

CHAPTER 18

Getting Our Act Together: Toward a General Model of Self-Control

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ABSTRACT

Research on self-control has enjoyed tremendous growth over the past few decades, as researchers from a variety of disciplines have tested different self-control techniques in different domains of self-control. The result has been a proliferation of theories, models, and approaches, each offering important, but so far largely unrelated insights. The lack of a unifying framework has been an impediment to the development of an incremental science of self-control, and has left researchers struggling to relate their work to that of others. In this chapter, we present a general model of self-control, which we call the cybernetic process model of self-control. This model integrates two existing models—Cybernetic control theory (Carver & Scheier, 1982) and the process model of emotion-regulation (Gross, 1998b)—and describes the process through which tempting impulses arise and may be regulated. The cybernetic process model of self-control provides a conceptual framework for organizing disparate findings from research on self-control, and serves as a useful aid in selecting and designing appropriate self-control techniques.

Keywords: Self-control, self-regulation, emotion-regulation, delay of gratification, cybernetic process, emotion, temptation, reconstrual, suppression, reappraisal, response modulation, intervention design

GETTING OUR ACT TOGETHER: TOWARD A GENERAL MODEL OF SELF-CONTROL

Research on self-control has been growing at an incredible pace. Based on current publication trends, the number of peer-reviewed articles on self-control for 2001 to 2010 will be greater than that of the four preceding decades put together.¹ We now know that an individual's level of self-control predicts important life outcomes including school performance, health behaviors, and substance abuse (Duckworth & Seligman,

2005; Mischel & Ayduk, 2004; Mischel, Shoda, & Rodriguez, 1989). In the clinical domain, low self-control is a central feature of many clinical disorders (Heiby & Mearig, 2002; Strayhorn, 2002a; Tangney, Baumeister, & Boone, 2004), as well as a reliable predictor of psychopathology and problematic behaviors in children (Eisenberg et al., 2001; Krueger et al., 1996).

With so much research on self-control taking place, what do we know about ways in which people can bolster their own self-control? What

options does an individual have when facing temptation? And which of these options, or what combination of them, is best? Despite their importance, the answers to these questions are not as clear as we would like. Part of the reason for this lies in the fact that our understanding of self-control is currently hampered by the lack of an integrative framework. Presently, researchers have no way of meaningfully relating their findings to those of others in the field, and the result is a hodgepodge of techniques with which to bolster self-control in specific domains or in specific situations, rather than a structured method of prioritizing and choosing the most appropriate techniques for the challenges at hand.

Our goal in this chapter is to present an integrative framework that will enable researchers and practitioners to use a shared language when communicating their insights and findings. This, in turn, will allow practitioners and researchers to systematically examine the etiology of the difficulty that their client (or research participant) is facing, determine the points that are most amenable to intervention, and then select or develop the most appropriate intervention. Our main interest is in the behavioral-experiential aspects of temptations and self-control. However, our integrative framework may also serve as a basis for neuropsychological study of self-control, and thus help build bridges between researchers studying basic self-regulatory processes, researchers studying naturalistic human behavior, and practitioners who develop interventions for real-life temptations that people face in everyday life.

The framework that we propose represents the integration of two prior models: Cybernetic control theory (Carver & Scheier, 1982) and the process model of emotion-regulation (Gross, 1998b, Gross & Thompson, 2007). The integrated model provides an overarching framework that clarifies the relations among different self-control techniques and establishes a way to prioritize diverse interventions. To provide a foundation for this model, we begin by defining temptations and self-control. We then review and compare the two existing models of self-control, integrate them, and present a general model of self-control. We explain the different types of

self-control methods and provide examples and empirical evidence relating to each one. We conclude by proposing a system of prioritization for the different types of self-control methods, based on features of the methods themselves, as well as external and internal contextual factors.

TEMPTATIONS AND SELF-CONTROL

We define temptation as *the impulse to behave in a way that one fully expects to regret at a later time*. Although people frequently behave in ways that are potentially regrettable, our focus is on behaviors that people fully expect to regret, even before they perform them. Note that this definition revolves around the belief that the individual holds about future regret *prior* to emitting the behavior. If one fully expects to regret a certain behavior and yet desires to perform it, one is experiencing temptation. It is possible that one would take the action that one expects to regret and later discover that one does not regret it (e.g., John chooses to stay in bed a few extra minutes despite knowing that he would be late for school and expecting to regret his decision, but upon arriving late at the school, he learns that his first class was cancelled). For our purposes, what matters is whether in the moment of choice the individual believes that the more immediately appealing alternative will lead to regret.

Note also that this definition does not include an element of probability ("Maybe I'll regret it, and maybe I won't.") —instead, one is certain that acting in accordance with the desired behavior will lead to regret. More specifically, people experience temptations when the goal of experiencing a relatively small short-term gain² is competing with the goal of experiencing a relatively large long-term gain (see Table 18-1). Thus, the short-term goal of feeling less upset (achievable by drinking alcohol) may compete with the long-term goal of staying sober (achievable by avoiding alcohol). Similarly, the short-term goal of feeling comfortable (achievable by staying in bed) may compete with the long-term goal of improving physical fitness (achievable by getting up to exercise). Generally speaking, despite having a clear long-term goal in mind (staying sober, improving physical fitness), one

TABLE 18-1. EXAMPLES OF TEMPTATIONS AND NONTEMPTATIONS

Short-Term Goal	Long-Term Goal	Self-Control Task
<i>Temptations (conflict between short-term and long-term goals)</i>		
Consuming alcohol	Remaining sober	Inhibiting alcohol consumption
Staying in bed	Improving physical fitness	Initiating exercising
<i>Nontemptations (no conflict between short-term and long-term goals)</i>		
Drinking water	Avoiding dehydration	N/A
Taking a nap	Being well-rested	N/A

Note: Temptations involve a conflict between a short-term goal and a long-term goal. In tempting situations, the person realizes that acting in line with the short-term goal will result in failure to attain the long-term goal and consequently lead to regret.

may feel drawn to act in a way that prevents the attainment of this goal (drink alcohol, stay in bed and skip exercise), to experience a relatively small but more immediate short-term gain.

Having defined temptation, we are now able to define self-control. Researchers have previously defined self-control as the ability to override pre-potent responses (Vohs, Baumeister, & Ciarocco, 2005), to overcome threats that short-term goals pose to long-term goals (Fishbach & Trope, 2005), or to act in accordance with perceived self-interests (Loewenstein, 1996). In the present context, we will use the term to denote *the ability to resist temptations*. The form that self-control takes depends on the temptation at hand. Referring to the examples we listed in Table 18-1, one might need to inhibit a certain impulse (e.g., avoid drinking alcohol despite the urge to do so) or to initiate a behavior despite the impulse to avoid doing so (e.g., starting to exercise despite the urge to stay in bed). Self-control refers to acting in line with one's long-term goal, despite the allure of a contradictory short-term goal.

EXISTING MODELS OF SELF-CONTROL

People attempt to control various aspects of their lives. Broadly speaking, people may try to control *extra*-personal factors (such as the temperature of the room, the Web site that their computer is displaying, the behavior of people around them, etc.), as well as *intra*personal factors (such as their mood, the tone of their voice, their level of hunger, etc.). Such extrapersonal and intrapersonal factors are typically tightly linked, and people often attempt to influence

one by manipulating the other. Thus, to reduce my hunger (intrapersonal), I may order a burrito at a local store (thereby manipulating the behavior of the sales person, which is extrapersonal for me). Similarly, to receive flight details from a finicky voice-activated phone system (extrapersonal), I may have to put effort into enunciating clearly rather than screaming with frustration (thereby controlling my own speech, which is intrapersonal).

Two influential models describe ways in which people exercise extra- and intrapersonal control, with each model focusing mainly on one of these. The *cybernetic control model* (Carver, 2004; Carver & Scheier, 1982) describes ways in which interactions with the environment give rise to behavioral impulses, and then details how such impulses are translated into behaviors that gradually change the environment. The cybernetic control model is largely concerned with the ways people manipulate and shape their environments—how people exert *extra*personal control. In addition, the cybernetic control model, although broadly applicable, does not specify how individuals may change the regulation process itself, thus rendering the regulation process blind to itself.

The *process model of emotion regulation* (Gross, 1998b; Gross & Thompson, 2007) complements the cybernetic control model by delineating ways in which impulses can be modulated, albeit in the more specific field of emotion research. The process model of emotion regulation is largely concerned with ways in which people attempt to alter their own emotional experience and control their expression

of this experience—how people exert *intrapersonal* control. Although the process model of emotion-regulation applies to a comparatively narrow domain (dealing only with emotions), it offers important insights regarding ways in which individuals regulate their own experience. We now turn to a more detailed overview of the two models.

The Cybernetic Control Model

Behavior is commonly guided by goals. People may want to help a friend, drink a glass of juice, drive safely, avoid humiliation, stay healthy, relax, or achieve any other goal. Goals typically require multiple steps to be achieved. These steps can themselves be thought of as smaller, intermediate sub-goals (Carver & Scheier, 1982; Vallacher & Wegner, 1987). Thus, eating watermelon (top goal) requires that I get it out of the refrigerator (sub-goal), which in turn requires that I stand next to the refrigerator (sub-sub-goal), which in turn requires that I get up from the sofa (sub-sub-sub-goal), and so on.

People continuously monitor their progress toward (or away from) goals by attending to their environment, and adjust their behavior in response to stimuli that seem relevant to the achievement of their various goals and sub-goals. After getting up from the sofa, I start walking towards the refrigerator. I can see that I am still too far away to reach it (my sub-goal of reaching the refrigerator hasn't been achieved), and so I continue to walk. As I walk, I hear the sound of an airplane flying by. This information is irrelevant with respect to my current goal, and so I continue on my way to the refrigerator. After a few steps, I find myself close enough to the refrigerator and I stop—I have achieved my sub-goal. I now switch to a different sub-goal (taking out some watermelon). In this way, I continuously compare the environment that I perceive (“I am standing next to the refrigerator with no watermelon in my hands.”) to my current goal (“having watermelon in my hands”), and act on my environment to achieve my goal. If there is a discrepancy between my current goal and the environment I perceive, the comparison process produces an impulse that calls for a certain behavior, which is aimed at

reducing the discrepancy between my situation (my perceived environment) and my goal.

Carver and Scheier (1982) formally presented this notion to the psychological community in the form of cybernetic control theory,¹ as depicted in Figure 18-1a.⁴ In this model, each stage of the process receives input from the preceding stage, processes it in some way, and feeds an output to the subsequent stage of the process. Thus, the environment is perceived, and this impression of the environment is fed to the comparator. The comparator compares the perceived environment to a goal (or standard), and outputs an impulse, aimed at generating behavior that would influence the environment, so that it would more closely match the goal on the next comparison.⁵ This impulse influences behavior, which in turn impacts the environment. The acted-upon environment is perceived again, compared again with the goal, the comparator outputs another impulse, and so forth.

The role of the comparator bears elaboration, as it is subtler than that of the other elements of the process. In the cybernetic control model, the comparator's work is described as determining whether there is a discrepancy between the environment (which the perception element provides) and the criterion or standard (which the goal element provides). We propose a small but critical addition to the “job description” of the comparator. After receiving input from the perception element, the comparator determines the *relevance* of that input to the goal and then, if the input is deemed relevant, compares the perceived environment to the goal. Making this additional role explicit helps to connect the cybernetic control model with the extensive literatures on emotion and motivation, in which researchers have suggested that emotions arise as a response to events that are seen as relevant to one's goals (Frijda, 1988; Gross & Thompson, 2007; Lazarus, 1991), and that the intensity of emotions is related to the rate and direction at which this discrepancy is changing (Carver, 2004; Carver & Scheier, 1990; Hsee & Abelson, 1991; Lawrence, Carver, & Scheier, 2002). In the example above, distance from the refrigerator was a relevant input (and therefore used to determine the behavioral impulse), whereas the sound

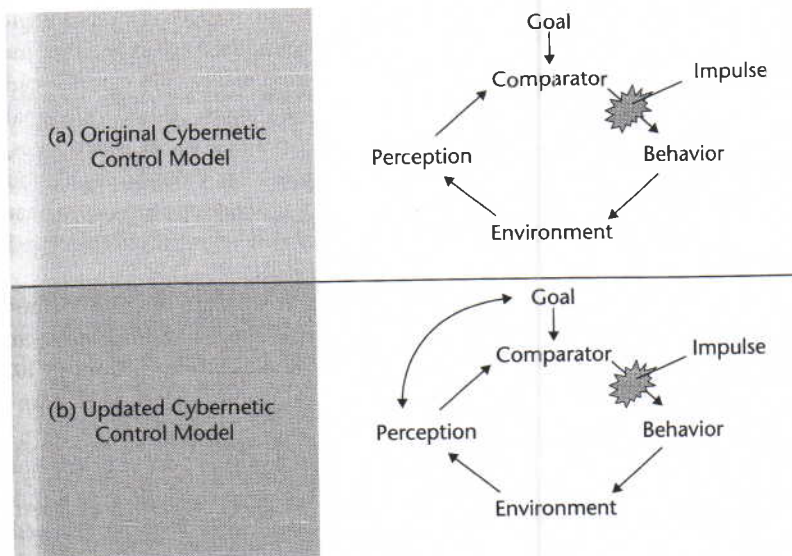


Figure 18-1. Cybernetic control model (Adapted from Carver & Scheier, 1982). The gray explosion (added by us) represents the generation of an impulse according to this model.

of a passing airplane was not (and therefore was not used to determine the behavioral impulse).

We have also updated the diagram of the cybernetic control model to represent research findings that are relevant to our discussion of self-control, by adding a bi-directional link between the *perception* and *goal* elements (see Figure 18-1b). A strong and consistent body of research has demonstrated how goals that people hold can bias their perception, often in a way that would preserve or bolster these goals (Jonas et al., 2001; Kunda, 1990; Lord, Ross, & Lepper, 1979; Nickerson, 1998). Conversely, a growing body of research has been exploring ways in which environmental cues can activate goals, even without conscious awareness (Bargh et al., 2001; Bonson et al., 2002; Fishbach, Friedman, & Kruglanski, 2003; Forster, 2007; Kavanagh, Andrade, & May, 2004; Lowe & Levine, 2005; Mauss, Cook, & Gross, 2007; Wansink, Painter, & Lee, 2006). As will become apparent in following sections, the powerful connection between goals and perception plays an important role when considering various methods of self-control.

The canonical example of a cybernetic control system is a thermostat, which compares the ambient temperature (the environment) to the

target temperature (the goal). If the ambient temperature is higher than the goal, the mechanism works to lower the temperature, and if the ambient temperature is lower than the goal, the mechanism works to raise the temperature. But people differ from thermostats in a number of important ways—not the least of which is people's capacity to self-reflect, and their ability to hold conflicting goals. Thus, a person may experience an urge to heat a room (because he is uncomfortably cold), but at the same time realize that this would be a bad idea (because this would result in a large gas bill, which he cannot afford). This type of internal conflict, and the ways in which it may be resolved, is missing from the cybernetic control model. Although the cybernetic model provides a compelling account of the way in which people attempt to exert extra-personal control by regulating their *environment* (namely, reducing the discrepancy between it and their goal), the model is unable to adequately represent the way in which people attempt to exert intra-personal control by regulating their own *behavior*, in part because it focuses on ways in which impulses arise and are acted upon, rather than ways in which these impulses may be regulated.

The Process Model of Emotion-Regulation

Unlike thermostats, people are capable of simultaneously having multiple and even conflicting goals. As a result, people do not immediately act on all impulses that they experience; instead, they may try to postpone or change either the impulse itself or its expression, using a variety of methods. One domain in which researchers have intensively studied such efforts has been the field of emotion regulation. In subsequent sections, we will generalize findings from this field to the broader domain of self-control, to discuss ways in which people exert intra-personal control by regulating their own impulses and behavior.

Emotions are coordinated sets of responses (experiential, physiological, behavioral) that arise as a result of interacting with the environment and perceiving stimuli that are seen as relevant to one's goals, and prepare or propel individual to act in a specific manner (Frijda, 1988; Gross & Thompson, 2007; Lazarus, 1991). Thus, individuals experiencing anger become more likely to aggress, whereas individuals experiencing amusement become more likely to smile. In this manner, emotions function in a similar manner to "impulses" in the cybernetic control model.

People often try to control which emotions they experience, when they experience them, and how they express them (Gross & John, 2003). Giggling during a solemn religious ceremony can be awkward. Showing envy at a friend's good fortune is a good way to make everybody feel upset. Getting angry at the driver who just cut you off can be a very bad idea if you suffer from hypertension (or if you are driving in certain parts of L.A.). In general, people often attempt to up-regulate (i.e., have more of) or down-regulate (i.e., have less of) certain emotions, either to feel good, or because they believe that certain emotions are more beneficial in specific situations (Tamir, 2005; Tamir & Robinson, 2004).

People engage in emotion-regulation for a variety of reasons, including the motivation to avoid the unpleasant experience of negative emotions, to display more socially appropriate

behavior, or to avoid dangerous physiological arousal. Sometimes the very experience (or behavioral expression) of a certain emotion can be considered a temptation, as an individual may expect to regret doing so. At other times, people may engage in emotion-regulation without experiencing temptation (i.e., without believing that they will regret their emotional experience in the future).

People attempt to regulate their own emotions in many ways. They may imagine their "happy place," breathe deeply and count to 10, smile at their conversation partner while planning exquisite revenge, or simply force themselves to display an emotion that they are not experiencing. To organize these diverse forms of emotion regulation, Gross (1998b) presented a process model of emotion regulation, which divided the various methods of regulating emotions into two broad categories according to the stage of the emotion-generative process during which they take place. *Antecedent-focused* emotion-regulation takes place before the emotion is generated, whereas *response-focused* emotion-regulation takes place after emotion is generated. These broad categories of emotion regulation methods can be broken down further into subcategories, each influencing a particular component of the emotion-generative process (see Fig. 18-2). The five general families of emotion regulation methods are: Situation selection, situation modification, attention deployment, cognitive change, and response modulation.

The process model of emotion regulation is inherently descriptive, rather than prescriptive. It specifies different types of emotion-regulation strategies and predicts differential effects of using different strategies, but it does not indicate when specific regulation strategies should be used. Research has demonstrated clear divergence in the consequences of using at least two of the strategies proposed by the model—namely, cognitive change and response modulation—on an experiential, physiological, cognitive, and social level (Gross, 2002; Gross & John, 2003; Richards & Gross, 2000; Butler et al., 2003; Gross, 1998a; Richards, Butler, & Gross, 2003). Nevertheless, the process model of emotion-regulation remains silent with respect