over that of groups urged to "do their best." Thus no support was found for hypothesis 2(b).

Planned comparisons indicated that neither three-person nor seven-person groups assigned a moderately difficult group goal outperformed groups assigned either a highly difficult group goal ($t(15) = 0.01, p > .05; t(15) = 0.01, p > .05$, three-person and seven-person groups, respectively) or a "do best" group goal ($t(17) = 0.59, p > .05; t(19) = 0.17, p > .05$, three-person and seven-person groups, respectively). Thus no support was found for hypothesis 2(c).

The average amount of money earned by three-person and seven-person groups during each trial is shown in Table 5. A repeated measures analysis of variance indicated a significant within-effect for time for three-person groups ($F(2, 48) = 6.75, p < .01$), but not for seven-person groups ($F(2, 46) = 0.31, p > .05$). Planned comparisons indicated that the amount of money made by three-person groups during blocks 2 ($t(24) = 2.61, p < .05$) and 3 ($t(24) = 3.48, p < .01$) was
Table 4: Mean group performance (in dollars) for each experimental condition. Standard deviations in parentheses.

<table>
<thead>
<tr>
<th>Assigned Group Goal Level</th>
<th>Do best</th>
<th>Moderate</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-person</td>
<td>$11.88</td>
<td>$12.09</td>
<td>$12.04</td>
</tr>
<tr>
<td></td>
<td>(1.36)</td>
<td>(1.14)</td>
<td>(1.25)</td>
</tr>
<tr>
<td>7-person</td>
<td>$27.76</td>
<td>$26.98</td>
<td>$27.69</td>
</tr>
<tr>
<td></td>
<td>(3.50)</td>
<td>(4.32)</td>
<td>(1.80)</td>
</tr>
</tbody>
</table>
Table 5: Average amount of money earned (in dollars) by groups per trial (T1 thru T9). Standard deviations in parentheses.

<table>
<thead>
<tr>
<th>Trial</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>T5</th>
<th>T6</th>
<th>T7</th>
<th>T8</th>
<th>T9</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-person</td>
<td>1.28</td>
<td>1.29</td>
<td>1.26</td>
<td>1.38</td>
<td>1.34</td>
<td>1.34</td>
<td>1.38</td>
<td>1.37</td>
<td>1.37</td>
</tr>
<tr>
<td></td>
<td>(0.16)</td>
<td>(0.16)</td>
<td>(0.20)</td>
<td>(0.15)</td>
<td>(0.17)</td>
<td>(0.16)</td>
<td>(0.18)</td>
<td>(0.16)</td>
<td>(0.20)</td>
</tr>
<tr>
<td>7-person</td>
<td>3.15</td>
<td>3.03</td>
<td>2.92</td>
<td>3.17</td>
<td>2.99</td>
<td>2.95</td>
<td>3.18</td>
<td>3.06</td>
<td>3.03</td>
</tr>
<tr>
<td></td>
<td>(0.35)</td>
<td>(0.46)</td>
<td>(0.46)</td>
<td>(0.38)</td>
<td>(0.50)</td>
<td>(0.48)</td>
<td>(0.41)</td>
<td>(0.55)</td>
<td>(0.60)</td>
</tr>
</tbody>
</table>
significantly greater than the amount of money made during block 1. There was no
significant difference in the amount of money made during blocks 2 and 3, \( t(24) =
0.77, p > .05 \). Thus partial support was obtained for hypothesis 2(d).

**Personal and group goals combined.** A social dilemma involves conflict
between a personal goal and the goal of the group. Path analysis was conducted to
test the effects of personal goals in conjunction with the group’s goal on group
performance.

The causal model specified that group performance is a function of both the
group’s goal and the personal goal that individual group members adopted. The
assignment of a specific group goal may encourage individuals to formulate a
specific personal goal. These personal goals, in turn, have an effect on group
performance.

Two multiple regression models were estimated. First, the level of the
personal goal was regressed on the assignment of the specific group goal. The
setting of a specific group goal was dummy coded. Because the analysis was
conducted at the group level, the personal goal was operationally defined as the
average of the response to the personal goal questionnaire of each group. Second,
group performance was regressed on the assignment of the specific group goal and
the level of the personal goal. Table 6 shows the results for three-person groups.
The Pearson product correlation between the assignment of a specific group goal and
the personal goal level for individuals in seven-person groups was not significant (\( r = .07, p > .05 \)). Therefore no regression models were estimated to test the model.
Table 6: Regression analyses with personal goal and group performance as dependent variables and personal goal and group goal as independent variables for three-person groups (N = 26).

<table>
<thead>
<tr>
<th>Test statistics</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Beta</strong></td>
<td><strong>t</strong></td>
</tr>
<tr>
<td>Equation 1: Personal goal</td>
<td></td>
</tr>
<tr>
<td>Group goal</td>
<td>.63</td>
</tr>
<tr>
<td>Equation 2: Group performance</td>
<td></td>
</tr>
<tr>
<td>Personal goal</td>
<td>.55</td>
</tr>
<tr>
<td>Group goal</td>
<td>-.23</td>
</tr>
</tbody>
</table>

* p < .05. ** p < .001.
Three structural equations were estimated to obtain the standardized path coefficients. The standardized path coefficients that were significant at the .05 level are shown in Figure 1. The initial numbers on the paths of influence are the significant standardized path coefficients. The numbers in parentheses are the first-order correlations. The path coefficient between the assignment of a specific group goal and group performance was not significant. This suggests that if there is an effect of group goals on group performance, it is indirect through the setting of personal goals.

**Group size.** Table 7 shows the average monetary contributions to the joint account across experimental conditions. A repeated measures analysis of variance with group size as a between-groups factor and time as a within-groups factor indicated a significant main-effect for time, $F(2, 482) = 9.37, \ p < .001$. Planned comparisons indicated that the amount of money contributed to the joint account during block 3 was significantly greater than the amount of money contributed during blocks 1 ($t(242) = 3.13, \ p < .01$) and 2 ($t(242) = 1.78, \ p < .08$). Furthermore, the amount of money contributed to the joint account during block 2 was significantly greater than the amount of money contributed during block 1 ($t(242) = 2.08, \ p < .05$). In addition, a significant interaction-effect between group size and time was found, $F(2, 482) = 4.29, \ p < .05$. Planned comparisons indicated that individuals in three-person groups contributed significantly more money to the joint account during blocks 2 ($t(74) = 3.76, \ p < .001$) and 3 ($t(74) = 4.94, \ p < .001$) than during block 1. Individuals in three-person groups contributed significantly more money to the joint
Figure 1: Path analysis for performance of three-person groups (N = 26). Group performance as a function of assigned group goals and self-set personal goals.
Table 7: Mean monetary contribution (in cents) to the joint account per trial (T1 thru T9). (Minimum = 0 cents; Maximum = 25 cents.) Standard deviations in parentheses.

<table>
<thead>
<tr>
<th>Trial</th>
<th>T1</th>
<th>T2</th>
<th>T3</th>
<th>T4</th>
<th>T5</th>
<th>T6</th>
<th>T7</th>
<th>T8</th>
<th>T9</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-person</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>do best</td>
<td>18.6</td>
<td>18.4</td>
<td>17.0</td>
<td>21.1</td>
<td>20.0</td>
<td>18.9</td>
<td>20.5</td>
<td>19.2</td>
<td>18.0</td>
</tr>
<tr>
<td></td>
<td>(5.9)</td>
<td>(6.4)</td>
<td>(8.1)</td>
<td>(6.4)</td>
<td>(7.4)</td>
<td>(7.9)</td>
<td>(7.5)</td>
<td>(8.7)</td>
<td>(10.1)</td>
</tr>
<tr>
<td>moderate</td>
<td>17.8</td>
<td>16.9</td>
<td>16.0</td>
<td>21.7</td>
<td>20.1</td>
<td>21.1</td>
<td>20.6</td>
<td>21.6</td>
<td>22.2</td>
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<td>(6.2)</td>
<td>(7.1)</td>
<td>(5.8)</td>
<td>(4.9)</td>
</tr>
<tr>
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<td>16.7</td>
<td>18.0</td>
<td>18.5</td>
<td>19.8</td>
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<td>21.6</td>
<td>21.5</td>
<td>21.9</td>
</tr>
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<td></td>
<td>(7.3)</td>
<td>(6.5)</td>
<td>(6.2)</td>
<td>(5.9)</td>
<td>(6.7)</td>
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<td>(7.5)</td>
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<td>(6.9)</td>
<td>(6.5)</td>
<td>(6.8)</td>
<td>(7.4)</td>
</tr>
<tr>
<td>7-person</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>do best</td>
<td>19.2</td>
<td>19.7</td>
<td>17.3</td>
<td>21.7</td>
<td>18.7</td>
<td>16.9</td>
<td>20.3</td>
<td>18.7</td>
<td>19.0</td>
</tr>
<tr>
<td></td>
<td>(7.6)</td>
<td>(7.1)</td>
<td>(9.0)</td>
<td>(5.7)</td>
<td>(8.3)</td>
<td>(8.8)</td>
<td>(8.2)</td>
<td>(9.9)</td>
<td>(9.6)</td>
</tr>
<tr>
<td>moderate</td>
<td>22.0</td>
<td>17.3</td>
<td>16.1</td>
<td>18.0</td>
<td>15.7</td>
<td>17.3</td>
<td>20.4</td>
<td>17.4</td>
<td>16.3</td>
</tr>
<tr>
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<td>(5.9)</td>
<td>(9.1)</td>
<td>(9.1)</td>
<td>(8.2)</td>
<td>(10.2)</td>
<td>(9.3)</td>
<td>(8.7)</td>
<td>(9.9)</td>
<td>(10.6)</td>
</tr>
<tr>
<td>high</td>
<td>18.8</td>
<td>17.8</td>
<td>16.1</td>
<td>20.8</td>
<td>18.7</td>
<td>17.6</td>
<td>20.8</td>
<td>19.9</td>
<td>19.8</td>
</tr>
<tr>
<td></td>
<td>(7.5)</td>
<td>(8.4)</td>
<td>(8.4)</td>
<td>(7.3)</td>
<td>(8.5)</td>
<td>(9.2)</td>
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<td>(7.7)</td>
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<td>(7.1)</td>
<td>(8.2)</td>
<td>(8.8)</td>
<td>(7.2)</td>
<td>(9.1)</td>
<td>(9.0)</td>
<td>(8.2)</td>
<td>(9.3)</td>
<td>(9.8)</td>
</tr>
<tr>
<td>mean</td>
<td>19.3</td>
<td>18.2</td>
<td>16.8</td>
<td>20.4</td>
<td>18.4</td>
<td>18.0</td>
<td>20.6</td>
<td>19.3</td>
<td>19.0</td>
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<td>(6.9)</td>
<td>(8.5)</td>
<td>(8.5)</td>
<td>(7.7)</td>
<td>(8.6)</td>
<td>(9.2)</td>
</tr>
</tbody>
</table>
account during blocks 2 \((t(180.0) = 2.38, p < .05)\) and 3 \((t(188.6) = 1.71, p < .08)\) than did individuals in seven-person groups. There were no significant differences in the amount of money contributed to the joint account during blocks 1, 2, and 3 for individuals in seven-person groups. Thus support was obtained for hypothesis 2(e).

The Pearson product correlations between one’s total contribution to the joint account (i.e., the sum of one’s allocations during trials 1 thru 9) and the amount of money earned by the individual were .79 \((p < .001)\) and .52 \((p < .001)\) for three-person and seven-person groups, respectively. Thus support was obtained for hypothesis 2(f).

**Moderator effects**

**Commitment to personal goal.** The coefficient alphas for the measurement of commitment to one’s personal goal were .57, .72, and .72 for blocks 1, 2, and 3, respectively. Table 8 shows the mean values for commitment to the personal goal across experimental conditions.

A repeated measures analysis of variance on commitment to the personal goal indicated a significant within-effect for time, \(F(2, 386) = 11.81, p < .001\). Commitment to the personal goal during block 3 was significantly lower than commitment during blocks 1 \((t(220) = 4.41, p < .001)\) and 2 \((t(195) = 4.43, p < .001)\). That commitment to the personal goal decreased over time supports hypothesis 3(a).

Because commitment to the personal goal decreased with time, three separate step-wise hierarchical regression models were estimated to test for a moderating effect of goal commitment. The procedures advocated by Cohen and Cohen (1983)
Table 8: Mean commitment to the self-set personal goal during blocks 1 (B = 1), 2 (B = 2), and 3 (B = 3). Standard deviations in parentheses.

<table>
<thead>
<tr>
<th>Block</th>
<th>B = 1</th>
<th>B = 2</th>
<th>B = 3</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>do best</td>
<td>3.60</td>
<td>3.77</td>
<td>3.54</td>
<td>27, 27, 21</td>
</tr>
<tr>
<td>3-person moderate</td>
<td>3.60</td>
<td>3.65</td>
<td>3.59</td>
<td>24, 21, 21</td>
</tr>
<tr>
<td>high</td>
<td>3.71</td>
<td>3.69</td>
<td>3.40</td>
<td>24, 18, 23</td>
</tr>
<tr>
<td>do best</td>
<td>3.64</td>
<td>3.45</td>
<td>3.31</td>
<td>61, 62, 61</td>
</tr>
<tr>
<td>7-person moderate</td>
<td>3.62</td>
<td>3.68</td>
<td>3.35</td>
<td>56, 42, 35</td>
</tr>
<tr>
<td>high</td>
<td>3.39</td>
<td>3.26</td>
<td>3.11</td>
<td>41, 35, 35</td>
</tr>
</tbody>
</table>
as well as Evans (1991) were used.

The level of the personal goal did not correlate significantly with the amount of money made by the participant; the Pearson product correlations were .03 (p > .05) and .05 (p > .05) for individuals in three-person and seven-person groups, respectively. Commitment to the personal goal and the amount of money made by the individual correlated positively and significantly, but only for individuals in seven-person groups during blocks 2 (r = .16, p < .05) and 3 (r = .28, p < .05). This pattern of correlations indicates that commitment did not moderate the relationship between personal goal level and the amount of money made by the individual in either three-person or seven-person groups. Hypothesis 3(b) was therefore rejected.

More than half (56%) of the participants in seven-person groups set a personal goal that was incompatible with that of maximizing group performance. Commitment to the personal goal measured during block 1 correlated negatively and significantly with the amount of money made by the group (r = -.45, p < .01). Thus high commitment to a challenging personal goal had a negative effect on performance of seven-person groups. The corresponding correlation for individuals in three-person groups was .05 (ns). Thus hypothesis 3(c) was partially supported.

Commitment to group goal. The coefficient alphas for the measurement of commitment to the group goal were .78, .85, and .86 for blocks 1, 2, and 3, respectively. The mean values for commitment to the group goal across the relevant experimental conditions are shown in Table 9.

A repeated measures analysis of variance indicated a significant within-effect
Table 9: Mean commitment to the group goal during blocks 1 (B = 1), 2 (B = 2), and 3 (B = 3). Standard deviations in parentheses.

<table>
<thead>
<tr>
<th>Block</th>
<th>B = 1</th>
<th>B = 2</th>
<th>B = 3</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>moderate 3-person</td>
<td>3.66</td>
<td>3.51</td>
<td>3.48</td>
<td>N = 22, 21, 21</td>
</tr>
<tr>
<td></td>
<td>(.71)</td>
<td>(.77)</td>
<td>(.95)</td>
<td></td>
</tr>
<tr>
<td>high</td>
<td>3.62</td>
<td>3.81</td>
<td>3.79</td>
<td>N = 23, 17, 22</td>
</tr>
<tr>
<td></td>
<td>(.74)</td>
<td>(.70)</td>
<td>(.75)</td>
<td></td>
</tr>
<tr>
<td>moderate 7-person</td>
<td>3.50</td>
<td>3.38</td>
<td>3.44</td>
<td>N = 56, 42, 35</td>
</tr>
<tr>
<td></td>
<td>(.74)</td>
<td>(.98)</td>
<td>(1.06)</td>
<td></td>
</tr>
<tr>
<td>high</td>
<td>3.41</td>
<td>3.18</td>
<td>3.19</td>
<td>N = 40, 32, 35</td>
</tr>
<tr>
<td></td>
<td>(.60)</td>
<td>(.69)</td>
<td>(.66)</td>
<td></td>
</tr>
</tbody>
</table>
for time, \(F(2, 176) = 3.70, p < .05\). Commitment to the group goal during block 1 was significantly higher than commitment during block 2, \(t(109) = 3.24, p < .01\). Furthermore, commitment to the group goal during block 1 was higher than commitment during block 3; this difference, however, was only marginally significant, \(t(116) = 1.91, p < .06\). Commitment to the group goal decreased with time. Thus no support was found for hypothesis 3(d).

Because commitment to the group goal decreased with time, three separate step-wise hierarchical regression models were estimated to test for a moderating effect of goal commitment. Commitment to the group goal was operationally defined as the average of the responses to the commitment scale of each group. Goal level was dummy coded.

The difficulty level of the group goal did not correlate significantly with the amount of money made by the group; the Pearson product correlations were .18 (\(p > .05\)) and .09 (\(p > .05\)) for three-person and seven-person groups, respectively. Commitment to the group goal and the amount of money made correlated positively and significantly, but only for seven-person groups. The Pearson product correlations were .65 (\(p < .01\)), .61 (\(p < .01\)), and .75 (\(p < .001\)), for blocks 1, 2, and 3, respectively. Thus partial support was obtained for hypothesis 3(e).

The overall pattern of correlations indicates that neither for three-person nor for seven-person groups did commitment moderate the relationship between group goal level and the amount of money made by the group. Hypothesis 3(f) was therefore rejected.
Social value orientation. Participants were classified as either individualists, competitors, or cooperators if at least six out of nine decisions were consistent with a particular value orientation (e.g., Parks, 1994; Van Lange & Kuhlman, 1994). Accordingly, 60 participants (22%) were classified as individualists, 26 as competitors (9%), and 104 as cooperators (38%). Eighty-four participants (31%) could not be classified because they did not complete all nine items of the questionnaire.

Consistent with previous studies on social value orientation, individualists and competitors were combined to form a group of basically self-interested participants ("pro-selfs"), and were contrasted with the group of cooperative participants ("pro-socials"). Similarly, the moderately difficult group goal condition and the highly difficult group goal condition were collapsed into a specific group goal condition, and was contrasted with groups encouraged to "do their best."

A chi-square test for two-independent samples (using combined data for all nine trials) indicated no significant difference in the frequencies of pro-selfs and pro-socials who pursued their self-interest rather than that of the group, \( \chi^2(1) = 2.13, p > .05 \). Thus hypothesis 4(a) was rejected.

A repeated measures analysis of variance on the actual amount of money contributed to the joint account with social value orientation and goal level as between-groups factors and time as a within-groups factor indicated a significant within-effect for time, \( F(2, 336) = 4.97, p < .01 \). No significant main effect was found for social value orientation, \( F(1, 168) = 0.91, p > .05 \). The interaction between social
value orientation and goal level was not significant, \( F(1, 168) = 2.29, p > .05 \). Thus hypothesis 4(b) was rejected.

**General Trust.** The coefficient alpha for the eight-item scale was .81. Consistent with previous research that examined the effect of trust on cooperative behavior in social dilemma situations (e.g., Parks, 1994; Parks, Henager, & Scamahorn, 1996; Yamagishi, 1986), the trust scores were dichotomized by taking a median split. The median split value was 2.50. The mean value for the low-trust group was 1.94 (S.D. = 0.23); the mean value for the high-trust group was 3.06 (S.D. = 0.40).

A chi-square test for two-independent samples (using combined data for all nine trials) indicated no significant difference in the frequencies of low-trust and high-trust individuals who pursued their self-interest rather than that of the group, \( \chi^2(1) = 1.69, p > .05 \). Thus hypothesis 5(a) was rejected.

A repeated measures analysis of variance on the actual amount of money contributed to the joint account with trust and goal level as between-groups factors and time as a within-groups factor indicated a significant between-effect for trust, \( F(1, 234) = 6.65, p < .01 \). High-trust individuals contributed significantly more money to the joint account during blocks 1 (\( t(235) = 2.02, p < .05 \)) and 3 (\( t(235) = 2.42, p < .05 \)) than low-trust individuals. The relevant mean values (and standard deviations) for high-trust individuals were 57.0 (S.D. = 17.1) and 62.5 (S.D. = 19.9). The corresponding values for low-trust individuals were 52.1 (S.D. = 20.5) and 55.6 (S.D. = 23.9). In addition, a significant within-effect for time was found, \( F(2, 468) = 5.09, \)
Groups whose members scored high on the measure of general trust made more money than groups whose members scored low. The Pearson product correlations between general trust and amount of money made were .33 ($p < .05$) for three-person and .41 ($p < .05$) for seven-person groups.

Finally, a three-way interaction between trust, goal level, and time was obtained. This effect, however, was only marginally significant, $F(2, 468) = 2.73$, $p < .06$. With the exception of low-trust individuals in groups assigned a "do best" goal, contributions to the joint account increased with time. The results are shown in Table 10.

**Mediator effects**

**Self-efficacy.** The correlations between self-efficacy magnitude and self-efficacy strength were .74 ($p < .001$), .83 ($p < .001$), and .82 ($p < .001$) for blocks 1, 2, and 3, respectively. Consistent with the recommendations of Locke and Latham (1990), these two measures were converted to z-scores and summed to derive a total self-efficacy score. The standardized scores for self-efficacy in making money across experimental conditions are shown in Table 11.

To test whether self-efficacy mediated the relationship between personal goal level and the amount of money made by the individual, mediator analyses were conducted consistent with the procedures advocated by Baron and Kenny (1986). Three models were estimated, one for each block. This is because a repeated measures analysis of variance indicated a significant within-effect for time for both
Table 10: Mean monetary contribution (in cents) to the joint account per block \((B = 1 \text{ thru } B = 3)\) by trust and group goal. Standard deviations in parentheses.

<table>
<thead>
<tr>
<th>Block</th>
<th>B = 1</th>
<th>B = 2</th>
<th>B = 3</th>
<th>N = 54, 54, 54</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do best goal</td>
<td>53.9</td>
<td>57.9</td>
<td>52.7</td>
<td>(21.0)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(19.6)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(26.0)</td>
</tr>
<tr>
<td>Low trust</td>
<td>50.7</td>
<td>53.7</td>
<td>57.8</td>
<td>N = 72, 72, 72</td>
</tr>
<tr>
<td>Specific goal</td>
<td>(20.2)</td>
<td>(22.1)</td>
<td>(22.2)</td>
<td></td>
</tr>
<tr>
<td>Do best goal</td>
<td>60.0</td>
<td>60.9</td>
<td>66.7</td>
<td>N = 31, 31, 31</td>
</tr>
<tr>
<td></td>
<td>(15.1)</td>
<td>(15.2)</td>
<td>(18.2)</td>
<td></td>
</tr>
<tr>
<td>High trust</td>
<td>55.8</td>
<td>58.1</td>
<td>60.9</td>
<td>N = 81, 81, 81</td>
</tr>
<tr>
<td>Specific goal</td>
<td>(17.7)</td>
<td>(19.2)</td>
<td>(20.4)</td>
<td></td>
</tr>
</tbody>
</table>
Table 11: Mean standardized scores of self-efficacy in making money during blocks 1 (B = 1), 2 (B = 2), and 3 (B = 3). Standard deviations in parentheses.

<table>
<thead>
<tr>
<th>Block</th>
<th>B = 1</th>
<th>B = 2</th>
<th>B = 3</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>do best</td>
<td>-.35</td>
<td>.77</td>
<td>.94</td>
<td>N = 26, 25, 20</td>
</tr>
<tr>
<td></td>
<td>(1.94)</td>
<td>(1.47)</td>
<td>(1.39)</td>
<td></td>
</tr>
<tr>
<td>3-person</td>
<td>moderate</td>
<td>.55</td>
<td>.54</td>
<td>.55</td>
</tr>
<tr>
<td></td>
<td>(1.76)</td>
<td>(1.49)</td>
<td>(1.61)</td>
<td></td>
</tr>
<tr>
<td>high</td>
<td>.38</td>
<td>1.06</td>
<td>1.15</td>
<td>N = 24, 18, 23</td>
</tr>
<tr>
<td></td>
<td>(1.70)</td>
<td>(1.46)</td>
<td>(1.46)</td>
<td></td>
</tr>
<tr>
<td>do best</td>
<td>.14</td>
<td>-.26</td>
<td>-.48</td>
<td>N = 55, 54, 54</td>
</tr>
<tr>
<td></td>
<td>(1.75)</td>
<td>(2.03)</td>
<td>(1.94)</td>
<td></td>
</tr>
<tr>
<td>7-person</td>
<td>moderate</td>
<td>-.30</td>
<td>-.08</td>
<td>-.32</td>
</tr>
<tr>
<td></td>
<td>(2.13)</td>
<td>(1.92)</td>
<td>(1.95)</td>
<td></td>
</tr>
<tr>
<td>high</td>
<td>.03</td>
<td>-.63</td>
<td>-.46</td>
<td>N = 40, 27, 31</td>
</tr>
<tr>
<td></td>
<td>(1.73)</td>
<td>(2.05)</td>
<td>(2.08)</td>
<td></td>
</tr>
</tbody>
</table>
three-person \((F(2, 112) = 7.97, p < .001)\) and seven-person groups \((F(2, 188) = 3.90, p < .01)\). For three-person groups, self-efficacy during block 1 was significantly lower than self-efficacy during blocks 2 \((t(63) = 3.68, p < .001)\) and 3 \((t(63) = 3.47, p < .001)\). There was no significant difference in self-efficacy during blocks 2 and 3, \(t(56) = 0.95, p > .05\). Similarly, for seven-person groups, self-efficacy during block 1 was significantly higher than self-efficacy during blocks 2 \((t(112) = 2.25, p < .05)\) and 3 \((t(109) = 2.25, p < .05)\). There was no significant difference in self-efficacy during blocks 2 and 3, \(t(95) = 0.86, p > .05\). Thus self-efficacy increased for three-person groups, but decreased for seven-person groups.

The Pearson product correlations between personal goal level and self-efficacy in making money were positive and significant for both three-person \((r = .49, p < .001, r = .33, p < .01, \text{ and } r = .25, p < .05)\) and seven-person groups \((r = .61, p < .001, r = .34, p < .001, \text{ and } r = .31, p < .001)\). Neither for three-person nor for seven-person groups did personal goal level correlate significantly with the amount of money made by the individual. The Pearson product correlations were .03 \((p > .05)\) and .05 \((p > .05)\) for three-person and seven-person groups, respectively. The correlations between self-efficacy in making money and the amount of money made by the individual were .08 (ns), .15 (ns), and .12 (ns) for three-person groups, and .08 (ns), .24 \((p < .01)\), and .39 \((p < .001)\) for seven-person groups for blocks 1, 2, and 3, respectively. Thus partial support was found for hypothesis 6(a).

The overall pattern of correlations indicates that neither for three-person nor for seven-person groups did self-efficacy mediate the relationship between personal
goal level and the amount of money made. Hypothesis 6(b) was thus rejected.

**Collective-efficacy.** The correlations between collective-efficacy magnitude and collective-efficacy strength were .75 (p < .001), .78 (p < .001), and .79 (p < .001) for blocks 1, 2, and 3, respectively. These two measures were converted to z-scores and summed to derive a total collective-efficacy score. Table 12 shows the standardized scores for collective-efficacy in making money across experimental conditions.

The indicator of collective-efficacy was an aggregate of individual responses to the questionnaire. In addition to the theoretical rationale for the group-level creation of this variable, two empirical criteria were assessed to evaluate the appropriateness of this aggregation. First, a one-way analysis of variance with group as the independent variable and collective-efficacy as the dependent variable was used to determine between-groups differences in collective-efficacy, and hence within-groups similarity (e.g., Bliese & Halverson, in press; George, 1990; Yammarino & Markham, 1992). Second, within-and-between analysis (WABA-I) was conducted to infer the appropriate level of analysis. The complete results of the analysis of variance between and within groups are presented in Table 13.

The traditional F-tests, with one exception (B = 1), were significant suggesting that between-group variance exceeded within-group variance. Thus the collective-efficacy measures during blocks 2 and 3 had a statistically significant amount of between-group variation.
Table 12: Mean standardized scores of collective-efficacy in making money during blocks 1 (B = 1), 2 (B = 2), and 3 (B = 3). Standard deviations in parentheses.

<table>
<thead>
<tr>
<th>Block</th>
<th>B = 1</th>
<th>B = 2</th>
<th>B = 3</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>do best</td>
<td>-.32</td>
<td>.30</td>
<td>.64</td>
<td>10, 9, 9</td>
</tr>
<tr>
<td></td>
<td>(1.46)</td>
<td>(1.29)</td>
<td>(1.35)</td>
<td></td>
</tr>
<tr>
<td>3-person</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>moderate</td>
<td>.49</td>
<td>.07</td>
<td>.04</td>
<td>8, 7, 7</td>
</tr>
<tr>
<td></td>
<td>(1.15)</td>
<td>(1.38)</td>
<td>(1.43)</td>
<td></td>
</tr>
<tr>
<td>high</td>
<td>.42</td>
<td>.95</td>
<td>1.22</td>
<td>8, 8, 8</td>
</tr>
<tr>
<td></td>
<td>(1.02)</td>
<td>(.83)</td>
<td>(.74)</td>
<td></td>
</tr>
<tr>
<td>do best</td>
<td>-.03</td>
<td>-.38</td>
<td>-.40</td>
<td>12, 12, 12</td>
</tr>
<tr>
<td></td>
<td>(.73)</td>
<td>(1.03)</td>
<td>(1.49)</td>
<td></td>
</tr>
<tr>
<td>7-person</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>moderate</td>
<td>-.31</td>
<td>.07</td>
<td>.09</td>
<td>8, 7, 7</td>
</tr>
<tr>
<td></td>
<td>(1.12)</td>
<td>(1.32)</td>
<td>(1.20)</td>
<td></td>
</tr>
<tr>
<td>high</td>
<td>.44</td>
<td>-.31</td>
<td>-.62</td>
<td>7, 7, 7</td>
</tr>
<tr>
<td></td>
<td>(.88)</td>
<td>(1.51)</td>
<td>(1.43)</td>
<td></td>
</tr>
</tbody>
</table>
Table 13: Within- and between-groups analysis of variance results for collective-efficacy measured during blocks 1 (B = 1), 2 (B = 2), and 3 (B = 3).

<table>
<thead>
<tr>
<th>Variable</th>
<th>Eta-correlation</th>
<th>Test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Between</td>
<td>Within</td>
</tr>
<tr>
<td>B = 1 Collective-efficacy</td>
<td>.96</td>
<td>.25</td>
</tr>
<tr>
<td>B = 2 Collective-efficacy</td>
<td>.88</td>
<td>.48</td>
</tr>
<tr>
<td>B = 3 Collective-efficacy</td>
<td>.78</td>
<td>.62</td>
</tr>
</tbody>
</table>

3-person group

| B = 1 Collective-efficacy | .85      | .48    | 1.77| 1.86**|
| B = 2 Collective-efficacy | .78      | .62    | 1.26| 2.82**|

7-person group

| B = 1 Collective-efficacy | .95      | .32    | 2.97| 1.66**|
| B = 2 Collective-efficacy | .88      | .48    | 1.83| 2.75***|
| B = 3 Collective-efficacy | .79      | .61    | 1.30| 4.29***|

* p < .05. ** p < .01. *** p < .001.

1The corrected ICC value was negative. A negative value for the ICC suggests that there are no group level properties of the data.
The eta-squared is a measure equivalent to an $R^2$ measure. The between-group etas are larger than the within-group etas; the eta-squared values indicate that 61% to 92% of the variance for collective-efficacy is between groups. The magnitude of the eta-correlations, and hence the eta-squared, is partially a function of group size (Bliese & Halverson, in press). A measure of the group-level properties of data that corrects for group size is the ICC(1) (Bliese & Halverson, in press; McGraw & Wong, 1996). Table 13 contains the eta-correlations corrected for group size.

Dansereau, Alutto and Yammarino (1984) advocated two tests of practical significance, namely, the 30 degree test and the 15 degree test. The 30 degree test corresponds to a between-eta correlation of .87 while the 15 degree test corresponds to a between-eta correlation of .79 (Dansereau, Alutto, & Yammarino, 1984, p. 169). To pass the tests of practical significance for the 30 degree test, ICC(1) would have to be .50 or larger while the 15 degree test would require an ICC(1) of above .26 (Bliese, personal communication; Bliese & Halverson, in press). The obtained eta-squared correlations in this study are practically significant. The results thus provide support that aggregation of the individual level data is appropriate.

A problem with the analyses at the group level was that of missing data. This problem can be severe with a repeated measures design because non-observation on one time-period results in the loss of all the group's data. Though the number of groups in the experiment was adequate to have acceptable power, the use of a repeated measures design and the occurrence of missing values seriously reduced the effective sample size.
Roth (1994) listed seven missing data techniques for repeated measures designs. These include (from best to worst): (1) interpolation of nearest points of the same variable; (2) nearest value (in time) of the same variable; (3) nearest previous value (in time) of the variable; (4) extrapolation, if interpolation is not possible; (5) linear regression over time on the same variable; (6) participant mean; and (7) linear regression on a related variable. Using Roth's (1994) recommendations, statistical analyses with and without missing values were conducted. There were no meaningful differences in the results between these two approaches, and hence the data that include missing values based on Roth's suggestions are reported. This is because a larger number of observations increases the power of statistical tests.

To test whether collective-efficacy mediated the relationship between group goals and the amount of money made by the group, three regression models were estimated for three-person groups; one for each block. This is because a repeated measures analysis of variance indicated a within-effect for time. This effect, however, was only marginally significant, $F(2, 46) = 2.96, p < .06$. Only for three-person groups did collective-efficacy increase with time. Collective-efficacy during block 1 was significantly lower than collective-efficacy during blocks 2 ($t(23) = 1.90, p < .07$) and 3 ($t(23) = 1.82, p < .08$). There was no significant difference between collective-efficacy during blocks 2 and 3, $t(23) = 1.14, p > .05$. No effects of time on collective-efficacy were found for seven-person groups, $F(2, 50) = 2.00, p > .05$. Therefore one regression model was estimated for seven-person groups where collective-efficacy was averaged over the three blocks. The assignment of a group goal was dummy
The Pearson product correlations between group goals and collective-efficacy in making money were for the most part non-significant. The correlations for three-person groups were .31 (p < .06), .10 (p > .05), and .01 (p > .05) for blocks 1, 2, and 3, respectively. The corresponding correlations for seven-person groups were .04 (p > .05), .11 (p > .05), and .05 (p < .05). The assignment of a specific group goal did not correlate significantly with the amount of money made by the group. The Pearson product correlations between collective-efficacy in making money and the amount of money made by the group on blocks 2 and 3 were positive and significant; the correlations were .22 (ns), .47 (p < .01), and .60 (p < .001) for three-person, and .28 (ns), .57 (p < .001), and .76 (p < .001) for seven-person groups for blocks 1, 2, and 3, respectively. Thus support was found for hypothesis 7(a).

Despite the high and significant correlations between collective-efficacy and the amount of money made by the group on blocks 2 and 3, the overall pattern of correlations indicates that collective-efficacy did not mediate the relationship between group goals and group performance. Thus hypothesis 7(b) was rejected.

Joint effects of self-efficacy and collective-efficacy on group performance. Step-wise multiple regression was used to test whether self-efficacy and collective-efficacy in making money contributed independently to the prediction of group performance. Table 14 shows the results for block 3.

The regression analyses were conducted at the group level. Therefore self-efficacy was operationally defined as the average of the responses to the self-efficacy
Table 14: Regression analysis with group performance as the dependent variable and self-efficacy in making money and collective-efficacy in making money as the independent variables.

<table>
<thead>
<tr>
<th></th>
<th>Beta</th>
<th>t</th>
<th>R^2</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>3-person group (N = 26)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Step 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Collective-efficacy</td>
<td>.60</td>
<td>3.50**</td>
<td>.36</td>
<td>12.28**</td>
</tr>
<tr>
<td>Step 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Collective-efficacy</td>
<td>.98</td>
<td>4.18***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-efficacy</td>
<td>-.51</td>
<td>-2.20*</td>
<td>.48</td>
<td>9.62***</td>
</tr>
<tr>
<td><strong>7-person group (N = 28)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Step 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Collective-efficacy</td>
<td>.76</td>
<td>5.79***</td>
<td>.58</td>
<td>33.49***</td>
</tr>
<tr>
<td>Step 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Collective-efficacy</td>
<td>1.13</td>
<td>3.96***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-efficacy</td>
<td>-.41</td>
<td>-1.43</td>
<td>.62</td>
<td>18.50***</td>
</tr>
</tbody>
</table>

* p < .05. ** p < .01. *** p < .001.
questionnaire of each group. Collective-efficacy in making money was entered in step 1; self-efficacy in making money was entered in step 2. Both collective-efficacy and self-efficacy explained a significant portion of the variance in the amount of money made by three-person groups. The increase in $R^2$ from step 1 to step 2 was significant, $F(1, 24) = 4.94, p < .05$. A similar pattern of results was obtained for seven-person groups. The beta-weight for self-efficacy, however, failed to reach statistical significance.

The results further suggest that collective-efficacy functioned as a suppressor variable. The correlation between self-efficacy in making money and the amount of money made by the group was non-significant. A positive and significant correlation was found between self-efficacy and collective-efficacy in making money ($r = .74, p < .001$). This significant correlation implies that irrelevant variance in the measurement of self-efficacy was present, and hence the relationship between self-efficacy and group performance is reduced. This finding is consistent with Bandura's (1997) argument that in appraising their personal efficacies, individuals inevitably consider group processes that enhance or hinder their efforts. The inclusion of collective-efficacy in the regression equation removes the unwanted variance in the measurement of self-efficacy, and hence enhances the relationship between self-efficacy and group performance.

The negative beta-weights for self-efficacy suggest that while group performance may be optimal when group members cooperate with one another, individuals may believe their capability to make a significant amount of money for
themselves is low. Conversely, those convinced of their ability to make money may focus on their personal goal, and are highly committed to it, and hence group performance suffers.

Outcome expectancies. The coefficient alphas for the nine-item scale were .77, .83, and .85 for blocks 1, 2, and 3, respectively. Table 15 shows the mean values for outcome expectancies across experimental conditions.

To test whether outcome expectancies mediated the relationship between group goals and the amount of money made by the group, three regression models were estimated for seven-person groups; one for each block of trials. This is because a repeated measures analysis of variance indicated a significant within-effect for time, but only for seven-person groups, $F(2, 372) = 6.64, \ p < .001$. Outcome expectancies of cooperating with others to attain the group goal were significantly higher during block 1 than outcome expectancies during blocks 2 ($t(153) = 5.06, \ p < .001$) and 3 ($t(153) = 3.70, \ p < .001$). There was no significant difference in outcome expectancies during blocks 2 and 3, $t(113) = 1.35, \ p > .05$. No effects of time on outcome expectancies were found for three-person groups, $F(2, 112) = 1.58, \ p > .05$. Therefore one regression model was estimated for three-person groups where outcome expectancies were averaged over the three blocks.

Neither outcome expectancies nor the amount of money made by the group correlated significantly with the level of the group goal. However, outcome expectancies of cooperating with others to attain the group goal correlated positively and significantly with the amount of money made by the group; the correlations for
Table 15: Outcome expectancies of cooperating with others to attain the group goal during blocks 1 (B = 1), 2 (B = 2), and 3 (B = 3).

Standard deviations in parentheses.

<table>
<thead>
<tr>
<th>Block</th>
<th>B = 1</th>
<th>B = 2</th>
<th>B = 3</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>3-person</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>do best</td>
<td>3.61</td>
<td>3.75</td>
<td>3.78</td>
<td>N = 27, 26, 20</td>
</tr>
<tr>
<td>( .42 )</td>
<td>(.67)</td>
<td>(.57)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>moderate</td>
<td>3.57</td>
<td>3.54</td>
<td>3.63</td>
<td>N = 24, 21, 21</td>
</tr>
<tr>
<td>( .67 )</td>
<td>(.77)</td>
<td>(.81)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>high</td>
<td>3.70</td>
<td>4.04</td>
<td>3.93</td>
<td>N = 24, 18, 23</td>
</tr>
<tr>
<td>( .60 )</td>
<td>(.58)</td>
<td>(.50)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>7-person</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>do best</td>
<td>3.49</td>
<td>3.20</td>
<td>3.20</td>
<td>N = 61, 62, 60</td>
</tr>
<tr>
<td>( .49 )</td>
<td>(.55)</td>
<td>(.75)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>moderate</td>
<td>3.30</td>
<td>3.21</td>
<td>3.41</td>
<td>N = 56, 42, 35</td>
</tr>
<tr>
<td>( .62 )</td>
<td>(.86)</td>
<td>(.90)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>high</td>
<td>3.26</td>
<td>2.98</td>
<td>3.24</td>
<td>N = 41, 32, 35</td>
</tr>
<tr>
<td>( .47 )</td>
<td>(.53)</td>
<td>(.57)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
three-person groups were \(-.17 (p > .05)\), \(.42 (p < .05)\), and \(.45 (p < .05)\) for blocks 1, 2, and 3, respectively. The corresponding correlations for seven-person groups were \(.51 (p < .01)\), \(.61 (p < .001)\), and \(.77 (p < .001)\). Thus hypothesis 8(a) was supported.

The pattern of correlations indicates that, despite the high and significant correlations between outcome expectancies and the amount of money made by the group, neither for three-person nor for seven-person groups did outcome expectancies mediate the relationship between group goal level and performance. Thus no support was obtained for hypothesis 8(b).

The effect of group size on the moderating and mediating variables. The setting of personal goals and the assignment of group goals had no effect on commitment to the personal goal, commitment to the group goal, self-efficacy in making money, collective-efficacy in making money, and outcome expectancies of cooperating with others to attain the group goal. Nevertheless, group size may have affected the hypothesized moderating and mediating variables. A series of repeated measures analyses of variance were conducted to test for a main effect of group size.

A repeated measures analysis of variance on commitment to the personal goal with group size as a between-groups factor and time as a within-groups factor indicated a significant within-effect for time only, \(F(1, 344) = 5.83, p < .01\). As reported earlier, with time, commitment to the personal goal decreased. Similarly, a repeated measures analysis of variance on commitment to the group goal with group size as a between-groups factor and time as a within-groups factor indicated a within-effect for time. This effect, however, was marginally significant, \(F(1, 174)\).
As reported earlier, with time, commitment to the group goal decreased.

A repeated measures analysis of variance on self-efficacy with group size as a between-groups factor and time as a within-groups factor indicated a significant between-effect for group size, $F(1, 150) = 7.74, p < .01$. Self-efficacy was significantly higher in three-person groups than in seven-person groups during blocks 2 ($t(163.7) = 4.08, p < .001$) and 3 ($t(160.6) = 5.04, p < .001$). In addition, a significant interaction effect between group size and time was found, $F(2, 300) = 10.30, p < .001$. As reported earlier, with time, self-efficacy increased for individuals in three-person groups but decreased for individuals in seven-person groups.

A repeated measures analysis of variance on collective-efficacy with group size as a between-groups factor and time as a within-groups factor indicated a between-effect for group size. This effect, however, was only marginally significant, $F(1, 48) = 3.84, p < .06$. Collective-efficacy was significantly higher for three-person groups than for seven-person groups during blocks 2 ($t(48) = 2.01, p < .05$) and 3 ($t(48) = 2.63, p < .01$). In addition, a significant interaction effect between group size and time was found, $F(2, 96) = 4.93, p < .01$. As reported earlier, with time, collective-efficacy increased for three-person groups but remained unchanged for seven-person groups.

A repeated measures analysis of variance on outcome expectancies with group size as a between-groups factor and time as a within-groups factor indicated a significant between-effect for group size, $F(1, 186) = 29.97, p < .001$. Outcome
expectancies were significantly higher in three-person groups than in seven-person
groups during blocks 1 \((t(261) = 4.30, p < .001)\), 2 \((t(218) = 6.08, p < .001)\), and 3
\((t(218) = 5.77, p < .001)\). In addition, a significant interaction effect between group
size and time was found, \(F(2, 372) = 6.64, p < .001\). As reported earlier, with time,
outcome expectancies decreased for seven-person groups but remained unchanged
for three-person groups.

In summary, group size had a significant effect on the hypothesized mediating
variables (i.e., self-efficacy, collective-efficacy, and outcome expectancies) but not on
the hypothesized moderating variables (i.e., commitment to the personal goal, commitment to the group goal).

Path analyses. The key variables in the study were personal goals, group goals, commitment to the group goal, collective-efficacy in making money, outcome expectancies of cooperating with others to attain the group goal, and trust. Two path models were estimated; one for three-person groups and one for seven-
person groups. These models tie the key findings together.

Neither commitment to the personal goal nor commitment to the group goal
correlated positively and significantly with contributions to the joint account and the
amount of money made by three-person groups. Thus these variables were not
incorporated in the path model for three-person groups. Similarly, commitment to
the personal goal did not correlate significantly with contributions to the joint and
the amount of money made by seven-person groups. Thus this variable was also not
part of the path model to be estimated. Self-set personal goals correlated positively
and significantly with group performance, but only for three-person groups. Self-set personal goals are not part of the path model for seven-person groups.

Figures 2 and 3 show the results. The standardized path coefficients that were significant at the .05 level are shown. The initial number on the paths of influence are the significant standardized path coefficients. The numbers in parentheses are the first order correlations.
Figure 2: Path analysis for performance of three-person groups (N = 26). Group performance as a function of self-set personal goals, assigned group goals, collective-efficacy, outcome expectancies, trust, and contribution to the joint account.
Figure 3: Path analysis for performance of seven-person groups (N = 28). Group performance as a function of collective-efficacy, outcome expectancies, commitment to the group goal, trust, and contribution to the joint account.
CHAPTER 5
Discussion

The present study integrates literature from two divergent fields, namely, goal setting in organizational behavior / industrial and organizational psychology and social dilemmas in social psychology. The underlying assumption was that, in a social dilemma, a moderately difficult group goal leads to higher group performance than either urging groups to "do their best" or assigning groups a highly difficult goal. The effect of goals on individual and group performance was hypothesized to be moderated by goal commitment, and mediated by self-efficacy in making money, collective-efficacy in making money, and outcome expectancies of cooperating with others to attain the group goal. Furthermore, the effect of group size on cooperation was examined; individuals in small groups were hypothesized to be more cooperative than those in large groups, and hence the setting of a specific group goal was hypothesized to have a stronger effect on the performance of small groups relative to large groups. Finally, the effect of dispositions on cooperative behavior in a social dilemma was investigated.

The results indicated that in a social dilemma, individuals initially choose to pursue their self-interest rather than the interest of the group. This finding is consistent with the social dilemma literature. The tendency to pursue one's self-interest as opposed to the interest of the group, however, dissipated with experience. At the end of the simulation, participants sacrificed attempts to maximize their self-
interest for that of optimizing the group's performance. Specifically, participants contributed more money to the joint account during later trials than they did during early trials. These findings suggest that participants learned the futility of everyone engaging in non-cooperative behavior for making money, and that through cooperation with others they could make more money than was the case when they focused only on maximizing personal gain. Thus in dilemma situations, individuals appear to learn that over time they will set themselves up for failure if they do not contribute to the overall good of the group.

Group size

Consistent with previous research (e.g., Hamburger, Guyer, & Fox, 1975; Marwell & Schmitt, 1972; Liebrand, 1984), members of seven-person groups contributed significantly less money to the joint account than did members of three-person groups. This is because members of three-person groups had higher self-efficacy in making money, higher collective-efficacy in making money, and higher outcome expectancies of cooperating with others to attain the group goal than did members of seven-person groups. The difference in cooperation (i.e., contributions to the joint account) between individuals in three-person and seven-person groups, however, was small.

An alternative explanation for the finding that seven-person groups did cooperate to a lesser degree than three-person groups can be found in a process variable, namely, the difficulty in communicating with other group members.
Research has shown that communication has a profound effect on cooperation (e.g., Komorita & Parks, 1995; Orbell, Van de Kragt, & Dawes, 1988). For example, communication allows one to discuss potential strategies to make money. The individuals in seven-person groups had approximately 26 seconds per person to discuss their beliefs and strategies. On the other hand, individuals in three-person groups had one minute each to convince their fellow group members of the effectiveness of particular strategies. The individuals in large groups may have consumed time and effort coordinating their roles and resolving their differences. It may thus be harder for large as opposed to small groups to create group norms regarding objectives and strategies that help to attain these objectives. In summary, both learning and group dynamics may explain why seven-person groups were less cooperative than three-person groups.

Self-efficacy

The correlations between self-efficacy in making money and actual performance were for the most part non-significant. Similarly, the correlations between the level of one’s personal goal and the amount of money made were non-significant. Both these findings reflect the interdependent nature of the task. Bandura (1997) has argued that in activities involving high interdependence, group members often have to rely on one another to perform their respective jobs. Because individual performance is to a large extent influenced by what other group members decide to do, communication, cooperative goals, and mutual adjustments to one
another's performance, the correlations between self-efficacy and the amount of money made by the individual may be low or even non-significant. In other words, situational constraints (e.g., Johns, 1991; Peters, Chassie, Lindholm, O'Connor, & Kline, 1982) can adversely affect goal setting, self-efficacy beliefs, and hence subsequent behavior and/or performance.

The decrease in self-efficacy in the seven-person groups has a number of practical implications for team-leaders, managers, and the like. First, individuals with low self-efficacy in making money are unlikely to be an active participant in the strategy development process on how to best make money. Research by Latham and his colleagues (e.g., Latham, Winters, & Locke, 1994; Winters & Latham, 1996) has shown that self-efficacy affects the development of appropriate task strategies. Performance in social dilemmas is largely a function of the identification and implementation of appropriate strategies (i.e., cognition) rather than motivation, that is, effort and persistence (Oskamp, 1971). For example, while discussing the dilemma, individuals with low self-efficacy may feel unable to (1) bring forth task relevant information that lead to the attainment of individual and collective goals, (2) convince fellow group members about the effectiveness of certain task strategies such as "tit-for-tat," and (3) form a coalition to strengthen their influence in the group. Consequently, groups may not reach their potential. As Bandura (1997) argued, only those who have a high belief in their efficacy persist in finding ways to exercise control over social systems containing limited opportunities and many constraints.

Second, there was a positive correlation between self-efficacy and personal
goal level in both three-person and seven-person groups. Adopting low personal goals is unfortunate in that individuals with low goals, as opposed to individuals with difficult ones, are less likely to employ the problem solving behaviors that are necessary to develop strategies to achieve optimal outcomes for themselves and the group. Instead, individuals acquiesce and compromise too soon when they set easy goals, decreasing the likelihood of finding an integrative win-win solution (Huber & Neale, 1986; 1987).

**Collective-efficacy**

Bandura (1986) argued that collective-efficacy "will influence what people choose to do as a group, how much effort they put into it, and their staying power when group efforts fail to produce results" (p. 449). Thus the stronger the beliefs people hold about their collective capabilities, the more that the group achieves. An explanation for the finding that collective-efficacy of seven-person groups was significantly lower than that of three-person groups is enactive mastery. Participants in three-person groups increased their contributions to the joint account whereas participants in seven-person groups did not. Individuals in three-person groups saw that their fellow group members were not only capable of contributing to group goal attainment, but through feedback (monetary contributions and the amount of money made by the group) they also observed that their group members were willing to do so. Therefore the conviction that the group can attain a high level of performance was stronger for three-person groups than for seven-person groups. The amount of
money made by seven-person groups did not change with time and neither did their collective-efficacy. This suggests that previous performance is a salient basis for subsequent collective-efficacy beliefs.

Outcome expectancies

That outcome expectancies were lower for seven-person as opposed to three-person groups is consistent with previous research (e.g., Earley, 1993; Kerr, 1989). There are at least two explanations for this finding. First, in a large group, participants may believe that their decisions as individuals can do little to affect the final outcome for the group. Therefore individuals may care little about the performance of their group, and hence decline to contribute for the common good. Those who have low outcome expectancies are not convinced that it is worthwhile for them to abandon their individual goal (e.g., at the risk of becoming the "sucker" and forego individual profit) and to commit to the group goal. Research (e.g., Rapoport, Bornstein, & Erev, 1989; Van de Kragt, Dawes, Orbell, Braver, & Wilson, 1986) has shown that group members who perceive their contributions as critical to group performance are exceedingly likely to cooperate. Second, in a large group, participants may think that others will free-ride on their efforts. Because it would be foolish to contribute if no other group member is going to do so, individuals may be very hesitant to contribute to the group effort.
Goal commitment

Though individuals in organizational settings are likely to experience conflict between competing goals, intra-individual goal conflict has not attracted a lot of attention from goal setting researchers (e.g., Locke, Smith, Erez, Chah, & Schaffer, 1994; Slocum, Brown, & Cron, 1997). Because individuals are not required to resolve conflicts in laboratory settings between competing goals, it is often difficult to capture the importance of goal commitment (Kirkpatrick & Locke, 1996). A strength of the present study was that goal conflict was induced through the use of a social dilemma.

The results showed that the correlation between commitment to one’s personal goal and performance of seven-person groups was negative and significant whereas the correlation between commitment to the group goal and performance of seven-person groups was positive and significant. Thus high commitment to one’s personal goal is associated with low group performance. This is because individuals handled goal conflict by prioritizing one goal (i.e., pursuing self-interest) at the expense of the other (i.e., pursuing the interest of the group). This finding is consistent with the bargaining studies conducted by Huber and Neale (1986, 1987). They argued that if negotiators have high personal goals, they are often unwilling to compromise at anything less than this goal. Consequently, a deficient outcome for both negotiators usually occurs. However, if negotiators reconcile their interests and give up their high personal goals, they will obtain joint benefits that are higher than those that are created by competitive strategies. The present study showed that the alignment of
an individual's commitment to a personal goal with the group's goal is a critical variable affecting subsequent performance.

**The effect of individual and group goals on performance**

Neither individual nor group goals had a significant effect on performance. A null finding is problematic in that it may reflect incompetence on the part of the researcher. This rival hypothesis was rejected because the present author has conducted studies that replicated the effects of goals on performance (Latham & Seijts, in press; Seijts, Meertens, & Kok, 1997). A limitation of the design of the present study is that it did not include a non-dilemma setting. The decision not to do so was based on the literally 500-plus studies that did not involve a dilemma which showed that setting specific difficult goals increase performance over that of urging individuals and groups to "do their best" (Locke & Latham, 1990).

The null findings thus suggest that a social dilemma situation is a boundary condition that prevents the normally obtained beneficial effects on performance of goal setting. This is because in a social dilemma the positive effect of individual (Locke & Latham, 1990; Miner, 1984) and group goals (O'Leary-Kelly, Martocchio, & Frink, 1994; Weingart & Weldon, 1991) mitigate one another. Because participants had a strong tendency to pursue their self-interest as opposed to that of the group during the early trials of the simulation, it is not surprising that the setting of specific individual and group goal had no beneficial effect on group performance relative to urging groups to "do their best."
No conflict between personal and group goals existed in three-person groups. Thus the personal goals individuals in three-person groups adopted were compatible with that of maximizing group performance. High personal goals enhanced group performance as shown by the significant and positive correlation between personal goals and the group’s performance.

This finding can be contrasted with the personal goals that the majority of participants in seven-person groups adopted. Almost 60% of the participants had a personal goal that was incompatible with that of maximizing group performance. It would appear that to the extent personal goals are incompatible with the group’s goal, the higher the personal goals the worse is group performance.

**Dispositions**

Locke and Latham (1990) concluded that the history of personality measures as moderator variables has been a cloudy one. The present study is one of the first that indicated that a disposition, namely, general trust, accounted for variance in cooperation and performance that was unaccounted for by goals. Encouraging low-trust individuals to "do their best" was not enough to encourage them to cooperate with group members. However, setting a specific group goal positively affected their cooperation with others. High-trust individuals cooperated with others regardless of goal condition.

While trust had an effect on the amount of money contributed to the joint account, and the amount of money made by the group, social value orientation did
not have an effect. Van Lange and Kuhlman (1994) found that, in a laboratory setting, the choice behaviors of cooperators were more strongly influenced by information about a partner's honesty than were those of individualists and competitors. In other words, they found a greater tendency among cooperators to match their choices or allocation decisions with their expectations of what other group members would do. Because in the present study most participants initially pursued their self-interest, cooperators were discouraged from cooperating with others, and hence did not differ in their contributions to the joint account from both individualists and competitors. Thus even though cooperators may be more inclined to take into account the interests of their colleagues (e.g., McClintock & Liebrand, 1988; Van Lange & Kuhlman, 1994), the results of the present study suggest that it is not sufficient to fully cooperate with them, rather trust is required.

Theoretical and practical significance

The present study is among the first in the organizational behavior literature to examine what occurs when individuals with both a personal and a group goal are confronted with a dilemma as to which one to choose. The theoretical and practical significance of the study are as follows.

The study increases knowledge of the conditions under which specific group goals are effective. First, high personal goals that are compatible with the group goal of maximizing performance enhance group performance; personal goals that are incompatible with the group goal have a detrimental effect on performance of the
group. Second, in a social dilemma, commitment to a specific group goal is critical for performance to improve. Third, groups on later blocks make significantly more money than they do on early blocks. Fourth, small groups are more cooperative than large groups, in part because individuals in small groups have higher self-efficacy, higher collective-efficacy, and higher outcome expectancies than individuals in large groups. Furthermore, individuals in small groups are more likely to set personal goals that are compatible with that of maximizing group performance than are individuals in large groups. Fifth, high collective-efficacy and outcome expectancies are necessary (but not sufficient) to foster high group performance.

With regard to social-cognitive theory, the study provided evidence that group-level results parallel those of individual-level findings. Collective-efficacy correlated positively and significantly with group performance. Furthermore, previous performance had an effect on subsequent efficacy beliefs. These findings are consistent with those obtained by Prussia and Kinicki (1996) and Lindsley, Mathieu, Heffner and Brass (1996). Because group perceptions of efficacy are related to group performance, there are important implications for an efficacy approach to team building and group training along the same lines as for individuals (e.g., low collective-efficacy may pinpoint specific training needs for work-groups and departments).

With regard to the social dilemma literature, the results of the present study suggest that individuals do not consistently pursue their self-interest as opposed to that of the group. It would appear that after initial trials, individuals realize the
futility of non-cooperation, and that they can make more money by cooperating with others. Thus practitioners need to focus on outcome expectancies and collective-efficacy, in addition to ensuring goal alignment, to overcome the tendency for people in a social dilemma to focus on self-interest.

Study limitations and future research

A number of limitations of the present study should be noted. First, the results of the present study are based on a 70-minute management simulation task. Manipulating the independent variables of interest in a field study would be difficult and arguably unethical (e.g., encouraging individuals to set personal goals that are in conflict with goals of the department or organization). Thus the design and procedures of the present study simplified the complexities of group conflict within organizations. Yet the results of the present study need to be replicated with individuals working in intact, long-term working groups, departments competing for resources in organizations, and member companies that are part of an alliance. Researchers need to address recent calls in the organizational behavior and human resources management literature in general (e.g., Jackson & Schuler, 1995; Mowday & Sutton, 1993), and the group literature in particular (e.g., Barry & Stewart, 1997; Guzzo & Dickson, 1996), for a strong focus on the context in which both individuals and groups are embedded. Possible research strategies include case or ethnographic studies and designs that allow for extensive interaction between researcher and participants. These highly relevant case and observational studies may be less
rigorous than experimental methods, but it is likely that weaknesses of research
designs in some scholarly reports are partly compensated by strengths in the research
designs of other reports (Guzzo & Dickson, 1996).

Second, the content of communication was not measured (e.g., using written
transcripts of all conversation among group members while working on the task
produced from work-session videotapes). The measurement of communication
allows researchers to obtain additional information that pertains to specific group
processes, and how these processes influence group performance. Examples include
whether communication is task relevant, whether group members make public
commitments to cooperate, an increase in the use of normative appeals to cooperate,
building morale among group members, and what specific negotiation strategies are
used to solve the conflict.

Third, the difference between the moderately difficult ($12.00) and highly
difficult ($13.00) group goals that were assigned to three-person groups was trivial.
Though the level of group goals were based on recommendations of Locke and
Latham (1990) and Wood and Locke (1990), this relatively small difference in dollars
to be earned may be one reason why no reliable differences in group performance
were obtained.

Fourth, the lack of a measure of self-set group goals in the study design is
unfortunate because self-set goals may relate more strongly to performance than
assigned goals (Locke & Latham, 1990). Thus the measure of self-set group goals
might have provided additional insight for what reason(s) assigned group goals had
no effect on group performance.

Fifth, the sample size was arguably small.

There are at least six areas of future research. First, the results of the present study suggest that collective-efficacy is an important determinant of group performance. What managers, teamleaders, and groups themselves can do to increase the group’s collective belief that it should successfully perform a specific course of action in a dilemma is not known. Bandura (1986, 1997) argued that four categories of experience are used in the development of self-efficacy, namely, enactive mastery, vicarious experience, verbal persuasion, and physiological arousal. Research is needed that examines whether these processes generalize to the group level, and which of these sources is the most salient method to increase collective-efficacy. Furthermore, although the experience of enactive mastery, vicarious experience, verbal persuasion, and physiological arousal influence efficacy perceptions, Bandura (1986) argued that it is the individual’s cognitive appraisal and integration of these experiences that ultimately determine self-efficacy. There is little known about the processes (e.g., analysis of task requirements, attributional analysis of experience, and assessment of personal, group, and situational resources and constraints) by which collective-efficacy is formed.

Second, even if a group believes it has the ability to perform the task and achieve a certain performance level, members are still less likely to devote effort to the task if there is no expected association between cooperative or goal-directed behavior and desired outcomes. Research has shown that people become more
committed to goals when goal attainment leads to valued rewards (Bandura, 1986; Locke & Latham, 1990). Thus a critical issue in group research is to design goal systems that are compatible with incentive systems which will at the same time motivate high individual effort and high group cooperation. Furthermore, researchers should investigate the degree to which the ratio of positive and negative outcomes have an effect on choice. For example, what do individuals decide to do when non-cooperation may lead to disastrous as opposed to very good outcomes for the individual and the group of which he or she is a member?

Third, the experimental task reflected a public goods problem. A public good (e.g., outcomes of labour - management disputes, rewards that follow from gainsharing plans, and medical treatment made possible through donations) is a resource or service that cannot be withheld from members of a group once it is provided (Olson, 1965). The public goods dilemma can be contrasted with the commons dilemma in which individuals must decide how much to take from a shared resource (e.g., harvesting of timber and fish, available funding for conducting research, and sick leave). If too much of the shared resource is taken, the resource is used up faster than it can be replenished. Research (e.g., Brewer & Kramer, 1986; McCusker & Carnevale, 1995) has indicated that the public goods and commons dilemma have a different effect on behavioral variables such as choice, effort, and persistence. An explanation for these differential effects is the impact of framing. In the public goods dilemma the reference outcome is what one has in possession, and cooperation involves an immediate loss to obtain a future, and uncertain benefit.
This corresponds to a loss frame. Conversely, in the commons dilemma, the reference outcome is zero, and the individual must decide how much of the resource to take. This corresponds to a gain frame. Consistent with Kahneman and Tversky's (1979) prospect theory, research (e.g., Brewer & Kramer, 1986; McCusker & Carnevale, 1995) has shown a higher level of cooperation among undergraduate students in a commons dilemma than in a public goods dilemma. Thus choice behavior differs in the public goods and commons dilemma due to loss aversion, which exists to a greater extent in the public goods dilemma than in the commons dilemma. The effects of setting specific personal and group goals on performance in a commons dilemma needs to be investigated, as should the relationship between goal processes (e.g., goal commitment, self-efficacy, collective-efficacy, and outcome expectancies) and group performance.

Fourth, though the composition of the work group is a theme in most models of group effectiveness (e.g., Guzzo & Shea, 1992; Hackman, 1990), the effects of member dispositions has not been widely investigated for its impact on group performance (e.g., Barry & Stewart, 1997; Guzzo & Dickson, 1996). Yet Hoyle and Crawford (1994) argued that "at the core of an analysis of either the structure or functioning of a group must be an analysis of what individual group members bring to the group" (p. 466). The present study indicated that trust (but not social value orientation) had an effect on the amount of money contributed to the joint account, and hence the amount of money made by the group. High-trust individuals took a more cooperative approach to the business simulation whereas low-trust individuals
took an individualistic approach. Future research should investigate how these dispositions affect group processes and performance (e.g., pro-socials may use moral persuasion and communicate relevant social values that builds commitment to group goals that in turn enhances group performance) as well as the implications for team selection and training practices. For example, the importance of matching individuals in terms of their values, beliefs, and personality traits with the values, beliefs, and norms of an organization may be an integral part of person-organizational fit (e.g., Chatman, 1991; Kristof, 1996; Saks & Ashforth, in press).

Fifth, research (e.g., Organ, 1990) has shown that the pursuit of the group's interest is not driven by utilitarian concerns alone. In organizations, employees routinely help colleagues complete their tasks and generally contribute to a positive work environment. Thus altruism and organizational citizenship may also play a role in pursuing the group's interest independent of utilitarian concerns (Skarlicki & Latham, 1996; 1997). These motives may stem from a sense of identification with social entities (e.g., family, work group, and organization) that are viewed as one's own (Lynn & Oldenquist, 1986). Messick and Brewer (1983) argued that identification with a group can lead to cooperative behavior because strong identification makes it less likely that individuals will make sharp distinctions between one's own welfare and that of others. Collectivism may produce both a desire to see the group succeed and a desire to serve and contribute to the group. Thus future research should investigate the role of non-utilitarian motives in social dilemma situations, and how goal setting procedures may facilitate citizenship
behaviors in groups and organizations.

Sixth, this study examined what individuals do when confronted with a dilemma to choose between their self-interest and the interest of the group. In organizational life, however, the decision whether and how much to contribute to a group goal is often made in groups. Research indicates that groups are often more competitive than individuals. For example, Insko, Pinkley, Hoyle, Dalton, Hong, Slim, Landry, Holton, Ruffin, and Thibaut (1987) found that when an interacting triad played the prisoner’s dilemma with another interacting triad, the number of non-cooperative choices was significantly higher than the number of non-cooperative choices of individuals playing individuals. Groups may be more self-interested than individuals because groups provide social support to fellow group members for attaining within-group benefits (Insko, Schopler, Hoyle, Dardis, & Graetz, 1990). Alternatively, individuals may expect that groups are more competitive, unfriendly, and untrustworthy than individuals (Insko, Schopler, Hoyle, Dardis, & Graetz, 1990). Thus there is a fundamental difference between inter-individual and inter-group behavior in social dilemma situations. Future research should investigate how commitment to a group goal can be accomplished when entities rather than individuals are involved.
REFERENCES


APPENDIX I

Recruitment letter send out to department heads of high schools

Dear Mr. / Mrs.

The purpose of this letter is to invite your students to participate in a study on group decision making. The study will be conducted in March, 1996.

I am a Ph.D. Candidate in Organizational Behavior \ Human Resource Management at the University of Toronto. Currently, I am working on my dissertation. The supervisor of my dissertation is Professor Gary Latham in the Faculty of Management at the University of Toronto. His work on motivation and performance is published in numerous journals in the field, and is widely cited.

My dissertation focuses on social dilemma situations. A social dilemma is a situation in which one’s personal interests or stakes are in conflict with those of the group to which the person belongs. Although it is sometimes beneficial for individuals to pursue their own personal interests, experience shows that people are often better off when they cooperate than when they decide to behave in a self-interested manner. I am interested in how individuals can be encouraged to cooperate with one another under social dilemma situations to increase their performance. The need to understand how performance can be enhanced is particularly important in the 1990s as group based activities have become commonplace in both educational and organizational settings.

The objectives of my study are two-fold:

(1) to illustrate the importance of trust when one’s gains are dependent not only on what one does but also on what others do; and
(2) to allow students to experience the difficulties and frustrations of attempting to solve the social dilemma with only a small amount of control over others' actions.

Students will be asked to work, as a team, on a task that requires group decision making. This task takes no longer than 60 minutes. Upon the discretion of the school, monetary rewards will be earned either by the individual student or allotted to the class. This study is supported by a grant from the Social Sciences and Humanities Research Council of Canada. In addition, students will receive an abstract of the research findings.

For these reasons, I hope that you will give me an opportunity to present my research proposal to you. I believe that the students will find the study interesting, and that it will be a valuable learning experience for them.

I will contact you within the next two weeks. If you have any questions, please do not hesitate to contact me at 416 - 978 - 6372 (office) or 416 - 598 - 5428 (home).

Sincerely,

Gerard Seijts
Ph.D. Candidate in Organizational Behavior / Human Resource Management
INTRODUCTION

This is a study on decision making and earning money. Assume that you are a division manager of a large business: El-Tek. This business is engaged in the design, manufacture, sale, and servicing of a wide variety of electrical products. El-Tek is a decentralized, product centered organization. This means that each division of El-Tek is responsible for determining and implementing policies and practices related to the development of particular new products. Furthermore, each division is responsible for the costing, pricing and selling of these products. Thus, divisions are operated as profit centers. This means that each division is responsible for its own profit. You will be working with two other division managers of El-Tek on a project that is aimed towards generating money for a mutual research and development project: designing audio equipment. The more money that is generated for this project, the better. However; as in real life, you do not want to be the division manager who solely contributes to the group effort so that the other managers can take advantage of your generosity.

INSTRUCTIONS

The instructions are simple and, if you follow them carefully and make good decisions, you may earn a considerable amount of money. The amount of money that you earn is variable and dependent on your decisions as well as the decisions of the other two division managers.
RULES

There are six rules in this study. It is important that you understand these rules because your knowledge of them will, to some extent, determine the amount of money that you make.

RULE 1

You have been organized into a group of three division managers. This will be your group for the entire study. You may not switch groups. The study will last several rounds. In each round, you will be required to make a decision. There will be at least seven rounds.

RULE 2

At the beginning of each round, you will receive 25 cents from the researcher. You have to decide where to invest the 25 cents. You have two options:

A. To you yourself, that is, your personal account.

B. To the mutual research project. This is a joint account that is shared with the other two division managers.

RULE 3

Allocations to your personal account are not shared with the other two division managers. For example, if you decide to allocate 10 cents to your personal account, you will be paid the 10 cents.
RULE 4

However, if you decide to invest money in the joint account, any contribution that is made is doubled in value. For example, 5 cents will become 10 cents. Thus, the amount of money is twice as high as that in your personal account. However, each division manager will receive an equal share of the money regardless of how much money he or she put into it. For example, if you put in 25 cents, it is worth 50 cents; if person 2 puts in 5 cents, it is worth 10 cents; if person 3 puts in 15 cents, it is worth 30 cents. The total amount of money is 90 cents. All three of you divide the money evenly so that each of you gets 30 cents.

RULE 5

At the end of each round, the amount of money that you earn is the money in your personal account plus the share from the joint account. An example follows.

RULE 6

For each round, you have two minutes to decide by yourself, without communicating with others, your contribution to your personal account and to the joint account.
EXAMPLE

Three people decide to invest their 25 cents as follows:

<table>
<thead>
<tr>
<th></th>
<th>Personal account</th>
<th>Joint account</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manager 1</td>
<td>8</td>
<td>17</td>
</tr>
<tr>
<td>Manager 2</td>
<td>5</td>
<td>20</td>
</tr>
<tr>
<td>Manager 3</td>
<td>25</td>
<td>0</td>
</tr>
</tbody>
</table>

Remember: The joint account doubles the amount of money that each manager has allocated to it. Therefore, the joint account contains:

\[(17 \times 2) + (20 \times 2) + (0 \times 2) = 74.\]

Remember: The amount of money that you earn is the money in the personal account plus the share from the joint account. Regardless of his or her contribution to the joint account, each manager receives:

\[74 \text{ cents} / 3 \text{ managers} = 25 \text{ cents from the joint account} .\]

Therefore:

Manager 1 receives \( 8 + 25 \text{ cents} = 33 \text{ cents} \)
Manager 2 receives \( 5 + 25 \text{ cents} = 30 \text{ cents} \)
Manager 3 receives \( 25 + 25 \text{ cents} = 50 \text{ cents} \)
INFORMATION SLIPS - I

Enter your contribution to the personal and the joint account in the space on the information slips which are provided by the researcher. You have one slip for each round. On each slip, your identification number (ID) appears in the upper right corner. The ID is needed for recording the gains or losses, and to determine the amount of money that you have earned.

INFORMATION SLIPS - II

Once the contributions have been entered, the slips will be collected by the researcher. The researcher will then tell you the contributions of the group to the personal and the joint account. You can record these if you wish to do so.

COMMUNICATION

Prior to round 1, round 4, and round 7, there will be an opportunity to discuss progress with the other two division managers. This should not take longer than three minutes. You are not allowed to communicate during the other rounds.

IMPORTANT

To make money typically requires groups to think strategically. Hence, it is important that the group does its best to think of ways to make as much money as possible.
Before we start with round 1, you will be asked a question to see whether you understand the procedures of the task. Please, answer the following question.

**question:**

You contribute 22 cents to the personal account and 3 cents to the joint account.
Manager 2 contributes 19 cents to the personal account and 6 cents to the joint account.
Manager 3 contributes 22 cents to the personal account and 3 cents to the joint account.

- How much money do you receive from the joint account _____ cents.
- How much money do you earn _____ cents.
- How much do the other two managers earn _____ cents (Manager 2)
  _____ cents (Manager 3)
- How much money does the group earn _____ cents
APPENDIX III
Debriefing

This study is about decision-making and performance. Research has shown that performance increases significantly when specific, challenging goals are set. In groups, however, there may be a conflict between the group’s goal and that of individual group members. This situation is known as a social dilemma. Although individuals may be fully capable of exhibiting behaviors that support the attainment of a challenging group goal, the structure of a social dilemma may discourage individual behaviors that lead to attainment of the group’s goal.

Research has also shown that cooperation declines as groups become large. Therefore group goals may have a stronger effect on performance of small groups relative to large groups.

The purpose of this study is to examine what individuals do when they are faced with a choice between their self-interest and the interest of the group. In addition, this study considers whether setting a challenging group goal and group size influence this decision. Furthermore, the effects of goal commitment (i.e., the degree to which an individual is determined to reach a goal), self-efficacy (i.e., the judgment of one’s capability to execute a specific course of action), collective-efficacy (i.e., one’s estimate that the group can execute a specific course of action), outcome expectancies (i.e., a person’s estimate that a given behavior will lead to certain outcomes), and dispositions (social values and trust) on cooperative behavior are investigated.
APPENDIX IV

Measure of self-set personal goal and commitment to it

Please specify the amount of money that you yourself intend to earn by the end of the task. Do not communicate this goal to the other group members. A realistic goal is between $1.50 and $5.25.

My personal goal for making money is ______ dollars.

Please report your attitude towards the goal of making money that you have set yourself by circling the number that best represents how you feel (1 = completely disagree; 5 = completely agree).

Quite frankly, I don't care if I achieve my personal goal or not.

1 2 3 4 5
completely disagree completely agree

It is quite likely that my personal goal may need to be revised.

1 2 3 4 5
completely disagree completely agree

I am strongly committed to pursuing my personal goal.

1 2 3 4 5
completely disagree completely agree

I think my personal goal is a good goal to shoot for.

1 2 3 4 5
completely disagree completely agree

It would take much to abandon my personal goal.

1 2 3 4 5
completely disagree completely agree
APPENDIX V

Measure of commitment to the assigned group goal

Please report your attitude towards the overall group goal of making $13.00 by circling the number that best represents how you feel (1 = completely disagree; 5 = completely agree).

It is unrealistic to expect the group to reach this goal.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>completely disagree</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>completely agree</td>
</tr>
</tbody>
</table>

It is hard for me to take this group goal seriously.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>completely disagree</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>completely agree</td>
</tr>
</tbody>
</table>

Quite frankly, I don’t care if the group achieves this goal or not.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>completely disagree</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>completely agree</td>
</tr>
</tbody>
</table>

It is quite likely that this group goal may need to be revised.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>completely disagree</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>completely agree</td>
</tr>
</tbody>
</table>

I am strongly committed to pursuing this group goal.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>completely disagree</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>completely agree</td>
</tr>
</tbody>
</table>

I think this group goal is a good goal to shoot for.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>completely disagree</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>completely agree</td>
</tr>
</tbody>
</table>
It would take much to abandon this group goal.

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>completely disagree</td>
<td></td>
<td></td>
<td>completely agree</td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX VI

Measure of social values

Imagine that you have to choose between a series of monetary outcomes for yourself and someone else, referred to as Other. You will never knowingly meet Other, or will he or see ever knowingly meet you. Your choices determine the amount of money you receive and the amount of money Other receives. At the same time Other will also make choices. Accordingly, his or her choices determine the amount of money you receive and the amount of money he or she receives. An example of the choice options is provided below.

Example:

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>You get</td>
<td>$5.00</td>
<td>$5.00</td>
<td>$5.50</td>
</tr>
<tr>
<td>Other gets</td>
<td>$1.00</td>
<td>$5.00</td>
<td>$3.00</td>
</tr>
</tbody>
</table>

If you choose A, you would receive $5.00 and Other would receive $1.00; if you choose B, you and Other would both receive $5.00; if you choose C, you would receive $5.50 and Other would receive $3.00. Thus, your choice affects the outcomes of yourself and Other. Similarly, Other’s decision influences his or her own outcomes and those of you.

You are asked to make nine decisions. Please circle the option (A, B, or C) you most prefer. There are no right or wrong answers.

Problem 1:

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>You get</td>
<td>$4.80</td>
<td>$5.40</td>
<td>$4.80</td>
</tr>
<tr>
<td>Other gets</td>
<td>$0.80</td>
<td>$2.80</td>
<td>$4.80</td>
</tr>
</tbody>
</table>

Problem 2:

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>You get</td>
<td>$5.60</td>
<td>$5.00</td>
<td>$5.00</td>
</tr>
<tr>
<td>Other gets</td>
<td>$3.00</td>
<td>$5.00</td>
<td>$1.00</td>
</tr>
</tbody>
</table>
Problem 3:

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>You get</td>
<td>$5.20</td>
<td>$5.20</td>
<td>$5.80</td>
</tr>
<tr>
<td>Other gets</td>
<td>$5.20</td>
<td>$1.20</td>
<td>$3.20</td>
</tr>
</tbody>
</table>

Problem 4:

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>You get</td>
<td>$5.00</td>
<td>$5.60</td>
<td>$4.90</td>
</tr>
<tr>
<td>Other gets</td>
<td>$1.00</td>
<td>$3.00</td>
<td>$4.90</td>
</tr>
</tbody>
</table>

Problem 5:

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>You get</td>
<td>$5.60</td>
<td>$5.00</td>
<td>$4.90</td>
</tr>
<tr>
<td>Other gets</td>
<td>$3.00</td>
<td>$5.00</td>
<td>$0.90</td>
</tr>
</tbody>
</table>

Problem 6:

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>You get</td>
<td>$5.00</td>
<td>$5.00</td>
<td>$5.70</td>
</tr>
<tr>
<td>Other gets</td>
<td>$5.00</td>
<td>$1.00</td>
<td>$3.00</td>
</tr>
</tbody>
</table>

Problem 7:

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>You get</td>
<td>$5.10</td>
<td>$5.60</td>
<td>$5.10</td>
</tr>
<tr>
<td>Other gets</td>
<td>$5.10</td>
<td>$3.00</td>
<td>$1.10</td>
</tr>
</tbody>
</table>

Problem 8:

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>You get</td>
<td>$5.50</td>
<td>$5.00</td>
<td>$5.00</td>
</tr>
<tr>
<td>Other gets</td>
<td>$3.00</td>
<td>$1.00</td>
<td>$5.00</td>
</tr>
</tbody>
</table>

Problem 9:

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>You get</td>
<td>$4.80</td>
<td>$4.90</td>
<td>$5.40</td>
</tr>
<tr>
<td>Other gets</td>
<td>$1.00</td>
<td>$4.90</td>
<td>$3.00</td>
</tr>
</tbody>
</table>
APPENDIX VII

Measure of general trust

Please circle the number that best represents how you feel (1 = completely disagree; 5 = completely agree).

One should not trust other people until one knows them well.

1 2 3 4 5
completely disagree completely agree

In these competitive times, one has to be alert or someone is likely to take advantage of you.

1 2 3 4 5
completely disagree completely agree

If there are fewer police-officers, the streets would be much more dangerous.

1 2 3 4 5
completely disagree completely agree

In dealing with strangers, one is better off to be cautious until they have provided evidence that they are trustworthy.

1 2 3 4 5
completely disagree completely agree

Most people tell a lie when they can benefit by doing so.

1 2 3 4 5
completely disagree completely agree
When someone says something complimentary about you it’s because they want to get something from you.

1 2 3 4 5
completely disagree completely agree

People will take advantage of you when you work with them.

1 2 3 4 5
completely disagree completely agree

Given the opportunity, people are dishonest.

1 2 3 4 5
completely disagree completely agree
APPENDIX VIII

Measure of self-efficacy in making money

Please indicate how much money you think you yourself will be able to make on this task. In the first column, please answer "YES" or "NO" to the statement. In the second column, please indicate how sure you are that you will be able to make that much money. 1 means no confidence, 10 means complete confidence. Once you have answered with a "1" in the second column, all the rest of your responses should continue as "1", meaning no confidence at all. For example, if you think that you can make $3.00 on this task, then enter "YES" in the first column; if you are somewhat sure that you can make $3.00 on this task, then enter a 7 in the second column. It is important that all blanks be filled out.

During this study:

<table>
<thead>
<tr>
<th>I feel I can make $</th>
<th>Yes - No</th>
<th>1-10</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.75 on this task</td>
<td></td>
<td>.....</td>
</tr>
<tr>
<td>2.00 on this task</td>
<td></td>
<td>.....</td>
</tr>
<tr>
<td>2.25 on this task</td>
<td></td>
<td>.....</td>
</tr>
<tr>
<td>2.50 on this task</td>
<td></td>
<td>.....</td>
</tr>
<tr>
<td>2.75 on this task</td>
<td></td>
<td>.....</td>
</tr>
<tr>
<td>3.00 on this task</td>
<td></td>
<td>.....</td>
</tr>
<tr>
<td>3.25 on this task</td>
<td></td>
<td>.....</td>
</tr>
<tr>
<td>3.50 on this task</td>
<td></td>
<td>.....</td>
</tr>
<tr>
<td>3.75 on this task</td>
<td></td>
<td>.....</td>
</tr>
<tr>
<td>4.00 on this task</td>
<td></td>
<td>.....</td>
</tr>
<tr>
<td>4.25 on this task</td>
<td></td>
<td>.....</td>
</tr>
<tr>
<td>4.50 on this task</td>
<td></td>
<td>.....</td>
</tr>
<tr>
<td>4.75 on this task</td>
<td></td>
<td>.....</td>
</tr>
<tr>
<td>5.00 on this task</td>
<td></td>
<td>.....</td>
</tr>
<tr>
<td>5.25 on this task</td>
<td></td>
<td>.....</td>
</tr>
</tbody>
</table>
APPENDIX IX

Measure of collective-efficacy in making money

Please indicate how much money you think the group will be able to make on this task. In the first column, please answer "YES" or "NO" to the statement. In the second column, please indicate how sure you are that the group will be able to make that much money. 1 means no confidence, 10 means complete confidence. Once you have answered with a "1" in the second column, all the rest of your responses should continue as "1", meaning no confidence at all. For example, if you think that the group can make $10.75 on this task, then enter "YES" in the first column; if you are somewhat sure that the group can make $10.75 on this task, then enter a 7 in the second column. It is important that all blanks be filled out.

During this study:

<table>
<thead>
<tr>
<th>I feel my group can make $</th>
<th>6.75 on this task</th>
<th>Yes - No</th>
<th>1-10</th>
</tr>
</thead>
<tbody>
<tr>
<td>I feel my group can make $</td>
<td>7.25 on this task</td>
<td>......</td>
<td>.....</td>
</tr>
<tr>
<td>I feel my group can make $</td>
<td>7.75 on this task</td>
<td>......</td>
<td>.....</td>
</tr>
<tr>
<td>I feel my group can make $</td>
<td>8.25 on this task</td>
<td>......</td>
<td>.....</td>
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<tr>
<td>I feel my group can make $</td>
<td>8.75 on this task</td>
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<tr>
<td>I feel my group can make $</td>
<td>9.25 on this task</td>
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<tr>
<td>I feel my group can make $</td>
<td>9.75 on this task</td>
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<tr>
<td>I feel my group can make $</td>
<td>10.25 on this task</td>
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<td>13.75 on this task</td>
<td>......</td>
<td>.....</td>
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</tbody>
</table>
**APPENDIX X**

**Measure of outcome expectancies of contributing to the joint account**

Please circle the number that best represents how you feel (1 = completely disagree; 5 = completely agree).

Think about what will happen when you cooperate, that is, when you allocate money to the joint account. When I cooperate:

I believe that I will be able to attain my personal goal.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>completely disagree</td>
<td></td>
<td></td>
<td></td>
<td>completely agree</td>
</tr>
</tbody>
</table>

I believe that hostilities (e.g., bickering, name-calling, and conflict) between the three division managers will occur.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>completely disagree</td>
<td></td>
<td></td>
<td></td>
<td>completely agree</td>
</tr>
</tbody>
</table>

I believe that a feeling of trust will arise so that each division manager will allocate money to the joint account.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>completely disagree</td>
<td></td>
<td></td>
<td></td>
<td>completely agree</td>
</tr>
</tbody>
</table>

I believe that other division managers will take advantage of me.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>completely disagree</td>
<td></td>
<td></td>
<td></td>
<td>completely agree</td>
</tr>
</tbody>
</table>

I believe that we will be able to attain a group goal.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>completely disagree</td>
<td></td>
<td></td>
<td></td>
<td>completely agree</td>
</tr>
</tbody>
</table>
I believe that I will gain a good feeling that I personally did not cheat on anyone.

1 2 3 4 5
completely disagree completely agree

I believe that I will be able to increase the profit of my division.

1 2 3 4 5
completely disagree completely agree

I believe that we will be able to increase the profit of the group.

1 2 3 4 5
completely disagree completely agree

I believe that at least one division manager will not allocate money to the joint account and thus earn extra profit for him- or herself.

1 2 3 4 5
completely disagree completely agree
APPENDIX XI

Demographic variables and manipulation checks

Please circle (or fill out) the correct answer.

Sex       (1) Male
           (1) Female

Age       ... Years

How specific was the group goal for making money?

1  2  3  4  5
very much so
not at all

To what extent was the amount of money to be earned by the group specified?

1  2  3  4  5
very much so
not at all

To what extent was there uncertainty as to the amount of money to be earned by the group?

1  2  3  4  5
very much so
not at all

The instructions were clear to me.

1  2  3  4  5
very much so
not at all

I had a full understanding about the procedures of the experiment.

1  2  3  4  5
very much so
not at all