

IMPROVING JOB PERFORMANCE THROUGH TRAINING IN GOAL SETTING¹

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The present study examined the generality of goal-setting theory to an industrial setting. Twenty pulpwood-logging operations were matched and randomly assigned to either a one-day training program in goal setting or a control group. Measures of production, turnover, absenteeism, and injuries were collected for 12 consecutive weeks. Analyses of variance indicated that goal setting can lead to an increase in production and a decrease in absenteeism.

Research on goal-setting theory (Locke, 1968) has been criticized for its lack of emphasis on investigating employee behavior in a natural work environment (Heneman & Schwab, 1972). Data supporting the theory are based largely on laboratory experiments in which the dependent variable is typically a task requiring simple addition. As Campbell, Dunnette, Lawler, and Weick (1970) have stated, the differences between college students solving addition problems and the behavior of workers in industrial settings must be considered.

Criticism on the theory's lack of external validity is not completely justified. Latham and Ronan (1970) factor analyzed data obtained from a random sample of 292 pulpwood producers. The results showed that goal setting and supervision loaded on the same factor as two measures of production (positive) and one measure of injuries (negative). Goal setting without supervision loaded on the only factor containing measures of turnover (positive). Supervision that did not include goal setting loaded on a third factor that did not include any criterion variables.

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No relationship was found between goal setting or supervision and absenteeism.

Although zero-order correlations between the previously mentioned independent and dependent variables were generally significant at the .05 level, the values were quite low. In order to corroborate these results, Latham and Kinne (1971) collected data on 892 additional producers and conducted an analysis of variance on the man-hour production. The results indicated that producers who supervise their employees and set production goals have higher productivity than producers who supervise their men but do not set production goals. In summarizing the results of these two studies, Ronan, Latham, and Kinne (1973) interpreted their findings as supporting Locke's (1966) contention that supervision leads to superior performance only insofar as it results in the establishment of specific performance goals. However, supervision, as defined by staying on the job with the crew, is required to insure that the worker accepts these goals. Goal setting without the presence of supervision may lead to an increase in labor turnover.

A limitation of the above studies is that both were correlational in nature. In no instance was the independent variable manipulated by the authors. The purpose of the present study was to determine the effects of a one-day training program on goal setting on the job performance of pulpwood workers. The primary criteria for measuring the effectiveness of the program were cords-per-sawhand-hour and cords-per-crew-hour production. Additional criteria included measures of turnover, absenteeism, and injuries.

METHOD

Sample

Twenty-six producers and their crews were selected and matched on the following variables: (a) crew size, (b) cords-per-man-hour production, (c) geographic location, (d) logging system, (e) delivery point, (f) sawhand function, (g) delivery system, (h) number of hours the producer spent on the job site with the crew, and (i) "did not previously set a daily, weekly, or monthly production goal." One crew from each pair was randomly assigned to the training group; the remaining subjects constituted a control group. The method of payment for both groups was their normal piece-rate system. No monetary or nonmonetary bonus other than verbal praise was tied to goal attainment.

Procedure

Seven company foresters who were aware of the aims and objectives of the producer's job, who frequently observed the producer on the job site and who were well-known by the producers, were given instruction in training. A three-hour program was conducted in which the purpose of the experiment and the assumptions underlying it were explained. This program was followed by an intensive discussion period.

Each forester contacted the selected producers and requested their participation in the study. The explanation given to the experimental and control groups was similar: Each was told that they would be participating in a research program, that the study would last three months, that they were under no obligation to enter the program, and that they could leave the program at any time. The essential difference in the instructions to the two groups was that the experimental subjects were told that the purpose of the study was to give them a one-day training program in learning to set production goals and to determine its effects on performance. The control subjects were told that the study was designed to determine the effects of injuries, absenteeism, and turnover on production.

Three producers assigned to the experimental group expressed an unwillingness to participate in the study. This nonparticipation necessitated the removal of the 3 control producers who had been paired with them. Thus, the results of this study are based on 20 producers.

Training in goal setting was based on the premise that increasing the performance of the sawhand results in an increase in the productivity of the crew. This premise was based on the fact that the felling of a tree is vital to achieving the remaining tasks in pulpwood harvesting. By using regression equations that had been developed from actual field measurements to predict cords per man-hour and number of trees cut per sawhand-hour, production tables were constructed to systematically establish

production goals.³ These tables took into account factors that could affect production due to differences in harvesting stand conditions.

On the first working day of each week, the trainer visited the experimental and control producers on the job site. The average diameter breast height based on 30 to 40 trees to the nearest inch was determined for the harvesting area. By using the table which represented the sawhand function and stand condition, a production goal in trees per sawhand hour was determined for the existing day and/or week. This goal was explained to the producers in the experimental group who in turn explained it to their sawyers. This goal was stressed as a minimum standard of acceptable performance; however, no penalties were provided for failure to attain the goal. The production goal was not made known to producers in the control group.

Tally meters were provided for the sawyers in the experimental group so that they could constantly monitor or evaluate their performance. The assumption at this point was that each number accumulated on the tally meter provides information feedback to the employee and thus is reinforcing for the individual. The possible confounding effects of goal feedback with goal setting were considered minimal, since previous research has shown that knowledge of score alone does not lead to higher performance unless it is used to set goals (Locke, Cartledge, & Knerr, 1970; Locke, Cartledge, & Koepfel, 1968).

Producers in both the experimental and control groups were given a form similar to that used by Latham (1971) to record production, turnover, absenteeism, and injuries. The only difference between the form given to the experimental group and that given to the control group was that the former contained an item requesting information concerning the production goal. The trainer had a questionnaire on which the production goal for the control group was recorded. These forms served the same purpose as the tally meter for the sawyer, namely, knowledge of results to the producer.

Data were collected for 14 consecutive weeks. The three-month study period was employed in order to determine the effects of the one-day training program over a considerable length of time. The results of only 12 weeks were retained, inasmuch as mill shutdowns occurred in 2 of these weeks, and hence the majority of the sample were unable to deliver timber.

RESULTS

The results of this study were based on six performance scores. The two primary cri-

³ These equations were developed by Georgia Kraft Company prior to this study. Time studies were made of more than 300 logging operations on varying harvesting conditions. The resulting production goal may be characterized as moderate in difficulty in that average to above average production is necessary in order to achieve the goal. Information concerning these tables can be obtained from the second author.

teria, cords per sawhand-hour and cords per crew-hour, were based on the arithmetic difference between actual production and expected (goal) production for the sawhand and the crew. Expected production was the assigned performance goal determined from the production tables.

The four remaining criteria included measures of turnover, absenteeism, and injuries. Turnover was defined by two measures, namely, the number of men who quit and the number of men who were fired. Each of these variables was divided by the total number of men in the producer's work force. Injury rate was defined as the number of men hurt on the job who missed eight or more hours of work. Absenteeism was defined as the number of men off the job eight or more hours for reasons other than an injury. Both of these variables were divided by the number of men in the crew. These definitions are identical to those used in a previous study by Latham (1971).

An analysis of variance was conducted to determine the significance of goal setting and weeks on the production of the individual sawhands. The difference in production between the group of sawyers who received training in goal setting and the control group was in the expected direction but the difference was only marginally significant ($F = 3.43$, $df = 1/9$, $p < .10$). The performance means and standard deviations of the indi-

TABLE 1

SUMMARY OF DIFFERENCES BETWEEN GOAL AND ACTUAL PERFORMANCE FOR SAWHAND IN CORDS PER SAWHAND-HOUR

Pro-ducer pair	Treated		Control	
	\bar{X}	SD	\bar{X}	SD
1	2.05	.43	.58	.83
2	-.25	.58	-.11	.69
3	.20	.56	-.17	.48
4	.02	.79	-.13	.73
5	.20	.45	.05	.61
6	.64	.97	-.09	.43
7	.36	.58	-.45	.59
8	1.26	.63	1.68	.68
9	.69	.88	-.21	.93
10	.44	.35	.86	.57

TABLE 2

SUMMARY OF DIFFERENCES BETWEEN GOAL AND ACTUAL PERFORMANCE FOR CREWS IN CORDS PER MAN-HOUR

Pro-ducer pair	Treated		Control	
	\bar{X}	SD	\bar{X}	SD
1	.23	.04	.09	.15
2	-.09	.21	-.09	.29
3	.05	.20	-.08	.17
4	.05	.20	-.07	.20
5	.04	.09	.01	.11
6	.13	.20	-.02	.12
7	.08	-.14	-.16	.22
8	.22	.11	.24	.10
9	.08	.12	-.07	.29
10	.11	.07	.13	.12

vidual sawyers in the experimental and control groups are shown in Table 1. The effect of weeks and the Weeks \times Treatment interaction (goal training) was not significant.

A similar analysis was performed on the cords-per-man-hour production for the entire crew. First, this analysis provided a test of a key assumption in this study, namely, that increasing the productivity of the sawyer results in an increase in the productivity of the crew. In general, there is only one sawyer in a crew ranging in size from two to eight men. Second, the analysis provided a test of the balance of the producer's operation in terms of the number of his employees and his equipment. The results showed that the performance of the experimental crews was significantly higher than that of the control group ($F = 7.44$, $df = 1/9$, $p < .05$), thus supporting the assumption that the sawyer has a key position in the producer's work force. Again, the effects of weeks and the Weeks \times Goal Setting interaction were not significant. Thus, it may be concluded that goal setting leads to a significant increase in the productivity of the group as well as the individual. Table 2 shows the means and standard deviations for each crew.

The finding that the difference between the experimental and control crews was at a higher level of significance than that between experimental and control sawyers is noteworthy. This result underscores the im-

portance of a well-balanced harvesting system in terms of manpower and equipment. Any improvement in performance in one function in harvesting, even if only slight, can have an appreciable effect on the total performance of the operation when its effects are distributed (and hence magnified) over a well-balanced operation. Conversely, if performance in one function is greatly improved, its effects on the entire system are nullified to the extent that the operation is unbalanced.

Two-way analyses of variance (tables are not shown) were conducted to determine the effects of a month (four weeks) and goal setting on turnover, absenteeism, and injuries. No significant differences were found between months. Moreover, goal setting had no significant effect on the two measures of turnover or injuries. The number of people who quit or were fired or injured was very low in both groups. Absenteeism, however, was significantly higher ($p < .05$) in the control group than in the experimental group.

DISCUSSION

The present study has shown that training in goal setting can lead to an increase in production and a decrease in absenteeism. The theoretical advantage of approaching the problem of worker motivation through goal setting is that it is not dependent on the use of mythological terms such as id, ego, and superego; nor does goal setting postulate personality mechanisms, or drive states, or separate and distinct factors independent of each other that contribute differentially to short-term and long-term performance. However, goal setting, as a theory of motivation, does focus on variables intrinsic to the job, namely, the job task(s) itself. It is based on a learning model in that the worker must be taught to set a task objective and he should be given information feedback concerning his performance. Knowledge of results provides meaning to a task. It is probable that tree counting in the present study enabled the sawyer to obtain a sense of achievement. The number of trees cut assumed meaning in that the worker was able to determine the extent to which his performance was above average. It may have been this "meaningful" dimension that contributed to the lower absenteeism

in the goal-training group, that is, goal setting led to effective performance, effective performance led to job satisfaction, and job satisfaction led to a reduction in absenteeism.

The use of the production tables as a systematic method for setting production goals is of theoretical importance. Work on levels of aspiration has shown that if the individual sets a performance goal before carrying out a task, he tends to raise the goal if he is successful, since he increases his expectations of himself (Lewin, 1951). Thus, to improve one's performance one must first aspire but to aspire one must see that success is possible, that is, clear evidence must be available that others under similar conditions are succeeding. The production tables were based on data collected from a large number of sawyers and hence provided this evidence. The sawyer knows that the goal is attainable and that it is not based on the whim of a demanding supervisor or on the unrealistic expectations that he himself has.

While there is an obvious need for additional research on the validity of goal-setting theory, the situation is by no means as serious as previous researchers have led us to believe. As a theory of motivation, goal setting appears to be effective in an industrial setting, and its effects appear to hold over time. A possible limitation of training in goal setting is that it is too simplistic for a complex situation, that is, it leads to a significant improvement in the performance of the average or above average worker, but it does little for the worker who is badly in need of a comprehensive training program. Nevertheless, even in such instances the supervisor who sets a specific task goal for his subordinates is in effect making it clear what it is they are supposed to do (Campbell et al., 1970). Thus, in the process of discussing with the worker the nature of these goals, the worker may acquire specific knowledge concerning his job tasks, their priorities, and the most effective methods that lead to their attainment.

REFERENCES

- CAMPBELL, J. P., DUNNETTE, M. D., LAWLER, E. E., & WEICK, K. E. *Managerial behavior, performance, and effectiveness*. New York: McGraw-Hill, 1970.

- HENEMAN, H. G., III, & SCHWAB, D. P. Evaluation of research on expectancy theory predictions of employee performance. *Psychological Bulletin*, 1972, 78, 1-9.
- LATHAM, G. P. *Indicators of productivity, turnover, absenteeism, and injuries*. Atlanta, Ga.: American Pulpwood Association, Harvesting Research Project, 1971.
- LATHAM, G. P., & KINNE, S. B., III. *Goal setting as a means of increasing the performance of the pulpwood harvester*. Atlanta, Ga.: American Pulpwood Association, Harvesting Research Project, 1971.
- LATHAM, G. P., & RONAN, W. W. *The effects of goal setting and supervision on the motivation of pulpwood workers*. Atlanta, Ga.: American Pulpwood Association, Harvesting Research Project, 1970.
- LEWIN, K. *Field theory in social science: Selected theoretical paper*. New York: Harper, 1951.
- LOCKE, E. A. The relationship of intentions to level of performance. *Journal of Applied Psychology*, 1966, 50, 60-66.
- LOCKE, E. A. Toward a theory of task motivation and incentives. *Organizational Behavior and Human Performance*, 1968, 3, 157-189.
- LOCKE, E. A., CARTLEDGE, N., & KNERR, C. S. Studies of the relationship between satisfaction, goal setting, and performance. *Organizational Behavior and Human Performance*, 1970, 5, 135-158.
- LOCKE, E. A., CARTLEDGE, N., & KOEPEL, J. Motivational effects of knowledge of results: A goal-setting phenomenon? *Psychological Bulletin*, 1968, 70, 474-485.
- RONAN, W. W., LATHAM, G. P., & KINNE, S. B., III. The effects of goal setting and supervision on worker behavior in an industrial situation. *Journal of Applied Psychology*, 1973, 58, 302-307.

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