

Origins and Functions of Positive and Negative Affect: A Control-Process View

Charles S. Carver
University of Miami

Michael F. Scheier
Carnegie Mellon University

The question of how affect arises and what affect indicates is examined from a feedback-based viewpoint on self-regulation. Using the analogy of action control as the attempt to diminish distance to a goal, a second feedback system is postulated that senses and regulates the rate at which the action-guiding system is functioning. This second system is seen as responsible for affect. Implications of these assertions and issues that arise from them are addressed in the remainder of the article. Several issues relate to the emotion model itself; others concern the relation between negative emotion and disengagement from goals. Relations to 3 other emotion theories are also addressed. The authors conclude that this view on affect is a useful supplement to other theories and that the concept of emotion is easily assimilated to feedback models of self-regulation.

This article addresses the nature of certain aspects of emotion, as viewed from a control-theory perspective on behavior. This perspective focuses on the feedback-based processes through which people self-regulate their actions to minimize discrepancies between actual acts and desired or intended acts. In this article we consider what such a viewpoint on behavior may say about the nature of emotion (see also Simon, 1967). More specifically, we examine positive and negative affect, present a theory of how these feelings may arise, and consider how they function in human self-regulation.

We begin with a brief outline of a control-theory view on the organization of behavior, to provide a context for what follows.

Self-Regulation of Behavior

Control Processes and Self-Regulation

We construe intentional behavior as reflecting a process of feedback control (see, e.g., Carver, 1979; Carver & Scheier, 1981, 1982a, 1986a, in press; MacKay, 1963, 1966; Norman, 1981; Powers, 1973). When people move (physically or psychologically) toward goals, they manifest the functions of a negative (discrepancy reducing) feedback loop (see Figure 1). That is, people periodically note the qualities they are expressing in their behavior (an input function). They compare these perceptions with salient reference values—whatever goals are temporarily being used to guide behavior (a comparison process inherent in all feedback systems).¹ If the comparisons indicate discrepancies between reference value and present state (i.e.,

between intended and actual qualities of behavior), people adjust behavior (the output function) so that it more closely approximates the reference value.

Taken as an organized system, these component functions act to “control” the quality that is sensed as input to the system. That is, when a feedback loop is functioning properly, it induces the sensed quality closer to the reference value. In terms of human behavior, the exercise of feedback control means that the person acts to minimize any discernable discrepancy between current actions and the behavioral reference value. To put it more simply, when people pay attention to what they are doing, they usually do what they intend to do, relatively accurately and thoroughly.

This brief description obviously omits a great deal that is important, and space limitations preclude treatment of all of the issues relevant to conceptualizing behavior. Two more sets of theoretical principles are needed, however, for us to address emotion and its role in self-regulation.

Hierarchical Organization of Behavior

One of these principles is the notion that behavior is organized hierarchically (e.g., Broadbent, 1977; Dawkins, 1976; Gallistel, 1980; Martin & Tesser, in press; Ortony, Clore, & Collins, 1988; Powers, 1973; Vallacher & Wegner, 1985, 1987). In

¹ A brief comment on our use of terms such as *reference value*, *standard*, and *goal*: We use these terms interchangeably here, despite the fact that they have slightly different connotations to many people. Reference values are qualities that are taken as guides, qualities to be approximated in one's actions. Although the word *standard* is often taken as implying social definitions of appropriateness, that is not meant here (see Carver & Scheier, 1985, for detail). The term *goal* often evokes an image of a “final state,” but we do not mean to imply a static, statelike quality. People have many goals of continuous action—for example, the goal of being engaged in sailing or skiing or the goal of having a successful career. Indeed, most goals underlying behavior would seem to be of this sort. This emphasis on dynamic goals in self-regulation will become more obvious later in the article.

Preparation of this article was facilitated by support from the National Science Foundation (BNS 87-06271 and BNS 87-17783).

We would like to thank Paul Blaney, Donald Broadbent, Deniz Ergener, Michael Hyland, William Powers, and Roxane Silver for their comments on earlier versions of this article.

Correspondence concerning this article should be addressed to Charles S. Carver, Department of Psychology, P.O. Box 248185, University of Miami, Coral Gables, Florida 33124.

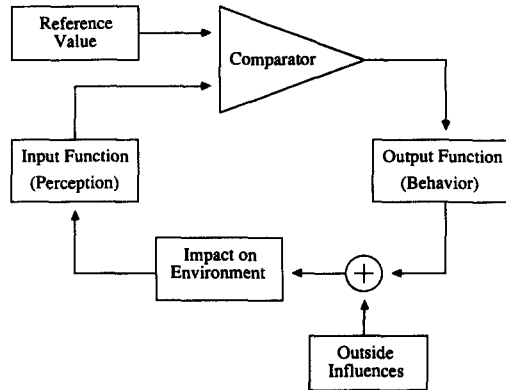


Figure 1. Schematic depiction of a feedback loop, the basic unit of cybernetic control. (In such a loop a sensed value is compared to a reference value or standard, and adjustments are made, if necessary, to shift the sensed value in the direction of the standard.)

control-process terms, the output of a superordinate feedback system (the system directing behavior at the level of present current concern—cf. Klinger, 1975; Shallice, 1978) is the resetting of reference values at the next lower level of abstraction (Figure 2). Powers (1973) argued that an identity between output at one level and resetting of standards at the next lower level is maintained from the level that is presently superordinate, down to the level of setting reference values for muscle tensions. Thus, the hierarchy creates the physical execution of whatever action is taking place.

We have adopted Powers' position as a conceptual heuristic, focusing on its implications at high levels of abstraction, the levels of our own interest (see Marken, 1986, and Rosenbaum, 1987, regarding the usefulness of similar notions at lower levels). The hierarchical organization in Figure 2 shows three high levels of control. At the highest level shown (labeled *system concepts*) are such values as the global sense of idealized self. Although self is not the only reference value at this level, it provides what may be the most intuitive illustration of the type of quality that occurs here, and it may be the most frequently used value at this level. Other possibilities include the idealized sense of a relationship or of a society.

Reference values at this level are abstract and difficult to define. How do people minimize discrepancies between their behavior and such abstract qualities? What behavioral outputs are involved? The answer suggested by Powers (1973) is that the behavioral output of this high-order system consists of providing reference values at the next lower level, which he termed the level of *principle* control. Thus, people act to "be" who they think they want (or ought) to be by adopting any of the guiding principles that are implied by the idealized self to which they aspire. (The constituents of the idealized self to which the person aspires—and what principles are thereby implied—obviously will differ from person to person.)

Principles begin to provide some form for behavior. Principles are probably the most abstract aspects of behavior that have names in everyday language—for example, honesty, responsibility, and expedience. Principles are not specifications of acts but of qualities that can be manifest in many acts. People do

not just go out and "do" honesty, or responsibility, or thrift. Rather, people manifest any one (or more) of these qualities while doing more concrete activities.

The concrete activities are termed *programs* (cf. Schank & Abelson's, 1977, discussion of scripts). Principles influence the program level by influencing what programs occur as potential reference values and by influencing choices made within programs. Programs of action are the sorts of activities that most people recognize more clearly as "behavior," although even programs are still relatively abstract. Going to the store, cooking dinner, writing a report—all these are programs.

Programs, in turn, are made up of movement *sequences*. One difference between programs and sequences is that programs involve choice points at which decisions must be made (ranging from trivial to important), whereas the constituents of a sequence are executed all-at-a-piece. When an action becomes sufficiently well learned that its enactment (once begun) is automatic rather than effortful (e.g., Shiffrin & Schneider, 1977), it can be thought of as having become a sequence rather than a program.

An important implication of the notion of hierarchical organization is that the higher one goes into this organization, the more fundamental to the overriding sense of self are the qualities encountered. A second, related implication is that the importance of a reference value at a low level is at least partly a product of the degree to which its attainment contributes to success in the attempt to reduce discrepancies at higher levels.

A last point concerning the hierarchical model is that self-regulation does not inevitably require engaging the full hierarchy from the top downward. We tentatively assume that whatever level of the hierarchy is temporarily focal is functionally superordinate at that moment, with self-regulation at any level higher suspended until attention is redirected toward reference values at the higher level. In practice, much of human behavior is probably self-regulated at the program level, with little or no consideration of values higher than that.

Difficulty, Disengagement, and Withdrawal

A final set of theoretical principles concerns the fact that people are not always successful in attaining their goals. Sometimes the physical setting precludes intended acts. Sometimes personal inadequacies prevent people from accomplishing what they set out to do. Regardless of the source of the impediment, and regardless of the level of abstraction at which it occurs (e.g., principle, program), there must be a way to construe the fact that people sometimes put aside their goals, aspirations, and intentions.

Assessing expectancies. We believe that behavior proceeds smoothly until and unless people encounter impediments (Figure 3). When people encounter enough difficulty to disrupt their efforts, we assume that they step outside the behavioral stream momentarily and assess the likelihood that the desired outcome will occur, given further effort. Potential impediments to action that come to mind before action begins presumably act the same in this respect as do those confronted during the action.

This sequence of interruption and expectancy assessment can be initiated in several ways. The simplest initiator is frustra-

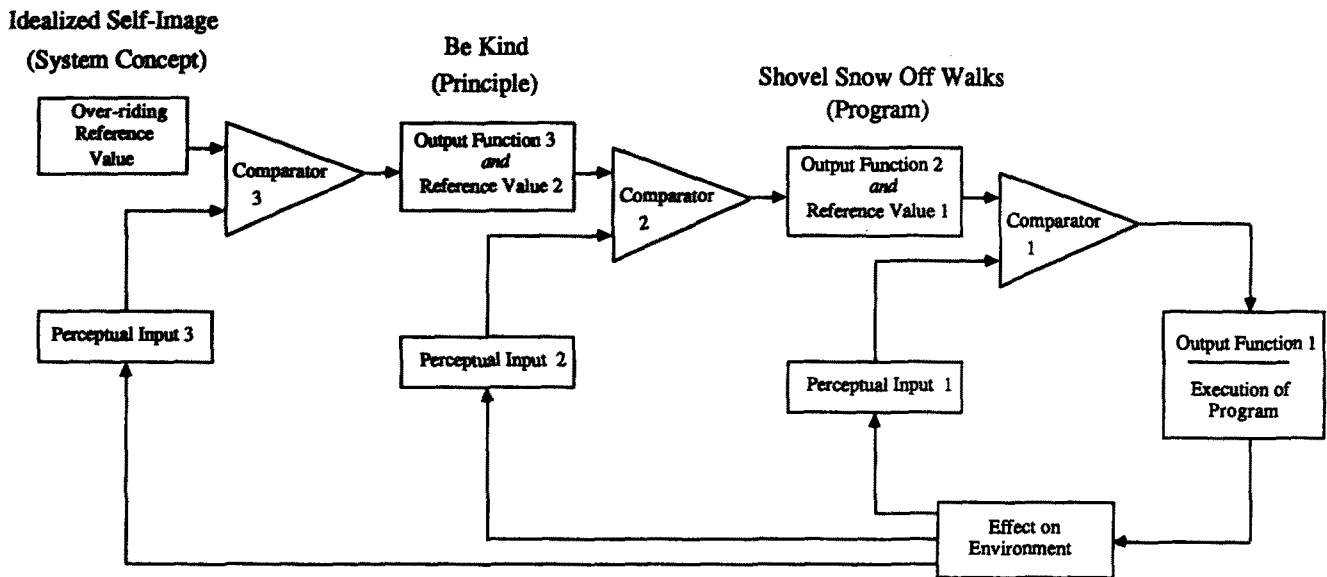


Figure 2. Three-level hierarchy of feedback loops showing the top three levels of control in the model proposed by Powers (1973) and illustrating the kinds of content that reference values at these three levels can assume. (This diagram portrays the behavior of someone who is presently attempting to conform to his ideal self-image, by using the principle of kindness to guide his actions, a principle that presently is being manifest through the program of shoveling snow from a neighbor's sidewalk.)

tion—existence of an obstacle to goal attainment, either external (impediments or constraints) or internal (deficits of skill, knowledge, or effort). Another major class of interruptors is anxiety, which is aroused in circumstances in which a contemplated or ongoing action is in some way threatening. Although other interruptors are certainly possible, most represent conditions that hamper or interfere with goal attainment.

The process of assessing outcome expectancy (whatever the interruptor) may make use of a wide variety of information pertaining to the situation and to internal qualities such as skill, anticipated effort, and available response options (cf. Lazarus, 1966). In many cases, however, expectancy assessment relies quite heavily on memories of prior experiences. Thus, a preexisting sense of confidence or doubt with respect to some activity can be a particularly important determinant of situational expectancies. If the expectancies that emerge from this assessment process are sufficiently favorable, the person renews his or her efforts. If the expectancies are sufficiently unfavorable, however, the person begins to disengage from the attempt at goal attainment.

Our research on this rough dichotomy among responses to adversity occurred in the context of our explorations of the effects of self-directed attention (Carver, Blaney, & Scheier, 1979a, 1979b; Carver, Peterson, Follansbee, & Scheier, 1983; Carver & Scheier, 1981; Scheier & Carver, 1982). This line of thought has also been extended to certain problems in self-management, including both test anxiety and social anxiety (Carver et al., 1983; Carver & Scheier, 1984, 1986a, 1986b; Carver, Scheier, & Klahr, 1987; see also Burgio, Merluzzi, & Pryor, 1986; Galassi, Frierson, & Sharer, 1981; Rich & Woolever, 1988; Schlenker & Leary, 1982). These discussions all emphasize the idea that expectancies about one's eventual outcome

are an important determinant of whether the person responds to adversity by continuing to exert effort at goal attainment or, instead, by disengaging from the attempt. This analysis has a good deal in common with other expectancy models of behavior (e.g., Abramson, Seligman, & Teasdale, 1978; Bandura, 1977, 1986; Kanfer & Hagerman, 1981, 1985; Rotter, 1954; Wortman & Brehm, 1975), although there are also differences among theories (for more detail, see Scheier & Carver, 1988).

Expectancies and affect. We have assumed for some time that the behavioral consequences of divergent outcome expectancies are paralleled by differences in affective experience (Carver, 1979), and research evidence tends to support this position (Carver & Scheier, 1982b; Andersen & Lyon, 1987; see also Weiner, 1982). When expectancies are favorable, people tend to have positive feelings, which are variously experienced as enthusiasm, hope, excitement, joy, or elation (cf. Stotland, 1969). When expectancies are unfavorable, people have negative feelings—*anxiety, dysphoria, or despair*. The specific tone of these feelings varies (in part) with the basis for the expectancies (Scheier & Carver, 1988). The latter is a theme that has been developed in much greater detail by Weiner (1982).

Limitation and Challenge

The preceding outline of the relations among expectancies, emotion, and behavior seems intuitively sensible to us. Making behavioral predictions from this aspect of the model has required (and continues to require) nothing more than the ideas in the preceding section. This outline has something of an ad hoc flavor to it, however, with a number of questions being left unasked and thus unanswered.

A fundamental question that is ignored in the preceding out-

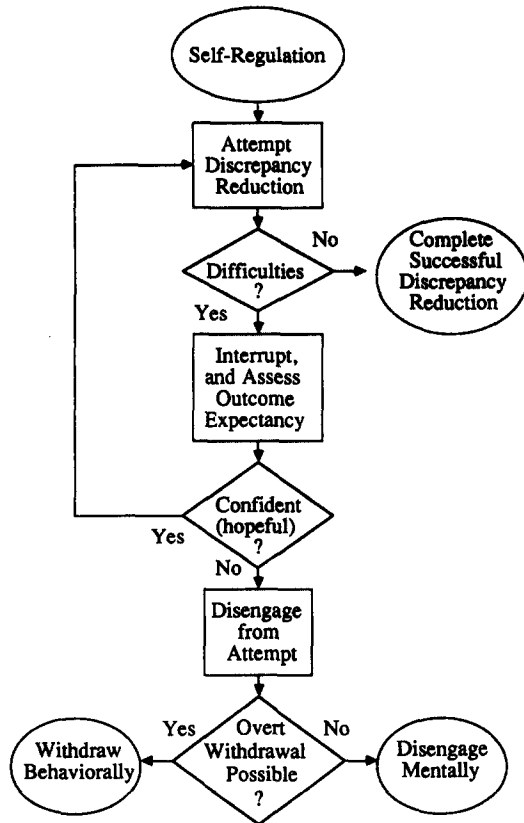


Figure 3. Flow diagram of the various consequences that can follow when a person attempts to match his or her behavior to a standard of comparison. (Although self-regulation often proceeds unimpeded, discrepancy reduction efforts may be interrupted if difficulties or impediments are encountered, or anticipated. What follows this interruption is determined by the person's expectations about whether continued efforts will promote a good outcome.)

line is how good and bad feelings come to arise while the person is engaged in goal-directed action. We are certainly not unique in having failed to ask this question. Indeed, it is remarkable how rarely anyone ever asks where affect comes from. Even information-processing theories touching on affect (which one might expect to be particularly attuned to this question) typically discuss only what happens once affect is already present. Discussions focus on the idea that affect is information that takes up space in working memory (Hamilton, 1983), information that may serve particularly important purposes in regulating motivation (Simon, 1967), and information that is encoded in long-term memory in much the same way as other information (Bower & Cohen, 1982). But where does it come from?

In the next section we examine this question. We do so by reconsidering, in somewhat different terms, the set of events we have just described. Nothing in the next section contradicts what we have already said, but our discussion takes a form that differs considerably from that of the preceding section.

A More Elaborated View: Meta-Monitoring and Emotion

We have characterized people's conscious self-regulation as a process of monitoring their present actions and comparing the

qualities that they perceive therein with the reference values that presently are salient, making adjustments as necessary to render discrepancies minimal. In what follows, we will use the term *monitoring* to refer to this feedback process. As indicated earlier, we see this monitoring loop as fundamental to the control of intentional behavior.

We suggest, however, that there is also a second feedback process that (in a sense) builds on this one, in a fashion that is orthogonal to the hierarchical organization discussed earlier. This second function operates simultaneously with the monitoring function and in parallel to it, whenever monitoring is going on. The second feedback system serves what we will term a *meta-monitoring* function.

Discrepancy Reduction and Rate of Reduction

The most intuitive way to begin in describing this meta-monitoring function is to say that the meta loop is checking on how well the action loop is doing at reducing the behavioral discrepancies that the action loop is monitoring. More concretely, we propose that the perceptual input for the meta-monitoring loop is a representation of the *rate of discrepancy reduction in the behavioral (monitoring) system over time*. What is important to the meta loop is not merely whether discrepancies are being reduced at the level of the action loop, but how rapidly they are being reduced. If they are being reduced rapidly, the action loop's progress toward its goal (as perceived by the meta loop) is high. If they are being reduced slowly, the action loop's progress is lower. If they are not being reduced at all, the action loop's progress is zero. Any time discrepancies are enlarging at the level of action monitoring, of course, the action loop's progress is inverse.²

Although it may be somewhat less intuitive than the foregoing, we find an analogy useful in describing the functioning of these two systems, an analogy that may also have more literal implications. Because action implies change between states, consider behavior to be analogous to distance (construed as a vector, because perception of one's action incorporates both the difference between successive states and also the direction of the difference). If the monitoring loop deals with distance and if (as we just asserted) the meta loop assesses the rate of progress of the monitoring loop, then the meta loop is dealing with the psychological equivalent of velocity (also directional). In mathematical terms, velocity is the first derivative of distance over time. To the extent that this physical analogy is meaningful, the perceptual input to the meta loop we are postulating presumably is the first derivative over time of the input information used by the action loop.

We propose that the meta-monitoring process functions as a feedback loop. It thus involves more than the mere sensing of the rate of discrepancy reduction in the action loop. This sensing constitutes an input function, but no more. As in any feedback system, this input is compared against a reference value (cf. Frijda, 1986, 1988). In this case, the reference value is an acceptable or desired rate of behavioral discrepancy reduction.

² For convenience, we will treat as equivalent phrases such as *progress of the action loop* and *rate of discrepancy reduction in the action loop*.

Table 1
Three Conditions of Behavior Over Time, How They Would Be Construed at the Level of the Action Loop, How They Would Be Construed at the Level of the Meta-Monitoring Loop, and the Affect That Theoretically Would Be Experienced

Depiction of behavior	Action-loop construal	Meta-loop construal	Affect
1. Progress toward goal, at a rate equal to the standard	Discrepancy reduction	No discrepancy	None
2. Progress toward goal, at a rate lower than the standard	Discrepancy reduction	Discrepancy	Negative
3. Progress toward goal, at a rate higher than the standard	Discrepancy reduction	Positive discrepancy	Positive

As in other feedback systems, the comparison determines whether there is a discrepancy or deviation from the standard. If there is, an output function is engaged to reduce the discrepancy.

We suggest that the outcome of the comparison process that lies at the heart of this loop is manifest phenomenologically in two forms. The first is a hazy and nonverbal sense of outcome expectancy. The second is affect, a feeling quality, a sense of positiveness or negativeness.

When sensed progress in the action loop conforms to the desired rate of progress, the meta-monitoring system accordingly registers no discrepancy (see Table 1, Example 1). Given an absence of discrepancy at the meta level, affect is neutral. When the action loop is making continuous, steady progress toward reducing its own discrepancy, but its rate of discrepancy reduction is slower than the meta-monitoring system's reference value, a discrepancy exists for the meta loop (Table 1, Example 2). The result in this case should be a degree of doubt and negative affect, proportional to the size of this meta-level discrepancy. When the rate of discrepancy reduction in the action loop is higher than the meta loop's reference value (Table 1, Example 3), there is a positive discrepancy at the meta loop, an overshoot of the reference value that is reflected in confidence and in positive feelings.

It is clear that the two systems under discussion (monitoring and meta-monitoring) are related to each other, but we argue that only one of them has implications for affect. In all three cases shown in Table 1, the action loop is successfully reducing discrepancies. The fact that it is doing so does not, however, determine affect. Affect may be neutral, it may be positive, or it may even be negative (Examples 1, 2, and 3, respectively), depending on the adequacy of the *rate* of discrepancy reduction. Assessing the adequacy of the rate of operation of one system implies the use of a second system.

It is also important to note that the size of the discrepancy confronted by the action loop at any given point does not play an important role in the perceptual input to the meta loop. A large discrepancy—even a *very* large discrepancy—perceived at

the level of the action loop can be associated with perceptions of either abundant or insufficient progress. This same discrepancy thus can be associated with either favorable or unfavorable expectancies and with either positive or negative affect. What matters with respect to the meta-monitoring system is solely whether the perceived *rate of progress* in the action system is adequate.

The same point can also be made of cases in which the behavioral discrepancy is relatively small. If the meta-monitoring system senses that there is an abundant rate of change toward discrepancy elimination, there should be positive affect and confidence. If it senses an inadequate rate of change, there should be negative affect and doubt.

Thus, ironically, it should be possible for a person who has a large discrepancy at the action loop to feel more positively than a person who has a small discrepancy at the action loop, if the first person is perceiving a more acceptable rate of progress than the second person. In terms of the physical analogy, the first person is more distant from the goal, but is moving toward it with a higher velocity.

Just as the monitoring of action apparently can take any of several levels in a hierarchy of behavioral control as superordinate, so should the meta system be able to function at any of several levels. It seems likely, however, that discrepancies noted by the meta system have greater emotional impact when they concern a central element of self than when they bear only on a more peripheral goal (a program or a sequence of action). Sometimes a task failure has a big impact on one's feelings, sometimes not (cf. Dweck & Elliott, 1983; Dweck & Leggett, 1988; Elliott & Dweck, 1988; Hyland, 1987; Srull & Wyer, 1986). The difference between these cases would seem to be the level of abstraction at which the person is focusing. The consequences of meta-monitoring are more intense, or more impactful, at higher levels than at lower levels of the hierarchy (see also Frijda, 1988).

If the meta loop is truly a bidirectional feedback system, it follows that an overshoot of the reference value should lead to a self-corrective attempt to return to the reference value. To put it more concretely, this view argues that people who have exceeded the desired rate of progress are likely to slow their subsequent efforts. They are likely to coast for a while. The phenomenological result of this would be that the positive affect is not sustained for long.

It is important to recognize that we are not suggesting that affect is the controlled quality in this loop, but rate. Positive feelings reflect a positive discrepancy, which is good. To a system whose goal is controlling sensed rate, however, a discrepancy is a discrepancy and any sensed discrepancy should be reduced.

The existence of a natural tendency that has the effect of causing positive affect to be short-lived seems, at first glance, highly improbable. A plausible basis for such a tendency can be seen, however, in the idea that human behavior is hierarchically organized and involves multiple current concerns. That is, people typically are working toward several goals more or less simultaneously, and many lower level efforts contribute to minimizing discrepancies at high levels. To the extent that movement toward goal attainment is more rapid than expected in one domain, it permits the person to shift attention and effort toward

goal strivings in another domain, at no cost. To continue the unnecessarily rapid pace in the first domain might increase positive affect with respect to that activity, but by diverting efforts from other goals, that action may create the potential for negative affect in other domains.

Changes in Rate and the Abruptness of Change

Although we have limited ourselves thus far to addressing various rates of progress toward action goals, it should be obvious that the rate of discrepancy reduction at the action loop can change. Changes in rate at the action loop are subjectively manifest, not as affect but as *change* of affect. Increases in rate are reflected in shifts toward more positive feelings, with the actual experience depending on the initial and final rates. When the change is from a rate far below the meta standard to a rate closer to the standard but still below it, affect should change from more negative to less negative. If the change is instead to a value that exceeds the meta standard, affect should change from negative to positive.

In the same manner, downward changes in sensed rate at the action loop are also reflected in affective shifts, with the quality of the experience again depending on the initial and final rates. When the change is from a rate that exceeds the meta standard to a rate below the standard, the affective change should be from positive to negative. When the change is from just below the standard to far below the standard, the affective change should be from mildly negative to very negative.

Shifts in rate of progress at the action loop can be gradual, or they can be more abrupt. The more abrupt an increase in the action loop's progress, the more the subjective experience incorporates a rush of exhilaration, reflecting the contrast between the more negative feelings and the more positive feelings (cf. the description of "sentimentality" by Frijda, 1988, p. 350). The more abrupt a slowing of the action loop's progress, the more the subjective experience should incorporate the well-known sinking feeling (de-exhilaration?) that reflects the contrast when feelings suddenly shift in a negative direction. Indeed, it seems reasonable to suggest that a discernible shift toward more negative feelings is often precisely the experience that causes people to interrupt ongoing action and consciously evaluate the probability of their eventual success.

We suggested earlier that the quality the meta loop senses as its input is analogous to the physical quality of velocity. Let us carry this analogy one step further. What we are addressing now is not velocity but change in velocity—acceleration. Acceleration is the second derivative of distance over time. Given that people apparently are equipped to sense these experiences, the analogy seems to suggest that some neural processor is computing a second derivative over time of the information input to the action loop. Does this imply the need to postulate a third layer of feedback control (complete with reference value and comparator)? Not necessarily. It is possible to sense a quality that is not involved in a feedback loop. In part because it is difficult for us to know what might be the implications of such a third layer of control, we are hesitant at this stage to assume its existence.

With respect to a final point, however, we are more confident. In the same way that distance and velocity are independent of

each other, both are independent of acceleration. (An object moving 20 ft per second can be accelerating, decelerating, or its velocity can be constant; the same is true of an object moving 80 ft per second.) We suggest that the same independence exists on the other side of the analogy. We argued earlier that affect experienced is independent of the degree of discrepancy at the action level (Table 1). In the same fashion, we argue that the rush associated with acceleration is independent of the size of the discrepancy at the action level and also independent of the rate of discrepancy reduction at the action level.

As an example, a person with a large discrepancy at the action level will have positive affect if the rate of discrepancy reduction is greater than needed. This positive affect will be free of exhilaration if the rate of discrepancy reduction is constant. If the rate has suddenly shifted upward (to the same ending value), the positive feelings will be accompanied by a sense of exhilaration.

Further Processing, and Differences Between Immediate and Thought-Out Expectancies

In describing the proposed meta-monitoring function we said that one manifestation of its operation is a hazy sense of expectancy. Obviously, however, people's consciously held expectancies for an outcome do not rest entirely on their currently sensed rate of progress toward that outcome. Indeed, as noted earlier, our own research has emphasized the idea that temporary frustration or anxiety arousal is less important than are other sources of information in producing the coping expectancies that ultimately determine subsequent behavior (e.g., Carver et al., 1979a, 1979b; Carver et al., 1983; Carver & Scheier, 1986a). Thus, although meta-monitoring during a period of adversity does yield a sense of doubt, this transient doubt is often modified to a substantial degree by additional thought.

In more consciously judging outcome probability, people depend to a large extent on memories of their prior outcomes in similar situations. They may also consider such things as what additional resources they might bring to bear (cf. Lazarus, 1966), the possibility of taking an alternative approach, and social comparison information (e.g., Wills, 1981; Wood, Taylor, & Lichtman, 1985). Thus, the more conscious and verbalizable expectancies that people generate when they interrupt their efforts and think about the likely outcomes of those efforts can be influenced by a fairly wide range of information.³

In some instances the additional processing that creates this influence is very simple. It may entail nothing more than retrieving a summary memory regarding prior outcomes in this class of situations (e.g., "I'm no good at standardized tests," "People never like me") or engaging in self-exhortation ("You can do it—try harder"). Other instances, however, involve a wider search of diverse memories or a more extensive analysis of possibilities. This would be the case whenever the person considered such questions as whether additional information is ob-

³ Dispositional biases can have a major influence on these expectancies, even within the normal range of human experience (cf. Scheier & Carver, 1987). Stable and self-sustaining biases in expectancies are also prominent as a feature of clinical depression, representing one of the irrational beliefs that theorists such as Beck (1972) see as important in the etiology of depression.

tainable, whether other people might provide assistance, or whether important aspects of the situation are likely to change soon enough to matter.

How do these various thoughts influence the expectancies that eventually emerge? In some cases the mechanism is probably very simple. When people retrieve relatively chronic expectancies from memory in summary form, the information already takes the form of expectancies. Presumably, these memories represent accumulations or consolidations of the products of earlier instances of meta-monitoring during behavior. When evoked from memory, this information contributes directly to a subsequent sense of confidence or doubt. Memories of expectancies may also be linked to memories of the corresponding affective quality, thus directly influencing subsequent affective tone (cf. Mayer & Gaschke, 1988).

For cases involving more thorough processing, we suggest a more complex mechanism, which derives conceptually from the theory under discussion. When people stop and analyze the situation they are in, they typically bring to mind a series of possibilities regarding the situation. In order for these possibilities to influence subsequent expectancies, their likely consequences must be evaluated. How does this evaluation take place? One argument is that the possibilities are briefly played through mentally as behavioral scenarios. Playing through the scenarios should lead to conclusions that influence the person's sense of outcome expectancy ("If I try approaching it this way instead of that way, it should work better," "This is the only thing I can see to do, and it will just make the situation worse").

It seems reasonable to suggest that this process engages the same mechanism that handles meta-monitoring during overt behavior. When one's progress is temporarily stalled, playing through a scenario that is confident and optimistic will indicate a higher rate of progress than is currently being experienced, and the meta loop thus will yield a more optimistic outcome assessment than is currently being derived from overt action. If the scenario is negative and hopeless, it will indicate a further reduction in progress, and the meta loop will yield an assessment of greater doubt. Thus, expectancy-relevant rumination can either reduce or exacerbate a person's temporary hesitancy and doubt, depending on the scenario that comes to mind. We suggest, however, that the influence on subsequent expectancies (and affect, as well) may involve the same mechanism that produces more momentary effects on expectancies during the actual flow of behavior.

This line of discussion brings up two more points. First, the idea that the meta-monitoring function can be applied to material drawn from memory is consistent with the broader idea that emotion can occur even when a person is not engaged in overt action. If the meta processes can be engaged as a person plays out a scenario mentally, a person can also feel hope or despair over the anticipated progress of an event that has not yet begun (cf. Markus & Nurius, 1986). Similarly, a person can renew feelings (as opposed to simply recalling them) by mentally reliving an event that has already happened. The more vivid the reliving, the stronger the affect experienced (see also Frijda, 1988). In such a case the affect would not simply be retrieved from memory, it would be regenerated.

Finally, this discussion suggests a somewhat novel view on the notion that affective reactions come quickly and certain kinds

of cognitive evaluations more slowly (Zajonc, 1980). Our assumption is that when affect arises during action, its appearance is relatively immediate, as is also true of a rather hazy and nonverbal sense of confidence and doubt. A more abstract construal of the situation one is in (i.e., the more consciously developed expectancy) follows from further reflection after action has been interrupted. It thus is slower to occur.

Issues and Questions Within the Model

The preceding portrayal of what we have termed *meta-monitoring* raises a number of issues and questions. Some of them pertain directly to the ideas that we have just outlined concerning the origins of positive and negative feelings. Others pertain more generally to the fit between this theory and other aspects of a control-process approach to behavioral self-regulation. Yet others pertain to relationships between this and other theories on emotion. These issues are addressed in the next three sections. We begin with issues that pertain directly to the emotion theory itself.

Reference Values Used in Meta-Monitoring

One important question is what reference value is being used by the meta-monitoring system. We assume that this system is capable of using widely varying definitions of adequate progress for the action loop. Sometimes the reference value is imposed from outside (as in tenure review decisions), sometimes it is self-imposed (as in someone who has a personal timetable for career development), and sometimes it derives from social comparison (as when people are in competition with each other). Sometimes the reference value is very demanding, sometimes it is less so.

As an example in which the meta standard is both stringent and externally imposed, consider the requirements of degree programs in medical or law school. In such cases, even continuous progress in an absolute sense (i.e., successful mastery of required material) is adequate only if it occurs at or above the rate required by the degree program. Thus, as the person attempts to attain the action goal of becoming a physician or a lawyer, the reference value for meta-monitoring will be a relatively stringent one.

How stringent a standard is used at the meta level has straightforward implications for the person's emotional life. If the pace of progress used as a reference point is too high, it will rarely be matched, even if (objectively) the person's rate of progress is extraordinarily high. In such a case, the person will experience negative affect often and positive affect rarely. If the pace of progress used as a reference point is low, the person's rate of behavioral discrepancy reduction will more frequently exceed it. In this case, the person will experience positive affect more often and negative affect more rarely.

What variables influence the stringency of the meta level standard being used? One important determinant is the extent to which there is time pressure on the activity being regulated, which varies greatly from one activity to another. Some actions are clearly time dependent ("Have that report on my desk by 5 o'clock"), others are more vaguely so (it's about the time of year to fertilize the lawn), and the time dependency is even hazier for others (I want to go to China some day; I'd like to have a boat

before I get too old to enjoy it). When an activity has demanding time constraints, the meta-level reference value used necessarily is stringent. When there is a relative lack of time pressure, a relatively lax standard is more likely to be used.

Although time dependence is clearest in situations that require a rapid pace, there also appears to be a second sort of time dependence. This occurs for behavioral activities that people wish to have completed but have no desire to do (a common view of chores). Such goals are highly time dependent, in the sense that people wish their attainment to be instantaneous. Given this, the meta-level reference value must necessarily be at a very high level. Because the rate of progress therefore cannot meet the standard, positive affect is nearly impossible and aversiveness is almost inevitable when the activity is being engaged in. (On the other hand, the intensity of this affect is proportional to the importance of the activity, which is often relatively low.) This set of relations would seem to define the experience of drudgery.

Changing Meta-Level Standards

As noted in the preceding section, reference values for the meta loop differ across people and across categories of behavior. Reference values at the meta level can also shift as a result of time and experience (see also Lord & Hanges, 1987). To put it differently, as people accumulate more experience in a given domain, adjustments can occur in the pacing that they expect and demand of their efforts.

Sometimes the adjustment is downward. For example, a researcher experiencing difficulty in his attempt to be as productive as his colleagues may gradually adopt less stringent standards of pacing. One consequence of this is a more favorable balance of positive to negative affect across time (cf. Linsmeier & Brickman, 1980). In other cases, the adjustment is upward. A person who gains work-related skills may undertake greater challenges, requiring quicker handling of each action unit. Upward adjustment has the side effect of decreasing the potential for positive affect and increasing the potential for negative affect.

This adjusting of meta-level reference values over the course of experience looks suspiciously like a self-corrective feedback process in its own right, as the person reacts to insufficient challenge by taking on a more demanding pace, and reacts to too much challenge by scaling back the criterion.⁴ If a feedback process is responsible for changing standards at the meta level (or contributes to such changes), it is much slower acting than are those that are the focus of this article. Shifting the reference value downward is not the immediate response when the person has trouble keeping up with a demanding pace. First the person tries harder to keep up. Only more gradually, if the person cannot keep up, does the meta standard shift to accommodate. Similarly, an upward shift is not the immediate response when the person's rate of discrepancy reduction exceeds the standard. The more typical response is to coast for a while. Only when the overshoot is frequent does the standard shift to accommodate.

The idea that these changes are produced by a slow-acting feedback system may help to account for why it can be so difficult to shift meta standards voluntarily. That is, one can make a verbal change easily ("Stop being so demanding of your-

self, and be more satisfied with what you are accomplishing"), but this sort of self-verbalization rarely takes effect immediately. If a true shift in standard relies on a slow-acting feedback loop, that would account for why subjective experience tends to lag behind the self-instruction.

It is of some interest that these patterns of shift in reference value (and the concomitant effects on affect) imply a mechanism within the organism that functions in such a way as to prevent the too-frequent occurrence of positive feeling, as well as the too-frequent occurrence of negative feeling. That is, the (bidirectional) shifting of the rate criterion over time would tend to control pacing of behavior in such a way that affect continues to vary in both directions around neutral. We earlier suggested that the meta system does not function to maximize positive affect. In the same manner, an arrangement for changing meta-level reference values such as we are suggesting here would not work toward maximization of pleasure and minimization of pain. Rather, the affective consequence would be that the person experiences more or less the same range of variation in his or her affective experience over extended periods of time.

Time Frames for Input to Meta-Monitoring

Another question to be raised about the model concerns the span of time over which the action loop's progress at discrepancy reduction is processed to form a perceptual input (a sensed rate) for the meta system. The time period across which information is merged may be brief or it may be quite long.⁵ There seems to be nothing inherent in the meta-monitoring process per se that dictates whether it focuses on a short or a long time period. Whether input information is merged over a short or a long time period, however, can have important implications for the subjective experiences that result.

Consider the case of a person whose actions create gradual but erratic progress toward some goal (see Figure 4). If the input function to this person's meta-monitoring loop assesses rate of

⁴ A possibility that may be worth considering is that this shift of meta standard reflects the long-term consequences of the *opponent process* discussed by Solomon (1980). Solomon proposed the existence of a system that acts to dampen emotional reactions, in two senses: In the short term, the opponent process causes the affect evoked by a given event to return to neutral. In the longer term (after repeated experiences of similar events), the event comes to elicit less of the emotional response than it did at first. This latter effect seems comparable in some ways to the idea that there has been a shift in meta standard.

⁵ We should distinguish between the matter under discussion here and other issues embedded in a growing literature on goal setting. One issue in goal setting concerns whether goals are close or distant in time (see Kirschenbaum, 1985, for a discussion of this and other variables). How distant a goal is in time, although important in its own right, is conceptually distinct from what we are discussing here. In general, assessment of progress toward any goal—whether close or distant—may still be made with respect to either a long or a short span of time and effort. Of course, with goals that are very close in time, one's freedom to assess over long time spans diminishes. Nor are we discussing the frequency with which a person "samples" perceptual input. That can also vary, from sampling often to sampling rarely. What is presently under discussion is the breadth of time (or the number of discrete bits of information) over which progress is merged to form a perceptual input.

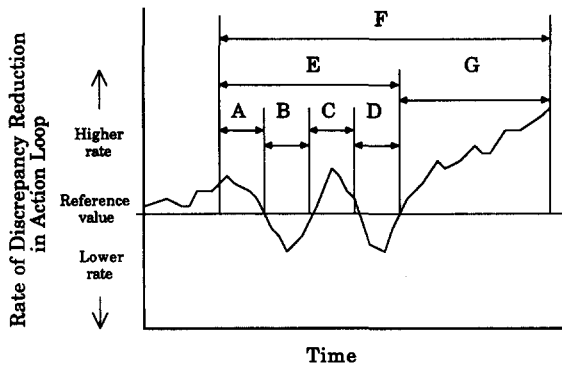


Figure 4. Assessing rate of discrepancy reduction across different lengths of time can produce different patterns of emotional experience. (If assessment bears on brief time spans [periods A, B, C, and D], the experience is alternately positive feelings [A and C] versus negative feelings [B and D]. If assessed rate of discrepancy reduction is merged across a longer interval [E], experienced mood does not fluctuate. Assessing across too long a period, however [F], can be misleading because it can obscure meaningful changes that occur over a shorter term [G, compared with E].)

discrepancy reduction over a very short time frame, the person will be intermittently happy (periods A and C) and dysphoric (periods B and D). That is, the rate of progress exceeds the standard during periods A and C (thus yielding positive affect) but falls short of the standard during period B and most of period D (thus yielding negative affect). If the person takes a longer view on the same set of events (i.e., merges across all of period E), the frequent deviations upward and downward from the standard will be blurred (in effect, averaged) in the derivation of perceptual input for the meta system. In the general case, this will produce affect (and a concomitant sense of expectancy) that is both more stable and more moderated. In the specific case of period E, the affect experienced will be near neutral, because the upward and downward deviations cancel each other out.

This reasoning might seem to argue that it is desirable to take the broader view of events. There is, however, a potential disadvantage of deriving input through the broader view. Merging data over a very long period can result in insensitivity to what are actually meaningful changes in the rate of discrepancy reduction at the action loop. Period G reflects considerably faster progress than took place across period E, but awareness of that shift in rate will be blunted if the input is merged across period F. Thus, taking too long a view in creating input for the meta system can be as bad as taking too short a view.

This general line of reasoning suggests a possible process basis for the fact that people seem naturally to differ in how variable their moods are (e.g., Diener, Larsen, Levine, & Emmons, 1985; Larsen, 1987; Wessman & Ricks, 1966). Perhaps these differences in emotional variability reflect default differences in the time spans merged for input by people's meta-monitoring systems.

Multiple Affects From a Single Event, and the Independence of Positive and Negative Affect

Our theoretical discussion was focused on the existence of one feeling at a time. Affect associated with goal-directed effort

need not be purely positive or purely negative, however. A single event may produce both of these feelings, depending on how it is viewed in meta-monitoring.

Sometimes there is more than one view on an event, even with respect to a single goal (cf. Ortony et al., 1988, pp. 51–52). For example, it may happen that the experience of a failure yields the realization of how to attain future success. The failure is displeasing, but the insight is elating. Feelings from the event thus are mixed. Focusing more on the present failure to attain the goal (inadequate progress) will yield a greater sense of negative affect. Focusing more on the insight (progress toward future success) will yield a greater sense of positive affect. Both feelings, however, are produced by different aspects of the same outcome, and both can be felt at once (or as alternating time-shared experiences).

It is perhaps more common that an action or an outcome has implications for two distinct goals. The goals making up the hierarchy of a person's self-definition are not always perfectly compatible with each other, and occasionally two conflicting goals become salient at the same time (see also Emmons, 1986; Van Hook & Higgins, 1988). For example, the goal of career advancement and the goal of spending a lot of time with one's young children may both be desirable, but the 24-hr day imposes limitations on the time available for trying to attain them. Sometimes the actions that permit progress toward one goal (working extra hours at the office) simultaneously interfere with progress toward the other goal (spending time with one's children). To the extent that both goals remain salient, the result is mixed feelings. In this case, however, the two feeling qualities stem from meta-monitoring with respect to each of two distinct goals.

This line of discussion also suggests a perspective on the assertion, made frequently in recent years, that positive and negative affective experiences are not at opposite poles of a continuum but rather are independent (e.g., Diener & Emmons, 1984; Diener & Iran-Nejad, 1986; Warr, Barter, & Brownbridge, 1983; Watson & Tellegen, 1985; Zevon & Tellegen, 1982). This argument usually focuses on the experience of moods, not on the nature of affect.⁶ As a statement about mood, the argument means in part that people's moods can incorporate mixed feelings. A mood can be partly good and partly bad, though only rarely are both of these feelings intense at the same time (Diener & Iran-Nejad, 1986).

This argument also means that knowing a person is not depressed does not make it reasonable to infer that the person is happy. Knowing a person is not happy does not make it reasonable to infer that the person feels bad. Sometimes people are affectively neutral. The relative independence of these qualities

⁶ Careful examination of Watson and Tellegen's (1985) position on the structure of mood reveals, however, the involvement of another issue that is beyond the scope of this discussion. Specifically, their dimension of negative affect has heavy overtones of anxiety, rather than depression. Higgins (1987) has recently argued for the importance of a distinction between these two emotion qualities, and his argument seems to require distinctions beyond those we are making here (as does the Watson & Tellegen position). This distinction does not, however, detract in any way from the points we are making here. We address the Higgins (1987) model in more detail in a later section of the article.

thus has important methodological implications. To know about both qualities in people's overall feelings, one must assess both (cf. Wortman & Silver, 1989).

Although these two qualities of mood have been observed to vary relatively independently, there has been very little discussion of why this is so. Diener and Iran-Nejad (1986) noted that their subjects sometimes reported moderate amounts of both positive and negative affect but did not speculate why. Watson and Tellegen (1985) noted the possibility that different parts of the brain might be involved in the two affect qualities, but did not address the question of why people might ever experience mixed feelings.

The preceding discussion suggests a very simple explanation for these findings. People often have many goals at once. A person who is making rapid progress on some current concerns and poor progress on others should experience positive feelings with respect to the former and negative feelings with respect to the latter. This experience must be common, even in the course of a single day. The diversity of these "progress reports" from the meta-monitoring system should disrupt any inverse correlation between reports of having experienced positive affect and reports of having experienced negative affect in a given time span, particularly if that span is relatively long. As the time span narrows to a given "emotional" event, one would expect the independence of the two affects to diminish, because the person is more likely to be dealing with only one goal (and only one perspective on it) than would otherwise be the case. This is precisely what seems to happen (Diener & Iran-Nejad, 1986).

Effects of Existing Emotion on Subsequent Experience

Our main theoretical interest is on the processes by which we think affect is created in the behaving person. We should note, however, that once an affect exists, it also influences later processing. It is now widely believed, for example, that emotional state influences the ease with which affectively toned material is brought from memory (e.g., Blaney, 1986; Bower & Cohen, 1982; Clark, Milberg, & Ross, 1983; Clark & Waddell, 1983). Positive affect makes positively valenced material more accessible, negative affect makes negatively valenced material more accessible.

It seems a reasonable inference from this that a current affective state may influence the outcomes of subsequent meta-monitoring. This is not a restatement of the point made earlier that people's consciously derived expectancies are subject to influences beyond current sensed progress. The point we are making now is that even sensed progress per se may be affected by current affect. That is, perceptions relevant to meta-monitoring (as well as monitoring) are determined partly by information drawn from the situation as it exists, and partly by information from memory (Figure 5). Any bias in the use of either of these sources of information will cause bias in the output of the meta process.

A current affective state may exert a bias by rendering external information consistent with current affective tone more salient for input processing, which may reflect easier access to memories consistent with that affective tone (cf. Masters & Furman, 1976; Pyszczynski, Holt, & Greenberg, 1987). More simply, being in a good mood may cause a current situation to be

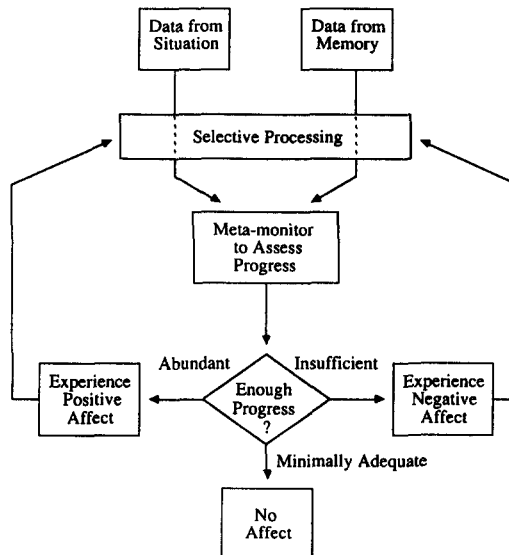


Figure 5. Current affect is both a consequence of, and an influence on, one's perceptions of how well one is doing at moving toward one's behavioral goals. (If meta-monitoring yields affect, that affect can cause the person to preferentially code affect-consistent information inherent in the situation itself and to preferentially extract affect-consistent information from memory. Both of these influences can bias subsequent assessments at the meta level, perpetuating the tone of the current mood.)

viewed more positively (Forgas & Moylan, 1987), because of selective encoding of favorable aspects of the situation (cf. Antes & Matthews, 1988), which may be facilitated by enhanced access to memories of prior successes. Being in a bad mood may cause a current situation to be viewed more negatively through selective coding of unfavorable elements of the situation, facilitated by enhanced access to memories of prior bad outcomes.

The effect of such a processing bias would be to perpetuate the original emotional tone. Being in a bad mood causes people to see things in a way that tends to keep them in a bad mood. What causes emotions ever to fade, then? An answer is provided by Solomon's (1980) argument that every emotion evokes a second, slower acting process that acts in opposition to the initial emotion. The relevant aspect of Solomon's theory in this context is that (in normal self-regulation, at least) the opponent process dampens affective tone. The opponent process itself implies the existence of a feedback system beyond the ones on which we are focusing, in that whichever the direction of the initial emotional response (positive or negative), the opponent process acts to return the person to a neutral state.

Breadth of Intended Application

A final question to be raised about the model concerns its intended scope. Although most examples in this article come from domains of achievement and instrumental activity, this is not a theory of achievement-related affect. This analysis is intended to apply to all goal-directed behavior, including attempts to attain goals that are amorphous and poorly specified, and goals for which the idea of assessing the rate of progress toward discrepancy reduction might at first glance seem odd.

Human goals such as developing and maintaining a sound relationship, being a good mother or father, dealing honorably and pleasantly with acquaintances, seeing someone you care for be happy and fulfilled, having a full and rich life, and even becoming immersed in the fictional lives portrayed in a novel or film are fully amenable to analysis in these terms. These are all qualities of human experience toward which people attempt to move, goals that evolve or recur across time, as do most goals underlying human action. To the extent that progress toward goals such as these is taken by the person as important, to the extent that people are invested in experiencing these qualities in their lives sooner rather than later, the meta loop produces positive and negative feelings as progress is faster or slower than the standard being used. Sometimes pacing toward such goals matters little, but sometimes it matters a lot. In the latter circumstances, we suggest, these events are capable of producing affect.

Issues Relating Emotion to Disengagement

A second set of issues and questions emerges when one considers our viewpoint on affect in relation to the model of behavior with which we began this article. An important aspect of that model is the idea that if a person's expectancies of goal attainment are sufficiently unfavorable, the person may disengage from active pursuit of the goal (see also Klinger, 1975; Kukla, 1972; Wortman & Brehm, 1975). Thinking about disengagement and about the emotions that often surround it, raises several issues.

Hierarchical Organization Sometimes Creates an Inability to Disengage

One issue stems from the idea that behavior is hierarchically organized and that goals are increasingly important as one moves upward through the hierarchy. Presumably, in most cases disengagement from values low in the hierarchy of control is easy. Indeed, the nature of programs is such that disengagement from efforts at subgoals is quite common, even while the person continues to pursue the overall goal of the program (e.g., if you go to buy something and the store is closed for inventory, you are likely to head for another store rather than give up altogether).

Sometimes, however, lower order goals are more closely linked to values at a higher level. To disengage from lower level goals in this case enlarges discrepancies at higher levels. These higher order qualities are values that are important, even central, to one's life. One cannot disengage from them, or disregard them, or tolerate large discrepancies between those values and currently sensed reality, without substantially reorganizing one's value system (Carver & Scheier, 1986c; Kelly, 1955; Millar, Tesser, & Millar, 1988). In such a case, disengagement from concrete behavioral goals is quite difficult.

Now recall the affective consequences of being in this situation. The desire to disengage was prompted in the first place by unfavorable expectancies for discrepancy reduction. These expectancies are paralleled by negative affect. In this situation, then, the person is experiencing negative feelings (because of an inability to progress toward behavioral discrepancy reduction)

and is unable to do anything about the feelings (because of an inability to give up the behavioral reference value). The person simply stew in the feelings that arise from irreconcilable discrepancies (see also Martin & Tesser, in press). In our view, this bind—being unable to let go of something that is unattainable—lies at the heart of exogenous depression (cf. Hyland, 1987; Klinger, 1975; Pyszczynski & Greenberg, 1987). It seems important to us to recognize that this bind often stems from the hierarchical nature of people's goal structures.

Disengagement Requires That There Be an Override Mechanism

The idea that people's efforts give way to disengagement from the goal as expectancies become more negative also raises a second issue. We believe that this characterization is reasonable as part of a model of motivated action. But there is a conceptual discontinuity between this idea and the feedback theories we have espoused regarding behavioral self-regulation and—now—affective experience.

Where in the model of affect is the mechanism to produce disengagement? We portrayed meta-monitoring as a feedback system in which discrepancies (inadequate progress) produce doubt and negative affect. Why should this system (and the corresponding behavioral monitoring system) not continue endlessly to attempt to reduce discrepancies, however ineffectively? Why should the negative affect not simply persist or intensify? What permits the person ever to disengage?

The answer has to be that in normal self-regulation there is an override that is capable of taking precedence over this feedback system and causing disengagement from the reference value currently being used to guide action. In the jargon of the computer field, there must be something akin to a *break* function, which permits ongoing action to be suspended or abandoned altogether. When disengagement is adaptive, it is so because it frees the system to take up other reference values and enables the person to turn to the pursuit of substitute or alternative goals. Such an override function has a critically important role in human self-regulation, inasmuch as there are any number of goals from which people simply must disengage, either temporarily or permanently (see Klinger, 1975, for a broader discussion of commitment to and disengagement from incentives).

Failure to override. Although it seems necessary to assume an override function in adaptive self-regulation, it should also be reemphasized that disengagement does not always occur, even when the desire to disengage is there. As we noted just earlier, when the goal toward which the person is unable to make progress is central to that person's implicit definition of self, the person for that reason often cannot disengage from it. Disengagement from such a goal means disengagement from oneself. Such an inability to disengage, we said, yields depression.

Consistent with this general line of thought is a variety of evidence that the inability (or unwillingness) to disengage correlates with depression. Depression has been linked to behavioral indicators of failing to disengage mentally from experimentally created failures (Kuhl, 1984, 1985; Pyszczynski & Greenberg, 1985, 1987), to concurrent self-reports of a tendency to persevere mentally on failure (Carver, La Voie, Kuhl, & Ganellen,

1988), and to ruminative thoughts during forced suspension of personally valued activities (Millar et al., 1988). Mental perseveration among depressed people is not limited to major life goals, but can occur even for transient and relatively trivial intentions (Kuhl & Helle, 1986). Thus, there is evidence that depression is bound up with a general failure to override and disengage. It is not clear why this should be so, but in some sense this failure seems to be at the core of the dynamics of depression (see also Klinger, 1975).

Discussion of this issue also raises a broader question. People clearly vary in how easily they put previously valued goals behind them and move on to new ones. This is true whether the goal has been removed permanently by some external event, for example, the death of a loved one (cf. Wortman & Silver, 1989), or whether the person has simply decided that the previously sought-after goal should no longer be pursued, as happens when people break off close relationships or give up previously desired careers. Some people disengage quickly and move on, experiencing relatively little distress; others take longer to disengage, and consequently (in our view) experience more negative affect. An important question would seem to be what makes people differ from each other in this way.

Relations to Other Theories

Although we do not propose to examine the relationship between this theory and every other theory bearing on emotions, three comparisons that seem important are outlined in the following sections.

Interruption Can Cause Emotion

Several theorists have made statements linking the experience of emotion to the interruption of behavior. Some have drawn the link in one causal direction, others in the opposite direction. Mandler (1984; Mandler & Watson, 1966) has proposed that interruption of an organized sequence of action causes autonomic arousal, which creates the potential for emotion (à la Schachter & Singer, 1962). The emotion most likely to occur after interruption, in Mandler's view, is anxiety. Anxiety is likely because interruptors often leave people without alternate ways to reach desired goals, and the latter circumstance is what (to Mandler) defines anxiety (cf. Millar et al., 1988).

Although Mandler (1984) views anxiety as the most likely emotional consequence of interruption, anxiety is not inevitable. Sometimes interruption leads to positive emotion. Berscheid (1983), in applying Mandler's theory to interpersonal attraction, developed this idea more completely. She argued for two circumstances in which interruptions facilitate rather than impede completion of action sequences. In the first case, the interruption is removed or shown to be less impactful than it first appeared to be. In the second case, the interruption is itself an event that produces attainment of a desired goal sooner than previously anticipated. In either of these cases, interruption can lead to positive feelings.

There are obvious similarities between this viewpoint and ours. One similarity is the idea that obstructions to goal attainment can cause emotional reactions. We agree with Mandler (1984) and Berscheid (1983) that the experience of a person

who feels helpless and disorganized following an interruption will be one of negative affect. In our view, however, conditions that impede or disrupt efforts at goal attainment (i.e., the interrupting conditions) cause negative affect intrinsically, rather than merely creating a condition of affect-free arousal that then must be assigned affective meaning.

In our view, the two situations said by Berscheid (1983) to produce positive affect reduce to a single phenomenon: Each case involves a shift toward higher levels of progress toward goal attainment. When an interrupting condition is removed, a loss of progress (the initial interruption) is followed by enhanced progress. When goal attainment occurs unexpectedly quickly, the increase in progress is immediate (i.e., without an initial slowing). Both cases satisfy our condition for positive affect, in that both suggest progress at a rate likely to exceed the reference point.

We would hold, however, that the position taken by Mandler (1984) and Berscheid (1983) misses two important things. First, as regards removal of an interrupting condition, we would argue that the person experiences negative affect during the period between onset and removal of that initial interruption. Only when the removal occurs (or is anticipated) does affect shift, because only then does progress return to a high level. Second, we would argue that it is not completion of act sequences per se that is pleasing (the position taken by Mandler, 1984, and by Berscheid, 1983), but rather movement toward completion at a rate higher than needed. As it happens, Mandler and Berscheid incorporated high rates of progress into the examples they used to illustrate the emergence of positive emotion. They did not, however, build the notion of rate of completion into their theories.

One further parallel between models is noteworthy, concerning the conditions that Mandler (1984) and Berscheid (1983) believe initiate an emotional experience. The examples they used to illustrate interruption all involve abrupt changes in progress. Indeed, abruptness seems inherent in the very concept of interruption. We noted earlier that an abrupt change in progress implies an acceleration or deceleration. It would seem, then, that acceleration or deceleration is intrinsic to the events that Mandler (1984) and Berscheid (1983) term *interruptions*. This inference on our part is very consistent with our speculation earlier in the article that deceleration may be the experiential quality that causes people to interrupt their behavioral efforts and evaluate more consciously their probable outcomes.

The notion that there is an equivalence between acceleration/deceleration and interruption suggests a basis for integrating our approach to affect with Mandler's view of emotion. Mandler (1984) has long held that the term *emotion* should be reserved for affectively toned experiences that incorporate arousal. To Mandler, without arousal there is no emotion. He views interruption as a precondition for emotion precisely because he believes that interruption creates arousal. Emotion, for Mandler, seems equivalent to what we described as an affective experience in which there also is acceleration or deceleration. Affective experiences without acceleration or deceleration (Table 1) have received less theoretical attention from Mandler or Berscheid (cf. Berscheid, 1983, pp. 123–124; Mandler, 1984, pp. 131–132). Thus, our analysis would appear to provide an important supplement to theirs.

Affect Can Cause Interruption and Reprioritization

Not every theorist who links interruption to emotion has placed the causal influence in the direction favored by Mandler (1984) and Berscheid (1983). Some have suggested that affect, particularly negative affect, causes interruption of ongoing behavior (Simon, 1967; Sloman, 1987). A potential consequence of this interruption, which suggests a function for the negative emotion, is a reconsideration and reprioritization of one's goals.

The simplest case that can be analyzed in these terms—to which we have largely restricted ourselves thus far in the article—is one in which a single reference value for behavior is currently focal. Negative affect occurs if progress toward that focal goal is inadequate. If negative affect becomes sufficiently intense (or expectancies regarding goal attainment become sufficiently unfavorable), the person disengages from the attempt to conform to it. Once disengagement occurs, the person may turn to a new goal domain or may adopt a less exacting goal in the same domain (cf. Schönflug, 1983, 1985). In either case, disengagement and choice of a new goal can be construed as reflecting a reprioritization, in that attaining the previous goal is now being accorded a lower priority than it was before.

In other cases, however, emotions can induce a different kind of reprioritization. It is this second type of reprioritization that Simon (1967) had in mind as a role for emotions. Simon suggested that many emotions cause people to interrupt behavior and consider the possibility that an alternative goal (not presently focal) should be accorded a higher priority than it is presently receiving. The stronger the emotion, the stronger is the message that the less attended goal should be receiving the highest priority, in place of the goal that is presently focal.

The need to assume dual monitoring. Simon's (1967) analysis seems compatible with the ideas we are proposing, but his view on reprioritization seems to require at least one further assumption (even beyond the assumption of an override mechanism). That is, Simon's analysis seems to require that discrepancies with respect to two different reference values be monitored (and meta-monitored) simultaneously, one focally and the other less so. The emotion that serves as the call for reprioritization is being generated by what is occurring with respect to the *less* focal reference value. The call for reprioritization inevitably is a call to upgrade the priority now being accorded that second value.

The clearest illustration of this argument is what occurs when anxiety arises while the person is engaged in goal-directed effort. For example, anxiety arises when a snake phobic attempts to attain the goal of holding a snake, or when a test-anxious person attempts to attain the goal of scoring well on a test. In such cases, rate of progress toward the focal reference value—the concrete behavioral goal that the person is trying to attain—is not itself the source of the anxiety. Rather, the anxiety is produced by something that is happening with respect to a second reference value.

This second reference value may be physical safety (in the case of the phobic), or the desire to maintain a positive self-portrayal to parents or teachers (in the case of the test-anxious person), or even such broader values as holistic personal integration (cf. Rogers, 1980). As the person attempts to do the in-

tended behavior, that second value (whichever it is) is being threatened. The farther the person goes in the attempted action, the greater is the perceived threat to that second goal. If a discrepancy thus is enlarging at the level of the action loop for that second goal, it should be clear that a major discrepancy has developed at the level of the meta loop for that second goal. The result is negative affect.

It is important to recognize that, in cases such as these, the threat that induces fear is occurring as a by-product of the attempt to do something else. The snake phobic is trying to hold the snake, but doing so is creating perceptions of diminishing safety. The fear thus represents a signal that the person should be devoting greater attention to the goal of safety than to the goal of holding the snake.

In most cases of this sort (perhaps all), the second, threatened value seems to be at a higher level of abstraction than the focal goal (see also Carver & Scheier, 1986a). Earlier in the article we professed no need to assume that self-regulation is always being guided by high-level reference values. Yet this view on reprioritization suggests that high-order values may often be monitored outside awareness until discrepancy enlargement is detected, at which point the value becomes more focal. Another possibility is that fear may happen only when the person is already primed in some way to be attending somewhat to this high-order value. Obviously, there are many unanswered questions here concerning how often and to what degree such parallel processing concerning multiple goal values takes place in human behavior.

Although anxiety is the easiest emotion to address in terms of Simon's (1967) analysis of prioritization, other emotions can also be assimilated to his point of view. Guilt, for example, occurs when a discrepancy is created between the reference value of a moral standard and one's current behavior (behavior that may perfectly match one's action intention). Shame, or embarrassment, occurs when an action creates a discrepancy with respect to a social standard. Anger seems to result from enlarging discrepancies concerning personal control over one's experiences (cf. Averill, 1983). In each of these cases, the emotion seems not to be directly related to the reference value toward which one is trying to move. Rather, it is a by-product of that movement, occurring because the action has consequences in addition to its intended consequences. These examples thus are consistent with the idea that meta-monitoring is often occurring with respect to a second point of reference, as well as to the intention that is being enacted focally.

Types of Discrepancy and Quality of Affect

A third useful theoretical comparison is between our ideas and a theory recently proposed by Higgins (1987). One thing that makes this comparison particularly interesting is the fact that the two models both make considerable use of the concept of discrepancy. Higgins (1987) proposed that certain emotions occur as the consequence of discrepancies between pairs of psychological entities. For the sake of simplicity, we will deal here with only two kinds of discrepancies. The first is between one's perceived actual self and one's ideal self (actual-ideal discrep-

ancies). The second is between one's perceived actual self and one's ought self (actual-ought discrepancies).⁷

An ideal self is a desired self, a self to which one aspires. This mental entity is reward-based. Living up to the ideal means attaining something desired, acquiring reward. An ought self, in contrast, is a duty or obligation, a self that one feels compelled to be, rather than desires to be. This mental entity is punishment-based. Living up to an ought means doing something so as to avoid a punishment. Each person has ideals, and each person has oughts (which may be either interrelated or distinct), and the perceived actual self may be compared to each of these reference points.

According to Higgins (1987), large discrepancies between ideal and actual yield depressed affect. Pure depression thus represents an impending failure to attain rewards (see also Finlay-Jones & Brown, 1981). In contrast, large discrepancies between ought and actual are said to yield anxiety. Pure anxiety thus represents an impending failure to avoid punishment. This separation of reference values for the self into ideal versus ought is reminiscent of Gray's (1981, 1982) discussion of stop and go systems in behavior, which he believes are mediated by distinct physiological structures.

Three differences between Higgins's theory and ours deserve comment. First, Higgins (1987) proposed that depressed affect is a consequence of a discrepancy between an actual and an ideal representation of the self. Our position, in contrast, is that the discrepancy that matters is a discrepancy in sensed rate of progress toward ideals. If progress is inadequate—if there is a discrepancy at the meta-monitoring loop—the person experiences negative affect. Thus, from our point of view, a person who is discrepant from the ideal but is moving toward it rapidly enough should experience positive rather than negative affect.⁸

A second difference between theories is also implicit in this last statement. The model we have presented here deals with both positive affect and negative affect. The theory proposed by Higgins (1987) focuses almost exclusively on negative affect. Higgins did address positive affect, but only in passing (p. 336), and in doing so he seemed to equate positive affect with the absence of negative affect, a position we are not sure is tenable. Our analysis thus supplements his in an important way, by suggesting a basis for the existence of positive feeling qualities, as well as a basis for the existence of negative affect.

The third point of comparison between models concerns the distinction between ideals and oughts. This is the most novel aspect of the Higgins (1987) analysis, providing him a conceptual basis for differentiating anxiety from depression. Higgins framed the distinction between ideals and oughts in terms of reward and punishment contingencies. We believe this distinction can be addressed in control-process terms as well, but to do so requires distinguishing between two kinds of feedback systems.

A negative feedback loop, to which we have limited ourselves thus far, is a discrepancy *reducing*, or negating, loop (thus the term *negative*). This system has a positively valenced reference value, a desired goal. This sort of system would be construed by some people as reward based. A positive feedback loop, in contrast, is a discrepancy *amplifying* loop (see DeAngelis, Post, & Travis, 1986, for detail).⁹ The reference value of this system is an undesired quality. Discrepancy amplifying loops attempt

to move the currently perceived value as far away as possible from the reference value. This sort of system would be construed by some as punishment based. Deviation amplifying loops are believed to be less common in naturally occurring systems because they are unstable. Nevertheless, whenever the motive behind an act is the desire to prevent a condition from existing, the behavior would seem to reflect a positive feedback process (see Carver & Scheier, 1981, pp. 157–165, Ogilvie, 1987, for examples).

Presumably meta-monitoring can occur with respect to both types of loops, providing (in terms of our analysis) a basis for affect in either case. To the extent the Higgins (1987) distinction is valid, then, perhaps depressed affect occurs when there is insufficient progress in a negative feedback system—that is, an approach system. Perhaps anxiety occurs when there is insufficient progress in a positive feedback system—an avoidance system (cf. Gray, 1981, 1982). The role of these latter systems in affective experience is an issue that would seem to deserve further scrutiny from a control process perspective.

Conclusion

In the preceding pages, we have tried to indicate some of the ways in which a control-process model of the self-regulation of behavior can incorporate assumptions about the nature and functions of certain qualities of emotion. We have attempted to specify how we think these affective qualities are created, and we have pointed to a link between them and another element that is important to self-regulation of action: expectancies. We have also tried to give a sense of how the model as a whole can provide a vehicle for conceptualizing some of the emotional difficulties that people periodically experience.

We obviously have not presented a comprehensive model of the nature of all emotional experiences (cf. Frijda, 1986; Leventhal, 1984). Nor have we catalogued the varieties of emotional experience (cf. Izard, 1977; Ortony et al., 1988; Plutchik, 1980; Tomkins, 1984). Doing so was not our intent. Our goal was less ambitious and more focused: To indicate how the nature of some emotions, as they are presently understood, seems compatible with the logic of control theory.

Our intent throughout this discussion was twofold. First, we wanted to contribute to an emerging line of argument that holds that the domain of human experience reflected in concepts such as *feeling* and *affect* is in no way inimical to information-processing or feedback models of thought and action. We believe that we have been able to address feeling states here in terms

⁷ We will disregard another, more complex issue: the fact that ideals (as well as oughts) can be one's own or can be imposed on one by significant others. We restrict our discussion here to cases in which the ideals and oughts are one's own.

⁸ The degree to which this issue represents a point of active disagreement is not entirely clear. Higgins (1987) did not address this distinction, and it is likely that he had not given it serious thought.

⁹ There is an unfortunate opposition between the terminology of control theory (used here) and the informal terminology of learning theory. That is, behavioral psychologists often refer to reward as positive feedback and to punishment as negative feedback. That is not the meaning of these phrases in this discussion.

that do little or no violence either to feedback concepts or to intuitions and knowledge concerning the subjective experience of feeling states. To the extent we have done this successfully, our discussion contributes to this line of argument.

We have not, however, been entirely blind to broader concerns. To the contrary, we believe that our attempt to create a control-process account of affect has led us to conclusions that complement and supplement in useful ways other accounts of emotion. For example, we agree with Frijda (1988) that emotions arise in response to meaning structures of situations. In some sense, what we have tried to do here is to specify in generic terms what kinds of meaning structures—as inputs—may give rise to emotions. In brief, we assert that emotions intrinsically are related to goal values, and that they reflect differences between expected and experienced rates of movement toward (or away from) those goals. They represent an organismic monitoring of “how things are going” with respect to those values.

Clearly, others have been intuitively aware of this quality of affect (see Frijda, 1988), but the importance of this aspect of the picture has rarely been emphasized. What we have done is simply to approach the subject from a somewhat different angle, which has served to make this aspect more salient. Independent of the origins of our effort (i.e., the desire to fit affect to control theory), we hope that others will find merit in the ideas developed here.

References

- Abramson, L. Y., Seligman, M. E. P., & Teasdale, J. D. (1978). Learned helplessness in humans: Critique and reformulation. *Journal of Abnormal Psychology, 87*, 49–74.
- Andersen, S. M., & Lyon, J. E. (1987). Anticipating desired outcomes: The role of outcome certainty in the onset of depressive affect. *Journal of Experimental Social Psychology, 23*, 428–443.
- Antes, J. R., & Matthews, G. R. (1988, November). *Attention and depression: Do the depressed focus on sad themes?* Paper presented at the meeting of the Psychonomic Society, Chicago.
- Averill, J. A. (1983). Studies on anger and aggression. *American Psychologist, 38*, 1145–1160.
- Bandura, A. (1977). *Social learning theory*. Englewood Cliffs, NJ: Prentice-Hall.
- Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: Prentice-Hall.
- Beck, A. T. (1972). *Depression: Causes and treatment*. Philadelphia: University of Pennsylvania Press.
- Berscheid, E. (1983). Emotion. In H. H. Kelley, E. Berscheid, A. Christiansen, J. H. Harvey, T. L. Huston, G. Levinger, E. McClintock, L. A. Peplau, & D. R. Peterson (Eds.), *Close relationships* (pp. 110–168). San Francisco: Freeman.
- Blaney, P. H. (1986). Affect and memory: A review. *Psychological Bulletin, 99*, 229–246.
- Bower, G. H., & Cohen, P. R. (1982). Emotional influences in memory and thinking: Data and theory. In M. S. Clark & S. T. Fiske (Eds.), *Affect and cognition: The 17th Annual Carnegie Symposium on Cognition* (pp. 291–331). Hillsdale, NJ: Erlbaum.
- Broadbent, D. E. (1977). Levels, hierarchies, and the locus of control. *Quarterly Journal of Experimental Psychology, 29*, 181–201.
- Burgio, K. L., Merluzzi, T. V., & Pryor, J. B. (1986). The effects of performance expectancy and self-focused attention on social interaction. *Journal of Personality and Social Psychology, 50*, 1216–1221.
- Carver, C. S. (1979). A cybernetic model of self-attention processes. *Journal of Personality and Social Psychology, 37*, 1251–1281.
- Carver, C. S., Blaney, P. H., & Scheier, M. F. (1979a). Focus of attention, chronic expectancy, and responses to a feared stimulus. *Journal of Personality and Social Psychology, 37*, 1186–1195.
- Carver, C. S., Blaney, P. H., & Scheier, M. F. (1979b). Reassertion and giving up: The interactive role of self-directed attention and outcome expectancy. *Journal of Personality and Social Psychology, 37*, 1859–1870.
- Carver, C. S., La Voie, L., Kuhl, J., & Ganelen, R. J. (1988). Cognitive concomitants of depression: A further examination of the roles of generalization, high standards, and self-criticism. *Journal of Social and Clinical Psychology, 7*, 350–365.
- Carver, C. S., Peterson, L. M., Follansbee, D. J., & Scheier, M. F. (1983). Effects of self-directed attention on performance and persistence among persons high and low in test anxiety. *Cognitive Therapy and Research, 7*, 333–354.
- Carver, C. S., & Scheier, M. F. (1981). *Attention and self-regulation: A control-theory approach to human behavior*. New York: Springer-Verlag.
- Carver, C. S., & Scheier, M. F. (1982a). Control theory: A useful conceptual framework for personality-social, clinical, and health psychology. *Psychological Bulletin, 92*, 111–135.
- Carver, C. S., & Scheier, M. F. (1982b). Outcome expectancy, locus of attribution for expectancy, and self-directed attention as determinants of evaluations and performance. *Journal of Experimental Social Psychology, 18*, 184–200.
- Carver, C. S., & Scheier, M. F. (1984). Self-focused attention in test anxiety: A general theory applied to a specific phenomenon. In H. M. van der Ploeg, R. Schwarzer, & C. D. Spielberger (Eds.), *Advances in test anxiety research* (Vol. 3, pp. 3–20). Hillsdale, NJ: Erlbaum.
- Carver, C. S., & Scheier, M. F. (1985). Aspects of self, and the control of behavior. In B. R. Schlenker (Ed.), *The self and social life* (pp. 146–174). New York: McGraw-Hill.
- Carver, C. S., & Scheier, M. F. (1986a). Functional and dysfunctional responses to anxiety: The interaction between expectancies and self-focused attention. In R. Schwarzer (Ed.), *Self-related cognitions in anxiety and motivation* (pp. 111–141). Hillsdale, NJ: Erlbaum.
- Carver, C. S., & Scheier, M. F. (1986b). Analyzing shyness: A specific application of broader self-regulatory principles. In W. H. Jones, J. M. Cheek, & S. R. Briggs (Eds.), *Shyness: Perspectives on research and treatment* (pp. 173–185). New York: Plenum Press.
- Carver, C. S., & Scheier, M. F. (1986c). Self and the control of behavior. In L. M. Hartman & K. R. Blankstein (Eds.), *Perception of self in emotional disorder and psychotherapy* (pp. 5–35). New York: Plenum Press.
- Carver, C. S., & Scheier, M. F. (in press). Principles of self-regulation: Action and emotion. In R. Sorrentino & E. T. Higgins (Eds.), *Handbook of motivation and cognition* (Vol. 2). New York: Guilford.
- Carver, C. S., Scheier, M. F., & Klahr, D. (1987). Further explorations of a control-process model of test anxiety. In R. Schwarzer, H. M. van der Ploeg, & C. D. Spielberger (Eds.), *Advances in test anxiety research* (Vol. 5, pp. 15–22). Lisse: Swets & Zeitlinger.
- Clark, M. S., Milberg, S., & Ross, J. (1983). Arousal cues arousal-related material in memory: Implications for understanding effects of mood on memory. *Journal of Verbal Learning and Verbal Behavior, 22*, 633–649.
- Clark, M. S., & Waddell, B. A. (1983). Effects of moods on thoughts about helping, attraction, and information acquisition. *Social Psychology Quarterly, 46*, 31–35.
- Dawkins, R. (1976). Hierarchical organisation: A candidate principle for ethology. In P. P. G. Bateson & R. A. Hinde (Eds.), *Growing points in ethology* (pp. 7–54). Cambridge, England: Cambridge University Press.
- DeAngelis, D. L., Post, W. M., & Travis, C. C. (1986). *Positive feedback*

- in natural systems (Biomathematics, Vol. 15). New York: Springer-Verlag.
- Diener, E., & Emmons, R. A. (1984). The independence of positive and negative affect. *Journal of Personality and Social Psychology*, 47, 1105-1117.
- Diener, E., & Iran-Nejad, A. (1986). The relationship in experience between various types of affect. *Journal of Personality and Social Psychology*, 50, 1031-1038.
- Diener, E., Larsen, R. J., Levine, S., & Emmons, R. A. (1985). Intensity and frequency: Dimensions underlying positive and negative affect. *Journal of Personality and Social Psychology*, 48, 1253-1265.
- Dweck, C. S., & Elliott, E. S. (1983). Achievement motivation. In P. H. Mussen (Ed.), *Handbook of child psychology* (4th ed., pp. 643-691). New York: Wiley.
- Dweck, C. S., & Leggett, E. L. (1988). A social-cognitive approach to motivation and personality. *Psychological Review*, 95, 256-273.
- Elliott, E. S., & Dweck, C. S. (1988). Goals: An approach to motivation and achievement. *Journal of Personality and Social Psychology*, 54, 5-12.
- Emmons, R. A. (1986). Personal strivings: An approach to personality and subjective well being. *Journal of Personality and Social Psychology*, 51, 1058-1068.
- Finlay-Jones, R., & Brown, G. W. (1981). Types of stressful life event and the onset of anxiety and depressive disorders. *Psychological Medicine*, 11, 803-815.
- Forgas, J. P., & Moylan, S. (1987). After the movies: Transient mood and social judgments. *Personality and Social Psychology Bulletin*, 13, 467-477.
- Frijda, N. H. (1986). *The emotions*. Cambridge, England: Cambridge University Press.
- Frijda, N. H. (1988). The laws of emotion. *American Psychologist*, 43, 349-358.
- Galassi, J. P., Frierson, H. T., Jr., & Sharer, R. (1981). Behavior of high, moderate, and low test anxious students during an actual test situation. *Journal of Consulting and Clinical Psychology*, 49, 51-62.
- Gallistel, C. R. (1980). *The organization of action: A new synthesis*. Hillsdale, NJ: Erlbaum.
- Gray, J. A. (1981). A critique of Eysenck's theory of personality. In H. J. Eysenck (Ed.), *A model for personality* (pp. 246-276). Berlin: Springer-Verlag.
- Gray, J. A. (1982). *The neuropsychology of anxiety: An enquiry into the functions of the septo-hippocampal system*. New York: Oxford University Press.
- Hamilton, V. (1983). *The cognitive structures and processes of human motivation and personality*. Chichester, England: Wiley.
- Higgins, E. T. (1987). Self-discrepancy: A theory relating self and affect. *Psychological Review*, 94, 319-340.
- Hyland, M. (1987). Control theory interpretation of psychological mechanisms of depression: Comparison and integration of several theories. *Psychological Bulletin*, 102, 109-121.
- Izard, C. E. (1977). *Human emotions*. New York: Plenum Press.
- Kanfer, F. H., & Hagerman, S. (1981). The role of self-regulation. In L. P. Rehm (Ed.), *Behavior therapy for depression: Present status and future directions* (pp. 143-179). New York: Academic Press.
- Kanfer, F. H., & Hagerman, S. (1985). Behavior therapy and the information processing paradigm. In S. Reiss & R. R. Bootzin (Eds.), *Theoretical issues in behavior therapy* (pp. 3-33). New York: Academic Press.
- Kelly, G. A. (1955). *The psychology of personal constructs*. New York: Norton.
- Kirschenbaum, D. S. (1985). Proximity and specificity of planning: A position paper. *Cognitive Therapy and Research*, 9, 489-506.
- Klinger, E. (1975). Consequences of commitment to and disengagement from incentives. *Psychological Review*, 82, 1-25.
- Kuhl, J. (1984). Volitional aspects of achievement motivation and learned helplessness: Toward a comprehensive theory of action control. In B. A. Maher (Ed.), *Progress in experimental personality research* (Vol. 13, pp. 99-170). New York: Academic Press.
- Kuhl, J. (1985). Volitional mediators of cognition-behavior consistency: Self-regulatory processes and action versus state orientation. In J. Kuhl & J. Beckmann (Eds.), *Action control: From cognition to behavior* (pp. 101-128). New York: Springer-Verlag.
- Kuhl, J., & Helle, P. (1986). Motivational and volitional determinants of depression: The degenerated-intention hypothesis. *Journal of Abnormal Psychology*, 95, 247-251.
- Kukla, A. (1972). Foundations of an attributional theory of performance. *Psychological Review*, 79, 454-470.
- Larsen, R. J. (1987). The stability of mood variability: A spectral analytic approach to daily mood assessments. *Journal of Personality and Social Psychology*, 52, 1195-1204.
- Lazarus, R. S. (1966). *Psychological stress and the coping process*. New York: McGraw-Hill.
- Leventhal, H. (1984). A perceptual-motor theory of emotion. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 17, pp. 117-182). New York: Academic Press.
- Linsenmeier, J. A. W., & Brickman, P. (1980). *Expectations, performance, and satisfaction*. Unpublished manuscript.
- Lord, R. G., & Hanges, P. J. (1987). A control system model of organizational motivation: Theoretical development and applied implications. *Behavioral Science*, 32, 161-178.
- MacKay, D. M. (1963). Mindlike behavior in artefacts. In K. M. Sayre & F. J. Crosson (Eds.), *The modeling of mind: Computers and intelligence* (pp. 225-241). Notre Dame, IN: University of Notre Dame Press.
- MacKay, D. M. (1966). Cerebral organization and the conscious control of action. In J. C. Eccles (Ed.), *Brain and conscious experience* (pp. 422-445). Berlin: Springer-Verlag.
- Mandler, G. (1984). *Mind and body: Psychology of emotion and stress*. New York: Norton.
- Mandler, G., & Watson, D. L. (1966). Anxiety and the interruption of behavior. In C. D. Spielberger (Ed.), *Anxiety and behavior* (pp. 263-288). New York: Academic Press.
- Marken, R. S. (1986). Perceptual organization of behavior: A hierarchical control model of coordinated action. *Journal of Experimental Psychology: Human Perception and Performance*, 12, 267-276.
- Markus, H., & Nurius, P. (1986). Possible selves. *American Psychologist*, 41, 954-969.
- Martin, L., & Tesser, A. (in press). Toward a model of ruminative thought. In J. S. Uleman & J. A. Bargh (Eds.), *Unintended thought: The limits of awareness, intention, and control*. New York: Guilford.
- Masters, J. C., & Furman, W. (1976). Effects of affective states on non-contingent outcome expectancies and beliefs in internal or external control. *Developmental Psychology*, 12, 481-482.
- Mayer, J. D., & Gaschke, Y. N. (1988). The experience and meta-experience of mood. *Journal of Personality and Social Psychology*, 55, 102-111.
- Millar, K. U., Tesser, A., & Millar, M. G. (1988). The effects of a threatening life event on behavior sequences and intrusive thought: A self-disruption explanation. *Cognitive Therapy and Research*, 12, 441-458.
- Norman, D. A. (1981). Categorization of action slips. *Psychological Review*, 88, 1-15.
- Ogilvie, D. M. (1987). The undesired self: A neglected variable in personality research. *Journal of Personality and Social Psychology*, 52, 379-385.
- Ortony, A., Clore, G. L., & Collins, A. (1988). *The cognitive structure of emotions*. Cambridge, England: Cambridge University Press.

- Plutchik, R. (1980). *Emotion: A psychoevolutionary synthesis*. New York: Harper & Row.
- Powers, W. T. (1973). *Behavior: The control of perception*. Chicago: Aldine.
- Pyszczynski, T., & Greenberg, J. (1985). Depression and preference for self-focusing stimuli after success and failure. *Journal of Personality and Social Psychology*, 49, 1066-1075.
- Pyszczynski, T., & Greenberg, J. (1987). Self-regulatory perseveration and the depressive self-focusing style: A self-awareness theory of reactive depression. *Psychological Bulletin*, 102, 122-138.
- Pyszczynski, T., Holt, K., & Greenberg, J. (1987). Depression, self-focused attention, and expectancies for positive and negative future life events for self and others. *Journal of Personality and Social Psychology*, 52, 994-1001.
- Rich, A. R., & Woolever, D. K. (1988). Expectancy and self-focused attention: Experimental support for the self-regulation model of test anxiety. *Journal of Social and Clinical Psychology*, 7, 246-259.
- Rogers, C. R. (1980). *A way of being*. Boston: Houghton Mifflin.
- Rosenbaum, D. A. (1987). Hierarchical organization of motor programs. In S. P. Wise (Ed.), *Higher brain functions: Recent explorations of the brain's emergent properties* (pp. 45-66). New York: Wiley.
- Rotter, J. B. (1954). *Social learning and clinical psychology*. New York: Prentice-Hall.
- Schachter, S., & Singer, J. E. (1962). Cognitive, social, and physiological determinants of emotional state. *Psychological Review*, 69, 379-399.
- Schank, R. C., & Abelson, R. P. (1977). *Scripts, plans, goals, and understanding*. Hillsdale, NJ: Erlbaum.
- Scheier, M. F., & Carver, C. S. (1982). Cognition, affect, and self-regulation. In M. S. Clark & S. T. Fiske (Eds.), *Affect and cognition: The 17th Annual Carnegie Symposium on Cognition* (pp. 157-183). Hillsdale, NJ: Erlbaum.
- Scheier, M. F., & Carver, C. S. (1987). Dispositional optimism and physical well-being: The influence of generalized outcome expectancies on health. *Journal of Personality*, 55, 169-210.
- Scheier, M. F., & Carver, C. S. (1988). A model of behavioral self-regulation: Translating intention into action. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 21, pp. 303-346). New York: Academic Press.
- Schlenker, B. R., & Leary, M. R. (1982). Social anxiety and self-presentation: A conceptualization and model. *Psychological Bulletin*, 92, 641-669.
- Schönplflug, W. (1983). Coping efficiency and situational demands. In G. R. Hockey (Ed.), *Stress and fatigue in human performance* (pp. 299-333). Chichester, England: Wiley.
- Schönplflug, W. (1985). Goal directed behavior as a source of stress: Psychological origins and consequences of inefficiency. In M. Frese & J. Sabine (Eds.), *Goal-directed behavior: The concept of action in psychology* (pp. 172-188). Hillsdale, NJ: Erlbaum.
- Shallice, T. (1978). The dominant action system: An information-processing approach to consciousness. In K. S. Pope & J. L. Singer (Eds.), *The stream of consciousness: Scientific investigations into the flow of human experience* (pp. 117-157). New York: Wiley.
- Shiffrin, R. M., & Schneider, W. (1977). Controlled and automatic human information processing: II. Perceptual learning, automatic attending, and a general theory. *Psychological Review*, 84, 127-190.
- Simon, H. A. (1967). Motivational and emotional controls of cognition. *Psychological Review*, 74, 29-39.
- Sloman, A. (1987). Motives, mechanisms, and emotions. *Cognition and Emotion*, 1, 217-233.
- Solomon, R. L. (1980). The opponent-process theory of acquired motivation: The costs of pleasure and the benefits of pain. *American Psychologist*, 35, 691-712.
- Srull, T. K., & Wyer, R. S., Jr. (1986). The role of chronic and temporary goals in social information processing. In R. M. Sorrentino & E. T. Higgins (Eds.), *Handbook of motivation and cognition: Foundations of social behavior* (pp. 503-549). New York: Guilford.
- Stotland, E. (1969). *The psychology of hope*. San Francisco: Jossey-Bass.
- Tomkins, S. S. (1984). Affect theory. In K. R. Scherer & P. Ekman (Eds.), *Approaches to emotion*. Hillsdale, NJ: Erlbaum.
- Vallacher, R. R., & Wegner, D. M. (1985). *A theory of action identification*. Hillsdale, NJ: Erlbaum.
- Vallacher, R. R., & Wegner, D. M. (1987). What do people think they're doing? Action identification and human behavior. *Psychological Review*, 94, 3-15.
- Van Hook, E., & Higgins, E. T. (1988). Self-related problems beyond the self-concept: Motivational consequences of discrepant self-guides. *Journal of Personality and Social Psychology*, 55, 625-633.
- Warr, P., Barter, J., & Brownbridge, G. (1983). On the independence of positive and negative affect. *Journal of Personality and Social Psychology*, 44, 644-651.
- Watson, D., & Tellegen, A. (1985). Toward a consensual structure of mood. *Psychological Bulletin*, 98, 219-235.
- Weiner, B. (1982). The emotional consequences of causal ascriptions. In M. S. Clark & S. T. Fiske (Eds.), *Affect and cognition: The 17th Annual Carnegie Symposium on Cognition* (pp. 185-209). Hillsdale, NJ: Erlbaum.
- Wessman, A. E., & Ricks, D. F. (1966). *Mood and personality*. New York: Holt, Rinehart & Winston.
- Wills, T. A. (1981). Downward comparison principles in social psychology. *Psychological Bulletin*, 90, 245-271.
- Wood, J. V., Taylor, S. E., & Lichtman, R. R. (1985). Social comparison in adjustment to breast cancer. *Journal of Personality and Social Psychology*, 49, 1169-1183.
- Wortman, C. B., & Brehm, J. W. (1975). Responses to uncontrollable outcomes: An integration of reactance theory and the learned helplessness model. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 8, pp. 277-336). New York: Academic Press.
- Wortman, C. B., & Silver, R. C. (1989). The myths of coping with loss. *Journal of Consulting and Clinical Psychology*, 57, 349-357.
- Zajonc, R. B. (1980). Feeling and thinking: Preferences need no inferences. *American Psychologist*, 35, 151-175.
- Zevon, M. A., & Tellegen, A. (1982). The structure of mood change: An idiographic/nomothetic analysis. *Journal of Personality and Social Psychology*, 43, 111-122.

Received October 11, 1988

Revision received March 7, 1989

Accepted April 4, 1989 ■