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Goal Regulation Across Time: The Effects of Feedback and Affect

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This research focused on the processes individuals use to regulate their goals across time. Two studies examined goal regulation following task performance with 6 samples of participants in a series of 8-trial task performance experiments. The experiments involved: (a) 3 task types, (b) 2 goal types, and (c) actual or manipulated performance feedback referring to the focal participant's own performance or to the participant's performance compared with others' performance. Applying multilevel methods, the authors examined (a) how performance feedback influences subsequent goals within individuals across both negative and positive performance feedback ranges, and (b) the mediating role of affect in explaining the relationship between feedback and subsequent goal setting. Results showed that participants adjusted their goals downwardly following negative feedback and created positive goal–performance discrepancies by raising their goals following positive feedback. In each sample, affect mediated substantial proportions of the feedback–goals relationship within individuals.

Keywords: motivation, goal setting, feedback, affect, self-regulation

Rationalist theories of human behavior, which date back to Plato and Aristotle, assumed that the aspect of human existence that differentiates humans from other species—rationality—is the driving force behind the supremacy of the human race, and primordial human features such as emotions disrupt human rationality and thus have undesirable influences on decisions and behavior. Following this rationalist assumption, basic psychology has long emphasized rationality and cognition, whereas the study of emotion has been focused on minimizing the effect of emotion on behavior. Similarly, organizational scholars have formulated cognitive models of traditional organizational topics such as leadership, job attitudes, and motivation. Within this cognitive paradigm, when they were studied, emotions were viewed either as the outcome of a cognitive evaluation process (Muchinsky, 2000), or as phenomena that should be prevented by institutionalizing norms of rationality (Ashforth & Humphrey, 1995).

The contributions of the cognitive paradigm notwithstanding, in the past 2 decades there has been a growing interest in the study of emotions, affect, and temperament in basic psychology (e.g., Cervone & Shoda, 1999; Watson, 2000). More recently, this trend has permeated organizational research, and the organizational literature has seen an increased interest in the experience, expression, and management of affect and emotions at work (e.g., Fox & Spector, 2002; Lord, Klimoski, & Kanfer, 2002; Weiss, 2001). Weiss (2001), in the introduction to a special issue on affect in the workplace, notes that "there has been an explosion of research on the topic over the past decade" (p. 1). However, work motivation has not been part of this "explosion," most likely because of the cognitive nature of theories of work motivation (see Erez & Isen, 2002, for a notable exception).

Developed within the rationalist perspective, traditional theories of work motivation consist of cognitive explanations of action. Most prominent theories of task or work motivation—goal-setting theory (Locke & Latham, 1990), social–cognitive theory (Bandura, 1986), resource allocation theory (Kanfer & Ackerman, 1989), control theory (Klein, 1989), and expectancy theory (Vroom, 1964)—have a strong cognitive focus. The cognitive nature of these theories has made the integration of affect into motivation theory difficult, which explains the relative paucity of theory and research examining the influence of affective constructs on motivational processes. Furthermore, most empirical examinations of antecedents or consequences of task or work motivation, even when they were based on longitudinal designs, have investigated motivational differences between individuals and have either inferred that similar processes operate within individuals, or have assumed that there is no systematic within-individual variance in motivation.

Though a great deal has been learned about motivation from cognitive theories and the study of individual differences, we contend that significant strides can be made in understanding motivation by investigating the process of motivation within individuals across time. Because we believe that emotional and affective processes have much to offer in explaining motivational self-regulation, and yet such processes have been understudied, we study motivation—operationalized according to goal-setting the-

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ory—across time and propose that experienced affect has an important role in explaining the within-individual process of goal regulation over time. To test this general proposition, we present two studies designed to examine how individuals regulate their goals across time, following feedback concerning their performance, and to investigate support for the hypothesized mediating role of affect.

Goal setting theory, by stating that "the simplest and most direct motivational explanation of why some people perform better than others is because they have different performance goals" (Latham & Locke, 1991, p. 213), has a *between-individual* primary focus. However, from a self-regulatory perspective, the motivating effects of goals *within individuals* can be explained by proactive discrepancy production (Bandura & Locke, 2003; Phillips, Hollenbeck, & Ilgen, 1996). That is, as specified by social–cognitive theory, people create positive discrepancies between their goals and past performance by setting goals that are higher than past performance (Phillips et al., 1996). In this respect, performance feedback is important because it allows individuals to evaluate their previous performance relative to a specific goal or standard.

Latham and Locke (1991, p. 226) concluded that their review of the effects of feedback and goals on performance "leads to the conclusion that goals and feedback together are more effective in motivating high performance or performance improvement than either one separately." Furthermore, Mento, Steel, and Karren (1987) provided meta-analytic evidence for the beneficial effects of feedback in goal-setting interventions. Performance feedback is also essential in understanding how employees regulate their goals and behaviors across time. Locke (1997, p. 384), after describing the moderating role of feedback (knowledge of results) on the effects of goals on performance, notes, "[o]n the other side of the goal-feedback coin, goals *mediate* the effect of knowledge of results on subsequent performance." From this point of view, performance feedback is a process variable that explains motivation within individuals, which is consistent with the perspective that we take here.

The role of feedback in influencing motivation and performance has generated a large body of research, but the findings often have been contradictory or inconsistent (Kluger & DeNisi, 1996). Kluger and DeNisi argue that lack of a unified theory makes it impossible to interpret such findings: "Without a comprehensive theory, there is no way to integrate the vast and inconsistent empirical findings" (p. 277). Latham and Locke (1991, p. 224) note that "few concepts in psychology have been written about more uncritically and incorrectly than that of feedback." As noted, in this article we operationalize motivation according to goal-setting theory, and we study how feedback influences individuals' regulation of performance goals across time.

The simplest framework explaining the effects of feedback on future performance assumes that a basic regulatory mechanism of behavior is the "evaluation of and reaction to a feedback-standard comparison" (Kluger & DeNisi, 1996, p. 259). This framework is most useful in explaining the motivating effects of negative performance feedback (feedback that tells individuals that they have not met their goals or standards). That is, following a control mechanism (Carver & Scheier, 1981, 1998), unmet goals (i.e., negative feedback) should lead to increased motivation and task effort in an attempt to decrease the negative feedback–standard discrepancy. Adjusting task effort is not the only alternative available to recipients of negative feedback; they can also adjust their goals downward (Kluger & DeNisi, 1996). Across a range of negative performance feedback, the more negative the feedback is, the more likely the feedback recipient is to adjust his or her goal downward. However, self-efficacy beliefs concerning performance capabilities are likely to moderate this effect such that those who hold stronger self-efficacy beliefs with respect to their performance capability should be more resilient in the face of negative feedback (Bandura, 1997; Bandura & Cervone, 1983).

The basic feedback–standard comparison mechanism is less useful in explaining the effects of positive performance feedback on future goals. Under the assumptions of control theory, people would tend to decrease effort rather than create a positive goal–performance discrepancy after meeting previous goals. When goals have been met or exceeded, as noted, social–cognitive theory predicts that individuals will engage in positive discrepancy creation by adjusting their goals upward, especially when they believe they have the capability to perform at a higher level (Bandura, 1997; Bandura & Locke, 2003; Wood & Bandura, 1989). As Bandura (1997, p. 131) comments: "After people attain the standard they have been pursuing, those who have a strong sense of efficacy generally set a higher standard for themselves. The adoption of further challenges creates new motivating discrepancies to be mastered."

In addition, whether individuals adopt increased challenges after attaining their goal should depend on the difficulty of the attained goal. That is, as one attains an extremely difficult goal on a specific task, he or she might not further increase the task goal, but rather shift his or her attention and effort toward a different task. In this scenario, goal difficulty would establish boundary conditions for the positive effect of goal-attainment feedback on future goals. However, for moderately difficult goals, feedback indicating goal attainment should lead to higher subsequent goals (Bandura, 1997). The general goal discrepancy-production hypothesis has been supported by longitudinal research on motivation (Phillips et al., 1996) as well as in recent studies that examined goal regulation within individuals (Donovan & Williams, 2003; Williams, Donovan, & Dodge, 2000).

Perhaps the best evidence to date on the process of goal regulation across time comes from studies of athletic performance. Williams et al. (2000) used a longitudinal design to study goal and performance regulation in 25 track and field athletes. These authors found evidence for both downward goal revision following negative feedback and positive discrepancy production following positive feedback. In addition, Donovan and Williams' (2003) recent study of varsity-level college track and field athletes presents evidence that the magnitude of the goal–performance discrepancy influenced athletes' goal revisions in that they were more likely to lower their goals when they failed to meet their previous goal and the goal–performance discrepancy was large. As Donovan and Williams note, because the focal task in their study was physical in nature and their results may not generalize to tasks performed in organizational settings, it is important to study the goal-regulation process with more cognitive tasks that are more similar to tasks performed at work.

In sum, as feedback indicating goal nonattainment becomes increasingly negative, individuals will adjust their goals downward, and the magnitude of the goal revision should be proportional to the magnitude of the (negative) feedback. In contrast,

after receiving positive performance feedback (i.e., people have met or exceeded previous goals), as predicted by goal-setting and social–cognitive theories (Bandura, 1997; Bandura & Locke, 2003; Latham & Locke, 1991), individuals will create positive goal–performance discrepancies by setting more difficult goals (e.g., Phillips et al., 1996). Together, these predictions are equivalent to a positive relationship between performance feedback and future goals across negative and positive feedback ranges.

We should note that this prediction is fundamentally different from the typical predictions found in between-individual investigations of the effects of *feedback sign* (i.e., whether feedback is negative or positive) on goals or performance (e.g., Nease, Mudgett, & Quiñones, 1999; Podsakoff & Farh, 1989), where feedback sign is manipulated by providing participants in different experimental conditions with different types of feedback (negative or positive). First of all, our prediction refers to a within-individual relationship, indicating how different levels of feedback (the magnitude of the feedback scores) influence goals across time (i.e., feedback levels vary within each individual) instead of referring to a between-individuals relationship with different individuals receiving different types of feedback. Second, our prediction refers to a relationship that specifies how feedback scores ranging from low scores (indicating goal nonattainment) to high scores (indicating that the trial goal has been exceeded)—as opposed to a dichotomous feedback sign score—predict subsequent goals across trials.

> *Hypothesis 1:* Performance feedback will have a direct effect on subsequent goals such that, across time, feedback indicating better performance will be associated with higher subsequent goals than feedback indicating lower performance.

The Mediating Role of Affect

Because goal adjustment is an important self-regulatory mechanism, we believe it is important to study the psychological mechanisms that link performance feedback to future goals. Explaining such mechanisms would advance self-regulation and motivation theory and would perhaps suggest interventions that could be used to enhance employees' motivation at work. Toward that end, in this section we present a conceptual model of motivational self-regulation that links performance feedback, affect, and goals. We developed this model following Mischel and Shoda's (1995, 1998) suggestions for studying intraindividual cognitive–affective processes that generate individuals' behavior patterns, and using the conceptual framework of Weiss and Cropanzano's (1996) affective events theory (AET), as well as basic behavioral motivation theory (e.g., Gray, 1981), to generate predictions concerning the relationships among feedback, affect, and goals.

Though not specifically focused on the role of affect in goal regulation, Mischel and Shoda's (1995, 1998) cognitive–affective personality system (CAPS) is a broad theoretical model aimed at explaining social information processing both within and across individuals. This personality system contains cognitive–affective units such as expectancies and beliefs, affects, and goals and values; we view this system as a general framework for developing specific models of intraindividual dynamics such as the model of goal regulation developed in this article. Our within-individual model of goal regulation across time is consistent with Mischel and Shoda's (1998) focus on intraindividual processes that should be studied with idiographical methods (Shoda, Mischel, & Wright, 1994).

At a more specific level, AET is the first attempt to conceptualize organizational behavior over time while recognizing differences between individuals in affect and behavior, and it proposes that events from the workplace environment have immediate affective consequences (they are *affective events*) in that they influence the experience of emotions and affect at work (Weiss & Cropanzano, 1996). In turn, momentary affect and emotions influence employees' behavior and performance at work, and can lead to the formation of more stable attitudes (Weiss & Cropanzano, 1996). For our specific purpose, we consider the receiving of performance feedback an affective event that influences individuals' momentary affective states, which in turn influence goal and behavioral regulation. It follows that performance feedback should influence goals and performance through the experience of affect and emotions.

At the most basic motivational level, the mediating role of affect is suggested by Gray's (1981, 1990) behavioral motivation theory (see also Higgins' [1997, 1998] regulatory focus theory). Gray's theory proposes that two distinct systems regulate behavioral motivation: the behavioral activation system (BAS), which regulates appetitive motivation and is activated by stimuli signaling reward (or relief from punishment), and the behavioral inhibition system (BIS), which regulates aversive motivation and is activated by stimuli signaling punishment (or frustrative nonreward; Gray, 1981, 1990).

In addition to the behavioral tendencies, which they regulate, the two broad motivational systems contain both emotional and cognitive components (e.g., Fowles, 1987; Watson, 2000). Emotions play a central role in explaining how the behavioral motivation systems work. The BAS is believed to regulate the experience of positive emotions and moods, whereas the BIS regulates negative emotions and moods (Gray, 1990). Stimuli from the environment influence people's affective states, and the resulting affective states will reinforce behavioral motivation. For example, appetitive stimuli activate approach behaviors leading to rewards, which induce positive affect. The experience of positive affect will reinforce the approach response to such appetitive stimuli. With respect to goal regulation, because positive affect has an energetic arousal component (e.g., it includes affective states such as interested, enthusiastic, active, alert, strong, etc.), it should increase respondents' optimism concerning performance, and thus individuals should set higher performance goals when they experience high positive affect (part of this effect is likely mediated by feelings of efficacy).

In sum, favorable cues lead to positive affect, which is associated with BAS activation, and individuals tend to engage in approach behaviors and set higher goals when they experience positive emotions or moods. Conversely, when individuals experience negative emotions that signal an unfavorable situation, these negative emotions will reinforce avoidance behaviors (and lower goals) because negative emotions activate the BIS. It follows that feedback influences subsequent goals through an affective mechanism associated with the two behavioral motivation systems: Performance feedback signaling success or failure (in reaching the initial goal) influences individuals' positive and negative affect, which activate the behavioral approach or avoidance system, respectively.

It is interesting that perhaps the most suggestive evidence to date on the mediating role of affect in explaining the relationship between feedback and performance comes from neuropsychology. Derryberry (1991), in Experiment 1, manipulated the emotional value of letter primes (instructions indicated that *A* represents good performance, *C* represents average performance, and *F* represents poor performance) and showed that negative feedback in the form of priming stimuli (the letter *F*) presented 100 ms prior to a reaction time task inhibited subsequent performance as compared with neutral (the letter *C*) and positive (the letter *A*) feedback. In other experiments, Derryberry randomized the prime stimuli, conveyed the feedback information through the task stimuli, and used a special technique to isolate attentional and response processes. On the basis of these experiments, Derryberry concluded that the effects of the primes on subsequent performance are emotional rather than cognitive, which suggests that emotions mediate the effects of feedback on performance.

Furthermore, in a recent study, Luu, Tucker, Derryberry, Reed, and Poulsen (2003) found that the autonomic emotional response to delayed feedback (feedback concerning Trial $n - 5$; feedback was delayed to minimize expectancy and performance effects in an effort to capture only the affective response to feedback) was reflected in a negative wave of electric activity over the medial frontal cortex (a negative electroencephalogram recorded potential; see Luu et al., for waveform plots and additional details), and that the magnitude of this wave was directly related to subsequent performance (faster responses on a reaction time task). Though the authors did not ask participants for self-reports concerning their affect, the evidence presented by Luu et al. indirectly suggests that an autonomic emotional response to feedback may partly explain how feedback affects behavior and performance.[1]

However, within reaction time task settings such as those from the studies described above, the influence of the emotional reactions on cognitive components of motivation is greatly minimized by the time requirements of the task. In other settings that track behavior and performance over time, it is entirely possible that the affective reactions to performance feedback influence future performance through cognitive constructs such as personal performance goals.

In sum, it is our contention that affect explains part of the influence of feedback on goal regulation. Indeed, there is empirical evidence suggesting that goal attainment or goal progress is associated with positive affect (e.g., Alliger & Williams, 1993), and goal nonattainment or lack of progress should be associated with increased negative affect. Though we are not aware of research investigating the effects of basic affect or emotions on task goals, the association between Neuroticism and Extraversion—personality traits thought to control the experience of negative and positive affect (Lucas & Fujita, 2000; Watson, 2000)—and goal setting across individuals (Judge & Ilies, 2002) suggests that affect should influence individuals' goal-setting processes.[2] Summarizing these arguments, we propose the following:

> *Hypothesis 2:* Positive and negative affect will partially mediate the relationship between performance feedback and subsequent goals within individuals.

Of note here is the role of goal difficulty in the effects of goal attainment/nonattainment on experienced affect. Naturally, performers should experience more positive affective states when they attain a more difficult goal, as compared with an easier goal. This argument suggests a moderating role of goal difficulty on the relationships between performance–goal discrepancies and affect. In the studies reported here, we do not model the effects of discrepancy feedback, and thus we do not examine the moderating role of goal difficulty. Whether goal difficulty moderates the relationship between performance feedback (as opposed to performance–goal discrepancy feedback) and future goals (e.g., whether the same actual performance results in more, or less, positive affect when the previous goal was difficult, compared with when it was easy) is a question that we can and do examine empirically.[3]

Influence of Type of Feedback

In traditional feedback studies, the feedback provided to participants is manipulated (e.g., Podsakoff & Farh, 1989). More recently, in research by Donovan and Williams (2003) and Williams et al. (2000), the feedback accurately reflected performance. Although this has yet to be investigated, the effects of "real" versus manipulated performance feedback on subsequent goals may reflect distinct, but related, processes. Specifically, when feedback reflects actual performance, its effect on subsequent goals within individuals could be due to (a) the explicit feedback information (the feedback message) or (b) the individuals' self-assessment of their performance (how well they think they performed on the trial task based on working on the task). When feedback is manipulated, however, because its value or magnitude is independent of actual performance, the effect on subsequent goals would necessarily reflect how individuals process the explicit feedback message and incorporate this information into their goal-regulation strategies. Though we are not aware of research on the within-individual effect of manipulated feedback on goals or performance, it is our expectation that the goal-regulation processes operate similarly for accurate and manipulated feedback, but we recognize that the effect of feedback on subsequent goals may be stronger when the feedback accurately reflects performance because such feedback is more credible, and feedback credibility should moderate its effect on goal setting and performance (Ilgen, Fisher, & Taylor, 1979; Podsakoff & Farh, 1989). Whereas we do not formalize this expectation, we will investigate whether it is supported by the data on an exploratory basis, using both accurate and manipulated performance feedback.

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[1] We thank an anonymous reviewer for help in clarifying the descriptions of the Derryberry (1991) and Luu et al. (2003) studies.

[2] Judge and Ilies (2002) present meta-analytic estimates for the relationships between the traits comprising the Five-Factor Model of personality and goal-setting motivation (operationalized as self-set goal level/difficulty). Neuroticism was negatively ($\rho = -.29$), and Extraversion positively ($\rho = .15$), related to goal setting; both estimates had 80% credibility intervals and 90% confidence intervals that did not include zero.

[3] Performance–goal discrepancy feedback informs individuals of their performance relative to their goal and thus includes feedback sign (whether the goal was met/exceeded or not) and discrepancy magnitude (by how much was the goal exceeded [for positive discrepancy feedback] or by how much the performance fell short to the goal [for negative discrepancy feedback]) information. Performance feedback simply indicates the level of performance.

To seek support for the hypotheses advanced in this article, we conducted two studies involving different tasks and different types of feedback. We describe these studies below.

Study 1

The study was conducted over the Web, by means of an electronic interface that was specifically developed for this project. Participants completed an eight-trial experiment that asked them to successively set a performance goal and perform a certain task (there were two versions of the task) for each trial. After performing the trial task, participants received performance feedback that was either real or manipulated, and then they were asked to report their current affective state.

Method

Participants

Participants were recruited from a large introductory management class at a public university. They were invited to participate by an advertisement that was placed on the course Web page. Participation in the study was completely voluntary, and individuals who participated received extra credit points in return for their participation. A total of 745 participants provided complete data for this study.

Experimental Design and Procedure

Participants logged on to the Web site, read a detailed description of the task and procedure, were asked to report their momentary affective state, and then were asked to set a goal for the first trial task. The Web page for goal setting gave participants the option to choose between nine different goal levels, ranging from 10% to 90% (e.g., "I want to perform better than 50% of the participants in this experiment"). After setting a goal for the first trial, participants were presented with the performance task and were given 5 min to work on the task. After submitting their task solutions, participants were presented with performance feedback. We provided half of the participants with accurate feedback by programming the electronic interface to provide relative performance feedback by comparing respondents' actual performance (computed as the number of correct solutions for the Remote Associates Test [RAT] and as the number of object/material uses provided by respondents for the brainstorming task; we describe these tasks below) with a distribution of responses constructed a priori. The other half received manipulated feedback that ranged between 35% and 80% (e.g., "For this trial, you have performed better than 35% of the participants), which was randomized across trials for each participant. We used manipulated feedback to examine whether feedback has an effect on goal regulation independent of actual performance (i.e., in the manipulated feedback condition, the feedback was independent of actual performance). Though we did not specifically provide performance–goal discrepancy feedback (we did not actually tell participants whether they had met their trial goals or not, or by how much), such discrepancy information was likely determined by the respondents themselves. (The analyses could only model the effects of performance feedback and not of performance–goal discrepancy feedback because of methodological limitations; to be explained shortly.) After receiving the feedback, participants were asked to report their affect, and then they started the subsequent trial. This process was repeated for six additional trials.

Performance Task

Two different tasks were used. The first was a brainstorming task that asked participants to list as many uses of a common object or material as they could. This task has been successfully used in prior laboratory research on goal-setting motivation (e.g., Harkins & Lowe, 2000; Locke, 1982). Participants were asked to list uses for the following objects–materials: (a) absorbent towel, (b) rubber tire, (c) wood, (d) ice, (e) sunlight, (f) a sheet of paper, (g) coat hanger, and (h) sand. Because the first task is a very simple task that requires a moderate amount of cognitive resources, we wanted to investigate whether the effects are similar in a more cognitively demanding task. The second task contained five items from the RAT (Mednick & Mednick, 1967; see also Bowers, Regehr, Balthazard, & Parker, 1990), a test widely used with undergraduate students (e.g., Brown & Marshall, 2001). Appendix A provides the instructions given to the respondents before the RAT task, and shows five sample items taken from Bowers et al. (1990).

Affect Measure

We used the 20-item Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988) with momentary instructions for measuring positive affect (PA) and negative affect (NA). Respondents were asked to indicate the extent to which they currently experience the affective states described by the PANAS adjectives (e.g., PA: excited, alert, active, enthusiastic; NA: distressed, hostile, scared, nervous) on a 5-point scale. The internal consistencies reliability of the PA scores ranged between .92 and .95 across the eight trials; the reliability of the NA scores was between .90 and .92 across the trials.

Analyses

To test the hypotheses, we used hierarchical linear modeling (HLM; Bryk & Raudenbush, 1992). The models estimate the within-individual effects of performance feedback on future goals; of performance feedback on affect; and of performance feedback and affect, jointly, on subsequent goals. We chose to model the effects of performance feedback scores (as opposed to performance–goal discrepancy scores) because, in addition to the fact that the use of difference scores has been heavily criticized over the last decade (e.g., Edwards, 1994; Edwards & Parry, 1993), using performance–goal discrepancy scores to predict goals across trials with our data would pose additional problems because of the serial dependency in the data (i.e., the difference score predictor would be computed using the score on the criterion on the previous trial).

Before proceeding with the tests of the hypotheses, we investigated whether systematic within- and between-individual variance exists in the performance goals set by individuals. To do so, we estimated a null model that calculated the within- and between-individual variance in goals. The equations for the null model, as well as for the models estimated to test hypotheses, are presented in Appendix B.

Provided that the test of the null model reveals that there is substantial within- and between-individual variance in the criterion, tests of the other HLM models can be conducted. Because there were four distinct conditions in this study (two versions of the task [possible uses vs. RAT] and two types of feedback [actual vs. manipulated]), we estimated the null model on each of the four data sets. Below, we offer descriptions of analyses used to test the hypotheses.

Hypothesis 1. Model 1 tests the relationship between feedback and goals within individuals. At Level 1, the model estimates the individuals' intercepts and slopes for predicting goals with feedback, and at Level 2, the model estimates the pooled values for the Level 1 parameters. In order to estimate the Level 1 parameters using only within-individual variance, the feedback variable was centered at the individuals' means, which removed all the between-individual variance in the predictor scores. As was the case with the null model, Model 1 was estimated on each of the four data sets determined by the type of performance task (possible uses vs. RAT) and

the type of performance feedback (actual vs. manipulated). The model equations are shown in Appendix B.[4]

Hypothesis 2. To test whether affect mediates part of the relationship between feedback and subsequent goals, we estimated Model 2, which included PA and NA as within-individual (Level 1) predictors of goals, in addition to the feedback predictor (see Appendix B for model equations). As we did with Model 1, we centered the Level 1 predictors at the individuals' means to remove the between-individual variance in the predictor scores, and we estimated the pooled Level 1 parameter values at Level 2. We followed the procedures for testing mediation with regression analysis outlined by Baron and Kenny (1986) and MacKinnon and Dwyer (1993), as well as the recommendations for applying these procedures for testing mediation in multilevel models given by Krull and MacKinnon (1999). The simplest analysis for testing mediation with ordinary least squares (OLS) analysis is to investigate whether a hypothesized mediator (*M*) mediates the relationship between *X* and *Y*. The conceptual model for testing this mediating effect is presented in Figure 1.

According to the notations from Figure 1, c is the direct effect of X on Y; a is the direct effect of X on the mediator M; the product $a \times b$ represents the meditating effect; and c' is the direct effect of X on Y, independent of M. Alternatively, the quantity $c - c'$ represents the magnitude of the mediation effect. (In OLS regression on single-level data, $c - c' = a \times b$ [MacKinnon, Warsi, & Dwyer, 1995].) In multilevel modeling, when the number of groups (i.e., individuals, in this study) exceeds 100, Krull and MacKinnon (1999) recommend testing the significance of the mediation effect with the unbiased estimator test. This test involves computing the z-value for the mediation effect as $z = a \times b / \sqrt{(b^2 \times s_a^2) + (a^2 \times s_b^2) - (s_a^2 \times s_b^2)}$. MacKinnon and colleagues (see MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002) have shown that the test comparing the z-value computed with the previous formula with the unit normal distribution has low power because the product $a \times b$ is not normally distributed (its distribution is often asymmetrical, with high kurtosis). To address the low power problem, MacKinnon et al. (2002) estimated empirical sampling distributions of z for various magnitudes of the mediation effect and various sample sizes on the basis of extensive simulations, and they termed the test using the empirical sampling distribution as z'. When the role of more than one mediating variable is examined in the same model, the significance of the mediating effect through each variable can be tested using formula presented above, and the proportion of the total effect mediated jointly is computed as $(c - c') \div c$.[5]

Following the procedure outlined above, to test the mediation, we used (a) the parameter estimates for predicting PA and NA with feedback within individuals (i.e., Level 1 estimates); (b) the results for Model 1, which predicted goals with feedback at Level 1, and (c) the results for Model 2, which included PA and NA as within-individual predictors of goals, in addition to the feedback predictor. We used the z' test by comparing the z-value computed by the formula presented above with the empirical critical values for a small mediating effect and $N = 100$ provided by MacKinnon et al. (2002).

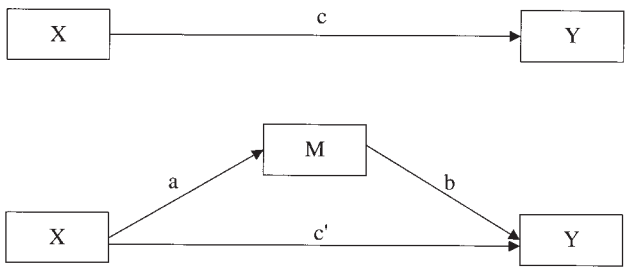

Figure 1. Illustration of a mediating effect. c represents the total direct effect of X on Y, a is the direct effect of X on the mediator M, and the product $a \times b$ represents the meditating effect. c' is the direct effect of X on Y, independent of M.

Results

Table 1 presents parameter values and variance components for the null model estimated in each subsample. The null model analyses indicated that there was significant between-individual variance in goals for each data set ($p < .01$ for all samples) and that a substantial proportion of the total variance in goal levels was within individuals ($p = \rho^2 \div [\rho^2 + \tau_{00}] = 34.5\%$, 34.9%, 31.8%, and 31.2% for possible uses–real feedback [Sample 1], possible uses–manipulated feedback [Sample 2], RAT–real feedback [Sample 3], and RAT–manipulated feedback [Sample 4] conditions, respectively). Performance scores showed similar patterns of variation; we present average levels of performance and variance components for each sample in Table 2. These results suggest that hierarchical modeling of these data was appropriate.

The parameter estimates for Model 1 and 2, computed on each of the four subsamples, are presented in Table 3. The results for Model 1 show support for Hypothesis 1 (see Table 3). The pooled slope for predicting goal level with feedback was positive and highly significant in each of the four data sets ($\gamma_{10} = .16$, $p < .001$; $\gamma_{10} = .15$, $p < .001$; $\gamma_{10} = .18$, $p < .001$; $\gamma_{10} = .18$, $p < .001$, for Samples 1–4, respectively—these are estimates for the path c, using the mediation notation), which shows that individuals did use feedback regarding their performance to adjust their goals, as hypothesized. These results are quite consistent across the tasks and feedback types.

The results described above were obtained by regressing goals on feedback across the entire range of feedback, which included both negative and positive feedback. To estimate the strength of the feedback–goals relationship within each of the two ranges, we conducted additional analyses. Following Raudenbush, Brennan, and Barnett (1995), we first constructed a "feedback sign" dummy variable reflecting whether the performance was higher than the goal for the respective trial (positive feedback) or whether it was lower than the goal (negative feedback). We then constructed a pair of dummylike feedback variables—negative feedback and positive feedback—that were equal to the value of the feedback when feedback sign corresponded to the valence of the dummylike feedback variable (i.e., negative or positive), and equal to zero otherwise (e.g., the positive feedback dummylike variable was

[4] In modeling data collected over time, serial dependency of the criteria scores can be an issue that needs to be taken into account (e.g., by controlling for the lagged score of the dependent variable; Ilies & Judge, 2002). However, in contrast to studies focusing on attitudes or affect as the dependent variable (e.g., Ilies & Judge, 2002), in multitrial experiments involving task performance (e.g., Yeo & Neal, 2004), the eventual serial dependencies are not caused by affective or attitudinal inertia. As such, like other recent multitrial studies involving HLM models (Yeo & Neal, 2004), we did not include a lagged variable in the analyses.

[5] Alternatively, the proportion of the total meditating effect can be computed as $(\Sigma a_i \times b_i) \div (\Sigma a_i \times b_i + c')$, though researchers differ on whether one should use actual or absolute values for the path coefficients a and b, and on whether one should "trim" the model on the basis of significance testing before estimating this proportion. We used the $(c - c') \div c$ formula here because it is more parsimonious and seems to be less controversial.

equal to the actual value of the feedback when the goal was met or exceeded and equal to zero when performance was below the goal). The additional analyses suggest that the downward goal-adjustment process following negative feedback was somewhat stronger than the discrepancy-creation process following positive feedback. Across the four samples, the mean standardized Level 1 regression coefficient for predicting goals with negative feedback was .37, and the corresponding mean estimate for positive feedback was .26. The effect of positive feedback on goals was not statistically significant in Sample 1; all other effects were significant at $p < .01$.[6]

The mediation hypothesis (Hypothesis 2) specified that PA and NA mediate part of the relationship between feedback and subsequent goals. Model 1 estimated the magnitude of the within-individual effect of feedback on goals, and, as noted, it showed that feedback did influence goals within individuals. In addition, within individuals, feedback significantly predicted both PA and NA across the full range of feedback scores (the standardized regression coefficients were $\gamma^*_{PA} = .23$, $p < .01$ and $\gamma^*_{NA} = -.17$, $p < .01$; $\gamma^*_{PA} = .11$, $p < .01$ and $\gamma^*_{NA} = -.10$, $p < .02$; $\gamma^*_{PA} = .29$, $p < .01$ and $\gamma^*_{NA} = -.29$, $p < .01$; $\gamma^*_{PA} = .17$, $p < .01$ and $\gamma^*_{NA} = -.15$, $p < .01$ for Samples 1–4, respectively; these results are not shown in the tables). As noted, to test whether PA and NA mediate part of the relationship between feedback and subsequent goals, we estimated Model 2, which included the two affect variables as within-individual predictors (i.e., the variables were centered at the individuals' means) of goals, in addition to the feedback predictor.

The parameter estimates for Model 2 showed that PA did predict goals ($\gamma_{20} = .51$, $p < .001$) in Sample 1, whereas NA did not significantly predict goals (see Table 3) in this sample. In Sample 1, the mediating effect of PA was highly significant ($z' = 3.80$, $p < .001$), whereas the mediating effect of NA was not significant. Comparing the parameter estimates for Model 1 and Model 2, it can be seen that the regression coefficient for predicting goals with feedback decreased from $\gamma_{10} = .16$ to $\gamma_{10} = .10$, which shows that introducing the two affect variables in the Level 1 regression resulted in a 38% reduction in the magnitude of the pooled regression coefficient for predicting goals with feedback. Similar results were obtained with the data from Samples 2 through 4. In each of the samples, PA positively predicted subsequent goals ($\gamma_{30} = .40$, $\gamma_{30} = .51$, $\gamma_{30} = .31$, for Sample 2, Sample 3 and Sample 4, respectively, $p < .01$), and the mediating effect of PA was also significant ($z' = 2.89$, $z' = 4.38$, $z' = 3.28$, $p < .01$). When the affect predictors were introduced in the regression, the magnitude of the pooled regression coefficient for predicting goals with feedback decreased by 33% in Sample 2, 39% in Sample 3, and 17% in Sample 4.

In sum, across the four samples, controlling for feedback, PA was a consistent predictor of goals; the effect of NA on goals was indeed negative, but it did not reach significance in any of the samples. Similarly, the mediating effect through PA was statistically significant in each sample, whereas the mediating effect through NA was not significant. Introducing the two affect variables as Level 1 predictors reduced the magnitude of the regression coefficient for predicting goals with feedback in each of the four samples—this reduction ranged from 17% to 39%, with a mean of 32%. We interpret these results as generally supportive of Hypothesis 2; the mediation effect was realized mainly through PA.

As we mentioned in the introduction, it is possible that goal difficulty moderates the impact of previous performance feedback on affect. To investigate the effect of the combination of goal difficulty and performance feedback on affect, we performed additional analyses in which we regressed PA/NA on feedback, previous goal, and the interaction between feedback and the previous goal within individuals (at Level 1) in all four samples (we centered both the feedback and the previous goal variables relative

Table 1
Study 1: Parameter Estimates and Variance Components for the Null Model

Sample/ parameters	Average goal (γ_{00})	Within-individual variance in goals (ρ^2)	Between-individual variance in goals (τ_{00})
Sample 1	61.34**	197.28	373.84**
Sample 2	66.55**	138.96	259.20**
Sample 3	54.52**	229.98	493.98**
Sample 4	64.91**	121.30	267.63**

Note. Sample 1 ($n = 163$) comprised participants in the possible uses-real feedback condition, Sample 2 ($n = 193$) included those in the possible uses-manipulated feedback condition, Sample 3 ($n = 178$) included those in the Remote Associates Test (RAT)-real feedback condition, and Sample 4 ($n = 211$) included individuals in the RAT-manipulated feedback condition. Average goal (γ_{00}) is the pooled intercept representing the average goal across individuals and trials.
** $p < .01$.

Table 2
Performance Levels and Variance Components for the Study 1 Data

Sample/ parameters	Average level (γ_{00})	Within-individual variance (ρ^2)	Between-individual variance (τ_{00})
Sample 1	11.89**	20.31	16.99**
Sample 2	10.95**	14.76	21.37**
Sample 3	1.80**	1.36	0.38**
Sample 4	1.73**	1.14	0.49**

Note. Sample 1 ($n = 163$) comprised participants in the possible uses-real feedback condition, Sample 2 ($n = 193$) included those in the possible uses-manipulated feedback condition, Sample 3 ($n = 178$) included those in the Remote Associates Test (RAT)-real feedback condition, and Sample 4 ($n = 211$) included individuals in the RAT-manipulated feedback condition. Maximum performance score was 20 for Sample 1 and Sample 2 (on the possible uses task) and 5 for Sample 3 and Sample 4 (there were five RAT problems). Average level (γ_{00}) is the pooled intercept representing the average performance score across individuals and trials.
** $p < .01$.

[6] Comparing the strength of the estimates for the negative feedback–goals and the positive feedback–goals relationships is not straightforward. First, whether feedback is coded negative or positive depends, for each trial, on each individual's goal and performance; thus, the two estimates represent different combinations of individuals (e.g., some consistently perform poorly or set very high goals and thus always receive negative feedback). Second, the two estimates involve different ranges of goals with different within-individual variances. Third, the feedback scores must be centered before constructing the two dummylike feedback variables and, consequently, the between-individual variance in the two feedback variables is not exactly zero.

Table 3
Study 1: Parameter Estimates and Variance Components for Model 1 and Model 2

Model and sample	γ_{00}	γ_{10}	γ^*_{10}	γ_{20}	γ^*_{20}	γ_{30}	γ^*_{30}	ρ^2	τ_{00}
Model 1									
Sample 1	61.34**	0.16**	0.20**					176.74	376.78**
Sample 2	66.59**	0.15**	0.17**					126.06	261.09**
Sample 3	54.52**	0.18**	0.27**					204.45	497.78**
Sample 4	64.92**	0.18**	0.22**					104.68	270.50**
Model 2									
Sample 1	61.34**	0.10**	0.12**	0.51**	0.25**	0.18	0.07	136.18	383.10**
Sample 2	66.60**	0.10**	0.11**	0.40**	0.20**	−0.14	−0.05	80.04	268.54**
Sample 3	54.53**	0.11**	0.17**	0.51**	0.24**	−0.18	−0.07	154.98	505.21**
Sample 4	64.93**	0.15**	0.18**	0.31**	0.16**	0.05	0.02	94.94	272.13**

Note. Sample 1 ($n = 163$) comprised participants in the possible uses-real feedback condition, Sample 2 ($n = 193$) included those in the possible uses-manipulated feedback condition, Sample 3 ($n = 178$) included those in the Remote Associates Test (RAT)-real feedback condition, and Sample 4 ($n = 211$) included individuals in the RAT-manipulated feedback condition. γ_{00} = pooled intercept; γ_{10} = pooled slope for predicting goals with feedback; γ_{20} = pooled slope for predicting goals with positive affect; γ_{30} = pooled slope for predicting goals with negative affect (γ^*_{10}, γ^*_{20}, γ^*_{30} = standardized slopes, obtained using the within-individual standard deviations of the criterion and the predictor variables).
* $p < .05$. ** $p < .01$.

to individuals' respective means before computing the interaction term, and we controlled for previous affect [the affect scores for the previous trial] because previous goals are influenced by previous affect). Unfortunately, these analyses did not permit a reliable assessment of the moderating effect of goal difficulty because of the low reliability of the Level 1 coefficient for the interaction term likely caused by the small number of trials.

Discussion

The results of the study supported the hypotheses. First, the results show that performance feedback does predict goal regulation within individuals, as predicted by Hypothesis 1. We found evidence for both downward goal revision following negative feedback, and upward goal revision (discrepancy creation) following positive feedback. With respect to the upward goal-revision process, these results are consistent with the positive-discrepancy-creation arguments of Phillips et al. (1996). The findings for both the downward and the upward goal-revision processes replicate the results reported by Williams et al. (2000) in their longitudinal study of varsity track and field athletes. Of note is the fact that the feedback–goals effect was supported regardless of whether feedback was accurate or manipulated, which suggests that stimulating positive discrepancy creation by using manipulated or positively framed feedback is feasible. The strength of the feedback–goals relationship was virtually identical for accurate and manipulated feedback: .16, compared with .15 for Sample 1 versus Sample 2 and .18 for both Sample 3 and Sample 4.

Second, and perhaps most important, the data collected for this study strongly support the contention that the experience of basic affect is an important mechanism that explains the relationship between feedback and future goals, as specified in Hypothesis 2. That is, in each of four samples, we found that affect (mainly PA) mediated a significant proportion of the within-individual relationship between feedback and goals, and the mediating path through PA was highly significant in each of the four samples. In addition, as compared with feedback concerning performance on the previous trial, current PA explained a larger proportion of the within-individual variance in goals in three of the four samples used in this study (23% vs. 11%, 24% vs. 10%, 20% vs. 12%, and 12% vs. 13% in Samples 1–4, respectively). This finding shows the importance of current affect to goal setting, but also raises the question of what other influences on affect, independent of feedback, may predict subsequent goals, within a controlled setting such as the one used in this study. Additional analyses revealed that a trial effect was present in the PA scores (across trials, PA systematically decreased). When controlling for the trial effect, feedback explained more variance in goals than PA in three of the four samples (across the four samples, feedback predicted an average of 11% of the within-individual variance in goals, and PA predicted 10%).[7]

Because the design of the study and the data analyses enabled us to separate between- and within-individual differences in goal magnitudes, the results of this study are particularly important for understanding goal regulation across time. That is, these results show that goal variation within individuals is responsible for a third of the total variance (both within and between individuals) in goals, and—more important—that the within-individual variance can be explained with feedback and with affect. To our knowledge, this is the first empirical attempt to explain the link between feedback, affect, and goals across time in a multilevel study that enabled precise partitioning of within- and between-individual variance.

Study 2

Study 1 provided support for the effect of feedback on goals within individuals (Hypothesis 1) and for the mediating role of affect (Hypothesis 2). However, the upward goal-revision effect (following positive performance feedback) was not supported in one of the samples, and it was weaker in magnitude than the magnitude of the downward goal-revision process that followed negative feedback in the other three samples. The purpose of the

[7] The trial trend did not influence the substantive results of the study. Post hoc analyses show that, controlling for trial, feedback still predicted subsequent goals and affect mediated this relationship within individuals.

second study was to replicate the findings of the first study with a different task and to investigate whether upward goal revision is more or less prevalent when the focal participant's performance is not compared with others' performance.

It is possible that comparative feedback (relative to others' performance) is less likely to lead to upward goal revisions and positive discrepancy creation than nominal feedback (concerning one's own performance), as a result of less perceived personal control in outperforming others (i.e., outperforming others depends on others' performance; as noted, performance attributions should moderate the impact of feedback on goal regulation). In other words, it is possible that after receiving positive performance feedback, people are more likely to create positive goal–performance discrepancies by further increasing their goals when the broad goal is to improve their own performance than when the broad goal is to outperform others. Given the role that social comparison processes have in the regulation of motivation (e.g., Bandura & Jourden, 1991), an opposite effect can also be predicted: As social comparison processes are important to self-appraisals of mastery across time (e.g., progressive mastery vs. progressive decline; Bandura & Jourden, 1991), comparative feedback may have stronger effects of goal regulation than nominal feedback. We will investigate this issue on an exploratory basis.

The second study was similar to the first, with the following exceptions: (a) It involved a different task, (b) performance feedback reflected actual performance for all participants, and (c) both the goals and the feedback were framed either relative to the focal participant's own performance (nominal goals and feedback) or relative to the performance of other participants (relative goals and feedback). Because performance on both tasks used in Study 1 assessed, to some extent, participants' creativity (e.g., Mednick, 1962), in Study 2 we used a task on which performance is determined more by knowledge (vocabulary) and persistence to examine whether the mediating role of affect is supported for noncreative tasks as well. The task involved listing words that contain a certain letter ("Please write as many words that contain the letter 'a' as you can, using the text boxes below. Do not include words that start with 'A'"). In addition, as mentioned, we used both relative and nominal feedback to examine whether the two types of feedback have different general effects on subsequent goals and whether the upward goal-revision mechanism is more prevalent when feedback is nominal or when it is comparative (relative to others' performance).

Method

As in the first study, participants completed an eight-trial Web-based experiment that asked them to successively report their current affective state, set a performance goal, and perform a task (generate words that contain a certain letter), for each trial.

Participants

Participants were 162 undergraduate students from a large introductory course in management at a public university. Participation in the study was completely voluntary, and individuals received extra credit points in return for their participation.

Experimental Design and Procedure

The data for the experimental trials were collected through an electronic interface. Participants logged on to a Web site, read a detailed description of the task and procedure, and were asked to report their momentary affective state and then to set a goal for the first trial task. There were two different versions of the goal-setting Web page. For the first version (relative goals), as in Study 1, the participants had the option to choose between nine different goal levels, ranging from 10% to 90%. The second version asked participants to set nominal goals by estimating the number of words they thought they would be able to generate in the task trial (between 0 and 40). After setting a goal for the first trial, participants were presented with the task; after submitting their solutions, they received performance feedback. Those who set relative goals received relative feedback; those who set nominal goals received nominal feedback. After receiving feedback, participants were asked to report their affect, and then they went on to the next trial.

Affect Measure

As in Study 1, the PANAS scales (Watson et al., 1988) were used to measure PA and NA. The internal consistencies reliability of the PA scores ranged between .93 and .96 across the eight trials; the reliability of the NA scores was between .90 and .94 across the trials.

Analyses

To test the hypotheses with the data collected in the second study, we modeled the data at two levels: within and between individuals. To ascertain whether multilevel modeling is appropriate for these data, we first estimated null models in each subsample to investigate whether sufficient within-individual variance in trial goals existed.

The analyses testing the first two hypotheses were identical to the analyses conducted to test these hypotheses in the first study. That is, we estimated Model 1 and Model 2 on each of the two Study 2 subsamples (i.e., relative goals and feedback [Sample 5] and nominal goals and feedback [Sample 6]). To test the significance of the mediation paths, we used the empirical distribution-based z' test developed by MacKinnon et al. (2002).

Results

Table 4 presents estimated parameter and variance components for the null model estimated in the two subsamples. Results showed there was significant between-individual variance in goals for each data set ($p < .01$ for both samples) and that a substantial proportion of the total variance in goal levels was within individuals (33.4% and 38.2% for Sample 5 and Sample 6, respectively). Thus, hierarchical modeling of these data was appropriate. Table 5 presents average levels of performance and variance components for each sample.

Table 4
Study 2: Parameter Estimates and Variance Components for the Null Model

Sample/ parameters	Average goal (γ_{00})	Within-individual variance in goals (ρ^2)	Between-individual variance in goals (τ_{00})
Sample 5	74.42**	196.85	392.98**
Sample 6	29.81**	65.03	105.16**

Note. Individuals in Sample 5 ($n = 77$) received relative feedback (in percentage points); those in Sample 6 ($n = 85$) received nominal feedback (the number of words they provided). Average goal (γ_{00}) is the pooled intercept representing the average goal across individuals and trials.
** $p < .01$.

Table 5
Performance Levels and Variance Components for the Study 2 Data

Sample/ parameters	Average level (γ_{00})	Within-individual variance (ρ^2)	Between-individual variance (τ_{00})
Sample 5	34.57**	64.14	94.55**
Sample 6	32.32**	64.30	60.24**

Note. Individuals in Sample 5 ($n = 77$) received relative feedback (in percentage points); those in Sample 6 ($n = 85$) received nominal feedback (the number of words they provided); maximum performance score was 40 for both samples. Average level (γ_{00}) is the pooled intercept representing the average performance score across individuals and trials.
** $p < .01$.

The results presented in Table 6 show that feedback indeed predicted goals within individuals in both samples (Model 1), which supports Hypothesis 1. As we did in Study 1, we conducted additional analyses to obtain distinct estimates for the negative feedback–goals and the positive feedback–goals relationships (these results are not provided in the tables). It is interesting that, whereas the negative feedback–goals relationship was significant in both samples, the positive feedback–goals relationship was significant only when goals and feedback were nominal (in Sample 6). Thus, it appears that, within the research paradigm used in this study, the positive discrepancy creation mechanism is more prevalent when the broad goal is improving one's own performance, as compared with outperforming others. Future research, in replicating these results, should examine moderating conditions such as the usefulness of feedback for the regulation of effort and the framing of the task.

The within-individual mediation hypothesis (Hypothesis 2) was supported in both samples. First, feedback did predict both PA and NA within individuals across the full range of feedback scores, in both samples (the regression coefficients were $\gamma_{PA} = .10$ [$p < .01$] and $\gamma_{NA} = -.06$ [$p < .01$], and $\gamma_{PA} = .28$ [$p < .01$] and $\gamma_{NA} = -.21$ [$p < .01$], for Sample 5 and Sample 6, respectively). Second, the magnitude of the regression coefficient for predicting goals with feedback on previous performance decreased by 44% and 29% upon introduction of the affect variables in the Level 1 regression, for Samples 5 and 6, respectively. The mediating effect through PA was significant in both samples ($z'_{PA} = 1.98$ [$p < .05$] and $z'_{PA} = 1.67$ [$p < .05$], in Samples 5 and 6, respectively), whereas the mediating effect through NA was significant only in Sample 6 ($z'_{NA} = 2.02$, $p < .05$).

Discussion

Like the first study, the second study offered support for the hypothesized relationship between feedback and subsequent goals (Hypothesis 1), and for the mediating role of affect in this relationship (Hypothesis 2). Because we used a task with different requirements in this study (i.e., compared with the creative tasks used in the first study), the consistent results show that the within-individual feedback–affect–goals relationship is robust across the different types of tasks considered in these studies. Across the negative feedback range, both nominal and relative feedback predicted subsequent goals, whereas across the positive feedback range only nominal feedback predicted future goals (in Sample 5, characterized by relative goals and feedback, the positive feedback–goals relationship was weak and not significant). Though this result needs to be replicated, it suggests that the discrepancy-production process is stronger when goals are set and feedback is provided in reference to individuals' own performance. It is also possible that because the nominal feedback indicated task performance (the number of words provided) that could have been easily tracked by the respondents themselves (and thus they could verify the accuracy of the external feedback), positive discrepancy creation may be more prevalent when accurate self-assessment of performance is possible or when external feedback is very credible (can be verified). These are issues that deserve further investigation.

General Discussion

Findings

The findings in the two studies presented herein provide two important insights into the psychological mechanisms involved in the dynamic self-regulation of goals. First, the present results show that performance feedback does predict goal regulation within individuals. In two studies, we found strong evidence for both downward goal revision following negative feedback and upward goal revision following positive feedback, which is consistent with goal-setting and social–cognitive theory (e.g., Bandura & Locke,

Table 6
Study 2: Parameter Estimates and Variance Components for Model 1 and Model 2

Model and sample	γ_{00}	γ_{10}	γ^*_{10}	γ_{20}	γ^*_{20}	γ_{30}	γ^*_{30}	ρ^2	τ_{00}
Model 1									
Sample 5	74.42**	0.18**	0.27**					97.41	407.12**
Sample 6	29.79**	0.34**	0.32**					39.79	108.81**
Model 2									
Sample 5	74.42**	0.10*	0.15*	0.28*	0.14*	−0.21	−0.06	84.90	413.04**
Sample 6	29.78**	0.24**	0.23**	0.15*	0.14*	−0.28*	−0.17*	20.23	111.66**

Note. Individuals in Sample 5 ($n = 77$) received relative feedback (in percentage points); those in Sample 6 ($n = 85$) received nominal feedback (the number of words they provided). γ_{00} = pooled intercept; γ_{10} = pooled slope for predicting goals with feedback; γ_{20} = pooled slope for predicting goals with positive affect; γ_{30} = pooled slope for predicting goals with negative affect (γ^*_{10}, γ^*_{20}, γ^*_{30} = standardized slopes, obtained using the within-individual standard deviations of the criterion and the predictor variables).
* $p < .05$. ** $p < .01$.

2003) and with previous findings about goal change (e.g., Phillips et al., 1996; Williams et al., 2000). Because the feedback–goal revision results were obtained by separating within- and between-individual variance, this finding reflects strictly within-individual self-regulation, which is a new contribution to the applied literature on task motivation.

Second, the results support the contention that basic affective reactions to feedback are important mechanisms that explain the relationship between feedback and future goals. This is the most important finding of this research project, and it has been supported in within-individual analyses using six independent samples totaling more than 900 participants, with three types of tasks, and with three types of performance feedback. Though this is not the first research to study the effects of performance feedback on affective constructs (e.g., Kanfer & Ackerman, 1989), it is the first empirical investigation into affective processes that explain goal and behavioral regulation (i.e., Kanfer & Ackerman [1989] studied self-reactions as a dependent variable) within individuals.

Implications for Theory Development

From a theoretical standpoint, this research advances understanding of the psychological mechanisms that individuals use in interpreting and responding to performance feedback. We have shown that feedback influences affect, which, in turn, influences subsequent goals. Conceptually, the feedback–affect–goals relationship should be moderated by causal attributions for the level of performance (Donovan & Williams, 2003; Ilgen & Davis, 2000) and by the credibility and acceptance of the feedback (e.g., Ilgen et al., 1979). Following goal nonattainment, for example, individuals should be more likely to exert more effort leading to performance improvements rather than decrease their goals when they attribute goal nonattainment to "effort or to situational conditions under the performer's control/influence" (Ilgen & Davis, 2000, p. 555), as compared with when they attribute goal nonattainment to uncontrollable external causes or to stable internal causes (Ilgen & Davis, 2000). Studies of such moderating influences would be fruitful extensions of the results presented herein.

Another mechanism important for goal regulation concerns the role of goal difficulty in moderating the impact of feedback on subsequent goal setting. As noted in the introduction, goal difficulty should moderate the positive discrepancy creation process in that after attaining extremely difficult goals on a focal task, individuals may shift their attention to different tasks instead of further increasing their goals for the focal task. Because of the serial nature of our data and the dependencies among variables (goal-attainment feedback depends on the goal level for Trial $t - 1$; goal difficulty equals the goal level for Trial $t - 1$, and the goal level for Trial t [the criterion] is serially dependent on goal level for Trial $t - 1$), we could not investigate this expectation with the present data. Future research should investigate this issue using research designs giving manipulated goal-attainment–discrepancy feedback (vs. performance feedback, as we gave in these studies) across varying levels of goal difficulty across trials.

Though our studies were not specifically designed to examine control theory, as in previous research (e.g., Phillips et al., 1996; Williams et al., 2000), the present results suggest that social–cognitive theory more adequately explains motivational self-regulation across time, compared with control theory. That is, the present results suggest that, in general, after meeting or exceeding their goals, individuals do not maintain their goal level and decrease effort in order to minimize the positive discrepancy between performance and goals, but rather set higher goals that motivate them to increase performance, as predicted by social–cognitive theory.

However, of note is the Study 2 finding which suggests that people may not always create such positive discrepancies after receiving positive feedback—when the feedback tells them only that they have performed well relative to others. Perhaps when performance relative to others is satisfactory, individuals turn their attention to other tasks, as suggested by control theory. Because we did find evidence for positive discrepancy creation under conditions of relative goals and feedback in Study 1, it is possible that task difficulty or other task characteristics interact with the type of goals and feedback involved (nominal vs. relative) in predicting whether individuals will create positive discrepancies following positive feedback. Future research should study the positive discrepancy-creation mechanism with tasks of varying difficulty and with both nominal and relative goals and feedback to replicate this finding and further investigate the issue.

Finally, the conceptual model of self-regulatory motivation presented here is a dynamic model that makes predictions specifically focused at the within-individual level. As noted in the introduction, traditional goal-setting theory research has had a between-individual focus (explaining why some people perform better than others). The present research builds on the emerging stream of research in goal regulation across time (e.g., Donovan & Williams, 2003; Williams et al., 2000), and advances goal-setting theory by adding predictions at the within-individual level. Furthermore, to the extent to which "stable and distinct patterns of intraindividual variability in behavior" (Shoda et al., 1994, p. 682) exist, this model can and should be extended to include dispositions as predictors of within-individual processes (processing dynamics; Mischel & Shoda, 1998). In this respect, personality traits such as Neuroticism and Extraversion, which have been associated with behavioral inhibition and approach, respectively (Carver, Sutton, & Scheier, 2000), may predict, nomothetically, parameters of individuals' characteristic self-regulatory processes such as the magnitude of within-individual variation in affect and goals or the extent to which these constructs covary within individuals and across time.

Implications for Practice

From a practical perspective, understanding how individuals interpret feedback should help in designing feedback delivery systems at work. The first practical implication concerns goal regulation following performance that has met or exceeded the goal. Theories based on simple discrepancy-reduction mechanisms suggest that positive feedback should be withheld because employees will decrease their effort after receiving such positive feedback. The present results suggest that this may not be the case, as "notable attainments bring temporary satisfaction, but people enlist new challenges as personal motivators for further attainments" (Bandura, 1997, p. 130).

Second, the results presented in this article suggest that negative feedback is beneficial only when the magnitude of the discrepancy between performance and standard is relatively small. Though

examining when negative feedback becomes demotivating was not the purpose of this investigation, it is clear that at some point, after repeated or extreme negative feedback, most individuals give up, or substantially lower their aspirations. In practice, this issue is particularly relevant for performance appraisal systems that impose a forced distribution on the appraisal ratings because such systems deliver negative feedback to a predetermined proportion of employees. On the basis of the present results, we speculate that forced distribution systems that deliver extreme negative feedback or large-magnitude negative discrepancy feedback (even to a small proportion of employees) are detrimental to the motivation of those receiving such feedback. Perhaps such systems based on a priori performance distributions should be designed to include only mild negative feedback or discrepancy feedback of small to moderate magnitudes.

In addition, as an anonymous reviewer pointed out, examining when people exert more effort toward the same goal (given feedback indicating goal nonattainment) rather than lowering their goal is an important research question in itself. It is entirely possible that individual differences in the inflection point (the point when individuals switch from exerting increased effort to lowering their goal) exist, and these differences could be predicted by dispositional factors. Finding empirical support for such predictions would provide evidence for a model that integrates processing dynamics and behavioral dispositions; testing such a model would be an initial step toward reconciling individual differences and processing dynamics theories of human personality and functioning (see Mischel & Shoda, 1995, 1998).

Limitations

An important limitation of this research concerns the potential lack of generalizability of the findings associated with laboratory experiments that use student participants. However, we believe that the novelty of the research questions and of the methods through which we attempted to answer them justify an initial examination in controlled settings. Another possible limitation concerns the performance task used in the experiments conducted to seek support for the hypotheses. The brainstorming task used in the first study, for example, though it has been extensively used in previous laboratory research on goal setting (e.g., Harkins & Lowe, 2000; Lee & Bobko, 1992; Locke, 1982), is a relatively simple task, and thus the results may not generalize to other performance situations. Future research should examine whether the findings presented in this article generalize to different research settings and different participant populations. In addition, as suggested by an anonymous reviewer, future research should investigate whether task differences in terms of complexity, requirements for ongoing learning (vs. recall of previously learned information), and intrinsic interest to the participant moderate the within-individual processes studied in this article.

Contributions

The limitations of the studies described in this article should be evaluated in light of the contributions of this research. We believe the studies presented here contribute to the general literatures on affect and behavior, goal setting and self-regulation, and their implications for task performance, and to the emerging literature on the role of emotional experiences in motivational self-regulation. This research contributes to these literatures in at least three ways:

First, this research contributes to the literature on self-regulation by taking a fresh perspective on the study of self-regulatory processes concerning goal regulation and investigating such processes within individuals and across time. Within a multilevel framework, we have shown that goals vary substantially within individuals (this is variance that has been missed [treated as error variance] in most past goal-setting research), and the within-individual variation is not stochastic error—it can be predicted with feedback and affect. In addition, affect (mostly PA) mediated a substantial proportion of the feedback–subsequent goals relationship within individuals (average of 33.33% across the six samples), and the mediating effect was statistically significant in each of the six independent samples.

Both affect and goals are constructs that exhibit important variations across time. The present results show that affect and goals are dynamically related within individuals in that they vary in synchrony across time. To be sure, this is not the first study examining affect or goals across time. But, to our knowledge, it is the first study attempting to explain goal variations within individuals through momentary affect. Previous research suggested that fluctuations in state affect may translate into fluctuations in behavior at work (e.g., George & Brief, 1992; Ilies & Judge, 2002; Weiss & Cropanzano, 1996). The present results show that goal variations were predicted by affect. It follows that goal regulation, as a process, is likely to explain part of the connection between affect; behavior; and, ultimately, performance.

On a conceptual level, recently developed models of behavior in organizations, such as Weiss and Cropanzano's (1996) AET or Spector and Fox's (2002) model of voluntary work behavior, place affect and emotions at their center. If affect impacts behavior, and "this does not usually happen in a reflexive or nonpurposive manner with humans" (Spector & Fox, 2002, p. 273), the process of goal regulation is likely to explain, in part, the links between emotion, action tendencies, and intentional behavior. Looking at our results through an AET lens, performance feedback is an affective event that influences performers' affective states and, through goals, their behavior. As noted, the present results support goal-regulation predictions derived from social–cognitive theory, which maintains that intentionality, forethought, self-reactiveness, and self-reflectiveness are core features of human agency (Bandura & Locke, 2003). By studying how individuals react to events such as feedback in terms of affect and emotions, and the effect of these self-reactions on goals and intentions, we can better understand the implications of affective events on behavior from an agency perspective.

Second, we developed a model of self-regulation based on goal setting, feedback, and behavioral motivation theory. By integrating these separate theories, we gave affect and emotions, which are constructs central to behavioral motivation theory, their rightful place in dynamic goal regulation. In the light of the recent interest in examining affective processes in organizational behavior, such integration is timely and should stimulate future research on the complex links among feedback, affect, goals, and behavior.

Third, this research contributes to goal-setting theory by adding to the previous efforts examining the goal-revision process following feedback. That is, the studies reported here add to the accu-

mulating evidence of the goal-revision mechanisms that individuals use to regulate their motivation and behavior, and the results offer evidence for the importance of affect for both the downward and the upward goal-revision processes. Further research can build on these results by examining emotions as mediators of the goal-revision process, and integrating these findings with other concepts found to be important, such as self-efficacy, attributions, and threats to self-esteem.

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Appendix A

Remote Associates Test: Instructions and Sample Items

Instructions

For this task you will be presented with three words and asked to write a fourth word which is *related* to *all three*.

For example, what word do you think is related to these three?

A. cookies sixteen heart

The answer in this case is "sweet." Cookies are sweet; sweet is part of the phrase "sweet sixteen," and part of the word "sweetheart."

Here is another example:

B. poke go molasses

You should have written "slow" in the space provided. "Slow poke," "go slow," "slow as molasses." As you can see, the fourth word may be related to the other three words for various reasons.

Try these next two:

C. surprise line birthday

D. base snow dance

The answers for the last two examples are "party" and "ball." As you can see, the fourth word may be related to the other three for various reasons.

You will be presented with 8 successive trials, each containing five groupings of words. Some of these are not easy and you will have to think about them for a while. You have 5 minutes for each trial.

Sample Items

A. big leaf shade
B. playing credit report
C. off trumpet atomic
D. high book sour
E. blank white lines

Appendix B

Equations for Hierarchical Linear Models

Null Model

$$\text{Level 1: } Goal_{ij} = \beta_{0j} + r_{ij} \quad (1)$$
$$\text{Level 2: } \beta_{0j} = \gamma_{00} + U_{0j} \quad (2)$$

where

$Goal_{ij}$= individual j's goal for trial i; β_{0j}= average goal level for individual j; γ_{00} = grand mean of goal scores; r_{ij}= deviations of trial goals from individuals' respective means, for each individual; ρ^2 = variance(r_{ij}) = within-individual variance in goals; U_{0j}= deviations of individuals' mean goal from the grand mean. τ_{00} = variance(U_{0j}) = between-individual variance in goals.

Model 1

$$\text{Level 1: } Goal_{ij} = \beta_{0j} + \beta_{1j}(FB_{ij}) + r_{ij} \quad (3)$$
$$\text{Level 2: } \beta_{0j} = \gamma_{00} + U_{0j} \quad (4)$$
$$\beta_{1j} = \gamma_{10} + U_{1j} \quad (5)$$

where

$Goal_{ij}$= individual j's goal for trial i; FB_{ij}= individual j's feedback for performance on trial i-1; β_{0j}= level 1 intercept for individual j. β_{1j}= individuals' slopes for predicting their goal with the feedback concerning their previous performance, across time; γ_{00}=pooled intercept; γ_{10}=pooled slope for predicting goals with feedback.

Model 2

$$\text{Level 1: } Goal_{ij} = \beta_{0j} + \beta_{1j}(FB_{ij}) + \beta_{2j}(PA_{ij}) + \beta_{3j}(NA_{ij}) + r_{ij} \quad (6)$$
$$\text{Level 2: } \beta_{0j} = \gamma_{00} + U_{0j} \quad (7)$$
$$\beta_{1j} = \gamma_{10} + U_{1j} \quad (8)$$
$$\beta_{2j} = \gamma_{20} + U_{2j} \quad (9)$$
$$\beta_{3j} = \gamma_{30} + U_{3j} \quad (10)$$

where

$Goal_{ij}$= individual j's goal for trial i; FB_{ij} = individual j's feedback for performance on trial i-1; PA_{ij} = momentary positive affect score reported by individual j before setting the performance goal for trial i; NA_{ij} = momentary negative affect score reported by individual j before setting the performance goal for trial i; β_{1j} = individuals' slopes for predicting their goal with feedback concerning their previous performance, across time; β_{2j} = individuals' slopes for predicting their goal with their momentary PA score; β_{3j} = individuals' slopes for predicting their goal with their momentary NA score; γ_{00} = pooled intercept; γ_{10} = pooled slope for predicting goals with feedback; γ_{20} = pooled slope for predicting goals with PA; γ_{30} = pooled slope for predicting goals with NA.

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