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Effects of Two Types of Feedback on Goal Acceptance and Personal Goals

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Effects of two types of performance feedback, goal discrepancy (GDF) and past-performance discrepancy (PDF), on acceptance of assigned goals and personal goal levels were examined. Subjects were 110 introductory psychology students, 90 in an experimental and 20 in a control condition, who performed an anagram task for seven trials. Assigned goals for experimental subjects became increasingly difficult. As predicted, assigned goals were rejected when GDF became sufficiently negative. GDF and PDF differed both in sign and magnitude of effects on acceptance and personal goals, indicating that subjects used these feedback discrepancies differently in the goal evaluation process. Unexpectedly, personal goals and performance remained high even after assigned goals were rejected. The importance of understanding factors affecting goal acceptance was discussed.

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Twenty years of research on the effects of goal-setting on performance have led several reviewers (Locke, Shaw, Saari, & Latham, 1981; Mento, Steel, & Karren, 1987; Tubbs, 1986) to conclude that the effects of goals on performance are among the most robust of any to be found in the motivation literature. Recently, specific interaction effects of goals and feedback have been the subject of scrutiny by researchers. Feedback, defined by Taylor, Fisher, and Ilgen (1984) as "information about the effectiveness of one's work behavior" (p. 82), has been hypothesized to enter into the goal-setting process by serving as a basis for evaluating assigned goals both to determine goal acceptance and to form personal goals (Erez & Zidon, 1984; Locke et al., 1981).

Erez and Zidon (1984) tested the hypotheses that goal acceptance declines as goals become more difficult and that acceptance moderates the goal difficulty–performance relationship. They used a within-subjects design whereby difficulty of assigned goals increased substantially over seven performance trials. Hypotheses were supported only when it was strongly suggested to subjects through social information that it was quite reasonable to reject very difficult goals. As predicted, performance was found to increase linearly as long as goals were accepted but to decrease linearly once rejection occurred. Thus, the long-assumed importance of goal acceptance was empirically documented by this study.

Campion and Lord (1982) conducted a longitudinal field study in a college classroom to test predictions derived from control theory. Students set their own grade goals for each of five exams administered during the term. Exam grades served as feedback. As predicted, it was found that (a) the magnitude of failure was positively correlated with subsequent increases in effort (as measured by amount of study time); (b) frequent failures produced increased effort or lowered grade goals, or both; and (c) consistency of failure was associated with lowering of grade goals.

Although feedback was an important part of both the Campion and Lord (1982) and Erez and Zidon (1984) studies, operationalizations of feedback in these studies were relatively simple. Participants are thought of as passive recipients of feedback who receive it as given, accept it, and use it. In contrast, a rich literature on feedback as a construct exists. Taylor et al. (1984) discussed factors affecting responses to feedback–goal discrepancies. These included the sign, relevance, and accuracy of feedback. Ilgen, Fisher, and Taylor (1979) concluded that such factors as amount, source, and sign of feedback affect the way people perceive, accept, use, and react to it. Ashford and Cummings (1983) described individuals as being active monitors and processors who seek feedback that is most useful to them.

In light of these conclusions, it is somewhat surprising that goal-setting researchers have only recently begun to study feedback effects on individuals for whom goals have been set. Bandura and Cervone (1986) examined the effects of several magnitudes of performance discrepancy feedback on performance dissatisfaction, self-efficacy, personal goals, and effort. They found that subjects given bogus feedback regarding their attainment of a 50% increase in effort over baseline on an ergometer task were more dissatisfied with more negative feedback, but there were no mean differences in self-efficacy, personal goal levels, or subsequent effort as a result of feedback. However, there was some evidence that subjects who were told that they had slightly exceeded the goal responded by raising their per-

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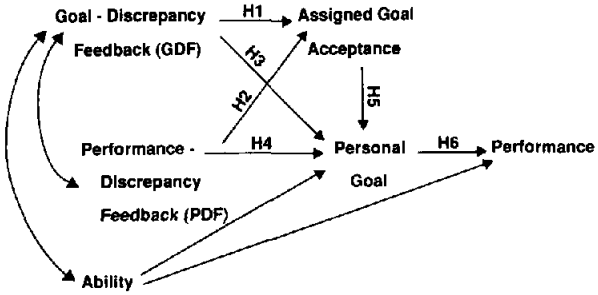

Figure 1. A model of feedback, goal acceptance, and performance. (H1 through H6 correspond to the major hypotheses.)

sonal goal for the next trial. Earley (1988) reported that magazine subscription processors who obtained specific goal-referenced feedback from a computer performed better than processors who received general feedback from the computer or either type of feedback from supervisors.

There are a number of additional potentially fruitful avenues for research in this area. For example, source of goals has been extensively explored (e.g., assigned vs. self-set), but source and type of feedback concerning goal attainment have not. Past research has focused on feedback explicitly dictated by the research design; performance relative to a goal or some other norm has typically been used. In addition, however, feedback that is implicit in the design may be available in goal-setting studies. For example, subjects may compare present performance to past performance when more than one performance trial is used. More than one type of feedback would provide subjects with a richer and more realistic information environment than would be the case with just one type; such a design would also permit testing of complex hypotheses concerning feedback effects on acceptance of assigned goals and setting of personal goals after assigned goal rejection.

The purpose of this study was to examine how subjects use two types of feedback about performance. Goal-discrepancy feedback (GDF) indicated whether subjects were performing above or below the assigned goal, and by how much. Campion and Lord (1982) cited the control systems literature (e.g., Sibley & McFarland, 1974) as the basis for several hypotheses relating past performance to grade goals set by students in their study. In light of their findings, we chose to provide subjects with performance–discrepancy feedback (PDF). PDF indicated whether subjects' performance was increasing or decreasing from one trial to the next, and by how much.

In our design, assigned goals became increasingly difficult over seven trials and, consequently, GDF became increasingly negative and goal acceptance became increasingly less likely. The general premise was that subjects would shift from GDF to PDF as the basis for evaluating assigned goals and for selecting personal goals. A model was developed to describe the effects of the two types of feedback, and hypotheses were generated concerning how these effects change over trials due to subjects' participation in the feedback process. This model is presented in Figure 1.

Hypotheses

Hypotheses 1 through 6 describe the model depicted in Figure 1. Each hypothesis corresponds to a path in the model. Each hypothesis also describes how these relationships are expected to change over trials as a function of increasing difficulty of assigned goals.

Hypothesis 1

For a given trial, GDF has a positive relationship to assigned goal acceptance. The magnitude of this relationship displays an inverted *U*-shaped function over trials.

If feedback is used to evaluate assigned goals, as argued by Campion and Lord (1982), then GDF should have a significant effect on goal acceptance or rejection (Stedry & Kay, 1966). If feedback is negative, indicating failure to achieve a goal, subjects should respond either by increasing effort on the next trial or by rejecting the assigned goal. GDF will become increasingly negative over trials. Thus, the likelihood that subjects will reject assigned goals should increase over trials. (This is essentially the same rationale posited by Erez and Zidon, 1984, for their goal difficulty–goal acceptance relationship.) Early on, subjects should almost universally accept assigned goals, and the relationship between feedback and acceptance would therefore be low. During middle trials, increasingly negative GDF should produce greater variability in assigned goal acceptance and, therefore, a stronger positive relationship between feedback and acceptance. During later trials, when assigned goals are rejected by nearly everyone, the observed relationship between the two variables should once again become weaker.

Hypothesis 2

During early trials, PDF is not related to acceptance of assigned goals. This relationship becomes increasingly negative during middle trials and weaker, though still negative, during later trials.

PDF was not expected to be related to goal acceptance in early trials because this information would be of less value in evaluating externally set goals than would GDF. During middle trials, subjects would begin to experience very negative GDF. At the same time, they would receive positive PDF for any trial in which they formed more words than the preceding trial. There would thus tend to be discrepancies between the two types of feedback in sign and increasingly in magnitude as well. Ashford and Cummings (1983) proposed that individuals seek feedback in complex *information environments* for several reasons, including bolstering one's sense of competence or mastery of an activity, defending one's ego or sense of self-efficacy through positive feedback, or choosing achievable goals by using feedback as cues in this choice process. Following the arguments of Ashford and Cummings, increasingly negative GDF would motivate the individual to seek out and use other types of feedback. Because PDF would tend to remain positive over trials (or at least be less negative than GDF), subjects should shift to reliance on this type of feedback to determine goal acceptance as trials progress. The magnitude of this relationship would be weaker during later trials when most subjects would reject assigned goals.

Hypothesis 3

GDF is positively related to personal goals for each trial. The magnitude of this relationship displays an inverted U-shaped function over trials.

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Erez (1977) reported that subjects used feedback in determining self-set goals. For a given trial, subjects who received negative GDF should have set lower personal goals than subjects who received positive feedback. During middle trials, when discrepancies in sign of GDF versus PDF were greatest, the GDF-to-personal-goal linkage should have been strongest. During later trials, when GDF became overwhelmingly negative, subjects should have shifted attention away from this type of feedback as the basis for setting personal goals.

Hypothesis 4

PDF is positively related to personal goals for each trial. This relationship is weak during early trials and grows stronger over trials.

Early on, because of the salience of assigned goals and because most subjects would be successful in achieving them, subjects were expected to pay little attention to PDF. However, as trials progressed and GDF indicated increasing failure, subjects were expected to find greater use for PDF and to use it to set personal goals.

Hypothesis 5

Acceptance of assigned goals is positively related to personal goals for each trial. This relationship displays an inverted U-shaped function over trials.

As long as assigned goals are accepted they should be directly translated into personal goals, as originally postulated by Locke (1968). Rejection of difficult goals should cause subjects to set lower, more achievable personal goals. Thus, the relationship between goal acceptance and personal goal level should have been strongest during middle trials when the sample was evenly divided between accepters and rejecters.

Hypothesis 6

Personal goals are positively related to performance for each trial.

This hypothesis was derived directly from goal theory (e.g., Locke, 1968; Locke et al., 1981).

Figure 1 also contains a task ability variable, which is shown as contributing to both personal goals and performance. As will be explained later, ability was operationalized in a manner similar to Erez and Zidon (1984), as average performance on two practice trials. Erez and Zidon found moderate to high ability–performance correlations across trials, and ability was therefore expected to affect both personal goals and performance in our study. The two double-headed arrows in Figure 1 represent correlations between exogenous variables. GDF and PDF were expected to be correlated because they had performance in common. The GDF–ability correlation was expected because ability was hypothesized to directly impact on performance, which determined GDF.

Data were also gathered that allowed a test of the proposition that individuals assigned specific, difficult goals would perform better than a control group of individuals who were told to "do your best" (Locke et al., 1981; Mento et al., 1987; Tubbs, 1986).

Table 1
Mean Number of Words Generated per Letter List: Pilot Study Data

List	Mean no. of words	*SD*
A E D B K U G	8.95	2.66
O A S F K E V	8.63	2.87
O A D M H U P	11.16	2.39
O E L B J A M	9.42	2.50
U A D Q W E R	8.84	2.65
E A S C K I Y	9.32	2.31
U O N H M E Y	10.21	2.42
O E L H M A Z	9.63	2.95
A O D J G I P	9.63	3.13

Note. $N = 19$.

Method

Subjects

Subjects were 110 college students enrolled in an introductory psychology course at Ohio State University who participated to fulfill a course requirement. Subjects were randomly assigned to conditions. There were 90 subjects in the experimental condition and 20 subjects in the control condition.

Task

For each trial, subjects were provided with a set of seven letters and were asked to list as many words as they could in a 3-min period. A 3-min time limit was used because a pilot study indicated that subjects generated words continuously for about 1.5 min, and then wrote sporadically for the remainder of the time. From this we inferred that performance was a function of both ability and motivation (it was apparent that a fair amount of effort was required to keep generating words throughout the time period) and that the task was therefore suitable to our purposes. Subjects were provided with several rules for forming words; a word had to be (a) from the English language, (b) two or more letters long, (c) other than a proper noun, and (d) used in one form only (i.e., both singular and plural versions of the same word were not permitted). In addition, letters presented in the list could be used only once in the same word.

Nine sets of seven letters were generated. To insure that letter sets were of comparable difficulty for forming words, sets were equated for the ease with which letters comprising them can be used to make words in the English language, according to values assigned to letters in the game of SCRABBLE. A pilot study was also conducted in which 19 subjects were given 3 min to produce as many words as they could from each set of letters. The mean number of words generated for each set, and the sets themselves, are given in Table 1. Order of presentation of the nine letter sets was randomized by subject across the two practice and seven goal trials. Letter sets varied somewhat in terms of mean difficulty; however, randomization by subject would obviate the potential confound of this on performance and feedback.

Procedure

Subjects in the experimental condition performed the anagram task for a series of 3-min trials, including two practice trials and seven goal trials. Average number of words made on the practice trials provided a

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measure of task ability.[1] To preclude effects of anticipation of completion of trials on motivation or performance, subjects were told that they would complete somewhere between 5 and 15 trials. They were also told that the purposes of the study were to assess whether or not they felt the goals were fair and reasonable working goals and whether or not they found the task to be interesting.

Subjects were tested in groups of 4 to 8, in a large room equipped with partitioned tables. Partitions prevented subjects from viewing each others' work and otherwise inhibited communication, informal competition, and other forms of group interaction. Thus, subjects were tested in groups for purposes of convenience only.

For each practice trial, subjects in the experimental group were instructed to form as many words as possible from the letters listed at the top of the work sheet during a 3-min time period. For the first goal trial, subjects were assigned a goal equal to the average number of words made on the two practice trials, to the nearest whole number.[2] After each goal trial, subjects recorded their performance (i.e., the number of words formed) as well as their assigned goal for the next trial. Difficulty of assigned goal was increased by two words per trial. Before beginning the next trial, subjects completed a form on which they calculated their GDF (goal discrepancy feedback: performance minus assigned goal) and PDF (performance discrepancy feedback: performance this trial minus performance last trial). They also answered the following two questions about their acceptance of the assigned goal for the next trial: To what degree do you accept the currently assigned goal (1 = *definitely reject*, 5 = *definitely accept*); To what degree is the assigned goal for the next trial reasonable (1 = *very unreasonable*, 5 = *very reasonable*). Responses to these items were averaged to yield an assigned goal acceptance score for each subject (median within-trial correlation of these items was .62). Subjects were asked to indicate their personal goal for the next trial by answering the question, What is your personal goal for the next trial? (This goal does not have to be the same as the assigned goal. It is the number of words you will be aiming to make on the next trial.) The latter instruction was provided to facilitate goal rejection. Past research has revealed an overwhelming tendency for subjects to accept assigned goals in laboratory studies. Erez and Zidon (1984) found more variability in goal acceptance when subjects were led to believe that other people often rejected externally set goals. Subjects were also asked to indicate their task interest after each trial by answering this question: Currently, how interesting is this task (1 = *very uninteresting*, 5 = *very interesting*).

A control group was used to assess the effects of practice and time on performance. Subjects in the control group were told to do their best on each of nine trials. Subjects calculated PDF after each trial, and they answered the task interest question described previously.

Analyses

Hypotheses 1 through 6 describe our expectations regarding paths in the model presented as Figure 1. These were tested using path analysis of data from each trial, using the LISREL VI computer program (Jöreskog & Sörbom, 1984). LISREL is a general program that estimates causal effect coefficients in a set of linear structural equations by the maximum likelihood method of estimation.

The hypothesized model determines the paths to be estimated. These are termed "free," and parameters not estimated are "fixed." Initial estimates of free parameters are obtained (see Jöreskog & Sörbom, 1984), followed by an iterative procedure to improve the initial estimates. Goodness-of-fit statistics indicate the likelihood that the hypothesized model could have produced the observed data. Two important goodness-of-fit statistics are the overall chi-square (χ^2), which is based on the difference between the observed and estimated covariance matrixes ($S - \hat{\Sigma}$), and rho (the nonnormed fit index; Bentler & Bonett, 1980). Rho compares the ratio of the model chi-square relative to its degrees of freedom to the same ratio representing two other models that serve as reference points, as follows: (a) a null, or worst-case model that hypothesizes that the measured variables are uncorrelated in the population and (b) an idealized model that holds exactly in the population. Thus, rho is an index of where the hypothesized model lies on a continuum from the null to the idealized model. Values of rho in excess of .90 are generally considered to be indicative of a good-fitting model (Bentler & Bonett, 1980). A third goodness-of-fit statistic is the root-mean-square residual (RMS), which measures the overall degree to which the covariances generated by the hypothesized model approximate the observed covariances. RMS values of .10 or less are generally regarded as good when the model is fit to a correlation matrix, as was the case in this study.

We should point out that the primary purpose of testing the model in Figure 1 was to estimate path coefficients that could then be compared across trials, not to test the model per se as a complete theory of feedback effects and goal setting. Consideration of model fit statistics is important in either case because one has more confidence in parameter estimates derived from a model that fits the data well.

Results

Comparison of Experimental and Control Conditions: ANOVA

Subjects who were assigned goals should have performed better than the control group. Performance data were analyzed by means of a 7 × 2 analysis of variance (ANOVA) with trials as a within-subjects variable and experimental condition as a between-subjects variable. Main effects of both trials, $F(6, 648) = 2.14$, $p < .05$, and conditions, $F(1, 108) = 12.36$, $p < .001$, were found. The interaction was not significant, $F(6, 648) = .45$, $p > .05$. Subjects in the experimental condition performed better over trials than subjects in the control group.

Tests of the Hypothesized Model: Path Analyses

Table 2 depicts, for each trial, the means and standard deviations of performance, assigned goals, personal goals, GDF, PDF, and goal acceptance for the experimental group, and the performance means for the control group. Experimental group data presented in Table 2 and as used in the path analyses are organized appropriately within trials. For example, performance as listed for Trial 2 was measured at the end of Trial 2,

[1] Note that this "ability" measure presumably encompassed elements of both ability and intrinsic task motivation. Because it was measured prior to the introduction of assigned goals, however, it did not reflect motivation resulting from these goals. Thus, its use as an ability measure should be understood to mean that it reflected performance levels that subjects attained in the absence of specific, challenging goals.

[2] Note that assigned goal for Trial 1 thus corresponded closely to the ability measure. It correlated .97 with ability, as did assigned goals for all subsequent trials (the correlations are less than 1.0 because goals were rounded to whole numbers). In that sense, assigned goals are represented mathematically in the model in Figure 1. More important, however, is that the motivational dynamics resulting from increasing assigned goals from trial to trial are represented in the model in terms of the two feedback variables, GDF (goal discrepancy feedback) and PDF (performance discrepancy feedback). These reflected performance relative to changing standards across trials, whereas ability was a static variable.

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Table 2
Means and Standard Deviations of Performance, Goals, Feedback, and Acceptance for Each Trial

Variable	Trial 1	2	3	4	5	6	7
Control group							
Performance							
M	8.40	9.05	9.45	9.75	10.15	9.40	8.95
SD	2.14	2.80	2.19	2.86	2.48	2.12	2.26
Experimental group							
Performance							
M	9.16	10.00	10.17	10.26	10.63	10.17	10.32
SD	2.92	2.82	2.94	3.03	3.03	2.76	2.93
Assigned goal							
M	8.93	10.99	13.02	15.00	16.99	18.96	21.00
SD	2.17	2.17	2.10	2.10	2.16	2.15	2.10
Personal goal							
M	—	11.10	11.88	11.99	11.77	12.12	12.02
SD	—	2.72	2.75	3.21	3.11	3.18	3.60
GDF							
M	—	0.22	−0.99	−2.86	−4.74	−6.36	−8.79
SD	—	2.87	2.52	2.50	2.73	2.79	2.87
PDF							
M	—	0.64	0.78	0.20	0.07	0.39	−0.43
SD	—	3.27	3.28	2.95	3.05	3.36	3.04
Acceptance							
M	—	3.78	3.31	2.78	2.39	2.11	1.77
SD	—	0.59	0.79	0.81	0.87	0.83	0.77

Note. $N = 90$. Performance scores and goals are in terms of number of words. GDF (goal discrepancy feedback) and PDF (performance discrepancy feedback) scores were computed as performance minus assigned goal and present trial minus last trial performance, respectively. The acceptance scale was anchored at the high and low ends as 5 = *definitely accept* and 1 = *definitely reject*.

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whereas assigned goal, personal goal, GDF, PDF, and acceptance were measured at the beginning of Trial 2 (i.e., at the end of Trial 1).

Hypotheses 1 through 6 were tested by using path analyses of the data from Goal Trials 2 through 7 (goal acceptance and personal goal data were not gathered prior to Goal Trial 1, as necessitated by experimental procedures). Goodness-of-fit statistics for the model which encompassed these predictions (see Figure 1) are presented in Table 3. The model can be seen to fit acceptably well for Trials 4, 5, 6, and 7. Chi-squares for these trials were nonsignificant, rho values exceeded .90, and RMS values were less than .10. The model showed marginal fit for Trial 3. A solution could not be obtained for Trial 2 data. Examination of the Trial 2 correlation matrix revealed that, unlike later trials, ability and PDF were significantly correlated. Therefore, the model was modified for this trial by adding the ability–PDF correlation parameter. This revision produced a solution that fit very well. Table 4 presents the standardized path coefficients for each trial and the standard error (*SE*) for each estimate. To test the hypotheses, we tested coefficients for significance and compared them across trials.[3] Table 5 presents the squared multiple correlations (R^2s) for the endogenous variables in the model.

Table 3
Model Goodness-of-Fit Statistics for Trials

Fit statistic	Trial 2	3	4	5	6	7
Chi-square	4.13	14.60	10.98	7.41	9.13	4.12
p	.39	.01	.05	.19	.10	.53
rho	1.00	.87	.91	.96	.90	1.02
RMS	.04	.11	.07	.06	.06	.05

Note. $N = 90$, $df = 5$ for Trials 3 to 7, $df = 4$ for Trial 2. RMS = root-mean-square residual. The hypothesized model was modified for Trial 2 by adding a parameter representing the correlation between ability and performance-referenced feedback. The model was not tested for Trial 1, as all variables were not measured for this trial.

[3] Significance tests are for each coefficient relative to zero. There is no test of significance of differences between path coefficients. However, a rough evaluation of differences can be made by using standard errors, provided in Table 4, to determine whether confidence intervals around individual coefficients overlap. When comparing coefficients two at a time using conventional probability levels, it is apparent that some coefficients differ (e.g., the decline of the effect of ability on personal goal from Trial 2 to Trial 6), but most probably do not. Nevertheless, coefficients did sometimes conform to the expected pattern across trials, and it remains for future research to determine whether the same patterns would hold.

Hypothesis 1 stated that, for a given trial, GDF is positively related to goal acceptance and that the magnitude of this relationship follows an inverted-U function over trials. This hypothesis was supported. Coefficients for Trials 3 through 7 were significant, and the predicted pattern was found, with coefficients increasing in magnitude from Trial 2 to Trial 5 and decreasing thereafter.

Hypothesis 2 stated that the pattern of path coefficients for the PDF to goal acceptance relationship is U-shaped, increasing from a weak to a strong negative relationship and back again across trials. This hypothesis was partially supported. All coefficients were negative except the first, but only those for Trials 5 and 7 were significant. Thus, the direction of the relationship was as predicted, but its magnitude and general form were not.

Hypothesis 3 stated that GDF is positively related to personal goals, displaying an inverted U-shaped function over trials. This hypothesis was supported in that all path coefficients were significant, and they increased in magnitude from Trials 2 through 4 and decreased in magnitude thereafter.

Hypothesis 4 predicted a positive PDF-to-personal-goal relationship, with the magnitude of this effect increasing linearly across trials. This hypothesis was not supported. Although significant for 4 of 6 trials, these coefficients were negative rather than positive. These anomalous results will be explored more later.

Hypothesis 5 stated that goal acceptance is positively related to personal goals, the magnitude of the relationship conforming to an inverted-U shape over trials. This prediction was supported in that the coefficients were positive and significant for all except Trial 2. However, the magnitude of coefficients followed more nearly an increasing linear function than a curvilinear one.

Hypothesis 6 stated that personal goals are positively related to performance for all trials. Only coefficients for Trials 3, 6, and 7 were significant, although all were positive. Thus, Hypothesis 6 received some support.

Four additional parameters specified by the model were estimated, although no formal hypotheses concerning these were stated. First, ability was significantly and positively related to personal goals and to performance for all trials, as expected. The decline of influence of ability on personal goals from Trial 2 to Trial 7 is noteworthy. It was also expected that GDF and ability would be correlated for all trials. There was a close link between ability (average performance on the two practice trials) and assigned goals (a direct function of performance on the second practice trial). Because GDF was calculated as performance minus assigned goal, a negative relationship between GDF and ability was expected. Table 4 contains these correlations, and they can be seen to be low, negative, and significant for all trials. GDF and PDF were expected to be positively correlated for all trials because of the fact that both were computed from performance. This was found, as all correlations were positive and significant.

Substantial amounts of variance were explained in the three endogenous variables, as indicated by the squared multiple correlations (Table 5). Variance explained in performance varied somewhat across trials, about a median of 26%. Variance explained in personal goals declined gradually from a very substantial 73% to a still impressive 47%. Variance explained in acceptance showed the familiar inverted-U pattern, increasing across trials from 14% to 22% and then decreasing to 13%.

Further Tests of Dynamic Processes: Chi-Square Analyses

As the path analyses were generally supportive of the major hypotheses, we decided to further explore dynamic linkages of the model (see Figure 1) by using a series of chi-square analyses. The first of these examined the hypothesis that assigned goals were more likely to be rejected as the discrepancy between GDF and PDF became larger. Difference scores between GDF and PDF were calculated for each subject for each trial, and a median split of these scores for each trial was then used to code discrepancies as either large or small. Acceptance scores were also dichotomized as *accept* or *reject* by using the scale midpoint of 3 as the dividing point for each trial. Chi-square analyses were then performed for each trial to determine whether subjects who experienced large feedback discrepancies for a trial were also likely to reject assigned goals at greater-than-chance levels, and whether subjects who experienced small feedback discrepancies would be more likely to accept assigned goals. Only the chi-square for Trial 3 was significant, $\chi^2 (1, N = 90) = 4.31, p < .05$, with the feedback discrepancy–acceptance relationship taking the predicted form. This was also the trial with the greatest variance in dichotomous acceptance scores, with 53% of the sample accepting Trial 3 goals and 47% rejecting. The percentages for adjacent trials were as follows: Trial 2, 81% accept and 19% reject; Trial 4, 24% accept and 76% reject. Thus, the discrepancy hypothesis received strong support in that feedback discrepancy was related to acceptance/rejection when subjects were shifting from one to the other.

Next, the linkage between assigned goal acceptance and personal goals was tested. As described previously, acceptance at each trial was dichotomized according to the scale midpoint. A basic premise of the model is that assigned goals that are accepted will be used as personal goals. Because assigned goals increased at each trial, the acceptance–personal goal relationship was examined by using change in personal goals from trial to trial as the dependent variable. For each subject, personal goal change was calculated as personal goal for a trial minus personal goal for the preceding trial. The sign of the difference indicated whether personal goals were increasing (+), decreasing (−), or remaining constant from one trial to the next. Because personal goals should have increased as long as assigned goals were accepted, these values were used to compute a dichotomous variable indicating whether personal goals increased (1) or remained constant or decreased (0). Chi-squares relating acceptance/rejection to personal goal change were significant and in the expected direction for Trial 2 acceptance to goal change from Trials 2 to 3, $\chi^2 (1, N = 90) = 5.28, p < .05$ (Trial 3 goals being set at the end of Trial 2); for Trial 3 acceptance to goal change from Trials 3 to 4, $\chi^2 (1, N = 90) = 9.51, p < .01$; and marginally significant for Trial 4 acceptance to goal change from Trials 4 to 5, $\chi^2 (1, N = 90) = 2.99, p < .10$. For subsequent trials, too few subjects were accepting assigned goals to meaningfully test the relationship. In addition, because subjects did not set personal goals for Trial 1, change in personal goal from Trials 1 to 2 was not available.

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Table 4
Standardized Path Coefficients for Trials

Path	Hypothesis	Trial 2	3	4	5	6	7
GDF to acceptance	1	.257	.479*	.493*	.502*	.403*	.405*
		(.225)	(.119)	(.117)	(.128)	(.127)	(.116)
PDF to acceptance	2	.122	−.177	−.042	−.332*	−.128	−.292*
		(.225)	(.119)	(.116)	(.128)	(.127)	(.116)
GDF to personal goal	3	.482*	.541*	.663*	.453*	.361*	.353*
		(.128)	(.084)	(.086)	(.100)	(.110)	(.103)
PDF to personal goal	4	−.011	−.189*	−.369*	−.246*	−.214*	.036
		(.125)	(.075)	(.077)	(.095)	(.103)	(.095)
Acceptance to personal goal	5	.094	.285*	.270*	.331*	.371*	.366*
		(.059)	(.064)	(.069)	(.075)	(.084)	(.082)
Personal goal to performance	6	.186	.256*	.181	.108	.237*	.215*
		(.127)	(.106)	(.102)	(.108)	(.106)	(.099)
Ability to personal goal		.839*	.791*	.653*	.615*	.526*	.565*
		(.058)	(.063)	(.063)	(.071)	(.082)	(.083)
Ability to performance		.358*	.399*	.419*	.427*	.261*	.389*
		(.127)	(.106)	(.102)	(.107)	(.106)	(.099)
GDF with ability		−.286*	−.307*	−.221*	−.167*	−.219*	−.319*
		(.110)	(.092)	(.088)	(.083)	(.086)	(.096)
GDF with PDF		.900*	.579*	.597*	.643*	.619*	.522*
		(.143)	(.118)	(.121)	(.125)	(.122)	(.115)

Note. Standard errors (*SE*) are given in parentheses. GDF = goal discrepancy feedback. PDF = performance discrepancy feedback. The hypothesized model was modified for Trial 2 by adding a parameter representing the correlation between ability and performance discrepancy feedback. This was estimated to be −.290 (*SE* = .110, $p < .05$).
* $p < .05$.

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The third linkage tested was that from personal goal change to performance change from one trial to the next. According to the model, increases in the former should be associated with increases in the latter. Performance change was calculated in the same way as personal goal change. Significant chi-squares were obtained that related goal change to performance change for Trials 2 to 3, $\chi^2(1, N = 90) = 8.56$, $p < .01$; for Trials 3 to 4, $\chi^2(1, N = 90) = 3.55$, $p < .10$; and for Trials 4 to 5, $\chi^2(1, N = 90) = 7.01$, $p < .01$. Inspection of the observed and expected cell frequencies, however, revealed that these relationships were opposite to those expected. Increases in personal goals from one trial to the next were associated with decreases in performance for the same pair of trials. As this relationship was directly counter to predictions of goal theory, the relationship between personal goal change and performance change was explored further.

Recall that PDF was calculated by the subject in the same manner as performance change used in this analysis (i.e., performance this trial minus performance last trial). Examination of the relationship between performance change for the preceding trials and personal goal change revealed significant relationships for all trials: performance change for Trials 1 to 2 with personal goal change for Trials 2 to 3, $\chi^2(1, N = 90) = 17.65$, $p < .01$; performance change for Trials 2 to 3 with goal change Trials 3 to 4, $\chi^2(1, N = 90) = 4.48$, $p < .05$; performance change for Trials 3 to 4 with goal change Trials 4 to 5, $\chi^2(1, N = 90) = 7.70$, $p < .01$; performance change for Trials 4 to 5 with goal change Trials 5 to 6, $\chi^2(1, N = 90) = 8.18$, $p < .01$; performance change for Trials 5 to 6 with goal change Trials 6 to 7, $\chi^2(1, N = 90) = 10.98$, $p < .01$; and performance change for Trials 6 to 7 with goal change Trials 7 to 8, $\chi^2(1, N = 90) = 14.15$, $p < .01$. (Note that a personal goal was set for Trial 8, but this trial was not actually conducted.) For all trials this relationship was a direct one, such that subjects who received positive performance feedback (performance improved from the last trial to this one) responded by increasing personal goal for the next trial as compared with personal goal for this trial, and subjects whose performance remained constant or decreased responded by holding constant or decreasing their personal goal for the next trial.

Table 5
Squared Multiple Correlations for Variables

Variable	Trial 2	3	4	5	6	7
Performance	.256	.344	.281	.242	.176	.265
Personal goal	.726	.694	.670	.571	.445	.474
Acceptance	.138	.162	.220	.148	.115	.126

Discussion

As expected, specific difficult goals were found to result in better performance than "do your best" goals. Experimental group performance means were consistently higher than control group means, even during later trials when virtually all subjects rejected their assigned goals. The finding that performance remained high even after assigned goals were rejected is in appar-

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ent contradiction to Locke's contention (Locke et al., 1981) that goals enhance performance only when they are accepted. It also differs from results reported by Erez and Zidon (1984), who found a linear decrease in performance after assigned goals were rejected. However, closer examination of our data reveals that personal goals remained consistently higher, on average, than performance. If experimental subjects were motivated to reach goals, either assigned or personal, then performance would have remained high as long as goal levels exceeded performance levels, consistent with Locke's model. Erez and Zidon did not ask subjects to set personal goals, and the only explicit feedback in their study was equivalent to our GDF. The salience of alternative goals and feedback in our study may account for the differences in results. Consistent with our results, Campion and Lord (1982) reported that students set personal grade goals that averaged about one letter grade higher than their previous performance.

Both the path analyses and chi-square analyses provided evidence that changes occurred in cognitive processes across trials as expected. Central to the study were the predictions that, as assigned goals became increasingly difficult, GDF and PDF would have increasingly large and opposite effects on goal acceptance, followed by diminishing effects in both cases. These predictions received substantial support, particularly in the case of GDF. As more and more subjects experienced negative GDF, its effects on acceptance began to decrease, whereas those of PDF began to increase. It appears that subjects shifted from primary reliance on one type of feedback to another; if more trials had been used, this trend may have been even more apparent. The chi-square analyses relating feedback discrepancies to acceptance lend further support to this hypothesis. Subjects who experienced larger discrepancies were more likely to reject assigned goals than subjects who experienced smaller discrepancies at Trial 3, when there were approximately equal numbers of accepters and rejecters. Note that, with regard to assigned goal acceptance, average level of acceptance declined substantially, as expected, from Trial 2 to Trial 7.

As expected, four variables in the model were found to affect personal goal level, including GDF, PDF, goal acceptance, and ability. Of these, ability had the strongest effects, although its influence declined over trials. The effects of acceptance of assigned goals on personal goal level remained unexpectedly strong through the last trials, indicating that subjects whose acceptance scores were at the high end of the distribution for each trial were likely to also set higher goals relative to other subjects, in spite of the fact that virtually all subjects were rejecting assigned goals by the later trials.

The chi-square analysis lends further insight into these processes. The change in personal goal level variable, in effect, converts normative data to ipsative data. The question answered by these analyses was thus somewhat different from that answered by the path analysis; to wit, is acceptance/rejection related to *changes* in personal goal levels rather than to the levels themselves? These results were clearly supportive of the hypothesis in that subjects who accepted assigned goals were still tending to increase personal goals as late as the end of Trial 4.

The negative effects of PDF on personal goals, as revealed by the path analyses, were unexpected. Subjects who received negative feedback compared with their past performance tended to set higher, not lower, goals for the next trial relative to goals set by others. The chi-square analyses shed further light on these results. For this analysis both personal goal change and performance change were ipsatized. Chi-squares relating personal goal change to performance change were significant for 3 of 5 trials for which tests were possible, but in the negative direction. However, change in performance from the preceding trial to this trial was positively associated with change in personal goal set at this trial for the next trial, for all six trials. It appears that subjects sought to further enhance performance by increasing personal goals on receipt of positive feedback, whereas they responded to negative feedback by setting lower, more realistic personal goals.

These results closely parallel those reported by Bandura and Cervone (1986), who reported that 50% of subjects who received slightly positive feedback increased their personal goals and 35% decreased them, whereas 50% of subjects who received very negative feedback decreased personal goals and no one increased them. Erez (1977) reported a moderate positive correlation (.45) between feedback and self-set goals. Campion and Lord (1982) argued that one extension of goal theory offered by control theory (Powers, 1973) as applied to goal setting is that an alternative to increasing performance in the face of negative feedback discrepancies is to lower goals. They reported that students were significantly more likely to increase grade goals for both the course and for subsequent tests after success in reaching a test goal, and to lower goals for the course grade after failing to reach a test goal. Our results are consistent with Campion and Lord's control theory interpretation of goal change and also with the mechanism proposed by Ashford and Cummings (1983) to account for feedback-seeking behavior: Setting a lower goal after failing to reach a goal increases the likelihood of future positive feedback, thus restoring feelings of competence, and setting a higher goal after success is a way to attain further positive feedback.

Two variables, ability and personal goal level, were expected to have direct effects on performance. Unlike Erez and Zidon (1984), who reported a decline in zero-order correlations between ability and performance across trials for experimental subjects, in our study ability had a strong impact on performance throughout the trials. The lack of significant effects of personal goals on performance until the last two trials would appear to pose a serious challenge to the traditional goal theory assumption that personal goals are the direct determinants of task motivation (and thus performance). Zero-order correlations between personal goals and performance, however, were moderate and consistent in magnitude across trials, ranging from .51 to .34. Thus, subjects who set higher personal goals were better performers. However, as the chi-square analyses discussed previously revealed, successful performance led subjects to set higher personal goals, though this did not relate to higher performance until later trials. In terms of a basic Performance = Ability × Motivation formulation, it is possible that personal goals (motivation) did not become a significant influence until the last trials, when some subjects persisted in setting high goals, whereas the motivation of others dropped and they set lower goals. In support of this, the last two trials tended to have both the highest means and standard deviations of personal goals.

These results point to several worthwhile directions for future research. Greater attention to the role of goal acceptance as a cognitive mediator of the goal–performance relationship is needed. As noted by Campion and Lord (1982) and Erez and Zidon (1984), within-subject designs lend themselves well to study of effects on effort and performance of shifts from goal acceptance to rejection. The role of performance feedback in this process appears to be critical. Feedback type, sign, and magnitude all played important roles in determining both acceptance of assigned goals and personal goal levels. Most performance environments offer multiple types and sources of feedback, and their effects on motivational variables are undoubtedly complex. Future research should continue to investigate the effects on cognitive processes of alternative types and sources of feedback.

Finally, the generalizability of these results should be addressed. Although the task used here was a simple one, with it we were able to test effects of increasing goals over several trials. In actual organizations, successful achievement of goals would often be followed by setting of still more difficult goals. Realization of this may prompt employees to reject assigned goals, the phenomenon of interest in this research. The first author has recently implemented a goal setting and appraisal system for exempt employees of a manufacturing organization. Anecdotally, employees have complained that the reward for goal accomplishment is more difficult goals. Managers report that they set challenging goals for employees on the basis of assessments of individual capabilities derived from observations of past performance. This study is realistic to the extent that it captures the same phenomena. Additional research on goal acceptance/rejection as it affects cognitive mediators between goals and performance is needed. The usual trade-offs between laboratory and field studies apply in terms of internal and external validity. The goal setting literature is characterized by a mix of laboratory and field research. A logical next step would be to test the findings reported here in a field setting.

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