PSYCHOLOGICAL
INQUIRY An International Journal of
Peer Commentary and Review

Strength of Will

Laura Smart and Daniel M. Wegner
Department of Psychology
University of Virginia

Reflecting on the nature of self-regulatory failure is not a new intellectual pursuit. The concept of weakness of will, or as the ancient Greeks called it, *akrasia*, has been with us since the time of Aristotle, Socrates, and Plato (Charlton, 1988). Failure at self-regulation, according to the Greeks, is a personality trait that is unchangeable—or more precisely, a personal flaw that is worthy of condemnation and ridicule. In their view, those who do not exert the self-control that is necessary in a given situation are weak, disdainful, and morally culpable for their lack of will. Those who have the appropriate amount of control over their impulses, however, have strong wills that are worthy of admiration.

Modern studies of personality traits such as optimism, hardiness, effective coping, perceived control, impulsiveness, and the like continue to take this approach and so teach us primarily that some people are strong willed and others are weak. Unfortunately, this approach is pretty much useless exactly when it counts most in daily life—at that moment when a person is poised in front of a dish of fudge, an enticing open pack of cigarettes, a fifth of whiskey, or whatever other temptation is challenging the will. In the grips of a dilemma of will, the knowledge of our own strength or weakness seems no more helpful than knowledge of our shoe size. This is why Baumeister and Heatherton's approach to strength of will is particularly refreshing and useful. They reinvent strength of will as a situational variable—a quantity that can vary with fatigue, mental load, stress, or other situational pressures. With this knowledge, and an appreciation of the mechanism by which the will operates, the will can be strengthened or weakened (at will) instead of serving only as an immutable personal handicap or virtue.

Baumeister and Heatherton go beyond the simplicity of the akrasia model to present quite a detailed picture of what may precipitate failures of will. In their review, they provide a wide range of evidence for the major patterns of self-regulation failures. They focus on the important distinction between underregulation and misregulation as outlined previously by Carver and Scheier (1981) and they propose that the literature on self-regulatory failures supports a strength model that is consistent with the underregulation literature. According to the strength model, the ability to regulate oneself is a limited renewable resource that becomes more limited when stress or fatigue drain an individual's strength. So, for the individual trying to lose weight, for example, success at that task may be

79

highly dependent on his or her cognitive and energy resources at the time. If the attempt is being made while the person is in the midst of some stressful or fatiguing life experience, success is unlikely.

The strength model is a logical and effective way of interpreting the breadth of self-regulatory failures. We like the model a lot, in large part because it has a strong resemblance to the ironic-process model (Wegner, 1994)—which we really, really like. We do not believe that Baumeister and Heatherton have appreciated this similarity, however, or that they have begun to capture how the workings of the ironic-process model may elucidate the nature of the mechanisms that underly "strength." That is why we thought a commentary on their target article would be worthwhile. Baumeister and Heatherton relegate the study of ironic processes (particularly thought suppression) to a minor category they call *quixotic misregulation*—the failure to self-regulate that occurs when people have the erroneous belief that they can rid their minds of unwanted thoughts. The ironic-process theory, however, has much more to offer—indeed, it provides a new and general model of the process by which self-regulation operates and of the major form that self-regulation failures can take.

Strength and Mental Control

Ironic-process theory offers the idea that people try to control their mental states and that self-regulation is achieved through this process. Each instance of mental control is implemented through the production of a control system that consists of two subprocesses. These include an *intentional operating process* that searches for mental contents that will yield the desired state and an *ironic monitoring process* that searches for mental contents that signal the failure to achieve the desired state. The control of anything involves changing it to a certain criterion, after all, and processes are thus needed to provide both the change and the assessment of progress in reaching the criterion. The two processes suggested here resemble the "operate" and "test" units traditionally included as components of control systems (Miller, Galanter, & Pribram, 1960; Powers, 1973) or production systems (Newell & Simon, 1972).

The intentional operating process is what we sense as our conscious activity when we exert mental control. When we decide not to think about fudge, for example, we attend to other things as our way of avoiding the temptation. This self-distractive operating process takes effort and tends to remain in awareness during its operation. Thus, it has some of the properties normally associated with conscious or controlled mental processes (Bargh, 1984, 1989; Posner & Snyder, 1975). Because the operating process requires cognitive capacity, it is susceptible to interference from distraction and can easily be sidetracked or terminated. Fortunately, there is a monitoring process to keep watch over the operating process.

The ironic monitoring process is not normally sensed as part of the activity of mental control, as its functioning is unconscious and relatively less demanding of mental effort. In this sense, it resembles an automatic cognitive process (cf. Wegner, 1992). Unlike the intentional operating process, the monitor does not come and go over time with variations in the allocation of mental effort and instead stands continually watchful of lapses in the intended control as long as the intention to engage in control is in effect. In the case of the intention to avoid thoughts of fudge, for instance, the monitor would search for exactly those unwanted fudge thoughts. The monitor searches for failures of control by examining preconscious mental contents arising from memory, sensation, or both and when items indicating failed control are found it restarts the operating process. In this way, the cyclic interplay of the operating and monitoring processes implements the intended control and we keep fudge out of mind (and so, hopefully, out of body).

The watchfulness of the monitor is also the source of ironic effects, however, and it is in this sense that the monitor is an *ironic* process. Because the monitor searches for potential mental contents that signal failure of mental control, it increases the accessibility of these contents to consciousness. Just like an externally encountered prime, the ironic monitor increases the likelihood that the primed content will enter the conscious mind and become available for report. In the usual functioning of the operating and monitoring processes, of course, the ironic monitor is relatively less effective than the conscious operator in introducing items to consciousness. The conscious operating process prevails by and large, and the ironic monitor primarily serves its watchdog function. However, when mental loads or stresses undermine the operating process, the ironic monitor increases the accessibility of mental content and so promotes *ironic errors*—slips of mind and tongue and action that are precisely in opposition to the conscious will.

This, then, is the source of the most pernicious form of weakness of will: the perverse and devastating experience of doing, perhaps repeatedly and often tragically, just exactly what we do not want to do. When we are robbed of mental capacity (Baumeister and Heatherton's "strength"), we find ourselves not only failing to do our wills, but also radically undermining our own intentions by virtue of the process that moni-

tors our worst fears of failure. The ironic process can make us sad when we want to be happy (Wegner, Erber, & Zanakos, 1993), it can make us distracted when we want to concentrate (Wegner, in press), and it can make us anxious when we want to relax (Wegner, Broome, & Blumberg, 1994). Wegner (1994) and Wegner and Wenzlaff (in press) reviewed a wide range of research in which this principle of ironic failure of the will appears to hold. It seems a reasonable step from this evidence to suggest that such processes may underlie some of the failures that Baumeister and Heatherton chalk up to forms of misregulation or underregulation.

The interesting problem they have missed, in other words, is that when the most overweight person, who may dearly want to avoid that fudge, tries to do so in the presence of stresses (or other weighty matters), excessive and obsessive thoughts of fudge will naturally result. The reason that people who are addicted to food, alcohol, tobacco, drugs, and so forth find it so difficult to quit is that their intention to quit, combined with stress due to this decision or to other sources, makes them fanatically preoccupied with the very items from which they hope to abstain.

Strength as Operating Process

Strength of will, in our view, is the degree to which the operating process can direct attention to desired contents of mind. This idea suggests that whatever makes the operating process more robust and resistant to interruption will increase strength of will. Wegner (1994) suggested that such strength comes in two forms: (a) the selection of effective operating process strategies and (b) the automatization of the operating process. We can have strong wills if we pick ways of controlling our minds that are indeed likely to work: if we do this often enough, these methods become well learned and automatic.

As an example of strategy selection, consider what may happen if a person tried to quit smoking. There are a variety of strategies that may be chosen, some of which may work (e.g., talking with a supportive friend whenever cravings come to mind or bringing to mind images of the negative consequences of smoking), some of which may have some small effect (e.g., skipping one cigarette a day, perhaps, or just trying not to think about smoking), and some of which are sure to fail (e.g., placing a lit cigarette between one's lips and trying to ignore it). Some strategies, then, are inherently "stronger" than others.

Even if a highly effective strategy is found, however, it can often be disrupted by distractions of one sort or another. Although strategies do differ in their ease of use, it is still the case that repetition of any strategy is likely to make it more automatic and less effortful. With practice and the resulting automatization, the operating process gains strength in a different way: The strategy becomes less likely to be monitored. The ironic-process theory suggests that the interaction of the operating and monitoring processes only occurs in service of conscious attempts to control mental states. Once an operating process becomes so highly automatized that it can no longer be disturbed by distractions, we suspect that the accompanying monitoring process drops away and no longer can produce ironic errors.

This analysis suggests a very different way to conceptualize Baumeister and Heatherton's concepts of *misregulation* and *underregulation*. Misregulation may occur because the wrong strategies are chosen for the operating process; underregulation may occur when the operating process is not automatic. In both cases, unlike Baumeister and Heatherton's strength model, the ironic-process approach suggests that people set themselves up for self-regulation errors when they intend to control themselves in the first place. Any desire to change the mind brings with it an ironic monitoring process that is unleashed when the operator is "weak." Operating processes may be weak either because they simply do not have the right strategic approach or because they are so poorly learned that they are easily disrupted. In either event, the simple desire to control oneself is the first step in unleashing that nasty little monitoring process to wreak its uniquely counterproductive havoc. The person who resolves to quit smoking without a strong operating process in hand will likely smoke more than before.

The Evil Monitor

Our approach to self-regulation portrays the monitoring process as anything but the benign night watchperson it has been painted in prior theories—including that of Baumeister and Heatherton. They include monitoring as one of the three ingredients of self-regulation and propose that it is essential to monitor one's actions and states in order to self-regulate. We have no dispute with this claim. They proceed, however, to propose that it is often when people cease to monitor themselves that they are apt to lose control and fail at self-regulation. The ironic-process model parts ways with their analysis at this point. We see monitoring as a necessary search for failure, which if allowed to occur unimpeded will invariably produce that failure.

This possibility is illustrated in a study on the conscious monitoring of smoking behavior. McFall (1970)

asked smokers either to count the number of cigarettes they smoked or to count the times they thought about having a cigarette but did not smoke. He found that the conscious monitoring of smoking acted to increase smoking behavior over time, whereas the conscious monitoring of thoughts of failures to smoke decreased smoking behavior. The importance of these effects becomes clear when we consider just what kind of monitoring a person may do who is trying to quit. Obviously, the ironic monitoring process during intentional quitting would look for cigarette thoughts and cravings ("God, I want one again!"). The veiled effect of such monitoring, in view of McFall's findings, would be to increase the accessibility of thoughts of having a cigarette.

The monitor always works against us. The person who is trying to start smoking (and people must do this at some point or why would it happen?), for example, would naturally monitor the failure of this intention. Such a person would note when nonsmoking thoughts or behaviors were happening and so would tend to do these things. Again by McFall's (1970) data, this would have the odd consequence of precisely undermining the person's intentional self-regulation. The person monitoring nonsmoking would be at least somewhat hampered in the pursuit of the habit by the monitor-induced tendency not to smoke. (We should note here, by the way, that the effects of pure monitoring as manipulated in McFall's study should not be confused with the effects of instructions to monitor that are imposed during manipulated interventions of self-regulation such as stop-smoking programs. These latter effects are likely to be complicated by operating processes that were not present in McFall's research.)

Of course, the conscious, instructed monitoring manipulated in McFall's (1970) study is likely to be somewhat more effective than the unconscious and relatively less effortful ironic monitoring processes that are set up when we form self-control intentions. However, the ironic monitoring processes are perhaps more insidious than conscious monitoring, as they are set into motion whenever any self-control intention is implemented and they quietly run along in the background during the entire self-regulation episode. The person who goes on a diet, tries to stop smoking, or climbs on the wagon in hopes of overcoming alcohol dependency takes on the burden of the proverbial little red devil whispering in his or her ear—an unseen ironic process that is promoting thoughts of the very worst thing the person could do. From this perspective, it is the intention to engage in mental control and self-regulation that itself sets up its own failures.

Baumeister and Heatherton do not miss this point completely. To be fair, we must note that they imply that failures at self-regulation do not result from "irresistible impulses" that occur with a complete loss of control. Rather, they contend that self-regulation failure is most often of the sort in which we do try to exert a great deal of control but our attempts are foiled when there is the presence of a mental load. In our view, this is just right: When control is attempted, people put themselves at the mercy of a monitoring process that is able to exert its perverse influence whenever the correcting power of the operating process is undermined for any reason. Strength of will inheres in the operating process but weakness of will appears in every accompanying monitoring process.

Conclusions

As Baumeister and Heatherton note, "self-regulation is a complex mechanism that can break down in many different ways." In their review, they were effective in illustrating the variety of ways in which this failure may occur and the model that they propose is useful in understanding it—but the sheer perversity of the mechanism of self-regulation was not fully understood. We hope that the ironic-process model adds just the right dash of perversity that is needed. Everyday self-regulation is just too full of comic, tragic, and ironic failures to be happening without a mechanism that specifically produces these effects.

Note

Laura Smart and Daniel M. Wegner, Department of Psychology, Gilmer Hall, University of Virginia, Charlottesville, VA 22903; e-mail les5a@virginia.edu and dwegner@virginia.edu.

References

Bargh, J. A. (1984). Automatic and conscious processing of social information. In R. S. Wyer, Jr., & T. K. Srull (Eds.), *Handbook of social cognition* (Vol 3. pp. 1–43). Hillsdale, NJ: Lawrence Erlbaum Associates, Inc.

Bargh, J. A. (1989). Conditional automaticity: Varieties of automatic influence in social perception and cognition. In J. S. Uleman & J. A. Bargh (Eds.), *Unintended thought* (pp. 3–51). New York: Guilford.

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

Charlton, W. (1988). *Weakness of will: A philosophical introduction.* New York: Blackwell.

McFall, R. M. (1970). Effects of self-monitoring on normal smoking behavior. *Journal of Consulting and Clinical Psychology, 35,* 135–142.

Miller, G. A.. Galanter, E., & Pribram. K. H. (1960). *Plans and the structure of behavior*. New York: Holt, Rinehart & Winston.

Newell, A., & Simon, H. A. (1972). *Human problem solving*. Englewood Cliffs, NJ: Prentice-Hall.

Posner, M. I., & Snyder, C. R. R. (1975). Attention and cognitive control. In R. L. Solso (Ed.), *Information processing and cognition* (pp. 55–85). Hillsdale, NJ: Lawrence Erlbaum Associates, Inc.

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

Wegner, D. M. (1992). You can't always think what you want: Problems in the suppression of unwanted thoughts. In M. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 25, pp. 193–225). San Diego, CA: Academic.

Wegner, D. M. (1994). Ironic processes of mental control. *Psycho-logical Review, 101*. 34–52.

Wegner, D. M. (in press). Why the mind wanders. In J. D. Cohen & J. W. Schooler (Eds.), *Scientific approaches to the question of consciousness*. Mahwah, NJ: Lawrence Erlbaum Associates, Inc.

Wegner, D. M., Broome, A., & Blumberg, S. (1994). *When trying to relax makes you nervous: Electrodermal evidence of ironic effects of intentional relaxation*. Unpublished manuscript.

Wegner, D. M., Erber, R., & Zanakos, S. (1993). Ironic processes in the mental control of mood and mood-related thought. *Journal of Personality and Social Psychology, 65*, 1093–1104.

Wegner, D. M., & Wenzlaff, R. M. (in press). Mental control. In E. T. Higgins & A. W. Kruglanski (Eds.), *Social psychology: Handbook of basic principles*. New York: Guilford.

Self-Regulation and Animal Behavior

Arthur Tomie

Department of Psychology
Rutgers University

Scientists who work on animal behavior are occupationally obliged to live chancier lives than most of their colleagues, always at risk of being fooled by the animals they are studying or, worse, fooling themselves. Whether their experiments involve domesticated laboratory animals or wild creatures in the field, there is no end to the surprises that an animal can think up in the presence of an investigator. Sometimes it seems as if animals are genetically programmed to puzzle human beings, especially psychologists.

> The risks are especially high when the scientist is engaged in training the animal to do something or other and must bank his professional reputation on the integrity of his experimental subject. (Thomas, 1983, p. 35)

Self-regulation, as set forth by Baumeister and Heatherton, is largely a matter of mustering sufficient resolve, volition, self-discipline, or self-control. They attribute the failure of self-regulation, therefore, to personal flaws or trait defects. casting aspersions on the integrity of participants who are deemed guilty of under- or misregulating the expression of their conduct. Although these participants may violate the intent of instructional agendas (self-imposed or otherwise) and frustrate the would-be manager of behavioral reform, perhaps, as suggested by Thomas (1983), the defect lies in the integrity of the instructional protocol.

The behavior of animals often bewilders researchers and not because animals are shady characters. Animals are merely sensitive to their environments in ways that differ from the perspective of their handlers; therefore, they respond to instructional protocols in ways that deviate from their handlers' agenda. Careful analysis of the instructional protocol almost invariably reveals the actual, and previously overlooked, source of control of the animals' behavior. Thereafter, the animals' integrity seems restored, as is the dignity of their handlers.

Consider the case of the pigeon pecking the response key illuminated briefly by a green light. The green key light signals the delivery of food and alternates with periods when the key light is white and no food is delivered. The instructional protocol is straightforward—food will be delivered if the pigeon does not peck or contact the green key light (i.e., omission training is in effect when the key light is green). The pigeon has never been trained to perform the key-pecking response, so we have every reason to expect that these conditions will generously provide the pigeon with frequent feedings, and all for doing nothing.

Unfortunately, the pigeon apparently cannot stand prosperity for long. As training proceeds, the pigeon begins to peck the green key light, even though the performance only results in the cancellation of the food that would have otherwise been presented. Remarkably, the pigeons actually train themselves to perform the only response that is prohibited, and as training proceeds, the pigeons perform the prohibited response on the majority of trials, losing out on most of the food available to them.

If only the pigeons could refrain from conducting themselves in such a counterproductive way. It seems particularly puzzling that they would devote so much