Self-regulation in Health Behavior

Edited by

Denise T.D. de Ridder and John B.F. de Wit

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Self-regulation in Health Behavior
To Paul, Daniel, and Charlotte Leseman
DdR
To Philippe Adam, for everything
JdW
Contents

About the Editors ix
Contributors xi
Foreword xiii

Chapter 1 Self-regulation in Health Behavior: Concepts, Theories, and Central Issues 1
Denise T.D. de Ridder and John B.F. de Wit

Part I Goal Setting in Health Behavior: Conflicting Desires and Social Influences 25
Chapter 2 Contextualizing Health Behaviors: The Role of Personal Goals 27
Winifred A. Gebhardt

Chapter 3 Unintentional Behavior: A Subrational Approach to Health Risk 45
Frederick X. Gibbons, Meg Gerrard, Rachel A. Reimer, and Elizabeth A. Pomery

Chapter 4 Social Influences on Adolescent Substance Use: Insights into How Parents and Peers Affect Adolescent’s Smoking and Drinking Behavior 71
Rutger C.M.E. Engels and Sander M. Bot

Chapter 5 Temperament, Self-regulation, and the Prototype/Willingness Model of Adolescent Health Risk Behavior 97
Meg Gerrard, Frederick X. Gibbons, Michelle L. Stock, Amy E. Houlihan, and Jennifer L. Dykstra

Part II Goal Striving to Achieve Outcomes: Getting Started, Staying on Track, and Letting Go 119
Chapter 6 Implementation Intentions: Strategic Automatization of Goal Striving 121
Paschal Sheeran, Thomas L. Webb, and Peter M. Gollwitzer
Chapter 7  Managing Immediate Needs in the Pursuit of Health Goals: 
The Role of Coping in Self-regulation  
  Denise T.D. de Ridder and Roeline G. Kuijer

Chapter 8  Maintaining Self-control: The Role of Expectancies  
  Carolien Martijn, Hugo J.E.M. Alberts, and Nanne K. de Vries

Chapter 9  Maintenance of Health Behavior Change: Additional 
  Challenges for Self-regulation Theory, Research, and Practice  
  John B.F. de Wit

Chapter 10 Hanging On and Letting Go in the Pursuit of Health Goals: 
  Psychological Mechanisms to Cope with a Regulatory 
  Dilemma  
  Klaus Rothermund

Index
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The psychology of health and illness has come a very long way since its inception. In the course of its evolution, the field has developed a fairly elaborate substructure of specializations. Some areas of health psychology focus on how the body responds to stressful experiences by setting into motion a cascade of cardiovascular, neuroendocrine, and immune changes—changes that adaptively prepare the body for the demands of high levels of activity but which can have longer-term residual effects that are problematic. Other areas of the field focus on how people with health problems go about regaining pre-illness levels of social and emotional functioning, or alternatively how they adapt to the restrictions their diseases place on them. Yet other areas of this field focus on the health-damaging behaviors that people sometimes engage in, in an effort to understand better what processes promote and maintain those behaviors and how those processes can be harnessed to make those behaviors less likely.

Different people find appeal in various aspects of this growing field. To me, the appeal of health psychology has always been less about the health than about the psychology. For example, I have long believed that what we sometimes treat as a special topic called “stress and coping” is simply human behavior under conditions of greater than typical adversity. As such, it displays essentially the same properties as human behavior in other contexts where obstacles exist. I think of adversity as any condition that represents a threat to, or interference with, attainment of goals the person values as important. Interestingly enough, it is not always outside forces that create such obstacles. It often turns out that the various goals a given person holds are not always fully compatible with one another. Sometimes attaining one goal interferes with the attainment of another. Thus even a success can be an obstacle to a different success. When the attainment of a goal is threatened, the person has to decide (and often must do so over and over again) whether to keep pursuing the goal or give it up. Because the negative emotions that come when goal attainment is threatened are unpleasant and undesired, people will often take steps to reduce them, even if only temporarily. They will often do this without regard to longer-term effects of the emotion-soothing actions, which in some cases can be deleterious. Increasingly, social and personality psychologists are also interested in the idea that behavior sometimes is managed from the top down (intentions leading to actions), but sometimes is triggered from the bottom up (via self-organization or reflexive triggering without the formation of an intention).

All the elements of this portrayal of stress and coping are represented in mainstream psychology. The idea that human behavior is about approaching (and maintaining proximity to) desired conditions (whether these conditions are thought of as goals,
values, desires, or pathways to the future) is a common element of psychological theory today. We also understand, though, that people do not always (or even often) have completely smooth sailing to those goals. Reality throws a wide variety of obstacles in people’s way (obstacles ranging in severity from closed doors to hurricanes). The idea that people’s values are often less than fully compatible with each other is part of many approaches to understanding behavior. Thus, the same person may want to be healthy and also want to pursue other interests that take time and attention away from the goal of health. Many theories also posit that how people respond to difficulty, whether created by obstacles or conflicts, depends partly on their confidence of prevailing. The fact that people’s goal-directed actions can be automatic or effortful—well thought out or impulsive—is of increasing interest today. Determinants of whether people choose to do things that feel good in the short run or instead make choices that are better in the long run have been studied for years under such labels as self-control and delay of gratification. All these ideas are embedded in contemporary psychology. All of them are also represented in this volume on health behavior.

These ideas interweave with one another (some perhaps more easily than others). The picture they form has an intrinsic dynamic. It fits the idea that living systems are composed of simple processes that draw them forward to desired ends, while keeping key parameters within certain comfortable ranges. Some such processes are labeled homeostasic, others are sometimes called homeodynamic. The processes are simple, but simple processes can be linked into arrays of great complexity. Many desired ends are pursued at once, sometimes in competition with each other and sometimes just concurrently. There are systems within systems, natural forces acting to regulate movement and control of many values simultaneously within plausible orbits. Humans are not linear strings of causal paths. Humans are self-regulating systems.

The idea that health-related behavior represents self-regulating systems is given clear expression in this excellent volume. As a group, the contributors take seriously the idea that people have consciously held goals and also goals that are implicit; the idea that goal pursuit can be effortful but can also be automatic; the idea that people often choose between short-term gratification and deeper longer-term well-being. The contributors to this volume understand that people confront conflict not just between impulse and restraint, but also between incompatible desires. They understand that whether people stay on track depends in part on their confidence, and that staying on track is a long-term proposition. In short, as a group they apply diverse aspects of a broadly grounded view of behavior-in-general to the specific problem of health behavior. The view is that of a self-regulating system. Many of the ideas represented in these discussions are present in more general statements on self-regulation (e.g., Carver & Scheier, 1998). However, the authors of these chapters extend such ideas more directly into the domain of health-related behavior.

The Chapters and Their Themes

The notion that health-promoting behavior is goal-directed (in some ways the core of self-regulatory models) is implicit in many of these chapters and a core feature of some of
them. Gebhardt (Chapter 2) focuses closely on the personal goals that underlie health-promoting behavior. De Wit (Chapter 10) makes the point that change in behavior can be viewed as a process of goal setting and effortful action toward attaining the goal. Sheeran, Webb and Gollwitzer (Chapter 6) focus on the fact that having broad, general goals is typically not enough; people also benefit from having concrete if-then connections in mind, to help them start acting when appropriate circumstances arise and to help them continue acting when the going gets difficult.

The idea that desires to behave in health-promoting ways can conflict with other desires is one that is important in many of these chapters. It forms a main focus for Gebhardt (Chapter 2), for de Ridder and Kuijer (Chapter 7), and for Rothermund (Chapter 10). Gebhardt focuses on organizations of goals within the self that can make health behaviors more likely or less likely to be adopted. De Ridder and Kuijer consider the frustrations and distractions that often emerge in the course of efforts toward the desired goal of behavior change, and argue that it is important to attend to those frustrations, because they signal other important goals. By satisfying those short-term goals periodically, the person may be able to facilitate the more difficult longer-term goals. Similarly, Rothermund uses the idea of conflict among goals as a basis for stressing the importance of sometimes accommodating to the reality of goals besides those directed at better health. The notion of conflict among goals also plays a more minor role in several other chapters.

The role of expectancies is taken up by several of these authors, in several forms. Rothermund (Chapter 10) stresses the fact that the decision whether to continue making efforts toward health goals depends in part on confidence about ultimate outcomes of the efforts. De Wit (Chapter 9) notes as well that confidence is a key determinant of continued efforts to maintain health behavior changes, once such changes are initiated. Martijn, Alberts and De Vries (Chapter 8) address a different sort of expectancy. They argue that people’s self-control efforts are guided by their expectations: in particular, expectations about whether continued efforts at self-control exhaust resources. Their very intriguing findings raise serious questions about whether the capacity for self-control is limited in the way that Baumeister and colleagues have argued.

The proposition that behavior is sometimes guided top-down by intentions and sometimes guided bottom-up by impulses suggested by the social environment plays a role in the Engels and Bot chapter (Chapter 4) and takes center stage in the interrelated chapters by Gibbons et al. (Chapter 3) and Gerrard et al. (Chapter 5). Engels and Bot review a variety of literature indicating that neither parents nor peers exert strong influence on adolescent risk behavior, but then turn to another source of evidence—direct behavioral observation—which shows strong situational modeling effects. These effects are relatively spontaneous, in contrast to the self-reports that form the bulk of the other literatures. As such, they suggest that the behavior itself is relatively spontaneous. Gibbons et al. go a step further, arguing that health-promoting behavior tends to be deliberative and derived from planful intentions, but that health-risk behavior tends to be more spontaneous and impulsive. The Gerrard et al. chapter delves more deeply into the conceptual basis of this difference. Based on a review of ideas from the developmental literature, they propose that one important source of risk behavior is poor self-control, the relative inability to override impulses. This is quite different from the active tendency to
seek out risks as a source of excitement. Instead, it is about the spontaneous nature of many acts of behavior, particularly in childhood and adolescence.

It is very satisfying to me to see health behavior approached from this conceptual framework. I think it is a general framework that offers great promise to future research efforts on these topics. I hope other readers will find it as interesting and valuable a perspective on health behavior as I do.

Charles S. Carver
Coral Gables, Florida
Good health is of critical importance to many people while they are generally aware that their behavior plays an important role in achieving and maintaining physical well-being. In Western societies, it is difficult not knowing that one is, to some extent, responsible for one’s own health as people are continuously reminded of the importance of their behavior for staying healthy by both public health campaigns and medical care professionals (Brownell, 1991). Yet, even though good health is generally considered important, and many people have good intentions for health behavior, the vast majority report difficulties in consistently performing those behaviors. They may find it hard, for instance, to maintain a healthy diet or a pattern of regular exercise in the face of temptations of modern life (e.g., Rothman, Baldwin & Hertel, 2004). Changing a bad health habit seems even more difficult than maintaining a good one (Polivy & Herman, 2002; cf. Norcross, Ratzin & Payne, 1989).

The proverbial road to hell does indeed seem to be paved with good intentions (cf. Powers, Koestner & Topciu, 2005). The question is: Why is it so difficult to act upon intentions or maintain attempts for changing health behavior, even for people who seem to be motivated? Only recently has the so-called “intention-behavior gap” started to attract substantial attention, and currently this is one of the most researched aspects of health behavior (e.g., Sheeran, 2002; Sheeran, Milne, Webb & Gollwitzer, 2005; also see Sheeran, Webb & Gollwitzer, this volume), and a crucial aspect of self-regulation. Self-regulation broadly refers to the processes of goal setting and goal striving, and includes dealing with a range of challenges that individuals may face when trying to achieve something that is important but, almost by definition, difficult to attain (Mischel, Cantor & Feldman, 1996). Important new questions arise from a self-regulation approach to health behavior, such as the following: How do people set health goals, and do they in fact...
have health goals? Are these goals authentic or merely a response to persuasive health messages or other social influences that are not well considered and therefore prone to failure? Which types of health goals motivate behavior, and what happens when health goals are in conflict with other goals? What are the conditions that promote or hinder the successful pursuit of health goals? And how do people deal with distractions and temptations when striving for health goals?

Self-regulation theories have not been designed uniquely to explain and understand health behavior and they are relevant in other important contexts as well, such as learning or organizational behavior (cf. Karoly, Boekaerts & Maes, 2005; for an overview, see Boekaerts, Pintrich & Zeidner, 2000). However, the health domain poses special challenges for self-regulation theories because of the substantial discrepancy that has been noted between the importance of individuals’ health goals (or at least, what they report to be important health goals) and their frequent failure to act upon these goals. In fact, self-regulation failure in the health domain is a prototypical case to illustrate the relevance of a self-regulation approach to behavior (Baumeister, Heatherton & Tice, 1994). In turn, health behavior research can benefit from a self-regulation approach as this explicitly frames health behavior as a process of investing in long-term goals that require the control of immediate needs, which is one of the most important and difficult self-regulatory tasks (Brandstätter & Renner, 1990; Mischel et al., 1996).

We feel that the self-regulation approach opens new perspectives for the study of complex health-related behaviors, and we are convinced that applying a self-regulation approach to critical issues in health behavior will result in a better understanding of why and when people effectively invest in their long term health than traditional approaches so far have done. In our overview of self-regulation approaches to health behavior we will not limit ourselves to one or two particular perspectives, as others have done (e.g., Cameron & Leventhal, 2003), but instead adopt a broad view that highlights important basic processes of self-regulation of health behavior, notably those involved in flexible goal setting and tenacious goal striving (Mischel et al., 1996). In the remainder of this chapter, we will first discuss what generally is meant by self-regulation, and briefly trace the historical roots of this approach. Next, we elaborate on different theoretical approaches to self-regulation, highlighting the cybernetic control approach (e.g., Carver & Scheier, 1998), a strength perspective of self-control (e.g., Muraven & Baumeister, 2000), and behavioral enaction strategy (e.g., Gollwitzer, 1999), respectively. We then proceed with highlighting critical issues related to the self-regulation of health behavior. In the last section we will give an overview of the book.

WHAT IS SELF-REGULATION?

Compared to other living creatures, human beings are noted for having an extensive ability to exert control over their inner states, processes, and responses (Baumeister et al., 1994). People are able to resist their own impulses, adapt their behavior to a range of standards, and change their current behaviors in the service of attaining distal goals (Baumeister, 1999). The term self-regulation is often used to refer broadly to efforts by humans to alter their thoughts, feelings, desires, and actions in the perspective of such
higher goals (Carver & Scheier, 1998; Vohs & Baumeister, 2004). Hence, self-regulation refers to the person as an active agent and decision-maker, and is a vital aspect of human adaptation to life without which the individual would be a helpless spectator of events (Baumeister, 2005).

Psychologists’ interest in self-regulation has burgeoned in recent years, and as an illustration Leventhal, Brisette and Leventhal (2003) found that two thirds of more than 2,700 publications containing the keyword “self-regulation” were published after 1990. This growing popularity promoted a range of views that differ in the various principles of self-regulation they emphasize and the specific mechanism they propose, but nevertheless share two basic properties (Cameron & Leventhal, 2003). A first common feature is to construe self-regulation as a dynamic motivational system of setting goals, developing and enacting strategies to achieve those goals, appraising progress, and revising goals and strategies accordingly. A second common characteristic is that self-regulation is also concerned with the management of emotional responses, which are seen as crucial elements of the motivational system, and that are conceived of as intricately linked with cognitive processes.

An issue of particular relevance in self-regulation concerns the processes involved in effective goal-pursuit that often extends over long periods of time and is frequently confronted with obstacles and temptations. How do individuals manage to successfully quit smoking, for instance, even though from time to time they may experience urges and cravings, and encounter numerous situations in which a cigarette is on offer? More generally, how do people manage the trade-offs and choices between distal goals and immediate urges? And how do they stay on track in cycles of waxing and waning commitment to their goals (cf. Klinger, 1977)? Some of these “preliminaries of willing” (cf. James, 1890), are related to the process of goal setting, and effective self-regulation is more likely when a goal is construed as personally meaningful, supported by favorable expectations about one’s ability to execute the necessary actions, and the choice of appropriate standards for performance (Mischel et al., 1996). Several other processes contribute to the successful enaction of intentions, such as effective planning and adequate self-instruction to implement plans. Detailed overviews of “goal-guidance processes” (Maes & Karoly, 2005) are presented by other authors (e.g., Gollwitzer & Moskowitz, 1996; Kuhl, 2000; Maes & Karoly, 2005; Mischel et al., 1996).

Successful self-regulation requires the strategic mobilization of thought, feeling, and action (Cantor, 1990; Gollwitzer, 1996; Kuhl, 2000), in particular when facing obstacles and conflicts between goals, and self-regulation generally is construed as a systematic process that involves conscious effort to influence thoughts, feelings, and behaviors in order to achieve a goal in the context of a changing environment (cf. Zeidner, Boekaerts & Pintrich, 2000). Phrased differently, self-regulation entails individuals’ involvement in the management of their own change processes (Abraham, Norman & Conner, 2000), including the conscious consideration of the relative importance of potentially competing goals, and goal prioritization in particular (Abraham & Sheeran, 2000). The unique contributions of the psychological self-regulation perspective to an explanation of (health) behavior can best be understood when considered in the historic context of other perspectives on behavior, especially insofar as they relate to the role of motivation (Bandura, 1986; Mischel et al., 1996).
**The Emergence of a Self-regulation Perspective**

Since the emergence of psychological science in the late 19th century, psychologists have proposed a range of substantially different views on the nature of motivational processes that underlie human behavior. However, be it the trait-disposition view, the biological perspective, psychoanalytic thinking or learning theory, to name but the most important perspectives, the approaches that have dominated thinking about motivation and behavior for most of the 20th century shared one critical assumption. All considered behavior to mostly result from non-reasoned processes. The precise processes that have been proposed differed between these perspectives, but none included reasoning. Indeed, for much of the history of psychological thought, motivational processes have been considered as substantially different from and independent of cognitive processes. Only more recently have scholars started to invoke human agency and systematically address the ways in which motivation and cognition are intricately linked (cf. Mischel et al., 1996). A major change in thinking about how motivation and cognition are related is evident in Bandura’s view that cognitive processes play a central role in human learning as well as motivation (Bandura, 1977). An important cognitive process underlying motivation is that reinforcements create expectations of future outcomes, which guide behavior through the processes of goal setting and self-evaluation against these standards, a notion that has become central to the self-regulation perspective of behavior. Indeed, it has been noted that the concept of self-regulation originates with attempts to make learning theory more sophisticated and flexible to encompass a larger portion of behavior (Bauemeister, 1998).

Bandura’s writings (e.g., 1977, 1986) have proven particularly seminal for the emergence of a self-regulation perspective, highlighting central issues such as the symbolic representations of goals and self-reflective monitoring of behavior in the pursuit of goals. Bandura’s Social Cognitive Theory posits that individuals engage in behavior because of the outcomes they hope to achieve, and these action expectations reflect the motivational function of reinforcement (Bandura, 1977, 1986). People strive to gain anticipated positive outcomes and to forestall potential negative outcomes, and this goal striving is further governed by individuals’ self-efficacy beliefs. As a general rule, people undertake those tasks for which they judge themselves efficacious. Self-efficacy is particularly important to self-regulation because it influences a host of variables that come into play as people strive to regulate their behavior (Cervone, Mor, Orom, Shadel & Scott, 2004). Self-efficacy beliefs affect the level and type of goal individuals adopt, which in turn influences performance. Explicit, challenging goals raise motivation and goal attainment (Locke & Latham, 2002), and individuals with high self-efficacy are more likely to adopt and remain committed to highly challenging goals.

The major contribution of Social Cognitive Theory arguably lies in the proposition that self-efficacy beliefs affect standards of performance (i.e., goal setting), a suggestion that has rapidly been included in other motivational theories of behavior. Only recently increasing attention is being devoted to explicating the ways in which self-efficacy beliefs also affect strategies for achieving goals (Bandura, 1991; Cervone et al., 2004; Lusczczynska & Schwarzer, 2005; Schwarzer, 1992), but the proposed mechanisms substantially overlap with processes that are central to other accounts of self-regulation. Also, according to Carver and Scheier (1998), Bandura has been somewhat reluctant to
adopt the vocabulary of feedback control, which constitutes another important feature of self-regulation (Miller, Gallanter & Pribam, 1960; Carver & Scheier, 1982), and one that we will discuss in the next section.

MODELS OF SELF-REGULATION

Cameron and Leventhal (2003) note that the term self-regulation has been so widely used in recent years that one cannot but wonder whether all theories of (health) behavior are self-regulation models. Obviously, the answer should be no. Following other authors in the field of self-regulation (Carver & Scheier, 1998; Mischel et al., 1996), we apply three criteria for including models of behavior as self-regulatory models: (a) The explicit consideration of goals, (b) a view of the person as an active agent in shaping his or her own behavior, and (c) an emphasis on volitional processes in goal striving.

Central to all self-regulation models of behavior is the concept of goals. Different type of goal constructs have been proposed, including personal strivings (Emmons, 1986), life tasks (Cantor & Kihlstrom, 1987), personal projects (Little, 1983) or self-guides (Higgins, 1987), each emphasizing different aspects of goals but having in common the idea that goals energize and direct activities as they give meaning to people’s lives (Baumeister, 1989). Indeed, understanding the person means understanding the person’s goals (Carver & Scheier, 1999). By definition, goals are future-oriented as they relate to how people think of their unrealized potential and the kind of things they might want to achieve. Most theoretical accounts of self-regulation cast goals as guiding principles that people consciously and intentionally set to effectively steer their behavior (e.g., Austin & Vancouver, 1996; Elliott & Dweck, 1988; Pervin, 1989). We consider a theory to be a self-regulation model when it starts from the assumption that individuals are agents that somehow are involved in shaping their own destiny. This can be as active decision-makers, but also includes instances in which individuals act to achieve goals of which they are not consciously aware (e.g., Bargh & Chartrand, 1999; Fitzsimons & Bargh, 2004; Strack & Deutsch, 2004).

In addition to acknowledging the importance of goals and goal setting as motivational underpinnings of human action, a self-regulation theory of human behavior also should make explicit the processes that are involved in striving to attain the specified goal. That is, self-regulation theories are not only concerned with motivation but also with volition, and the processes of goal setting and goal striving are construed as intricately linked in a recursive process, which dynamically adapts to changes in the context in which the self-regulation occurs. We next introduce major theoretical approaches to self-regulation that differ in the extent in which they incorporate these different features. We distinguish among cybernetic control theory (e.g., Carver & Scheier, 1998), models of willpower and self-control resources (e.g., Baumeister et al., 1994; Mischel et al., 1996), and behavioral enaction theories (e.g., Gollwitzer, Fujita & Oettingen, 2004; Schwarz, 2001).

Cybernetic Control Theory

For a long time, the cybernetic view of self-regulation developed by Carver and Scheier (Carver, 2004; Carver & Scheier, 1998; Scheier & Carver, 2003) has more or less been
equated with the self-regulation perspective, not in the least because it was one of the first self-identified self-regulation theories. Central to Carver and Scheier’s approach to self-regulation, which continues to be “the bedrock of self-regulation science” (Vohs & Baumeister, 2004, p. 4), is the notion that “individuals live life by identifying goals and behaving in ways aimed at attaining those goals” (Scheier & Carver, 2003, p. 17). Behavioral self-regulation hence entails that individuals hold a goal, monitor progress towards the attainment of this goal, and act in ways to reduce any discrepancy between the current state and a standard as specified by the goal, and they do this in ways that fit the situation and their personalities (Carver, 2004).

This dynamic process of feedback control is summarized by the Test-Operate-Test-Exit cycle (TOTE; Miller et al., 1960; Powers, 1973), in which stimulus input is evaluated through a comparison with a reference value or standard (Test), acted upon to bring the person’s situation in line with the standard (Operate), which constitutes the systems output function, and tested again to evaluate whether the standard has been reached (Test). If so, the control process is ended (Exit). Feedback loops are discrepancy reducing (or “negative”) when behavior decreases any discrepancy between the person’s current state and the goal. This process is seen when someone attempts to attain a valued goal or conform to a standard, such as exercising more or eating more fruits, and refers to approach behaviors. A discrepancy enlarging (“positive”) feedback loop is involved in acts of avoidance, as in not eating high caloric foods or reducing alcohol intake. It is in particular the consequences of behavior that constitute useful feedback, and self-regulation in essence refers to an internal guidance system that operates on the short-term effects of actions (Carver & Scheier, 1998), and can override normal response tendencies.

A central idea in Carver and Scheier’s theorizing of self-regulation is that goals differ in abstraction, and are organized hierarchically. They similarly propose a hierarchy of feedback loops in which lower order goals are controlled by higher order goals (Carver & Scheier, 1982; cf. Powers, 1973). In this hierarchical system of self-regulation, a lower level represents the means towards the ends specified at the next higher level, and what results is a “cascade of control” (Scheier & Carver, 2003, p. 20), which extends from the most abstract top level at which system concepts (or “be” goals) are represented, such as being a healthy person, down to motor control goals at the lowest level, such as walk to work instead of driving by car (Carver & Scheier, 1982). An implication of the notion of hierarchy is that goals vary in importance. The higher in the organization, the more goals are tied to the sense of self and the more an individual is committed to this goal. In turn, high goal commitment is often associated with affect, and affect in particular is thought to be involved in priority management (Carver, 2004). Carver and Scheier (1998) have suggested that the feelings a person experiences reflect how well the behavior regulation process is doing. This self-awareness or self-monitoring of affect is crucial for the understanding of self-regulation processes as the affect resulting from either slower or faster than expected progress to the standard is believed to determine further action.

Given that the function of feedback systems is to reduce discrepancies, positive affect is suggested to promote slowing down or coasting, as a result of which the positive affect gradually fades (Carver, 2004). While people are generally thought to strive for continued pleasure, this makes functional sense because it can explain why someone would ever stop a pleasurable activity and attend to other important issues and concerns. Negative
affect is proposed to promote that a person tries harder, but an impulse to withdraw or disengage may also occur when the person’s expectancy of being able to reduce the discrepancy is unfavorable (cf. Carver, 1979). Sometimes this disengagement involves scaling back to the pursuit of a less demanding goal, which adaptively keeps the person in specific domain of goal pursuit. An import issue concerns when it is adaptive to give up, and Scheier and Carver (2003) suggest that this is the case when it leads to taking up of other goals, which can be substitutes for the abandoned goal (Wrosch, Scheier, Miller, Schulz & Carver, 2003; see also Rothermund, this volume).

Theories of Willpower and Self-control Resources

Whereas the Carver and Scheier approach to self-regulation highlights the process of self-monitoring as crucial in acting upon the experience of discrepancy between a current state and a desired goal, Baumeister’s self-control strength theory emphasizes the resources involved in making changes and adjustments in one’s behavior to achieve a goal (Baumeister, Bratslavsky, Muraven & Tice, 1998). In cybernetic terms this self-regulation resource approach focuses on the operate phase of the TOTE loop, and much less on performance standards or monitoring progress (Baumeister & Heatherton, 1996). As such, both approaches are believed to be complementary, and to address different aspects of self-regulation (Vohs & Baumeister, 2004). The approach advocated by Baumeister and colleagues entails that self-control or willpower plays an essential role in self-regulation, as self-control is required to resist urges and temptations that would otherwise interfere with the individual’s long-term interests. This emphasis on the importance of self-control and willpower is shared with earlier theories concerning postponing the fulfillment of immediate needs, such as Mischel’s delay of gratification paradigm (Mischel, Shoda & Rodriguez, 1989).

The Baumeister model holds three central assumptions. First, it states that there is a limited capacity for self-regulation because self-regulation is an effortful process. Second, the theory holds that all self-regulation tasks draw on the same (limited) resource, making it difficult to engage in continued self-control once the resource has been employed for an initial task. The third and probably most important assumption is that successful self-regulation entirely depends on the availability of the resource. A series of experimental studies have provided evidence for the first two assumptions, demonstrating that the capacity for controlling the self draws on a resource that resembles a strength, more than a skill or a knowledge structure and is hence vulnerable to depletion (Baumeister et al., 1998; Muraven, Tice & Baumeister, 1998). That is, the resource for self-regulation is limited in such a way that expending it is followed by a period of reduced capacity until it builds up again, much like a muscle works (Muraven & Baumeister, 2000). However, it has been suggested that depletion effects may also be related to decreased motivation (Martijn, Alberts & De Vries, this volume; Muraven & Slessareva, 2003).

Regarding the third assumption of the model, evidence is mixed. To date, most studies applying self-control resource theory have been concerned with explaining self-regulation failure, which seems reasonable because of its emphasis on the limited availability of self-control (Baumeister & Heatherton, 1996; Baumeister et al., 1994; Muraven et al., 1998). Indeed, the scarce capacity for self-regulation may provide a good account of why so
many people fail in acting upon their intentions or do not maintain initial attempts to change their behavior. That is, they may be able to withstand the temptations of cigarettes, alcohol or fattening foods for a short while but, as the theory predicts, sooner or later they will give in because of self-control depletion. Often they do so for the hedonistic motive of feeling good in the short term or because they fail to recognize the long-term benefits of self-control (Leith & Baumeister, 1996; Tice, Bratslavsky & Baumeister, 2001).

Despite its relevance for understanding self-regulation failure, which seems especially important in the field of health behavior, the resource approach has some trouble in explaining why and how people may achieve successful self-regulation. There is some evidence that self-control may improve as a result of exercise (Muraven, Baumeister & Tice, 1999), but overall the theory is more concerned with explaining the conditions that hinder self-regulation than those that may promote it. Because of its emphasis on self-control as the essential feature of self-regulation the theory also tends to neglect other important aspects of self-regulation, most notably how people determine their strategies for goal achievement in the face of distractions and frustrations (an issue we will discuss later in this chapter). Thus, although self-control may be a powerful device in withstanding immediate urges that may interfere with striving for long-term goals, the resource approach remains rather implicit about how people engage in successful goal pursuit once they have effectively inhibited their impulses. In addition, the resource approach also is somewhat vague about the way goals regulate behavior, and implicitly seems to hold that people are driven by immediate interests only. These issues are addressed by a third type of self-regulation models, which we will discuss in the next section.

**Behavioral Enaction Theories**

In contrast to classic social-cognitive models that focus on the role of motivation in behavior (for a discussion of social-cognitive models of health behavior, see later this chapter), more recent models in this tradition have become increasingly concerned with the volitional processes involved in the initiation and maintenance of actions to achieve one’s goals (Abraham & Sheeran, 2000). These models have been termed behavioral enaction models, and we consider them models of self-regulation because they not only address processes involved in goal setting but also distinguish important aspects of goal striving.

In recent years a number of theories have been proposed that have in common the assumption that the process of behavior change can be best described as a passing through a number of distinct stages, and that suggest factors that might influence the transition from one stage to another. Stage models hold that individuals in different stages will behave in qualitatively different ways, and propose that interventions needed to move individuals further in the process of change should vary from stage to stage (Weinstein, Rothman & Sutton, 1998). These models differ in the number of stages they propose and, more importantly, in how specific they are with respect to the psychological mechanisms and strategies that are involved at different points in the process of behavior change.
Well-known stage models of behavior change, notably the Transtheoretical Model (Prochaska & DiClemente, 1984), but also Weinstein’s Precaution Adoption Process model (Weinstein, 1988), propose five to six distinct stages of change. These refer to the transitions a person experiences from initially unaware of a problem to undecided about taking action, considering action, initiating effective action, and through to successful maintenance and avoidance of relapse. While these models have intuitive appeal and hold substantial heuristical value for large scale prevention as well as change attempts in therapeutic settings, the mechanisms of change that are involved in stage transitions remain rather unspecified (Weinstein et al., 1998). Armitage and Conner (2000) note that in both these models the description of what occurs in terms of social-cognitive processes is rather imprecise, and it remains unclear whether they truly describe the change process, or strategies for goal pursuit at all. In addition, these models are rather implicit about the role of personal goals, which is probably related to their development in the context of behavioral interventions that may often serve to convince individuals of the need to adopt a particular health goal.

Other important stage models distinguish between a motivational and a volitional phase to behavior change, as implied by the classic distinction between goal setting and goal striving (Lewin, Dembo, Festinger & Sears, 1944). A model that has proven particularly influential is the model of action phases (Heckhausen & Gollwitzer, 1987; Gollwitzer, 1993). This model argues that an individual selects a particular behavior because of expected consequences, and then sets out to implement it in a specific way. The entire behavior change process is thought to consist of four stages: 1) a predecisional phase in which potential goals are deliberated, and a decision to pursue one of them is made; 2) a post-decisional phase in which ways of implementing goals are considered, and some means of goal attainment are selected; 3) an actional phase in which functional behaviors to attain the goal are initiated; and 4) a postactional phase in which attained outcomes are evaluated.

While no empirical work has directly assessed the propositions of the model (Armitage & Conner, 2000), it has proven an important conceptual basis for contemporary work on the implementation of intentions (cf. Gollwitzer, 1996). Gollwitzer, Heckhausen and Steller (1990) propose that each phase involves a distinct mindset that tailors a person’s cognitive processing to meet the task demands of that phase (i.e., cognitive tuning). Gollwitzer and colleagues reported a number of studies examining the deliberative mindset of the predecisional phase and the implemental mindset of the post-decisional phase, and made clear that goal setting and goal striving differ in nature. They further noted that researchers interested in goal-oriented behavior did not develop distinct theories to account for goal striving, but rather stretched expectancy-value theories to make them account for goal setting as well as goal striving (Gollwitzer et al., 1990).

Gollwitzer (1996) advances the view that planning promotes the willful implementation of a person’s goal and thus provides volitional benefits. In particular, it is proposed that planning helps to alleviate crucial volitional problems of goal achievement, such as being too easily distracted or giving up in the face of difficulties when instead increased effort and persistence are needed. These beneficial effects of planning are achieved by the formation of implementation intentions (if-then plans that specify when, where and how an instrumental goal-directed response is to be initiated) that should be particularly facilitative when faced with implemental problems (for overviews, see Gollwitzer, 1999;