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SELF-REGULATION AS A KEY TO SUCCESS IN LIFE*

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Self-regulation is one of the most important traits in the human psyche. Some other species have limited capacities for self-regulation, but this ability is far more developed and powerful in human beings. It is largely responsible for the immense diversity of human behavior.

Self-regulation (or the very similar term *self-control*) can be defined as the ability to alter one's own behavior, including one's thoughts, feelings, actions, and other responses. To put self-regulation in context, it is useful to step back for a moment and realize how far psychology came working with stimulus–response models. A great deal of human and animal behavior is, indeed, simply responses to stimuli. What stimulus–response theories miss, however, is the possibility of altering one's response. Human beings have a remarkably powerful ability to prevent themselves from responding to a stimulus in the normal or natural way.

To illustrate, consider an easy example of stimulus and response: A tempting piece of steak is set in front of a hungry dog. The dog's response is easy to predict: He will devour the steak. But put the same steak in front of an equally hungry human being, and the outcome is harder to predict. The impulse to eat the steak may be there, but the person may easily override that response, for a variety of other reasons: being on a diet, being a vegetarian, worries about cholesterol, and the like. Nothing would be more natural than eating a delicious food when one is hungry, but many people frequently override that response.

BENEFITS OF SELF-REGULATION

The title of this chapter asserts that self-regulation is a key to success in life. Success in life was defined by Dolores Pushkar at the 1996 Concordia Conference on Competence

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Through the Life Span as a matter of being able to live with oneself and to live with others. If self-regulation is indeed a key to success in life, then it should improve people's ability to live with themselves and with others. The research reviewed in subsequent sections of this chapter will contribute to making this point, but it is worth adding some general observations here. These are general conclusions based on extensive literature reviews concerning failures of self-regulation (Baumeister, Heatherton, & Tice, 1994).

With regard to improving how well one can live with oneself, self-regulation has several benefits. Self-regulation encompasses affect regulation, that is, the control over one's emotional states and moods, and it is easy to appreciate that success at controlling emotions will enable one to feel better and suffer less on a daily basis. Self-regulation also includes control over one's mental processes, such as the ability to concentrate and to persist on tasks. After all, the natural "response" to the "stimulus" of numbers on a page is hardly to do arithmetic exercises, but if a child is to grow up as a successful and competent member of modern society, he or she is going to have to override the natural response and do math homework at some point.

Controlling impulses is another important sphere of self-regulation, and it too contributes to success in life. The most obvious example of the problems of self-regulation failure in this sphere is addiction to drugs or alcohol. Self-regulation enables people to resist a variety of temptations.

Self-regulation also involves setting and reaching goals. To succeed in life, people must manage themselves effectively, which involves setting appropriate goals and then making themselves carry out the steps to achieve them. Often this involves persisting in the face of failures or setbacks. Self-regulation is crucial for enabling people to do this.

Self-defeating behaviors constitute some of the most significant ways in which people fail to live with themselves (Baumeister & Scher, 1988). Self-defeating behavior involves whatever people do that thwarts their strivings or brings suffering, misfortune, and failure on themselves. A great deal of self-regulation consists of preventing self-defeating behaviors — in fact, the general patterns of self-defeating behavior offer multiple parallels to the general principles of self-regulation failure (Baumeister, 1997a).

Turning from the issue of living with oneself to living with others, it is readily apparent that self-regulation is again helpful. Controlling emotions is often just as important and valuable for helping one get along with others as it is for securing one's own affective serenity. Likewise, self-regulation enables people to keep their promises and fulfill their obligations when they might not feel like doing so or might be tempted to act otherwise.

Addiction was mentioned as one sphere in which poor self-regulation contributes to misfortune and suffering for the self. Addiction also has an interpersonal aspect, of course. It is often the families of addicts and alcoholics who suffer immensely, and addictive processes are quite destructive of family life and friendship. More generally, self-regulation can reduce infidelity, betrayal, and other behaviors that involve yielding to temptations in ways that harm close relationships.

Violence is probably the most destructive interpersonal behavior. Violent behavior often follows from failures of self-regulation. Gottfredson and Hirschi (1990) proposed a general theory of crime that revolved around poor self-control. Baumeister (1997b) noted there are so many causes of violence and aggression, it is surprising that there is not more violence than there is — and the reason is that most violent impulses are restrained by inner inhibitions. Thus, self-regulation is important for preventing violence.

Although this brief survey is sufficient to suggest the range of benefits of self-regulation, it is worth citing one important study that provided longitudinal evidence of such bene-

fits. Mischel, Shoda, and Peake (1988; see also Shoda, Mischel, & Peake, 1990) measured children's ability to delay gratification (i.e., to refuse immediate rewards for the sake of obtaining larger, but delayed rewards) when they were 4 or 5 years old. Delay of gratification is an important and basic form of self-regulation. Over a decade later, the researchers found that the children who had showed the best capacity for self-regulation went on to be the most successful in young adult life. They were superior to others in terms of school performance and college readiness, in terms of social competence and getting along with others, and in terms of personal strengths such as being able to cope with frustration and stress effectively. These results suggest that self-regulation is a central aspect of personality that is stable across many important developmental changes and consistently yields positive outcomes that benefit both the individual and the social network.

Thus, it is safe to say that self-regulation is centrally involved in many activities that hold the possibility to make people happy and successful or miserable and unsuccessful in life. In the next sections, we shall cover what our own research efforts have learned about self-regulation.

SETTING AND REACHING GOALS

One set of definitions for success in life focuses on how well people can reach their goals (e.g., Gollwitzer & Bargh, 1996). Yet reaching goals is obviously not a simple matter. Two separate processes must be understood, and both can involve self-regulation. The first is a matter of setting appropriate goals. The second is a matter of pursuing them effectively and persistently so as to achieve success.

The implications for success in life are important. Two people with identical levels of academic ability may end up performing quite differently and having very different grade point averages over a couple years of college, if one is better at this sort of self-management. By choosing courses appropriate to one's level of ability and by budgeting one's time and effort properly, one can gain the maximum return for one's ability. In contrast, an equally intelligent person who selects courses that are alternately far too hard or too easy will end up with a poorer education and lower performance. Thus, by selecting appropriate contingencies and setting proper goals and obligations for oneself, one can maximize one's successes.

Although many laboratory experiments set explicit goals for their participants, in everyday life people are often called upon to set their own goals. How one sets one's goals can have considerable impact on whether one reaches them or not. After all, some goals are presumably so simple that anyone can easily reach them and success is almost guaranteed, whereas others may be practically impossible and hence failure is ensured.

If life were simply a matter of reaching one's goals, then the wisest advice would be to set extremely low goals, because these have the highest probability of success. Yet obviously people do not do this. The reason is that goals have various rewards and subjective values associated with them, and easy goals tend to have low values. For example, one's chances of securing a mate may be highest if one fixes one's romantic aspirations on someone so undesirable that one will have no rivals and the person will presumably be desperately grateful for any attention one shows. One has thus a high chance of success — but the success may be worth relatively little, because the mate is, by definition, quite undesirable. A similar logic applies to career aspirations and other spheres of endeavor.

Setting goals thus requires recognizing a tradeoff between the value of success and the likelihood of success. The most valuable goals are usually those with the lowest likeli-

hood of success. Somewhere along that continuum the person must find the optimal balance. Ideally this will be at the point at which one's own abilities and other qualities are sufficient to keep the likelihood of success high while the value is also still high. In simple terms, one ideally wants the best goal that one has a good chance of reaching.

Self-knowledge thus emerges as a key factor in setting goals. To set goals effectively, one needs to know how much one can accomplish. In pursuing a mate, for example, a person would ideally have a good understanding of his or her own attractiveness and other factors that can contribute to one's romantic appeal, so as to be able to appraise one's chances that a particular mate will regard one as suitable.

There is, however, a further complication to the matter of setting goals on the continuum that ranges from easy but worthless up to wonderful but impossible. Given the difficulty of predicting exactly how well one can do, it is to be expected that people will periodically overshoot or undershoot; that is will set goals that are above or below the optimal point. The complication is that there is an asymmetry to the consequences of those two types of error. Overshooting can often be significantly worse than undershooting.

Undershooting means setting a goal that is somewhat below the best one could possibly achieve. Such a goal means that one is very likely to achieve success, but the success will not have the highest value one could achieve. In contrast, overshooting means setting too high a goal, which will normally result in failure. Thus, undershooting brings a slightly diminished success, whereas overshooting brings failure. Failure is often considerably worse than a slightly diminished success.

For this reason, perhaps, popular wisdom offers an assortment of sayings that recommend selecting a goal that is somewhat lower than the best possible (so as to "leave a margin for error," for example). The optimal strategy, in other words, would be to be slightly underconfident. Yet this strategy seemingly conflicts with the body of research findings suggesting that in terms of self-knowledge and self-prediction, people tend toward broad patterns of overconfidence (Taylor & Brown, 1988; Vallone, Griffin, Lin, & Ross, 1990). Given the broad tendencies toward positive illusions and inflated self-esteem, people should be prone to make the more dangerous kind of mistake, namely setting goals that are too high.

A series of studies examined this dilemma of overconfident goal-setting (Baumeister, Heatherton, & Tice, 1993). To include the role of positive illusions, we measured self-esteem. We also included one condition with an ego threat, because previous findings had shown that inflated self-appraisals and predictions may be especially common in people with high self-esteem who have received an ego threat (McFarlin & Blascovich, 1981). We had people perform a task (a video game) through a long learning phase, during which they recorded their scores (thereby facilitating self-knowledge about their capabilities). Then we had them perform trials with money on the line. In one study we had them select goals for themselves, such that higher goals carried greater financial rewards. In two other studies, we selected a target goal that was at the 67th percentile of the subject's own scores, and we allowed the subject to bet, at triple or nothing, any part of $3 we paid him or her on the subject's chances of surpassing that criterion on the final trial. In both procedures, the subject had to make a fairly accurate prediction of how well he or she would perform and set the contingency accordingly. The situation included the asymmetry of consequences of overshooting versus undershooting mentioned earlier, insofar as if the person failed to reach the criterion, all money (at least all that was bet) was lost.

The results of these studies shed interesting light on how people set goals and contingencies for themselves. The bottom line in all studies was how much money the subject managed to earn in the experiment, because that was the outcome measure of self-regula-

tion. In the betting studies, the subject could do well by making a low bet and keeping most or all of the $3, and the subject could do very well by making a high bet and then performing well, in which case he or she could gain up to $9. The subject only fared badly by making a large bet and then not performing well, which would entail losing the stake.

In the condition where no ego threat was involved, people with high self-esteem did well and ended up with an impressive amount of money — indeed, significantly more than people with low self-esteem earned. This finding suggests that when times are good, people with high self-esteem manage themselves effectively, in the sense that they set appropriate goals and then perform up to their own expectations. These results fit Campbell's (1990; see also Campbell & Lavallee, 1993) findings that people with high self-esteem have superior self-knowledge and process information bearing on the self better than people with low self-esteem. In our study, apparently, people with high self-esteem learned more quickly and accurately what they were capable of doing and were able to set their own goal contingencies accordingly.

This effective self-management pattern was thoroughly disrupted, however, when people with high self-esteem received an ego threat. In two studies, the ego threat consisted of the experimenter intimating that the subject might not "have what it takes to perform well under pressure," and in a third it consisted of randomly assigned failure feedback on a creativity test (that was ostensibly unrelated to the video game task). People with high self-esteem responded to such threats with extremely positive, self-aggrandizing assertions, including setting very high goals for themselves or making maximum bets on their own performance. These highly self-confident responses were often unwise, in that they exceeded what the subject was likely to achieve, and so these individuals tended to lose all their money. On average, they left the experiment with the lowest earnings among all the cells, and indeed their average take-home pay was significantly lower than what people with low self-esteem earned in the same condition.

Thus, people with high self-esteem showed the best and the worst self-management in this study, as measured in terms of how much money they managed to earn by setting reward contingencies for their own performance. When things had been going well, they set appropriate goals and performed well, and they earned an average of five and a half dollars. When they received an ego threat, however, they set overconfident goals and failed to live up to them, and their take-home earnings averaged a paltry 93 cents (out of $9 maximum).

There is thus nothing inherently wrong with having a favorable opinion of oneself. People with high self-esteem did manage themselves quite well in the condition where there was no ego threat. Taylor and Brown (1988) have proposed that positive illusions, in the sense of holding highly favorable and possibly inflated views of oneself, are generally adaptive, and our results supported that view — at least in the prior success condition. On the other hand, an ego threat seemed to undermine the self-managing efficacy of people with high self-esteem. Apparently their response to an esteem threat is immediately to assert their superior capability. These responses are unwise, however, and the overly confident commitments these individuals make tend to backfire in a costly fashion.

These results also fit a broader pattern suggesting that threatened egotism is a particularly dangerous condition. In this study, people who thought highly of themselves but encountered an external threat to their favorable self-image made foolish, risky choices that ended up costing them money. Other work has associated threatened egotism with violent, aggressive behaviors (Baumeister, Smart, & Boden, 1996) and with various self-defeating responses (Baumeister, 1997a). An inflated self-opinion plus an external esteem threat may be a general recipe for destructive, problematic responses.

PROCRASTINATION

Doing one's work on time and fulfilling other obligations in a timely fashion would seem to be an integral part of healthy, proper adult functioning. Yet the majority of people report that they procrastinate on some things, and a substantial minority of people report that their procrastination habits are serious enough to cause personal, financial, or occupational problems for them (Ferrari, Johnson, & McCown, 1995).

Procrastination is often criticized, especially by people who do not see themselves as guilty of it, as a form of self-regulatory failure indicative of laziness, self-indulgence, and poor self-management. These critics contend that putting things off until the last minute will tend to lower the quality of work, because one has to perform in a rushed manner. They are also sometimes self-righteous about the stress and other problems that procrastinators must endure when the deadline is looming (see Boice, 1989, 1996).

On the other hand, procrastination does have its apologists. Some point out quite plausibly that one can put the same amount of time into a project, resulting in the same quality of work, regardless of whether one does so early or late in the deadline period. Some procrastinators even contend that procrastination may actually improve their performance: "I do my best work under pressure" is a common statement by such people (Ferrari, 1992; Ferrari et al., 1995; Lay, 1995), implying that they raise the pressure by putting things off until the last minute. Other apologists say that the last-minute stress suffered by procrastinators should be balanced against a carefree, casual enjoyment of life at other times, in contrast to the possibly compulsive, driven, pervasively stressed style of the nonprocrastinators who always get right to work on any task. Some researchers draw parallels to the Type A personality, which is marked by constant drive and ambition (and presumably by a lack of competitiveness) — and by a tendency to suffer from heart disease which the more casual and carefree Type B is less prone to experience.

To investigate these competing hypotheses, Tice and Baumeister (in press) conducted a series of longitudinal studies. They assigned students a term paper long in advance and measured their procrastination tendencies using standard self-report measures (Lay, 1986; McCown & Johnson, 1989, 1991). The scales proved valid: self-described procrastinators did indeed turn their papers in later than other students.

Of greater interest, however, were the effects on performance and on health. Performance was assessed in terms of grades on the term paper, the midterm, and the final examination. All this work was graded by instructors who were blind to the students' procrastination status. In two studies, procrastinators achieved consistently lower grades on all measures. The difference was about two-thirds of a letter grade (a high B versus a C plus). Thus, the view that procrastination helps people do their best work by creating pressure appears to be false, as is the view that procrastination is innocuous. Other studies have suggested that procrastinators are just as intelligent as nonprocrastinators. The lower grades in these studies must, therefore, be attributed to the deleterious effects of procrastination.

Although procrastination may be bad for performance, the first study suggested that it may benefit health. Students in that study recorded their health symptoms over a 4-week period early in the semester, and procrastinators emerged as healthier than nonprocrastinators. This finding supports the view that procrastinators do derive some benefits from putting things off. It casts procrastination as a possible tradeoff, in which health and quality of life are improved in exchange for lower performance.

The ambiguity in those findings came from the fact that the health data were collected early in the semester, when the deadline was still remote. It seemed necessary to measure health late in the semester, when the procrastinator is presumably struggling to complete all

the tasks that have been postponed. The second study included such a measure (as well as recording visits to the student clinic). This study replicated the finding from the first study that procrastinators are healthier early in the semester. The late-semester data showed, however, that procrastinators are considerably sicker when the deadline looms. Indeed, adding the early and the late data together, procrastinators emerged as sicker overall.

Taken together, these results portray procrastination as a self-defeating behavior pattern that should be included among the problems resulting from poor self-regulation. The net long-term effects of procrastination include harm to one's health and harm to one's performance. The only benefit is the short-term advantage to one's health that arises early in the performance period (but is then outbalanced by the higher illness later on). The pattern of short-term gain but higher long-term cost is one that characterizes many forms of self-defeating behavior (Baumeister & Scher, 1988; Platt, 1973) as well as being one common pattern of self-control failure (Baumeister, 1997a; Baumeister et al., 1994; Mischel, 1974, 1996; Mischel, Shoda, & Rodriguez, 1989).

The link of procrastination to self-defeating behavior raises the broader issue of how self-regulation contributes to such problems. The next section will examine one important link.

EMOTIONAL DISTRESS, RISK-TAKING, AND SELF-DESTRUCTIVE ACTS

The terms *self-defeating* and *self-destructive* are used (usually synonymously) to characterize behavior patterns in which people bring misfortune, failure, and suffering to themselves or otherwise prevent themselves from reaching their positive goals (e.g., Baumeister, 1997a; Baumeister & Scher, 1988; Berglas & Baumeister, 1993). Such behaviors have fascinated psychologists for many decades, in part because they expose the limits of rationality in human nature. Rational behavior is often defined as the pursuit of enlightened self-interest, whereas self-defeating behavior consists precisely in thwarting one's enlightened self-interest. Hence modern views of human nature as rational, information-processing beings often confront their limits in self-defeating behavior.

A decade ago, Baumeister and Scher (1988) reviewed a dozen major patterns of self-defeating behavior that social and personality psychologists had documented among normal (nonclinical) populations. By examining the set of them together, they were able to draw a series of broad conclusions. There was hardly any sign that people ever intentionally sought to suffer or fail. Rather, self-defeating behavior resulted either from tradeoffs, in which people pursued positive gains that ended up being accompanied by risks and costs, or they pursued positive outcomes but used strategies and methods that tended to backfire and produce unintended, undesired harm.

The role of emotional distress remained, however, as a major loose end in that work. Baumeister and Scher's (1988) review of the literature suggested that negative emotional states were involved in many of the self-defeating behavior patterns, but it was not clear how emotion produced such effects. In particular, there was little evidence to support psychodynamic hypotheses that negative affect makes people want to suffer, desire to fail, or believe they deserve to be punished. Why, then, should aversive emotional states increase self-defeating behaviors?

Risk-taking offered one possible answer that emerged from a review of the suicide research literature (Baumeister, 1990). Many deaths, such as from single-car crashes, are difficult to classify as either definite suicides or definite accidents. Some researchers have

proposed that the difficulty of classification is more than a methodological limitation: it reflects the fact that the suicidal person did not have clear intentions either way. The person may have simply been taking extreme risks as one symptom of his or her highly distraught condition, and at some point the risks caught up with him or her.

To investigate whether risk-taking might mediate between emotional distress and self-defeating behavior, two of us (Leith & Baumeister, 1996) conducted a series of studies. One consisted of autobiographical narratives. We had people write accounts of their own past self-defeating actions. More precisely, they wrote about things they had done that had led to bad consequences that they later regretted, which seemed a fair operationalization of self-defeating behavior. For comparison purposes, they also wrote about something they had done that had turned out well. These stories were subjected to rigorous content coding for specific features relevant to our ideas.

The stories provided encouragement for the risk-taking theory. People were much more likely to describe taking risks or chances when they wrote about things that turned out badly than when writing about things that turned out well. Furthermore, there was a strong tendency for people to describe bad moods and emotional distress preceding the risk-taking. This was true in both types of stories — that is, even when they wrote about a risk that led to a positive outcome, they still tended to start the story with some bad mood or negative emotion that preceded the risky decision. In these accounts, bad moods were far more likely than good moods to lead to risk-taking.

We then developed a laboratory procedure to measure risk-taking, especially risks that seemed ill-advised or self-defeating. The measure, which we have used in a long series of studies (Leith & Baumeister, 1996, and subsequent unpublished work), involves presenting the subject with a choice between two lotteries. One of these is a low-risk, low-payoff lottery, offering a 70% chance of winning a $2 prize. The other is a long shot, with a $25 prize but only a 2% chance of winning.

Two features of this procedure need to be emphasized, given our interest in self-defeating behavior. First, although some people might count the lack of a positive outcome as bad, we thought there ought to be some actually negative outcome involved in order that the choice might qualify as self-defeating. Hence we added the stipulation that if one did not win the prize in the lottery, then one would be subjected to an unpleasant experience. The subject was told that this would involve taking part in a noise stress procedure, which meant putting on headphones in a sound laboratory and listening to a sound described as similar to fingernails scratching on the blackboard, magnified 25 times.

Second, it is important to recognize that the expected gains from the two lotteries are unequal. (The term *expected gain* is used by statisticians, accountants, and others to assess risks, and it is based on multiplying the probability of each outcome times the value of the outcome and then adding these up. For example, the low-risk lottery described above had an expected gain of .70 times $2 plus .30 times zero, or $1.40.) Even if one ignores the noise stress outcome and focuses solely on the cash payoffs, the expected gain from the low-risk lottery was nearly three times that of the long shot. The noise stress possibility further increased the discrepancy between the rational appeal of the two lotteries. Rational analysis or statistical calculation would therefore dictate always choosing the low-risk lottery. The long shot therefore qualified as a foolish risk.

In a series of experiments, then, we manipulated mood and emotional states and then assessed preference between the two lotteries. Our results repeatedly confirmed the view that emotional distress leads to foolish risk-taking. They also replicated earlier findings by Isen and her colleagues (Isen & Geva, 1987; Isen, Nygren, & Ashby, 1988; Isen & Patrick, 1983) indicating that pleasant, positive moods make people risk averse.

In one study, we created embarrassment by having people expect to sing a corny, difficult song without accompaniment while being stared at and tape recorded. These people showed a high preference for the long shot lottery, unlike neutral and positive mood subjects who expressed more evenly divided preferences among the two lotteries. In another, we created anger by asking people to recall and describe an intense interpersonal conflict and then by frustrating them with repeated equipment problems and requests for them to start over with their description. They too chose the long shot, while people in neutral and good moods showed a strong preference for the low-risk lottery. In yet another study, some people were put in a bad mood by jogging in place, and they too favored the long shot.

The only negative mood induction that failed to produce a preference for the long shot was sadness. We induced sadness in one group of participants by having them watch an excerpt from a sad movie. These people preferred the low-risk lottery just like the people in neutral and happy moods. Sadness differs from anger and embarrassment in several ways, but the most likely candidate is arousal.

The implication is that only high-arousal emotions produce the tendency to take foolish risks. Moreover, moods marked by high arousal and pleasant feelings did not yield that tendency either. Thus, self-destructive risk-taking appears to be concentrated in the mood and emotional states that combine unpleasant valence and high arousal.

But what does all this have to do with self-regulation? Initially we did not think there was any connection, beyond the simple point that self-defeating behavior can be defined as one type of poor self-regulation. Over the course of this investigation, however, we gradually began to realize that self-regulation plays a much more important and prominent role.

The initial findings confirmed the basic hypothesis that bad moods lead people to take stupid or foolish risks. But why? There is no obvious or direct connection between emotion and risk-taking. Thus, in a sense we had solved one problem only to reveal another. Risk-taking was apparently the link mediating between emotional distress and self-defeating behavior — but what was the link that mediated between emotional distress and risk-taking?

Our initial theory was that emotional distress alters the subjective utility of possible outcomes. In plainer terms, when you feel bad, you have more to gain and less to lose than when you feel good. The mirror image of this argument had been put forward by Isen et al. (1988) to explain why good moods made people risk averse: people do not want to take a chance on any outcome that might spoil their good mood.

By extension, risk-taking might be rationally appealing to someone in a bad mood. If one takes a chance and fails, one would feel bad, but insofar as one already felt bad, less is lost. Meanwhile, if one takes a chance and succeeds, one has not only the practical or material benefits of the success but also the improvement in one's mood, because the success would make one feel better.

Although this theory seemed plausible, we were not able to find any support for it. In study after study, people's ratings of the subjective appeal and value of the various outcomes showed no effect of their emotional states. Nor did their subjective estimates of the probabilities of winning or losing either of the lotteries change. Ultimately we had to abandon that theory.

The subjective value theory was based on the notion that emotion altered the cognitive appraisal of risk. An alternative hypothesis was that emotion simply cut short the cognitive appraisal of risk, rather than altering the values and calculations. To put it simply, maybe people who are upset simply grab for a desirable outcome without thinking about

the dangers and consequences. This second hypothesis involved self-regulation, because it indicated that emotion prevented people from making an informed, considered choice and instead simply promoted impulsive choices. There was some precedent for this view: Keinan (1987) found that people who were in unpleasant, stressful situations tended not to review all the options on a multiple-choice test and instead simply selected the first viable one that presented itself.

To pit these theories against each other, we arranged to replicate the anger study with one further twist. In one condition, we instilled anger in participants and then gave them the lottery choice, but we told them to list the favorable and unfavorable features of each lottery before making their selection. We reasoned that if our first theory was correct and emotional distress altered the subjective utility calculations, then this effect would be magnified by calling people's attention to the relative merits of the two lotteries. In contrast, if our second theory was correct and emotional distress had its effect by preventing people from thinking through their options, then forcing them to think through those options should eliminate or reverse the pattern of results.

The results were quite clear: Angry people who had to stop and think for a few seconds before making their choice ceased to favor the long shot and instead overwhelmingly chose the low-risk lottery, just like people in neutral or positive moods. If stopping to think reverses the normal effect of anger, then presumably the normal effect of anger has to do with failing to stop and think. The implication is that states of emotional distress promote impulsive behavior that can produce risky and self-defeating outcomes. This is a form of self-regulation failure. In our procedure, when people did stop to think, they made the rational, optimal choice, but such analysis requires self-regulation to restrain oneself from making quick, impulsive choices. Emotional distress apparently undermines that self-regulation, thereby allowing people to make quicker choices without adequate consideration.

Together, these results provide a useful insight into the psychology of self-destruction. Emotional distress does indeed lead to self-defeating behavior, but the causal process does not necessarily conform to outdated psychodynamic theories about wishing for punishment or desiring to fail. Rather, emotional distress apparently undermines the self-regulation process necessary to produce an informed, rational appraisal of the situation and its options. Once that is gone, people tend to make impulsive choices without thinking them through. These choices may especially favor high-payoff but high-risk courses of action. Although sometimes the person may be lucky and benefit from the high payoff, in many other cases the risk will materialize into substantial harm or cost. The causal process thus leads from emotional distress (high arousal, negative moods) to self-regulation failure, to taking foolish risks, to costly self-defeating outcomes.

NATURE OF SELF-REGULATION

Our more recent line of research has addressed a basic question about the nature of self-regulation. What sort of process is involved in exerting self-control, as in resisting temptation, altering one's emotional state, or keeping a resolution?

At least three major types of theories have been described. One resembles the traditional concept of willpower, which implies that self-regulation involves energy or strength. Another is that self-regulation is essentially a matter of cognitive processing guided by a schema or knowledge structure. A third is that it is a skill that is acquired through practice. All of these are plausible and have their adherents (e.g., Baumeister et al., 1994; Carver & Scheier, 1981; Higgins, 1996).

The three theories make competing predictions about what will happen when people are presented with the need to self-regulate after they have just completed an act of self-regulation. If self-regulation is a strength, then it will become tired or depleted by the initial act, and so the second act is likely to be less effective. In contrast, if self-regulation is a schema, then the initial act will prime the schema (i.e., activate the relevant knowledge structures) and so subsequent self-regulation will be improved. And if self-regulation is a skill, then there would be no change in the second act, because skill remains essentially constant from one trial to the next.

Our first study to assess these competing predictions involved measuring the effects of affect regulation on physical stamina and endurance (Muraven, Tice, & Baumeister, in press). Participants watched a sad, upsetting movie excerpt with one of three instructions. Some were told to control their feelings so as to minimize any emotional response, including both trying to not show and not feel emotional reactions. Others were told to try to increase and amplify their emotional response (which is another form of self-regulation of emotion). A third group was not told to alter their emotional response in any way.

Following exposure to the film, physical endurance was measured by performance on a handgrip task. This task uses a device sold commercially for exercising the muscles in the hand, and it consists of two handles and a spring. The user squeezes the handles together, thereby compressing the spring. We measured how long people could maintain the handles squeezed together, which becomes physically tiring as the muscles use up their strength. Like any endurance task, a good performance requires one to use self-regulation to overcome the impulse to stop to rest, so that one can keep going.

The results of this first study supported the strength theory of self-regulation. People who had tried to regulate their emotions, either increasing or stifling their emotional response to the film, subsequently gave up faster on the handgrip task, as compared to people who watched the same movie but did not try to regulate their emotions. Thus, apparently, regulating one's emotional state used up some limited resource that was then unavailable for helping one persist on the handgrip task.

A second study used quite different procedures. In this one, people first engaged in a thought suppression task in which they try not to think about a white bear (borrowed from Wegner, Schneider, Carter, & White, 1987). Two control groups were also run, including one in which people were permitted (although not required) to think about a white bear, and one in which no bears were mentioned. Following this, we measured persistence on unsolvable problems. Each participant was asked to work on a series of anagrams, and these had been rendered unsolvable by omitting letters. The measure was how long the person kept trying to solve the puzzles before giving up.

This study likewise confirmed the strength or energy model. People who had tried to suppress thoughts about the white bear subsequently gave up faster on the anagrams task, as compared to people who had not tried to suppress forbidden thoughts. (Additional studies and control groups have ruled out alternative explanations, such as the idea that people felt themselves to have failed at the white bear suppression task and were therefore too discouraged to do well on the anagrams.) Thus, the act of trying not to think about the bear apparently depleted some crucial resource that was then unavailable for helping them persist at the problems in the face of failure.

Resisting temptation is one of the classic, prototype cases of self-regulation, and so we also conducted research with resisting temptation (Baumeister, Bratslavsky, Muraven, & Tice, in press). Participants in this study were asked to skip a meal prior to the experimental session, so most of them arrived hungry. To increase their temptation, we baked chocolate chip cookies in the laboratory room just before the subject arrived, so that the

room and adjacent hallway were suffused with the delicious aroma of freshly baked chocolate. After entering the room, the subject was seated at a table near a stack of these cookies, along with chocolate candies. There was also a bowl of radishes on the table. In the crucial condition, the experimenter informed the subject that he or she was assigned to the radish condition and would have to eat only radishes. The subject was left alone in the room (to maximize the temptation to filch some chocolate) for five minutes.

Afterward, we measured how long people would continue trying to solve some geometric puzzles that had been rigged to be unsolvable, a measure borrowed from Glass and Singer (1972). The people who had had to resist the temptation gave up faster than people who had been allowed to eat chocolates, and also faster than people for whom no food had been involved. Thus, resisting temptation apparently depleted the same resource that was needed for persistence.

Next, we conducted several studies aimed at remedying some weaknesses or limitations in these first few. We were concerned that most of the task measures had included unsolvable tasks, and so we showed that an initial exertion of self-regulation led to a decrement in performance on solvable tasks (Baumeister et al., in press). We were also concerned that the dependent measures had all been oriented toward self-regulation of performance processes, so we conducted one in which the dependent measure was affect regulation. In that study, people first performed the white bear thought suppression exercise (or a neutral task not requiring self-regulation), and then they watched a funny movie with instructions to avoid laughing or smiling. Sure enough, the white bear exercise apparently depleted people's capacity for self-regulation, with the result that they were more likely to laugh and smile at the video.

All these results point to the conclusion that self-regulation conforms to a pattern of strength or energy. That is, there appears to be one inner psychological resource that is used for many different kinds of self-control, and any act of self-control that depletes the resource will result in subsequent decrements in self-control. In everyday life, this problem might correspond to people who find themselves confronted with exceptional demands for self-control and as a result begin finding that their self-control breaks down in other, unrelated spheres. For example, many students find that during examination week they are more likely to overeat, smoke too much, neglect their exercise, become crabby or show other signs of failed affect regulation, and in general exhibit various breakdowns in self-control. These may be understood on the basis of the limited energy model: final exam week requires the student to devote his or her self-regulatory capabilities to studying and complying with other academic deadlines and requirements, and this exceptional depletion of regulatory energy results in weaker self-control in other spheres.

One disturbing implication of this line of research is that it seems to warn people against exercising self-control. If people have only limited resources, then it seems prudent to avoid using it except when it is most urgently needed. People could take that as a recommendation to avoid exerting self-control, which would be a regrettable, socially undesirable recommendation.

A possible counterargument would be that if self-regulation is like a strength or muscle, then exercise should improve it over the long run. A muscle grows tired each time it is exercised but grows stronger as a result. It is conceivable that self-regulation would follow the same pattern.

We conducted one longitudinal study (Muraven, Baumeister, & Tice, 1997) to examine whether the capacity for self-regulation could be increased by exercise. We instructed several groups of students to follow some procedure for two weeks, and these procedures were all secretly designed as exercises in self-control. One group was told to

try to improve their posture as often as possible. Another was supposed to try to regulate their moods and emotional states so as to feel good as much as possible. Two other groups were instructed to keep detailed records of everything they ate. A control group received no instructions.

At the beginning and the end of this two-week period, we assessed self-regulatory depletion by putting people through one of our experimental procedures. Specifically, they had to perform the white bear suppression exercise, followed by the handgrip measure of physical endurance.

The results of this study provided encouraging evidence that self-control can be improved with exercise. Relative to the control group, the groups who performed various self-control acts were less susceptible to depletion after the two weeks. That is, they showed improvement in how well they could make themselves persist on the handgrip task from the beginning to the end of the two-week period, whereas the control group did not show any such improvement (and in fact did worse, reflecting perhaps that the second measure was taken at a somewhat more stressful part of the semester).

Hence these results provide converging evidence that it is best to think of self-regulation as a kind of strength or muscle. Exertions of self-control bring short-term decrements but long-term improvements. Instead of concluding that people should avoid self-control, this line of work suggests that the optimal recommendation may be to exert self-control on a regular basis so as to increase one's overall capacity.

This line of research did lead into one more important set of findings that has potentially powerful implications. The studies covered thus far seemed to indicate that all (or at least a broad variety of) acts of self-regulation draw on the same pot of energy, which is quite limited in size. That pot of energy would have to be regarded as an important part of the self, given the importance of self-regulation. Still, is that pot used only for self-regulation?

A review of what social psychologists have learned about the self yielded the conclusion that relatively little is known about the "executive function" in general (Baumeister, in press). The executive function is another term for what is sometimes called the agent or the active principle (and is an important part of what is called the "I"). More precisely, it is the part of the self that initiates action, makes choices and decisions, and takes responsibility.

Self-regulation can be regarded as one of the duties of the executive function. If self-regulation uses this limited supply of energy, could it be that the other duties of the executive function also draw on that same resource? If so, that resource would indeed be one of the most important and central aspects of the self.

To examine whether the same energy resource is used for activities outside of self-regulation, we needed to show that other acts would interfere with subsequent self-regulation. For our first study, we used the standard choice manipulation from cognitive dissonance research (cf. Linder, Cooper & Jones, 1967). In this procedure, subjects were asked to make a counterattitudinal speech favoring a large tuition increase at their university. Half were simply told to make the speech (using materials that were given them and being recorded on audiotape). Others were asked to make the speech but told that the final decision about whether to do so was entirely up to them. Following this, we used the same persistence measure that we had used in the radish/chocolate study.

The results provided striking confirmation of the view that choice draws on the same energy resource that self-regulation does. People who had performed the act of choice and taken responsibility for their behavior acted like depleted subjects in the previous studies: they gave up relatively quickly on the unsolvable problems. In contrast, people who had

performed the same counterattitudinal behavior without choice showed no decrement in persistence, as compared to the no-speech control group.

In other work, we have found that initial acts of self-control make people more passive. Apparently active responses by the self draw on the same energy resource that self-regulation does. When people face a decision where there are both active and passive options, they are more likely to take the passive option if they have previously exerted self-control.

Taken together, these results suggest implications about the basic nature of the self, and not just about self-regulation. The self seems to have a limited supply of energy that is required for a variety of its functions, including active responses (e.g., initiating action), making choices and decisions, taking responsibility, and regulating the self. It appears that the same resource is used in all these and, moreover, that the resource is quite easily depleted.

CONCLUSION

Self-regulation has major, important implications for success in life, and indeed there is ample basis for asserting that it is one of the most important keys to success. People who are good at self-regulation show a multitude of advantages over other people, in both task performance and interpersonal relations.

This chapter has provided an overview of our recent studies on self-regulation. This work has indicated that self-regulation failures are involved in a variety of self-defeating behavior patterns, including taking foolish, destructive risks and procrastinating.

The studies on risk-taking indicate that high-risk behavior may often be an important link between emotional distress and self-defeating behavior. When people are upset (in the form of unpleasant moods or emotional states that feature high arousal), they tend to cut short the processing of information about the possible costs and bad outcomes associated with some choices. They may pursue a highly desirable goal but one that carries risks and costs that would make it prohibitive if one were to consider the options thoughtfully. Self-regulation is required to make oneself stop and think instead of acting impulsively. Emotional distress apparently undermines this form of self-regulation.

Procrastination involves postponing work on assigned tasks. Contrary to apologists who regard procrastination as fairly harmless, the present results suggest that it carries significant costs in terms of task performance and health. In a series of studies, we found procrastinators earned lower grades, suffered more stress, and were sicker than nonprocrastinators. The only benefit of procrastination was that when the deadline was far off they enjoyed lower stress and better health than nonprocrastinators — gains that were later offset and even reversed when the deadline became close. Self-regulation includes the self-discipline to make oneself work on tasks in the absence of powerful external pressures, and so self-regulation is inimical to procrastination.

An important form of self-regulation involves self-management, which refers to using information about self and the external world to choose appropriate performance settings and other commitments so as to maximize what one can accomplish. We found that people with high self-esteem were better at this when operating under favorable conditions. An ego threat, however, disrupted the smooth self-management of people with high self-esteem and caused them to become overly confident, resulting in destructive and costly courses of action.

Our last line of work addressed the fundamental question of the nature of self-regulation. Converging evidence from many studies suggests that self-regulation operates like

a stock of common energy, analogous to a muscle or other form of strength. When people exert self-regulation, their capacity becomes depleted, similar to the way a muscle becomes fatigued after exercise. For a time, any other act of self-regulation is likely to show poorer performance, as long as the fatigue or depletion lasts. Meanwhile, preliminary findings indicate that self-regulation can improve over time with regular exercise, which extends the muscle analogy.

The findings about depletion suggest that the capacity for self-regulation depends on a limited supply of energy, and this supply must be regarded as one of the most important features of the self. Apparently the same stock of energy is used for a wide variety of different acts of self-regulation, including many that would seem entirely unrelated to each other. Furthermore, recent findings suggest that this supply of energy is also used by the self for all acts of choice, initiative, responsible decision-making, and active response. This supply of energy is thus vital to the effective functioning of the self.

Yet the supply is also quite limited. A mere five minutes of resisting temptation to eat chocolate, for example, led to a subsequent reduction by half in the amount of time people could persist in the face of failure before quitting. Whether the self's energy is really absent in such conditions, or whether the effects indicate only that the self responds to depletion by seeking to conserve, it is still clear that the self can only exert deliberate control over a very small amount of its behavior. The functioning of the self must therefore be understood as taking place amid scarcity, and the reliance on habits, routines, automatic behaviors, and easy or passive patterns of action may be a direct result. Fortunately, however, current work suggests that the self's capacity for self-regulation can be increased.

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