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Effects of Goals and Feedback on Performance in Groups

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In the first study, 26 undergraduate pairs and 52 individuals worked on a perceptual speed task for 20 min to win prizes based on performance. The pairs set group goals and individual goals to be attained, whereas the individuals set only individual goals. Despite the equal levels of individual goals set, goal acceptance and performance were significantly higher for the pairs than for the individuals. A stepwise hierarchical regression analysis supported the contributions of goal acceptance and group goals to performance. In the second study, 50 undergraduate pairs were assigned a goal to be attained as teams on a perceptual speed task lasting 15 min. Group and individual task feedback, given after 7½ min of work, significantly improved performance only for those subjects who were below target for either group or individual feedback, yielding interaction effects on performance. The implications of the findings for group goal setting, social loafing, and organizational effectiveness are discussed.

In the last two decades, knowledge of the effects of individual goal setting on task motivation has accumulated (see Locke, Shaw, Saari, & Latham, 1981, for a review). However, the effects of group goal setting have rarely been studied.

Studies so far have dealt with two key attributes of group goals. One is goal clarity. Cohen (1959), Ishida (1980), Latham and Kinne (1974), and Watson (1983) found that specific goals led to better group performance than unspecified, vague goals. The other attribute is goal difficulty. Latham and Yukl (1975), Steers and Porter (1974), and Zander and Newcomb (1967) found that groups performed better if their goals were difficult than if they were easy. Yet, the question remains as to which type of goal, group or individual, would lead to better performance.

The present article reports two studies of the effects of goals and feedback on performance in groups. The first study predicted that subjects would perform better if the ultimate standard were group performance (referred to as group goal setting) than if the ultimate standard were individual performance (referred to as individual goal setting). If subjects set a goal to be attained as a team, and define their contribution to the attainment of the goal in terms of individual goals, they actually set two types of goals: a group goal and an individual goal. It is obvious that the group goal is much higher than any one individual goal under additive task demands (Steiner, 1972). Subjects naturally will see that the group goal is not their goal alone and is impossible to attain individually. Yet, Horwitz's (1954) classic study demonstrated that group goals aroused motivational forces in group members that were similar to those aroused by individual goals. Erez and Zidon (1984) and Locke (1982) found that even impossible goals had positive effects on performance if the goals were accepted. Thus, subjects with group goals should strive, beyond the point of reaching their individual goal levels, to get as close as possible to their group goal, resulting in higher goal difficulty levels and thus higher performance levels than in the case in which subjects set individual goals alone.

In addition to increasing goal difficulty levels, group goal setting should enhance acceptance of individual goals. In group goal setting, subjects should develop a sense of shared responsibility for the attainment of their individual goals. This would motivate them to exert extra effort so that their performance would not cause the failure of the group. Pepitone (1952) found that members of groups felt responsible to their groups if they performed an important role in the groups. Erez, Earley, and Hulin (1985) found a positive relation between goal acceptance and performance. Thus, group goal setting should lead to higher performance than individual goal setting alone wherein goal acceptance is higher.

One possible qualification to these hypotheses may lie in the phenomenon of social loafing. Studies on social loafing (e.g., Albanese & Van Fleet, 1985; Harkins, Latané, & Williams, 1980; Harkins & Petty, 1982; Ingham, Levinger, Graves, & Peckham, 1974; Kerr, 1983; Kerr & Bruun, 1981, 1983; Latané, Williams, & Harkins, 1979; Williams, Harkins, & Latané, 1981) have presented various examples of motivation loss in groups. Latané et al. (1979) found that when subjects were asked to clap as loudly as possible in groups of differing sizes, the amount of noise per person was a negative function of group size. Note, however, that these subjects were not allowed to set any specific goals. They were merely told to do their best. Goal setting studies found that specific, challenging goals trigger maximum effort, but unspecified, vague goals like merely saying "do your best" do not (see Locke et al., 1981, for a review). People having no specific goals to attain as a group would free-

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ride on others' efforts (Kerr & Bruun, 1983) or lose motivation if they found their partners free-riding on them (Kerr, 1983).

Study 1

Method

Subjects

A total of 104 undergraduates (74 men and 30 women), enrolled in an industrial relations course, served as subjects. They were chosen from a pool of 211 students on the basis of pretest ability scores.

A numerical counting task was used to measure perceptual speed. Subjects were asked to count the frequency of a number that corresponded to a designated number to the left of each row of 50 numbers. Numbers within and across rows were completely randomized. Responses were recorded in a blank space to the right of each row of numbers.

A week before the experiment, the 211 students worked on the pretest, which lasted 2 min. They were told to do their best. After 2 min had elapsed, subjects were asked to count and record the number of correct responses, which served as the ability score.

The experimental trial was conducted with 52 group goal subjects (26 teams of 2 persons each) and 52 individual goal subjects, chosen from the pool of the 211 students (see ahead). The task was numerical counting similar to that used in the pretest. The trial lasted 20 min.

Experimental Conditions

The 211 students were divided in two groups with similar ability score distributions. One group (n = 105) served as a pool for group goal subjects, and the other group (n = 106), as a pool for individual goal subjects. The group goal and individual goal subjects were chosen from the pools so that the differences of team ability scores (i.e., the sum of ability scores for the two teammates) across the teams was smallest and the number of subjects and the distributions of ability scores were exactly equal for the two goal conditions. This was done to minimize the potential differences in the probability of winning prizes for the two goal conditions.

Group Goal Condition

The highest scoring student in the group goal subject pool was matched with the lowest scoring student, the second highest scoring student with the second lowest scoring student, and so forth. Although this procedure generated 52 two-member teams, it was found that only 26 teams of equal ability could be formed. Thus, these 26 teams (i.e., 52 subjects) were used for the group goal condition. The mean for ability scores was 10.8 (SD = 2.29). The ability scores for the two teammates totaled 21 or 22. The differences between the two teammates in ability scores within teams ranged from 1 to 8.

Subjects were informed that their team would win a prize if their team score (i.e., the sum of performance for the two teammates) fell within the highest six team scores. The prize had a value of about $8. They were told that the teams were competing on the basis of equal team ability scores (i.e., 21 or 22). Thus, the probability of winning the prize was 23%. Team members were told to discuss and specify (a) the score the team would attempt to achieve (i.e., a group goal) and (b) each member's contribution to the attainment of the group goal (i.e., an individual goal).

After the group and individual goals were set, subjects were asked to move to assigned seats in a separate room where they worked on the experimental trial together with the individual goal subjects. The seats were completely randomized so that team members were not sitting together and could not encourage one another during the trial.

Individual Goal Condition

In all, 52 students were chosen from the individual goal subjects pool as individual goal subjects. The subjects were then classified into high- and low-ability categories. The 26 subjects whose ability scores matched those of the high-scoring group goal subjects were classified as the high-ability category, and the remaining subjects as the low-ability category. The ability scores ranged from 11 to 16 with a mean of 12.9 (SD = 1.05) for the high-ability category, and from 7 to 10 with a mean of 8.7 (SD = .90) for the low-ability category. The overall mean was 10.8, the same as that for the group goal subjects. To minimize the differences in the potential probability of winning a prize, subjects competed on the basis of their classification of either high- or low-ability categories. Subjects were informed of the category to which they belonged through their code in the questionnaire.

Subjects were told that they would win a prize if their score fell within the highest six individual scores in their respective categories. The prize had a value of about $4. Thus, the probability of winning the prize was also 23% for both high- and low-ability subjects. Subjects were then asked to specify the number of rows they sought to attain to win the prize (i.e., their individual goal). After this, subjects moved to assigned seats in a separate room where they worked on the experimental task together with the group goal subjects.

Measures

Attractiveness of incentive. Subjects were asked to indicate the extent to which they found the incentive attractive. A 5-point scale, ranging from *unattractive* (1) to *extremely attractive* (5), was used for this purpose.

Desire to win. Subjects were asked to indicate their desire to win the prize on a 5-point scale. The scale ranged from *strongly undesirable* (1) to *strongly desirable* (5).

Goal acceptance. This measure was obtained by asking subjects to indicate the extent to which they would try to attain their individual goal. A 5-point scale, ranging from *will definitely not try* (1) to *will definitely try* (5), was used for this purpose.

Probability of success. Both group and individual goal subjects were asked to indicate their probability of winning the prize as a team, and personally, respectively. This was rated from 0% to 100%, with 10% intervals.

Performance. The number of correct answers made by subjects in the experimental trial was used as the index of performance.

Results

Although subjects worked as teams in the group goal condition, analyses were based on individuals' data. Table 1 shows means and standard deviations of main variables for the two goal conditions.

There are no significant differences between the two conditions in attractiveness of incentive, desire to win, and probability of success. These findings support the equality of motivational antecedents for the two goal conditions.

The performance mean is significantly higher for the group goal condition than for the individual goal condition, supporting the prediction. This finding suggests substantial effects of group goals on performance, inasmuch as there was no difference between the two goal conditions in ability level.

The individual goal means are not different for the two goal conditions. It is not surprising that the difference between the group goal and the individual goal for the group goal condition was significant (M = 221.8 and M = 107.9, respectively),

Table 1
Predictor and Criterion Means and Standard Deviations for Two Goal Conditions

Variable	Goal condition: Group	Goal condition: Individual	$t(102)$
Attractiveness of incentive			
M	3.6	3.5	*ns*
SD	1.11	1.12	
Desire to win			
M	3.4	3.1	*ns*
SD	0.99	1.15	
Probability of success			
M	36.3	38.4	*ns*
SD	17.10	18.26	
Individual goal			
M	107.9	107.2	*ns*
SD	18.15	21.01	
Goal acceptance			
M	4.4	3.9	3.15**
SD	0.69	0.73	
Group goal			
M	221.8		
SD	22.47		
Performance			
M	114.9	105.5	2.41*
SD	20.73	18.48	

Note. Group $n = 52$; individual $n = 52$.
* $p < .05$. ** $p < .01$.

Table 2
Means and Standard Deviations of Individual Goals and Performance for Two Ability Categories for Two Goal Conditions

Ability category	Individual goal	Performance	$t(25)$
	Group goal		
High ($n = 26$)			
M	118.0	128.6	2.70*
SD	17.73	17.14	
Low ($n = 26$)			
M	97.7	101.2	1.24
SD	11.71	13.81	
Total ($n = 52$)			
M	107.9	114.9	2.88[a] **
SD	18.15	20.73	
	Individual goal		
High ($n = 26$)			
M	121.4	117.4	1.13
SD	17.28	13.55	
Low ($n = 26$)			
M	93.0	93.6	0.19
SD	13.43	14.71	
Total ($n = 52$)			
M	107.2	105.5	0.70[a]
SD	21.01	18.48	

[a] $df = 51$.
* $p < .05$. ** $p < .01$.

$t(50) = 42.86$, $p < .01$. Of more relevance, the group goals are significantly higher than the sum of the individual goals for the two teammates (for group goal and the sum of the individual goals, $M = 221.8$ and $M = 215.7$, respectively; $SD = 21.62$; for the difference, $M = 6.1$, $SD = 6.66$, $t[25] = 4.54$, $p < .01$, for correlated sample). These findings suggest that group goal subjects strove toward higher goals than did individual goal subjects.

Table 2 summarizes the means and standard deviations of individual goal and performance for high- and low-ability subjects for the two conditions. Despite the equal levels of individual goals for the two goal conditions as shown in Table 1, high and low group goal subjects exceeded their individual goals, although not significantly for low-ability subjects. For the total, performance was significantly higher than individual goal.

In contrast, high individual goal subjects did not reach their individual goal levels, whereas low individual goal subjects strove only up to their individual goal levels. For the total, performance did not differ from the individual goal. These findings suggest that goal acceptance was higher for group goal subjects than for individual goal subjects. In fact, the goal acceptance mean is significantly higher for the group goal condition than for the individual goal condition ($M = 4.4$ and $M = 3.9$, respectively), $t(102) = 3.15$, $p < .01$.

To determine the contributions of ability, individual goals, goal acceptance, goal conditions, and their interactions to performance, a stepwise hierarchical regression analysis was calculated across the two conditions. This analysis used performance as the dependent variable. Independent variables were, in order, ability, individual goal, goal acceptance, goal conditions (1 for the group goal condition, and 0 for the individual goal condition), and their interaction terms. Results are summarized in Table 3.

As shown in Table 3, ΔR^2 for Step 2 is significant. Thus, individual goal explains performance variance after removing ability. ΔR^2 is also significant for Steps 3 and 4. Goal acceptance explains performance variance after removing both ability and individual goal. Group goal explains performance variance even after all other effects were removed, suggesting the potent effects of group goals on performance.

Additional analyses were conducted to determine whether experimental conditions affected the results. The 26 teams had

Table 3
Regression Results for Performance

Step	Variable	R^2	ΔR^2	F for ΔR^2
1	Ability	.52	—	—
2	Individual goal	.55	.03	6.71*
3	Goal acceptance	.58	.03	7.14**
4	Goal condition	.61	.03	7.62**
5	Interaction (2 × 3)	.61	.00	0.99
6	Interaction (2 × 4)	.62	.01	2.55
7	Interaction (3 × 4)	.62	.00	1.80
8	Interaction (2 × 3 × 4)	.62	.00	0.22

* $p < .05$. ** $p < .01$.

differing combinations of male and female students. Thus, the effect of sex differences in the pairs on performance was tested. Group goal subjects were classified into male–male, female–female, or male–female pair category. Performance means were computed for the three categories. The performance means were 111.8 (n = 22, SD = 21.75), 106.8 (n = 6, SD = 12.21), and 119.8 (n = 24, SD = 20.28), respectively. There were no significant differences among the three performance means, $F(2, 49) = 1.35$. Because ability levels were equivalent as well (M = 10.8, SD = 2.21; M = 10.7, SD = 1.48; and M = 10.8, SD = 2.56, respectively), sex differences in the pairs did not affect performance.

To equalize the ability levels of groups, the highest ability subject was paired with the lowest ability subject, the second highest ability subject with the second lowest ability subject, and so forth. Thus, the ability levels of high-ability subjects were different for the teams. In such a situation, the group performance could have largely reflected the ability levels of high-ability subjects. To test this possibility, a stepwise, hierarchical regression was computed for group performance. Independent variables were, in order, the ability score of high-ability subjects, the ability score of low-ability subjects, and the interaction term. If the variance in group performance is unduly accounted for by the ability level of high-ability subjects, the entry of the score of low-ability subjects would not increase the value of R^2. The results indicated significant increment in R^2 (R^2 = .08, R^2 = .36, and R^2 = .37, respectively; for the increment in R^2, $F[1, 23] = 10.41$, $p < .01$, for the second step, and $F[1, 22] = .12$, *ns*, for the third step), thereby precluding the possibility.

Low-ability subjects worked alone in the individual goal condition, whereas they worked with high-ability subjects in the group goal condition. This could have led to increased performance for low-ability subjects in the group goal condition (for low-ability subjects' performance, M = 101.2, SD = 13.81, for the group goal condition, and M = 93.8, SD = 14.71, for the individual goal condition; $t[50] = 1.88$, $p < .10$). Laughlin and Johnson (1966) found that lower ability subjects performed better when they worked with higher ability subjects than when they worked alone or with those of the same ability levels. To test this possibility, a stepwise hierarchical regression analysis was computed for low-ability subjects' performance. Independent variables were, in order, the ability score of low-ability subjects, the ability score of high-ability subjects, and their interaction term. Results indicated that neither the ability score of high-ability subjects nor the interaction term increased R^2 (R^2 = .18, R^2 = .26, and R^2 = .27, respectively; for the increment in R^2, $F[1, 23] = 2.29$, *ns*, for the second step, and $F[1, 22] = .49$, *ns*, for the third step), thereby suggesting the minimal influence of high-ability subjects on low-ability subjects' performance. Laughlin and Johnson (1966) used a problem solving task in which solutions were reached on the basis of group discussion. On the other hand, the present subjects worked independently. Thus, high-ability subjects did not affect the performance of low-ability subjects.

In his review article, Eden (1984) noted that the high expectation of supervisors has a positive influence on the performance of their subordinates. When subjects set goals, they were told whether they belonged in the high- or low-ability category. Thus, low-ability subjects might expect a larger contribution to the group performance from high-ability subjects. It is likely that the lower the ability levels of subjects, the higher their expectation that high-ability subjects would perform better. This could have positively affected the performance of high-ability subjects (for high-ability subjects' performance, M = 128.6, SD = 17.14, for the group goal condition, and M = 117.4, SD = 13.55, for the individual goal condition; $t[50] = 2.56$, $p < .05$). To test this possibility, a stepwise hierarchical regression was computed for the performance of high-ability subjects in the group goal condition. The independent variables were, in order, the ability score of high-ability subjects, the ability score of low-ability subjects, and their interaction term. This analysis did not yield significant increment in R^2 for either the score of low-ability subjects or the interaction term (R^2 = .27, R^2 = .35, and R^2 = .38, respectively; for the increment in R^2, $F[1, 23] = 2.56$, *ns*, for the second step, and $F[1, 22] = 1.04$, *ns*, for the third step). These findings indicate that pairing high- and low-ability subjects, and informing subjects about their ability category did not bias the results.

Discussion

This study found that group goal setting led to higher performance than did individual goal setting. In addition, it suggests that group goal setting would facilitate performance through two mechanisms. One is increased goal difficulty. The individual goal levels were equal for the two conditions. Group goals were higher than individual goals for either teammate, and even higher than their sum. These findings suggest that group goal subjects strove, in effect, for higher goals than did individual goal subjects, resulting in higher performance.

The other mechanism is enhanced acceptance of individual goals. Despite the equal levels of individual goals for the two conditions, group goal subjects exceeded their individual goals, whereas individual goal subjects strove only up to their individual goal levels. This suggests that group goal subjects accepted their goals to a greater degree than did individual goal subjects, and in fact, the goal acceptance mean was significantly higher for the group goal condition than for the individual goal condition.

The study so far demonstrates the effects of group goals and individual goals on performance. However, goal-setting studies with individuals showed that feedback is a necessary accompaniment of goals to improve subsequent performance (Erez, 1977; Locke et al., 1981; Strang, Lawrence, & Fowler, 1978). This suggests the need for investigating the relation of goals and feedback in improving performance in group goal setting. Thus, the second study was conducted to investigate this relation.

Subjects can receive two types of task feedback in group goal setting. One is feedback on their own performance, and the other, feedback on group performance. Thus, one important issue concerning feedback in group goal setting is the mechanisms by which the two types of task feedback affect performance. It was found in the 1960s that feedback containing both individual and group performance information was more effective than that containing group performance information alone (e.g., Zajonc, 1962; Zander & Wolfe, 1964). However, these studies did not consider the concept of goal setting. In

addition, the mechanisms by which feedback containing both types of performance information improved performance was not identified.

Peak (1955) identified that differences in the way one feels about a present state and an imagined state are the most important determinants of motive structure, and account for the persistence and intensity of motivated behavior. More recently, Campion and Lord (1982) conceptualized the relations among goals, feedback, and performance on the basis of the control systems model that was initially developed by Powers (1973). According to Campion and Lord, when subjects receive feedback, a referent signal (goal) and sensor signal (task feedback) are compared by a "comparator." If a sufficiently large discrepancy exists, some form of remedial action (e.g., goal revision as cognitive change or increased effort as behavioral change) is triggered.

Many studies have supported the control systems model in individual goal setting. Campion and Lord (1982) found that students who failed in attaining test goals increased effort as a function of the magnitudes and frequencies of failure. Matsui, Okada, and Inoshita (1983) found that when subjects were assigned goals and received feedback midway through their work, those subjects below target improved performance, whereas those who were on target merely maintained their previous levels of performance. Bandura and Cervone (1983) found that feedback was most effective for subjects who were below target, were dissatisfied with their past performance, and had a high level of perceived self-efficacy. These findings suggest that a negative goal discrepancy in the comparison process is essential for task feedback to improve performance.

If subjects set group goals and individual goals and receive group and individual task feedback during work, the comparison process would take place for the two types of feedback. If subjects found negative goal discrepancy in either comparison process, they would try to minimize it. In such a situation, subjects can be categorized into four groups, as shown in Figure 1. The *G* and the *I* refer to group and individual task feedback. The feedback is positive when the group or individual performance is either on or above the specified target. It is negative when the same performance is below the target. *P* indicates the level of performance.

Subjects in Category A are on target for both group and individual feedback. They receive positive task feedback from the two comparison processes. They can be expected merely to maintain their previous levels of efforts, resulting in no change in performance. Subjects in Category B, on the other hand, are on target individually, but their group is below target. They receive positive feedback from the comparison process for the individual task feedback and negative feedback from the comparison process for the group task feedback. They are expected to improve their performance to minimize the group goal discrepancy. Subjects in Category C have group performance on target, but they are below target individually. They receive positive feedback from the comparison process for the group task feedback, and negative feedback from the individual task feedback. They are expected to improve performance to minimize the individual goal discrepancy. Finally, subjects in Category D are below target for both group and individual task feedback. They receive negative feedback from the two comparison processes.

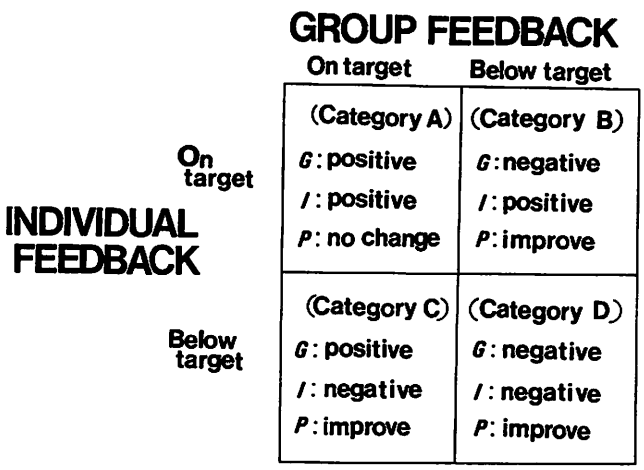

Figure 1. Subject categories, nature of feedback, and predicted performance changes. (*G* = group task feedback; *I* = individual task feedback; and *P* = predicted performance changes after feedback).

They are expected to improve performance to minimize either goal discrepancy. In short, the task feedback would improve performance only for those below target for one or more sources of task feedback. Thus, the second study hypothesized the interaction effects of group and individual task feedback on performance. In addition, it specified that the interaction must be complementary, not additive in nature.

It may also be argued that subjects in Category B can lose motivation by finding their partners free-riding on them. Similarly, subjects in Category C can lose motivation by free-riding on their partners. Kerr (1983) found motivation loss due to the "sucker effect," when group members reduced efforts if they had capable partners who free-rode on their efforts. Kerr and Bruun (1983) found motivation loss due to the free-rider effect when group members exerted less effort as the perceived dispensability of their efforts for group success increased. Note, however, that these subjects worked under disjunctive or conjunctive task demands in which the standard was the performance of more capable or less capable subjects. Thus, the efforts of more capable or less capable subjects were dispensable, with no reason to work hard. It is interesting to note that Kerr and Bruun (1983) failed to find the free-rider effect when subjects worked under additive task demands. In addition, subjects were not allowed to set either group or individual goals. If the task demand is an additive one, and subjects set both group and individual goals that are attainable only if they worked hard, motivation loss due to the sucker or free-rider effect would be prevented.

Study 2

Method

Subjects, Task, and Procedure

Subjects were 89 male and 11 female university students enrolled in an industrial relations course. A perceptual speed task was used that was similar to that in the first study.

Before the experimental trial, a 2-min pretest using the same task as

Table 4
Means, Standard Deviations, and Intercorrelations of Major Variables

Variable	*M*	*SD*	1	2	3	4	5	6
1. Ability	11.3	2.88	—					
2. Probability of success	67.5	22.22	.09	—				
3. Goal acceptance	4.0	0.94	.15	.18*	—			
4. Individual goal	80.4	12.94	.89**	.12	.19*	—		
5. Prefeedback performance	40.8	8.48	.77**	.10	.13	.72**	—	
6. Postfeedback performance	44.0	8.48	.72**	.11	.16	.70**	.87**	—

Note. $N = 100$.
* $p < .05$, one-tailed. ** $p < .01$.

that used in the experimental trial was conducted. Subjects were instructed to do their best. After 2 min had elapsed, subjects were asked to count and record the number of correct answers, which then served as an ability score.

After the pretest, the highest scoring subject was matched with the lowest scoring subject, the second highest scoring subject with the second lowest scoring subject, and so forth, resulting in 50 teams. The sum of the ability scores for the two teammates ranged from 21 to 24. The difference between the two teammates in ability score in teams ranged from 1 to 8.

Subjects were asked to sit together with their team-mates, and were informed what their team ability score was. Subjects were told that there would be a trial lasting 15 min, with a team goal to be attained. The goal was to complete 160 rows as a team for the period. Subjects were then asked to discuss with their teammate the number of rows that each member would attempt in order to attain the assigned team goal.

After 7½ min of work, subjects were asked to stop, and were informed that one half of the total time had elapsed. Subjects then received feedback on both group and individual performance. After receiving feedback, subjects were asked to continue the task.

Measures

Probability of success. Subjects were asked to indicate the probability of attaining the goal as a team. The scale ranged from 0% to 100%, with 10% intervals.

Goal acceptance. This measure was obtained by asking subjects to indicate the extent to which they would try to attain the team goal. A 5-point scale, ranging from *will definitely not try* (1) to *will definitely try* (5), was used for this purpose.

Individual and group performance. The number of correct answers made by each subject in the experimental trial served as the index of individual performance. The sum of individual performance for the two teammates was the index of group performance.

Results

Although subjects worked as teams, the following analyses were conducted on the basis of individuals' data. Table 4 shows means, standard deviations, and intercorrelations of main variables.

The table indicates that the assigned goal was perceived by subjects as moderately difficult ($M = 67.5$, for probability of success), and was accepted by most of the subjects ($M = 4.0$, for goal acceptance). Postfeedback performance is significantly higher than prefeedback performance, which suggests that task feedback enhanced performance (for the difference between postfeedback and prefeedback performance, $M = 3.2$, $SD = 4.34$; $t[99] = 7.35$, $p < 0.1$).

Table 5 shows the means of performance changes before and after feedback for the four subject categories shown in Figure 1. Subjects are classified as on target for group feedback if their prefeedback group performance was equal to or higher than 80 (i.e., one half of the assigned goal). Similarly, subjects are classified as on target for individual feedback if their prefeedback individual performance was equal to or higher than one half of the personal goals. The remaining subjects are classified as below target for group and individual feedback, respectively.

As shown in Table 5, no significant performance change occurs for Category A, $t(32) = 1.29$, *ns*, whereas postfeedback performance is significantly higher than prefeedback performance for the remaining three categories, $t(13) = 3.76$, $p < .01$; $t(24) = 5.22$, $p < .01$; and $t(27) = 6.22$, $p < .01$, respectively. The mean for Category A is significantly lower than that for the remaining three categories, $t(45) = 3.10$, $p < .01$, for Category B; $t(56) = 3.28$, $p < .01$, for Category C; and $t(59) = 2.87$, $p < .01$, for Category D. There are no significant differences among the means for Categories B, C, and D, $F(2, 64) = .96$, *ns*. These

Table 5
Means and Standard Deviations of Performance Changes for Four Subject Categories

Individual feedback	Group feedback: On target	Group feedback: Below target
On target	Category A	Category B
	$n = 33$ $M = 0.9$ $SD = 3.96$	n = 14 $M = 5.4$ $SD = 5.13$
Below target	Category C	Category D
	$n = 25$ $M = 4.6$ $SD = 4.28$	$n = 28$ $M = 3.6$ $SD = 2.98$

Note. On target for group (individual) feedback = subjects whose prefeedback group (individual) performance was equal to or higher than one half of group (individual) goal; Below target = remaining subjects. For the mean difference, $t(32) = 1.29$, *ns*, for Category A; $t(13) = 3.76$, $p < .01$, for Category B; $t(24) = 5.22$, $p < .01$, for Category C; and $t(27) = 6.22$, $p < .01$, for Category D.

findings are consistent with the predictions made in Figure 1, which suggest the interaction effects between the two types of task feedback on performance. In addition, the finding that the mean for Category D did not significantly differ from that for Categories B and C suggests that the effects of both types of task feedback were complementary, not additive, in nature.

Additional analyses were conducted to determine whether the free-rider effect (Kerr & Bruun, 1983) and the sucker effect (Kerr, 1983) had occurred. The free-rider effect is defined as reduced efforts due to dispensability of efforts for group success (Kerr & Bruun, 1983). This effect was thought to be possible for those subjects whose performance was below target, but group performance and partners' performance were on target. Thus, performance changes were computed for 23 subjects belonging to Category C whose partners were on target. If they intended to free-ride on their partners, postfeedback performance should be lower than prefeedback performance. However, postfeedback performance was significantly higher than prefeedback performance (for postfeedback and prefeedback performance, $M = 42.3$, $SD = 6.52$, and $M = 37.5$, and $SD = 6.04$, respectively; for the difference, $M = 4.8$, $SD = 4.36$, $t[22] = 5.19$, $p < .01$). Thus, there was no free-rider effect.

The sucker effect, on the other hand, is defined as reduced efforts of group members who have capable partners free-riding on their efforts (Kerr, 1983). This effect was thought to be possible for lower ability subjects whose performance was on target but whose partners' performance was below target. Thus, performance changes were computed for 10 lower ability subjects belonging to Category A, and 7 lower ability subjects belonging to Category B, whose partners' performance was below target. For the lower ability subjects belonging to Category A, postfeedback performance did not differ from prefeedback performance ($M = 42.8$, $SD = 4.26$, and $M = 43.5$, $SD = 4.67$, respectively; for the difference, $M = -0.7$, $SD = 2.63$, $t[9] = .84$, *ns*). For the lower ability subjects belonging to Category B, on the other hand, postfeedback performance was significantly higher than prefeedback performance ($M = 39.7$, $SD = 4.74$, and $M = 35.9$, $SD = 4.22$, respectively; for the difference, $M = 3.9$, $SD = 3.02$, $t[6] = 3.37$, $p < .05$). These findings indicate that the lower ability subjects did not lose motivation even when they learned that their higher ability partners were performing poorly. It is interesting that lower ability subjects belonging to Category A and those belonging to Category B reacted differently to the same information that their capable partners were below target. The former merely maintained their previous levels of performance because their group was on target, whereas the latter improved performance because their group was below target, thereby demonstrating the potent effects of group goals on task motivation.

To confirm the interaction effects of the two types of task feedback suggested in Table 4, a stepwise hierarchical regression analysis was calculated. The analysis used postfeedback performance as the dependent variable. Independent variables were, in order, prefeedback performance, individual goal discrepancy, group goal discrepancy, and the interaction of the two goal discrepancies. A score of 1 was assigned to those subjects previously classified as on target, and 0, to those classified as below target for individual goal discrepancy. A similar procedure was used for group goal discrepancy. Difference scores were not used as goal discrepancies because the correlation between the individual and group goal discrepancies was .50. With such a high correlation for the components of interaction terms, the variance accounted for by the interaction terms would be unduly small. The high correlation resulted from the facts that the individual and group goal discrepancies have in common individual prefeedback performance as a component, and that the teams consisted of only 2 subjects. In addition, it was thought that subjects' perceptions of below target, as well as the magnitudes of goal discrepancies, would trigger increased efforts. Table 6 summarizes results. It indicates that ΔR^2 is significant only for Step 4, substantiating the interaction effects of the two types of task feedback hypothesized.

Table 6
Regression Results for Postfeedback Performance

Step	Variable	R^2	ΔR^2	F for ΔR^2
1	Prefeedback performance	.76	—	—
2	Individual goal discrepancy	.76	.00	0.76
3	Group goal discrepancy	.76	.00	1.28
4	Interaction (2 × 3)	.78	.02	9.32*

* $p < .01$.

Discussion and Concluding Remarks

This study supports the control systems model of task feedback (Campion & Lord, 1982) in group goal setting. If subjects receive both group and individual task feedback, the comparison process between goal and performance would take place for the two types of task feedback. If subjects find a negative goal discrepancy in either process, they would try to minimize it, resulting in improved performance. Subjects would maintain their previous levels of performance only if they found no discrepancies in the two comparison processes. Thus, the effects of group and individual task feedback on performance would be complementary, not additive in nature.

The findings from the study suggest that the effectiveness of task feedback in group goal setting will be maximized if the feedback involves both individual and group performance information. If feedback does not involve individual performance information, those subjects below target would not improve performance when their group performance was on target (equivalent to those in Category C in Figure 1). On the other hand, if the feedback does not involve group performance information, those subjects with their group performance below target would not improve performance when they are on target individually (equivalent to those in Category B in Figure 1). In contrast, if the feedback involves both group and individual task feedback, information of lower group (individual) progress would trigger increased effort to improve performance, despite information of higher individual (group) progress, resulting in maximum utilization of subjects' resources. Locke and Latham (1984) also argued that to ensure maximum performance, the performance of individuals and groups in relation to goals should be measured.

The present findings also have implications for the prevention of social loafing. It was found that subjects who were below target did not stop striving even after they learned that their group was on target. Feedback enabled them to identify their own low progress that resulted in dissatisfaction. Thus, they worked harder to catch up, which prevented them from free-riding on their partners' effort. Subjects who were on target did not stop striving even after they learned that their more capable partners were performing poorly, and did not show the sucker effect. This was possible because they had the group goal to be attained, and felt that their efforts were indispensable. Social-loafing studies found that motivation loss was minimized when the tasks increased identifiability (Williams, Harkins, & Latané, 1981) or decreased dispensability (Kerr & Bruun, 1983) of efforts. Specific group goals and individual goals minimize dispensability of efforts. Feedback on both group and individual performance maximize identifiability of efforts. Thus, setting both specific group and individual goals with the provision of feedback on performance in relation to both goals would be an effective strategy to prevent motivation loss when people work together.

The implications of the present findings for organizations deserve mention. Organizations consist of many groups: departments, sections, task forces, and so forth. The findings suggest that having members work as teams with a specific team goal rather than as individuals with only individual goal increases productivity. In addition, to maximize the productivity of such teams, information and control systems (Lawler & Rhode, 1976) should contain information on team progress and individual progress. Although these suggestions are based on findings from the laboratory setting, which is much simpler than organizational settings, Latham and Lee (1986) found that goal-setting findings of laboratory studies were consistent with those of field studies.

Some methodological issues should be discussed. The possible effects of cultural attributes on goal acceptance might have limited the generalizability of the present findings. Although empirical evidence is scarce, it has been argued that the Japanese culture, including the present subjects, places its emphasis on fulfilling team expectations to a greater degree than do cultures of other countries like the United States. Assuming that this argument is reasonable, the cultural attributes emphasizing group attainment might have unduly enhanced goal acceptance and prevented the occurrence of free-rider or sucker effect. Locke, Latham, and Erez (in press) argued that the effect of group versus individual goal setting on goal acceptance may be moderated by cultural attributes.

Finally, the present studies relied on the simplest form of groups (i.e., two-member teams). This might have led to high goal acceptance. Such acceptance, however, could be reduced if group size is increased. Thus, replications of the present findings in different cultural contexts with larger groups would be worthwhile in future studies.

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