Feedback: A Necessary Condition for the 
Goal Setting–Performance Relationship

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The study focused on feedback as a necessary condition for goals to affect performance. It was predicted that feedback and goals would be interactively related to performance. This prediction complements the findings of Locke that knowledge alone is not a sufficient condition for effective performance. It was also hypothesized that feedback would facilitate the display of individual differences in goal setting and hence the goal setting–performance relationship. Results supported the hypotheses by indicating that the individual differences in self-set goals were significantly higher in the feedback group \(n = 38\) than in the no-feedback group \(n = 48\), and that it was in the feedback condition that the relationship between goals and performance \((r = .60)\) was significantly higher than in the no-feedback condition \((r = -.01)\).

Previous research and theorizing by Locke and his colleagues have indicated that knowledge—knowledge of score (KS), knowledge of results (KR), and feedback—by itself does not have the power to control action. When differential goal setting by subjects in KR and no-KR conditions was controlled, KR had no effect on performance. Thus, Locke and his colleagues (Locke, 1967, 1968; Locke & Bryan, 1968, 1969; Locke, Cartledge, & Koeppe, 1968) concluded that goals and intentions mediate the effect of feedback on performance.

Although the evidence indicates that knowledge is not a sufficient condition for goal setting and task motivation, one could logically ask whether it is a necessary condition.

The procedure and experimental design used by Locke et al. are not inconsistent with this question. For example, in the Locke (1967) study, no KR-goal subjects were given knowledge of their progress in relation to their goals. It is then implied that goals cannot be set meaningfully unless the subjects have some knowledge of how hard the goals are and how they are performing in relation to their goals.

In another study by Locke and Bryan (1968), subjects were given a computation task to perform in two groups, KS and no KS. No goal-setting instructions were given. However, after the first part of the experiment, all subjects were asked to set their goals for the second part. Findings indicated that in the second part of the experiment, after subjects set their goals, (a) level of performance attained by the KS group was higher than that attained by the no-KS group and (b) the distribution of goals reported by the two groups was different, with KS subjects setting more difficult goals than no-KS subjects. In both groups, goals were set on the basis of some knowledge of previous performance.

In a recent review of research on the application of goal setting in organizations, Latham and Yukl (1975) were unable to find any field studies in which goal setting and performance feedback were independently manipulated. One implication of their inability to find such studies is that applied researchers may believe intuitively that feedback is indeed necessary for goal setting to affect performance, and hence have been reluctant to omit this variable when implementing goal setting in organizational setting.

The present study is designed to test the
hypothesis that KS is a necessary condition for goal setting to affect performance. Specifically, it is predicted that goals will be related to task performance only (or more strongly) under conditions of high knowledge and not (or less strongly) under conditions of low knowledge. In other words, there will be an interaction between feedback and goals on performance. This interaction effect is in line with the basic theorem that behavior is a function of the interaction between the individual and the environment, since external KS and self-set goals can be conceptualized as an environmental attribute and an individual variable, respectively. Schneider (1975) raised the hypothesis that performance would be highly predicted by personal characteristics under the environmental conditions that facilitated the display of individual differences. When there are no constraints on goal setting and subjects are given KS on an individual basis, KS should increase and support the expression of individual differences in self-set goals.

On the basis of the above discussion, the following hypotheses were formulated: (a) There will be higher variance in self-set goals or intentions under KS than no KS, if goal setting is not constrained. (b) The relationship between performance and self-set goals will be higher under the KS than under the no KS condition. and (c) There will be a significant interaction effect between KS and goal-setting in predicting performance over and above the linear combination of initial performance and the two main effects, feedback and goals.

Method

Subjects

The subjects were 86 undergraduate students enrolled in two discussion groups (Group 1, n = 38; Group 2, n = 48) of an introductory psychology course at the Technion-Israel Institute of Technology.

Task

The task was number comparison, requiring quick checking to detect discrepancies between two lists of numbers. It is one of the common clerical aptitude tests. Two similar forms were used, each in a different stage of the experiment. Performance was measured by the number of correct answers.

Procedure and Conditions

One group was randomly assigned to the experimental condition (n = 38), and the other was designated as the control group (n = 48). The experiment that was introduced as such was administered in two stages. In Stage 1 (10 minutes), the two groups were instructed to perform the task within a specified amount of time. At the conclusion of Stage 1, subjects in the experimental group were told how they had actually performed relative to others during that stage. This information was given to each experimental group subject in one of 5 ways: Subjects performance is among the highest (a) 10%, (b) 25%, (c) 50%, (d) 75%, and (e) 90%. The control group received no feedback on performance.

A questionnaire designed to assess subjects' intentions or self-set goal for the second part of the experiment was administered at the beginning of Stage 2 to both experimental and control subjects. For the experimental group, the questionnaire was administered immediately after the experimental condition, feedback on performance, was introduced. Subjects were asked to indicate their level of intention for performance on a 5-point scale, similar to the five levels of performance feedback: intention to be among the highest (a) 10%, (b) 25%, (c) 50%, (d) 75%, and (e) 90%. The different levels of intention were assigned numerical values ranging from 5 for the highest level to 1 for the lowest level. After this, subjects worked on the second form of the number-comparison task.

Analysis

The hierarchical model of multiple regression was proposed in order to test the significant KS × Goal interaction over and above the linear combination of initial performance and the two main effects feedback and goal. For purposes of analysis, KS was treated as an interval variable by assigning numerical index values to the two conditions—no KS = 1 and KS = 2.

Results

The two groups did not significantly differ in performance at the end of Stage 1, that is, before the experimental condition was introduced, (KS $M = 9.82$, no-KS $M = 10.69$, $t = 1.48$, $p > .05$).

The mean Stage 2 performance of all subjects ($M = 12.34$) was significantly higher than their Stage 1 performance ($M = 10.31$, $t = 6.13$, $p < .01$). Stage 2 performance under the KS condition ($M = 13.17$) was significantly higher than under the no-KS condition ($M = 11.68$, $t = 2.35$, $p < .02$).
Table 1
A Step-Wise Regression of Stage 2 on Stage 1 Performance for Feedback and Goal and Their Interaction

<table>
<thead>
<tr>
<th>Step</th>
<th>Variable entered</th>
<th>$R$</th>
<th>$R^2$</th>
<th>$R^2$ change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Stage 1 performance</td>
<td>.45</td>
<td>.20</td>
<td>.20**</td>
</tr>
<tr>
<td>2</td>
<td>Feedback</td>
<td>.55</td>
<td>.30</td>
<td>.10**</td>
</tr>
<tr>
<td>3</td>
<td>Goal</td>
<td>.59</td>
<td>.34</td>
<td>.09*</td>
</tr>
<tr>
<td>4</td>
<td>Feedback $\times$ Goal</td>
<td>.63</td>
<td>.39</td>
<td>.05*</td>
</tr>
</tbody>
</table>

* $p < .05$.
** $p < .001$.

1. The first hypothesis stated that individual differences in levels of intention increase under the KS condition as compared to no-KS condition. This hypothesis was supported by significant differences between the variance of the two groups in level of intention (KS $\sigma^2 = .94$, no-KS $\sigma^2 = .41$, $F(37, 47) = 22.9, p < .01$).

The Pearson coefficient of correlation between the KS given to the subjects and the goals they chose was .45 ($p < .01$). Most of the points are scattered around a monotone increasing and concave curve. Individuals with high-performance KS lie more closely to the curve than individuals with low-performance KS.

2. The second hypothesis predicted stronger relationships between intention or self-set goals and performance for the KS group as compared to the no-KS group.

The Pearson correlation across all subjects between goals and performance was .24 ($p < .05$), and between feedback and performance was .25 ($p < .05$). However, when the effect of KS was controlled, the Pearson correlation between self-set goals and performance for the KS groups was .60 ($p < .01$); for the no-KS group, $r = .01$. Using Fisher's $z$, the difference between these two correlations was significant ($p < .001$). This result strongly supported the hypothesis that performance is more strongly related to goals under the KS condition than under the no-KS condition. It indicates that the effect of self-goals on performance is moderated by feedback.

3. The Feedback $\times$ Goal interaction on performance was tested by linearly partialling out the effect of Stage 1 performance and the two main effects following the model:

$$Y = b_0 + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_1x_2 + \text{error},$$

where $Y =$ performance on Stage 2, $x_1 =$ Stage 1 performance, $x_2 =$ feedback, $x_3 =$ goal, $x_1x_2 =$ the Feedback $\times$ Goal interaction. Using step-wise regression, results are summarized in Table 1.

Results indicated that 20% of performance variance was accounted for by individual differences in initial performance. When feedback was entered into the equation following performance, the amount of performance variance explained significantly increased to 30 ($p < .01$). The goal-setting effect significantly increased explained variance to .34 ($p < .05$) beyond the linear combination of the two previously entered variables. The Feedback $\times$ Goal interaction significantly increased explained performance variance to .39 ($p < .05$) over and above the three previously entered variables. Thus, results supported the third hypothesis that the interaction effect significantly contributed to explained performance variance over and above the linear combination of initial performance and the two main effects feedback and goal.

It should be noted that when all four variables were placed in the regression simultaneously, the beta weights for the two main effects were not significantly different from zero.

Discussion

The focus of the present study was on KS as a necessary condition (though not sufficient) for goal or intention to affect task performance. Locke and his colleagues indicated that knowledge is not a sufficient condition for goal setting and task motivation. The crucial issue for them "is not that a person is given KS but what he does with it" (Locke, Cartledge, & Koeppel, 1968, p. 475). However, they did not directly test the hypothesis that KS is a necessary condition for goals to affect performance.

The present study tested the hypothesis that KS has a significant effect on goal setting and that it is a necessary condition for goals to affect performance. Results indicated that the variance in goal setting was significantly higher under the KS than the no-KS condition. Thus, KS facilitated the display of individual differences in self-set goals on the basis of individual past performance.

Stage 2 performance for all subjects was significantly higher than Stage 1 performance ($p < .01$). However, when the effect of KS was controlled, goals were significantly and more strongly related to performance under the KS ($r = .60, p < .01$) than under the no-KS condition ($r = .01, p < .05$). Further analysis revealed that Feedback $\times$ Goal interaction significantly contributed to explained performance variance.
when Stage 1 performance and the two main effects of feedback and goal were partialled out. About 40% of explained performance variance was accounted for by the linear combination of the above four variables. However, it may be argued that a more parsimonious model would be the linear combination of Stage 1 performance and the interaction, because when all four variables were placed in the regression simultaneously the beta weights for the two main effects were not significantly different from zero.

Based on the above discussion, it is concluded that KS is a necessary condition for the goal setting–performance effective relationships: It facilitates the display of individual differences in self-set goals on the basis of knowledge of individual past performance. Then, when goals are self-set, they provide knowledge for future performance that is consistent with goals.

References

Latham, G. P., & Yukl, G. A. A review of research on the application of goal setting in organizations.


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