Journal of Applied Psychology
2003, Vol. 88, No. 1, 87–99

0021-9010/03/$12.00 DOI: 10.1037/0021-9010.88.1.87

Negative Self-Efficacy and Goal Effects Revisited

Albert Bandura
Stanford University

Edwin A. Locke
University of Maryland

The authors address the verification of the functional properties of self-efficacy beliefs and document how self-efficacy beliefs operate in concert with goal systems within a sociocognitive theory of self-regulation in contrast to the focus of control theory on discrepancy reduction. Social cognitive theory posits proactive discrepancy production by adoption of goal challenges working in concert with reactive discrepancy reduction in realizing them. Converging evidence from diverse methodological and analytic strategies verifies that perceived self-efficacy and personal goals enhance motivation and performance attainments. The large body of evidence, as evaluated by 9 meta-analyses for the effect sizes of self-efficacy beliefs and by the vast body of research on goal setting, contradicts findings (J. B. Vancouver, C. M. Thompson, & A. A. Williams, 2001; J. B. Vancouver, C. M. Thompson, E. C. Tischner, & D. J. Putka, 2002) that belief in one's capabilities and personal goals is self-debilitating.

Social cognitive theory is rooted in an agentic perspective in which people function as anticipative, purposive, and self-evaluating proactive regulators of their motivation and actions (Bandura, 2001). A theory embodying feed-forward self-regulation differs from control theories rooted solely in a negative feedback control system aimed at error correction. Among the mechanisms of human agency, none is more central or pervasive than beliefs of personal efficacy. Whatever other factors serve as guides and motivators, they are rooted in the core belief that one has the power to produce desired effects; otherwise one has little incentive to act or to persevere in the face of difficulties. Self-efficacy beliefs regulate human functioning through cognitive, motivational, affective, and decisional processes (Bandura, 1997). They affect whether individuals think in self-enhancing or self-debilitating ways, how well they motivate themselves and persevere in the face of difficulties, the quality of their emotional well-being and their vulnerability to stress and depression, and the choices they make at important decisional points.

Self-Efficacy Causality

A central question in any theory of the cognitive regulation of motivation and action is the issue of causality. Do beliefs of personal efficacy contribute to human functioning? This issue has been extensively investigated by a variety of methodologies and analytic procedures. Nine large-scale meta-analyses have been conducted across diverse spheres of functioning. These spheres include work-related performances in both laboratory and field studies (Sadri & Robertson, 1993; Stajkovic & Luthans, 1998), psychosocial functioning in children and adolescents (Holden, Moncher, Schinke, & Barker, 1990), academic achievement and persistence (Multon, Brown, & Lent, 1991), health functioning (Holden, 1991), athletic performance (Moritz, Feltz, Fahrbach, & Mack, 2000), only controlled investigations (i.e., laboratory studies) in which efficacy beliefs were altered experimentally (Boyer et al., 2000), and perceived collective efficacy in group functioning (Gully, Incalcaterra, Joshi, & Beaubien, 2002; Stajkovic & Lee, 2001).

This vast body of research encompasses wide-ranging methodological and analytic approaches. These approaches included interindividual experimental designs comparing groups raised to differential levels of perceived efficacy as well as intraindividual designs in which the same individuals are progressively raised to higher perceived self-efficacy; diverse modes of self-efficacy development based on enactive, vicarious, persuasory, and somatic and affective sources of efficacy-relevant information; and varied domains of functioning and impact of self-efficacy on different response systems encompassing cognitive, affective, and behavioral expressions. They have applied multiple controls for other potential contributors to performance and have involved diverse populations of varying ages and sociodemographic characteristics in different cultural milieus. Functional relations have been examined with different methods by using both microlevel and macrolevel longitudinal analyses. Moreover, efficacy beliefs have been measured by different formats and domain-related scales so that obtained relations have not been peculiar to a particular instrument.

The evidence from these meta-analyses is consistent in showing that efficacy beliefs contribute significantly to the level of motivation and performance. Efficacy beliefs predict not only the behavioral functioning between individuals at different levels of perceived self-efficacy but also changes in functioning in individuals at different levels of efficacy over time and even variation within the same individual in the tasks performed and those

Albert Bandura, Department of Psychology, Stanford University; Edwin A. Locke, College of Business and Management, University of Maryland.

Preparation of this article was facilitated by grants from the Grant Foundation and the Spencer Foundation to Albert Bandura.

Correspondence concerning this article should be addressed to Albert Bandura, Department of Psychology, Stanford University, Stanford, California 94305-2130, or to Edwin A. Locke, 32122 Canyon Ridge Drive, Westlake Village, California 91361. E-mail: bandura@psych.stanford.edu or elocke@rhsmith.umd.edu

shunned or attempted but failed. Evidence that divergent procedures produce convergent results adds to the explanatory and predictive generality of the self-efficacy determinant.

In several publications, Vancouver and his associates have claimed that belief in one's capabilities has no determinative function or is self-debilitating (Vancouver, Thompson, Tischner, & Putka, 2002; Vancouver, Thompson, & Williams, 2001). The debilitating performance effects are said to be derived from Powers's (1991) perceptual control theory. The present article reviews the diverse research strategies used to verify the functional properties of efficacy beliefs and examines the conceptual, methodological, empirical, and interpretive bases on which Vancouver et al. (2001, 2002) rest their claim. This critique is embedded in a broader analysis of the ontological foundations of control theory and social cognitive theory and conceptual and methodological issues bearing on verification of causation.

Verification of Functional Properties of Efficacy Beliefs Altered Directly Without Enactive Experiences

Meta-analyses do not portray the variety of creative experimental strategies that have been used to verify the functional properties of people's beliefs in their capabilities. Because of the centrality of this issue, this section reviews, in some detail, the nature of these strategies, the multiple controls they institute, and evidence of the functional impact of self-efficacy beliefs. In the most stringent tests, perceived self-efficacy is raised directly to differential levels rather than by enactive experiences. Such modes of influence provide no personal performance information for judging one's personal capabilities.

One direct way of altering perceived self-efficacy is to introduce a trivial factor devoid of any relevant information whatsoever but that can bias perceived self-efficacy. Studies of anchoring influences show that arbitrary reference points from which judgments are made bias judgmental processes because the adjustments from the arbitrary starting points are usually insufficient (Tversky & Kahneman, 1974). For example, people will judge a larger crowd at a major sports event from an arbitrary starting number of 1,000 rather than from an arbitrary number of 40,000, even though these anchoring numbers are completely irrelevant to judging the size of the crowd. Cervone and Peake (1986) raised perceived self-efficacy by having individuals rate their efficacy from a supposedly randomly selected high number and lowered their self-efficacy from a low arbitrary starting number. The higher the instated perceived self-efficacy was, the longer individuals persevered on difficult and unsolvable problems before they quit. Mediational analyses showed that the biasing anchoring influence had no effect on performance motivation when perceived self-efficacy was controlled. Thus, the effect of the external anchoring influence on performance motivation was completely mediated by the degree to which it changed efficacy beliefs.

Another direct mode of influence that involves no performance alters efficacy beliefs solely by observational means. In one such experiment, perceived self-efficacy was raised in snake phobics by modeling alone either to differential levels in different individuals or to successively higher levels in the same individuals by modeling the same information repeatedly (Bandura, Reese, & Adams, 1982). The higher the induced level of perceived self-efficacy was, the more snake-handling tasks phobics performed regardless of whether the functional relation of self-efficacy belief to coping performance was assessed intraindividually or interindividually. Microanalysis of efficacy–action congruences revealed a very close 85% fit between efficacy beliefs and snake-handling performance on individual tasks that the snake phobics had never done before. The snake phobics successfully executed coping tasks with a snake that fell within their enhanced range of perceived self-efficacy, but they shunned or failed those tasks that exceeded their perceived coping capabilities.

Efficacy enhancement merely through visualization is still another direct means of altering efficacy beliefs without the mediation of enactive experiences. Severe phobics visualized progressively more threatening snake scenes while deeply relaxed in symbolic desensitization until anxiety reactions to all of the scenes were completely eliminated in everyone (Bandura & Adams, 1977). Their perceived self-efficacy and snake-coping behavior were then measured. Although completely desensitized, the participants varied in belief in their coping efficacy. The more their efficacy beliefs were raised, the higher their coping performance became.

In modes of influence that alter efficacy beliefs by observing models or visualizing threatening activities, people do not execute any behavior. Consequently, they have no personal performance data for reappraising their capabilities. In a pretest assessment, 40% of the phobics receiving symbolic desensitization could not even perform a single task, such as enter the test room containing a caged snake (Bandura & Adams, 1977). None had ever touched a snake in their lives or had a physical encounter with one. The only thing that the phobics' performance history and pretest performance could tell them was that they could do nothing. Although they were all completely desensitized to the visualized threats, their perceived self-efficacy at the end of treatment differed markedly, ranging from a 6% to a 67% increase from their zero performance baseline. Their posttreatment coping behavior was similarly varied, ranging from a 6% to a 58% increase in performance attainment. The microlevel congruence between self-efficacy belief at the end of treatment and subsequent coping behavior was a high 83%.

One might argue that anxiety extinction is a possible alternative mechanism. Williams (1992) analyzed numerous data sets from studies of efficacy-based treatment for agoraphobia in which perceived self-efficacy, anticipatory anxiety, and coping behavior were all measured. The findings are consistent in showing that perceived self-efficacy is a strong predictor of coping behavior when anticipatory anxiety is partialed out, whereas the relationship between anticipatory anxiety and coping behavior essentially disappears when the influence of perceived self-efficacy is partialed out. The predictive superiority of perceived self-efficacy is replicated in other domains of functioning. People's beliefs in their efficacy have an independent effect on their performance attainments, whereas their level of anxiety bears little or no relationship to their performances on stressful academic tasks (Meece, Wigfield, & Eccles, 1990; Pajares & Miller, 1994) and athletic activities (McAuley, 1985) after the influence of perceived self-efficacy is removed. Beliefs of personal efficacy similarly predict willingness to perform threatening activities, but anticipatory anxiety makes no independent contribution (Arch, 1992).

Many experiments have been conducted in which people receive veridical feedback concerning their performance, but their efficacy

beliefs are altered by bogus normative comparison. Erroneous feedback serves as a form of persuasory influence. Litt (1988) used an intraindividual design for this purpose. After being tested for pain tolerance on a cold-pressor test, individuals were led to believe that they were either at a high (90th) or at a low (37th) percentile rank in pain tolerance compared with an ostensibly normative group, regardless of their actual performance. The bogus normative information produced differential levels of perceived self-efficacy, which, in turn, were accompanied by corresponding changes in pain tolerance. The greater the changes in perceived self-efficacy were, the larger the changes in pain tolerance became.

In the second phase of the intraindividual design, the bogus normative feedback was opposite of that provided originally. Those who were led to believe that they had lost their comparative superiority lowered their perceived self-efficacy, whereas those who were led to believe that they had allegedly gained comparative superiority raised their belief in their capability to tolerate pain. Their subsequent level of pain tolerance changed in the direction of their efficacy beliefs. The condition involving alleged change from high to low normative standing is especially interesting because perceived self-efficacy overrode past performance as a predictor of subsequent performance.

The regulatory role of perceived self-efficacy instated by fictitious normative comparison has been replicated in markedly different domains of functioning. Bouffard-Bouchard (1990) instilled high- or low-efficacy beliefs in students by suggesting that they were of higher or lower standing compared with bogus peer norms, irrespective of their actual performance. Students whose perceived efficacy was illusorily raised set higher goals for themselves, used more efficient problem-solving strategies, and achieved higher intellectual performances than did students of equal cognitive ability who were led to believe that they lacked such capabilities. The research corroborated not only the functional relation of perceived self-efficacy to behavior but also the well-known impact of efficacy belief on aspiration and strategic thinking (Wood & Bandura, 1989).

Jacobs and his colleagues (Jacobs, Prentice-Dunn, & Rogers, 1984) similarly demonstrated that efficacy beliefs raised by fictitious normative comparison heightened perseverant motivation in difficult problem solving. In research in which efficacy beliefs were altered by bogus information about a competitor's strength, the higher the illusory beliefs of physical strength were, the more physical stamina the individuals displayed during competition (Weinberg, Gould, Yukelson, & Jackson, 1981). Failure in a subsequent competition spurred those whose perceived self-efficacy was arbitrarily raised to even greater physical effort, whereas failure further impaired the performance of those whose efficacy beliefs had been undermined. Beliefs of physical efficacy illusorily heightened in females and illusorily weakened in males obliterated large preexisting gender differences in physical stamina.

Efficacy beliefs, instilled illusorily, operate determinatively at the collective level as well as at the individual level. Group members given erroneous information that they performed better or worse than a fictitious norm altered belief in their collective capabilities (Prussia & Kinicki, 1996). The effect of this bogus information on groups' aspirations and performance attainments was mediated entirely through the changes it produced in perceived collective efficacy.

Verification of Functional Properties of Efficacy Beliefs Altered by Enactive Means With Controls for Past Performance

Epiphenomenalists and behavior analysts typically single out studies in which perceived self-efficacy is altered by enactive modes of influence because there is a behavior to latch on to. They then contend that perceived self-efficacy is just a reflection of prior performance. This claim has long lost its credibility by evidence from countless studies demonstrating that perceived self-efficacy contributes independently to subsequent performance after controlling for prior performance and indices of ability. The following sections present a sample of experimental and prospective studies applying not only controls for past performance and ability but often multiple controls for other factors that can influence performance.

The unique contribution of self-efficacy is verified in numerous experiments by Schunk in which perceived efficacy is developed in children who are markedly deficient in mathematical ability by self-directed instruction (Schunk, 1982) and in those with severe reading deficiencies by training in verbal self-guidance (Schunk & Rice, 1993). Children's beliefs in their efficacy account for variance in performance after controlling for level of skill development and performance attainment in the self-instruction. In path analyses in other studies, children's perceived efficacy to regulate their learning activities and to master academic subjects raises academic aspirations and final grades independently of their prior grades in the subject matter and of the academic aspirations the parents hold for their children (Zimmerman, Bandura, & Martinez-Pons, 1992).

Locke and his colleagues (Locke, Frederick, Lee, & Bobko, 1984) conducted an experimental test of the role of perceived self-efficacy and goals in the development of creative proficiency. In path analysis, perceived group efficacy predicted creative performance both directly and mediationally through its impact on goal setting after applying multiple controls. These controls included training in creativity and use of brainstorming strategies, preexisting creative ability, and posttraining creative performance in the prediction of subsequent level of creative performance.

Prussia and Kinicki (1996) examined experimentally how perceived collective efficacy operates in concert with other sociocognitive determinants of the quality of group problem solving. Groups received videotaped instruction in brainstorming strategies either in a lecture format or by observing a group modeling the same strategies behaviorally and cognitively. Participants received accurate feedback about their own performance attainments, but prearranged comparative feedback leading them to believe that their group performed either above or below the normative productivity standard. The groups' subsequent success in adopting the strategic processes and generating novel solutions was measured. The impact of performance feedback on group performance operated entirely through its effects on affective reactions and perceived collective efficacy. Group dissatisfaction with substandard performance combined with a strong sense of collective efficacy spurred group productivity. Perceived collective efficacy also completely mediated the effects of the positive and negative bogus

feedback on the goals the groups set for themselves and partially mediated the benefits of instructive modeling on group effectiveness. The unique contribution of collective efficacy to group productivity remained after controlling for prior group performance.

The crucial role of perceived self-efficacy under challenging conditions was revealed in path analyses of determinants of athletic performance in different phases of tournament matches (Kane, Marks, Zaccaro, & Blair, 1996). In preliminary wrestling matches, contestants with less secure self-efficacy triumphed over weaker contestants because of differential ability. Wrestling ability, as measured by athletic level and prior performance record in contests, predicted competitive performance directly but also through the mediated effect of self-efficacy belief and personal goals. However, in pressure-packed overtime matches, in which contestants are more evenly matched, perceived self-efficacy was the sole determinant of overtime performance, and prior competitive performance had no predictive value.

In experimental tests of the extent to which self-regulatory influences determine response to varying degrees of goal discrepancy, participants performed on an ergometer, and their effortful performance was measured in kilopond meter units (Bandura & Cervone, 1983, 1986). To equate for individual differences in physical performance, participants rated their self-efficacy for 14 levels of performance attainment ranging from a 50% decline to an 80% increase in effortful performance compared with their baseline performance level. Their subsequent percentage change in effortful performance was also measured relative to their baseline performance level. The higher the participants' perceived self-efficacy and the greater their discontent with just matching their past performance were, the higher their performance output became.

Social cognitive theory of career choice and development has sponsored wide-ranging programs of research with special focus on the role played by beliefs of personal efficacy in occupational choice and preparation (Betz & Hackett, 1997; Lent, Brown, & Hackett, 1994). These lines of research help to clarify the impact of self-efficacy beliefs on decisional behavior. The findings of this substantial body of research showed that the higher the perceived self-efficacy to fulfill educational requirements and occupational roles is, the wider are the career options people seriously consider pursuing, the greater is the interest they have in them, the better they prepare themselves educationally for different occupational careers, and the greater is their staying power in challenging career pursuits. Efficacy beliefs predict occupational choices and level of mastery of educational requirements for those careers and predict persistence in technical or scientific pursuits when variations in actual ability, prior level of academic achievement, scholastic aptitude, and vocational interests are controlled (Lent, Brown, & Larkin, 1984, 1986, 1987; Lent, Lopez, & Bieschke, 1993).

Self-development during formative years forecloses some types of occupational options and makes others realizable. A multifaceted longitudinal project examined, by use of the path-analytic method, how sociostructural determinants operating in concert with different facets of perceived self-efficacy at the beginning of junior high school predict the types of occupational pursuits students seriously consider toward the end of junior high (Bandura, Barbaranelli, Caprara, & Pastorelli, 2001). The impact of familial socioeconomic status and parents' self-efficacy and aspirations on their children's occupational preferences is entirely mediated through the children's perceived occupational self-efficacy and academic aspirations. Perceived occupational self-efficacy rather than actual academic achievement is the key determinant of the kinds of career pursuits children seriously consider for their lifework and those they disfavor.

Multivariate investigations using panel designs with path analytic and structural equation modeling are now commonly used to estimate the unique contribution of efficacy belief to subsequent performance after controlling not only for past performance but for a host of other possible determinants. The entire system of direct and mediated relations in the causal structure is tested, not just the contribution of isolated predictors. Tests are conducted on the goodness of fit between the posited conceptual model and the empirical data and on how well alternative conceptual models fit the data. The results of these studies have shown that perceived self-efficacy is a significant contributor to subsequent performance over and above the influence of other factors, including past performance (Bandura, 1997).

The issue of past performance and the determinative function of perceived self-efficacy can, of course, be addressed experimentally rather than by partialing out variances statistically. This experimental strategy was used in an intraindividual experimental design with sequential microanalytic comparison of the relative predictiveness of prior performance and perceived efficacy (Bandura & Adams, 1977). Coping tasks for severe snake phobics were hierarchically ordered in terms of severity of threat, that is, touching a snake, holding it, letting it loose and retrieving it as it slithered around, and tolerating the snake crawling in their laps. The phobics received guided mastery treatment until they could perform the uppermost coping task they failed in pretest assessment, whereupon they rated their perceived self-efficacy for all the succeeding coping tasks they had never performed. Their coping behavior was then assessed.

Contrary to the view that perceived self-efficacy simply reflects past performances, the same performance attainment gave rise to widely different levels of perceived self-efficacy. For example, having achieved the same performance level at the midpoint of the hierarchical coping tasks, some phobics judged themselves capable of performing only 10% of the higher level tasks, others 20%, still others 35%, and some felt supremely efficacious to perform 100% of the tasks. Efficacy beliefs predicted at an 84% level of accuracy performance on the highly threatening tasks that the phobics had never done before. All that past performance could tell phobics in regard to coping tasks that they had never attempted was that they could do what they had just done, which has no predictive value. Vancouver et al. (2001) claimed that past performance can never be ruled out because somewhere at sometime there may have been "past performance unmeasured by the researcher but observed by the individual" (p. 608). They proposed a performance determinism that is presumably nonfalsifiable. Unless the incapacitated snake phobics in the aforementioned experiments handled reptiles in previous lives, none of them had done so in their past.

Studies that apply performance controls provide a conservative estimate of the regulatory function of perceived self-efficacy because of statistical overcontrol. Behavior is not a cause of behavior. Correlations between prior and subsequent behavior simply reflect the degree of commonality of their determinants. If the determinants are similar across time, the performances will be

highly correlated. Performance is not an unadulterated measure of ability (Bandura, 1990; Sternberg & Kolligian, 1990); it is heavily infused with many motivational and self-regulatory determinants. Past performance is thus a conglomerate index encompassing the set of unmeasured sociocognitive factors operating at the time. Perceived self-efficacy is an important part of that constellation of unmeasured determinants of performance. Thus, past performance is itself affected by beliefs of personal efficacy. Efficacy beliefs are autocorrelated and affect both prior and later performance. Using unadjusted past performance scores thus also removes some of the effects of efficacy beliefs on future performance. Therefore, control for past performance ideally should use the residual after partialing out the prior self-efficacy contribution to variance in performance (Wood & Bandura, 1989).

The field has moved beyond the simple-minded view that efficacy beliefs are just reflectors of performance to analyses of the unique contribution of efficacy beliefs in multifaceted causal structures. In these structural analyses, the relation of past performance to subsequent performance is heavily, if not fully, mediated through efficacy beliefs, goals and aspirations, outcome expectations, and other sociocognitive determinants (Bandura, 1997).

Functional Role of Perceived Personal Control in Stress and Anxiety

The discussion thus far has documented the independent contribution of self-efficacy beliefs to motivational level and performance accomplishments. The management of stressors and taxing environmental demands is another important area of human functioning. Diverse lines of research examining coping with different types of stressors and taxing demands have provided converging evidence for the influential impact of perceived ability to exercise control on anxiety and stress reactions (Averill, 1973; Bandura, 1997; Levine & Ursin, 1980; Miller, 1980). People who are arbitrarily led to believe that they can control aversive events display lower autonomic arousal and less performance impairment than do those who believe that they lack personal control, although they are subjected equally to the painful events (Geer, Davison, & Gatchel, 1970; Glass, Singer, Leonard, Krantz, & Cummings, 1973). The same is true for stress reactions to clinical pain. Bogus physiological feedback that patients were effective relaxers raised beliefs in their efficacy to cope with their oral surgery (Litt, Nye, & Shafer, 1993). Self-efficacy enhancement surpassed relaxation and sedation drugs in reducing self-rated anxiety as well as anxiety reactions and behavioral agitation during surgery, as rated by the oral surgeon and dental assistant. Regardless of type of ameliorative treatment the patients received, the more their efficacy beliefs were raised by the preparatory ministrations, the lower the anxious agitation was.

The power of control beliefs to transform frightening environments into benign ones was graphically demonstrated by Sanderson, Rapee, and Barlow (1989). Inhaling a CO_2 mixture induces panic attacks in agoraphobics. One group inhaled the mixture without control over it. Another group inhaled it under illusory control, believing they could regulate how much CO_2 they received by turning a valve, but unbeknownst to them the valve was disconnected so they inhaled a constant amount of the CO_2 mixture. Agoraphobics who had no control experienced mounting anxiety over time. They were plagued with catastrophic thoughts that they were going to disintegrate, go crazy, or die, and 80% experienced panic attacks. Those agoraphobics who were led to believe they were exercising control remained unperturbed and free of catastrophic thinking, and relatively few of them experienced panic attacks.

Sociocognitive Dual Control Model of Self-Regulation

Social cognitive theory posits dual control systems in self-regulation of motivation and action—a proactive discrepancy production system working in concert with a reactive discrepancy reduction system (Bandura, 1991). People are aspiring and proactive organisms, not just reactive ones. Their capacity to exercise forethought enables them to wield adoptive control anticipatorily rather than being simply reactive to the effects of their efforts. They are motivated and guided by foresight of goals, not just by hindsight of shortfalls.

People are not primarily motivated by discrepancy reduction. They motivate and guide themselves through proactive control by setting themselves challenging goals and performance standards that create negative discrepancies to be mastered. They then mobilize their effort and personal resources on the basis of their anticipatory estimation of what it would take to fulfill those standards. Reactive feedback control comes into play in subsequent adjustments of effort to achieve desired outcomes. After people attain the goals they have been pursuing, those individuals with high perceived self-efficacy set a higher standard for themselves (Bandura & Cervone, 1986). The adoption of further challenges creates new motivating discrepancies to be mastered. Thus, discrepancy reduction is only half of the story and not necessarily the more interesting half. The greater challenge is to explain why people inflict on themselves high standards that demand hard work and beget a lot of stress, disappointments, and failures along the way rather than to explain why they should seek tranquility by matching a standard.

Creating and removing discrepancies are two sides of the same goal-directed coin. Discrepancy reduction is a concomitant of motivating self-challenge, not the prime motive of action. If it were, people would simply set their goals to match whatever they had already done, thus ensuring no discrepancy. Furthermore, the very concept of discrepancy reduction, even as part of the full goal-seeking process, is misleading. It is not discrepancies that people seek to eliminate but goals and valued outcomes that they seek to attain.

In research that examined intraindividual change, goals enhanced performance at the outset before any feedback was provided to create a discrepancy (Bandura, 1991). Framing feedback of the same performance discrepancy as progress toward a desired goal (e.g., 75%) versus shortfall from the same goal (e.g., -25%) had markedly different effects (Jourden, 1991). Feedback framed as gains toward goal attainment sustained high perceived self-efficacy, raised self-set goals, and supported self-satisfaction and group productivity in the management of a simulated organization. By contrast, under factually equivalent discrepancy feedback framed as goal shortfalls, perceived self-efficacy plummets, self-set goals decrease, self-satisfaction declines, and organizational performance progressively deteriorates. So much for the driving power of negative feedback. The removal of a negative is not the same as the attainment of a positive.

In the pursuit of difficult challenges, people have to override a lot of dissuading negative feedback if they are to realize what they seek. Resilient belief that one has what it takes to succeed provides the necessary staying power in the face of repeated failures, setbacks, and skeptical or even critical social reactions that are inherently discouraging. Those beset by self-doubts become the early quitters rather than the successful survivors (Bandura, 1997).

We are now in the era of accelerated social, informational, and technological change. Success under rapid change requires overriding even current positive feedback. For example, efficacious adaptability has become a premium at the organizational level. Organizations must be proactively innovative to survive and prosper in the rapidly changing global marketplace. Innovative proaction brings future preemption in the competitive arena. Organizations face the paradox of preparing for change at the height of success. Those organizations that get locked into the technologies and products that produce their current success and that fail to change fast enough to the technologies and marketplaces of the future quickly fall victim to the inertia of success. The growing primacy of proactive or "feed-forward" agency in adaptation and change in all aspects of life in the electronic era is discussed more fully elsewhere (Bandura, 2002).

Distinction Between Social Cognitive Theory and Expectancy–Value Theory

Vancouver et al. (2001) erroneously equated social cognitive theory with expectancy–value theory. In expectancy–value theory, motivation is governed by the expectation that given performances will produce particular outcomes and the value individuals place on the expected outcomes. However, people act on their beliefs about what they can do as well as their beliefs about the likely outcomes of performance. Indeed, they exclude entire classes of options rapidly on self-efficacy grounds without bothering to analyze costs and benefits. Adding perceived self-efficacy to rational models of decision making increases their explanatory and predictive power (Ajzen & Madden, 1986; Bandura, 1997).

Some expectancy–value theories include an expectancy that given performances are achievable through effort (Vroom, 1964). However, many tests of expectancy–value theory do not include the effort expectancy. Danehower (1988) showed that efficacy beliefs contribute to performance, whereas general expectancies about the effectiveness of effort do not. It should be noted that perceived self-efficacy is a broader construct than effort expectancy. Most people believe that high effort is likely to enhance performance attainments; however, there is an important difference between belief in the utility of effort and belief that one can get oneself to mobilize and sustain a required level of effort in the face of impediments, failures, setbacks, and bouts of discouragement along the way. The latter concerns perceived personal efficacy; the former concerns beliefs in the instrumental value of a particular means. Agentic efficacy beliefs are good predictors of performance, whereas means beliefs are weak differentiators and predictors (Chapman, Skinner, & Baltes, 1990).

Perceived self-efficacy for effort regulation is but one aspect of self-management that contributes to level and quality of performance. Success in performances that requires ingenuity, resourcefulness, and adaptability demand more than just dint of effort. People, therefore, judge their efficacy for other essential aspects of self-management including their cognitive and social facility and resilience. Moreover, in taxing endeavors people have to judge their efficacy not only to sustain their motivation and task-oriented focus but to manage distressing emotional states and self-debilitating thought patterns, which can impair their execution of activities.

Analysis of Control Theories

Vancouver et al. (2001) used control theory as the vehicle for testing the notion that belief in one's capabilities is self-debilitating. We review briefly the core feature of control theory and examine more fully Powers's (1978, 1991) perceptual control theory from which the negative self-efficacy effects are allegedly predicted. Control theory of human functioning was developed by Powers (1973) as an outgrowth of the cybernetic model in engineering to show how mechanical devices are regulated through feedback based on the results of their previous motions. The core idea is the negative feedback loop in which a deviation from the desired programmed state or reference value detected by a sensor automatically triggers movements that will drive the system toward the preprogrammed state. This model takes discrepancies between the programmed state and the perceived input from the output of the system as the fundamental driving force behind motion within the system. "Action is driven by the difference, or error" (Powers, 1991, p. 152). If there is no disturbance, there is no adjustment. The system either maintains its present movements or remains at rest. According to this conceptual scheme, the nervous system embodies a hierarchy of interconnected feedback loops with upper-level loops providing the reference signals that serve as goal settings for subordinate loops.

An odd aspect of perceptual control theory is the claim that "people act to control perceptions, not actions" (Vancouver & Putka, 2000, p. 335). Taken literally, an organism that is focused solely on regulating perceptions would not survive for long. People act to develop their knowledge and capabilities and to exercise some measure of control over their everyday lives. They obviously do so through their construals and constructions of reality, but the aim of their purposive actions is not just to manage their perceptions but to manage their life circumstances.

Despite claims to the contrary, Powers's (1978) control theory is founded on austere materialistic reductionism. In this view, the human organism is "nothing more than a connection between one set of physical quantities in the environment (input quantities) and another set of physical quantities in the environment (output quantities)" (Powers, 1978, p. 421). Experiments in which subjects are instructed to control a cursor by manipulating a stick are used to verify the theory. In the posited "behavioral law," action is "determined strictly and quantitatively by the inverse of the feedback function and is, therefore, a property of the environment and not of the subject" (Powers, 1978, p. 432). Powers (1978) also noted, "We are not modeling the interior of the subject, so we need not worry about how this effect is created" (p. 430). Such a view is hardly conducive to understanding human motivation and action, which are extensively cognitively regulated.

Powers (1991) stated that machine language is better than "natural language" because it reduces ambiguity (p. 152). Let us consider an example:

> If the output of a control or subsystem in such a hierarchy is temporarily switched, so that it enters the perceptual input of the same system rather than serving as a reference signal for a lower system, the result is the same as if the lower system had acted instantly and perfectly to make its own perception match the reference signal. This is called the *imagination mode.* (Powers, 1991, p. 152)

This is a convoluted way of saying that people can imagine themselves taking actions that they do not actually take. In the machine metaphor of human functioning, the organism is stripped of qualities that are distinctly human—a phenomenal and functional consciousness, intentionality, self-reactiveness, and self-reflectiveness (Bandura, 2001).

Many problems arise in a cybernetic model of human motivation and action. Machines are not conscious. They operate automatically and nonvolitionally. People are not nonconscious organisms locked in negative feedback loops driven automatically to reduce disparity between sensed feedback and inner referents. They can and do respond with a wide variety of possible reactions to performance shortfalls. They act proactively and can choose and change the standards they aim for, use multiple and even conflicting standards, make judgments about their capabilities for different options, process feedback in many different ways, use various methods of developing task strategies, use diverse combinations of conscious and nonconscious knowledge, engage in many types of problem-solving activities, and operate across many different time spans. The connections between sensing and action are not mechanical. The cybernetic model ignores the vast knowledge of cognitive self-regulation of human motivation and action.

Control theory is rather barren psychologically. It has identified little in the way of new processes aside from the ones already known. Other than stating that people act to reduce detected discrepancies, it has little additional content. Control theory does posit hierarchical goal systems, but that idea is not unique to control theory. Powers (1991, p. 152) described, in stilted machine language, four ways of increasing motivation: (a) raise the goal, (b) underrate achievement, (c) increase importance of the goal, and (d) present obstacles. The conditions under which these types of interventions may or may not increase motivation were identified and tested years ago within the framework of goal theory and social cognitive theory (Bandura, 1986; Locke, 1968; Locke & Latham, 1990).

In efforts to create a psychocybernetic system, control theorists have had to incorporate "add-ons" into the model. There is no single control theory with a determinate set of propositions. Rather, there is a multiplicity of control theories that take different forms depending on the particular mix of sociocognitive factors grafted on the negative feedback loop. Klein (1989), for example, listed 33 "new" control theory hypotheses. Fifteen hypotheses were taken from goal theory (Locke & Latham, 1990), eight from expectancy theory, three from attribution theory, two from satisfaction theory, one from social cognitive theory, one or two from script theory, and others were just statements of the obvious (e.g., people have goal hierarchies). The ingredients in this theoretical conglomerate may contain valid ideas, but none of them have anything to do with control theory (Locke, 1991). The rich eclectic embellishment of the negative feedback loop is more akin to cafeteria theorizing than to integrative theorizing as claimed.

Lord and Levy (1994), recognizing that control theory was too mechanistic, made control theory explicitly cognitive by adding complex information-processing functions and by endowing the cybernetic analogue with not only a consciousness but even a free will. These cognitive components certainly are critical to understanding human action, but again, they have little to do with the basic control theory.

Carver and Scheier (1981), claiming that other motivation theories did not deal adequately with affect, argued that affect would be a function of the rate at which discrepancies are reduced but not of current goal–outcome discrepancies. However, goal theory had already shown that affect was, in fact, a result of both goal–outcome discrepancies and progress toward the goal (Locke, Cartledge, & Knerr, 1970; Locke & Latham, 1990). Research conducted by Simon (1979) within the framework of social cognitive theory demonstrated that the pattern in which activities are mastered can drastically alter affective self-evaluative reactions (see Bandura, 1991). Accomplishments that surpass earlier ones bring a continued sense of self-satisfaction, but people derive little satisfaction from smaller accomplishments or even devalue them after having made larger strides. People who are prone to depression display even greater affective reactivity to their pattern of progress. They are more self-satisfied with accelerating strides, but they find even less satisfaction in modest improvements after large attainments.

Vancouver and Putka (2000) claimed that they would advance our knowledge by identifying the processes that explain goal-directed action. All that they found, however, was that when people were assigned a goal and were given feedback regarding their performance relative to the goal, they would use the feedback to adjust their actions so as to better match the goal. This, of course, is a standard finding of goal theory and was first observed over 30 years ago using an intraindividual design by Locke, Cartledge, and Knerr in 1970 and thus added nothing to our knowledge.

Vancouver et al. (2001) propounded a backward-oriented goal system in which "goal level may be a function of past level achieved rather than a representation of a desired state to which a person is striving" (p. 605). This conception essentially dismantles a stable regulatory function by the feedback loop. If personal goals simply reflect past performance, then the feedback loop is stuck with a continually fluctuating internal goal setting reflecting the rises and declines in prior performance. In social cognitive theory, humans are proactive and are more apt to look forward than to look backward, locked in a negative feedback loop (Bandura, 2001). They extend their aspirations distally well beyond their proximal performance level and override a lot of negative feedback along the way in pursuit. Through this proactive self-management they turn high aspirations into reality. Conditions of rapid change demand a forward-looking perspective for human success.

Neither perceived self-efficacy nor goals are simply reflectors of past performance (Bandura & Cervone, 1986). A given performance attainment can give rise to diverse self-set goals depending on level of perceived self-efficacy. Thus, when people fail to fulfill a challenging standard, some become less sure of their efficacy and lower their goals, but others remain confident and persist in the face of failure and even raise their goals. Surpassing a taxing standard through sustained strenuous effort does not necessarily raise efficacy beliefs. Although for most people, high accomplishment strengthens beliefs of personal efficacy, many who drive themselves to hard-won success are left with self-doubts that they

can duplicate the feat and so adopt more modest goals for future pursuits. Strength of perceived efficacy and goal commitment predict whether people redouble their efforts, react apathetically, or become despondent when they fail to fulfill a valued standard (Bandura, 1991).

There is more to self-regulation than control by means of feedback loops. A comprehensive theory must encompass the variety of agentic factors known to influence human self-regulation (Bandura, 1997, 2001). These factors include proactive adoption of aspirant standards serving valued purposes; self-appraisal of personal efficacy to fulfill various goal challenges; anticipatory regulation of the strategies, resources, and effort needed to turn cognized standards into reality; material and social outcome expectations for fulfilling or failing to meet the standards; affective self-evaluative reactions to the quality of one's performances; and self-reflective metacognition focused on the accuracy of one's efficacy appraisals, the appropriateness of one's goals and the adequacy of one's strategies for realizing them, and the meaning of one's pursuits. Describing agentic functions as higher level loops contributes little to our understanding of these proactive functions. These are the very interior cognitive processes that Powers (1978) dismisses as of little interest because "we are not modeling the interior of the subject" (p. 432).

The self-regulation of learning through performance and error correction is a drawn out process. If knowledge and skills could be acquired only by negative response feedback, human development would be greatly retarded, not to mention exceedingly tedious and hazardous. Moreover, limited time, resources, and mobility impose severe constraints on what people can directly explore to gain new knowledge and competencies. However, humans have evolved an advanced cognitive capacity for observational learning that enables them to abbreviate the acquisition process by learning directly from modeled information, not just enactive experience (Bandura, 1986). They extract the generic structure embodied in modeled exemplars, use the symbolic representation to construct appropriate courses of action, and then refine their skills through a conception-matching process. By drawing on symbolic modeling through the electronic media, observers transcend the bounds of their immediate environment and sole dependence on learning by means of error correction (Bandura, 2002).

In Powers's (1991) theory, neither self-satisfaction nor self-dissatisfaction serves as a motivator. It is solely shortfalls that drive behavior. Social cognitive theory accords affective self-reactions motivating functions (Bandura, 1986, 1991). The theory also makes an important distinction concerning the performance on which self-satisfaction is conditional—self-satisfaction with past performance versus the future level of performance with which one will be satisfied. This distinction carries important theoretical and methodological implications. The backward negative feedback theorizing focuses on self-satisfaction with past performance, whereas the feed-forward orientation of social cognitive theory emphasizes the level of future attainment required for self-satisfaction, which provides a self-motivating incentive. Self-satisfaction made conditional on future level of performance is more predictive of performance than self-satisfaction with past performance (Bandura & Cervone, 1983).

Evidence disputes Powers's (1991) theory that neither self-satisfaction nor self-dissatisfaction with discrepant attainments has any effect on performance. Cybernetic machines do not respond emotionally to their own performances; humans do. Humans react self-critically to performances that are deficient or that violate their personal standards and react with pride and self-satisfaction when they attain what they value (Bandura, 1986; Locke, Cartledge, & Knerr, 1970). Studies have been conducted that experimentally vary the direction and the level of discrepancy with microanalysis of the impact of affective self-reaction (Bandura & Cervone, 1983, 1986). The higher the discontent with large and moderate substandard performances, the higher the subsequent effortful performance. Affective self-reactions serve as significant predictors of subsequent performance within each of these discrepancy levels. Other studies have similarly shown that affective self-reactions to one's performances contribute to variance in subsequent individual and group performance (Cervone, Jiwani, & Wood, 1991; Prussia & Kinicki, 1996).

Not only is perceived self-efficacy an extraneous implant in perceptual control theory, but Powers (1991) and Vancouver et al. (2002) did not seem to agree on how it debilitates performance. Powers believed that it does so by shrinking the discrepancy (i.e., "reduces the apparent shortfall"), whereas Vancouver et al. believed that it does so by predicting speedier goal attainment (i.e., "reaching the goals sooner"). Discrepancy shrinkage and speed are by no means the same processes, because for any level of goal discrepancy, one can have speedy or slow realization of it. Furthermore, control theorists have never validated either of these propositions.

Thicket of Problems in the Search for Negative Self-Efficacy Effects

The impetus for this article was research by Vancouver and his colleagues (Vancouver et al., 2001, 2002), who reported that belief in one's capabilities and personal goals is self-debilitating. In this section we summarize the conceptual, methodological, and interpretive problems with their studies. The first major problem is the theoretical disconnect between the posited perceptual control theory and the actual theory being tested. According to Vancouver et al., they tested predictions from Powers's (1973) perception control theory, in which action is driven by negative discrepancy between perceived input and a programmed standard. However, the predictions they offered are conditional on perceived self-efficacy—high perceived self-efficacy allegedly shrinks the apparent negative discrepancy, thereby lowering motivation through complacency. However, perceived self-efficacy is not part of the perceptual control theory that they claimed to be testing. The theoretical discordance involves a nonconscious feedback control system reflecting on its personal efficacy and thereby constructing its perceptions of performance incongruities. Similarly, the complacency mechanism they posit for negative motivational effects is at odds with the theory they espouse. Powers (1973) contended that mere discrepancy is the motivator and that neither self-satisfaction nor self-dissatisfaction with discrepant attainments has any effect on performance. Cybernetic systems do not respond emotionally to their own performances.

Another theoretical problem is the failure to specify the impact of counteracting self-efficacy and goal determinants. Vancouver et al. (2001) focused heavily on demonstrating that self-efficacy is a performance debilitator but completely ignored the effect of the coacting goal partner. High perceived self-efficacy presumably

slackens performers' efforts, but it also promotes high goals, which create large discrepancies that drive performers. The former is demotivating; the latter is motivating. Vancouver et al. did not specify how these counteracting influences get resolved to produce a joint impact.

There are also disconnects between theorizing and experimental design in Vancouver et al.'s (2001) research. According to perceptual control theory, high self-efficacy is a debilitator only when performance is ambiguous or unknown, thus allowing leeway to decrease the perceived goal discrepancy. A serious test of their theory would, therefore, require comparing the effects of self-efficacy on performance under ambiguous versus explicit performance feedback. However, in their studies, Vancouver et al. tested their theory solely under conditions of explicit feedback in which the negative efficacy effect should not occur and then claim that the findings corroborate their theory. In dealing with the methodological mismatch, they claimed in retrospect that the feedback did not really "capture the entire feedback space" because control theory has many hierarchical loops. Unless these upper loops are clearly specified and measured, the theory is essentially nonfalsifiable.

Vancouver et al.'s (2001) studies did not work in the way they had expected—negative effects for self-efficacy but positive effects for goals. Instead, self-set goals had a negative effect on performance as well, although their theory predicted a positive effect of goals on performance. Their methodological remedy for the alleged fault with the goal measure by assigning goals also failed their theory—although assigned goal conditions differed, self-set goals still had a negative effect on performance. They dismissed the negative goal effects that contradicted their perceptual control theory as "spurious" because they could not think of a mechanism for the discordant finding.

In a subsequent test of their perceptual control theory, Vancouver et al. (2002) discarded goals. It is meaningless to test control theory while stripping it of goals. Powers (1973) regarded goals to be essential. Feedback loops need goals for discrepancies that are presumed to drive behavior. Moreover, to judge perceived self-efficacy for a goalless activity makes no more sense than judging one's self-efficacy for high-jumping without specifying the height to be cleared.

Interindividual and Intraindividual Designs

Verification of functional relations requires converging evidence from different research strategies (Bandura & Walters, 1963). This is because any given methodology has limitations as well as advantages. Moreover, the methods vary in scope of application, in ecological validity, and in the generalizability of the data they produce. Converging evidence from complementary methodologies increases confidence in the functional properties of sociocognitive factors. We saw earlier that the functional properties of efficacy beliefs are replicated regardless of whether beliefs are investigated intraindividually or interindividually, or are investigated in controlled laboratory studies or field studies. The same is true for positive goal effects (Locke & Latham, 1990).

Intraindividual designs are informative in verifying functional relations between variables over time. Such designs have been used successfully in studying both self-efficacy and goal effects. But there is nothing inherently superior in such designs, and they may even yield misleading findings under some conditions. There is often far less variance within individuals than between individuals on critical determinants. Without variance, one cannot find causal or even correlational relations, or if one does find them, the size of the relation may be greatly attenuated with the result that the contribution of a given determinant is underrated. Thus, a factor such as goal commitment gets dismissed as insignificant in intraindividual analysis because of little change over time (Vancouver, 1997). Using an intraindividual design, Erez and Zidon (1984) deliberately altered commitment to increase variation and got strong effects.

Vancouver et al. (2001) regarded interindividual experimental designs as suspect on the assumption that efficacy beliefs may reflect intergroup performance differences. This argument fails to recognize the controls for performance that have been used in such studies. We saw earlier that in interindividual designs in which efficacy beliefs are varied directly rather than by enactive means, individuals' prior performance, competencies, abilities, and so forth, remain the same but their beliefs in their efficacy are raised or lowered merely by bogus feedback. Random assignment to experimental conditions provides a further safeguard against group differences in ability and performance level. Multiple controls are likewise applied in evaluating the unique contribution to performance of naturally developed levels of perceived self-efficacy.

Experimental laboratory approaches have the advantage of providing some indication of the relative importance of factors that cannot be easily isolated in naturalistic situations by varying the factors of interest while holding constant other potential contributors. However, the scope of controlled experiments is severely limited. It is precluded for phenomena that are not reproducible in laboratory situations because such phenomena require a lengthy period of development, are the products of complex constellations of influences by different social sources operating interactively, or are prohibited ethically. For example, the impact of pernicious socialization practices on children's sense of efficacy and aspiration and the extraordinary resilience of some children to severe adversity are not subject to experimental studies. All too often researchers select simple activities that permit at least some change in a single sitting with the predictable caveat that the generalizability of the findings should be tested under more meaningful real-life conditions. What possible significance and generalizability does the guessing game used by Vancouver et al. (2001, 2002) have for understanding how people's beliefs in their capabilities enable them to bring their influences to bear on the consequential realities with which they have to cope?

Controlled field studies that systematically vary psychosocial factors under real-life conditions provide greater ecological validity, but they too are limited in scope. Finite resources, limits imposed by social systems on what types of interventions they permit, hard to control fluctuations in quality of implementation, and ethical considerations place constraints on controlled field interventions.

Controlled experimentation must, therefore, be supplemented with controlled investigation of variations in psychosocial factors that are produced naturally linked to possible determinants (Nagel, 1961). For reasons already given, the latter approach is indispensable in the social sciences. For example, longitudinal investigations address the complex interplay of sociostructural, familial, education, and self influences in shaping the course of lives that

are socially situated in historical contexts (Bandura, 1995, 1997; Elder, 1995). Path analysis and structural equation modeling evaluate the patterns of influences as a whole and help to disentangle the unique contribution of sociocognitive factors within the posited causal structures. There are no experimental analogues for these complex, multicausal structures governing human self-development, adaptation, and change.

Given the complex multicausality of human functioning and the social and ethical constraints on the opportunity to apply experimentally designed influences, no single investigatory approach can provide a full explanation of behavior. The introductory section of this article documents how diverse research strategies have been brought to bear on the verification of the functional properties of self-efficacy beliefs.

Task Requirements for Elucidating Determinants of Intraindividual Change

Meaningful tests of the contribution of perceived self-efficacy to performance in intraindividual change over time have several requirements. The structure of the ongoing activity should permit progressive changes in perceived self-efficacy and performance rather than sequentially disjoined activities. In the disconnected activity structure there is nothing learnable that is transferable or controllable from one task to another.

A second requirement for informative research on the functional properties of efficacy beliefs is the use of a dynamic rather than a static environment. Tasks that allow meaningful progressive changes but in which the same activity is performed repeatedly in the same session under invariant conditions not only are minimally informative but can be misinformative. With nothing changing situationally, little being learned, no impediments or stressors to shake performers' self-assurance, and nothing to intrude on attentional focus or disrupt execution of the activity, performance quickly stabilizes, yielding the mundane finding that prior performance correlates highly with subsequent performance. Such static environments reveal little of interest beyond the initial trial.

The studies conducted by Vancouver et al. (2001, 2002) illustrate the problems that arise when the experimental task is discordant with the type required to clarify the determinants governing personal changes over time. Vancouver et al. selected a disjoined guessing game in which participants had to guess patterns randomly preset before each game. The disconnectedness precludes any growth of perceived self-efficacy and performance from one game to another. Guesswork also makes ratings of perceived self-efficacy basically trifling. Moreover, the guessing game includes a confound that cannot be disentangled. It is impossible to separate sheer guesses from correct discernment of the solution on a particular game. Indeed, the authors coded some performances as "missing" because participants guessed the correct arrangement on the very first try by sheer luck.

When participants guessed correctly, they probably assumed they were becoming more skilled, and therefore they momentarily raised their self-assurance and goals only to have their hope dashed because the task precluded translation of self-belief and goals into improved performance. When they guessed incorrectly, they probably assumed that they were less able and lowered their goals only to be surprised again by an uptic. This is just the result one might expect on a guessing game. The obtained sawtooth pattern would produce a weak negative relation of both self-efficacy and goals to performance as an artifact rather than a genuine control process. This can, of course, be easily verified by having participants perform activities that permit skill acquisition and controllability of performance. However, as previously noted, numerous such studies using an intraindividual design have been conducted, yielding findings that contradict those of Vancouver et al. (2002). The peculiarity of the guessing game that yields negative goal effects is most likely responsible for the negative self-efficacy effects as well.

Perceived self-efficacy is measured in terms of judgments of personal capabilities and the strength of that belief. Vancouver et al. (2001) had participants estimate the number of attempts it would take to find a solution. The anchors on the strength measure varied from *extremely likely* to *extremely unlikely.* In the context of a guessing game, the anchors suggested estimates of chance rather than explicit judgments of personal capabilities. As one would expect for a guessing game, participants estimated their chances, on average, as around 50% with little variance around this 50-50 probability level.[1]

Conditional Specification of Negative Self-Efficacy Effects

No psychosocial factor, or any other factor for that matter, ever bears an invariant relation to human behavior. Social cognitive theory specifies certain conditions under which an elevated sense of efficacy can have negative effects. Vancouver et al.'s (2001) proclaimed discovery of negative efficacy effects is nothing new. The examples Vancouver et al. cited were reported and analyzed in some detail in the volume on the exercise of control through self-efficacy belief (Bandura, 1997). However, as previously shown, Vancouver et al.'s conceptual and empirical claims of invariant debilitating effects of belief in one's capabilities in intraindividual change do not survive close scrutiny.

Self-efficacy theory adopts a conditional view regarding negative effects of an elevated sense of personal efficacy. For example, the functional value of high perceived self-efficacy differs in preparatory and performance aspects of functioning. In preparing for challenging endeavors, some self-doubt about one's performance efficacy provides incentives to acquire the knowledge and skills needed to master the challenges. However, one must distinguish between different aspects of perceived self-efficacy. In the skills development phase, a high sense of learning self-efficacy serves a positive promotive function. Thus, informative peer modeling raises, by observational means, children's beliefs in their own efficacy for learning, which, in turn, predicts both their rate of progress during instructional sessions and their eventual level of mathematical competency (Schunk & Hanson, 1989a, 1989b). Thus, even in the preparatory phase of functioning, one need not undermine a sense of efficacy to motivate self-investment in activities, as the control theory under discussion would prescribe. On the contrary, instilling a strong sense of learning efficacy enhances the development of competencies.

[1] A detailed analysis of these various conceptual, methodological, and interpretational issues is available from Albert Bandura at bandura@psych.stanford.edu or from Edwin A. Locke at elocke@rhsmith.umd.edu.

In managing challenges in performance situations, people need a resilient sense of efficacy that they can achieve desired results by their efforts and try to remain unfazed by setbacks or failure. One cannot execute well-established skills while beset with self-doubt. In applying what one knows, a strong belief in one's performance efficacy is essential to mobilize and sustain the effort necessary to succeed (Bandura, 1997). Control theory would have coaches send their team on the playing field in a self-doubting frame of mind; otherwise they will play complacently. We would lay heavy bets against a team coached according to Vancouver's control theory.

A resilient sense of efficacy provides the necessary staying power in the arduous pursuit of innovation and excellence. During difficult endeavors, people have to invest a great deal of time and effort and have to be willing to take risks under uncertainty. Those of high perceived self-efficacy focus on the opportunities worth pursuing, whereas the less self-efficacious dwell on the risks to be avoided (Krueger & Dickson, 1993, 1994). Among patent inventors, it is those of high perceived self-efficacy who are most likely to start new business ventures (Chen, Greene, & Crick, 1998; Markman & Baron, 1999). Venturers who achieve high growth in companies they have founded or who transform those they have bought have a vision of what they wish to achieve, set challenging growth goals, and have a firm belief in their efficacy to realize their goals (Baum, Locke, & Smith, 2001).

Marked discontinuity in environmental circumstances and in adaptational styles are other conditional factors. The very resilient self-efficacy that brings success in tough ventures may perpetuate adherence to practices of questionable utility. Thus, for example, managers of high perceived self-efficacy are more prone than those of low self-efficacy to escalate commitment to unproductive ventures and practices (Audia, Locke, & Smith, 2000; Whyte & Saks, 1999; Whyte, Saks, & Hook, 1997). The corrective for the perils of success is not diminishment of personal efficacy. Such a disenabling remedy would undermine human aspiration, innovation, and performance accomplishments in endeavors presenting tough odds. Some of the problems stem from misreading the environment rather than misjudgment of self-efficacy. The challenge is to preserve the considerable functional value of resilient self-efficacy but at the same time to institute informative monitoring and social feedback systems that help to identify practices that decline in utility.

Researchers have studied extensively the risks of overconfidence but have ignored the pervasive personal and social debilitating costs of underconfidence (Bandura, 1997). This risk-averse bias reflects the cautious orientation and one-sided focus of our theorizing and experimentation. For example, instructing individuals in laboratory studies to manage problems that are inherently unsolvable stacks the deck in favor of quitting as the functional option. Where persistence eventually pays off, as in virtually all innovative endeavors, early quitting is the losing option. However, the costs of giving up too early receive little attention because unrealized futures are neither observable nor easily visualized. The history of innovation vividly documents that premature abandonment of beneficial ventures would have deprived societies of the major advances they enjoy in virtually every aspect of life (Bandura, 1997; White, 1982).

We need to expand our experimental designs to assess the costs of underconfidence in innovativeness, creativity, and personal and social change. Experimental designs that include challenging problems solvable only by dogged effort would document the functional value of resilient self-efficacy and the self-handicapping costs of nagging self-doubts about one's capabilities.

Ontological and Epistemological Foundations

As noted earlier, social cognitive theory is founded on an agentic perspective to human self-development, adaptation, and change (Bandura, 2001). This theory specifies four core features of human agency, which include intentionality, forethought, self-reactiveness, and self-reflectiveness. People form intentions that include plans and strategies for realizing them. The temporal extension of agency involves more than future plans, however. People set goals for themselves and anticipate likely outcomes of prospective actions to guide and motivate their efforts anticipatorily. Agents are not only planners and forethinkers, they are self-regulators as well. They adopt personal standards and monitor and regulate their actions by self-reactive influence. They do things that give them satisfaction and a sense of self-worth and refrain from actions that bring self-censure. People are not only agents of actions, they are self-examiners of their own functioning. They reflect on their efficacy, the soundness of their thoughts and actions, the meaning of their pursuits, and make corrective adjustments if necessary. Goal theory is similarly rooted in an agentic perspective (Binswanger, 1991; Locke & Latham, 1990).

The ontological foundations of control theory in its different versions have never been clearly articulated. This is no easy task given that this theory of cybernetic regulation is a discordant hybrid of agentic functions grafted on a mechanical feedback control system devoid of consciousness or any self-reflective capabilities. To further complicate matters, agentic functions have crept even into the allegedly automatic feedback system, although somewhat dissonantly, as when the cybernetic system is humanized by being equipped with complex information-processing components, endowed with a consciousness, and even granted a free will (Lord & Levy, 1994); furnished with scripts, causal attribution judgments, and calculation of utilities for alternative options (Klein, 1989); and affixed with affective self-evaluative motivators and self-efficacy beliefs from social cognitive theory (Vancouver et al., 2001). Carver and Scheier (1981) endowed the superordinate feedback loop with innumerable human attributes—self-consciousness, different types of selves, outcome expectations, attributional judgments, self-esteem, egotism, and the like. Where amid these sundry embellishments is control theory, and what unique perspective does it provide?

References

Ajzen, I., & Madden, T. J. (1986). Prediction of goal-directed behavior: Attitudes, intentions, and perceived behavioral control. *Journal of Experimental Social Psychology, 22,* 453–474.

Arch, E. C. (1992). Affective control efficacy as a factor in willingness to participate in a public performance situation. *Psychological Reports, 71,* 1247–1250.

Audia, G., Locke, E. A., & Smith, K. G. (2000). The paradox of success: An archival and a laboratory study of strategic persistence following a radical environmental change. *Academy of Management Journal, 43,* 837–853.

Averill, J. R. (1973). Personal control over aversive stimuli and its relationship to stress. *Psychological Bulletin, 80,* 286–303.

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory.* Englewood Cliffs, NJ: Prentice Hall.

Bandura, A. (1990). Reflections on nonability determinants of competence. In R. J. Sternberg & J. Kolligian Jr. (Eds.), *Competence considered* (pp. 315–362). New Haven, CT: Yale University Press.

Bandura, A. (1991). Self-regulation of motivation through anticipatory and self-regulatory mechanisms. In R. A. Dienstbier (Ed.), *Perspectives on motivation: Nebraska Symposium on Motivation* (Vol. 38, pp. 69–164). Lincoln: University of Nebraska Press.

Bandura, A. (Ed.). (1995). *Self-efficacy in changing societies.* Cambridge, England: Cambridge University Press.

Bandura, A. (1997). *Self-efficacy: The exercise of control.* New York: Freeman.

Bandura, A. (2001). Social cognitive theory: An agentic perspective. *Annual Review of Psychology, 52,* 1–26.

Bandura, A. (2002). Growing primacy of human agency in adaptation and change in the electronic era. *European Psychologist, 7,* 2–16.

Bandura, A., & Adams, N. E. (1977). Analysis of self-efficacy theory of behavioral change. *Cognitive Therapy and Research, 1,* 287–308.

Bandura, A., Barbaranelli, C., Caprara, G. V., & Pastorelli, C. (2001). Self-efficacy beliefs as shapers of children's aspirations and career trajectories. *Child Development, 72,* 187–206.

Bandura, A., & Cervone, D. (1983). Self-evaluative and self-efficacy mechanisms governing the motivational effects of goal systems. *Journal of Personality and Social Psychology, 45,* 1017–1028.

Bandura, A., & Cervone, D. (1986). Differential engagement of self-reactive influences in cognitive motivation. *Organizational Behavior and Human Decision Processes, 38,* 92–113.

Bandura, A., Reese, L., & Adams, N. E. (1982). Microanalysis of action and fear arousal as a function of differential levels of perceived self-efficacy. *Journal of Personality and Social Psychology, 43,* 5–21.

Bandura, A., & Walters, R. H. (1963). *Social learning and personality development.* New York: Holt, Rinehart & Winston.

Baum, J. R., Locke, E. A., & Smith, K. G. (2001). A multi-dimensional model of venture growth. *Academy of Management Journal, 44,* 292–303.

Betz, N. E., & Hackett, G. (1997). Applications of self-efficacy theory to the career assessment of women. *Journal of Career Assessment, 5,* 383–402.

Binswanger, H. (1991). Volition as cognitive self-regulation. *Organizational Behavior and Human Decision Processes, 50,* 154–178.

Bouffard-Bouchard, T. (1990). Influence of self-efficacy on performance in a cognitive task. *Journal of Social Psychology, 130,* 353–363.

Boyer, D. A., Zollo, J. S., Thompson, C. M., Vancouver, J. B., Shewring, K., & Sims, E. (2000, June). *A quantitative review of the effects of manipulated self-efficacy on performance.* Poster session presented at the annual meeting of the American Psychological Society, Miami, FL.

Carver, C. S., & Scheier, M. F. (1981). *Attention and self-regulation: A control-theory approach to human behavior.* New York: Springer-Verlag.

Cervone, D., Jiwani, N., & Wood, R. (1991). Goal-setting and the differential influence of self-regulatory processes on complex decision-making performance. *Journal of Personality and Social Psychology, 61,* 257–266.

Cervone, D., & Peake, P. K. (1986). Anchoring, efficacy, and action: The influence of judgmental heuristics on self-efficacy judgments and behavior. *Journal of Personality and Social Psychology, 50,* 492–501.

Chapman, M., Skinner, E. A., & Baltes, P. B. (1990). Interpreting correlations between children's perceived control and cognitive performance: Control, agency, or means–ends beliefs? *Developmental Psychology, 26,* 246–253.

Chen, C. C., Greene, P. G., & Crick, A. (1998). Does entrepreneurial self-efficacy distinguish entrepreneurs from managers? *Journal of Business Venturing, 13,* 295–316.

Danehower, C. (1988). An empirical examination of the relationship between self-efficacy and expectancy. In D. F. Ray (Ed.), *Southern Management Association proceedings* (pp. 128–130). MI: Southern Management Association.

Elder, G. H. (1995). Life trajectories in changing societies. In A. Bandura (Ed.), *Self-efficacy in changing societies* (pp. 46–68). New York: Cambridge University Press.

Erez, M., & Zidon, I. (1984). Effect of goal acceptance on the relationship of goal difficulty to performance. *Journal of Applied Psychology, 69,* 69–78.

Geer, J. H., Davison, G. C., & Gatchel, R. I. (1970). Reduction of stress in humans through nonveridical perceived control of aversive stimulation. *Journal of Personality and Social Psychology, 16,* 731–738.

Glass, D. C., Singer, J. E., Leonard, H. S., Krantz, D., & Cummings, H. (1973). Perceived control of aversive stimulation and the reduction of stress responses. *Journal of Personality, 41,* 577–595.

Gully, S. M., Incalcaterra, K. A., Joshi, A., & Beaubien, J. M. (2002). A meta-analysis of team-efficacy, potency, and performance: Interdependence and level of analysis as moderators of observed relationships. *Journal of Applied Psychology, 87,* 819–832.

Holden, G. (1991). The relationship of self-efficacy appraisals to subsequent health-related outcomes: A meta-analysis. *Social Work in Health Care, 16,* 53–93.

Holden, G., Moncher, M. S., Schinke, S. P., & Barker, K. M. (1990). Self-efficacy of children and adolescents: A meta-analysis. *Psychological Reports, 66,* 1044–1046.

Jacobs, B., Prentice-Dunn, S., & Rogers, R. W. (1984). Understanding persistence: An interface of control theory and self-efficacy theory. *Basic and Applied Social Psychology, 5,* 333–347.

Jourden, F. (1991). *The influence of feedback framing on the self-regulatory mechanisms governing complex decision making.* Unpublished doctoral dissertation, Stanford University.

Kane, T. D., Marks, M. A., Zaccaro, S. J., & Blair, V. (1996). Self-efficacy, personal goals, and wrestlers' self-regulation. *Journal of Sport and Exercise Psychology, 18,* 36–48.

Klein, H. (1989). An integrated control theory model of work motivation. *Academy of Management Review, 14,* 150–172.

Krueger, N. F., Jr., & Dickson, P. R. (1993). Self-efficacy and perceptions of opportunities and threats. *Psychological Reports, 72,* 1235–1240.

Krueger, N. F., Jr., & Dickson, P. R. (1994). How believing in ourselves increases risk taking: Perceived self-efficacy and opportunity recognition. *Decision Sciences, 25,* 385–400.

Lent, R. W., Brown, S. D., & Hackett, G. (1994). Toward a unifying social cognitive theory of career and academic interest, choice, and performance. *Journal of Vocational Behavior, 45,* 79–122.

Lent, R. W., Brown, S. D., & Larkin, K. C. (1984). Relation of self-efficacy expectations to academic achievement and persistence. *Journal of Counseling Psychology, 31,* 356–362.

Lent, R. W., Brown, S. D., & Larkin, K. C. (1986). Self-efficacy in the prediction of academic performance and perceived career options. *Journal of Counseling Psychology, 33,* 265–269.

Lent, R. W., Brown, S. D., & Larkin, K. C. (1987). Comparison of three theoretically derived variables in predicting career and academic behavior: Self-efficacy, interest congruence, and consequence thinking. *Journal of Counseling Psychology, 34,* 293–298.

Lent, R. W., Lopez, F. G., & Bieschke, K. J. (1993). Predicting mathematics-related choice and success behaviors: Test of an expanded social cognitive model. *Journal of Vocational Behavior, 42,* 223–236.

Levine, S., & Ursin, H. (Eds.). (1980). *Coping and health.* New York: Plenum Press.

Litt, M. D. (1988). Self-efficacy and perceived control: Cognitive mediators of pain tolerance. *Journal of Personality and Social Psychology, 54,* 149–160.

Litt, M. D., Nye, C., & Shafer, D. (1993). Coping with oral surgery by

self-efficacy enhancement and perceptions of control. *Journal of Dental Research, 72,* 1237–1243.

Locke, E. A. (1968). Toward a theory of task motivation and incentives. *Organizational Behavior and Human Performance, 3,* 157–189.

Locke, E. A. (1991). Goal theory vs. control theory: Contrasting approaches to understanding work motivation. *Motivation & Emotion, 15,* 9–28.

Locke, E. A., Cartledge, N., & Knerr, C. S. (1970). Studies of relationships between satisfaction, goal setting, and performance. *Organizational Behavior and Human Performance, 5,* 135–158.

Locke, E. A., Frederick, E., Lee, C., & Bobko, P. (1984). Effect of self-efficacy, goals, and task strategies on task performance. *Journal of Applied Psychology, 69,* 241–251.

Locke, E. A., & Latham, G. P. (1990). *A theory of goal setting and task performance.* Englewood Cliffs, NJ: Prentice-Hall.

Lord, R. G., & Levy, P. E. (1994). Moving from cognition to action: A control theory perspective. *Applied Psychology: An International Review, 43,* 335–398.

Markman, G. D., & Baron, R. A. (1999, May). *Cognitive mechanisms: Potential differences between entrepreneurs and non-entrepreneurs.* Paper presented at the Babson College/Kauffman Foundation Entrepreneurship conference.

McAuley, E. (1985). Modeling and self-efficacy: A test of Bandura's model. *Journal of Sport Psychology, 7,* 283–295.

Meece, J. L., Wigfield, A., & Eccles, J. S. (1990). Predictors of math anxiety and its influence on young adolescents' course enrollment intentions and performance in mathematics. *Journal of Educational Psychology, 82,* 60–70.

Miller, S. M. (1980). Why having control reduces stress: If I can stop the rollercoaster I don't want to get off. In J. Garber & M. E. P. Seligman (Eds.), *Human helplessness: Theory and applications* (pp. 71–95). New York: Academic Press.

Moritz, S. E., Feltz, D. L., Fahrbach, K. R., & Mack, D. E. (2000). The relation of self-efficacy measures to sport performance: A meta-analytic review. *Research Quarterly for Exercise and Sport, 71,* 280–294.

Multon, K. D., Brown, S. D., & Lent, R. W. (1991). Relation of self-efficacy beliefs to academic outcomes: A meta-analytic investigation. *Journal of Counseling Psychology, 38,* 30–38.

Nagel, E. (1961). *The structure of science.* New York: Harcourt, Brace and World.

Pajares, F., & Miller, M. D. (1994). Role of self-efficacy and self-concept beliefs in mathematical problem solving: A path analysis. *Journal of Educational Psychology, 86,* 193–203.

Powers, W. T. (1973). *Behavior: The control of perception.* Chicago: Aldine.

Powers, W. T. (1978). Quantitative analysis of purposive systems: Some spadework at the foundations of scientific psychology. *Psychological Review, 85,* 417–435.

Powers, W. T. (1991). Comment on Bandura's "human agency." *American Psychologist, 46,* 151–153.

Prussia, G. E., & Kinicki, A. J. (1996). A motivational investigation of group effectiveness using social cognitive theory. *Journal of Applied Psychology, 81,* 187–199.

Sadri, G., & Robertson, I. T. (1993). Self-efficacy and work-related behavior: A review and meta-analysis. *Applied Psychology: An International Review, 42,* 139–152.

Sanderson, W. C., Rapee, R. M., & Barlow, D. H. (1989). The influence of an illusion of control on panic attacks induced via inhalation of 5.5% carbon dioxide-enriched air. *Archives of General Psychiatry, 46,* 157–162.

Schunk, D. H. (1982). Effects of effort attributional feedback on children's perceived self-efficacy and achievement. *Journal of Educational Psychology, 74,* 548–556.

Schunk, D. H., & Hanson, A. R. (1989a). Influence of peer-model attributes on children's beliefs and learning. *Journal of Educational Psychology, 82,* 431–434.

Schunk, D. H., & Hanson, A. R. (1989b). Self-modeling and children's cognitive skill learning. *Journal of Educational Psychology, 81,* 155–163.

Schunk, D. H., & Rice, J. M. (1993). Strategy fading and progress feedback: Effects on self-efficacy and comprehension among students receiving remedial reading services. *The Journal of Special Education, 27,* 257–276.

Simon, K. M. (1979). *Effects of self comparison, social comparison, and depression on goal setting and self-evaluative reactions.* Unpublished manuscript, Stanford University.

Stajkovic, A. D., & Lee, D. S. (2001, August). *A meta-analysis of the relationship between collective efficacy and group performance.* Paper presented at the national Academy of Management meeting, Washington, DC.

Stajkovic, A. D., & Luthans, F. (1998). Self-efficacy and work-related performance: A meta-analysis. *Psychological Bulletin, 124,* 240–261.

Sternberg, R. J., & Kolligian, J. (Eds.). (1990). *Competence considered.* New Haven, CT: Yale University Press.

Tversky, A., & Kahneman, D. (1974). Judgment under uncertainty: Heuristics and biases. *Science, 185,* 1124–1131.

Vancouver, J. (1997). The application of HLM to the analysis of the dynamic interaction of environment, person and behavior. *Journal of Management, 23,* 723–746.

Vancouver, J., & Putka, D. (2000). Analyzing goal-striving processes and a test of the generalizability of control theory. *Organizational Behavior and Human Decision Processes, 82,* 334–362.

Vancouver, J. B., Thompson, C. M., Tischner, E. C., & Putka, D. J. (2002). Two studies examining the negative effect of self-efficacy on performance. *Journal of Applied Psychology, 87,* 506–516.

Vancouver, J. B., Thompson, C. M., & Williams, A. A. (2001). The changing signs in the relationships between self-efficacy, personal goals, and performance. *Journal of Applied Psychology, 86,* 605–620.

Vroom, V. H. (1964). *Work and motivation.* New York: Wiley.

Weinberg, R. S., Gould, D., Yukelson, D., & Jackson, A. (1981). The effect of preexisting and manipulated self-efficacy on a competitive muscular endurance task. *Journal of Sport Psychology, 4,* 345–354.

White, J. (1982). *Rejection.* Reading, MA: Addison Wesley.

Whyte, G., & Saks, A. (1999). Expert decision making in escalation situations: The role of self-efficacy. Manuscript submitted for publication.

Whyte, G., Saks, A., & Hook, S. (1997). When success breeds failure: The role of perceived self-efficacy in escalating commitment to a losing course of action. *Journal of Organizational Behavior, 18,* 415–432.

Williams, S. L. (1992). Perceived self-efficacy and phobic disability. In R. Schwarzer (Ed.), *Self-efficacy: Thought control of action* (pp. 149–176). Washington, DC: Hemisphere Publication Services.

Wood, R. E., & Bandura, A. (1989). Social cognitive theory of organizational management. *Academy of Management Review, 14,* 361–384.

Zimmerman, B. J., Bandura, A., & Martinez-Pons, M. (1992). Self-motivation for academic attainment: The role of self-efficacy beliefs and personal goal-setting. *American Educational Research Journal, 29,* 663–676.

Received October 25, 2001
Revision received April 16, 2002
Accepted April 18, 2002 ■