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MECHANISMS OF SELF-REGULATION: A SYSTEMS VIEW

Paul Karoly

Department of Psychology, Arizona State University, Tempe, Arizona 85287-1104

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INTRODUCTION

At the turn of the century, when the nascent discipline of psychology sought to appraise consciousness in both its mentalistic (James 1892) and physiologic (Wundt 1910) manifestations, the "problem of volition" emerged as a central

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issue. James's ideas about the complex and multilevel relations among thought, affect, will, self, and attention were informed by his medical training, his unificationist leanings, and his wariness of the dualities and fruitless debates of the past. James's *will,* like Freud's (1923) *ego,* became the object of "scientific" scrutiny, a dynamic state "variable" to be analyzed as well as localized within a larger system, rather than a static organismic quality or faculty invoked post hoc as a pseudoexplanation. Notably ambitious, the Jamesian, Wundtian, and to a lesser extent the Freudian and Neo-Freudian agendas and their methods of investigation were eventually eclipsed and undermined by the rise of positivism, mechanism, and reductionism, and by the general sense that the elimination of concepts like consciousness and volition enabled significantly more parsimonious but no less powerful explanations of psychological phenomena. Further, by equating volition with "free will," the psychology of self-determination was written off as blatantly nonscientific (cf Howard & Conway 1986; Secord 1984; Silver 1985; Westcott 1985).

Whether we are currently in the midst of a "conative revolution," a Kuhnian paradigm shift, or a natural recycling of conservable ideas is not clear; but the empirical analysis of voluntary action management, or *self-regulation,* is a healthy and growing enterprise as psychology moves into the 21st century. The resurgence of interest in the presumably measurable and manipulable capacity for self-guidance undoubtedly has multiple roots, including the demise of logical positivism; the successes of cognitive psychology in explicating the processes involved in the retrieval and storage of information; the importation of concepts from digital computing, cognitive neuroscience, cybernetics, and artificial intelligence into applied psychology; the broadening of psychodynamic models and their integration within mainstream psychology; and the liberalization of American learning theory that began in the 1950s. Cultural, economic, and political forces have likewise been at work during the last few decades of the 20th century, creating a climate conducive to personal and societal expressions of individualism, responsibility, autonomy, and freedom of choice (Mahoney 1991; Westcott 1988).

The reintroduction of self-regulation and related concepts into contemporary psychology has not been restricted to a single subdiscipline.[1] Self-regulatory constructs and models are highly visible in such domains as personality (Cantor & Zirkel 1990; Carver & Scheier 1981; Mischel 1973; Mischel et al 1989; Singer & Bonanno 1990), motivation/emotion (Bandura 1991; Deci 1980; Gollwitzer 1990; Heckhausen & Kuhl 1985; Kuhl & Kazen-Saad 1988), social psychology (Beckmann & Irle 1985; Fiske & Taylor 1991; Higgins et al

[1] Among the terms used (often interchangeably) to denote a capacity for self-regulation are freedom, autonomy, agency, responsibility, maturity, ego-strength, willpower, self-control, choice, purposiveness, self-direction, voluntary action, self-sufficiency, morality, consciousness, free will, independence, conscientiousness, self-discipline, intentional action, self-intervention, intrinsic motivation, self-determination, and volition.

1986; Koestner et al 1992; Markus & Wurf 1987), clinical/abnormal (Glasser 1984; Hilgard 1986; Josephs 1992; Kanfer & Schefft 1988; Karoly & Kanfer 1982; Marlatt & Gordon 1985; Meichenbaum 1985; Semmer & Frese 1985; Shapiro 1965; Watson & Tharp 1989), developmental psychology (Brandtstädter 1989; Kopp 1982; Power & Chapieski 1986; Zivin 1979), health psychology/behavioral medicine (Brownell 1991; Ewart 1991; Goodall & Halford 1991; Holroyd & Creer 1986; Karoly 1991a,b), education (Ames & Ames 1989; Brown 1987; Newman 1991; Pintrich & Garcia 1991), industrial-organizational psychology (Cervone et al 1991; Kanfer & Kanfer 1991; Locke & Latham 1990; Wood et al 1990), and experimental psychology (Libet 1985; Logan & Cowan 1984; MacKay 1984; Norman & Shallice 1986; Pribram 1976; Stelmach & Hughes 1984; Weimer 1977), among others.

Expectable divergences in content emphasis and preferred investigatory methods mark the contemporary psychologies of self-regulation. These subdisciplines share, however, an aspiration to transcend longstanding philosophical debates over the conditions under which the proximate causes of action may be identified (cf Brand 1984; Lennon 1990). To achieve their empirical objectives, self-regulation researchers of all persuasions employ operational and context-specific definitions and an a priori partitioning of regulatory processes, outcomes, and putative mediators. Despite an absence of paradigmatic consensus, the following multi-element definition can be offered as a conceptual roadmap and organizational aid:

> Self-regulation refers to those processes, internal and/or transactional, that enable an individual to guide his/her goal-directed activities over time and across changing circumstances (contexts). Regulation implies modulation of thought, affect, behavior, or attention via deliberate or automated use of specific mechanisms and supportive metaskills. The processes of self-regulation are initiated when routinized activity is impeded or when goal-directedness is otherwise made salient (e.g. the appearance of a challenge, the failure of habitual action patterns, etc). Self-regulation may be said to encompass up to five interrelated and iterative component phases: 1. goal selection, 2. goal cognition, 3. directional maintenance, 4. directional change or reprioritization, and 5. goal termination.

Self-regulatory skills and processes, as presently conceived, are related to, but remain conceptually distinct from beliefs, attributions, preferences concerning freedom of choice or desirability of control, general intellective capabilities, and biochemical or neurophysiological systems of internal state regulation (homeostasis).

PARADIGM VARIATIONS AND BASIC MODELS

By far the largest empirical literature on mechanisms of self-regulation concerns various aspects of the goal execution sequence (i.e. maintenance, change, and/or termination of action). To be fully appreciated, however, the

major regulatory functions should be considered in the context of the theories that proclaim them, the paradigms that contain them, and the surrounding superstructure provided by the less frequently studied (but nonetheless influential) components or phases of the regulatory cycle.

Procedural, Epistemic, and Conceptual Divergence

Investigators of human self-guidance processes can be distinguished not only on the basis of their theoretical (or metatheoretical) allegiances and their investigatory objectives within the regulatory cycle but also by (*a*) their preference for controlled laboratory simulations vs naturalistic or correlational designs; (*b*) the degree of their interest in social-contextual modifiers, individual differences, maturation, biological parameters, or other factors potentially interacting with "core" mechanisms; (*c*) their focus upon basic or normative vs applied or "clinical" phenomena; and (*d*) their choice of dependent measures, including short-term task performance, extended activity patterns ("self-help", "independent living", "medical compliance"), and the dynamics of self/performance appraisal associated with self-generated motivation (e.g. patterns of self-reward, attributions of self-efficacy, ratings of intrinsic interest, and the like).

Further, in contrast to the experimental anatomization of a psychological process that preserves the temporal integrity of the targeted phenomenon, as in the decomposition of reaction time (Sternberg 1969), investigators of human self-governance have generally opted for the strategy of segmenting and isolating regulatory phases or subfunctions. No research program has ever tackled the entire sequence from goal choice to goal attainment for obvious practical reasons and because the component processes tend to be indexable at different levels, nonrecursive, and difficult to identify in vivo. However, an unfortunate consequence of the artificial (but artful) parsing of a complex, contextually embedded stream of events is the tendency for mechanisms to be analyzed singly (overlooking possible compound effects), via unique paradigmatic renderings, in relation to only a subset of potential outcomes, and with regard to but a portion of the complete regulatory cycle. The difficult trip that many regulatory variables and assessment modes experience in transport between the laboratory and clinic and the absence of a seamless integration of hypothesized causal mechanisms may be traced, at least in part, to prevailing analytic technologies.

Models of self-regulation have sprung from a variety of sources—philosophical exegeses, clinical insights, laboratory studies, and the tenets and ramifications of control-systems engineering—making for an interesting, if not wholly compatible, mix of interpretive metaphors. Theories can be roughly divided into those that address off-line preparation for action via goal selection and schematic organization and those that address on-line goal pur-

suit via diverse aspects of performance monitoring and evaluation (phases 1 and 2 vs phases 3, 4, and 5 of the process described above).

Goal Selection

The achievement of any personal objective is logically predicated upon the selection of at least a tentative directional path (or set of paths) from among diverse and sometimes conflicting alternatives—but with the important recognition that deciding upon, intending, wishing for, or anticipating an outcome does not alone guarantee its accomplishment (Heckhausen 1991; Heckhausen & Kuhl 1985). Nevertheless, goals remain the quintessential psychological construct—symbolic structures with presumptive causal significance. Unfortunately, many investigators implicitly foreclose the analysis of variations in the preparatory or representational components of motivation by assigning goals to research participants or by operationalizing them narrowly and in relation to proximal determinants.

For example, social psychological approaches to *intention* or *commitment* (e.g. Fishbein & Ajzen 1975; Kiesler 1971) focus not on the unconstrained choice of goal paths but on the factors (typically interpersonal) that compel the actor to follow through on his/her stated intentions. Some operant perspectives (Dulany 1961; Kanfer & Karoly 1972) have centered upon the conditionability of intentions rather than upon their natural emergence (although most radical behaviorists still deny that intentions can ever serve as action motivators). Although the content of children's motivational action patterns has been the subject of social-learning based studies, the specific target of socialization has tended to be either prosocial (moral) or self-constraining goals (delay of gratification, resistance to temptation) often operationalized in a laboratory context and likewise randomly assigned to participants (Mischel & Mischel 1976). Within educational psychology, efforts are under way to classify goal contents (Ford & Nichols 1987, 1991) and to examine the impact of goal types (e.g. self-set vs other-set, intrinsic vs extrinsic, or performance vs mastery goals) upon outcomes such as learning, sustained interest, or the maintenance of effort/performance (cf Deci & Ryan 1985; Dweck 1986; Harackiewicz et al 1984; Lepper & Hodell 1989). However, the study of goals as dependent variables remains infrequent.

Recently, Cantor & Fleeson (1991) addressed what they termed the *goal definition* process, asserting that differential goal selection has been ignored by theorists and researchers in favor of the more readily examined performance-centered subprocesses and mechanisms that seem to function as "goal independent general purpose modules." Cantor & Fleeson speculate that sources of influence, both self-relevant (needs and motives) and contextual (cues to age-graded or normative expectancies), serve to shape the definitional (goal selection) process [see also Markus & Wurf's (1987) discussion of the role of self-definition in self-regulation].

Goal Cognition

Assuming that goal choice is driven (at least partially) by the power of personal identity and the ubiquity of sociocultural forces, and that real time goal pursuit is managed by various on-line processing mechanisms (to be discussed), individuals must additionally be presumed to possess a relatively stable and potentially retrievable *mental model, action schema,* or *script* by means of which active goals are propositionally specified, evaluated, and organized as well as stored. The striving-referent thoughts, appraisals, construals, or abstracting qualities are here collectively labelled *goal cognition*—an emergent domain of empirical investigation (e.g. Cantor & Zirkel 1990; Emmons 1986, 1989; Karoly 1991b; Little 1983; Snyder et al 1991).

Goal cognition has been found to predict various indexes of mental and physical health status in the absence of any formal assessment of people's declarative knowledge base, instrumental skill repertoire, or instantiation of specific goal-coordination mechanisms (cf Emmons 1992; Emmons & King 1988; King & Emmons 1990; Omodei & Wearing 1990; Palys & Little 1983; Ruehlman & Wolchik 1988).

Goal representations or construals also serve a higher-order *governing function* (Ford 1987); that is, by virtue of their content, level of abstraction, and structural organization, they can store, organize, transform, and activate information about self, world, and self-world transactions so as to potentially aid in the mobilization of goal-directed behaviors. A key content feature of goal construal involves motivational or value *preference,* i.e. the specification of what is personally desirable or undesirable. Wants, passions, wishes, hopes, strivings, and the like represent commonplace goal-construal elements with clear affective connections. Of all the things one can develop passionate aversions or attachments to, only some motivational preferences are targeted for action. These are called *commitments,* a second important class of goal-representational content. Finally, although one may prefer an outcome or its absence and be committed cognitively to attaining it, one may not work to achieve or avoid it unless there is an anticipation or expectancy that serves to trigger selective preparation and the expenditure of effort (cf Bandura 1986; Ford 1987; Kuhl & Kazen-Saad 1988). The best-known and most systematically researched anticipatory goal representation is self-efficacy, defined by Bandura (1986) as involving "people's judgments of their capabilities to organize and execute courses of action required to attain designated types of performances" (p. 391).

Over the years, investigators interested in measuring not only goal types but the organizational attributes of goal representation have orchestrated assessment systems that access the value-preference, commitment, and anticipatory features of goal cognition. Klinger (1977), for example, fashioned a detailed procedure for explicating goal-directed strivings, which he labeled

current concerns. Using both interview and questionnaire procedures, Klinger and his colleagues (Klinger et al 1981) require subjects to list goals and rate them along dimensions such as level of commitment, time availability, expectancy of success, and the like. Little's (1983, 1989) Personal Projects Analysis (PPA) system involves an elicitation of goals, followed by a rating procedure incorporating 17 goal-construal dimensions that cluster into the following five factors: efficacy, meaning, structure, stress, and community. Little's factors reflect a multifaceted mental modeling process wherein projects (defined as a set of interrelated acts, extended over time, intended to achieve or maintain a desired state) are construed as variably worthwhile (meaning), capable of progressing (efficacy), organized (structure), demanding (stress), and visible/supportable by others (community). A number of active investigators (including Emmons and Cantor and their associates) employ similar protocols for the assessment of goal-construal content.

Level of abstractness of goal construal is yet another dimensional attribute that has been postulated to influence the success of the regulatory cycle (Carver & Scheier 1990; Emmons 1992; Powers 1973; Vallacher & Wegner 1989). Little (1989), for example, has sought to capture the hierarchical nature of goals (personal projects) through what he calls "phrasing level analysis." He notes the distinction between the intention to "return my neighbor's ladder" and the goal of "liberating my people" as marking the extremes for an individual, and then discusses the tradeoff between meaning and manageability that needs to occur in order that psychological well-being be maintained. Substituting the concept of *personal strivings* for projects, Emmons (1992) has shown that, in fact, high-level strivers experience greater psychological distress but less physical illness than their low-level-striving peers, who report less negative affect but a greater number of physical symptoms.

Finally, the structural relations among the goals in one's experiential "active file" have long been of interest to theoreticians, particularly as regards incompatibility or conflict (cf Lewin 1926, 1935; Miller 1944; Murray 1938). Several contemporary investigators have assessed the internal conflict among goals for individuals as well as the conflict between the goals of social dyads and have discerned behavioral and emotional consequences associated with incompatibility, ambivalence, and active goal hindrance (e.g. Emmons & King 1988; King & Emmons 1990; McKeeman & Karoly 1991; Ruehlman & Wolchik 1988).

Strategic, On-Line Goal Coordination: The Systems Base

That countless regulatory objectives have occupied the attention of social and behavioral scientists over the years attests (*a*) to the importance our society places on the individual's potential to decide, act, feel, express, think, perceive, and change as his/her intentions/needs dictate, and (*b*) to the equally compelling awareness that barriers, both internal and external, limit the actual-

ization of this potential.[2] Although humanistic psychology has underscored the generative power of self-determination and aptly characterized its experiential nature (e.g. Maslow 1971; May 1953), the task of demystifying and systematically unpacking the cognitive/perceptual and behavioral operations underlying goal directedness has fallen to the more experimentally minded. In attempting to build models of self-regulation, researchers and theoreticians have largely focussed on the pragmatics of post-decisional action management (phases 3–5 of the regulatory cycle, noted above)—the so-called *goal-striving* portion of the motivational loop (cf Lewin et al 1944).

Based upon a century-old insight attributed to William James (cf Powers 1989), that humans are "unique" in nature because they can produce consistent ends by variable means, a number of contemporary (post-1960) models of dynamic self-regulation have been developed under the imprimatur of cognitive theory, control/systems science, cognitive social learning, or European action theory. All presume that on-line regulation is a dynamic process, continuous and holistic rather than linear, built upon the operation of feedback (knowledge of results) and feedforward (standard-produced disequilibrium), sensitivity to action-produced environmental changes, the accessibility of goal representations, and a capacity for the selective mobilization of energy, attention, and relational judgment. The output of any regulatory process is dependent upon the uptake of information and its relatively unconstrained flow within the person and between the person and his/her social world. Goals exist within such a framework as reference values or standards of comparison (e.g. Bandura 1986; Carver & Scheier 1981, 1990; Ewart 1991; Ford 1987; Hyland 1988; Kanfer & Hagerman 1981; Kanfer & Karoly 1972; Miller et al 1960; Powers 1973). The theories differ in the way the components are configured and in which elements are emphasized. Yet all converge in their allegiance to a multi-element, closed-loop, mediational perspective on human self-guidance.

PROXIMAL VOLITIONAL REGULATORS

Ford's (1987) "living systems" perspective, an excellent synthesis of many regulatory models, offers *negative feedback control* as the primary organizing metaphor and specifies six interrelated functional capabilities to serve as the constituents of goal-directed, self-organizing, adaptive systems.

2 Included among the clinical or applied targets of volitional self-regulation are the coordination of skilled behaviors such as studying, simple and complex job performances, and interpersonal transactions; the management of stress, anxiety, or other affective experiences; the control of attentional/cognitive processes that presumably mediate action (e.g. thoughts, images, verbal cues); the modulation of somatic experiences or symptoms, such as sleep, pain, energy level, and body awareness; and the gaining of indirect jurisdiction over the experiential correlates of behavior, thought, and emotional control—such as quality of life, perceived freedom, and the sensed availability of time.

The goal or purpose toward which the actor is directed is called the feedforward, command, set-point, or *directive* function. When engineers use the term, they are discussing a value or objective programmed dispassionately into a machine. In living-systems terms, the directive function is the product of goal-choice socialization and the vagaries of goal cognition (discussed above). Insofar as proximal goal guidance is concerned, the directive function reduces to a standard or criterion for the performance of a specific act or set of acts. Although the overall "goal" may involve "Getting into graduate school," it must be skillfully translated into subgoals whose defining structural properties (e.g. difficulty, specificity) determine the likelihood that the next functional component, the *comparator,* will be engaged.

The comparator, or *regulating function,* addresses the fit between the current status of the regulatory objective and the desired status. The system has access to information about the current status of things owing to an *information collection function* that feeds the data back to the comparator. The comparator is therefore designed so as to match two signals: the set point (command) signal that is fed forward from the directive function ("This is what I desire") and the feedback signal delivered by the information collection function ("This is what I've achieved thus far").

Should a mismatch be detected between the two signals, the discrepancy information is fed forward to a *control function* that selects a course of action and then to an *action function* that produces environmental effects. Finally, because every activity expends energy, the system must have a source of power, labeled the *arousal function.*

It should be clear that the regnant principle of self-regulation, *negative feedback control,* is more aptly viewed as a complex set of interrelated mechanisms (including feedforward) whose coordinated functioning is a prerequisite of adaptive flexibility. No consensus yet exists about the necessary and sufficient volitional regulators. I outline next the mechanisms currently thought essential to negative feedback control (broadly construed).[3]

Goal (Standard) Setting

Several theoretical accounts of self-regulation emphasize the view that its analysis can occur at distinct levels of explanation (e.g. Carver & Scheier 1990; Locke & Latham 1990; Powers 1973) and that the most practical is the action-centered, efficient-cause level. To predict current performance, one must focus upon task-specific goal content (specificity, difficulty, complexity,

3 The need to construe "negative feedback control" in broad terms is dictated by the desire not only to achieve explanatory comprehensiveness but also to avoid groundless criticisms of control theory as being monolithically tied to discrepancy reduction as its core and only motive principle (cf Locke & Latham 1990). Clearly, the constant presence and reprioritization of preferences and hoped-for possibilities introduce disequilibrium into the control system alongside the equilibrating structure afforded by negative feedback (discrepancy-reducing) mechanisms (Appley 1991; Bandura 1988).

and conflict) and goal intensity (factors influencing task engagement or commitment, such as expectancy and self-efficacy). This is the perspective offered by Locke & Latham's (1990) *goal-setting theory*, perhaps the leading self-regulation model in contemporary industrial-organizational psychology. Goals are said to affect job performance by channeling attention, mobilizing on-task effort (in proportion to task difficulty), sustaining performance over time, and stimulating strategic planning. However, their facilitative effects can be moderated by such factors as availability of feedback, task complexity, commitment, ability, and knowledge. Bandura's (1986) social-cognitive theory likewise emphasizes the "goal properties" of specificity, challenge, proximity, strength of commitment, and degree of participation in goal selection. The influence of the various goal-setting variables is usually complex and interactive, with some relationships yielding consistent findings (e.g. specific, difficult goals to which one is committed produce higher-quality performances than do vague, easy goals toward which one is not attracted) and others being less clear (proximal goals mobilize performance accomplishment/persistence to a greater degree than do distal goals in some studies, fail to differ from distal goals in others, and yield inferior effects in still other experiments) (cf Tubbs 1986).

For present purposes, several points can be made about the goal- or standard-setting literature. First, it helps to bridge the ostensibly distinct domains of goal selection/goal cognition (the off-line, higher-order processes that serve as distal volitional regulators) and goal striving. The schematic *goal construals assessed* by Little, Cantor, Emmons, and others in longitudinal or field studies concerned with predicting mental health, well-being, stress, or activity choices resemble the sorts of *goal properties manipulated* by goal-setting researchers studying performance in classrooms and work settings (cf Kanfer & Kanfer 1991; Lee et al 1989; Schunk 1991).

However, because goal cognition derives from sources other than direct performance feedback (socialization, self-identity, "needs" for consistency and self-esteem) and involves value preferences and symbolic transformations of experience, there need not be a perfect correspondence between the representational domain (how one thinks about goals) and the executional domain (how effectively or hard one works under the immediate influence of task demands and instructions). Indeed, the distinctiveness of the two domains helps explain the difficulty people often encounter in clinical self-change efforts (Kuhl & Kazen-Saad 1988). Research and theorizing at the interface of the representational and executional models, such as Bandura's (1986) work on self-efficacy, Eisenberger's (1992) studies of "learned industriousness," and R. Kanfer & Ackerman's (1989) work on attentional resource allocation, may help to clarify the sometimes tenuous connections between distal and proximal elements in the self-regulatory stream.

Self-Monitoring

An adapting organism is constantly collecting, transforming, and utilizing information within an "open system" context—a process that allows for growth, change, and self-regulation (Ford 1987). Goal-directed organisms selectively attend to and perceive information that bears upon their directive or command functions; that is, goals (intentions, projects, concerns, etc) drive our perceptions of our mental and sensory states and of our self/environment transactions (Klinger 1977). This status check upon internal events and the results of expressive or instrumental activity is called, in a somewhat oversimplified fashion, *self-observation, self-monitoring,* and on occasion (when the individual keeps a written account of what has occurred) *self-recording* (Kanfer & Karoly 1972; Kazdin 1974; McFall 1977; Nelson 1977). Perhaps a better term would be information, input, or disturbance monitoring. In any case, it is clear that systematic, self-consciously guided movement toward or away from a goal or subgoal cannot occur in the absence of deliberate attention to qualitative and quantitative aspects of ongoing performance.

Of course, not all goal-directed movement need be conscious or deliberate. Indeed, when skills are overlearned or automatized, self-regulation is not an issue and self-monitoring is potentially disruptive. Self-monitoring is, therefore, often the first stage in multistage models of self-regulation (e.g. Bandura 1986; Kanfer & Karoly 1972; Kanfer & Hagerman 1981) as it signals a temporary disengagement from automaticity, or a transition from "mindlessness" to "mindfulness" (Langer 1989). Note, however, that when Bandura (1986) declares that "self-observation is not simply a mechanical tracking or registry process" he is alerting us to the multiple antecedents of self-monitoring and its myriad effects, while cautioning us against any literal interpretation of regulatory stages, steps, or sequences (such as self-monitoring → self-evaluation → self-reward). Among the potential determinants of self-observation, in addition to such obvious ones as response failure, sudden environmental change, or social prompts, are moods, self-conceptions, values, and self-attentional proclivities, as well as the effects of supposed postmonitoring mechanisms, such as self-evaluations and -attributions. Among the multiple consequences of self-observation are the collection of goal-relevant information, the enhancement of motivation, and the triggering of self-reflective (judgmental) responses that may alter the occurrence of monitored events or the accuracy with which they are enumerated (cf Bandura 1986; Kanfer & Karoly 1972; Kazdin 1974; Nelson 1977).

When behavioral models predominated in self-regulation research, self-monitoring was usually directed at specific target responses (such as the number of cigarettes smoked or the number of homework pages completed). However, people can monitor not only what they do, but also the environmental vs self-directed influences on their behavior (Kanfer & Hagerman 1981), the *rate* at which they are approaching their goals (a process called

metamonitoring; cf Carver & Scheier 1990), and the somatic (affective, arousal-based) consequences of goal pursuit (Pennebaker et al 1985).

The Activation and Use of Standards

Having a goal (or a specific performance level to which one aspires) and being able systematically to surveil goal-relevant activities do not alone provide the impetus to self-regulated modulation of thought, affect, or behavior. Before the all-important comparison of the feedforward and the feedback signals can occur in human control systems, the goal or standard must be triggered, activated, or called up from long-term memory. Unlike mechanical servomechanisms whose instructions (goals) are unambiguous, fixed, and unconflicted, human beings are best viewed as pluralistic (multiple-minded as opposed to single-minded) computational systems whose purposes can be assigned to distinct modules that can either compete or cooperate with one another, can be arranged either in a serial or parallel fashion, and can exist in either an activated or a deactivated state at any given time (Navon 1989; Simon 1967). Unless we wish to postulate a homunculus that activates and supervises an enormous and ever-changing agenda of intentions, we must conclude that most goals are "in a queue" as Simon (1967) suggests, waiting to be called into service by the proper environmental circumstance, an internal motive, or via communication with the dominant goal(s) of the moment.

What circumstances, specifically, activate intentional or strategic propositions (goals) presumably stored in working memory? In most experimental research, standards are triggered by clear and compelling instructions and/or incentives and the social demand characteristics intrinsic to the setting (Greenwald 1982). In less-contrived settings, certain external features and internal events can also trigger a mental consideration of one's self-aspects, including but certainly not restricted to one's salient goals. Inspired by the work of Duval & Wicklund (1972), Carver & Scheier (1981, 1990) assumed (*a*) that attention fluctuates between the outside world and the self, (*b*) that certain stimuli such as audiences, mirrors, or physiological arousal direct attention toward the self, and (*c*) that once a person is focused upon him/herself (regardless of what induced the self-focused attention) there is a tendency to compare his or her present state against a behavioral standard. In a series of experiments, Carver & Scheier demonstrated that, in control-theory terms, self-focused attention can *activate the relevant comparator* and, all else being equal, *promote self-regulation* by encouraging discrepancy-reduction efforts.[4]

Laboratory studies of self-regulation generally allow for little variation in the types of standards that subjects access. If, for example, the experimental

[4] Of course all else is seldom equal; thus, when subjects are fearful or have low self-confidence about performance, a heightened self-focus engages the comparator and precipitates withdrawal (or giving-up) rather than task persistence (Carver & Scheier 1990). Bear in mind also that self-focus in the Carver/Scheier model activates the comparator, not the standard per se (which is usually triggered by situational relevancy cues).

task involves anagram solution, then subjects access intellectual standards rather than standards of athletic or sexual performance. In many contexts outside the laboratory, the cues, demands, or "opportunity structures" are such that the "appropriate" goal or standard is readily called into service. However, some situations are ambiguous and/or multidimensional, potentially activating multiple and possibly incompatible standards while accentuating individual differences in on-line standard (goal) selection and representation. In this regard, the work of Higgins and associates (1987; Higgins & Moretti 1988; Higgins et al 1986) is instructive. Higgins and his colleagues propose at least three distinct types of self-evaluative standards: factual points of reference, imagined possibilities (see also Markus & Nurius 1986), and acquired guides, the last of which involves the sorts of personal or normative self-relevant anchors usually discussed in the self-regulatory literature. Further, different standards can be employed at different stages in the process of evaluation, yielding different emotions. Finally, these investigators assert that either nonnormative *selection* of standards from the above-noted types or the nonnormative *use* of standards (i.e. application of the right type of standard but at the wrong stage of information processing) may form the basis for aberrant self-relevant beliefs, e.g. (delusions).

Discrepancy Detection, Self-Evaluative Judgment, Self-Consequation

A pivotal regulatory operation occurs when an activated personal standard is juxtaposed against the knowledge of one's current performance (gathered via self-monitoring or direct external feedback)—namely, the process of comparison and discrepancy detection. The evaluative reactions that follow are believed to be central to self-motivation, and depend upon the joint availability of standards and knowledge of results (e.g. Bandura & Cervone 1983).[5] Evaluative, "matching-to-standard" reactions are believed capable of guiding behavior not only through their invocation of prescriptive requirements (the feedforward or directive function), but also by their recruitment of effort and energy (when performance falls below expected levels of excellence) and self-satisfaction and pride (when standards are met or surpassed). Social learning conceptions of self-motivation (Bandura 1986; Kanfer & Karoly 1972) presume further that the conditional discrimination of criterion matching precipitates self-reward, whereas the failure to match occasions self-punishment (cf also Grimm 1983; Spates & Kanfer 1977).

However, self-evaluations or detected discrepancies do not act as reflexive "autoregulators" of action. Although from a purely engineering (cybernetic) perspective, the standard of correctness is "physically embodied as a perfectly

5 We can assume, for the moment, that people are always motivated to compare standards with feedback and are always willing to recognize and own up to discrepancies, should they exist. These assumptions, which hold for well-constructed mechanical systems, may not be justified under conditions considered below, in the section on Self-Regulatory Failure.

real physical reference signal inside the control system" (Powers 1986:152), in human self-regulators the rule-generation and rule-following routines are variable and subject to moderating influences. Recognition of the complexities inherent in the supposedly straightforward process of standard matching (*a*) may help reconcile control-theory formulations with those (e.g. Ellis 1976; Orth & Thebarge 1984) that proclaim self-evaluation to be intrinsically pathogenic, (*b*) underscores the importance of affective processes in self-regulation, and (*c*) paves the way for systematic analyses of self-regulatory failure.

Illustrative of the sensitivity of self-reactive judgment to contextual influences are the following sorts of findings: (*a*) that the degree of increase in effortful behavior following feedback regarding substandard performance is greater for individuals high in self-efficacy than in those low in self-efficacy (Bandura & Cervone 1983); (*b*) that performance in achievement situations varies with whether the standards are self-set or externally determined (Schunk 1989); (*c*) that the degree of mismatch or displacement between performance and standard affects effort and self-appraisal (Bandura & Cervone 1986); (*d*) that the effects of negative evaluation following substandard performance on complex tasks are opposite to those found on simple tasks—namely performance/effort is reduced (Cervone et al 1991); (*e*) that satisfaction is related not only to the absolute level of discrepancy between performance and standard but also to the rate at which the performance changes over time (Carver & Scheier 1990; Hsee & Abelson 1991); and (*f*) that social comparisons can affect the self-reward process, as, for example, when self-reward after successful performance is diminished if others are known to have performed better, and self-punishment after poor performance is diminished if others are known to have performed worse (Karoly & Decker 1979).

The Implementation of Discrepancy-Reduction Skills

In a self-regulating machine such as a thermostatically driven air conditioner or a guided missile, the action function is, as Powers would say, a physical embodiment—a built-in component designed either to operate effectively or be repaired/replaced. In humans, the action function is learned, is subject to interference or deterioration, and can hardly be expected to "kick in" automatically when needed. Most laboratory studies of self-regulation have involved either motor tasks or problem-solving tasks well within the physical or intellectual capabilities of the participants. When difficult or novel tasks are employed, ability must be considered in concert with motivational parameters (R. Kanfer & Ackerman 1989).

In the realm of goal-directedness, "regulation" denotes trajectory correction operations that help either to "stay the course" against obstacles or to recalculate it (often against such powerful contravening contingencies as temptation by an addictive substance). Closing the gap between intention and execution

therefore often requires the recruitment of dynamic and diverse discrepancy-reduction mechanisms.[6]

Among the active cognitive-behavioral mechanisms considered useful (with no presumption of necessity or sufficiency) in correcting standard-feedback mismatch are (*a*) attentional resource allocation (R. Kanfer & Ackerman 1989; Norman & Shallice 1986); (*b*) effort mobilization (Wright & Brehm 1989); (*c*) planning and problem solving (Berger 1988; Hayes-Roth & Hayes-Roth 1979; Sternberg 1982); (*d*) verbal self-cueing (Bem 1967; Hartig & Kanfer 1973; Kanfer et al 1975; Meichenbaum 1977); (*e*) facilitative cognitive sets or expectations (Bandura 1986; Gollwitzer et al 1990; Rosenbaum 1990); (*f*) stimulus control or milieu selection (Kanfer & Gaelick-Buys 1991; Thoresen & Mahoney 1974), and (*g*) mental control/thought suppression (Wegner & Schneider 1989).

Self-Efficacy

In addition to goal-setting and self-evaluative reactions, social-cognitive theory (Bandura 1986) invokes self-efficacy judgments as a third mechanism underlying cognitively based motivation. The theory of self-efficacy (Bandura 1977), a member of a family of conceptual models concerned with personal effectiveness, mastery, or control (cf Maddux 1991; Maddux & Stanley 1986), postulates that broad-based knowledge and specific monitoring and discrepancy-reduction skills are insufficient to insure goal-based performance—as witnessed by the fact that people often do not do what they are perfectly capable of doing. Self-referent thought is believed to mediate the relation between wanting/knowing and action. The belief in domain-specific personal efficacy, in contrast to beliefs about performance consequences (outcome expectancies), is the self-referent, generative capability that stands out as a singularly powerful self-motivating force. Recognizing that efficacy estimates arise (partly) from performance accomplishments does not detract from their putative role as action regulators; thus self-efficacy judgments can serve as predictors and/or dependent variables in research.

Over the years, Bandura and others have demonstrated the significant contribution of self-efficacy judgments to such diverse outcomes as the regulation of approach/avoidance and/or distress responses to fearful stimuli (Bandura et al 1982; Biran & Wilson 1981; Gattuso et al 1992; Ozer & Bandura 1990), smoking cessation/relapse (Condiotte & Lichtenstein 1981; Godding & Glasgow 1985; Haaga & Stewart 1992; Owen & Brown 1991), the perception and tolerance of physical pain (Baker & Kirsch 1991; Bandura et al 1987; Jensen

6 Early social-learning models (Bandura 1969; Kanfer & Karoly 1972) depicted the primary task of self-regulation as the taking over ("internalization") of external contingencies. Standards of conduct were viewed as "socially transferable and conditionable," with failure to adhere to them the result of the nonoperation of covert reinforcement practices. Thus, a discrepancy between standard and performance could be rectified by self-generated punishment for inappropriate actions and/or self-reinforcement of behavior-goal correspondence.

et al 1991; Litt 1988; Manning & Wright 1983; Vallis & Bucher 1986), the use of decisional strategies and the control of performance in complex organizational tasks (Bandura & Jourden 1991; Cervone et al 1991), and the process of stress coping and its immunologic correlates (Bandura et al 1988; Wiedenfeld et al 1990), among others. Although not without its critics (Corcoran 1991; Eastman & Marzillier 1984; Kirsch 1985; Powers 1991), the theory of self-efficacy has generated a considerable body of research that has illuminated the role of one major type of self-referent thought (operating in concert with other regulatory mechanisms) across an impressive array of applied domains.

The social-cognitive construct of "self-referent thought" may, however, be somewhat limiting, in that attributions concerning personal mastery do not encompass the full range of schematic goal-relevant cognition. Along with expectancies, values, or goal preferences, beliefs regarding one's instrumental competence represent a type of "guiding" or anticipatory function that Ford (1987) has labeled *directive.* Yet, if we assume that individuals likewise evolve a set of beliefs or attributions concerning their skilled use of other goal-coordination mechanisms (constituting the regulatory, control, action, or arousal functions), then shouldn't these also be assessed and linked (in a domain-specific rather than traitlike fashion) to on-line patterns of behavior, thought, and emotional expressivity? Goal-centered action schemata that have been suggested, in addition to those reflected in the multiple, control-theory functions articulated by Ford (1987), include Read & Miller's (1989) mediating structures [goals, plans (strategies), beliefs (about the world), and resources] and those in Kuhl & Kazen-Saad's (1988) "five-systems model," incorporating the motivational preference system, the executional preference system, the volitional system, the emotional system, and semantic memory (in which all intentional and action-schematic representations are stored). In short, an empirical warrant exists for examining not only self-efficacy but also the complete spectrum of *goal-referent thinking,* including knowledge, attitudes, and attributions relevant to all proximal volitional regulators. Whether beliefs about monitoring, planning, self-evaluation, and the like are mere proxies for efficacy beliefs or have incremental utility as intention-action moderators remains to be determined.

METASKILLS AND BOUNDARY CONDITIONS

Not only do the proximal negative-feedback control mechanisms of human self-regulation need to be contextualized within the purview of the self-contained executive control system of which they are a part, but they likewise require referencing in terms of the multiple, simultaneously operating, and hierarchically organized subsystems responsible for the realization of intelligent (flexible) adaptation in the world. Although self-regulation is distinct from "intelligence," it is nonetheless dependent upon collateral competencies that aid in the computation and recomputation of goal trajectories across

changing environments and over time. I call these computational superstructures *metaskills*.

Metaskills

Because we can most effectively describe self-regulation in terms of phases and can most readily examine it via isolation of subfunctions, we might tend to think of the natural regulatory process as a relatively straightforward, sequential combination of constituent parts. Yet such a model would fail dismally to account for how we reach for a glass of water and bring it to our lips, let alone how we manage to study for an examination, lose 30 pounds, or write an *Annual Review* chapter (cf Bullock & Grossberg 1988; Kosslyn & Koenig 1992). The coordination of complex action is now believed to occur across multiple levels of computation whose functional outputs include (but are not limited to) the conscious, reasoning-centered, and potentially trainable regulatory skills discussed above.

Some computational superstructures are more obvious than others. For example, a goal or performance standard can only drive a comparator process if it is encoded as a perceptual signal, stored, and replayed at the proper time. Hence, memory and retrieval are clearly regulatory metaskills (Kuhl & Kazen-Saad 1988; Powers 1973; Wyer & Srull 1986). For most cognitive and instrumental discrepancy-reduction programs to function there must also exist a declarative knowledge base (facts) from which to build event schemas or action scripts (Singer & Salovey 1991). And, to the degree that flexibility and efficiency of goal directedness are desired, the control system should reflect a structural division of labor (specialization) on the one hand and decentralized (or distributed) processing on the other. The statement, above, that goals are "in a queue" should not be taken to imply that they are literally lined-up. Their organization is best seen as hierarchial (Carver & Scheier 1990; Mahoney 1991; Powers 1973). The functional status of one's regulatory hierarchy is not fixed, and depends, in part, on automatic or preconscious activation patterns and on the outcomes of low-level behavioral pursuits (Bargh 1990; Kimble & Perlmuter 1970; Vallacher & Wegner 1985). In a hierarchy, goals must both compete for expression and cooperate by communicating information across levels. This process is facilitated by what has been called *attention work* (Navon 1989), a process that represents yet another metaskill. Clearly, deficits in memory, attention, or knowledge will compromise the effectiveness of the proximal volitional regulators (as will the effects of automatic or inaccessible cognitive operators).

Some metaskills may not come to mind as readily when the negative feedback loop metaphor serves as our sole heuristic guide. Originating in a more experiential and person/environment-interaction analytic mode, social-cognitive theory (e.g. Bandura 1986) postulates several "basic capabilities" as essential to human functioning, including forethought, self-reflectiveness, the capacity to use symbols (images and language), the capacity to learn vicari-

ously, and, of course, the capacity to self-regulate. Volitional freedom, or the exercise of self-influence, requires the availability of all of these capacities acting in concert—a fact that the "machine analogy" sometimes causes us to overlook.

William James believed that holding the desired end state (or goal) "fast before the mind" was a prime animator of action and the all-important bridging element linking the present with the future (cf Cross & Markus 1990). The ability to envision vividly an intended outcome, to create a possible future that connects with the present as well as the past, to anticipate obstacles to symbolic, temporal projections, and to resist actively the episodic intrusions of reality into the realm of imagination is a superordinate mental capacity that should not be assigned to the neverland of *ceteris paribus*.

Forethought (and correlative constructs, such as perspective taking, planning, event simulation, mental control, mental rehearsal, daydreaming, problem solving, or creative imagination) can be assessed and empirically linked to a host of outcomes that include tolerance of delay in the receipt of reward (e.g. Patterson & Mischel 1975), the generation of positive or negative emotions (Cottle & Klineberg 1974; Wohlford 1966; Velten 1968), self-efficacy estimation (Cervone 1989), coping with stress (Taylor & Schneider 1989), behavioral compliance (Gregory et al 1982), and other key aspects of goal directedness.

In their provocative discussion of "event simulation," Taylor & Schneider (1989) suggest that the imaginal evocation of future events can serve as a means of controlling emotions. Further, change or maintenance of mood can be a mechanism of behavior control (cf Showers & Cantor 1985). Thus, we are reminded of yet another metaskill: affect regulation (or "emotional intelligence"; see Salovey & Mayer 1990).

Despite a plethora of theories of emotion and emotive experience, a viewpoint is emerging within which affect is naturally linked to goal-directed behavior. Essentially, it is asserted that diverse feeling states arise as a result of success, failure, frustration, slowing, or delay in the pursuit of goals (e.g. Carver & Scheier 1990; Emmons & Diener 1986; Frijda 1986; Higgins 1987; Lazarus 1991; Sloman 1987). Assuming the general utility of goal discrepancy-affect models, one can expect that individual goal trajectories will give rise to positive and/or negative arousal states that will on occasion become the targets of regulatory efforts, effectively transforming self-regulation into a high workload, dual-task (or multi-task) situation (Wickens 1984). The management of interpersonal emotional displays, emotional arousal, and/or emotional dynamics via cognitive, image-oriented, and/or instrumental means in order either to dampen (or forestall) the intrusive or biasing effects of mood or to accelerate or maximize the strategic goal-energizing effects of affect is an emerging topic of contemporary theory and research (cf Brewin 1989; Friedman & Miller-Herringer 1991; Frijda 1986; Kirsch et al 1990; Salovey & Mayer 1990; Taylor 1991; Wright & Mischel 1982).

Boundary Conditions

Two types of boundedness are worthy of brief consideration. First, *inferential boundaries* are the epistemic limits imposed by natural language habits and/or the surface implications of extant models. Consider, for example, the all-but-universal expectation that, whatever else self-regulation entails, it is something that the individual must accomplish alone. However, the transactional-process definition offered earlier underscores the importance of recognizing the social embeddedness of self-regulation. For example, the pursuit of goals often involves other people (in fact, exciting others' reactions may constitute one's objective); thus, goal attainment is a culture-specific social problem-solving process. To self-regulate, we often seek to "manipulate" or influence others, while, to be a responsive participant in a social exchange, we likewise must regulate ourselves. The cycle of self/social influence and dependence too often remains vaguely implicit in contemporary information-processing models of self-regulation. Cognitive conceptions also tend to elevate the rational, the conscious, and the structural, no doubt because of their reliance upon the dominant computational-representational metaphor (cf Mahoney 1991). However, we must acknowledge the potential for counterfactual and nonmaximal decision-making, bounded rationality, automaticity, and dynamical processes, especially as they bear upon a second type of boundary—the *operational* or functional kind.

Operational boundaries refer to theoretically salient or plausible limits on the realization of self-regulation. For example, persons high in self-efficacy and in possession of the requisite skills will not consistently work toward goals in the absence of incentives. Nor can individuals be expected to persist in goal-directed behavior in the face of powerful counterinfluences by significant others.

Individual differences in people's interpretation of the situational enablers of regulatory activity, their sensitivity to goal-relevant feedback, their exposure to exemplars and context-specific rules of conduct, their attributional habits under conditions of success and failure, their ability to tolerate boredom and stimulus overload, and their ability to "protect" a current intention from being temporarily or permanently displaced by competing motivational tendencies all represent plausible moderators of self-directiveness (cf Bandura 1986; Deci & Ryan 1985; Kuhl 1985; Weiner 1990). A life-span developmental perspective affords an even keener appreciation of the functional boundaries on the enactment of self-regulation by highlighting the age-, phase-, or context-specific emergence of individual differences in componential abilities such as those involved in the representation of self, environment, and their covariation; the selection of realistic goals; the use of absolute vs comparative and self vs other standards of competence evaluation; the awareness of social demands or expectancies; the instantiation of introspection and metacognition; and the creation of anticipatory images and an appreciation of the temporal

connectedness (continuity) of past, present, and future (Cottle & Klineberg 1974; Brandstädter 1989; Feltz & Landers 1983; Harter 1990; Karoly 1977; Kopp 1982; Ruble & Frey 1991). Finally, constitutionally derived differences in affectivity and its modulation (temperament), emerging and shifting over the life span, serves as yet another limiting factor on the voluntary control of action and attention (Rothbart & Posner 1985).

SELF-REGULATORY FAILURE: CONCEPTS AND DYNAMICS

People are capable of self-regulating, but they do not do so in a formulaic, dispassionate, unwavering, or fully self-contained manner. This statement broadly summarizes the present review to this point. Further, a critical appraisal of the literature on self-regulatory training of various sorts (Karoly & Kanfer 1982; Kirschenbaum 1987) suggests that people's efforts at self-management, even when professionally assisted, do not always yield successful short- or long-term outcomes. The need for greater empirical attention to the problem of self-regulatory failure is now widely acknowledged. Unfortunately, a wealth of theoretically plausible avenues of dysfunction and the unavailability of a proven troubleshooting algorithm effectively situate contemporary investigators and interventionists under a somewhat rickety signpost that reads "Mechanic On Duty." Nonetheless, if a prescriptive science of self-regulation is someday to be achieved, it may well emanate from a seat-of-the-pants fine-tuning of the models and mechanisms outlined in this chapter, in concert with some creative tinkering and conceptual reformulation. I next consider briefly the psychology of self-regulatory failure, hoping to blend realism and optimism in the proper proportion.

In the absence of general theoretical consensus, either within or between psychological subdisciplines, discussions of regulatory failure (like discussions of self-regulation itself) hinge upon the investigator's assumptions. Learning theorists would, for example, search for failure mechanisms in the same "locale" as they would expect to find normative control mechanisms—in the relation between a target behavior and its environmental contingencies. Psychoanalytic thinkers would, for their part, explore the relational matrix of early childhood and its current representation in adult character structure. Adhering broadly to a control (cybernetic) framework, I view the contours of regulatory failure and its putative causes in the following manner. Insofar as formal categories of miscarried self-regulation are concerned, patterns of goal-directed activity (aimed either at behavior maintenance or change) can fail to be initiated, can terminate (disengage) prematurely, or can persist beyond their useful or necessary lifespan. Explanatory mechanisms can be construed as involving (*a*) subfunction deficiencies; (*b*) disruptions in cross-function communication; (*c*) the pursuit of inappropriate or self-defeating standards or goals; (*d*) the absence (or underdevelopment) of supportive metaskills; (*e*) the

encroachment of natural or imposed boundary conditions; or (*f*) some combination of these.

Our most valuable insights into the nature of self-regulatory failure come, I believe, from controlled experiments expressly designed to examine system-based dysfunction, despite the obvious sacrifice of verisimilitude that such designs entail. Much contemporary theory about failure mechanisms is based, however, on the results of clinical intervention efforts aimed at enhancing self-regulatory skills in children or adults and upon studies of "naturalistic" success or failure in self-initiated behavior change. When the analysis of self-regulatory breakdown is secondary or indirect, there is little possibility for the precise identification of causal mechanisms or their interaction. In fact, most clinical studies neglect to assess pre- to post-treatment changes in metaskills or in the specific proximal regulators presumably taught during the intervention phase (or they rely on retrospective reports). And even if focal skills and metaskills are assessed before and after training, the difficulties involved in tracking moment-to-moment person/environment exchanges (relatively molecular transitional events and reactions) would foster largely post hoc guesswork about the reciprocally emergent (transactional) sources of failure (Karoly 1980; Kirschenbaum 1987).

To date, most analyses of failed self-regulation have sought to examine the parameters of premature disengagement from goal pursuit (also known as giving up, relapse, recidivism, resistance, or the maintenance/generalization problem). Notwithstanding a growing interest in commitment disruptions, as reflected in directive-function deficits or internal conflicts (cf Cantor et al 1987; Emmons & King 1988; Kuhl & Kazen-Saad 1988) and some attention to excessive goal pursuit or perseveration (Drigotas & Rusbult 1992; Heckhausen & Beckmann 1990), the lion's share of empirical attention has been directed at untimely goal abandonment presumably brought about by (*a*) short-circuiting of the comparator (defensive self-evaluation), (*b*) dysfunctional standard setting, (*c*) deficient or excessive self-monitoring (self-focus) in combination with negative expectancies, and (*d*) control system overload.

Above I highlighted the sensitivity and complexity of self-reactive judgment and raised the possibility that the comparator (the matching-to-standard process) might on occasion be circumvented. That is, although a standard at a given level in a goal hierarchy is activated and knowledge of substandard performance is clearly available, the individual may nonetheless elect to distort or reinterpret this information and, thereby, fail to initiate the necessary self-correctives. Such a pattern, which I will term *defensive evaluative avoidance* (DEA), appears most likely when the regulatory objective is a difficult, high-stakes, self-relevant, socially discernible outcome set at a level that may exceed the individual's abilities or efficacy/outcome expectations. By engaging in DEA, the person can, in the short run, safeguard a standard match at a higher level in the goal hierarchy while averting the unpleasant emotion associated with failure recognition. For example, a student receiving a grade of

"D" on an examination can attribute his/her "failure" to the teacher's "evil motives" rather than acknowledge his/her own role in the outcome. As a result, a higher-order principle of self-esteem maintenance is achieved, self-deprecatory emotions are precluded, and the aspired-to-standard (getting an "A") is preserved. The cost of DEA, on the other hand, is a self-imposed moratorium on self-knowledge expansion, skills-building, and ultimately goal attainment (Bandura 1986; Baumeister & Scher 1988; Kanfer & Hagerman 1981; Snyder et al 1983).

Several mechanisms of DEA have been explored in addition to externalizing attributions, including rationalization, downward social comparison, self-handicapping (prearranging incompetent performance), self-deception, and compensatory self-inflation (Baumeister 1991; Fiske & Taylor 1991). A relatively new and intriguing formulation, focusing on retreat from responsibility and threatened identity, is *accountability theory* (Schlenker et al 1991). Asserting that accountability "makes self-regulation possible," Schlenker et al (1991) introduce four elements that affect conditional self-evaluation, including (*a*) the prescription (the goal or standard, in control theory terminology), (*b*) the event (the self-monitored feedback), (*c*) a set of identity images (specifications of the sort of person one is or aspires to be), and (*d*) an evaluating audience. The addition of the latter two elements provides salient self-referential and interpersonal anchors that help concretize the nature of "accountability avoidance strategies" such as selective audience exposure, apologies, and the use of excuses and post hoc justifications.

Another momentarily self-serving but ultimately goal-defeating type of self-reaction involves the lowering of standards in the face of failure. As a means of artificially dealing with a standard-performance mismatch, the lowering of standards can occasion decreased motivation (effort), a sacrifice of enjoyment, a decrease in self-esteem, and a counter-intentional increase in dysphoria (Ahrens & Abramson 1991; Bandura 1986; Locke & Latham 1990).

A third disengagement mechanism centers on the self-monitoring/self-awareness subfunction of negative feedback control. Whereas a standard-performance discrepancy can be reduced productively by improving one's performance, an individual can alternatively elect to withdraw from a self-aware state. Several theoretical models (Carver & Scheier 1981; Duval & Wicklund 1972; Duval et al 1992; Hull & Levy 1979) postulate that, in the presence of a salient standard, self-awareness facilitates the matching-to-standard process. However, when expectancy of success is slight and the self-vs-standard discrepancy large, the individual tends to withdraw mentally and/or physically from the task. To complicate matters, excessive self-focus (as opposed to reduced self-awareness) can likewise precipitate adaptive disruptions. Depressed individuals, for example, demonstrate a self-focusing style in which self-awareness is heightened after failure and diminished after success (cf Pyszczynski et al 1991).

Finally, an arousal- or workload-based strain on cognitive capacity can impair information-processing and self-regulation. Because individuals pursue multiple goals over prolonged periods characterized by uncertainty, it is not unreasonable to expect that the complexities and attentional demands of "just one more" self-regulated task can precipitate dysfunctions that will reverberate throughout the system (Hockey 1986; Kanfer & Stevenson 1985). We are here reminded that goal-directed thought is not an absolute good; people must on occasion let go of their end-state cognition in order to enjoy the spontaneity and flow of their lives (Apter 1982; Csikszentmihalyi 1990).

FINAL COMMENT

Self-regulation has, until relatively recently, defied experimental analysis, perhaps because of its uncertain epistemological status. In its modern cast, the topic of self-regulation has captured the creative imagination of a variety of researchers. The empirical results of their work, however satisfying, should be viewed with an appreciation of their recency, their loose ends or unfinished agenda, their restricted phenomenal range, and their limited pragmatic yield to date. As a concept akin to "getting one's life together," self-regulation has not achieved a simple or uniform paradigmatic embodiment, nor should we expect this in the foreseeable future.

Nevertheless, the prospects for strong theoretical and operational advancement are excellent, as model-builders from diverse subdisciplines of psychology increasingly take up the challenge of exploring goal-directedness in slow but steadily more faithful approximations of its emergent and multilayered complexity.

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