Differential Engagement of Self-Reactive Influences in Cognitive Motivation

ALBERT BANDURA AND DANIEL CERVONE

Stanford University

The present research tested the hypothesis that self-reactive influences exert differential impact on motivation as a function of the level and direction of discrepancy between a comparative standard and attainments. Subjects pursued a challenging standard in a strenuous activity and received preselected feedback that their effort fell either markedly, moderately, or minimally short of the standard, or that it exceeded the standard. They then recorded their perceived self-efficacy, self-evaluation, and self-set goals, whereupon their motivational level was measured. In accord with prediction, perceived self-efficacy contributes to motivation across a wide range of discrepancy conditions. Self-evaluation operates as an influential motivator only when attainments fall markedly or moderately short of a comparative standard. Self-set goals contribute to motivation at all discrepancy levels except when attainments are markedly discrepant from the standard. The relevant self-influences operating in concert at particular discrepancy levels explain a substantial amount of the variance in motivation. © 1986 Academic Press, Inc.

The capacity to exercise self-influence by personal challenge and reaction to one's own attainments provides an important cognitive mechanism of motivation. Motivation through pursuit of challenging standards has been the subject of extensive research on goal setting. Different lines of investigation provide substantial converging evidence that explicit challenging goals enhance and sustain motivation (Locke, Shaw, Saari, & Latham, 1981). Research has also begun to delineate the self-reactive influences by which personal standards create these powerful motivational effects (Bandura & Cervone, 1983; Locke, Frederick, Lee, & Bobko, 1984).

Motivation based on standards involves a cognitive comparison process. When people commit themselves to explicit standards or goals, the perceived negative discrepancies between performance and the standard they seek to attain create self-dissatisfaction that serves as a motivational inducement for enhanced effort. Activation of self-evaluative reactions by internal comparison requires both personal standards and knowledge.

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about one's performance level. When these constituent factors are systematically varied, neither knowledge of performance without standards nor standards without knowledge of performance has lasting motivational impact (Bandura & Cervone, 1983; Becker, 1978; Strang, Lawrence, & Fowler, 1978). Studies in which self-evaluative reactions are measured antecedently to motivational change provide more direct evidence that self-evaluation contributes to motivation (Bandura & Cervone, 1983; Locke, Cartledge, & Knerr, 1970). The findings show that the higher the self-dissatisfaction with substandard attainments, the greater is the subsequent intensification of effort.

Perceived self-efficacy is another cognitive factor that plays an influential role in the exercise of personal agency in ways that affect motivation. It is partly on the basis of self-percepts of efficacy that people choose what challenges to undertake, how much effort to expend in the endeavor, and how long to persevere in the face of difficulties (Bandura, 1982, 1986). Whether perceived discrepancies between personal standards and attainments are motivating or discouraging is likely to be determined by the strength of people's perceived capabilities to attain the standards they have been pursuing. Those who distrust their capabilities are easily discouraged by failure, whereas those who are highly assured of their efficacy for goal attainment will intensify their efforts when their performances fall short and persevere until they succeed. That strong belief in one's efficacy heightens perseverance in difficult pursuits is corroborated by evidence across diverse activity domains for both children and adults (Bandura & Cervone, 1983; Brown & Inouye, 1978; Cervone & Peake, 1986; Schunk, 1984; Weinberg, Gould, & Jackson, 1979).

The goals people set for themselves at the outset of an endeavor are likely to change, depending on the pattern and level of progress they are making (Campion & Lord, 1982). They may maintain their original goal, lower their sights, or adopt an even more challenging goal. Thus, the third constituent self-influence in the regulation of motivation concerns the goals people set for themselves in response to feedback about their attainments. Csikszentmihalyi (1979) examined what it is about activities that fosters continuing deep engrossment in life pursuits. The common factors found to be conducive to enduring motivation include adopting challenges in accordance with one's perceived capabilities and having informative feedback about how one is doing. Self-set goals are accorded a significant role in Locke's (1968) goal theory. As long as personal goals appear reachable, the more challenging are the standards people continue to set for themselves, the higher is their performance motivation (Garland, 1983; Locke et al., 1984).

Different theorists agree that goal difficulty raises performance level, but they differ in how they view the nature of the relationship. Expectancy-valence theory predicts a curvilinear relationship between goal dif-
ficulty and performance, with both effort and performance being highest for moderately difficult goals (Atkinson, 1964; Feather, 1982; Heckhausen, 1977). In contrast, Locke (1968) postulates an increasing linear function between goal level and performance motivation. However, the linear relationship is assumed to hold only if people accept the goals and are committed to them.

Each of the three self-influences—self-evaluation, perceived self-efficacy, and self-set goals—has been shown to affect level of motivation. The next fruitful stage for research is to further our understanding of how these self-influences operate in concert to affect motivation when the results of people's efforts diverge in varying degrees from standards within their reach. The present research was designed to test hypotheses that the constituent self-influences contribute differentially to motivation, depending on the direction and magnitude of the discrepancy between selected standards and attainments.

Subjects performed a strenuous physical activity on an ergometric device with the goal of sustaining at least a 50% increase in effort above their previous level. This goal level was selected because it was regarded as highly challenging but potentially reachable (Bandura & Cervone, 1983). Following performance on the ergometer, subjects received preselected feedback that their effort fell either markedly, moderately, or minimally short of their standard, or that it exceeded the standard. They then recorded how dissatisfied they would be were they to attain the same level again, their perceived efficacy for goal attainment, and their self-set goal for their next attempt. The level of effort they mobilized in the pursuit was then measured.

Self-dissatisfaction is likely to be activated most strongly when efforts fall either markedly or moderately short of the standard one seeks to attain. It is a cause for satisfaction when one has just about accomplished a highly challenging standard or has surpassed . People who would be quite satisfied to equal their prior attainment in a future attempt will mobilize the effort needed to do as well, whereas those who would be dissatisfied with a similar subsequent level of attainment will intensify their efforts to do better. Hence, it was hypothesized that self-dissatisfaction would operate as a motivator mainly under negative discrepancies in the marked to moderate range.

Perceived self-efficacy to attain a challenging standard can enhance and sustain motivation, whatever the level of prior attainment might be. The research cited earlier amply documents that perseverant effort is partly regulated by assurance in one's efficacy to master a given challenge. It was, therefore, predicted that the strength of perceived self-efficacy would contribute to motivation at all discrepancy levels.

When attainments fall far short of a standard considered reachable, people would have no inclination to set even more taxing goals for them-
selves. Rather, their self-set goals are likely to remain at or near the standard they have set out originally to fulfill. At the level of large discrepancy, variation in effort would be accounted for predominantly by the level of self-dissatisfaction and the strength of perceived self-efficacy for goal attainment. However, some people set their sights even higher when their attainment diverges moderately (Bandura & Cervone, 1983) or minimally from the standard, so that self-set goals come into play as determinants of how much effort is to be mobilized in the pursuit. Personal goal setting would similarly function as an important contributor to motivation when attainments surpass the challenge. After fulfilling a difficult standard, subsequent motivation will depend on the level at which future aims are set. To the extent that people raise their standards, they create new motivating challenges for themselves. For these reasons, it was hypothesized that personal goal setting would contribute to motivation at all discrepancy levels except at the large substandard one.

METHOD

Subjects

The subjects were 44 males and 44 females drawn from an introductory psychology course. Twenty subjects, equally divided by sex, were randomly assigned to each of four treatment conditions. Eight subjects were similarly randomly assigned to a self-judgment control condition to determine whether recording one's self-satisfaction, self-percepts of efficacy, and self-set goals, in itself, had any reactive effects on performance motivation. Two such subjects were randomly paired with two experimental subjects from each of the four treatment conditions for this purpose.

General Procedure and Apparatus

The introductory instructions, which were identical for all subjects, presented the experiment as part of a research program ostensibly designed to develop performance tasks for planning and evaluating postcoronary rehabilitation programs. It was explained that the information being gathered would not only aid development of diagnostic devices, but also provide normative data on physical stamina at different age levels. The relationship between cardiovascular fitness and performance on aerobic tasks was then described to lend further credibility to the activity.

The task for measuring changes in motivation was a Schwinn Air-Dyne ergometer, an exercise device requiring effortful activity. The ergometer is operated by alternatively pulling and pushing two arm levers. The force exerted rotates a wheel with fanlike wind vanes creating resistance to the physical effort. The ergometer was connected by a cable to a work load indicator, with an odometer, in the adjoining room. The odometer readings were recorded at 1-min intervals during the 5-min sessions. To measure precisely the effort expended during the 5-min sessions, the
odometer readings were converted to kilopond meter units. Kilopond units are indices of effort expenditure that consider both the speed at which the ergometer is operated and the exponential increase in air resistance with increasing speed. The five sets of kilopond scores resulting from the five 1-min intervals were summed to obtain a total score of effort expenditure for each session.

The ergometer task, which in previous research proved to be ideally suited for studying sustained effort (Bandura & Cervone, 1983), was chosen for a number of reasons. The major defining property of motivation is the level of effort mobilized and sustained in a pursuit. The ergometer measures changes in effort precisely, with virtually no upper limit. Because it requires considerable effort over extended periods, the task provides a stringent test of how the postulated determinants and mechanisms affect the mobilization and maintenance of motivation. Moreover, the task itself provides little implicit feedback of the cumulative level of effort expended over a given period, which allows for credible prearranged feedback. Because subjects cannot easily discern quantitative variations in their physical output across sessions, feedback information can be systematically varied without jeopardizing the perceived veridicality of the feedback. This effortful activity combined with the rationale is highly credible.

Before starting the experiment, subjects completed a background questionnaire asking about their age, sex, height, weight, and smoking habits. It was included both to add further credence to the prior instructions and to increase the naturalness of the assessment, in a later session, of self-reactions imbedded among filler items ostensibly measuring other aspects of physical status. They also filled out a physical readiness questionnaire designed to exclude any subject for whom extended physical exertion would be medically contraindicated. Three subjects, who reported a history of cardiovascular problems, were excluded on this basis.

Subjects removed their watches to control for possible variations in the regulation of effort by checking the elapsed time. They were informed that each session would last 5 min but were not told how many sessions they would be asked to complete. The latter procedure was instituted to eliminate the possibility that subjects might intensify their effort in the third session if they knew it was their final attempt.

The experimenter concluded the general instructions by explaining that he would be in the adjoining room tending to the recording instruments during each session. The subject would be signaled when to begin and end each session via an intercom system.

**Baseline Session**

All subjects performed alone on the ergometer for a 5-min baseline pe-
period. Pretesting indicated that a 5-min session required substantial effort without being overly fatiguing.

A random order of assignment to treatment conditions within sex groupings was devised for the entire sample at the outset of the study. After each subject completed the baseline and the second session, the experimenter removed a cover card which revealed the condition to which the particular subject had been assigned. Thus, the experimenter had no prior knowledge of a subjects’ condition assignment during the baseline and the second session.

Goal-Setting and Discrepancy Variations

At the beginning of the second session, all subjects selected a goal for improved attainment in subsequent sessions. The experimenter explained that, in coronary rehabilitation programs, patients are assigned goals for increasing their physical activity. These goals vary in each case. Therefore, the subjects would perform the ergometer task with goals to shed light on the effects of this goal variability.

Subjects cannot actually choose what goal to pursue because those who choose high goals are likely to differ on other personal characteristics from those who opt for low goals. To avoid such confounding, goals must either be assigned by the experimenter or selected by subjects through an apparent choice procedure. In the present experiment goals were not simply assigned to subjects. Rather, they ostensibly selected their goal in a way that also controlled goal level across discrepancy conditions. They were told that in order to study goal levels representative of the range found in rehabilitation programs, they were to choose one goal from among a wide range of goal levels. It was explained that in rehabilitation programs, goals are set according to the patient’s current physical status. But since this physiological information was not available for the participants in the present study, there was no basis for assigning particular goals to particular subjects. Hence, subjects were simply to select one from among a variety of goals.

Different goal levels representing decrements and improvements, expressed in percentages above or below the baseline level, were printed on cards. After the subjects inspected the full range of goal levels, the experimenter placed all the goal cards in a cloth bag attached to a wooden rim and handle, shook the bag and presented it to the subject, who selected a goal. Unbeknown to subjects, they were selecting their goal from a preloaded compartment of goal cards, all of which designated a +50% increase in effort above the baseline level. A +50% goal level was chosen because it represented an attainable goal, and a performance discrepancy from it, in either direction, would appear credible. Although a large body of evidence reveals that assigned and self-selected goals are equally motivating (Latham & Yukl, 1975; Locke & Schweiger, 1979), the apparent
choice procedure was used to enlist a sense of commitment to a goal which, from the subjects’ perspective, they had some part in selecting. As Langer (1975) has shown, even choice on chance tasks instills a sense of personal determination. The apparent choice procedure was shown in a previous study (Bandura & Cervone, 1983) to serve well the dual function of ensuring goal equivalence and moderately high initial commitment to it.

To control for any possible experimenter bias, all the information for creating the requisite conditions for the main phase of the experiment was remotely presented via a video system. The experimenter explained that he had to reset the recording instruments after the second session. Thus, the video system would be used to convey further information. Subjects then performed the ergometer task for 5 min alone in the room, whereupon they were instructed through the intercom to turn on the video terminal.

The feedback and goal-setting information were printed on a card. A camera in the adjoining room transmitted the relevant information to the video terminal. The card read, “The goal you were aiming for is ____.” The experimenter wrote “+50%.” The second part of the feedback card read “Your performance score for the last session was ____% ____ your first session.” The experimenter wrote the appropriate feedback information in the blanks depending on the discrepancy condition to which the subject had been preassigned. This information, independent of the subject’s actual performance, was written in the blanks to avoid the impression that the feedback may have been prearranged.

Subjects assigned to the condition involving a large substandard discrepancy were informed that they had attained a 24% increase above their baseline level. The experimenter wrote “24% above” in the blanks on the feedback card. Since they were aiming for a 50% gain, they were faced with a sizable negative discrepancy (−26%) between selected standard and attainment. In the moderate substandard discrepancy, subjects were informed that they achieved a 36% increase, creating a −14% negative discrepancy. Subjects in the small substandard discrepancy received information that they achieved a 46% increase, falling just short (−4%) of the selected standard. Subjects assigned to the condition involving a small suprastandard discrepancy were informed that they attained a 54% increase, which surpassed the selected standard by +4%.

For subjects in all conditions, the next sign that appeared on the screen instructed them to complete a questionnaire next to the video terminal.


The questionnaire contained the three measures of central interest:
subjects’ level of self-satisfaction with their attainment, their perceived self-efficacy at reaching various levels of attainment, and the goals they set for themselves for the next session. These scales were embedded in a set of filler items (cast in the same format) measuring exercise routines and general physical status.

In measuring self-evaluative reactions, subjects rated their self-reactions on a 25-interval scale, ranging from highly self-satisfied, through neutral, to highly self-dissatisfied. They first rated their level of self-satisfaction or dissatisfaction with their performance in the second session, which they had just completed. However, this served mainly as a filler item. For the second rating, which is the relevant one to the hypothesized relationships, subjects rated how self-satisfied or self-dissatisfied they would be if they attained the same level on the next session. It is the self-evaluative prescript for subsequent endeavor rather than evaluation of past endeavor that serves as the critical motivator. That is, subjects who would be quite content to do as well as they did before will mobilize less effort than those who would be highly dissatisfied if they were to do no better the next time than they did before. Indeed, people may be pleased with their prior progress but self-dissatisfied were they to make no further gains on their subsequent attempts. Consider, by way of example, a runner who was satisfied in placing third in a preliminary race. Self-dissatisfaction in coming in third again would lead the runner to try much harder than would satisfaction with another third-place finish. The second self-evaluation measure, which is the one of major interest because it reflects the future attainments subjects judge they must fulfill to feel self-satisfied, was used in the analyses.

Subjects recorded their perceived self-efficacy for goal attainments on an efficacy scale that described 15 possible levels of attainments relative to the baseline level. The goal attainments varied in 10% intervals from a 30% decrement to an 110% increase above the baseline level. For each of the 15 levels, subjects rated the strength of their perceived efficacy that they could attain them using a 100-point scale, ranging in 10-unit intervals from high uncertainty, to intermediate values of certainty, to complete certitude. The strength of subjects’ perceived efficacy that they could achieve the original goal of a 50% increase was the most pertinent efficacy measure. Previous research confirms that the strength of perceived self-efficacy for the original goal level is most predictive of how much effort subjects enlist in the activity (Bandura & Cervone, 1983).

To assess subjects’ self-set goals, they were asked to indicate what level of attainment they were personally aiming for in the next session. The item was cast in a free response form, but all subjects recorded their personal goals in terms of the percentage change in effort they set for themselves.
Test of Motivational Level

After the assessment of self-processes, subjects were instructed via the intercom to resume the ergometer task. They engaged in the effortful activity for 5 min during which their effort expenditure was recorded. It is this third session, when all four treatments were fully formed and operating, that provided the data for testing the effects of the antecedent self-reactive influences on motivation. The measure of motivational change is the percentage change in effort in this third session relative to that of the second session.

At the conclusion of the formal experiment, subjects completed a questionnaire in which they rated their perceptions of the attainability of a 50% increase in the degree of challenge presented by such a goal and the strength of their commitment to their self-set goals. The groups did not differ in their responses to these items. Nor did they differ on the earlier filler items, on which they had rated their physical stamina and the type and amount of physical activity they regularly performed each week.

RESULTS

Effects of Recording Self-Judgments

The subjects who participated in the test for possible reactive effects of recording self-judgments performed with goals and feedback, but did not record their self-evaluative reactions, self-percepts of efficacy, or self-set goals. The questionnaire they completed contained only the filler items. The change in the effort they expended was compared with that of their matched counterparts, who also performed with goals and feedback, after recording their self-satisfaction, perceived self-efficacy, and self-set goals. The analysis revealed no significant difference between the groups in percentage change in motivation, $t(7) = 0.77$. Nor did these two groups differ in how they responded to the postexperiment questionnaire. These results are congruent with earlier findings (Bandura & Cervone, 1983), that the assessment of factors that serve as self-influences has no reactive effects.

Mean Level and Pattern of Self-Reactive Influences

Analyses revealed no significant sex differences on any of the three self-reactive influences. Table 1 presents the mean levels of the self-reactive influences and the percentage increase in motivation in the various discrepancy conditions. The issue of major interest is whether the posited self-reactive influences contribute similarly or differentially to motivation at various levels of discrepancy between attainment and standard. How-
ever, before addressing this issue the mean level and pattern of self-reactive influences are analyzed as a function of discrepancy levels.

Subjects were self-dissatisfied with a large substandard performance, but, as the discrepancy between the selected standard and the performance narrowed, they became more self-satisfied with their attainments, $F(3,76) = 3.52, p < .02$. The self-evaluative reactions to the large substandard performance differed significantly from those of performances that fell just short of the selected standard, $t(76) = 1.86, p < .04$, or surpassed it, $t(76) = 3.15, p < .001$. Subjects were also more self-satisfied with an attainment that surpassed the standard than with one that fell moderately short of the standard, $t(76) = 2.16, p < .02$, or fell just short of it, $t(76) = 1.29, p = .10$.

Strength of perceived self-efficacy to attain a 50% gain also rose as performance discrepancy narrowed, ranging from a low mean strength value of 36 in the large substandard condition to a relatively high value of 60 in the suprastandard condition (Table 1). However, the notable finding is the variable impact that feedback information exerted on perceived self-efficacy. The means do not differ, but the patterns of perceived self-efficacy for goal attainment vary as a function of discrepancy levels. This can be shown by plotting the percentage of subjects within each discrepancy condition falling in the bottom, middle, or upper third of the efficacy strength range. These patterns are presented graphically in Fig. 1.

Subjects in the large and medium substandard conditions predominantly expressed weak to moderate efficacy that they could attain the selected standard of a 50% gain in performance. Feedback that subjects had surpassed the selected standard left most of them (75%) moderately to highly self-efficacious. But interestingly, a small subgroup (25%) within the suprastandard condition harbored strong self-doubts that they could do it again. Even more noteworthy is the bimodal impact on perceived self-efficacy of high sustained effort that falls just short of the standard being sought. When vigorous effort produces a near miss, subjects (45%) judge themselves either supremely self-efficacious that they

### Table 1
Mean Levels of Self-Reactive Influences and Increase in Effort in the Various Discrepancy Conditions

<table>
<thead>
<tr>
<th>Measures</th>
<th>Large (-26%) substandard</th>
<th>Moderate (-14%) substandard</th>
<th>Small (-4%) substandard</th>
<th>Small (+4%) suprastandard</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
<td>M</td>
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<tr>
<td>Self-dissatisfaction</td>
<td>12.55</td>
<td>6.07</td>
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<tr>
<td>Self-efficacy</td>
<td>37.00</td>
<td>33.10</td>
<td>48.00</td>
<td>30.88</td>
</tr>
<tr>
<td>Self-set goals</td>
<td>36.10</td>
<td>16.80</td>
<td>41.40</td>
<td>24.23</td>
</tr>
<tr>
<td>% Increase in effort</td>
<td>77.06</td>
<td>70.48</td>
<td>72.57</td>
<td>70.26</td>
</tr>
</tbody>
</table>
FIG. 1. Patterns of changes in self-reactive influences at each discrepancy level. The panel on the left shows the changes in perceived self-efficacy for goal attainment; the panel on the right shows the changes in personal goal setting.

will triumph in their next attempt, or they (40%) strongly distrust their capability of attaining the standard again. The $\chi^2$ test shows these differences to be significant, $\chi^2(6) = 12.26$, $p = .056$.

As in the case of perceived self-efficacy, self-set goals did not differ in mean level, but here, too, variation in discrepancy level produced substantially different patterns of personal goal setting. For the pattern analysis, subjects were categorized in terms of whether they adhered to the selected standard, abandoned it for a lower one, or set themselves an even more challenging goal. As shown in Fig. 1, when performance attainments were presented as either moderately or markedly discrepant from the selected standard, subjects either adhered to the standard of a 50% gain or lowered their goal. When they were informed that their attainment fell just short of the selected standard, 45% continued to strive for it, 30% raised their goal, and 25% set their sights lower. In the condition in which subjects were told they surpassed the standard, half of them (50%) set themselves even more challenging goals, 15% stuck to the goal, but a sizable proportion of them (35%) lowered their goal. These variable patterns of personal goal setting are highly significant, $\chi^2(6) = 17.74$, $p < .01$.

In a succession of setbacks, huge failures would undoubtedly erode perceived self-efficacy and lower personal goals faster and more extensively than would small failures. However, the present research sought to
clarify how self-processes contribute to motivation under less massive impact when challenging goals could still be regarded by some performers as within reach even though their initial efforts fell substantially short. By using a task requiring sustained hard effort, as do many naturalistic endeavors, not all performers who attain a lofty goal necessarily believe they can mount a similar extraordinary effort.

Subjects in the different conditions exerted comparable effort both in the initial session \( (F = 0.13) \) and in the second session \( (F = 0.78) \) before they received the prearranged information that created the appropriate level of discrepancy for the test session. An analysis of covariance was computed on percentage change in effort in the test session, with discrepancy conditions and sex as the factors, and the first session’s effort as the covariate. Effort did not differ in mean level across the various discrepancy conditions \( (F = 1.10) \). There was a small but significant sex difference \( (F(1,71) = 7.25, p < .01) \), with males displaying a 12% larger increment in effort than females. Similar results are obtained if the analysis of covariance is computed for the level of effort in the third session, with effort in the second session serving as the covariate.

**Mechanisms Governing Motivational Effects**

Table 2 presents the pattern of zero-order correlations among the different self-processes and their relation to change in effort for each level of discrepancy.

The relations among the self-reactive influences differ depending on the level and direction of discrepancy. The stronger the subjects’ perceived self-efficacy for goal attainment, the higher the goals they set for

<table>
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<th>Small (+4%) suprastandard</th>
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<tr>
<td>Effort expenditure with</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Self-dissatisfaction</td>
<td>.53***</td>
<td>.44*</td>
<td>-.12</td>
<td>.29</td>
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<td>.57****</td>
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<td>.84****</td>
<td>.59****</td>
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<tr>
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<tr>
<td>Self-set goals</td>
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<td>.48**</td>
<td>.26</td>
<td>.43*</td>
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<tr>
<td>Self-dissatisfaction with</td>
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<tr>
<td>Self-set goals</td>
<td>.71*****</td>
<td>.52**</td>
<td>-.17</td>
<td>.27</td>
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* \( p < .05 \), ** \( p < .025 \), *** \( p < .01 \), **** \( p < .005 \), ***** \( p < .001 \).
themselves and the more self-dissatisfied they were with substandard attainments. These relations of perceived self-efficacy to personal goal setting and self-dissatisfaction are replicated at each level of discrepancy, except when attainments fell just short of the selected standard. When subjects received feedback that their attainments fell either substantially or moderately short of the selected standard, the higher the goals they set for themselves, the greater was their self-dissatisfaction.

The self-reactive influences are also differentially related to effort under different conditions of discrepancy (Table 2). All three self-reactive influences are predictors of the degree of motivational increase when the disparity between attainment and standard is large or moderate. Motivational change is predicted by self-set goals when the standard was just barely missed and by both perceived self-efficacy and self-set goals when the standard was surpassed.

Regression Analysis

To determine the proportion of variance in motivation accounted for by the various self-reactive influences, a hierarchical multiple regression analysis was performed separately for each level of discrepancy. Degree of motivational change was regressed on self-dissatisfaction, perceived self-efficacy, and self-set goals. Self-evaluation is considered as the first motivational factor because personal investment of self-evaluative significance in an activity contributes some incentive to exercise one's capabilities. Variations in perceived self-efficacy influence how well effort is mobilized and sustained in a continuing endeavor, and the level at which proximal personal goals are set. To base one's proximal goals on one's perceived capabilities has considerable functional value. People do not choose to swim a treacherous body of water and then wonder whether they have the swimming capabilities to reach the opposite shore. Rather, they tend to select proximal goals they judge to be within their reach. The higher people judge their capabilities the higher the proximal goals they are likely to set for themselves. Indeed, several studies have shown that perceived self-efficacy raises the level of self-set goals (Locke et al., 1984; Taylor, Locke, Lee, & Gist, 1984). Self-set goals, in turn, specify the level of effort needed to realize them. The results of the regression analysis are summarized in Table 3. The incremental $r$'s were transformed into $z$'s and tested for significance between the predicted groupings.

Self-evaluation. In accord with prediction, the average incremental $r$ for the large and moderate substandard conditions differed significantly from the average incremental $r$ for the small substandard and suprastandard conditions, $z = 1.89, p < .05$. Level of self-dissatisfaction was thus a significant contributor to motivation when attainments fell substantially
<table>
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<th>Predictors</th>
<th>Large (26%) substandard</th>
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<th>Small (+4%) suprastandard</th>
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<td>$r$</td>
<td>$R^2_{inc}$</td>
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<td>50% goal</td>
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<td>.24</td>
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</tr>
<tr>
<td>30–70% goal</td>
<td>.46</td>
<td>.21</td>
<td>7.16***</td>
<td>.41</td>
</tr>
<tr>
<td>Self-set goals</td>
<td>.64</td>
<td>.05</td>
<td>1.79</td>
<td>.69</td>
</tr>
</tbody>
</table>

*p < .07.
**p < .05.
***p < .025.
****p < .01.
*****p < .005.
******p < .001.
or moderately short of the selected standard, but not when attainments fell just short, or surpassed the standard. Subjects were quite self-satisfied with approximating or surpassing attainments, and self-evaluation for a similar future accomplishment no longer operated as a motivator at these levels of attainment. When a hoped for standard is surpassed, subjects’ perceived self-efficacy and the new goal challenges they set for themselves govern their future effort.

Self-efficacy. Except for the condition in which the standard was almost matched, perceived self-efficacy for goal attainment contributed significantly to motivation, regardless of direction and level of discrepancy (Table 3). The incremental r's in the various conditions did not differ significantly from each other. The more self-efficacious subjects judged themselves to be, the more they intensified their effort.

In a previous study using a moderate goal-performance discrepancy (Bandura & Cervone, 1983), subjects’ perceived self-efficacy to attain the initially selected goal was a uniformly better predictor of motivational change than perceived self-efficacy for any other level of goal attainment. In the present study, discrepancy levels varied over a broad range. To determine the predictiveness of perceived self-efficacy for a wider range of goal attainments, regression analyses were performed with perceived self-efficacy averaged over the 30–70% goal attainment range. The results in Table 3 show that aggregated efficacy does not improve predictiveness under marked or moderate discrepancy, but it accounts for additional variance when people are told that their effortful performance approached or surpassed the initially selected standard, which led some of them to set their sights even higher. In fact, perceived self-efficacy contributes to motivation even in the minimal discrepancy condition, albeit at a borderline level of significance.

When attainment exceeds the standard, the contribution of perceived self-efficacy to motivation is even higher if the strength of perceived self-efficacy is measured for goal levels above a 50% gain. Since subjects had already surpassed the 50% standard their perceived efficacy for even higher goal attainment assumes greater significance. The proportion of variance that this measure of perceived self-efficacy accounts for in motivation is $R^2_{\text{inc}} = .28, p < .01$.

Self-set goals. When subjects received feedback that their attainments

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1 As previously noted, self-motivation is apt to be affected less by how one feels about a past substandard performance than by how one would feel about a similar substandard performance in a subsequent attempt. Regression analyses using self-evaluation for past attainment show this measure to be a less reliable predictor of motivational change. The incremental $R^2$'s are as follows when performance fell short markedly, $R^2 = .03, F = 1.38$; moderately, $R^2 = .26, F = 10.40, p < .005$; minimally, $R^2 = .01, F = 0.50$; or surpassed the standard, $R^2 = .13, F = 4.08, p < .06$. 

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fell markedly short of the selected standard, their self-set goals either corresponded to the standard or were set slightly below, and personal goal setting was not a contributing factor (Table 3). However, at every other level of discrepancy, where personal goal setting spanned a wider range, the goals subjects set for themselves emerged as a significant motivator. Comparison of the incremental \( r \) in the large discrepancy condition with that of the other three discrepancy conditions yielded a significant difference, \( z = 1.59, p = .056 \).

The failure of personal goals to contribute unique variance to motivation in the large discrepancy condition does not seem to be due simply to greater collinearity. The degree to which perceived self-efficacy, self-disatisfaction, and personal goals correlate with each other does not differ significantly between the large and moderate discrepancy conditions, yet personal goals account for variance in motivation under moderate discrepancy but not under large discrepancy.

The preceding analyses indicate the contribution of self-reactive influences to motivation, but they do not give a sense of the magnitude of the motivational impact of the self-reactive influences operating in concert. This is most clearly revealed by comparing the effort exerted by subjects who were high or low in the self-reactive influences identified by the regression analysis as the significant contributors at each discrepancy level. For this descriptive purpose, subjects were categorized on two levels of each factor by whether they would be self-satisfied or self-disatisfied with a comparable future attainment to that achieved in the prior session; whether their perceived efficacy for attaining the selected standard exceeded the 50% strength value or fell below it; and whether they set their personal goal at or above the selected standard, or below it. The mean percentage changes in motivation as a function of the appropriate combination of self-reactive influences are presented in Fig. 2.

Variations in self-reactive influences are accompanied by striking differences in motivation. Subjects for whom the relevant self-influences were operating at a high level exhibited huge increases in effort, whereas when self-influences were low, they mobilized relatively little effort in the endeavor.

The findings from the small substandard condition in which a vigorous effort falls just short of the standard that appears difficult to fulfill are especially intriguing. To corroborate the motivational determinants at this level of discrepancy, a replication was conducted with 20 subjects in which they received feedback that their effort fell −4% short of the standard. The replication yielded a pattern of results identical to that of the original condition. Degree of motivational change was highly related to the goals subjects set for themselves (\( r = .50, p < .02 \)) but not to self-disatisfaction (\( r = .04 \)) or to perceived self-efficacy (\( r = .18 \)). In the re-
Fig. 2. Mean percentage change in effort by subjects who are high or low in the self-reactive influences identified by the regression analysis as the critical motivators at each discrepancy level. EFF signifies perceived self-efficacy for attaining a 50% increase in effort, DIS the level of self-dissatisfaction with the same level of attainment as in the prior attempt, and S-G the goals subjects set for themselves for the next attempt.

Regression analyses, self-set goals account for a good part of the variance in motivation, $R^2_{inc} = .31$, $p < .025$, whereas the other two factors do not contribute significantly to it. However, as in the original study, the aggregated measure of perceived self-efficacy correlates more highly with degree of motivational change ($r = .31$) at this discrepancy level and contributes to variance in motivation at a borderline level of significance, $R^2_{inc} = .13$, $F = 3.67$, $p < .07$.

**DISCUSSION**

The findings of the present study reveal that self-reactive influences account for a substantial portion of the variation in motivation. However, the degree of impact exerted by the different self-reactive influences on motivation varies depending on the level and direction of the discrepancy between attainment and a comparative standard.

In accord with prediction, perceived self-efficacy contributed to motivation across a wide range of discrepancy conditions. The stronger the subjects' perceived self-efficacy that they could meet a challenging standard, the more they intensified their efforts. Perceived self-efficacy operated as a motivator, regardless of whether attainments supposedly fell substantially or moderately short of the goal, or exceeded it. These findings, taken together with converging evidence from other lines of research using diverse tasks and efficacy induction procedures, attest to the generality of the relationship between perceived self-efficacy and motivation (Bandura & Cervone, 1983; Cervone & Peake, 1986; Jacobs, Prentice-Dunn, & Rogers, 1984; Locke *et al.*, 1984; Schunk, 1984).
Failure to fulfill a challenging standard had variable effects on perceived self-efficacy. Many people remained unshaken in their self-beliefs of efficacy, others became less sure of themselves, while still others seemed to lose faith in their capabilities. In everyday life the important matter is not that failure rouses some self-doubt, which is a natural immediate reaction, but rather the degree and speed of recovery from adversity. Resiliency of perceived self-efficacy is a possible factor that might underlie some of the variability in the effects of failure feedback. Resilient self-percepts of efficacy are developed by overcoming setbacks and obstacles through perseverant effort (Bandura, 1986). A succession of failures may eventually erode perceived efficacy to the point where valued goals are abandoned (Campion & Lord, 1982), but the pursuits of people with resilient self-percepts of efficacy should be less vulnerable to successive failures. Research in which resiliency of perceived self-efficacy is systematically varied may provide further insight into motivation under taxing conditions.

Self-dissatisfaction operates as an influential affective motivator when attainments fall substantially or moderately short of a comparative standard. The more self-dissatisfied people are with substandard attainments, the more they heighten their efforts. However, if they are satisfied with approximating or surpassing the standard they do not invest increased effort in the pursuit. Rather, under such circumstances, many people motivate themselves by setting greater challenges that create new discrepancies to be mastered for a sense of self-satisfaction. Thus, notable attainments bring temporary satisfaction, but people enlist new challenges as personal motivators for further accomplishment. Naylor and Ilgen (1984) present a formal analysis of how goals can influence motivation by altering the shape of the attainment-evaluation contingency function.

Self-set standards contribute to motivation at all discrepancy levels, except when subjects supposedly fell far short of attaining what they had sought. For most of them, this marked disparity undermined their perceived self-efficacy. Although many of them lowered their aspirations, even so, it would be difficult for them to mobilize and sustain high effort in the service of goals when they had serious self-doubts concerning their capabilities. Some evidence that such an attenuating effect may be operating is provided by Locke and his associates, who found that perceived self-inefficacy lowers commitment to goals (Locke et al., 1984).

The data from the small substandard discrepancy warrant special comment. It will be recalled that, in this condition and in the replication of it, motivation was strongly affected only by the challenges subjects set for themselves. Perceived self-efficacy also seemed to account for some variance in motivation when perceived efficacy is considered for a wide range of goal attainments. Knowledge that attainment fell just short of the demanding standard produced several different patterns of self-reactions.
Some subjects became demoralized. Their perceived self-efficacy plummeted, and, although they abandoned the selected standard, they remained discontent with their substandard attainment. Others were self-efficacious and aspiring, but insufficiently discontent to motivate themselves to do better. Still others remained aspiring although somewhat less certain of their capabilities and pleased with having performed as well as they did. However, about a quarter of the subjects became overcomplacent. They viewed themselves as highly efficacious in meeting the challenge, but they were too content with a near miss to mobilize the effort needed to do better. Folk wisdom cautions that too much confidence has deceived many a person. Indeed, Salomon (1984) has found that a high level of perceived self-efficacy as a learner fosters a heavy investment of cognitive effort and superior learning when the task is considered difficult, but less investment of effort and poor learning when the task is believed to be easy. Motivation is perhaps best maintained by a strong sense of self-efficacy to withstand failure, coupled with some uncertainty (construed in terms of the challenge of the task, rather than fundamental doubts about one's capabilities) to spur the effort needed to fulfill personal challenges. It remains a problem of future research to delineate the factors that contribute to overcomplacency.

It is commonly assumed that accomplishments raise performance standards. Evidence from research on level of aspiration shows that, indeed, people generally set their goals above their immediately preceding level of attainment (Festinger, 1942; Ryan, 1970). However, the use of simple tasks that call for little effort, such as tossing darts, limits the generality of the results. This is because, in everyday life, most accomplishments require arduous effort over an extended period. People do not necessarily expect to surpass each past accomplishment in an ever-rising series of triumphs. Lofty accomplishments achieved through sustained extraordinary effort are not easily repeated or excelled.

The findings of the present study show that accomplishments are more complexly related to perceived self-efficacy and personal goal setting than might appear intuitively. Knowledge of having surpassed a demanding standard through laborious effort does not automatically strengthen perceived self-efficacy and raise aspiration. Half the performers in the suprastandard condition did respond to their success by affirming a strong sense of efficacy and setting themselves even more challenging goals to accomplish. However, some of the performers were left with self-doubts that they could muster the same level of laborious effort again, and they set their sights on simply trying to match the standard they had previously surpassed. Having driven themselves to success, a number of the performers judged themselves inefficacious to repeat the demanding feat and lowered their aspirations.

The combined influence of a robust sense of self-efficacy and self-set
challenges had marked motivational effects when attainments supposedly exceeded the comparative standard. When both of these self-reactive influences were low, performers failed to heighten their subsequent effort, whereas if they judged themselves highly self-efficacious and set themselves greater challenges they more than doubled their effort. These findings, as well as those from the other discrepancy levels, lend support to the view that one prominent form of motivation stems from challenges created by self-standards and self-belief in one’s capability to realize them.

That motivating challenge arises from the match between self-standard and perceived self-efficacy is further revealed in data from the conditions involving appreciable negative discrepancies. When performance fell substantially short of the selected standard, most subjects continued to subscribe to that standard or a slightly lower one. Those who judged themselves highly efficacious to meet that level of challenge and who were self-dissatisfied at not having done so heightened their effort markedly. However, the same standard had weak motivating potential for those who doubted their capability to realize it. Negative discrepancy at a moderate level yielded similarly marked motivational differences, except that some of the subjects set their standard higher than the one they had originally selected, thus creating for themselves even greater challenges.

When analyses of motivation focus on internal standards, self-evaluation, regulation of effort, and the like, the process may sound like one of self-inflicted burdens. Extreme examples readily spring to mind of individuals who drive themselves relentlessly in pursuit of unattainable goals and whose ever-rising standards negate any sense of self-fulfillment along the way. But this is not the common psychological effect of motivation. Findings of this line of research reveal that motivation through aspiration provides an important and continuing source of self-efficacy, interest, and personal satisfaction (Bandura & Schunk, 1981; Locke et al., 1970; Malone & Lepper, 1985). Without aspirations and active involvement in activities, people are unmotivated, bored, and uncertain about their capabilities. Life without elements of challenge can be rather dull.

REFERENCES


**RECEIVED:** March 15, 1985