CHAPTER 31

Emotion Regulation

JAMES J. GROSS

Have you ever gotten so angry that you've done something really spiteful? Or felt so much love for your child that you've bored someone to tears by recounting your child's exploits? Or been so sad that life has temporarily lost its meaning? If your answer to any of these questions is "yes"—or if anyone you care about would answer "yes"—then this chapter is for you.

The focus of this chapter is *emotion regulation*, which refers to how we try to influence which emotions we have, when we have them, and how we experience and express these emotions (Gross, 1998b). Although the topic of emotion regulation is a relatively late addition to the field of emotion, a concern with emotion regulation is anything but new. Emotion regulation has been a focus in the study of psychological defenses (Freud, 1926/1959), stress and coping (Lazarus, 1966), attachment (Bowlby, 1969), and self-regulation (Mischel, Shoda, & Rodriguez, 1989).

What is new are the theoretical and empirical advances that have been made in recent years, thanks to a dramatic increase in attention to this topic (Gross, 2007). Until the early 1990s, there were just a few citations a year containing the phrase "emotion regulation." For example, in 1990, PsycINFO listed 4 citations containing the phrase "emotion regulation." Since this time, there has been an astonishing increase in citations: In 2005, for instance, the PsycINFO citation count was 671. Although citation counts are an imperfect metric, the 150-fold-plus increase in citations over this 15-year period clearly reflects the growing popularity of this topic.

Popularity is a wonderful thing, but despite this increased attention, there remains an unfortunate degree of confusion about what emotion regulation is (and isn't), and what effects (if any) emotion regulation has on important outcomes. My goal in this chapter is to provide a conceptual map and readable introduction useful to anyone who is interested in emotion regulation. In the first section, I provide an orientation to emotion and emotion regulation, and sketch a process model of emotion regulation that my colleagues and I have found useful in our work. In the second section, I describe

the five major families of processes that populate our conception of emotion regulation. In the third section, I consider three exciting growth points for the field: (1) an emerging understanding of the way particular beliefs encourage or discourage specific forms of emotion regulation; (2) an increasing appreciation of automatic (as opposed to effortful) forms of emotion regulation; and (3) a growing sense of the implications the field of emotion regulation has for the diagnosis and treatment of psychopathology.

EMOTION AND EMOTION REGULATION

Contemporary emotion theories emphasize the ways emotions facilitate adaptation by readying behavioral responses (Tooby & Cosmides, Chapter 8, this volume), enhancing memory for important events (Phelps, 2006), and guiding interpersonal interactions (Keltner & Kring, 1998). However, emotions are by no means always helpful. They can hurt us as well as help us (Parrott, 1993). They do so when they are of the wrong type, when they come at the wrong time, or when they occur at the wrong intensity level. At times such as these, we may be highly motivated to try to regulate our emotions. To understand how emotions are regulated (or become dysregulated), we first must consider the target of emotion regulation—namely, emotion itself.

What Is Emotion?

As with many of the terms we use in psychology, "emotion" was lifted from everyday discourse. For this reason, it has fuzzy boundaries rather than classical edges, and it refers to an astonishing array of happenings—from the mild to the intense, the brief to the extended, the simple to the complex, and the private to the public. Irritation when a shoelace breaks counts. So do amusement at a joke, anger at political oppression, surprise at a friend's new "look," grief at the death of a parent, and guilt over a moral lapse. This incredible diversity has led many theorists to despair of ever deriving a tidy classical definition of emotion—one that lists the necessary and sufficient conditions for something to qualify as a "real" emotion. Instead, they have begun to think of emotion in prototype terms, and have identified three key features.

One commonly described feature has to do with what gives rise to emotions. Emotions are thought to arise when an individual attends to a situation and understands it as being relevant to his or her current goals (Lazarus, 1991a). It's important to appreciate that these goals may be enduring and central to the person's self-concept (wanting to be trustworthy) or transient and peripheral (wanting the last slice of cake). They may be conscious and complicated (wanting to survive the rigors of graduate school) or unconscious and simple (wanting to distance oneself from a snake). They may be widely shared and understood in a given culture (wanting to be a good son/daughter) or idiosyncratic and somewhat mysterious to others (wanting to travel on a UFO). Whatever the goal, and whatever meaning a situation has for the individual, it is this meaning that gives rise to emotion. As either the goal or meaning change over time (due to a change in the person, the situation, or the meaning the situation holds for an individual), the emotion will also change.

A second commonly described feature of emotion has to do with its constituent elements. Emotions are generally conceptualized as multifaceted, embodied phenomena that involve loosely coupled changes in the domains of *subjective experience*, *behavior*, and *peripheral physiology* (Mauss, Levenson, McCarter, Wilhelm, & Gross, 2005). The experiential aspect of emotion—or what it feels like when we have an emotion—is so tightly bound up with what we mean by emotion that in everyday speech, the terms "emotion" and "feeling" are often used interchangeably. However, surprisingly little is known about the psychological and biological underpinnings of emotion experience (Barrett, Mesquita, Ochsner, & Gross, 2007), and there are many contexts in which there are dissociations between emotion experience and other aspects of an emotion (e.g., Bonanno, Keltner, Holen, & Horowitz, 1995). In addition to giving rise to subjective feelings, emotions also often make us more likely to do something (e.g., approach others, say something mean, cry) than we otherwise would have been (Frijda, 1986). These impulses to act in certain ways (and not to act in others) are associated with autonomic and neuroendocrine changes that both anticipate the associated

behavioral responses (thereby providing metabolic support for the action) and follow it, often as a consequence of the motor activity associated with the emotional response. As the many chapters of this volume attest, there remains considerable debate about which of these aspects of emotion should be prioritized, and how these aspects of emotion co-occur during emotion. For our purposes, it is enough to note that emotions often involve changes in each of these response domains.

A third commonly described feature of emotion has to do with its malleability. Emotions possess an imperative quality, in that they can interrupt what we are doing and force themselves upon our awareness (Frijda, 1988). However, emotions must compete with other responses occasioned by the situations we are in, and therefore do not automatically trump other possible responses to the situation. The malleability of emotion has been emphasized since William James (1884), who viewed emotions as response tendencies that may be modulated in a large number of ways. It is this third aspect of emotion that is most crucial for an analysis of emotion regulation, because it is this feature that gives rise to the possibility for regulation.

The "Modal Model" of Emotion

Because these three core features of emotion are emphasized in many different theories of emotion, I have found it useful to refer to them as constituting a consensual model or "modal model" of emotion (Barrett, Ochsner, & Gross, 2007; Gross, 1998a). According to this model, emotion arises in the context of a person–situation transaction that compels attention, has a particular meaning to an individual, and gives rise to a coordinated yet malleable multisystem response to the ongoing person–situation transaction. I believe that it is no accident that this heuristic "modal model" underlies lay intuitions about emotion, and also represents crucial points of convergence among researchers and theoreticians concerned with emotion.

In Figure 31.1, I present in schematic form the situation–attention–appraisal–response sequence specified by the modal model of emotion (with the organismal "black box" interposed between situation and response). This sequence begins with a psychologically relevant

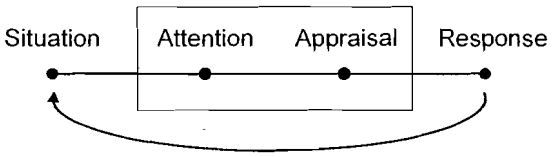

FIGURE 31.1. The "modal model" of emotion. From Gross and Thompson (2007). Copyright 2007 by The Guilford Press. Reprinted by permission.

situation, which is often external and hence physically specifiable. This situation is attended to in various ways, giving rise to appraisals that constitute the individual's assessment of—among other things—the situation's familiarity, valence, and value relevance (Ellsworth & Scherer, 2003). As noted above, the emotional responses generated by appraisals are thought to involve changes in experiential, behavioral, and physiological response systems. It is important to keep in mind that these responses often change the situation that gave rise to the response in the first place. For example, when someone appears embarrassed after committing a faux pas, others see this embarrassment, and are then more likely to forgive the social lapse (Keltner, 1995). One way to depict this recursive aspect of emotion is by an arrow that shows the response feeding back to (and modifying) the situation. The key idea here is that emotions can and often do change the environment, thereby altering the probability of subsequent instances of emotion.

What Is Emotion Regulation?

With this schematic conception of emotion in view, we are ready to turn to emotion regulation. It will come as no great surprise that like "emotion," the concept of "emotion regulation" is a slippery one. This is partly because the concept inherits all of the complexities that are inherent in the term "emotion." But the construct is confusing in a second way, in that it isn't clear whether it refers to how emotions regulate something else, such as blood pressure, memory, or parent–child interactions (regulation *by* emotions) or to how emotions are themselves regulated (regulation *of* emotions). Both usages have currency, but the problem with the first usage (regulation *by* emotions) is that one of the functions of emotion is the coordination of diverse response systems

(Levenson, 1999). Thus emotion regulation in this first sense is redundant with emotion, in that *all* instances of emotion would constitute emotion regulation. I therefore find the second usage more sensible (regulation *of* emotions), in which emotion regulation refers to the heterogeneous set of processes by which emotions are themselves regulated.

Another point of confusion is whether emotion regulation refers to intrinsic processes (Amy regulates her own emotions: regulation *in self*), to extrinsic processes (Amy regulates baby Bob's emotions: regulation *in other*), or to both. In general, researchers in the adult literature typically focus on intrinsic processes, whereas researchers in the developmental literature focus more on extrinsic processes (Gross & Thompson, 2007). In my view, it makes sense to include both forms of regulation, and to use the qualifiers "intrinsic" and "extrinsic" whenever clarification is needed, such as when Amy helps Bob to regulate his anger (extrinsic emotion regulation) in order to be able to calm down herself (intrinsic emotion regulation).

Putting aside for a moment the complexity associated with intrinsic versus extrinsic emotion regulation, what are people trying to accomplish when they regulate emotions? When we think of emotion regulation, many of the instances that leap to mind—at least in a Western cultural context—involve turning down (decreasing) the experiential and/or behavioral aspects of negative emotions such as anger, fear, and sadness (Gross, Richards, & John, 2006). This is not to say that positive emotions aren't regulated; they certainly are, as when we try to look less happy than we are about winning a hard-fought tennis game, or when we try to decrease feelings of attraction that (for whatever reason) we find objectionable. It's also important to note that emotion regulation needn't involve down-regulation. It can also involve maintaining or increasing emotion, as when we share good news with others, thereby prolonging its effects (Langston, 1994), or even—in the context of negative emotion—when bill collectors try to increase their anger to help collect delinquent accounts (Sutton, 1991).

Many of these emotion regulation goals are readily understood in hedonistic terms: People are motivated to avoid pain and seek pleasure. But if emotion regulation involves increasing/initiating and decreasing/stopping negative or positive emotions, it is not clear how we can explain the "odd" cells (increasing negative emotion and decreasing positive emotion) on the basis of short-term hedonic considerations. Tamir (2005) has argued that hedonic considerations can sometimes be trumped by other considerations, such as whether a given emotion will help a person achieve his or her immediate objectives. One example is when individuals high (vs. low) in neuroticism try to increase their levels of negative emotion in order to maximize their performance on a demanding cognitive task. This finding suggests that emotions are regulated with a view to both how they feel and what they help us to do.

EMOTION REGULATION STRATEGIES

If "emotion regulation" refers to the processes by which we influence which emotions we have, when we have them, and how we experience and express these emotions, we face an embarrassment of riches. Many processes are involved in decreasing, maintaining, or increasing one or more aspects of emotion. Indeed, relevant processes range from changing one's job to calling one's mother to keeping a stiff upper lip. How should we conceptualize the potentially overwhelming number of processes involved in regulating our own or others' emotions?

My approach has been to undertake a conceptual analysis of the processes underlying diverse emotion regulatory acts. Using the modal model of emotion shown in Figure 31.1 as a starting point, I have argued that emotion regulatory acts may be seen as having their primary impact at different points in the emotion generative process (Gross, 2001). In particular, I have suggested that the modal model specifies a sequence of processes involved in emotion generation, each of which is a potential target for regulation. In Figure 31.2, I have redrawn the modal model, highlighting five points at which individuals can regulate their emotions. These five points represent five families of emotion regulation processes: situation selection, situation modification, attentional deployment, cognitive change, and response modulation.

Two complementary points should be made about this process model of emotion regulation. First, although this model makes a five-way distinction among emotion regulation processes, there are higher-order commonalities. For example, for some purposes, the first four emotion regulation families may be considered

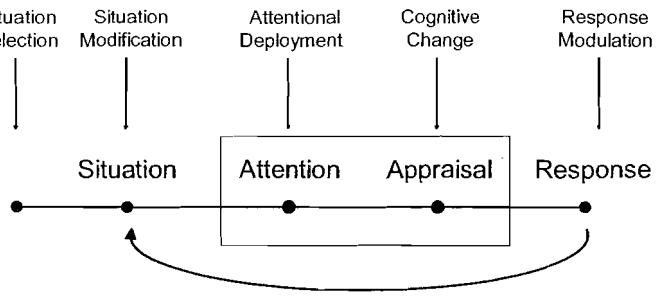

FIGURE 31.2. A process model of emotion regulation that highlights five families of emotion regulation strategies. From Gross and Thompson (2007). Copyright 2007 by The Guilford Press. Reprinted by permission.

"antecedent-focused," in that they occur before appraisals give rise to full-blown emotional responses. These may be contrasted with "response-focused" emotion regulation, which occurs after the responses are generated (Gross & Munoz, 1995; Gross & Thompson, 2007). The second point about these distinctions is that what someone does in everyday life to regulate emotions—such as going fishing with a buddy to cool down after a big fight with a spouse—often involves multiple regulatory processes. Nonetheless, I believe that this process model provides a conceptual framework useful for understanding the causes, consequences, and mechanisms underlying various forms of emotion regulation.

In the following sections, I selectively review research relevant to each of the five families of emotion regulation processes. My focus is on emotion regulation processes in adults (for considerations of developmental issues, see Charles & Carstensen, 2007; Eisenberg & Morris, 2002; Gross & Thompson, 2007; Thompson, 1994; for considerations of individual differences in emotion regulation, see John & Gross, 2004, 2007).

Situation Selection

The first type of emotion regulation we'll consider is *situation selection*, which I've placed at the leftmost point in Figure 31.2 because it affects the situation to which a person is exposed, and thus shapes the emotion trajectory from the earliest possible point. Situation selection involves taking actions to make it more likely that we'll be in a situation we expect will give rise to the emotions we'd like to have (or less likely that we'll be in a situation that will give rise to emotions we'd prefer not to have).

Of course, many of our decisions about which appointments to keep, where to go to lunch, whom to spend time with, and what to do after work have implications for how we'll later feel, but these decisions are not always shaped by our estimates of which emotions these situations will engender. "Situation selection" refers to the subset of these choices that are taken with a view, at least in part, to the future consequences of our actions for our emotional responses. Often we are aware of the trajectory our emotions are likely to take during a given period of time (e.g., a day) if we don't take steps to influence our emotions. This awareness may motivate us to take steps to alter the default emotional trajectory via situation selection. Thus we may try hard to avoid situations we know will bring us face to face with an ex-spouse or ex-lover, or we may actively seek out situations that will provide us with contact with friends when we need a chance to vent and/or share positive emotions.

These examples make situation selection sound like a rather simple calculus. It is not. Indeed, there is a growing appreciation of just how difficult it is either to remember how we used to feel, or to predict how we will feel. When we look backward in time, there is a profound gap between what might be called the "experiencing self" and the "remembering self" (Kahneman, 2000). In one of the more colorful illustrations of this gap, Redelmeier and Kahneman (1996) studied patients who were undergoing colonoscopies (a decidedly unpleasant procedure in which a probe is inserted into one's innermost recesses) and provided pain ratings at regular intervals throughout the procedure. They found that even when the procedure was longer (and thus gave rise to more "units" of experienced pain), participants

later expressed a preference for the longer procedure when it ended with lower levels of pain.

This "duration neglect" is also evident in affective forecasting, when we look forward rather than backward in time. In one illustration of this phenomenon, Gilbert, Pinel, Wilson, Blumberg, and Wheatley (1998) asked participants how they would feel if they broke up with a partner or were denied academic tenure. They found that participants did a good job of figuring out *what* they would feel. Where participants miscalculated was in figuring out how long they would feel that way. In particular, participants dramatically overestimated how long their negative responses would last. These backward- and forward-looking biases hint at the complexity and the fallibility of the judgments involved in using situation selection.

Even if we had perfect information regarding past and future emotional responses to situations, there would remain the thorny issue of how to appropriately weigh short-term benefits of emotion regulation versus longer-term costs. For example, take Harold, a mild-mannered person who hates angry confrontations. If he is interested in maximizing short-term psychological comfort, it seems obvious that he should avoid situations in which angry confrontations will occur. But is this the best long-term strategy? What if his avoidance of conflict is giving implicit permission to others to bully him, and to behave in generally unreasonable and toxic ways to him? For his long-term (rather than short-term) happiness, it might be better to seek out an opportunity for a confrontation—even an angry one—if this meant that his work situation were changed in ways that made it a better place for him. Because of the complexity of these tradeoffs, situation selection often requires the perspective of others, whether parents, friends, or therapists.

Situation Modification

Potentially upsetting situations—such as making a social gaffe or seeing the family television go dead just before a favorite show is to start—do not inevitably lead to negative emotional responses. After all, one can always make a joke of one's social lapse or play a family game instead of watching television. Such efforts to modify the situation directly so as to alter its emotional impact constitute a second form of emotion regulation, shown next in line in Figure 31.2. In the stress and coping tradition, this type of emotion regulation is referred to as "problem-focused coping" (Lazarus & Folkman, 1984) or "primary control" (Rothbaum, Weisz, & Snyder, 1982).

What forms may situation modification take? When a romantic interest comes over for dinner, it may take the form of mood lighting, music, and the strategic excision of unflattering memorabilia. Situation modification may also take the form (with children) of laying out games in a way that will ensure a smooth play date, helping with scaffolding that will allow them to solve a difficult problem, (partially) absenting oneself when their friends come over, or reinforcing one's limits via clear emotion expressions. The last case is particularly interesting theoretically, because it's a case in which emotion expressions themselves can be a potent extrinsic form of emotion regulation. This is because emotional expressions have important social consequences: If one's partner suddenly looks sad, this can shift the trajectory of an angry interaction as one pauses to express concern, apologize, or offer support.

Given the vagueness of the term "situation," it is sometimes difficult to draw a bright line between situation selection and situation modification. This is because efforts to modify a situation may effectively call a new situation into being. Also, although I have previously emphasized that situations can be external or internal, situation modification (as I mean it here) has to do with modifying external physical environments. I consider efforts at modifying "internal" environments (i.e., cognitions) in the section on cognitive change below.

Attentional Deployment

The first two forms of emotion regulation—situation selection and situation modification—both help to shape the situation to which an individual will be exposed. However, it is also possible to regulate emotions without actually changing the environment. Situations have many aspects, and *attentional deployment* refers to influencing emotional responding by redirecting attention within a given situation. Attentional deployment is thus an internal version of situation selection, in that attention is used to select which of many possible "internal situations" are active for an individual at any

point in time. In Figure 31.2, attentional deployment comes after situation modification in the emotion trajectory.

In one form or another, attentional deployment is used from infancy through adulthood, particularly when it is not possible to change or modify one's situation (Rothbart, Ziaie, & O'Boyle, 1992). It is used, for example, by children who are waiting for delayed rewards, and spontaneous use of attentional deployment powerfully affects success during delay of gratification (Mischel et al., 1989). Attentional deployment may also include physical withdrawal of attention (e.g., covering the eyes or ears), internal redirection of attention (e.g., through distraction), and responding to external redirection of attention (e.g., a parent's redirection of a hungry child by telling the child an interesting story). Two of the best-researched forms of attentional deployment are distraction and rumination.

"Distraction" involves a shift in attention either away from emotional aspects of the situation or away from the situation altogether, such as when an infant shifts its gaze during an overly intense emotional interaction (Stifter & Moyer, 1991). Distraction may also involve a change in internal focus, such as when an individual invokes thoughts or memories that are inconsistent with the undesirable emotional state. Distraction has often been studied in the context of pain, where it leads to increased activation of brain regions associated with cognitive control (such as lateral prefrontal cortical regions) and diminished activation of brain regions associated with pain generation (such as the insula) (Ochsner & Gross, 2005).

"Rumination" refers to a perseverative focus on thoughts and feelings associated with an emotion-eliciting event. Rumination on sad or angry events increases the duration and intensity of negative emotion (Bushman, 2002; Morrow & Nolen-Hoeksema, 1990; Ray, Wilhelm, & Gross, in press) and is associated with greater levels of depressive symptoms (Nolen-Hoeksema, Morrow, & Fredrickson, 1993; Spasojevic & Alloy, 2001). Unlike distraction, rumination involves a sustained focus on emotion-eliciting stimuli. Another point of difference is that while distraction can take the form of attention directed outwards, to competing stimuli, or inwards, to thoughts, rumination typically involves an inflexibility in inner-directed attention.

Cognitive Change

Even after a potentially emotion-eliciting situation has arisen and been attended to, emotion does not necessarily follow. This is because an emotion further requires that the individual imbue the situation with a certain kind of meaning. As noted above, emotion theorists have delineated the different appraisals that are thought to lead to different emotions (Scherer, Schorr, & Johnstone, 2001). *Cognitive change* (shown fourth in line in Figure 31.2) refers to changing one or more of these appraisals in a way that alters the situation's emotional significance, by changing how one thinks either about the situation itself or about one's capacity to manage the demands it poses.

One form of cognitive change that has received particular attention is reappraisal (Gross, 2002). "Reappraisal" involves changing a situation's meaning in such a way that there is a change in the person's emotional response to that situation. For example, take a situation in which an acquaintance breezes by us in the hall and seems to ignore our smile and wave of greeting. For many, a natural response in such a situation is to feel hurt or angry at this perceived snub. In this case, cognitive change may take the form of thinking about the acquaintance as distracted, or perhaps preoccupied with his or her own problems. Such an interpretation of the situation—whether objectively correct or not—can profoundly affect the quality (which emotion) as well as the quantity or intensity (how much emotion) of the subsequent emotional response.

To date, studies of reappraisal have focused on quantitative changes in emotion, particularly decreases in negative emotion. These studies have provided evidence that reappraisal leads to decreased negative emotion experience and expressive behavior (Dandoy & Goldstein, 1990; Gross, 1998a). Reappraisal has also been shown to lead to decreased startle responses (Dillon & LaBar, 2005; Jackson, Malmstadt, Larson, & Davidson, 2000), decreased neuroendocrine responses (Abelson, Liberzon, Young, & Khan, 2005), and decreased autonomic responses (Stemmler, 1997; but see Gross, 1998a). Importantly, comparable effects have been observed when research participants spontaneously use reappraisal, either in a negative-emotion-eliciting situation in the lab (Egloff, Schmukle, Burns, &

Schwerdtfeger, 2006), or in everyday life (Gross & John, 2003). These findings suggest that studies manipulating emotion regulation have ecological validity: They provide insights into reappraisal as it naturally occurs in everyday life.

Consistent with these behavioral and physiological findings, reappraisal in the service of emotion down-regulation is associated with decreased activation in subcortical emotion-generative regions (such as the insula and amygdala), as well as increased activation in dorsolateral and medial prefrontal regions associated with cognitive control (Levesque et al., 2003; Ochsner, Bunge, Gross, & Gabrieli, 2002; Ochsner et al., 2004). When reappraisal is used in the service of emotion up-regulation, similar prefrontal regions are activated, but in this context (as one might expect), there are increases rather than decreases in activation of emotion-generative structures such as the amygdala (Ochsner & Gross, 2004; Schaefer et al., 2002). As our process model would predict, activations in prefrontal regions associated with the top-down control of emotion seem to occur relatively early (in the first few seconds), whereas the downstream consequences of decreased experience and behavior seem to last considerably longer (Goldin, McRae, Ramel, & Gross, in press).

If reappraisal occurs relatively early in the emotion-generative process, we might expect that using reappraisal would not interfere with other ongoing cognitive processes. This is just what we've found in a series of studies that have tested whether reappraisal impairs subsequent memory for information presented during the reappraisal period (Richards & Gross, 1999, 2000, 2006). Findings from these studies, which have used slides or films to elicit emotion, and have used a variety of techniques to probe incidental memory, show that reappraisal does not compromise later memory for material presented while a participant was engaging in reappraisal (relative to not using reappraisal). We have also found that when unacquainted pairs of participants interacted socially, there are no signs of social disruption when one member of a dyad is covertly instructed to engage in cognitive reappraisal during the interaction (Butler et al., 2003). Taken together, these findings suggest that reappraisal intervenes early in the emotion-generative process, and alters the experiential, behavioral, and physiological components of the emotional response without incurring any appreciable costs.

Response Modulation

Response modulation, the last of the emotion regulation families, is shown on the right side of Figure 31.2. As this placement indicates, it occurs late in the emotion-generative process, after response tendencies have been initiated. "Response modulation" refers to influencing physiological, experiential, or behavioral responses relatively directly. For example, exercise and relaxation may be used to decrease physiological and experiential aspects of negative emotions.

One of the best-researched forms of response modulation is "expressive suppression," which refers to attempts to decrease ongoing emotion-expressive behavior (Gross, 2002). Examples of suppression abound, including our efforts to hide the anger we feel toward a boss, the anxiety we feel during an interview, or the amusement we feel at a coworker's decidedly politically incorrect joke. One reason suppression has attracted interest is that there are two opposing ideas about what happens when emotions are suppressed (Gross & Levenson, 1993). One idea is that behavioral expressions of emotion constitute a channel for discharging emotion. According to this "hydraulic" model, if emotions are denied expression, they will leak out elsewhere—for example, as increased physiological responses. A second idea, however, leads to opposite conclusions about the effects of suppression. According to this "facial feedback" model, behavioral expressions of emotion (such as facial expressions) actually serve to amplify the emotional response; thus if they are inhibited, the emotion itself will be muted.

Empirical studies of expressive suppression have yielded findings that conform neatly to neither of these two models. On the one hand, participants who have been instructed to suppress their emotions (during emotion-eliciting slides, films, or conversations) have shown increases in sympathetic activation of the cardiovascular system, as indexed, for example, by measures that reflect blood pressure (Demaree et al., 2006; Gross, 1998a; Gross & Levenson, 1993, 1997; Harris, 2001). On the other hand, when asked to suppress their emotions, participants report feeling either comparable or de-

creased levels of emotion (with decreases occurring more commonly for positive emotion) (Goldin et al., in press; Gross, 1998a; Gross & Levenson, 1993, 1997; McCanne & Anderson, 1987; Stepper & Strack, 1993; Strack, Martin, & Stepper, 1988).

Neurally, only one study to date has been conducted on expressive suppression (Goldin et al., in press). In this study, participants were asked to suppress their ongoing emotion-expressive behavior in the scanner during 15-second film segments that elicited intense levels of disgust. Findings indicated that suppression led to robust increases in the activation of dorsal and medial prefrontal regions associated with cognitive control, as well as to increased activation in emotion-generative regions such as the amygdala. Importantly, as the process model of emotion regulation would predict, these activations were evident late in the induction period, suggesting that suppression was associated with ongoing cognitive activity as the participants effortfully tried to manage each emotional impulse as it arose throughout the course of each film.

If this conception of expressive suppression is correct, we might expect that unlike reappraisal, suppression should have clear cognitive and social costs. In a series of studies, this is precisely what we have found. In studies of memory, we have repeatedly found that suppression (compared to no emotion regulation) leads to worse memory for material presented during the suppression period (Richards & Gross, 1999, 2000). Indeed, the degree of memory impairment associated with suppression was as large as when we instructed participants to distract themselves as much as possible during the presentation of information (Richards & Gross, 2006). In studies of social interactions in the laboratory, we have similarly found that suppression is associated with significant social costs: Partners of suppressors report less comfort and ease with their interaction partners (Butler et al., 2003). As with the reappraisal findings, we would note that the costs that have been associated with instructed suppression in the laboratory also seem to be evident when suppression is used spontaneously in the laboratory (Egloff et al., 2006; Richards & Gross, 2006); during an important life transition, the transition to college (Srivastava, Tamir, McGonigal, John, & Gross, 2008); and in everyday life (Gross & John, 2003).

EMERGING DIRECTIONS IN THE STUDY OF EMOTION REGULATION

Now that we have reviewed the emotion-regulation processes shown in Figure 31.2, we can step back and take stock of where this field is now and where it is going. Clearly, this is a time of unmatched excitement for the field of emotion regulation. There has never before been such a focused scientific effort to examine emotion regulation processes, nor has there been such a variety of perspectives brought to bear. Because emotion regulation lies at the intersection of the major subareas of psychology, it benefits from—and contributes to—developments in biological, cognitive, developmental, personality, social, and clinical areas (Gross, 1998b, 2007).

In the following sections, I consider three promising new directions for research in emotion regulation, each of which seems likely to broaden and extend the way we think about emotion regulation. The first concerns the cognitive antecedents of emotion regulation; the second concerns the boundaries of emotion regulation; the third concerns the implications emotion regulation research may have for understanding psychopathology. Although by no means exhaustive, these three selections exemplify the promise of emotion regulation research.

Beliefs and Emotion Regulation

One intriguing puzzle is *why* people use one emotion regulation strategy rather than another. If some strategies are associated with generally beneficial consequences (such as reappraisal), while others are associated with generally harmful consequences (such as suppression), why doesn't everyone use reappraisal and not suppression? One possibility, of course, is that people differ in their emotion regulation goals. Thus some people may want to increase high-arousal positive emotions, whereas others may want to decrease these emotions. This possibility is consistent with growing evidence of cultural differences in emotion regulation goals (Mesquita & Albert, 2007). For example, in individualistic cultural contexts, people generally seek out high-arousal positive emotional states; in collectivistic cultural contexts, people generally seek out low-arousal positive emotional states (Tsai, Knutson, & Fung, 2006).

But what about when emotion regulation goals are shared (e.g., when people wish to decrease their sadness)? How can we explain why people differ even when they are pursuing the same emotion regulation goal? One interesting possibility is that people may differ in their *beliefs* regarding emotion and emotion regulation, and these differences may in turn shape whether people try to regulate their emotions, and (when they do so) which emotion regulation strategies they employ. This idea derives from the "lay theories" perspective, a perspective that draws inspiration from the social-cognitive approach to personality (Molden & Dweck, 2006). The lay theories perspective holds that people differ in the assumptions they make about themselves and the social world (these constitute their "lay theories"), and it seeks to determine whether and how such lay theories influence important life outcomes.

One particular focus of the work on lay or implicit theories has been the distinction between "entity theories" (which hold that attributes such as personality and intelligence are fixed and stable) and "incremental theories" (which hold that such attributes are dynamic and malleable) (Dweck, 1986, 1999; Dweck, Chiu, & Hong, 1995). Individuals who hold incremental beliefs make flexible, contextual interpretations of events; when challenged, they make assertive attempts at self-regulation, increasing the chances of successful behavior. In contrast, individuals who hold entity beliefs view attributes as fixed and impossible to control; when challenged, they make fewer attempts at self-regulation, leading to self-regulation failure.

Prior work on lay theories has focused on intelligence, but we (Tamir, John, Srivastava, & Gross, 2007) wondered whether extending this work to the domain of emotion might help to unravel the mystery of why people differ so dramatically in their use of successful emotion regulation strategies. We (1) hypothesized that people differ in whether they believe emotions are generally malleable (incremental theorists) or fixed (entity theorists), and (2) suggested that incremental theorists should be more likely than entity theorists to use antecedent-focused emotion regulation strategies such as reappraisal. To test these hypotheses, we devised a measure of implicit beliefs regarding emotion, and administered it to students facing a crucial life transition—namely, the transition to college.

Findings revealed that participants did differ in their beliefs about emotion, and that participants with incremental as opposed to entity views of emotion reported greater emotion regulation self-efficacy and greater use of reappraisal. By the end of freshman year, participants with incremental views of emotion reported greater levels of positive emotions, lesser levels of negative emotions, higher levels of well-being, and lower levels of depression. Incremental participants also had higher levels of social adjustment and lower levels of loneliness.

These findings indicate that participants' naïve beliefs concerning their emotions—as either fixed or malleable—influenced how they regulated their emotions, and how they fared in an important life transition. Although this finding clearly must be replicated in other samples and in the context of other transitions, one important emerging direction for research in this area is the study of the role played by beliefs about emotion and emotion regulation in shaping emotion regulation choices and success.

Automatic versus Effortful Emotion Regulation

Many of the examples of emotion regulation that come to mind—and the majority of examples offered so far in this chapter—involve effortful and conscious attempts to down-regulate negative emotion. As we have discussed, however, emotion regulation can occur anywhere in the 2×2 matrix formed by crossing negative and positive emotion (say, as columns) with up- and down-regulation (say, as rows). Each of these dimensions can be further fleshed out, too. Additional columns can be added for those who prefer to think in discrete-emotion terms (e.g., pride, amusement, sadness, disgust), and additional rows for those wanting to do fuller justice to the complexities of the temporal dynamics of emotion (e.g., maintaining emotion). This sounds complicated enough—even before we recall the many families of regulation strategies that are used to achieve each of these types of change in emotion described by our 2 (or more) $\times$ 2 (or more) matrix—and we may be tempted to stop here. But one other dimension of variation has recently begun to be explored systematically, and this concerns variation in whether a given episode of emotion regulation is relatively effortful and conscious or relatively automatic

and unconscious (Bargh & Williams, 2007; Mauss, Bunge, & Gross, 2007).

Just what does "automatic" mean in this context? Contemporary dual-process models contrast "automatic" (also called "nonconscious," "implicit," or "impulsive") processes with "deliberate" (also called "controlled," "conscious," "explicit," or "reflective") processes (e.g., Strack & Deutsch, 2004). Whereas deliberate processes require attentional resources, are volitional and conscious, and are goal-driven, automatic processes require neither attention nor intention, occur outside of awareness, and are stimulus-driven. Although often framed as clear opposites, many researchers think that these processes are located on a continuum from conscious, effortful, and controlled regulation to unconscious, effortless, and automatic regulation (Shiffrin & Schneider, 1977).

The notion that relatively high-level self-regulatory processes such as emotion regulation can be performed automatically may seem counterintuitive (Bargh, 2004). However, research on automatic goal pursuit has challenged the notion that "higher-level" processes can only take place in a deliberate fashion, and it appears that the full sequence of goal pursuit—from goal setting to the completion of the goal—can proceed outside of conscious awareness. In a series of studies, Bargh and colleagues have shown that goals can indeed be activated and executed without the intervention of conscious awareness. For example, they implicitly primed goals such as the intention to cooperate with others or to perform well on a cognitive task, and found that subsequently participants behaved in agreement with these goals, without knowing *why* or even *that* they were acting this way (Bargh, Gollwitzer, Lee-Chai, Barndollar, & Trötschel, 2001).

To see whether emotion regulation could also operate automatically, we (Mauss, Cook, & Gross, 2007) manipulated automatic emotion regulation by priming emotion control versus emotion expression with an adaptation of the Sentence Unscrambling Task (e.g., Bargh, Chen, & Burrows, 1996; Bargh et al., 2001; Srull & Wyer, 1979). This task unobtrusively exposed participants to words relating to emotion control or expression, thereby *implicitly* activating (priming) related concepts and goals. Participants were then instructed by an "unfriendly" and "arrogant" experimenter to repeatedly perform a boring yet cognitively straining task.

As expected, most participants became angry during the task. Of particular interest, however, was the finding that participants primed with emotion control reported less anger than did participants primed with emotion expression. These results have been corroborated by an individual-difference study that employed an emotion regulation implicit association test; this study showed that participants with positive implicit associations with emotional control felt less angry when provoked, and exhibited an adaptive challenge response (rather than a maladaptive threat response), characterized by greater sympathetic activation, greater cardiac output, and lower total peripheral resistance (Mauss, Evers, Wilhelm, & Gross, 2006).

Although these initial studies are promising, it's important to note that it is too early to conclude that all forms of automatic emotion regulation are benign or helpful. The venerable clinical literature on repression (e.g., Freud, 1936) has long cautioned that certain forms of automatic emotion regulation—such as when someone struggles to keep anxiety out of awareness—may have maladaptive consequences ranging from personality disturbances to psychosomatic illnesses. One of the challenges we face in understanding automatic emotion regulation is developing methods for assessing and manipulating different automatic emotion regulation processes. Difficult as this challenge is, work in this area is badly needed to clarify the types and timing of automatic emotion regulation processes that are helpful versus unhelpful.

Emotion Regulation and Psychopathology

Inappropriate emotional responses are implicated in a large number of forms of psychopathology (Gross & Levenson, 1997; Thoits, 1985). Indeed, more than half of the Axis I clinical disorders (such as the anxiety disorders and mood disorders), and all of the Axis II personality disorders (such as borderline personality disorder), involve problematic emotional responses (American Psychiatric Association, 2000). What's proven more difficult than one might expect, however, has been moving from broad statements such as these to specific empirically grounded insights concerning how differences in emotional reactivity and/or emotion

regulation contribute to different forms of psychopathology (Rottenberg & Gross, 2003; Rottenberg & Johnson, 2007), and how therapeutic interventions might be used to correct dysregulated emotion (Moses & Barlow, 2006).

Take major depressive disorder. This disorder is a devastating psychiatric condition whose definition includes increased negative affect and anhedonia (diminished positive affect). From this definition, it might seem obvious that depression leads to disrupted emotion regulation (Gross & Munoz, 1995). However, there are no fewer than three competing views of how depression disrupts emotional responding, and without clarity about the nature of the problematic emotions, it is very difficult to draw conclusions about the role of emotion regulation (Rottenberg, Gross, & Gotlib, 2005). The first view is that depression involves diminished emotional reactivity to positive situations. In support of this "positive attenuation" view, convincing evidence from a variety of induction contexts suggests that individuals who are depressed respond with less positive emotion than individuals who are not depressed. The second view is that depression involves increased negative emotional reactivity. Like the positive attenuation hypothesis, the "negative potentiation" view seems to follow directly from the very definition of depression, as well as from major theories of depression (e.g., Beck, Rush, Shaw, & Emery, 1979). However, the preponderance of empirical evidence actually suggests that individuals who are depressed show lesser rather than greater emotional reactivity.

These findings suggest a third view—namely, the "emotion context insensitivity" view (Rottenberg et al., 2005). This view derives from evolutionary accounts of depression as characterized by disengagement (Nesse, 2000), and sees emotional responses (whether negative or positive) as involving energetic engagement with the environment. In this view, depression leads to pervasive disengagement, and hence to diminished levels of both positive and negative emotional reactivity. Consistent with this third view, Rottenberg and colleagues (Rottenberg, Kasch, Gross, & Gotlib, 2002; Rottenberg & Johnson, 2007) have presented studies showing that relative to either formerly depressed or never-depressed participants, depressed individuals showed less reactivity to happy and sad stimuli.

Are the challenges associated with specifying precise emotion and emotion regulation deficits unique to depression? It appears that they are not. Take social anxiety disorder (social phobia), another common and debilitating psychiatric condition, which by definition includes high levels of anxiety in social contexts. Given this definition, it seems obvious that social anxiety involves heightened levels of experiential, behavioral, and physiological responses in social contexts. To test this hypothesis, individuals who were either high or low in social anxiety were asked to give a speech on a difficult topic. Participants rated how anxious they felt at several points during the session. They also rated their physiological responses (e.g., how much their hearts were racing), and objective physiological measures were taken throughout the study (Mauss, Wilhelm, & Gross, 2004).

As might be expected, compared to low-trait-anxiety participants, high-trait-anxiety participants said that they were feeling more anxious, and that their bodies were responding much more violently. Intriguingly, however, there were no differences in the observed physiological responses between the high- and low-anxiety participants. Participants in both groups showed expected increases in various indicators of sympathetic nervous system responding, but there was no difference between the groups, either in the magnitude of their responses to the initial speech or in their responses to a second speech (Mauss, Wilhelm, & Gross, 2003). Although it is possible that these findings are specific to nonclinical samples, the available evidence does not suggest this is so. Like the findings from major depressive disorder, these findings from social anxiety hint at the complexities that lie ahead as we try to discern the ways in which emotion and emotion regulation are disrupted in various forms of psychopathology.

SUMMARY

Emotions have been said to represent the "wisdom of the ages" (Lazarus, 1991b, p. 820), and functionalist approaches to emotion have rightly emphasized the many adaptive benefits of emotion. But even the wisest guides have their limits, and since the early 1990s there has been a dramatic increase in research attention

to how emotions can be regulated so as to help people benefit from what is useful about them, but avoid what is not useful.

In this chapter, I have used the "modal model" of emotion to highlight the idea that emotions arise in the context of person–situation transactions that compel attention, have particular meaning to an individual, and give rise to coordinated yet flexible sets of experiential, behavioral, and physiological responses to the ongoing person–situation transactions. Using the modal model as a jumping-off point, I have described a process model of emotion regulation that my colleagues and I have found useful, and have argued that this model provides a valuable conceptual framework for organizing and directing research on emotion regulation processes. Within this framework, I have distinguished five families of emotion regulation processes that have their primary impact at different points in the emotion-generative process. For each of these families of processes, I have selectively sampled recent research findings. Taken together, these findings suggest that different emotion regulation processes have different consequences; what seems crucial, therefore, is using a strategy that matches one's goals.

One reason why research in this area is so compelling is that we all come face to face with emotion regulation issues in our lives—whether in handling our own emotions or those of family members, friends, or work associates. Emotions matter, and when emotions go wrong, we want to do something about it. Another reason why emotion regulation research is attracting so much attention is that it is a "poster child" for two broad scientific trends: multilevel/multispecialty collaboration, and the bidirectional interplay between basic research and clinical application. Of the many growth points in this field, I have identified three as particularly exciting: (1) the role of beliefs in shaping when and how we try to regulate our emotions; (2) the largely unexplored realm of automatic emotion regulation processes; and (3) the bridges that are beginning to be built between basic research on emotion and emotion regulation on the one hand, and clinical science and practice on the other. Findings from these research areas, and others, promise to transform how we think about the intricate dance in which we at once regulate and are regulated by our emotions.

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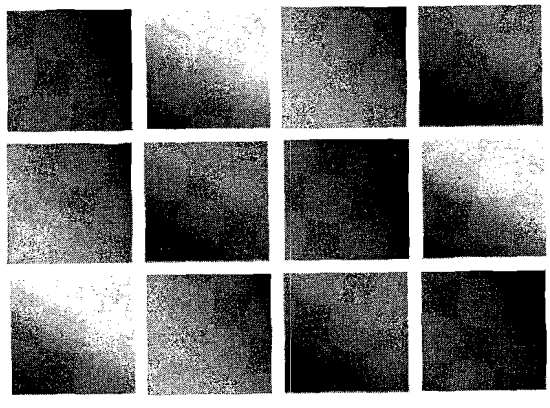

EDITED BY MICHAEL LEWIS,
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