

How Emotions Affect Self-regulation

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To a self-regulation researcher, one of the intriguing facts about emotion is its relative immunity to direct self-regulation. To be sure, people have a great many strategies, procedures, habits, and other practices with which they try to alter or prolong their emotional states (see Gross, 2006, for review), and some of them are reportedly somewhat effective. Still, people cannot control their emotions as easily or directly as they can control their behaviors or some of their thoughts. The very multiplicity of emotion regulation strategies stems in part from the fact that, in general, none of them works all that well and there is no one that can be relied upon to produce the desired emotional state whenever needed. Moreover, almost all the emotion regulation strategies are indirect, in the sense that they operate by changing something else (e.g., what one is thinking, or one's level of bodily arousal) which may then in turn alter emotion. Direct control over emotions — as in simply deciding to stop feeling guilty and, perhaps with a small exertion of willpower, succeeding at not feeling guilty any more after that — is apparently outside the realm of normal human experience.

Why is direct control of emotions so different from other responses? One answer proposed by emotion theory is that an ability to choose and change one's emotional state at will would undermine the adaptive functions of emotion. As proposed by Baumeister, Vohs, DeWall, and Zhang (2007), you cannot control your emotions because the purpose of your emotions is to control you. To pursue the guilt example: If people could simply stop feeling guilty by deciding to stop, guilt would lose its usefulness for promoting socially desirable, interpersonally beneficial behavior. After all, if guilt were voluntary, who would ever choose to feel guilty?

The purpose of this chapter is to explore the idea that emotions exert control over the person. Our particular focus is on self-regulation, which has been recognized as one of the crucial and overarching functions of the self in its control over behavior (Baumeister, Heatherton, & Tice, 1994; Higgins, 1996). We shall consider both the beneficial and the harmful influences that emotion can have on the self-regulation process. First, however, we need to define our terms and examine the role of emotion in the direct control of behavior.

Definitions

By *emotion* we mean the full-blown response that is commonly understood in ordinary language. It refers to a conscious emotional state accompanied by bodily arousal. The emphasis on conscious experience is important because recent research has increasingly documented a variety of affective reactions that can influence cognition and behavior but may not even be conscious and may also not have any bodily arousal or other physical manifestation. We reserve the term *automatic affect* to refer to these quick, simple, and possibly nonconscious reactions, which may be no more than a fleeting sense of liking or disliking something. The term emotion is thus reserved for full-blown responses that include bodily arousal and a clear conscious sense of being in an altered state.

Self-regulation refers to attempts to alter one's responses. Most commonly, self-regulation is used to control one's thought processes, emotional states, impulsive and appetitive responses, and task performance, though that list is not entirely exhaustive. The term regulate denotes more than change, however: Typically it entails change to bring something in line with a rule, goal, or other standard. Self-regulation is thus not just random change but goal-directed change, in that the person seeks to bring his or her responses into accordance with some standard.

Does Emotion Cause Behavior (and Should It)?

The assumption that emotion evolved for the direct control of behavior is one of the most widely affirmed ideas in emotion theory (e.g., James, 1899; Frijda, 1987). According to the standard example, an animal that did not experience fear would fail to run away from predators and other dangers, and as a result it would soon be killed, often without fulfilling its reproductive potential. Hence its more emotional conspecific rivals, who did experience fear and therefore fled to safety when appropriate, would be left alone to reproduce and would soon fill up the gene pool.

Although the argument about fear and fleeing to safety has often been repeated, it has some flaws. First, if by emotion we mean the full response (as we defined it, including bodily arousal), then it may often be too slow to provide safety from many of the dangers in the animal world. After all, producing a physiological arousal response takes some time, and if it is only in perception of the body response that the animal flees, then flight would not take place until several seconds or even several minutes after danger is perceived. That model does not appear to apply accurately to how animals flee. Often they begin fleeing at the first sign of danger, which suggests that almost as soon as the threat is perceived and understood, the behavior commences, without waiting around for the emotion to develop.

Moreover, and perhaps more to the point, fear is an atypical emotion. Although the fear/fleeing example has become the standard example, invoked by almost every emotion theorist who seeks to argue that emotion causes behavior, its very popularity should be suspicious, because there are so few other examples. XX (200xx) has argued that fear is an unusual emotion on multiple grounds and hence has been an unfortunate prototype of emotion.

Yet another objection is that emotions in general lack specificity. To argue that emotions evolved to directly cause behaviors, one would have to argue that the link from emotion to behavior is hard-wired. Yet even fear does not always cause fleeing. As Schwarz and Clore (1996) have pointed out, "From just knowing that people are afraid, we cannot predict whether they will listen to the weather report, sell their stocks, or start running" (p. XX) or indeed engage in any number of other possible behaviors. Similar objections can be made about almost any other emotion. The behavior cannot be "in" the emotion, because it depends on situational constraints and opportunities. At most, broad tendencies toward approach and avoidance would be associated with emotions.

To be sure, emotion may *sometimes* alter behavior directly. For example, the chances that someone will strike someone else are undoubtedly higher if the first person is angry. There is no disputing that emotion can sometimes cause behavior — only whether that is what emotion is basically *for*, in the sense that it is what emotion evolved to produce. In popular stereotype, when people act or make decisions out of

strong emotion, the results are often counterproductive and sometimes downright destructive. These stereotypes have some validity: Researchers have in fact confirmed that currently felt emotional states produce irrational decisions and self-defeating behaviors (for review, see Baumeister, DeWall, & Zhang, 2007).

To resolve these and other problems, Baumeister, Vohs, DeWall, and Zhang (2007) proposed that emotion essentially serves as a source of feedback about behavior, rather than being designed primarily for direct control of behavior. That is, after a person has emitted a behavior and perhaps encountered the consequences, emotion provides a strongly evaluative message about the event. Emotion may therefore contribute to learning, indeed in several ways. First, emotion amplifies the rewarding or punishing nature of the consequences and outcomes. Second, emotion stimulates cognitive reflection about the event. Emotion can prompt the person to continue thinking about a complex event after it is over, so that the person can deduce the proper lesson from among the many possible interpretations. Third, and also related to learning, emotion stimulates counterfactual thinking (e.g., Roese, 2001), which can greatly improve the prospects for learning and for improving behavior. That is, counterfactual replays enable the person to imagine behaving in many different ways in the same situation, and hence the person can perhaps settle on what he or she might do differently and with better result the next time a similar situation arises.

The emphasis on learning helps explain a seeming paradox noted by emotion researchers. Schwarz and Clore (20xx) reviewed the literature on emotion and recorded a rather stunning imbalance. They found abundant evidence showing that emotion affects cognition in all sorts of ways. In contrast, they found relatively little evidence showing how emotion affects behavior. (Moreover, as we noted, when emotion does influence behavior directly, the results are often undesirable or problematic.) If we understand emotion as designed to promote learning by providing feedback, then its direct effects on cognition rather than behavior make perfect sense.

Thus, improving learning is one important process by which emotion can produce beneficial, adaptive improvements in behavior. Another is that the person can begin to select behaviors based on anticipated emotional outcomes. Over time, the person can begin to learn what behaviors will produce which emotional responses. When faced with behavioral choices, the anticipation of an emotional outcome can serve as a powerful guide to behavior. In a sense, then, much behavior becomes a form of emotion regulation, as people make their behavioral choices on the basis of the anticipated improvements in their emotional states.

The emphasis on anticipated emotion also helps resolve a seeming paradox in the emotion literature. As we said, folk wisdom and more than a few research findings have characterized emotion as an irrational and possibly dangerous basis for decision and action. Yet an influential book by Damasio (1994) pointed out that people with deficient emotional responses, such as may be caused by brain damage that prevents ordinary emotional reactions, are not the wise, rational, well-adjusted paragons like the legendary Mr. Spock of television's *Star Trek*. Instead, they live very poorly governed lives, are prey to all manner of bad decisions and self-regulation failures, and often come to bad ends. Damasio's conclusion was that emotions are extremely useful and adaptive, and losing one's capacity for normal emotion is psychologically disadvantageous if not crippling.

To reconcile these contrary views of the helpfulness of emotion, one can invoke the distinction between current and anticipated emotions. Acting on the basis of anticipated emotion is often helpful and adaptive. Acting on the basis of a currently felt emotion can produce maladaptive and irrational outcomes (Baumeister, DeWall, & Zhang, 2007).

To illustrate, it is useful to consider the example of guilt. The idea that emotion is for direct causation of behavior immediately seems problematic when applied to guilt, for, unlike fleeing because of fear, there is no single prototype of behavior that all guilty persons would be expected to perform. Guilt may motivate a variety of relationship-repairing behaviors, to be sure, but these would depend heavily on what gave rise to guilt, what the relationship is like, and what the behavioral options are. In contrast to direct causation of behavior, guilt stimulates thinking about the offense, very likely including counterfactual analysis of what one could have done to avoid feeling guilty. Guilt motivates people to learn lessons and to change their behavior for future (e.g., Baumeister, Stillwell, & Heatherton, 1995, BASP). Eventually, people may behave quite effectively by simply refraining from acts that they know will cause guilt, and so the anticipation of possible guilt becomes a vital and adaptive aid to useful behavior in social settings.

How Emotions Impair Self-regulation

We turn now to consider how emotions influence the self-regulation process. There are both beneficial and harmful effects. We shall cover the harmful ones first, and then we shall turn to the positive ones.

The idea that emotional states and especially aversive emotional states impair self-regulation is fairly common. When are people assumed to be likely to break their diets, abuse drugs, fall of the alcohol-reform wagon, or engage in inappropriate sexual or aggressive acts? A common answer is that such failures of self-control will occur when people are in a strong and unpleasant emotional state.

Shifting Priorities

There are multiple reasons that aversive emotional states may undermine self-regulation. One involves shifting priorities. When people feel bad, they may give priority to feeling better. Scarry (1985) has pointed out that this is the basic principle underlying torture: The need to feel better immediately takes precedence over everything else, and torture victims will betray their lives' work, their most cherished ideals, and their loved ones simply to get the pain to stop. It is hardly surprising that people abandon their self-regulatory good intentions when they feel bad enough.

As it happens, many self-control regimens are designed to help people resist short-term temptations that bring the promise of immediate pleasure but carry downstream costs and dangers. An intensely aversive current state may shift the balance of these toward favoring the immediate gain instead of the delayed benefit.

For example, consider smoking. Most people recognize that smoking cigarettes carries significant health risks. However, smoking also brings fairly immediate pleasure. Once a person decides to quit smoking, the challenge becomes the daily or even hourly struggle to resist the temptation to feel good in order, in order to reduce the long-term damage to health. The goal of abstaining from smoking is best served by maintaining

focus on the long-term benefits rather than thinking about the quick pleasures of lighting up. When someone is quite upset or depressed, however, the allure of immediate pleasure may seem that much more appealing, while perhaps the possibility of harm in the distant future becomes relatively less compelling.

This line of reasoning was tested in a series of studies by Tice, Bratslavsky, and Baumeister (2001). They proposed that emotional distress would increase failures of self-regulation, insofar as people would engage in tempting but risky activities in order to feel good. In their first experiment, some participants were induced to feel an unpleasant emotional state (by means of a visualization exercise in which they envisioned causing a traffic accident that killed a child). They then were given the opportunity to eat unhealthy snack foods (e.g., cookies). The sad mood contributed to a significant increase in unhealthy eating, as compared to participants who were in better moods.

To be sure, there may be alternative explanations to account for why people might eat more when they are upset. Maybe emotional distress drains the body's glucose or stimulates hunger in other ways. Maybe emotions stimulate automatic motor activity so that hands and mouth start mindlessly chomping cookies. To rule out these and other alternative explanations and provide stronger evidence that emotion regulation is central, these studies made use of an ingenious procedure developed by Manucia, Baumann, and Cialdini (1994). The mood-freezing pill procedure was pioneered by those authors to investigate whether the effect of sad moods on helping was a strategy for curing the sadness. In this procedure, participants were given a placebo but told that it would have the temporary effect of making their current emotional state immune to change for about an hour. Thus, if you were sad when you took the pill, nothing you did would be able to cheer you up. Under such conditions, emotion regulation becomes effectively impossible. They found that sad people did not help more than others after taking the (bogus) mood-freezing pill, which showed that helping is a strategy to cheer oneself up. When cheering up is impossible, sad people do not help.

Tice et al. (2001) found that sad moods did not increase eating of snack foods under a mood-freeze condition. (The original mood-freezing pill procedure was adapted for these studies. In the first one, participants were simply told, correctly, that eating snack foods would not improve their moods.) Thus, the general pattern that sadness impairs self-regulation of eating must be a strategy for mood regulation, because when mood regulation is ruled out, sad people did not eat any more than others.

A second study made a similar point with delay of gratification, using a resource management problem that had been developed by Knapp and Clark (19xx). Participants could earn real money by playing a game that simulated harvesting fish from a pond, but they needed to restrain themselves so that the fish population would reproduce itself, allowing for further harvesting indefinitely. Participants in an aversive emotional state showed a significant tendency to harvest too many fish too fast, with the result that the fish population declined. Although the quick payoff of this approach gave the emotionally distraught participants an early advantage in terms of money, over the course of the experimental game session they earned significantly less than others, because after the first round or two there were not enough fish left to furnish a good harvest. The seeking of quick gratification instead of garnering better rewards over the

long run has long been a hallmark of self-regulation failure (see Mischel, 1974, 1996), and these results showed that emotional distress contributes to it.

In this second study, again, a mood-freeze manipulation wiped out the effect. That is, emotionally distraught persons favored immediate over delayed gratification, but only if they anticipated a quick payoff in terms of improved affective state. When no improvement in mood was likely, they did not shift toward immediate gratification.

The third study in the series showed similar results for procrastination. Procrastination is a widespread problem, and over the years theorizing has converged on (poor) self-regulation as a central cause (e.g., Ferrari). Although some people say they work effectively under pressure, results from field experiments show that procrastination contributes to poor quality work (Tice & Baumeister, 1996). A prominent cause is the planning fallacy, by which people underestimate how much time and other resources will be required for almost any task (Buehler, Griffin, & Ross, 1994). Thus, when people put off a task until they have what they think is just enough time left to do it, they typically find that they do not have enough time, because unexpected obstacles arise or simply because they have underestimated what is needed.

The third study on emotion and self-regulation by Tice et al. (2001) showed that people procrastinate more when they are upset. Participants were warned of an upcoming test and were told (correctly) that studying and practicing would improve their performance. They were given a fixed amount of time to prepare for the test. The experimenter told them that they did not have to spend all the time preparing for the test and could if they wanted spend some of it in other pastimes that were available, such as reading magazines and playing puzzle games. Participants in whom a sad and upset emotional state had been induced spent more time on these distractor activities, though not when their emotional state had been ostensibly frozen.

Another moderator of the procrastination effect was the pleasantness of the distractors. That is, emotional distress increased procrastination in the sense that participants spent more time on the distractor tasks — but only when these were pleasant and appealing. When the available distractors were not so appealing (e.g., the magazines were boring and out-of-date), emotional state made no difference to procrastination.

The moderating effect of appealing versus unappealing distractors is quite relevant to understanding why emotion can impair self-regulation. One could propose on theoretical grounds that sad or distraught individuals do not want to work toward their goals because they lack confidence, or because working toward goals is aversive, or any number of other reasons. However, if the goal were to avoid the task, then any distractor should have been effective. Instead, the results indicated that people procrastinate because they want to engage in a pleasant, rewarding activity that holds some promise of improving their emotional state.

Put another way, one could analyze procrastination as either push or pull: Either something pushes one away from doing the main task, or another option pulls one away from it. The third study's findings point to pull rather than push. Emotional distress did not provoke a wholesale flight from studying. Rather, it made one more susceptible to the allure of an alternative task that held the promise of feeling better.

Taken together, these results reveal one important pathway by which emotional distress can undermine self-regulation. Distress narrows the temporal focus because

the aversive state increases the subjective urgency of feeling better soon. Self-control probably evolved in part to enable people to pursue long-term gains and benefits even when these require foregoing short-term pleasures. Aversive emotional states shift the balance in favor of the immediate pleasures.

These patterns can help explain the bad reputation that emotion has for triggering irrational and sometimes self-destructive behaviors. As noted above, the bulk of the evidence reviewed by Baumeister et al. (2007) suggested that when decisions or actions are affected by one's current emotional state, the results are often maladaptive or unproductive. The reason for this may be that current distress causes people to choose behaviors that promise immediate payoffs despite higher downstream costs.

Ignoring Relevant Information

A second pathway by which emotions (especially aversive emotions) impair self-regulation has to do with ignoring relevant information. Easterbrooke (1959) proposed that arousal states lead to a narrowing of attention, which can produce the famous inverted U-shaped curve relating arousal to performance. At first, arousal causes a screening out of task-irrelevant information, so that performance becomes more exclusively focused on the relevant information and therefore improves. At some point, however, further increases in arousal cannot eliminate any more irrelevant information, possibly because all of it has already been eliminated, and so instead task-relevant information is screened out, with the result that performance deteriorates.

Emotional states and reactions seem generally insensitive to probabilities. Hence as emotion is increased, probabilistic information is probably among the first to be eliminated, and so decisions will be made in a less than optimal manner. The emotional blindness to probability was one theme of a review by Loewenstein, Weber, Hsee, and Welch (2001), who illustrated it by comparing the numbers 10 thousand and 10 million. When these are presented in terms of dollar prize amounts, people can emotionally appreciate the difference, because the larger sum would open opportunities and transform one's life in ways that the smaller one would not, even though winning \$10,000 would undoubtedly be a very positive outcome. In contrast, if one were to treat those numbers as probabilistic odds, the difference is hard to register emotionally: A chance of winning that is one in ten thousand versus one in ten million does not feel much different at all.

The difference was central to a series of experiments by Leith and Baumeister (1996) concerned with why emotion contributes to self-defeating behavior. A literature review summarizing the many ways that people do things that increase their chances of failure or suffering found that emotional distress was implicated in many of them, but it was unclear why or how emotion had this effect (Baumeister & Scher, 1988). The standard Freudian view, that emotional distress gives rise to a wish for punishment or other self-destructive impulses, had not been supported by research findings. One more plausible hypothesis was that led to an increase in high-risk behavior, in which risks and costs were accepted insofar as they accompanied short-term gains and pleasures. (Thus, again, the theme was that emotional distress causes a shift in priorities toward doing things that promise a quick fix in terms of mood repair.)

Sure enough, Leith and Baumeister (1996) found that aversive emotional states led people to choose risks that were objectively poorer and would likely yield bad

outcomes but that at least held out the possibility of a major improvement in emotional state. Their participants were offered the choice between two lotteries. For both lotteries, winning meant a cash prize and losing meant an aversive, stressful experience (of undergoing noise stress). One was a long shot in the sense that it offered only a 2% chance of a large prize (\$25). The other was a fairly safe bet: a 70% chance of winning \$2. Objective appraisal of those values, such as an accountant or statistician would offer, pointed ineluctably toward the safe bet as the preferable choice. Hence selecting the long shot qualified as a self-defeating decision. Leith and Baumeister found that most participants chose the safe choice, but emotionally upset persons shifted toward favoring the long shot.

Why? Those authors had originally favored elaborate hypotheses about shifting values of costs and benefits, such as people having more to gain and less to lose if they already feel bad. Those hypotheses received no support. Instead, it appeared that the emotional distress made participants ignore the probabilities and focus only on the rewards. Thus, they would choose the long shot because they were thinking about how much better the \$25 prize was than the \$2 prize — and because they were not thinking about how much the 2% odds of winning was worse than the 70% odds. In one condition of one study, emotionally upset (angry) participants were required to stop and make a list of the pros and cons of the two lotteries, and this completely eliminated the tendency for negative emotion to cause self-defeating behavior. In other words, angry participants did not choose the long shot if they stopped to think about it first. But without that requirement, angry participants did make the poor choice of the long shot.

The implication is that emotional distress caused participants to ignore relevant information (about probabilities) and make their decision based on other information. Thus, emotion can cause bad decisions and impair self-regulation by making people insensitive to probabilities.

How Emotions Benefit Self-regulation

Thus far we have focused on the negative. Emotion, especially emotional distress, can impair self-regulation. But there can be benefits as well. In this section we focus on how emotion can produce beneficial effects.

Signaling

The analysis of emotion as a feedback system by Baumeister et al. (2007) was anticipated by self-regulation researchers, who have proposed a variety of helpful ways that the process of self-regulation is facilitated by emotional feedback. Indeed, emotion may contribute to signaling the need for self-regulation in the first place.

An important work by Higgins (1987) contended that emotion serves to signal discrepancies between actual and desired states, which is crucial for self-regulation. Higgins contended that different types of standards produce different types of emotional reactions. Specifically, he said that discrepancies between actual states and ought-standards (i.e., beliefs about how one ought to be) produce high-arousal negative emotions, whereas discrepancies between actual states and ideal-standards (e.g., how one might ideally be) produce low-arousal states of emotional dejection. This hypothesis has had at best mixed results in empirical tests, and some have concluded that it is fundamentally wrong (e.g., Tangney, Niedenthal, Covert, & Barlow, 1998). Whether the

specificity is correct or partly correct remains for future work, but the basic insight that negative emotions signal discrepancies and thereby initiate self-regulatory processes remains influential.

To be sure, Higgins (1996) was not the first or only theorist to propose that emotions signal the need for self-regulation, though he remains one of its most eloquent advocates, and his elaboration of how different emotions signal different types of discrepancies remains distinctive. Probably the most influential theory to link emotion to self-regulation (though, again, not the first) was proposed by Carver and Scheier (1980, 1981), who elaborated how self-regulation is typically governed by a cybernetic or feedback-loop process that involves comparison of current states to standards and, depending on the outcome of that comparison, either exits the loop or initiates operations aimed at resolving the discrepancy.

More broadly, the long history of the psychology of goal pursuit has assigned emotion the vital role of signaling success or failure in pursuing goals. Reaching one's goals produces positive emotion, and being thwarted in one's goals produces negative emotion: This fundamental truth has been affirmed in many contexts, ranging from accounts of human goal striving (e.g., Locke & Kristof, 1996), to complex theories of action control (Gollwitzer & Bargh, 1996), and even back to early theories of frustration and aggression (Dollard & Miller, 1939?). One may question whether all goal attainments always produce some positive emotion, and whether all blockages or failures always produce negative emotion, but these are mere quibbles about the possibility of exceptions. The general pattern is indisputable.

A more nuanced and sophisticated version of the goal pursuit theory was proposed by Carver and Scheier (1990), who extended emotion's role beyond just evaluating the final outcome. In their view, emotion is a function not just of goal attainment or failure but of progress. In their analysis, positive emotions may occur in the goal pursuit process long before the goal is actually achieved. A person may feel happy or satisfied simply on the basis of having made good progress toward the goal. Likewise, one may feel upset, sad, frustrated, angry, or otherwise badly on the basis of having failed to make any progress, even though the goal remains attainable. Indeed, by this analysis, one may feel upset despite no change at all in one's position relative to the goal, simply because one was hoping to make progress but did not do so.

Emotion and Regulatory Depletion

Another important way that emotion can influence self-regulation, indeed to a positive effect, is based on its apparent capacity to counteract the effects of depletion. To understand this, it is necessary to understand the so-called strength model of self-regulation (Baumeister, Vohs, & Tice, 2007).

The idea that self-regulation depends on a limited resource, akin to a kind of energy or strength, was proposed as one speculative possibility among others by Baumeister, Heatherton, & Tice (1994) on the basis of a literature review. They proposed that the folk notion of willpower seemed to correspond to a variety of findings in the literature and might prove accurate.

The essence of the strength or willpower theory of self-regulation is that acts of self-control consume some kind of energy that is important for psychological functioning but is limited in its extent. One indication of these limits would be that as people

continue to exert self-control, they would deplete the resource, and so the success of efforts at self-regulation would deteriorate progressively. In contrast, a purely cognitive model of self-regulation would predict that a first act of self-regulation would activate the relevant constructs and mental faculties, so that subsequent acts of self-control would be facilitated (as in the many studies on priming).

Empirical tests provided consistent support for the strength model. In a broad variety of procedures, a first act of self-regulation was followed by relatively poor performance on a second, ostensibly irrelevant measure of self-regulation (Baumeister, Bratslavsky, Muraven, & Tice, 1998; Muraven, Tice, & Baumeister, 1998; for review, see Muraven & Baumeister, 2000). The term ego depletion was adopted to describe the psychological condition that ensued from having expended some of one's resources on initial acts of self-regulation. Under ego depletion, people were shown to be more likely to engage in inappropriate sexual and aggressive acts (REFS). The effects of ego depletion go beyond impaired self-control, because some of the self's other activities also make use of the same resource. In particular, making decisions uses the same resource (Vohs, Baumeister, Schmeichel, Twenge, Nelson, & Tice, in press), as does active instead of passive responding.

Given the detrimental effects of ego depletion, some researchers have begun to ask what factors can overcome it. One answer appears to be motivational incentives. That is, when people have a good reason to self-regulate, they can perform well despite ego depletion (Muraven & Slessareva, 2003). It appears that these incentives do not replenish the depleted resource, but rather they simply increase the person's willingness to expend what they have left. If depleted persons expend more resources self-regulating on a second task and then are confronted with a third, they show especially severe deficits (Muraven et al., 2006; also DeWall, Mead, Vohs, & Baumeister, 2007).

Recent evidence suggests that positive emotion can at least temporarily counteract the effects of ego depletion. A series of studies by Tice, Baumeister, Shmueli, and Muraven (2007) induced positive emotional states among some participants between the initial, depleting task and the dependent measure of self-regulatory performance. Performance on the second task was significantly improved by the infusion of positive emotion. That is, the standard ego depletion effect was effectively eliminated (reduced to nonsignificance) by positive emotion. Again, we assume that a dose of positive emotion cannot replenish the depleted resource, but it can make people willing to expend more of what they have left.

Conclusion

Thus, emotion can have both beneficial and detrimental effects on self-regulation. It would be reckless of us to claim that we have exhausted all the possible ways that emotion can affect self-regulation, and indeed it seems a safe bet that research will continue to uncover new ways in which emotion and self-regulation interact. Nonetheless, what we have presented should be already sufficient to reject any simple or monolithic explanation. Popular stereotypes that emotional distress ruins or impairs self-regulation have some truth to them but also fail to acknowledge the positive, beneficial effects.

Taking the broad view, it appears that emotion can impair self-regulation by narrowing the focus of attention and narrowing the sense of the present (see Vohs & Schmeichel, 2003), so that people give priority to activities that will feel good. Unfortunately, these are often precisely the activities that people ordinarily seek to restrain, and so the urgent quest to find a pleasant antidote to emotional distress may lead straight to the temporary abandonment or violation of important programs of self-control. Emotion can also interfere with self-regulation in relatively subtle ways, such as by altering the processing of information. During emotional states, people tend to downplay or ignore some kinds of information, notably probabilistic information. Insofar as such information is helpful to self-regulation, its neglect contributes to self-regulation failure.

On the positive side, emotion appears to serve vital informational functions in aiding self-regulation. In particular, anticipated emotion can guide behavior toward desired goals. Emotion (whether felt or anticipated) may signal the need for self-regulation, such as in a feedback loop control system. Emotions may also signal progress toward goals or the lack of progress.

Last, we have reported some evidence that positive emotions can help counteract one common cause of self-regulation failure, namely ego depletion. Self-regulation relies on a limited resource akin to a strength or energy, and when that resource has been depleted such as by making decisions or exerting self-control in another context, people tend automatically to reduce their self-regulatory efforts as a way of conserving their remaining resources. Positive emotion makes them willing to expend their remaining resources and thus can facilitate self-regulation in the short run.

The view of emotion as a feedback system (see Baumeister et al., 2007) suggests that a large proportion of human behavior, potentially almost all of it, can be regarded as emotion regulation. That is, to the extent that people choose their behaviors on the basis of the emotional outcomes they anticipate, they are behaving in order to regulate their emotions. This may sound like an egocentric and potentially dangerous guide for behavior, but in fact it may be highly adaptive, especially if the person is reasonably well socialized and therefore will feel the socially and culturally appropriate emotions. But such a system can only work if people learn to predict with some accuracy what emotions they are likely to feel. Thus, emotional learning may be an important key to successful self-regulation.