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**Emotion Regulation:  
Conceptual Foundations**

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## Abstract

The topic of emotion regulation has now come into its own. Books, articles, and conferences related to emotion regulation seem to be everywhere. Enthusiasm has outpaced theoretical advances, however, and there is considerable confusion about what is even meant by “emotion regulation.” In this chapter, we seek to provide a conceptual foundation for the field. To this end, we first set emotion in the context of other affective processes. Next, we relate emotion regulation to other forms of self-regulation. We then present a process model of emotion regulation that distinguishes five points in the emotion-generative process at which emotions may be regulated. Using this model as our framework, we review research drawn from developmental and adult literatures related to each of five major families of emotion regulatory processes. We conclude by addressing several of the most pressing questions facing the field.

## **Emotion Regulation: Conceptual Foundations**

Standing in a long line at the supermarket check-out counter probably isn't anyone's idea of a good time. But when the line's glacial pace is further slowed by a gossipy clerk, annoyance turns to anger, and changes become apparent in one's thoughts, feelings, behavior, and indeed, throughout one's body. One's blood pressure rises, one's fingers grip the cart more tightly, and one prepares a scathing remark for the clerk. But, at the last moment, the thought crosses one's mind that a cutting comment will make a bad situation worse. And so one opts to bite one's tongue and keep one's mouth shut as the dual decisions of credit or debit, paper or plastic are made.

Quotidian acts of emotion regulation such as this constitute one important thread in the fabric of civilization. After all, civilization is defined by coordinated social interchanges that require us to regulate how emotions are experienced and expressed. But what do people do to regulate their emotions? Are some ways of regulating emotions more successful than others? How do temperament and learning interact to shape an individual's unique style of emotion regulation? In this chapter, we provide a conceptual foundation for answering such questions as they arise in developmental and adult literatures relevant to emotion regulation.

Because a discussion of emotion regulation presupposes an understanding of what emotion is, we first consider emotion in the context of the larger family of affective processes to which it belongs. Next, we distinguish emotion regulation from other major forms of self-regulation. This prepares the way for our presentation of the framework we use to organize the many different types of emotion regulation. Using this framework, we review findings from

developmental and adult literatures. In the last section, we highlight some of the biggest challenges – and opportunities – for those interested in emotion and emotion regulation.

### *Emotions and Related Processes*

Contemporary functionalist perspectives emphasize the important roles emotions play as they ready necessary behavioral responses, tune decision making, enhance memory for important events, and facilitate interpersonal interactions. However, emotions can hurt as well as help. They do so when they occur at the wrong time, or at the wrong intensity level. Inappropriate emotional responses are implicated in many forms of psychopathology (Campbell-Sills & Barlow, this volume; Hinshaw, this volume; Linehan, this volume; Sher & Grekin, this volume), in social difficulties (Wranik, Barrett, & Salovey, this volume; Eisenberg, Hofer, & Vaughan, this volume; Shaver & Mikulincer, this volume), and even in physical illness (Sapolsky, this volume). Clearly, a great deal hinges on our ability to successfully regulate emotions.

To understand emotion regulation, we first need to know what is being regulated. This sounds simple, but emotion has proven famously difficult to pin down. Part of the problem is that what people seem to want when they try to “pin down” emotion is the list of necessary and sufficient conditions for something to qualify as an emotion. What is it that you must have for something to be an emotion (necessary conditions)? What is it that – if present – guarantees that something is an emotion (sufficient conditions)? Efforts to derive this sort of tidy classical definition run athwart the fact that *emotion* is a term that was lifted from common language, and that 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 with a gossipy clerk counts. So does amusement at a cartoon, anger at economic disparities around the world, surprise at a friend’s new tattoo, grief at the death of a loved one, and embarrassment at a child’s misbehavior.

A growing appreciation of the mismatch between the wish for definitional precision and the ill-bounded subject matter has led to an increasing reliance on prototype conceptions of emotion. Unlike classical conceptions, prototype conceptions emphasize typical features, which may or may not be evident in any given case, but whose presence makes it more likely that something is an emotion. In the next section, we focus on three core features of the emotion prototype that relate to emotion antecedents, emotion responses, and the link between emotion antecedents and responses.

### *Core Features of Emotion*

First, emotions arise when an individual attends to a situation and sees it as relevant to his or her goals. The goals that support this evaluation may be enduring (staying alive) or transient (seeing one's team win the game). They may be central to one's sense of self (being a good student) or peripheral (opening a cereal box). Goals may be conscious and complicated (plotting revenge on a classroom bully) or unconscious and simple (ducking a punch). They may be widely shared and understood (having friends) or highly idiosyncratic (finding a new beetle for one's collection). Whatever the goal, and whatever the source of the situational meaning for the individual, it is this meaning that gives rise to emotion. As this meaning changes over time (due either to changes in the situation itself, or to changes in the meaning the situation holds), the emotion will also change.

Second, emotions are multi-faceted, whole-body phenomena that involve loosely-coupled changes in the domains of *subjective experience*, *behavior*, and *central and peripheral physiology* (Mauss et al., 2005). The subjective aspect of emotion is, of course, so tightly bound up with what we mean by emotion that in everyday usage the terms emotion and feeling often are used interchangeably. But emotions not only make us feel something, they make us feel like *doing* something (Frijda, 1986). This is reflected in the language we use to describe emotions: We say we were "hopping mad," "moved to tears," or "frozen with fear". These impulses to act in certain

ways (and not act in others) are associated with autonomic and neuroendocrine changes that both anticipate the associated behavioral response (thereby providing metabolic support for the action) and follow it, often as a consequence of the motor activity associated with the emotional response. Maturational changes in behavioral and physiological response systems involved in emotion play a fundamental role in the developmental of emotion, particularly in infancy and early childhood.

Third, the multi-system changes associated with emotion are rarely obligatory. Emotions do possess an imperative quality – which Frijda (1986) has termed “control precedence” – meaning that they can interrupt what we are doing and force themselves upon our awareness. However, emotions often must compete with other responses that are also occasioned by the social matrix within which our emotions typically play out. 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 makes such regulation possible.

### *The Modal Model of Emotion*

Together, these three core features of emotion constitute what we refer to as the “modal model” of emotion: a person-situation transaction that compels attention, has particular meaning to an individual, and gives rise to a coordinated yet flexible multi-system response to the ongoing person-situation transaction. We believe that this modal model underlies lay intuitions about emotion (Barrett, Ochsner, & Gross, in press), and also – not coincidentally -- represents major points of convergence among researchers and theoreticians concerned with emotion.

In Figure 1, we present the highly abstracted and simplified 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

situation, which is often external, and hence physically specifiable, such as the checkout line in the opening example. However, psychologically relevant “situations” also can be internal, and based on mental representations. Whether external or internal, situations are 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). Different theorists have postulated different appraisal steps or dimensions, and these appraisal processes change developmentally, but there is broad agreement that it is these appraisals that give rise to emotional responses. As noted above, the emotional responses generated by appraisals are thought to involve changes in experiential, behavioral, and neurobiological response systems.

Like many other responses, an emotional response often changes the situation which gave rise to the response in the first place. One way to depict this recursive aspect of emotion is shown in Figure 2A, which has the response feeding back to (and modifying) the situation. A second way of depicting recursion is shown in Figure 2B. Here, time is on the X-axis, and three miniature versions of Figure 2A are drawn back-to-back. To make this idea of recursion more concrete, imagine two colleagues (or a parent and child) who are in situation S (disagreeing heatedly) when one emits response R (starts to cry). This emotional response substantially alters the interpersonal situation, transforming it into situation S’ (interacting with someone you’ve just made cry). This situation now gives rise to a new response R’ (an apology), which further transforms the situation, into situation S’’ (responding to someone who has just apologized). This situation, in turn, provokes still another response, R’’ (embarrassment), and so on. The key idea in Figures 2A and 2B is that emotions have a recursive aspect, in that they can lead to changes to the environment which have the effect of altering the probability of subsequent instances of that (and other) emotions.

*Emotions and Other Affective Processes*

Dozens of terms swirl about in the emotion literature (e.g., affect, reflex, mood, impulse, feeling, etc.), making communication difficult. Following Scherer (1984), we use *affect* as the superordinate category for various kinds of states that involve relatively quick good-bad discriminations (and thus have in common certain attentional processes and valence appraisals). These affective states include (a) general *stress responses* to taxing circumstances, (b) *emotions* such as anger and sadness, (c) *moods* such as depression and euphoria, and (d) *other motivational impulses* such as those related to eating, sex, aggression, or pain. Although these terms overlap in complex ways (see below), a simple depiction of these key terms is given as Figure 3.

How are these various affective processes distinguished? While both stress and emotion involve whole-body responses to significant events, stress typically refers to negative (but otherwise unspecified) affective responses, whereas emotion refers to both negative and positive affective states (Lazarus, 1993). Emotions also may be distinguished from moods (Parkinson, Totterdell, Briner, & Reynolds, 1996). Moods often last longer than emotions, and compared to moods, emotions typically have specific objects and give rise to behavioral response tendencies relevant to these objects. By contrast, moods are more diffuse, and although they may give rise to broad action tendencies such as approach or withdrawal (Lang, 1995), moods bias cognition more than they bias action (Clore, Schwarz, & Conway, 1994; Davidson, 1994; Fiedler, 1988). Emotions also may be distinguished from other motivational impulses (e.g., hunger, thirst, sex, pain). Like emotions, each of these motivational impulses has a valence and motive force, directing and energizing behavior (Ferguson, 2000). Emotions are different from other motivational impulses, however, because of the flexibility with which they are deployed and the much broader range of potential targets. Thus, one can distinguish approach from withdrawal

emotions, but it is difficult to more precisely specify the nature of an emotion's action tendency without referring to the context within which the emotion is taking place.

Lest these distinctions seem overly academic, consider the term “affect.” We place affect at the “top” of the hierarchy. Others use the terms affect and emotion interchangeably. For still others, affect is used to refer to the experiential (Buck, 1993; MacLean, 1990) or behavioral (American Psychiatric Association, 1994; Kaplan & Sadock, 1991) components of emotion. Clearly, there is no reason to expect neat distinctions among the many types of motivationally relevant affective processes with which we have been endowed. However, clarity regarding these constructs is a prerequisite for an analysis of how these various processes are (or are not) regulated.

### *Emotion Regulation and Related Processes*

Contemporary research on emotion regulation has its roots in the study of psychological defenses (Freud, 1926/1959), psychological stress and coping (Lazarus, 1966), attachment theory (Bowlby, 1969), and, of course, emotion theory (Frijda, 1986). Emotion regulation first gained currency as a distinct construct in the developmental literature (Campos, Campos, & Barrett, 1989; Thompson, 1990, 1991), and then subsequently in the adult literature (e.g., Izard, 1990; Gross & Levenson, 1993). Despite richly overlapping concerns, to date there has been a surprising lack of integration across developmental and adult literatures on emotion regulation.

On its own, the phrase “emotion regulation” is crucially ambiguous, as it might refer equally well to how emotions regulate something else, such as thoughts, physiology, or behavior (regulation by emotions) or to how emotions are themselves regulated (regulation of emotions). However, if a primary function of emotions is to coordinate response systems (Levenson, 1999), the first sense of emotion regulation is coextensive with emotion. For this reason, we prefer the

second usage, in which emotion regulation refers to the heterogeneous set of processes by which emotions are themselves regulated.

Emotion regulatory processes may be automatic or controlled, conscious or unconscious, and may have their effects at one or more points in the emotion generative process (we return to this idea in a later section). Because emotions are multi-componential processes that unfold over time, emotion regulation involves changes in “emotion dynamics” (Thompson, 1990), or the latency, rise time, magnitude, duration, and offset of responses in behavioral, experiential, or physiological domains. Emotion regulation may dampen, intensify, or simply maintain emotion, depending on an individual’s goals. Emotion regulation also may change the degree to which emotion response components cohere as the emotion unfolds, such as when large changes in emotion experience and physiological responding occur in the absence of facial behavior.

One as-yet unresolved issue is whether emotion regulation refers to intrinsic processes (Fred regulates his own emotions: emotion regulation *in self*), to extrinsic processes (Sally regulates Bob’s emotions: emotion regulation *in other*), or to both. In general, researchers in the adult literature typically focus on intrinsic processes (Gross, 1998). By contrast, researchers in the developmental literature focus more on extrinsic processes, perhaps because extrinsic processes are so salient in infancy and early childhood (e.g., Cole et al., 2004). We believe that both intrinsic and extrinsic regulatory processes are essential, and recommend using the qualifiers “intrinsic” and “extrinsic” whenever clarification is needed, such as when Sally regulates Bob’s emotions in order to calm herself down.

### *Core Features of Emotion Regulation*

Three aspects of this conception of emotion regulation warrant particular comment. First, we explicitly include the possibility that people may regulate either negative or positive

emotions, either by decreasing them or by increasing them. Little is known about whether the emotions people try to change differ depending on their developmental stage. However, in an interview study, young adults predominantly reported trying to down-regulate negative emotions (especially anger, sadness, and anxiety), with a focus on regulating experiential and behavioral aspects of emotion (Gross, Richards, & John, in press). These emotion regulation episodes were nearly always social in nature, and although participants did regulate positive emotions (e.g., decreasing happiness to fit in socially), they did so far less frequently than negative emotions.

Second, although prototypic examples of emotion regulation are conscious, such as our opening example of the supermarket checkout line, one can imagine emotion regulatory activity that is initially deliberate, but which later occurs without conscious awareness. Examples include hiding the anger one feels when one is rejected by a peer, or quickly turning one's attention away from potentially upsetting material. Previous discussions have distinguished categorically between conscious and unconscious processes (Masters, 1991). However, we prefer to think of a continuum from conscious, effortful, and controlled regulation to unconscious, effortless, and automatic regulation. It is difficult to adequately assess automatic emotion regulation processes. However, there are behavioral (Bargh, this volume; Mauss, Evers, Wilhelm & Gross, in press) and physiological approaches (Davidson & Kalin, this volume; Hariri, this volume; Ochsner & Gross, this volume) that show promise in elucidating automatic emotion regulation processes.

Third, we make no a priori assumptions as to whether any particular form of emotion regulation is necessarily good or bad (Thompson & Calkins, 1996). This is important, as it avoids the confusion that was created in the stress and coping literature, where defenses were pre-defined as maladaptive, and contrasted with coping strategies, which were pre-defined as adaptive (Parker & Endler, 1996). These pre-definitions made it difficult to consider the costs

and benefits of defensive processes (Lazarus, 1985). In our view, emotion regulation processes may be used to make things either better or worse, depending on the context. For example, cognitive strategies that dampen negative emotions may help a medical professional operate efficiently in stressful circumstances, but also may neutralize negative emotions associated with empathy, thereby decreasing helping. Moreover, consistent with our functionalist orientation, regulatory strategies may accomplish a person's own goals but nonetheless be perceived by others as maladaptive, such as when a child cries loudly in order to get attention.

### *Emotion Regulation and Related Constructs*

Paralleling the distinctions drawn among members of the affective family in Figure 3, we see emotion regulation as subordinate to the broader construct of *affect regulation*. Under this broad heading fall all manner of efforts to influence our valenced responses (Westen, 1994).

As depicted in Figure 4, affect regulation includes (among other things) four overlapping constructs: (a) *coping*, (b) *emotion regulation*, (c) *mood regulation*, and (d) *psychological defenses*. Because virtually all goal-directed behavior can be construed as maximizing pleasure or minimizing pain – and is thus affect regulatory in a broad sense – we believe it is important to narrow the focus by examining the four second-level families of processes shown here.

Coping is distinguished from emotion regulation both by its predominant focus on decreasing negative affect, and by its emphasis on much larger periods of time (e.g., coping with bereavement). As noted above, moods are typically of longer duration and are less likely to involve responses to specific “objects” than emotions (Parkinson et al., 1996). In part due to their less well defined behavioral response tendencies, in comparison with emotion regulation, mood regulation and mood repair are more concerned with altering emotion experience than emotion behavior (Larsen, 2000). Like coping, defenses typically have as their focus the

regulation of aggressive or sexual impulses and their associated negative emotion experience, particularly anxiety. Defenses usually are unconscious and automatic (Westen, this volume), and are usually studied as stable individual differences (Cramer, 2000).

### *Emotion Regulation Strategies*

To set the stage for our discussion of specific emotion regulation strategies, imagine a father who decides to take his child for the child's first proper (i.e., non-parental) haircut. Before mentioning the idea to his child, the father scouts out a few places. Some are generic adult-only barber shops. Others look more kid friendly, with brightly colored walls and racks of toys. Once his child is planted in a chair at Cuts 'R' Us, the father waits nervously. The first barber that comes over is the least promising of the lot, with a huge beard and a terrifying demeanor. As he approaches – scissors in hand – the kid screams bloody murder. The father asks to wait for the next available barber. When a second barber finally becomes free, the haircut begins. At first, the child watches the flurry of falling hair with great interest. After a few minutes of calm, the child loses interest, and wants to leave. The father says they'll certainly leave, but first asks what the child would like for his birthday. This distracts the child until the barber turns on a noisy shaver. The child bursts into tears, terrified by the “monster's roar.” The father says the noise is the machine purring, just like their cat. This yields a few more minutes of tranquility until the child notices the pile of hair trimmings around the chair, which again provokes an emotional outburst. In desperation, the father says that big kids shouldn't cry and tells the child to stop it right now.

As this barbershop story suggests, one of the challenges in thinking about emotion regulation is finding a conceptual framework that can help to organize the myriad forms of emotion regulation that are encountered in everyday life. The modal model of emotion (Figure 1) suggests one approach, in that it specifies a sequence of processes involved in emotion

generation, each of which is a potential target for regulation. In Figure 5, we 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 (Gross, 1998b). These families are distinguished by the point in the emotion-generative process at which they have their primary impact. We emphasize the notion of families, which harkens back to the prototype conception of emotion emphasized earlier, and we regard these families as loose-knit constellations of processes.

For purposes of presentation, we focus on between-family differences (e.g., the difference between cognitive change and response modulation). However, there are also higher-order commonalities. For example, the first four emotion regulation families may be considered *antecedent-focused*, in that they occur before appraisals give rise to full-blown emotional response tendencies, and may be contrasted with *response-focused* emotion regulation, which occurs after the responses are generated (Gross & Munoz, 1995). As we will describe below, there are also considerable within-family differences. In the following sections, we review adult and developmental literatures related to each of the five families of emotion regulation processes.

### *Situation Selection*

The most forward-looking approach to emotion regulation is *situation selection*. This type of emotion regulation involves taking actions that make it more (or less) likely that one will end up in a situation one expects will give rise to desirable (or undesirable) emotions. In the example of the father taking his child for a haircut, situation selection is illustrated by the father choosing the barbershop that he thinks is likely to maximize the chances that the child will

tolerate the haircut. Other examples include avoiding an offensive co-worker, renting a funny movie after a bad day, or seeking out a friend with whom one can have a good cry.

Situation selection requires an understanding of likely features of remote situations, and of expectable emotional responses to these features. There is a growing appreciation of just how difficult it is to gain such an understanding. Looking backward in time, there is a profound gap between the “experiencing self” and the “remembering self” (Kahneman, 2000). In particular, real-time ratings of emotion experience (e.g., how I’m feeling at each moment throughout an emotional film) diverge from retrospective summary reports (e.g., how I felt during the film) in that retrospective reports are predicted by peak and end feelings, but are curiously insensitive to duration. Looking forward in time, people profoundly mis-estimate their emotional responses to future scenarios (Gilbert et al., 1998; Loewenstein, this volume). In particular, people over-estimate how long their negative responses to various outcomes (e.g., being denied tenure, breaking up with a partner) will last. These backward- and forward-looking biases make it difficult to appropriately represent past or future situations for the purposes of situation selection.

Another barrier to effective situation selection is appropriately weighing short-term benefits of emotion regulation versus longer-term costs. For example, a shy person may feel much better in the short term if she avoids social situations. However, this short-term relief may come at the cost of longer term social isolation. Because of the complexity of these tradeoffs, situation selection often requires the perspective of others, ranging from parents to therapists.

Indeed, people commonly intervene in this way to manage the feelings of a child, spouse, friend, or acquaintance, whether by dissuading them from going to events that may be stressful, joining them for activities that are likely to be emotionally satisfying, or offering warm conversation and a sympathetic ear. This form of extrinsic emotion regulation is important

throughout life, but is most evident in infancy and early childhood when parents strive to create daily routines with manageable emotional demands for their offspring. This can involve careful selection of child care arrangements, predictable routines, scheduling naps and breaks to assist young children's coping, and managing the broader emotional climate of family life. Early emotional life is strongly influenced by situation selection because infants and young children are less capable of choosing their circumstances for themselves.

Using situation selection to manage another's emotions requires the same kinds of predictive judgments that are involved in managing one's own feelings in this way, with the additional complication that one must estimate the emotional consequences for another. In this regard, extrinsic emotion regulation using situation selection occurs in concert with estimations of the recipient's self-regulatory capacities. Parents thus must arrange the schedule of their offspring with due regard, for example, to their particular child's temperamental qualities, activity level, interests, and capacities for managing arousal (Fox & Calkins, 2003).

### *Situation Modification*

Potentially emotion-eliciting situations – such as the approach of the terrifying barber in the example above – do not inevitably lead to emotional responses. After all, one can always ask to wait until a less frightening barber is free. Such efforts to directly modify the situation so as to alter its emotional impact constitute a potent form of emotion regulation.

When conservative in-laws visit, situation modification may take the form of hiding politically incendiary artwork. Situation modification is also a mainstay of parenting, where it takes the form of helping with a frustrating puzzle or setting up for an elaborate doll tea party. With older children and adults, situation modification can include verbal prompts to assist in problem-solving, or to confirm the legitimacy of an emotion response. It is important to

recognize that in these situations, situation modification is created both by the supportive presence of a partner and by that partner's specific interventions. A study by Nachmias, Gunnar, Mangelsdorf, Parritz, and Buss (1996) found, for example, that toddlers' emotional coping in a stressful situation was aided both by the specific interventions of their mothers and the existence of a secure attachment between them.

Given the vagueness of the term "situation," it is sometimes difficult to draw the 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 we have previously emphasized that situations can be external or internal, situation modification – as we mean it here – has to do with modifying external, physical environments. We will consider efforts at modifying "internal" environments (i.e. cognitions) under the section on cognitive change below.

Another boundary issue arises when considering the social consequences of emotion expression. As we noted earlier, emotional expressions have important social consequences and can dramatically alter ongoing interactions (Keltner & Kring, 1998). If one's partner suddenly looks sad, this can shift the trajectory of an angry interaction, as one pauses to express concern, back peddle, or offer support. In this sense, emotion expressions can be powerful extrinsic forms of emotion regulation, changing the nature of the situation (Rime, this volume).

One context in which the emotion regulatory effects of emotion expression has been examined is parents' emotional responses to their children's emotions. A considerable body of research indicates that when parents respond supportively and sympathetically to the emotional expressions of offspring, children cope more adaptively with their emotions in the immediate situation, and acquire more positive emotion regulatory capacities in the long run. By contrast, when parents respond to their children's emotions in ways that are denigrating, punitive, or

dismissive, more negative outcomes are likely (Denham, 1998; Eisenberg, Cumberland, & Spinrad, 1998, for reviews; see also Thompson & Meyer, this volume). The latter is a reminder that emotional expressions can elicit social responses that modify the situation in ways that undermine effective emotion regulation rather than facilitating it. More generally, these developmental studies alert us to how emotional expressions inaugurate social processes that progressively modify the situation that initially elicited emotion -- sometimes aiding emotion regulation, while on other occasions impairing it. This is one way that the broader emotional climate of the family influences the development of emotion regulatory capacities in children.

### *Attentional Deployment*

Situation selection and situation modification help shape the individual's situation. However, it also is possible to regulate emotions without actually changing the environment. Situations have many aspects, and *attentional deployment* refers to how individuals direct their attention within a given situation in order to influence their emotions.

Attention deployment is one of the first emotion regulatory processes to appear in development (Rothbart, Ziaie, & O'Boyle, 1992), and appears to be used from infancy through adulthood, particularly when it is not possible to change or modify one's situation. Infants and young children not only spontaneously look away from aversive events (and towards pleasant ones), but their attentional processes can also be guided by others for purposes of emotion management. In the example above, emotion regulation involved facilitating an attentional shift in the child by getting the child to focus on birthday wishes. Attention deployment might be considered an internal version of situation selection. Two major attentional strategies are distraction and concentration.

*Distraction* focuses attention on different aspects of the situation, or moves attention away from the situation altogether, such as when an infant shifts its gaze from the emotion-eliciting stimulus to decrease stimulation (Rothbart, this volume; Stifter & Moyer, 1991). Distraction also may involve changing internal focus, such as when individuals invoke thoughts or memories that are inconsistent with the undesirable emotional state (Watts, this volume), or when an actor calls to mind an emotional incident in order to portray that emotion convincingly.

*Concentration* draws attention to emotional features of a situation. Wegner and Bargh (1997) have termed this “controlled starting” of emotion. When attention is repetitively directed to one’s feelings and their consequences, this is referred to as rumination. Ruminating on sad events leads to longer and more severe depressive symptoms (Just & Alloy, 1997; Nolen-Hoeksema, 1993). However, Borkovec and colleagues (Borkovec, Roemer, & Kinyon, 1995) have argued that when attention is focused on possible future threats, this may have the effect of increasing low-grade anxiety but decreasing the strength of the negative emotional responses.

Attentional deployment thus may take many forms, including physical withdrawal of attention (such as covering the eyes or ears), internal redirection of attention (such as through distraction or concentration), and responding to others’ redirection of one’s attention (such as the father and the haircut). As children become more aware of the internal determinants of emotional experience, their reliance on attentional deployment to manage emotions increases. Attentional deployment is enlisted beginning in early childhood, for example by children who are waiting for delayed rewards (Mischel & Ayduk, 2004). By grade-school, children are well aware of how the intensity of emotion wanes over time as they think less of emotionally-arousing situations (Harris, Guz, Lipian, & Man-Shu, 1985; Harris & Lipian, 1989).

*Cognitive Change*

Even after a situation has been selected, modified, and attended to, an emotional response is by no means a foregone conclusion. Emotion requires that percepts be imbued with meaning and that individuals evaluate their capacity to manage the situation. As described above, appraisal theorists have described the cognitive steps needed to transform a percept into something that elicits emotion. *Cognitive change* refers to changing how one appraises the situation one is in so as to alter its emotional significance, either by changing how one thinks about the situation or about one's capacity to manage the demands it poses.

In the example above, cognitive change is exemplified by the father's comment that the barber's buzzer sounded like a cat purring (rather than a monster roaring). One common application of cognitive change in the social domain is downward social comparison, which involves comparing one's situation with that of a less fortunate person, thereby altering one's construal and decreasing negative emotion (Taylor & Lobel, 1989; Wills, 1981). Because psychologically-relevant events or situations can be internal as well as external, cognitive change also can be applied to one's internal experience of the event. It is likely that individuals who interpret their physiological arousal prior to a stressful athletic or musical performance as competence-enhancing ("getting pumping up") rather than debilitating ("stage fright") are more capable of managing emotion, although little is known of how individuals interpret or reconstrue their physiological signs of emotional arousal.

One form of cognitive change that has received particular attention is reappraisal (Gross, 2002; John & Gross, this volume; Ochsner & Gross, this volume). This type of cognitive change involves changing a situation's meaning in a way that alters its emotional impact. Leading subjects to reappraise negatively valenced films has been shown to result in decreased negative emotion experience. Decreases in physiological responding are not always evident (Gross, 1998;

Steptoe & Vogele, 1986), however, perhaps because so little cognitive processing is needed in order to translate the potent images that have been used in these studies into physiological responses.

For children, cognitive appraisals related to emotion are significantly influenced by their developing representations of emotions, including the causes and consequences of these emotions (Terwogt & Stegge, this volume). This development has implications for children's efforts to manage emotion. Not surprisingly, parents, and later peers and other caregivers, are highly influential in children's developing emotion-related appraisals. Parents influence how children appraise emotion-relevant situations by (a) the information they provide about these circumstances (describing a camping trip as fun outdoors, but not mentioning mosquitoes or bears), (b) explaining the causes of the emotions the child feels or observes in others ("Your brother is scared of the dog because another dog barked at him yesterday"), and (c) enlisting feeling rules or emotion scripts ("Big kids don't fuss and cry when they're at someone's home"). Parents also coach emotion regulatory strategies involving cognitive change (such as thinking happy thoughts in the dark at bedtime), and directly provoke cognitive change by reinterpreting the situation for the child ("We don't laugh at people who fall down -- how do you think they feel?") (Denham, 1998; Eisenberg et al., 1998; Thompson, 1994). In these and other ways, socialized representations of emotion shape children's evaluations of emotion-relevant situations and their emotion-regulatory reappraisals (Mesquita, this volume). Over time, these experiences shape how an individual construes both the self and the environment (Peterson & Park, this volume).

The importance of these developmental influences is reflected in culturally-comparative studies of children's representations of emotion and emotion regulation. As early as age six, for

example, Nepalese children differ significantly from American children in their appraisals of interpersonal conflict (as eliciting shame or guilt) and their beliefs about whether negative emotion of any kind should be expressed (Cole, Bruschi, & Tamang, 2002; Cole & Tamang, 1998). Studies such as these suggest how much the development of children's emotion-related appraisals is culturally constructed through socialization processes that begin at home.

### *Response Modulation*

In contrast with other emotion regulatory processes, *response modulation* occurs late in the emotion generative process, after response tendencies have been initiated. Response modulation refers to influencing physiological, experiential, or behavioral responding as directly as possible. Attempts at regulating the physiological and experiential aspects of emotion are common. Drugs may be used to target physiological responses such as muscle tension (anxiolytics) or sympathetic hyper-reactivity (beta blockers). Exercise and relaxation also can be used to decrease physiological and experiential aspects of negative emotions, and, alcohol, cigarettes, drugs, and even food also may be used to modify emotion experience.

Another common form of response modulation involves regulating emotion-expressive behavior (Gross, John, & Richards, in press). A person may wish to regulate expressive behavior for many reasons, ranging from an assessment that it would be best to hide one's true feelings from another person (e.g., hiding one's fear when standing up to a bully) to direct prompts from a parent (e.g., in the barbershop example). By and large, studies have shown that initiating emotion-expressive behavior slightly increases the feeling of that emotion (Izard, 1990; Matsumoto, 1987). Interestingly, decreasing emotion-expressive behavior seems to have mixed effects on emotion experience (decreasing positive but not negative emotion experience) and actually increasing sympathetic activation (Gross, 1998a; Gross & Levenson, 1993; 1997).

In general terms, children and adults seem to be more capable of regulating emotions if they can find ways of expressing them in adaptive rather than maladaptive ways (Thompson, 1994). The parental maxim to toddlers -- “use words to say how you feel” -- reflects the psychological reality that developing language ability significantly facilitates young children’s capacities to understand, convey, reflect upon, and manage their emotions (Kopp, 1992). At older ages, the extent to which emotions can be successfully managed is based, in part, on the availability of adaptive response alternatives for expressing emotion, such as to provoke problem-solving or interpersonal understanding rather than simply venting.

This conclusion has several implications, all consistent with functionalist emotions theory. First, “adaptive response alternatives” may vary significantly in different situations. For example, crying is likely to be maladaptive for toddlers in some situations (e.g., when resisting mother’s request) but to accomplish valuable goals in others (e.g., calling attention to sudden danger or an older sibling’s aggression). Thus it is not the emotional response *per se* that is adaptive or maladaptive, but the response in its immediate context. Second, evaluating broader individual differences in emotion regulatory capacities must likewise incorporate attention to the contexts in which the individual’s emotions are expressed and the potentially adaptive consequences of these emotions. Sometimes examples of “emotional dysregulation” by children or adults can be viewed as the only adaptive response options in the circumstances in which these individuals are expressing emotion, such as in the context of an emotionally abusive family. Third, cultural values are significant in determining what constitutes “adaptive response alternatives” for expressing emotion for persons of any age. As indicated in Cole’s studies of Nepalese children profiled earlier, expressing negative emotion may be viewed by American adults as appropriately assertive but by Nepalese adults as woefully inappropriate. This indicates

how response modulation must be considered within the broader cultural context in which emotion is experienced, expressed, and regulated.

### *Elaborations and Complications*

Our process model provides an integrative framework for organizing the dizzying array of emotion regulatory processes. Like any model, however, it makes a number of simplifying assumptions. As our understanding of emotion grows, we will naturally outgrow the modal model of emotion in the sense that we will be able to better specify constituent processes, and thus will be able to describe the emotion-generative processes in greater detail. This will in turn permit us to refine our conception of emotion regulation processes. In the following section, we consider three specific aspects of our model of emotion regulation that bear particular comment.

### *Time and Feedback*

In discussing the model presented in Figure 5, we have focused on just one cycle of the emotion generative process. Movement from left to right in this figure captures movement through time: a particular situation is selected, modified (or not), attended to, appraised in a certain way, and yields a particular set of emotional responses. However, as we have emphasized in Figure 2, emotion generation is an ongoing process, not a one-shot deal. This dynamic aspect of emotion and emotion regulation is signaled by the feedback arrow in Figure 5 from the emotional response back to the situation. This arrow is meant to suggest the dynamic and reciprocally-determined nature of emotion regulation as it occurs in the context of an ongoing stream of emotional stimulation and behavioral responding. Similar feedback arrows might also be drawn from the emotional response to each of the other steps in the emotion-generative process. Each of these in turn influences subsequent emotional responses. On the antecedent side, for example, which emotions we have and how we express them are potent inputs into a new emotion cycle (e.g., feeling embarrassment about

an angry outburst: see Ekman, 1993). On the response side, too, it seems likely that our current emotional state (which is the result of previous emotion regulatory efforts) may influence how we decide to modulate the current emotional response tendencies (e.g., deciding to "really let someone have it" when one is angry). Furthermore, as we have noted, the reactions of other people to one's emotions constitute significant changes in the situation that further influence emotional responding. Modeling these real-time influences is a significant conceptual and empirical challenge.

### *Antecedent-focused Versus Response-focused Regulation*

This recursive aspect of emotion generation is essential for understanding the broad distinction between antecedent-focused and response-focused emotion regulation. In view of the cyclic nature of emotion (see Figures 2A and 2B), a given instance of emotion regulation is antecedent-focused or response-focused *with respect to a given cycle through the emotion-generative process*. Consider the use of cognitive change to help regulate the anxiety one feels about an upcoming exam. The night before the exam, in an effort to decrease one's anxiety, one might try to think in a way that decreases the significance the exam has for one's long-term goals (e.g., one might focus on how well one has done with the other aspects of the course so far, or remind oneself that there are more important things in life than grades, etc.).

It is true that this instance of emotion regulation occurs before the exam, but this is not what makes this regulatory strategy antecedent-focused. Indeed, one could mount the same effort at cognitive change during the exam, and it would still be antecedent-focused in our sense. What sense is that? As we've described, emotions unfold over time, and in each cycle of emotion generation, our responses in that cycle influence our subsequent responses. When a person uses cognitive regulation either before or during an exam, we regard these efforts as antecedent-focused in the sense that they take place early in a given emotion-generative cycle. At the heart of this distinction

between antecedent- and response-focused emotion regulation, then, is the notion of a fast cycling system that gives rise to an emotional “pulse” in each iteration. Emotion regulation efforts that target pre-pulse processes (in any given cycle of the emotion-generative process shown in Figure 5) are antecedent-focused, whereas emotion regulation efforts that target post-pulse processes are response-focused.

### *From One Process to Many*

For clarity of presentation, our examples have been cases in which an individual has used one type of emotion regulation at a time. Thus, in the previous section, we considered using cognitive change to decrease feelings of exam-related anxiety. However, emotion regulation can also occur in parallel at multiple points in the emotion generative process. Using many forms of emotion regulation might in fact be the modal case. This approach of “throwing everything you’ve got at it” makes sense. There are many different ways of influencing the emotion-generative process, and if one wants to make a big change in a hurry, it may be useful to try several things at once. Thus, what individuals do to regulate their emotions – such as going out to a bar with friends in order to get their mind off a bad day at work – often involves multiple regulatory processes.

One important and as yet unanswered question is how different forms of emotion regulation typically co-occur. We believe that this question may be profitably addressed both by considering particular contexts (e.g., exam taking) and by considering particular individuals (e.g., does a person who uses a particular type of cognitive change also typically use a particular type of response modulation: see John & Gross, this volume). Even if regulatory processes are often co-active and adjusted dynamically, we believe that a process-oriented approach will bring us closer to understanding the causes, consequences, and underlying mechanisms. Moreover, such a process-

oriented approach is well-suited to the study of developmental changes in emotion regulation, and encourages investigators to examine the interaction of external and intrinsic influences.

### *Fundamental Questions and Directions for Future Enquiry*

As is the case with any new and vital area of science, the study of emotion regulation has generated many more questions than answers. In the following sections, we consider three such questions that we believe are particularly important to the field of emotion regulation.

#### *How Separable Are Emotion and Emotion Regulation?*

The notion of emotion regulation presupposes that it is possible (and sensible) to separate emotion generation from emotion regulation. However, emotion regulation is so tightly intertwined with emotion generation that some theorists view emotion regulation as part and parcel of emotion (Campos et al., 2004; Frijda, 1986). On the one hand, this perspective is consistent with the observation that adult emotions are almost always regulated (Tomkins, 1984), and that emotion-generative brain centers are tonically restrained by the prefrontal cortex (Stuss & Benson, 1986). On the other hand, both common sense and its academic counterpart -- the modal model -- suggest the need to distinguish between emotion and emotion regulation.

Admittedly, making this distinction is difficult, because emotion regulation often must be inferred when an emotional response would have proceeded in one fashion, but instead is observed to proceed in another. For example, a still face in someone who typically expresses lots of emotion may be rich with meaning, but the same lack of expression in someone who rarely shows any sign of emotion is less strongly suggestive of emotion regulation. However, recent advances in neuroimaging have made it possible to begin to assess whether (particularly in the context of explicit manipulations of emotion regulation) there are differences either in the magnitude or regional locus of brain activation associated with emotion alone versus emotion in

addition to emotion regulation (Ochsner et al., 2004). Emotion regulation also may be inferred from changes in how response components are interrelated as the emotion unfolds over time (e.g., a dissociation between facial expression and physiology, suggestive of suppression).

At the highest level, emotion and emotion regulation processes (and all other psychological processes for that matter) co-occur in the same brain, often at the same time. The question of whether two sets of processes are separable (e.g., emotion and memory; emotion and emotion regulation) is therefore a question about the value of distinguishing processes for a particular purpose. We believe that a two-factor approach that distinguishes emotion from emotion regulation is a useful approach for analyzing basic processes, individual differences, and fashioning clinical interventions. That said, we also believe that it is crucial to be as explicit as possible about the grounds for inferring the existence of emotion regulation in any given context.

One particular challenge in this regard is understanding the bidirectional links between limbic centers that generate emotion and cortical centers that regulate emotion (Beer & Lombardo, this volume; Davidson & Kalin, this volume; Ochsner and Gross, this volume; Quirk, this volume). At present, we would hypothesize that (a) emotion regulation often co-occurs with emotion, whether or not emotion regulation is explicitly manipulated; and (b) emotion regulation engages some (and perhaps many) of the same brain regions that are implicated in emotion generation. Given our nascent understanding of both emotion and emotion regulation processes, we believe it is appropriate to be very cautious indeed when inferring whether emotion regulation processes are operative in a particular context. At the same time, however, we would argue that the question “Is emotion ever *not* regulated?” is misleading, in that it suggests an all or none affair. A conception of varying amounts and types of emotion regulation seems more appropriate.

### *What are the Developmental Trajectories of Emotion Regulation?*

One powerful tool for understanding emotion regulation is to chart the development of emotion regulation. Much of the developmental literature on emotion regulation has focused on the period from infancy through adolescence (e.g., Thompson, 1990; 1994). This is a crucial period because it is a time when temperamental, neurobiological (e.g., the development of the frontal lobes), conceptual (e.g., understanding of emotional processes), and social (e.g., family, teachers, and peers) forces come together to lay the foundation for the individual differences in emotion regulation we observe in adulthood (Calkins & Hill, this volume; Rothbart and Sheese, this volume; Thompson & Meyer, this volume).

Because the developmental study of emotion regulation has been influenced by constructivist and relational approaches to emotional development, it has emphasized the person-in-context (Thompson & Lagattuta, in press). Contextual factors considered pivotal in the development of emotion regulation include the varieties of caregiving influences on which infants and young children rely for managing their emotions; the growth of language by which emotions are understood, conveyed, and managed; the settings in which the expression of emotion may have adaptive or maladaptive outcomes; and cultural values that define how the emotions of men and women should be regulated in social contexts. In later childhood and adolescence, as emotions themselves are understood in more complex terms, children begin to appreciate the diverse internal constituents of emotional experience that can be targets of regulatory efforts (such as one's thoughts, expectations, attitudes, personal history, and other facets of cognitive appraisal processes). Over time, individual differences in emotional regulatory capacities develop in concert with personality, so that children manage their feelings in a way that is consistent with their temperament-based tolerances, needs for security or stimulation, capacities for self-control,

and other personality processes (Thompson, in press). Understanding how these developmental processes emerge and are integrated in the growth of emotion regulation skills is a conceptual challenge, and developmental research on emotion regulation faces unique difficulties in empirically operationalizing these processes (Cole, Martin, & Dennis, 2004).

There is also reason to believe that emotion regulation processes continue to change and develop throughout the adult years (see Charles & Carstensen, this volume). In part, age-related shifts in emotion regulation should be expected due to changes in contextual factors: there may be more situations that require suppression in early adulthood than later adulthood (e.g., in the work setting). Increasing life experience and wisdom regarding the relative costs and benefits of different forms of emotion regulation also suggest that changes will take place with age (Gross & John, 2002). For example, if cognitive reappraisal has a healthier profile of consequences than expressive suppression, as individuals mature and gain in life experience, they might increasingly learn to make greater use of healthy emotion regulation strategies (such as reappraisal) and lesser use of less healthy emotion regulation strategies (such as suppression). Evidence now exists that just such an age-related change does occur (John & Gross, 2004). More broadly, later-life developmental changes in emotion regulation likely occur in concert with broader life goals for older individuals, such as conserving physical energy, ensuring consistent emotional demands, and heightening positive emotional experience (Carstensen et al., 2003).

#### *How Does Emotion Regulation Relate to Other Forms of Self-Regulation?*

Emotional impulses are far from the only psychological processes we must regulate. How does emotion regulation relate to the regulation of stress, moods, thoughts, attention, and impulses such as hunger, aggression and sexual arousal? Are impulses to respond – and the processes by which they are modulated – crucially similar, as suggested by Block and Block

(1980) and by recent discussions of ego depletion (Baumeister, Geyer, & Tice, this volume)? Or is it necessary to maintain distinctions among various forms of self-regulation?

There is certainly reason to see continuity among regulatory processes across response domains. For example, Mischel's (1996) famous "marshmallow studies" of young children's ability to delay gratification highlight the role of attentional processes such as distraction and reframing that are closely related to those implicated in emotion regulation. Similarly, the neural bases of emotion regulation seem to overlap considerably with those associated with pain regulation (Ochsner & Gross, 2005). Nonetheless, in our discussion of emotion and emotion regulation processes above, we have emphasized our preference for making distinctions among various loosely-defined types of affective processes and hence, similar distinctions among various equally loosely-defined types of self-regulation.

In part, our emphasis on distinctions among affective processes reflects our abiding respect for the complexity of both the affective processes themselves and the regulatory processes involved. We are entirely comfortable with the proposition that there may be domain-general aspects of executive control (e.g., set switching, updating, response inhibition: Cohen, this volume; Miyake et al., 2000; Zelazo, this volume), but believe it is currently an open question as to whether either (a) different regulatory processes are engaged in the context of different affective processes such as moods, emotions, and other impulses, and/or (b) the same regulatory processes have different consequences in the context of different affective processes. By drawing as explicit distinctions as we can now, we will be able to discern whether these differences matter. If so, we've learned something important about the regulatory processes in question. If not, so much the better – we will then have context-general principles by which to understand self-regulation. For the moment, we recommend a dual strategy of making as explicit

distinctions as possible in each study, and then paying careful attention across studies to the points of difference and similarity.

## References

- American Psychiatric Association (1994). *Diagnostic and statistical manual of mental disorders* (4th ed.). Washington D.C.: American Psychiatric Association.
- Bargh, this volume
- Wranik, Barrett, & Salovey, this volume
- Baumeister, Geyer, & Tice, this volume
- Beer & Lombardo, this volume
- Block, J. H., & Block, J. (1980). The role of ego-control and ego-resiliency in the organization of behavior. In W. A. Collins (Ed.), *Development of cognition, affect, and social relations: The Minnesota symposia on child psychology* (Vol. 13, pp. 39-51). Hillsdale, N.J.: Lawrence Erlbaum.
- Borkovec, T. D., Roemer, L., & Kinyon, J. (1995). Disclosure and worry: Opposite sides of the emotional processing coin. In J. W. Pennebaker (Ed.), *Emotion, disclosure, and health* (pp. 47-70). Washington D.C.: American Psychological Association.
- Bowlby, J. (1969). *Attachment and loss: Attachment*. New York: Basic Books.
- Buck, R. (1993). What is this thing called subjective experience? Reflections on the neuropsychology of qualia. *Neuropsychology*, 7, 490-499.
- Calkins & Hill, this volume
- Campbell-Sills and Barlow, this volume
- Campos, J. J., Barrett, K. C., Lamb, M. E., Goldsmith, H. H., & Stenberg, C. (1983). Socioemotional development. In M. Haith & J. J. Campos (Eds.), *Handbook of child psychology* (Vol. 2, pp. 783-915). New York: Wiley.

- Campos, J. J., Campos, R. G., & Barrett, K. C. (1989). Emergent themes in the study of emotional development and emotion regulation. *Developmental Psychology, 25*, 394-402.
- Campos, J.J., Frankel, C.B., Camras, L. (2004). On the nature of emotion regulation. *Child Development, 75*, 377-394.
- Charles & Carstensen, this volume
- Clore, G. L., Schwarz, N., & Conway, M. (1994). Affective causes and consequences of social information processing. In R. S. Wyer & T. K. Srull (Eds.), *Handbook of Social Cognition* (pp. 323-417). Hillsdale, NJ: Erlbaum.
- Cohen, this volume
- Cole, P. M. (1986). Children's spontaneous control of facial expression. *Child Development, 57*, 1309-1321.
- Cole, P. M., Bruschi, C. J., & Tamang, B. L. (2002). Cultural differences in children's emotional reactions to difficult situation. *Child Development, 73*, 983-996.
- Cole, P., Martin, S., & Dennis, T. (2004). Emotion regulation as a scientific construct: Methodological challenges and directions for child development research. *Child Development, 75*, 317-333.
- Cole, P. M., & Tamang, B. L. (1998). Nepali children's ideas about emotional displays in hypothetical challenges. *Developmental Psychology, 34*, 640-646.
- Cramer, P. (2000). Defense mechanisms in psychology today. *American Psychologist, 55*, 637-646.
- Davidson, R. J. (1994). On emotion, mood, and related affective constructs. In P. Ekman & R. J. Davidson (Eds.), *The nature of emotion: Fundamental questions* (pp. 51-55). New York: Oxford University Press.

Davidson & Kalin, this volume

Denham, S. (1998). *Emotional development in young children*. New York: Guilford.

Eisenberg, N., Cumberland, A., & Spinrad, T. L. (1998). Parental socialization of emotion. *Psychological Inquiry, 9*, 241-273.

Eisenberg, Hofer, & Vaughan, this volume

Ekman, P. (1993). Facial expression and emotion. *American Psychologist, 48*, 384-392.

Ellsworth, P.C., & Scherer, K.R. (2003). Appraisal processes in emotion. In R.J.

Davidson, K.R., Scherer, & H.H. Goldsmith (Eds.), *Handbook of affective sciences* (pp. 572-595). New York: Oxford University Press.

Feldman Barrett, L., Ochsner, K.N., & Gross, J.J. (in press). Automaticity and emotion. In J.

Bargh (Ed.). *Automatic processes in social thinking and behavior*. New York: Psychology Press.

Ferguson, E.D. (2000). *Motivation: A biosocial and cognitive integration of motivation and emotion*. New York: Oxford University Press.

Fiedler, K. (1988). Emotional mood, cognitive style, and behavior regulation. In K. Fiedler & J.

Forgas (Eds.), *Affect, cognition and social behavior: New evidence and integrative attempts* (pp. 100-119). Toronto: C.J. Hogrefe.

Fox, N. A., & Calkins, S. D. (2003). The development of self-control of emotion: Intrinsic and extrinsic influences. *Motivation and Emotion, 27*, 7-26.

Freud, S. (1959). *Inhibitions, symptoms, anxiety* (A. Strachey, Trans. and J. Strachey, Ed.). New York: Norton. (Original work published 1926)

Frijda, N. H. (1986). *The emotions*. Cambridge: Cambridge University Press.

- Gilbert, D. T., Pinel, E. C., Wilson, T. D., Blumberg, S. J., & Wheatley, T. P. (1998). Immune neglect: A source of durability bias in affective forecasting. *Journal of Personality and Social Psychology, 75*, 617-638.
- Gross, J.J. (1998a). Antecedent- and response-focused emotion regulation: Divergent consequences for experience, expression, and physiology. *Journal of Personality and Social Psychology, 74*, 224-237
- Gross, J.J. (1998b). The emerging field of emotion regulation: An integrative review. *Review of General Psychology, 2*, 271-299.
- Gross, J. J. (2002). Emotion regulation: Affective, cognitive, and social consequences. *Psychophysiology, 39*, 281-291.
- Gross, J.J., & John, (2002). Wise emotion regulation. In L. Feldman Barrett & P. Salovey (Eds.), *The wisdom of feelings: Psychological processes in emotional intelligence* (pp. 297-318). New York: Guilford.
- Gross, J.J., & Levenson, R.W. (1993). Emotional suppression: Physiology, self-report, and expressive behavior. *Journal of Personality and Social Psychology, 64*, 970-986.
- Gross, J.J., & Levenson, R.W. (1997). Hiding feelings: The acute effects of inhibiting positive and negative emotions. *Journal of Abnormal Psychology, 106*, 95-103.
- Gross, J.J., & Munoz, R.F. (1995). Emotion regulation and mental health. *Clinical Psychology: Science and Practice, 2*, 151-164.
- Gross, J.J., Richards, J.M., & John, O.P. (in press). Emotion regulation in everyday life. In D.K. Snyder, J.A. Simpson, & J.N. Hughes (Eds.). *Emotion regulation in families: Pathways to dysfunction and health*. Washington DC: American Psychological Association.

Hariri, this volume

Harris, P. L., Guz, G. R., Lipian, M. S., & Man-Shu, Z. (1985). Insight into the time course of emotion among Western and Chinese children. *Child Development, 56*, 972-988.

Harris, P. L., & Lipian, M. S. (1989). Understanding emotion and experiencing emotion. In C. Saarni & P. L. Harris (Eds.), *Children's understanding of emotion*. Cambridge: Cambridge University Press.

Hinshaw, this volume

Izard, C. E. (1990). Facial expressions and the regulation of emotions. *Journal of Personality and Social Psychology, 58*, 487-498.

James, W. (1884). What is an emotion? *Mind, 9*, 188-205.

John & Gross, this volume

John, O.P., & Gross, J.J. (2004). Healthy and unhealthy emotion regulation: Personality processes, individual differences, and lifespan development. *Journal of Personality, 72*, 1301-1334.

Just, N., & Alloy, L.B. (1997). The response styles theory of depression: Tests and an extension of the theory. *Journal of Abnormal Psychology, 106*, 221-229.

Kahneman, D. (2000). Experienced utility and objective happiness: A moment-based approach. In D. K. A. Tversky (Ed.), *Choices, Values, and Frames*. Cambridge: Cambridge University Press.

Kaplan, H. I., & Sadock, B.J. (1991). *Synopsis of psychiatry* (6th Ed.). Baltimore, MD: Williams & Wilkins.

Keltner, D., & Kring, A.M. (1998). Emotion, social function, and psychopathology. *Review of General Psychology, 2*, 320-342.

- Kopp, C. B. (1992). Emotional distress and control in young children. In N. Eisenberg & R. A. Fabes (Eds.), *Emotion and its regulation in early development*. San Francisco: Jossey-Bass.
- Lang, P.J. (1995). The emotion probe: Studies of motivation and attention. *American Psychologist*, 50, 372-385.
- Larsen, R. J. (2000). Toward a science of mood regulation. *Psychological Inquiry*, 11, 129-141.
- Lazarus, R. S. (1966). *Psychological stress and the coping process*. New York: McGraw Hill.
- Lazarus, R. S. (1985). The costs and benefits of denial. In A. Monat & R. S. Lazarus (Eds.), *Stress and coping: An anthology* (2 ed., pp. 154-173). New York: Columbia University Press.
- Lazarus, R. S. (1993). From psychological stress to the emotions: A history of changing outlooks. *Annual Review of Psychology*, 44, 1-21.
- Levenson, R.W. (1999). The intrapersonal functions of emotion. *Cognition and Emotion*, 13, 481-504.
- Linehan, this volume
- Loewenstein, this volume
- MacLean, P. D. (1990). *The triune brain in evolution: Role in paleocerebral functions*. New York: Plenum.
- Masters, J. C. (1991). Strategies and mechanisms for the personal and social control of emotion. In J. Garber & K. A. Dodge (Eds.), *The development of emotion regulation and dysregulation* (pp. 182-207). Cambridge: Cambridge University Press.

- Matsumoto, D. (1987). The role of facial response in the experience of emotion: More methodological problems and a meta-analysis. *Journal of Personality and Social Psychology*, 52, 769-774.
- Mauss, I.B., Evers, C., Wilhelm, F.H., & Gross, J.J. (in press). How to bite your tongue without blowing your top: Implicit evaluation of emotion regulation predicts affective responding to anger provocation. *Personality and Social Psychology Bulletin*.
- Mauss, I.B., Levenson, R.W., McCarter, L., Wilhelm, F.H., & Gross, J.J. (2005). The tie that binds? Coherence among emotion experience, behavior, and physiology. *Emotion*, 5, 175-190.
- Mesquita, this volume
- Mischel, W. (1996). From good intentions to willpower. In P. Gollwitzer & J. Bargh (Eds.), *The psychology of action* (pp. 197-218). New York: Guilford.
- Mischel, W., & Ayduk, O. (2004). Willpower in a Cognitive-Affective-Processing System: The dynamics of delay of gratification. In R.F. Baumeister & K.D. Vohs (Eds). *Handbook of self regulation: Research, theory, and applications* (pp. 99-129). New York: Guilford Press.
- Miyake, A., Friedman, N.P., Emerson, M.J., Witzki, A.H., Howerter, A., & Wager, T.D. (2000). The unity and diversity of executive functions and their contributions to complex “frontal lobe” tasks: A latent variable analysis. *Cognitive Psychology* 41, 49–100.
- Nachmias, M., Gunnar, M., Mangelsdorf, S., Parritz, R., & Buss, K. (1996). Behavioral inhibition and stress reactivity: The moderating role of attachment security. *Child Development*, 67, 508-522.

Nolen-Hoeksema, S. (1993). Sex differences in control of depression. In D. M. Wegner & J. W. Pennebaker (Eds.), *Handbook of mental control* (pp. 306-324). Englewood Cliffs, NJ: Prentice-Hall.

Ochsner & Gross, this volume

Ochsner, K. N. & Gross, J. J. (2005). The cognitive control of emotion. *Trends in Cognitive Sciences*, 9, 242-249.

Ochsner, K.N., Ray, R.R., Cooper, J.C., Robertson, E.R., Chopra, S., Gabrieli, J.D.E., & Gross, J.J. (2004). For better or for worse: Neural systems supporting the cognitive down- and up-regulation of negative emotion. *Neuroimage*, 23, 483-499.

Parker, J. D. A., & Endler, N.S. (1996). Coping and defense: A historical overview. In M. Zeidner & N. S. Endler (Eds.), *Handbook of coping: Theory, research, applications* (pp. 3-23). New York: Wiley.

Parkinson, B., Totterdell, P., Briner, R.B., & Reynolds, S. (1996). *Changing moods: The psychology of mood and mood regulation*. London: Longman.

Peterson & Park, this volume

Quirk, this volume

Rime, this volume

Rothbart, this volume

Rothbart, M. K., Ziaie, H., & O'Boyle, C.G. (1992). Self-regulation and emotion in infancy. In N. Eisenberg & R. A. Fabes (Eds.), *Emotion and its regulation in early development* (pp. 7-23). San Francisco, CA: Jossey-Bass.

Rozin, P., & Fallon, A. E. (1987). A perspective on disgust. *Psychological Review*, 94, 23-41.

Sapolsky, this volume

- Scherer, K. R. (1984). On the nature and function of emotion: A component process approach. In K. R. Scherer & P.E. Ekman (Eds.), *Approaches to emotion* (pp. 293-317). Hillsdale, N.J.: Erlbaum.
- Shaver and Mikulincer, this volume
- Sher and Grekin, this volume
- Stifter, C. A., & Moyer, D. (1991). The regulation of positive affect: Gaze aversion activity during mother-infant interaction. *Infant Behaviors and Development, 14*, 111-123.
- Stuss, D., & Benson, D. (1986). *The frontal lobes*. New York: Raven Press.
- Taylor, S. E., & Lobel, M. (1989). Social comparison activity under threat: Downward evaluation and upward contacts. *Psychological Review, 96*, 569-575.
- Terwogt & Stegge, this volume
- Thompson & Meyer, this volume
- Thompson, R. A. (1990). Emotion and self-regulation. In R. A. Thompson (Ed.), *Socioemotional development. Nebraska Symposium on Motivation* (Vol. 36, pp. 367-467). Lincoln: University of Nebraska Press.
- Thompson, R. A. (1991). Emotional regulation and emotional development. *Educational Psychology Review, 3*, 269-307.
- Thompson, R. A. (1994). Emotion regulation: A theme in search of definition. In N. A. Fox (Ed.), *The development of emotion regulation: Biological and behavioral considerations (Monographs of the Society for Research in Child Development)* (Vol. 59, pp. 25-52).
- Thompson, R. A. (in press). The development of the person: Social understanding, relationships, self, conscience. In W. Damon & R. M. Lerner (Eds.), *Handbook of child*

- psychology* (6th Ed.), Vol. 3. *Social, emotional, and personality development* (N. Eisenberg, Vol. Ed.). New York: Wiley.
- Thompson, R. A., & Calkins, S.D. (1996). The double-edged sword: Emotional regulation for children at risk. *Development and Psychopathology*, 8, 163-182.
- Thompson, R. A., & Lagatutta, K. (in press). Feeling and understanding: Early emotional development. In K. McCartney & D. Phillips (Ed.), *The Blackwell handbook of early childhood development*. Oxford, UK: Blackwell.
- Tomkins, S.S. (1984). Affect theory. In P. Ekman (Ed.), *Emotion in the human face* (2 ed., pp. 353-395). New York: Cambridge University Press.
- Watts, this volume
- Wegner, D. M., & Bargh, J.A. (1997). Control and automaticity in social life. In D. Gilbert, S. T. Fiske, & G. Lindzey (Eds.), *Handbook of social psychology*. Boston, MA: McGraw-Hill.
- Westen, D. (1994). Toward an integrative model of affect regulation: Applications to social-psychological research. *Journal of Personality*, 62, 641-667.
- Westen, this volume
- Wills, T. A. (1981). Downward social comparison principles in social psychology. *Psychological Bulletin*, 90, 245-271.
- Zelazo, this volume

### Author Note

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## Figure Captions

*Figure 1.* The “modal model” of emotion.

*Figure 2.* Recursion in emotion shown using a feedback loop in the modal model (Figure 2A), or, equivalently, using three iterations of the modal model (Figure 2B).

*Figure 3.* Emotion and related affective processes.

*Figure 4.* Emotion regulation and related processes.

*Figure 5.* A process model of emotion regulation that highlights five families of emotion regulation strategies.









