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The Impact of Perceived Loafing and Collective Efficacy on Group Goal Processes and Group Performance

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This paper presents two studies investigating the influence of social perceptions (perceived loafing, collective efficacy, and cohesion) on group goal processes (difficulty and commitment) and group performance. The role of group goal processes as mediators of the relationships between social perception variables and group performance was also tested. The first study involved a sample of 247 college students in 59 groups working on a team interdependent, divisible academic task. Results supported all but one hypothesis. The mediation hypothesis was not supported as both group goal and social perception variables related similarly to group performance. The second study employed a different design to address some limitations of the first study and to extend those findings. Results from the second study, using 383 college students in 101 groups, were consistent with Study 1 with two exceptions. First, the mediation hypothesis was supported in Study 2, replicating the findings of Klein and Mulvey (1995). Second, anticipated lower effort and the sucker effect, additional intervening variables examined in Study 2, partially mediated

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the relationship between perceived loafing and collective goal difficulty as hypothesized.

As the use of formal work teams has become prevalent in organizations (Gordon, 1992; Osterman, 1994), understanding how group motivation influences team performance is imperative. Reviews of the group goal setting literature suggest that challenging group goals can be instrumental in improving group performance and that groups with specific goals perform better than groups with vague or "do your best" goals (see O'Leary, Martocchio, & Frink, 1994; Weldon & Weingart, 1993). Although the existing group goal setting research has replicated these basic findings from the individual goal setting literature, many social perception variables have not been examined (Klein & Mulvey, 1995). The term social perceptions is used here to describe shared perceptions about the group (e.g., norms, cohesion, efficacy). Social perception variables have considerable influence on group effectiveness relative to other antecedents such as interdependence or group composition (Campion, Medsker, & Higgs, 1993; Campion, Papper, & Medsker, 1996). This paper presents two studies on the impact of social perceptions on goal processes and performance. Also, these studies reexamine and extend the findings that group goal processes mediate the relationship between social perceptions and group performance (Klein & Mulvey, 1995).

Perceived Loafing

Perceived loafing is the perception that one or more other group members are contributing less than they could to the group (Comer, 1995). Perceived loafing can be distinguished from social loafing and free riding (Comer, 1995). Social loafing and free riding are two forms of actual reduced effort in group contexts (Kidwell & Bennett, 1993). Social loafing refers to an effect when individuals put forth less effort working in a group than when working alone. Free riding, a concept similar to social loafing, occurs when indivisible public goods are involved and one perceives that other group members will put forth sufficient effort to make his/her own contribution unnecessary to receive the public goods (Olson, 1965).

Although perceptions of reduced effort and actual reduced effort may covary, it is possible for either social loafing or free riding to occur without other group members perceiving that reduced effort. For perceived loafing to perfectly reflect actual loafing, the efforts of all group members would need to be observed, attended to, correctly interpreted, and accurately retrieved (Lord, 1985) by all group members. If social loafing is not perceived by other group members, that reduced effort would not be expected to have a negative influence on those members' motivation. Likewise, group members can perceive loafing even when all group members are contributing fully and that perception of loafing could have a negative effect on group members' motivation. Research in a number of areas of organizational behavior (e.g., attribution theory, justice, stress, decision making, and performance appraisal) has shown that attitudes and

behavior are largely based on perceptions which may or may not reflect actual conditions (Ilgen, Major, & Tower, 1994). Therefore, the perceptions of group members are important in examining the consequences of loafing on the group members' motivation regardless of the accuracy of those perceptions.

A considerable amount of work has focused on the antecedents of social loafing and free riding (see Comer, 1995; Kidwell & Bennett, 1993). Substantially less work, both theoretical and empirical, has focused on perceptions of social loafing (e.g., George, 1992) or free riding or on the subsequent consequences of these perceptions. Orbell and Dawes (1981) speculated on the relationship between free riding perceptions and performance. They argued that group members find it aversive to carry those they believe will free ride and will instead reduce their own contributions to the group. This phenomena of group members carrying the free rider has been termed playing the sucker role. Rather than play the sucker role, group members may reduce their own effort. This has been termed the sucker effect (Kerr, 1983). Only a few laboratory experiments have investigated the sucker effect (i.e., Jackson & Harkins, 1985; Kerr, 1983; Schnake, 1991; Williams and Karau, 1991). Kerr (1983) found support for the sucker effect when subjects were led to believe that their partner, who had the ability to perform, was consistently failing. These individuals reduced their effort and their performance subsequently dropped. Support also has been found for the sucker effect when the partner was perceived to be lacking in motivation rather than ability (Jackson & Harkins, 1985; Williams & Karau, 1991). Schnake (1991) used large groups of individual performers and found support for the sucker effect when two confederates used negative social cues.

One key consequence of the perception of loafing thus appears to be a negative motivational effect. Kerr (1983) proposed that the perception of reduced effort in other group members affects motivational choices. One possible motivational choice group members can make regards their performance goals for the group. Expectations for success have repeatedly been found to be determinants of goals and level of aspiration (Klein, 1991; Locke & Latham, 1990; Zander, 1980). With the perception of loafing, anticipated total group effort is lower which should also lower expectations of success for high levels of performance. As such, group members who perceive loafing would be expected to have lower performance goals for their group because of the anticipated lower effort on the part of others. In addition, rather than play the sucker role, group members who perceive loafing may choose to expend less effort themselves (Albanese & Van Fleet, 1985; Veiga, 1991). Members who choose to reduce their own effort in response to perceived loafing should have even lower expectations for success given that neither they nor the perceived loafer(s) will be contributing fully. In sum, group members who perceive loafing should lower their goals for the group because they perceive less effort will be expended by others coupled with the sucker effect (i.e., individuals reducing their own effort as well). In situations where group goals are set by consensus, the degree to which group members perceive loafing should negatively impact the decision about the difficulty of the group's goal.

Another motivational choice available to group members is their commitment to the performance goals of the group. Perceived loafing may operate on group goal commitment in a similar fashion to its effect on group goal difficulty as expectations of success have also been found to be strong determinants of goal commitment (Hollenbeck & Klein, 1987; Klein, 1991; Locke & Latham, 1990). The performance, goals, and goal commitment of others were identified by Hollenbeck and Klein (1987) as antecedents of goal commitment. Group members who perceive loafing may perceive that other group members are performing at a lower level, are less committed to the group's goal, and have lower goals for the group. Thus, the more perceived loafing within a group, the less persistent members should be in pursuing the group's goal.

HYPOTHESIS 1A. *Perceived loafing will be negatively related to group goal difficulty.*
HYPOTHESIS 1B. *Perceived loafing will be negatively related to group goal commitment.*

Collective Efficacy

Efficacy refers to beliefs about the expected performance for a particular task and can be applied to individuals, groups, organizations, and nations (Bandura, 1982; Gist, 1987). A majority of the research on efficacy has concerned the individual level construct of self-efficacy. Locke and Latham (1990) proposed that self-efficacy influences performance directly as well as indirectly through the difficulty of personal goals. Studies conducted since that review have confirmed these relationships (e.g., Earley & Lituchy, 1991; Gellatly & Meyer, 1992; Mento, Locke, & Klein, 1992). A relationship between self-efficacy and goal commitment has also been hypothesized (e.g., Hollenbeck & Klein, 1987; Locke, Latham, & Erez, 1988) and supported (Earley 1985, 1986; Locke, Fredrick, Lee, & Bobko, 1984).

Despite arguments made by Bandura (1982) and Gist (1987) that efficacy is applicable to groups, research only recently has investigated collective efficacy. Collective efficacy is a group's aggregate perception that the group can perform a particular task (Lindsley, Brass, & Thomas, 1995). Conceptual distinctions have been made between collective efficacy and similar concepts. Collective efficacy differs from self-efficacy in that the referent of the efficacy perceptions is the group and not the individual. A distinction has also been made between collective efficacy and group efficacy (Gibson, Randel, & Earley, 1996). Collective efficacy is the aggregation of individual group member perceptions of the efficacy of the group whereas group efficacy is the consensus of the group regarding their own efficacy (Gibson *et al.*, 1996). Another construct similar to collective efficacy is group potency (Guzzo, Yost, Campbell, and Shea, 1993). Group potency is "the collective belief in a group that it can be effective" (Guzzo *et al.*, 1993, p. 87). This definition refers to generalized performance beliefs held by a group while collective efficacy is task specific (Bandura, 1982; Earley, 1993; Gist, 1987).

Collective efficacy can be expected to operate in relation to group goals and

group performance at the group level in a manner similar to that demonstrated for self-efficacy at the individual level. Gist (1987) argued that group perceptions of collective efficacy should be related to group performance. Support for this relationship has been demonstrated in two short laboratory experiments (Prussia & Kinicki, 1996; Whitney, 1994). Earley (1993) found that an individual level measure of collective efficacy significantly influenced individual performance. Lee (1989) investigated individual self-efficacy, a subjective measure of team goals, and team performance. She found significant relationships between self-efficacy and team performance and between team goals and team performance at the individual level. Lee (1989) further found that team goals partially mediated the effects of self-efficacy on team performance. Studies using measures of group potency have yielded similar results (Guzzo, Campbell, Moses, Ritchie, Schneider, Shaff, Wheeler, & Gustafson, 1991; Shea & Guzzo, 1987).

Bandura (1982) argued that "perceived 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. 143). In other words, collective efficacy should influence group goals and commitment to those goals. High efficacy groups are likely to have had higher past performance and more success in achieving their goals than low efficacy groups (Zander, 1985, 1994). Because of their past performance and goal attainment these groups will likely set goals that are equal to or higher than past performance compared to less efficacious groups (Zander, 1985, 1994). This positive relationship between collective efficacy and group goals was demonstrated by Prussia and Kinicki (1996). Groups with high efficacy should also be more committed to the goals they set for themselves than groups with low efficacy. When faced with obstacles, groups with higher efficacy will be more persistent in trying to solve those problems (Bandura, 1982). Finally, based on Bandura & Cervone's (1983, 1986) findings with individual self-efficacy, high efficacy groups should respond to negative feedback concerning goal attainment by putting forth more effort in comparison to low efficacy groups.

HYPOTHESIS 2A. *Collective efficacy will be positively related to group goal difficulty.*
HYPOTHESIS 2B. *Collective efficacy will be positively related to group goal commitment.*

Replications

Klein and Mulvey (1995) hypothesized and found that: (a) group goal difficulty and group goal commitment were positively related to group performance, (b) cohesion was positively related to group goal commitment and group goal difficulty, and (c) group goal difficulty and group goal commitment mediated the relationship between cohesion and group performance. As noted by those authors, the relationship between cohesion, goals, and performance is more complex than this in some situations. High performance would be expected from groups with high cohesion and high goals for performance while low

performance would be expected for a cohesive group with a goal for low performance (Schachter, Ellertson, McBride, & Gregory, 1951). This suggests that cohesion, in addition to influencing the difficulty of self-set group goals, would moderate the relationship between goal difficulty and performance. While conceptually cohesion and goal difficulty may jointly influence performance, this interaction is not hypothesized here and was not found by Klein and Mulvey (1995) because of the restricted range of goals examined. Both Klein and Mulvey (1995) and the current studies examined self-set group goals in academic setting where most students set goals for A's. When a sufficiently wide range of goal levels is present, a moderated mediation model could be expected in place of the simple mediation predicted here. In this study, cohesion should operate in the same manner as found by Klein and Mulvey (1995). Along with cohesion, the effects of perceived loafing and collective efficacy on group performance should also be mediated by group goal processes.

HYPOTHESIS 3A. *Group goal difficulty and group goal commitment will be positively related to group performance.*

HYPOTHESIS 3B. *Cohesion will be positively related to group goal difficulty and group goal commitment.*

HYPOTHESIS 3C. *Group goal processes (difficulty and commitment) will mediate the relationship between social perception variables (cohesion, perceived loafing, and collective efficacy) and group performance.*

STUDY 1

Method

Sample and Task

Two hundred fifty nine undergraduate students from a large Midwestern university served as participants in 63 groups ranging in size from three to five members. Participants were volunteers from five different sections of the same introductory Human Resource Management course and received extra credit for their participation. Students not wishing to participate in the research were offered an alternative assignment to receive the extra credit. All students elected to participate in the research. Eight individuals (four groups) were eliminated from the study when the size of their groups fell below three members due to students withdrawing from the course. This left a final sample of 247 participants in 59 groups. Two group projects required for the course served as the task. Naturally occurring groups were used because of administrative limitations. Participants were allowed to set their own goals so as to not impede participants in obtaining the grades they desired and felt capable of earning.

Complete discretion concerning division of labor and coordination of effort was given to the groups. The task was divisible into components, but it was required that the final report read as an integrated whole. Thus, the task was divisible (Steiner, 1972) and successful task performance required team

interdependence (Van de Ven, Delbecq, & Koenig, 1976). Groups performed the task twice. Both projects (or trials) were identical in form, but different in content. The task required group members to research, develop, support, and present written arguments for and against an assigned controversial human resource management issue. Although both projects counted equally for the course, for purposes of this study, the first project was used only to familiarize group members with the task and each other. Participants worked as groups on the two projects over an 8-week period. Groups were given some class time to work on the projects to ensure a minimum level of interaction.

Procedure

Although data were collected from five different sections taught by two different instructors, the course content, group projects, and research procedures followed were identical. Both projects were described at the first class meeting along with the other course requirements and participants were encouraged to begin selecting their groups. The first project was introduced two weeks later. At this time, groups were formalized and given time to organize. The study was introduced when the second project was assigned during the sixth week of the term. At this time groups were instructed to agree upon and set a goal for the score they as a group realistically hoped to earn on the project. In the eighth week of the term a questionnaire was administered which (a) asked participants to report the efficacy of the group in obtaining different grades on the group project, (b) measured perceived loafing and cohesion, (c) assessed the group's self-set goal for the group, (d) and measured individual commitment to the group's goal. The projects were collected in the tenth week of the term.

Variables

Perceived loafing. A measure was developed to assess member perceptions of loafing in groups. This scale asks participants to indicate their agreement with four statements about their group using a five-point Likert scale (from strongly disagree to strongly agree). In a pilot study, this scale was administered to 96 students working on group projects in courses different from the one employed in the current study. The coefficient alpha for these items in the pilot sample was .90. An exploratory principal axis factor analysis was conducted and a scree test revealed one interpretable factor. This factor accounted for 70% of the variance. All four items had substantial factor loadings. In the current study, the coefficient alpha was .89. An exploratory principal-axis factor analysis was again conducted and again yielded a single factor accounting for 76% of the variance. The factor loadings for the four items ranged from 0.84 to 0.89.

Cohesion. The measure of cohesion was taken from Seashore (1954). Participants indicated their agreement with five statements about their group using

a five-point Likert scale (e.g., "I feel I am really a part of my group"). The coefficient alpha was 0.86 for cohesion.

Collective efficacy. Each participant rated the probability of the group of attaining each of nine possible performance levels ranging from A to D+ (i.e., A, A−, B+, etc.). The point values corresponding to each of these letter grades were also provided. Participants reported the probability (from 0 to 100) that they could attain *at least* that grade. Responses to the nine performance levels were then summed for each participant. This procedure is consistent with Gist's (1987) suggestions for measuring collective efficacy and parallels the self-efficacy strength method described by Locke *et al.* (1984) and widely used in other self-efficacy research (e.g., Earley, 1986, 1993; Lee, 1989).

Group goal difficulty. Participants were asked, as a group, to set a group goal for the score the group hoped to attain on the project (based on 50 possible points). This procedure follows from Zander's (1971) definition of a group goal—the outcome desired by members for the group as a whole. Group goal difficulty was assessed by asking each group member to respond to the item: "What score does your group hope to receive on the project? My group's goal is a score of ____ points".

Group goal commitment. Commitment to the group's goal for the group was assessed using the seven-item self-report measure provided by Hollenbeck, Klein, Wright, and O'Leary (1989). Items were reworded to reflect a group rather than individual goal. For this study, the coefficient alpha was 0.73.

Group performance. The score assigned to the group project by the instructors served as the performance index. These scores, based on a possible 50 points, reflected the performance levels used in the collective efficacy measure. Instructors had no knowledge of the groups' goals when assigning grades. To assess the reliability of this criterion, a random 20% of the projects were graded by both instructors. Agreement between the two instructors was assessed using the r_{wg} approach provided by James, Demaree, and Wolf (1984). The inter-rater agreement was 0.98.

Level of Analysis

The group was the level of analysis with zero-order correlations and multiple regression employed to examine the hypotheses. With the exception of group performance, the variables were assessed at the individual level. In order to meaningfully aggregate individual responses to the group level, sufficient perceptual agreement within groups must be demonstrated (James, 1982). To determine if aggregation was appropriate, within-group inter-rater agreement was assessed using r_{wg} (James *et al.*, 1984). Within-group agreement was calculated for each group on each of the individual level variables. The obtained values were then averaged across the 59 groups. The average r_{wg} values were 0.98 for group goal difficulty, 0.91 for group goal commitment, 0.84 for collective efficacy, 0.89 for cohesion, and 0.80 for perceived loafing. Given sufficient

within-group agreement, participants' individual responses were aggregated to the group level by calculating the mean value within each group.

Results

Means, standard deviations, reliability estimates, and zero-order correlations are reported in Table 1 for all of the measured variables. The first hypotheses predicted that perceived loafing would be negatively related to group goal difficulty and group goal commitment. As evident in Table 1, both of these hypotheses were supported. Perceived loafing was significantly and negatively correlated with group goal difficulty ($r=-0.49$) and group goal commitment ($r=-0.43$). The second set of hypotheses predicted that collective efficacy would be positively related to group goal difficulty and group goal commitment. Both of these hypotheses also were supported as collective efficacy was significantly and positively correlated with group goal difficulty ($r=0.60$) and group goal commitment ($r=0.44$).

Given the strength of the relationships among the measured variables, additional analyses were conducted to determine the relative impact of perceived loafing, cohesion, and collective efficacy on the group goal variables. Group goal difficulty and group goal commitment were regressed on the three social perception variables in two separate equations. The results of these analyses are reported in Table 2. As a set, perceived loafing, cohesion, and collective efficacy accounted for a significant 45% of the variance in group goal difficulty. With group goal commitment as the dependent variable, the three social perception variables explained a significant 36% of the variance.

Hypothesis 3 concerned the replication and extension of findings reported by Klein and Mulvey (1995). Specifically, it was predicted in Hypothesis 3a that group goal difficulty and group goal commitment would be positively related to group performance. Hypothesis 3b predicted that cohesion would be positively related to group goal commitment and to group goal difficulty. The correlations provided in Table 1 indicate support for all four of these relationships. Group goal difficulty and group goal commitment were both significantly

TABLE 1

Means, Standard Deviations, Reliabilities, and Intercorrelation Matrix for Study 1

Variable	Mean	*SD*	1	2	3	4	5	6
1 Perceived Loafing	2.54	.67	(.89)					
2 Cohesion	3.61	.51	−.70**	(.86)				
3 Collective Efficacy	745.90	71.28	−.33**	.40**	—			
4 Group Goal Difficulty	47.48	1.56	−.49**	.43**	.60**	—		
5 Group Goal Commitment	4.07	.28	−.43**	.55**	.44**	.23*	(.73)	
6 Group Performance	45.76	2.90	−.32**	.37**	.34**	.30**	.35**	(.98)

Note: $N = 59$. Reliability estimates are in parentheses and are coefficient alphas except for group performance which is an inter-rater reliability.

*$p < 0.05$; **$p < 0.01$.

TABLE 2

Results of Regressing Group Goal Difficulty, Group Goal Commitment, and Group Performance on Cohesion, Perceived Loafing, and Collective Efficacy for Study 1

Independent variables	Dependent variables								
	Group goal difficulty			Group goal commitment			Group performance		
	Total R^2	Beta	F	Total R^2	Beta	F	Total R^2	Beta	F
	0.45		15.26**	0.36		10.21**	0.19		4.18**
Cohesion		0.03	0.03		0.39	6.40**		0.22	1.62
Perceived loafing		−0.31	4.94*		−0.07	0.24		−0.09	0.28
Collective efficacy		0.49	19.96**		0.26	4.74*		0.22	2.73

Note. $N = 59$.

*$p < 0.05$; **$p < 0.01$.

and positively correlated with group performance (r=0.35 and 0.30, respectively). Cohesion was significantly and positively correlated with both group goal commitment and group goal difficulty (r=0.55 and 0.43, respectively).

Hypothesis 3c stated that the group goal processes (difficulty and commitment) would mediate the relationship between the social perception variables (perceived loafing, cohesion, and collective efficacy) and group performance. In order to test for mediation, it is necessary to demonstrate that (a) both the independent (social perception) and the mediating (group goal) variables relate to the dependent variable (group performance), (b) the independent variables relate to the mediating variables, (c) the relationship between the independent variables and the dependent variables becomes negligible or is reduced significantly when controlling for the mediating variables, and (d) the relationship between the moderator variables and the dependent variable is still significant when controlling for the independent variables (Baron & Kenny, 1986; James & Brett, 1984). The previously reported results demonstrate that the social perception variables significantly related to the goal processes and that the goal processes significantly related to group performance. Hierarchical multiple regression was employed to test the remaining steps for the mediation hypothesis.

First, group performance was regressed on the three social perception variables. These results are presented in Table 2. As a set, the three social perception variables accounted for a significant 19% of the variance in group performance. Group performance was then regressed on group goal difficulty and group goal commitment with the three social perception variables entered in a second hierarchical step. These results are presented in Table 3. When entered as a first hierarchical step, group goal difficulty and group goal commitment accounted for a significant 17% of the variance in group performance. Perceived loafing, cohesion, and collective efficacy, entered in a second hierarchical step, accounted for an incremental 3% of the group performance variance. Consistent with the mediation hypothesis, the variance in group performance explained

TABLE 3

Results of Regressing Group Performance on Cohesion, Perceived Loafing, Collective Efficacy, and Group Goal Processes for Study 1

Step	Independent variables	ΔR^2	Beta	F
1		0.17		5.78**
	Group goal difficulty		0.29	5.55*
	Group goal commitment		0.23	3.43
2		0.03		0.68
	Cohesion		0.18	0.93
	Perceived loafing		−0.03	0.03
	Collective efficacy		0.12	0.48
	Total R^2	0.20		2.68*

Note. $N = 59$.
*$p < 0.05$; **$p < 0.01$.

by the three social perception variables dropped from a significant 19% to a nonsignificant 3% when controlling for the two group goal variables.

The final step was to assess whether the more proximal variables (group goal processes) predicted meaningful variance in group performance after controlling for the more distal variables (social perceptions). When group performance was regressed on group goal difficulty and group goal commitment after first controlling for the three social perception variables, group goal difficulty and group goal commitment accounted for a nonsignificant incremental 2% of the variance in group performance. The results for Hypothesis 3c are, therefore, equivocal as the mediating variables did not enhance the explanatory power of the model. Although the variance in group performance attributable to the social perceptions variables became negligible when controlling for the group goal variables, the data were equally supportive of the opposite causal ordering. It thus appears that both the group goal and social perception variables are equally proximal in relating to group performance in this study.

Discussion

The purpose of this first study was to examine the impact of perceived loafing and collective efficacy on group goal variables and group performance and to replicate and extend the findings of Klein and Mulvey (1995) concerning the role of group goal processes as mediators of the relationship between social perception variables and group performance. The results were supportive of all hypotheses except one. Correlational results indicated that cohesion, perceived loafing, and collective efficacy all significantly related to both group goal difficulty and group goal commitment. In addition, both group goal difficulty and group goal commitment correlated significantly with group performance. However, results for the mediation hypotheses were ambiguous and the findings of Klein and Mulvey (1995), that group goal processes mediate the relationships between social perception variables and group performance, were not replicated.

Limitations of this first study should be recognized. First, all of the measured variables (e.g., group goal commitment, cohesion, and perceived loafing) were collected at the same time. The inability to determine a clear causal ordering between the independent and mediating variables may be attributable to their assessment at the same point in time. This also raises the possibility that common method variance could explain some of the observed relationships between social perceptions and group goal processes. To explore this possibility, a Harmon (1967) one factor test was conducted with the items from loafing, goal commitment, and cohesion scales. Three distinct factors were obtained suggesting that common method variance was not the underlying source of the relationships among these variables. Another limitation of this study is that group members were not randomly assigned to groups. As such, it is possible that groups formed on some relevant, systematic basis such that the observed results are spurious due to differences among groups on some unmeasured dimension.

Third, in hypothesizing the relationship between perceived loafing and group goal difficulty it was suggested that anticipated lower effort and the sucker effect were key intervening variables. Although a significant relationship was found between perceived loafing and group goal difficulty, these intervening variables were not measured. As a result, it is unknown if perceived loafing affected goals through these expected mechanisms. Finally, the design of Study 1 did not completely match the hypotheses which held that social perception variables influenced the setting of group goals. Groups were asked to set a goal for their group two weeks prior to the measurement of the goal and social perception variables. It would have been more appropriate to have assessed the social perception variables prior to the setting of group goals.

STUDY 2

The second study was designed to replicate and extend the results of the first study and to address some of the limitations of that study. In Study 2 a longitudinal design that better matched the hypothesized model was used and participants were randomly assigned to groups. Another difference in Study 2 is that group members reported their personal goals for the group. In the previous study, groups agreed to a common goal and group members reported that group goal for the group. As such, this study measured collective goal difficulty (the aggregation of individual goals for the group) as opposed to group goal difficulty. Another difference between the two studies, resulting from the change in group goal operationalization, was the elimination of group goal commitment. The previous study assessed individual group members' commitment to a group goal previously set by the group. Individual team members may or may not have been committed to those group-set goals. In Study 2, with participants providing current personal goals for the group, commitment to that goal was viewed as redundant. Finally, two additional constructs were assessed relating to anticipated lower effort and the sucker effect.

The hypotheses for this second study are identical to those in Study 1 except

for the deletion of group goal commitment and the addition of hypotheses concerning the intervening perceptions of anticipated lower effort and the sucker effect. As suggested in the introduction to Study 1, group members who perceive loafing should anticipate a lower level of total group effort. The anticipated effort of the group should be lower if one perceives that others are contributing less than they could (perceived loafing) than if one perceives everyone is contributing fully. To the extent that group performance is viewed as contingent on group effort, anticipated lower effort should result in lower personal goals for the group and lower collective goal difficulty. Another consequence of perceived loafing, which should result in lower collective goal difficulty, is the sucker effect. As defined earlier, the sucker effect is the reduction of one's own effort rather than carry group members perceived to be loafing. The curtailed motivation of group members planing to reduce their own effort is likely to be evident in a corresponding reduction of their personal goals for the group. In sum, the perception of loafing should result in anticipated lower effort and the sucker effect. These perceptions should, in turn, result in the choice of lower personal goals for the group which, when aggregated, will result in lower collective goal difficulty.

HYPOTHESIS 4A. *Perceived loafing will be positively related to anticipated lower effort and the sucker effect.*

HYPOTHESIS 4B. *Anticipated lower effort and the sucker effect will be negatively related to collective goal difficulty.*

HYPOTHESIS 4C. *Anticipated lower effort and the sucker effect will mediate the relationship between perceived loafing and collective goal difficulty.*

Method

Sample and Task

Three hundred ninety two undergraduate students in a large Southeastern university, randomly assigned to 104 groups ranging in size from three to five members, served as participants. These students were enrolled in five different sections of the same introductory Human Resource Management course and received extra credit for their participation. An alternative extra credit assignment was again offered but all students chose to participate in the study. Four individuals (two groups) were eliminated from the study when the size of their groups fell below three members due to students withdrawing from the class. As with Study 1, two group projects required for the course served as the task and participants were allowed to set their own goals. The projects were similar to Study 1 in all but two respects. First, both projects required group members to research, summarize, and evaluate a human resource subfunction (i.e., selection and compensation, respectively) of an organization. Second, participants worked as groups on the two projects over an 11-week period instead of an 8-week period.

Procedure

Although data were collected from five different sections taught by three different instructors, the course content, group projects, and research procedures followed were identical. Both projects were described at the first class meeting along with the other course requirements. Two weeks later, participants were randomly assigned to groups and given time to organize. The study was introduced during the eighth week of the term after participants received their scores on the first project. At this time, a questionnaire was administered which measured perceived loafing and cohesion. In the eleventh week of the term, a second questionnaire was administered assessing the efficacy of the group in obtaining different scores on the group project, anticipated lower effort, the sucker effect, and the participant's personal goal for the group. The second project was collected in the thirteenth week of the term.

Variables[1]

Anticipated lower effort. A measure was developed to assess participants' anticipation of lower effort by other group members. Participants indicated their agreement with four items using a five-point Likert scale. These items are provided in Table 4. Participants were instructed to read each two-part sentence dealing with the perception of reduced effort and effects of that reduced effort on the part of the rest of the group. If they strongly disagreed with the first part of the statement concerning reduced effort, respondents were instructed to indicate that the item was not applicable. Otherwise, they were instructed to read and respond to the entire sentence. Nonapplicable items were rescored to indicate strong disagreement with that item. The coefficient alpha for this scale was 0.90.

Sucker effect. A measure assessing participants' reduction of their own effort was also developed. Participants indicated their agreement with five items using a five-point Likert scale. These items are also provided in Table 4. The instructions for the sucker effect scale were identical to those for anticipated lower effort. The coefficient alpha for this scale was 0.92. To ensure that the items written to tap the sucker effect, anticipated lower effort, and perceived loafing were measuring three distinct constructs, an exploratory principal-axis factor analysis with an oblique rotation was conducted with the items from these three scales. A scree test indicated that three factors should be retained. The three factors accounted for 77% of the variance and each of the items from these scales correctly loaded on the appropriate factor. The results of this analysis are provided in Table 4.

Collective efficacy. Consistent with Study 1, each participant rates the probability of the group of attaining each of nine possible performance levels. The

[1]The scales and measurement procedures used in Study 2 are the same as those used in Study 1 unless otherwise noted.

TABLE 4

Perceived Loafing, Anticipated Lower Effort, and Sucker Effect Items and Factor Loadings for Study 2

Items	Factor 1	Factor 2	Factor 3
Perceived loafing			
(1) Members of my group are trying as hard as they can. (R)	0.86	0.00	0.01
(2) Members of my group are "free-loaders."	0.81	0.01	−0.01
(3) Members of my group are contributing less than I anticipated.	0.83	0.00	0.02
(4) Given their abilities, my group members are doing the best they can. (R)	0.87	−0.01	−0.01
Anticipated lower effort			
(1) Because some group members are not trying as hard as they can, the rest of my group will probably put in less effort.	0.02	0.89	−0.07
(2) Some of my group members are putting in less effort than they could, so other group members will not try as hard as they could.	−0.04	0.86	0.03
(3) Because some members are not doing their share, I don't think anyone in my group is going to work as hard as they could on this project.	−0.02	0.73	0.05
(4) Since some group members are not expending much effort on this project, others in the group will likely reduce their effort.	0.06	0.84	0.03
Sucker effect			
(1) Because other group members are not contributing as much as they could, I'm not trying my best on this project.	−0.01	0.15	0.75
(2) Because other group members are putting in less effort than they are able, I do not plan to continue to work hard on the project.	0.03	0.05	0.73
(3) Others in my group are not trying their best on this project, so I'm not trying my best either.	0.00	−0.06	0.94
(4) Because other group members are not trying as hard as they could, I am not working as hard as I could on this project.	−0.04	−0.04	0.91
(5) Because other group members are not trying as hard as they can, I am going to reduce my effort on the project.	0.03	−0.03	0.82

Note. $N = 383$. (R) Indicates reverse scoring.

only difference was that participants evaluated scores ranging from 60 to 100 in 5-point increments instead of letter grades.

Collective goal difficulty. Instead of asking the group to set a group goal as in Study 1, collective goal difficulty was assessed by asking each group member to respond to the item: "What grade should your group be trying to earn on the second group project. My personal goal for the group grade on the second group project is _____ points (out of 100)".

Level of Analysis

As in Study 1 the group was the level of analysis. With the exception of group performance, the variables were assessed at the individual level. To determine if aggregation was appropriate, the amount of perceptual agreement within groups was calculated for each of the individual level variables. The obtained r_{wg} values were then averaged across the groups. The average r_{wg} values were above 0.80 for all variables except anticipated lower effort. With the elimination of one group which had an extremely low level of agreement on this variable, the average r_{wg} for anticipated lower effort increased to 0.87. This left a final sample of 383 participants in 101 groups. The average r_{wg} values for the other variables, based on this final sample, were 0.80 for perceived loafing, 0.93 for the sucker effect, 0.89 for cohesion, 0.99 for collective efficacy strength, and .99 for group goal difficulty. Participants' individual responses were aggregated to the group level by calculating the mean value within each group.

Results

Means, standard deviations, reliability estimates, and zero-order correlations are reported in Table 5 for all of the measured variables. Hypothesis 1a predicted that perceived loafing would be negatively related to the collective goal difficulty. This hypotheses was supported by the correlational evidence in Table 5 ($r = -.56$, $p < .01$). Support was also observed for Hypothesis 2a which

TABLE 5

Means, Standard Deviations, Reliabilities and Intercorrelation Matrix for Study 2

Variable	Mean	*SD*	1	2	3	4	5	6	7
1 Perceived loafing	2.25	0.74	(.91)						
2 Anticipated lower effort	1.85	0.63	.35**	(.90)					
3 Sucker effect	1.53	0.43	.35**	.57**	(.92)				
4 Cohesion	3.70	0.47	−.42**	−.42**	−.48**	(.88)			
5 Collective efficacy	700.17	60.48	−.12	−.18*	−.13	.18*	—		
6 Collective goal difficulty	91.98	4.48	−.56**	−.35**	−.43**	.47**	.33**	—	
7 Group performance	87.65	7.65	−.56**	−.12	−.19*	.35**	.37**	.57**	(.90)

Note. $N = 101$. Reliability estimates are in parentheses and are coefficient alphas except for group performance which is an inter-rater reliability.

*$p < 0.05$; **$p < 0.01$.

predicted that collective efficacy would be positively related to collective goal difficulty ($r = .33$, $p < .01$). As with Study 1, multiple regression was used to determine the relative impact of perceived loafing, cohesion, and collective efficacy on collective goal difficulty. The results of this analysis are reported in Table 6. As a set, perceived loafing, cohesion, and collective efficacy accounted for a significant 43% of the variance in collective goal difficulty.

Hypothesis 3a predicted that collective goal difficulty would be positively related to group performance and Hypothesis 3b predicted that cohesion would be positively related to collective goal difficulty. The correlations provided in Table 5 indicate support for both of these relationships. Collective goal difficulty was significantly and positively correlated with group performance ($r = 0.57$) and cohesion was significantly and positively correlated with collective goal difficulty ($r = 0.47$).

Hypothesis 3c stated that collective goal difficulty would mediate the relationship between the social perception variables (perceived loafing, cohesion, and collective efficacy) and group performance. As demonstrated in Tables 5 and 6, the three social perception variables are significantly related to collective goal difficulty and collective goal difficulty is significantly related to group performance. To support the mediation hypothesis, it also needs to be shown that (a) the social perception variables are related to group performance, (b) the relationship between the social perception variables and group performance becomes negligible or is reduced significantly when controlling for collective goal difficulty, and (c) collective goal difficulty predicts meaningful variance in group performance after controlling for the social perception variables (Baron & Kenny, 1986; James & Brett, 1984). Hierarchical multiple regression was employed to test these effects.

First, group performance was regressed on perceived loafing, cohesion, and collective efficacy. As presented in Table 6, the three social perception variables accounted for a significant 41% of the variance in group performance. Next, group performance was regressed on collective goal difficulty with the three social perception variables entered in a second hierarchical step. These results are presented in Table 7. When entered as a first hierarchical step, collective

TABLE 6

Results of Regressing Collective Goal Difficulty and Group Performance on Cohesion, Perceived Loafing, and Collective Efficacy for Study 2

Independent variables	Dependent variables					
	Collective goal difficulty			Group performance		
	Total R^2	Beta	F	Total R^2	Beta	F
	0.43		24.03**	0.41		23.07**
Cohesion		0.26	8.88**		0.07	0.74
Perceived loafing		−0.41	23.26**		−0.51	33.67**
Collective efficacy		0.23	8.64**		0.29	13.06**

Note. $N = 101$.

*$p < 0.05$; **$p < 0.01$.

TABLE 7

Results of Regressing Group Performance on Cohesion, Perceived Loafing, Collective Efficacy, and Collective Goal Difficulty for Study 2

Step	Independent variables	ΔR^2	Beta	F
1		0.33		47.47**
	Collective goal difficulty		0.57	47.47**
2		0.14		8.18**
	Cohesion		0.00	0.00
	Perceived loafing		−0.38	17.13**
	Collective efficacy		0.23	8.09**
	Total R^2	0.47		20.61**

Note. $N = 101$.
*$p < 0.05$; **$p < 0.01$.

goal difficulty accounted for a significant 3% of the variance in group performance. Perceived loafing, cohesion, and collective efficacy, entered in a second hierarchical step, accounted for an incremental 14% of the group performance variance. The variance in group performance explained by the three social perception variables dropped from 41 to 14% when controlling for the collective goal difficulty. While the incremental variance in group performance explained by the social perception variables was still significant when controlling for collective goal difficulty, the drop in explained variance (28%) was significant ($F(4,95) = 9.27$, $p < .01$)providing evidence of partial mediation.

The final step was to assess whether collective goal difficulty enhanced the explanatory power of the model. Group performance was regressed on collective goal difficulty after first controlling for the three social perception variables. Collective goal difficulty accounted for a significant, incremental 6% of the variance in group performance when entered in a second hierarchical step. These results support Hypothesis 3c and suggest partial mediation given that (a) the variance in group performance explained by the social perception variables after controlling for collective goal difficulty is significantly lower than the variance explained by the social perception variables alone and (b) collective goal difficulty (the more proximal variable) explains significant additional variance in group performance after controlling for social perceptions (the more distal variables).

Hypothesis 4a predicted that perceived loafing would be positively related to anticipated lower effort and the sucker effect. As demonstrated in Table 5, this hypothesis was supported as perceived loafing was positively and significantly correlated with anticipated lower effort and the sucker effect ($r = .35$, $p < .01$ for both). Also, Hypothesis 4b was supported as anticipated lower effort and the sucker effect were negatively correlated with collective goal difficulty ($r = .-35$, $p < .01$ and $r = -.43$, $p < .01$, respectively).

Hypothesis 4c stated that perceived loafing would operate through anticipated lower effort and the sucker effect to influence collective goal difficulty.

The above correlational analyses indicated that perceived loafing significantly related to anticipated lower effort and the sucker effect and that those variables were significantly related to collective goal difficulty. Results from testing Hypothesis 1a demonstrated that perceived loafing is significantly and negatively related to collective goal difficulty. The observed correlation of −0.56 is equivalent to an R^2 of 0.31. To support the mediation hypotheses, it remains to be shown that (a) this relationship becomes negligible or is reduced significantly when controlling for anticipated lower effort and the sucker effect and (b) anticipated lower effort and the sucker effect predict meaningful variance in collective goal difficulty after controlling for perceived loafing (Baron & Kenny, 1986; James & Brett, 1984).

Collective goal difficulty was regressed on anticipated lower effort and the sucker effect in an initial hierarchical step with perceived loafing entered as a second hierarchical step. The results of the regression analyses are reported in Table 8. When entered as a first hierarchical step, anticipated lower effort and the sucker effect, as a set, accounted for a significant 20% of the variance in collective goal difficulty. Perceived loafing, entered in a second step, accounted for a significant incremental 18% of the variance in collective goal difficulty. The variance in collective goal difficulty explained by perceived loafing dropped from 31 to 18% when controlling for the collective goal difficulty. This reduction in explained variance (15%) is significant ($F(3,96) = 5.54$, $p < .01$) providing evidence of partial mediation.

Finally, anticipated lower effort and the sucker effect were regressed on collective goal difficulty, after first controlling for perceived loafing. These results are also provided in Table 8. The hypothesized mediating variables

TABLE 8

Results of Regressing Collective Goal Difficulty on Anticipated Lower Effort, the Sucker Effect, and Perceived Loafing for Study 2

Step	Independent variables	ΔR^2	Beta	F
1		0.20		12.25**
	Anticipated lower effort		−0.16	1.97
	Sucker effect		−0.34	9.54**
2		0.18		27.37**
	Perceived loafing		−0.45	27.37**
	Total R^2	0.38		19.51**
1		0.31		44.74**
	Perceived loafing		−0.56	44.74**
		0.07		5.04**
2	Anticipated lower effort		−0.05	0.27
	Sucker effect		−0.24	5.88*
	Total R^2	0.38		19.51**

Note. $N = 101$.

*$p < 0.05$; **$p < 0.01$.

accounted for a significant, incremental 7% of the variance in group performance when entered in a second, hierarchical step. This pattern of results supports Hypothesis 4c and suggests partial mediation given that (a) the variance in collective goal difficulty explained by perceived loafing after controlling for anticipated lower effort and the sucker effect is significantly lower than the variance explained by perceived loafing alone and (b) anticipated lower effort and the sucker effect (the more proximal variables) explain significant additional variance in group performance after controlling for perceived loafing (the more distal variables).

Discussion

The second study reexamined the relationships among perceived loafing, collective efficacy, collective goal difficulty, and group performance. The results were more supportive of the hypotheses than Study 1, perhaps because of design differences which included the random assignment of participants to groups, the measurement of social perception variables several weeks before the assessment of goals, a slightly different task, different operationalizations of some variables, and a slightly longer time frame. The improvements in Study 2 notwithstanding, there are some additional limitations of both studies that should be noted. First, the groups were relatively short term in duration. Social perception variables such as cohesion, loafing, and collective efficacy may need longer than 8 to 11 weeks to fully develop and the relationships between social perception variables and goal processes may change over the stages of group development. In addition, while the group task was a meaningful one, participants likely realized that they would no longer have to work together as a group after the assignment was completed. These limitations aside, the results of these two studies suggest a number of insights and issues for future research regarding the replications, perceived loafing, and collective efficacy.

Replications

The findings presented here were highly consistent with those of Klein and Mulvey (1995). In Study 1, group goal difficulty and commitment correlated positively with group performance and cohesion related positively to both group goal processes. In Study 2, cohesion related positively to collective goal difficulty and collective goal difficulty related positively to group performance. In addition, the finding that goal processes partially mediated the effects of social perception variables on group performance was replicated in Study 2 but not in Study 1. These differences are likely due to the design differences between the two studies. Study 2 used a different operationalization of group goal difficulty, used a slightly different task, did not include group goal commitment in the mediation analysis, and did not measure all of the group and goal variables at the same point in time.

For example, the task in Study 2 may have resulted in more task interdependence than the one used in Study 1. The task in Study 1 required groups to

write a debate paper on a controversial issue whereas in Study 2 the task required students to evaluate a human resource subfunction in an existing organization. Anecdotal evidence suggested that the task in Study 2 may have resulted in more task interdependence than the one used in Study 1. While task interdependence was neither measured nor manipulated in the current study, the tasks employed in these studies are an important boundary condition for the reported findings. Another potentially relevant variable which neither study measured is task cohesion which has been shown to affect group processes and group performance (Zaccaro & Lowe, 1986). Future research should examine the role of task interdependence, task cohesion, and other situational factors that may influence the relationships between social perception variables and goal processes and group performance.

Perceived Loafing

In both studies, the greater the perception of loafing within the group, the lower the difficulty of the goal, whether aggregated individual goals for the group (Study 2) or agreed upon group goals (Study 1). In Study 1, perceived loafing also had a negative impact on the group's goal commitment. This negative motivational impact of perceived loafing could turn into a vicious, escalating cycle. With perceptions of loafing, group members may lower their efforts and aspirations for the group rather than play the sucker role. This in turn, could lead to greater perceptions of loafing and a further reduction in group motivation and group performance. Unlike cohesion which can have either positive or negative effects on group performance depending on how that influence is channeled, perceptions of loafing can only have negative effects. While not assessed in these studies, perceived loafing likely has a negative influence on group morale as well. Given the amount of work performed in organizations by groups and the popularity of autonomous and semi-autonomous work groups, organizations have a clear interest in minimizing perceptions of loafing, particularly if those perceptions are not based on the actual reduced efforts of others.

Several issues regarding perceived loafing require additional attention in future research. One issue that requires investigation is the examination of the extent to which perceived loafing coincides with actual loafing. Loafing may be perceived at a lower level than it is actually occurring for several possible reasons. These include but are not limited to: actual loafing that is not observed by any other group members, loafing that is observed by some members but not shared with others, attribution errors in which reduced effort is misattributed to a lack of ability or other more legitimate causes, the active impression management by the loafer, or loafers believing that they are contributing fully to the group. Similarly, collective perceptions of loafing may be higher than the actual level of loafing due to attribution errors or inaccurate perceptions about other group members' contributions or capabilities. Research on the effects of actual versus perceived loafing is also needed to determine their relative effects on group member motivation and group performance.

Another useful area for future research would be to explore different sources of loafing perceptions within groups. Perceptions of loafing are likely influenced by both the number of loafers within the group and by the extent of loafing by group members. In the current studies, no distinction was made between these two sources of loafing perceptions. The perception of several group members loafing a little may have different implications for goal processes and group performance than the perception of a single group member loafing excessively. For example, the more widespread the perception of loafing behavior in the group, the less impact cohesion and collective efficacy may have and, subsequently, the lower the goals and commitment to those goals.

Situations in which perceptions of loafing might lead group members to increase their effort is another area for future research. Williams and Karau (1991) found that subjects may compensate for a poor performing co-worker and put in more effort than they otherwise would. This phenomenon, known as social compensation, occurs when a group member perceives that the task is meaningful and that co-workers do not have the ability to perform (Williams & Karau, 1991). This is different from loafing, however, which is a conscious withholding of effort not a lack of ability. Social compensation has not been demonstrated in response to perceptions that co-workers have the ability to perform but are not contributing fully. However, there may be situations in which the task is so important that even in the face of perceived loafing, group members would increase their own effort.

Future research also needs to examine the kinds of motivational systems that help prohibit perceived loafing in groups. For example, in the current studies, all group members received the same grade regardless of individual contributions. Perceptions of loafing may differ or play a different role under different reward systems. Similarly, the use of goals for individual performance, in conjunction with goals for group performance, may reduce perceptions of loafing (Matsui, Kakuyama, & Onglatco, 1987; Schnake, 1991).

Anticipated Lower Effort and the Sucker Effect

The sucker effect and anticipated lower effort were the hypothesized mediators in the relationship between perceived loafing and goal difficulty. They operated as expected in Study 2, partially mediating the effects of perceived loafing on goal difficulty. The results demonstrated that group members who perceive loafing lower their goals, in part, because they anticipate lower effort on the part of other group members and because they do not wish to play the sucker role. As these proposed intervening variables did not fully mediate the effects of perceived loafing on goal difficulty, future research is needed to identify the additional mechanisms by which perceived loafing effects motivational choices such as goal difficulty. It may be the case that the relationships between perceived loafing and these variables is moderated by group size. That is, the perception of loafing may not lead to lower group goals through anticipated lower effort and the sucker effect in larger groups because there are enough other contributing members to compensate. There was not sufficient variance

in group size in the current study to investigate this possibility. Future research needs to examine the operation of anticipated lower effort and the sucker effect on groups of differing sizes.

Collective Efficacy

The findings with collective efficacy were consistent with previous findings at the individual level of analysis (Locke & Latham, 1990). In the first study, groups with higher collective efficacy set more difficult group goals and were more committed to those goals. In Study 2, members of groups with high collective efficacy set higher personal goals for their groups. Also in Study 2, collective efficacy had a direct as well as an indirect effect on group performance paralleling the relationships found among self-efficacy, goal difficulty, and individual performance. Collective efficacy is, therefore, an important factor in getting groups to set and remain committed to difficult group goals which, in turn, are instrumental for improving group performance.

Bandura (1982) argued that collective efficacy is rooted in self-efficacy. If correct, then effective groups need members with high self-efficacy or groups need to develop the self-efficacy of group members so that the group members feel that the group is efficacious. It is also likely that the antecedents of self-efficacy have identifiable parallels at the group level. If so, the manipulation of those group level antecedents of collective efficacy should facilitate the setting of difficulty group goal, commitment to those goals, and group performance. It would also be useful to determine how and when collective efficacy develops and how collective efficacy changes over the course of a group task and over repeated task performances (Lindsley *et al.*, 1995). For example, groups that experience initial failures may take longer to develop a strong sense of collective efficacy than groups which experience initial success. Investigations of how self-efficacy influences collective efficacy would also be instructive. Examples of research questions here include how collective efficacy is influenced by the level and variability of member self-efficacy and how self-efficacy within the group spreads from high self-efficacy group members to other group members (and whether low self-efficacy would be similarly contagious). Given the widespread use of groups and teams in organizations, all of these questions would be valuable avenues for future research.

CONCLUSION

The results of the two studies presented here again demonstrate that group goals are strongly related to group performance. These studies also replicate and extend the conclusions of Klein and Mulvey (1995) that (a) social perception variables can have a robust influence on the group goal setting process and (b) social perception variables influence group performance, to some extent, through group goal setting processes. Cohesion, perceived loafing, collective efficacy, group goal difficulty, and group goal commitment were all shown to substantially impact group performance. Shared, challenging goals have long

been recognized as important to group member motivation and group performance (e.g., Zander & Newcomb, 1967). Despite the extensive literatures on both goal setting and social perceptions, much remains to be learned about the relationships between social perceptions and goal processes and how to optimize both.

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