

CHAPTER 2

Development of Emotion Regulation

MORE THAN MEETS THE EYE

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Emotion regulation has captured the interest of behavioral scientists in many disciplines, and one reason is that it addresses core scientific and practical concerns. The nature of emotion regulation—that is, the imposition of higher, rational control over lower, more basic emotion systems to accomplish adaptive goals—highlights fundamental issues in emotion theory, including the role of emotion in adaptive functioning and how to distinguish activational and regulatory influences on emotion. Emotion regulation can be studied at multiple levels of analysis, including neurobiological foundations, the cognitive construction of emotional experience, relational influences, cultural constraints, social facilitation and inhibition, and temperamental individuality, and thus poses opportunities for integrative thinking across these levels. Research on emotion regulation also has practical applications and is often motivated by these applied concerns. The association of emotion regulation with personal adjustment, social competence, and even cognitive functioning suggests that emotion regulation is a core developmental achievement with significant personal consequences. This has contributed to the conceptualization of many forms of child and adult psychopathology (including depression, anxiety disorders, conduct problems, and other internalizing and externalizing disorders) as problems of emotion dysregulation, with new therapeutic approaches to enhance capacities for emotion self-management.

Scientific enthusiasm for emotion regulation must address, however, a number of conceptual and empirical challenges. When emotion regulation is viewed in systems terms involving continuing interaction between higher and lower processes, for example, it becomes apparent that emotion

regulation is a component of (rather than a separate process of) emotional activation. Identifying “adaptive” strategies depends on context and conditions of psychobiological or environmental factors. Emotion regulation thus may not always result in positive outcomes or offer immediate benefits. Furthermore, emotion regulation derives not merely from maturation of neural capacities but also from more complex, integrated network of component processes.

These are important challenges in the developmental study of emotion regulation. Our goal in this chapter is to profile a developmental theory of emotion regulation and its implications for applied science in this area. Although there are many dilemmas currently facing researchers toward a more complex and integrative theory of emotion regulation and its functioning, we focus here on its practical applications. Our discussion addresses definitional challenges facing emotion regulation, a survey of some of the important developmental issues in the growth of emotion self-management, and the implications of these definitional and developmental challenges for emotion regulation and psychopathology before c

Defining Emotion Regulation

Although it is a phenomenon common to many cultures, there is much to debate about the definition of emotion regulation (cf. Bridges, Denham, & Ganiban, 2004; Cole, Martin, & Dennis, 2004; Gross, 1994). Developmental scientists share a common interest in the relation of emotion regulation and the development of self-regulation, and the creation of multifaceted changes in emotion regulation as well as minimizing emotional reactivity. The question of whether emotion regulation arises from external or internal factors, and the extent to which regulatory influences are goal-directed, are also important. Our own definition addresses these and other issues:

Emotion regulation consists of the processes that are used for monitoring, evaluating, and

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regulation is a component of (rather than only a response to) emotional activation. Identifying “adaptive” and “maladaptive” emotion regulation strategies depends on context and goals, moreover, especially in conditions of psychobiological or environmental adversity, and emotion regulation thus may not always result in positive long-term outcomes even when it offers immediate benefits. Furthermore, the growth of emotion regulation derives not merely from maturation of higher neurobiological or behavioral capacities but also from more complicated development of a multifaceted network of component processes.

These are important challenges, and because they commonly arise in developmental study of emotion regulation, they are the focus of this chapter. Our goal is to profile a developmental perspective to the growth of emotion regulation and its implications for developmental psychopathology, with special attention to the challenges facing future basic and applied science in this area. Although we do not have answers for each of the dilemmas currently facing the field, we believe that they will lead researchers toward a more complex and nuanced view of the nature of emotion regulation and its functioning that will ultimately prove more useful for its practical applications. Our discussion opens by profiling some of the definitional challenges facing emotion regulation researchers, followed by a survey of some of the important developmental processes governing the growth of emotion self-management. We then consider the implications of these definitional and developmental issues for questions of emotion regulation and psychopathology before offering some concluding thoughts.

Defining Emotion Regulation

Although it is a phenomenon common to everyday experience, there is more to emotion regulation than meets the eye, and developmental researchers continue to debate the definition of emotion regulation and its core features (cf. Bridges, Denham, & Ganiban, 2004; Campos, Frankel, & Camras, 2004; Cole, Martin, & Dennis, 2004; Gross & Thompson, 2007; Thompson, 1994). Developmental scientists share in common a functionalist orientation to emotion regulation and the view that regulatory influences can create multifaceted changes in emotion (e.g., maintaining, enhancing, as well as minimizing emotional responses). However, they disagree about whether emotion and emotion regulation can be distinguished, whether emotion regulation arises from extrinsic as well as intrinsic influences, and the extent to which regulatory influences consistently advance adaptive goals. Our own definition addresses some of these definitional challenges and others:

Emotion regulation consists of the extrinsic and intrinsic processes responsible for monitoring, evaluating, and modifying emotional reactions, especially

their intensive and temporal features, to accomplish one's goals. (Thompson, 1994, pp. 27–28)

Several features of this definition bear further comment. First, this definition implicitly distinguishes emotion from emotion regulation, although, as we later comment, this distinction is far more complex and nuanced than it might first appear. Second, regulatory processes can target positive as well as negative emotions and can create changes in both the intensity and the temporal qualities of emotional responding (such as changing the speed of onset or recovery, persistence, range, or lability of emotional responding). This is important as a corrective to the common expectation that emotion regulation is devoted to minimizing negative affect and also because many conditions of psychopathology are characterized not just by the prevalence of negative affect but also by disturbances in the intensity, persistence, or lability of negative and positive emotion. Third, emotion is managed through the extrinsic influence of other people as well as the person's own efforts. This is important to developmental analysis because emotions are primarily managed by caregivers early in life, and a child's emotional repertoire and tolerances are shaped by these experiences of extrinsic emotion regulation. This is also important to understanding emotion-related psychopathology because of how social facilitation or inhibition can contribute to managing emotion in adaptive or maladaptive ways.

Fourth, a core feature of our definition of emotion regulation is that emotion regulation is defined functionally. In other words, emotion regulation is guided by the regulator's goals in a specific emotion-eliciting context. Emphasizing the goals motivating emotion regulation and the context in which it occurs together underscores the point that strategies of emotion regulation are rarely inherently adaptive or maladaptive; such a distinction can be made only with reference to the functions of these strategies in specific contexts. This is apparent in developmental analysis. Misunderstanding children's goals for emotion management can cause adults to perceive them as emotionally dysregulated in situations where children are functioning quite well as emotional tacticians (e.g., a toddler fussing for candy, an adolescent becoming moody to elicit sympathy from friends). Multiple goals can govern emotion regulatory efforts, moreover, and different self-regulatory strategies can serve different goals in different contexts. A child who has been threatened by a peer, for example, may experience conflict between managing emotion to enlist the assistance of others (by enhancing distress and controlling anger), defending oneself and deterring aggression (by controlling fear and enhancing feelings of anger), avoiding further conflict (by controlling feelings of anger and distress), or accomplishing other goals. There may be different immediate and long-term consequences of each strategy, which makes determining their adaptiveness in this context especially difficult. The same is true of adults: A medical professional's skilled self-regulation of negative emotion in emergency situations may blunt empathic sensitivity in other contexts.

Added to this functionalist analysis such as the child's relationship with the child, these children are socialized to avoid negative emotions. (see Cole, Bruschi, & Tamang, 2002) is important: If the child comes from a culture where expressions of anger are important to self-regulation, by caregivers, an adaptive emotion regulation strategy is different than in another sociocultural context. Although a functionalist approach to emotion regulation is complex and caution in judgments about the effectiveness of emotion regulation strategies, it is important to bring attention to the nature of the individual's experience of contextual influences. As we discuss later, to understand psychopathology from the perspective of emotion regulation and dysregulation.

Finally, emotion regulation includes the child's emotional experience as well as evaluative monitoring and cognitive appraisal. This is central to emotion regulation because the child's goals in that context, and the strategies used to manage them, are defined by this analysis. This definitional feature is important to developmental analysis because children's capacities for emotion regulation change considerably from infancy through adulthood, and this influence on the growth of emotion regulation is central (Thompson & Lagattuta, 2006). It also is important to note that goals are likely to be different for children and adults because of their biological vulnerability to negative emotions. Their experiences of heightened emotion and their needs for emotion regulation will be different because of characteristics of children and adults whose goals for emotion management are their hypersensitivity to negative affect or their dysfunctional appraisals.

Incorporating emotion appraisal into the model of emotion regulation is important for other reasons. Emotion regulation processes can influence emotional reactivity through modulation of emotion activation: not just modulation of cognitive appraisals and, for that matter, modulation of context selection, and other elements of the process (Gross & Thompson, 2007). This model has important applications to therapeutic efforts to enhance self-regulatory capability.

Taken together, the purpose of emotion regulation is not just to manage negative affect. Otherwise, it seems fairly simple and straightforward. The complexity of emotion regulation shows that the complexity of emotion

of emotion itself and the personal and social goals its expression serves. Understanding the importance of the goals for managing emotion, contextual influences, the effects of other people on emotion regulation, and the significance of the cognitive appraisals and self-monitoring is important for developmental analyses because these features change significantly from infancy through the life course. They are also important for applying the concept of emotion regulation to clinical thinking because of the complexity of the circumstances contributing to emotion-related psychopathology in children and adults.

Development of Emotion Regulation

How does emotion regulation change over the course of development? In light of the foregoing considerations, characterizing the development of emotion regulation as better management of negative emotions is incomplete (Thompson & Goodvin, 2007). The growth of emotion regulation also includes:

- The transition from emotion regulation primarily by others to increasingly self-initiated regulation as children assume responsibility for managing their own positive and negative feelings.
- Growing reliance on mentalistic strategies of emotion self-regulation (e.g., attentional redirection, cognitive reappraisal) over behavioral tactics that rely on contextual support (e.g., seeking help, avoiding emotionally arousing events).
- Increasing breadth, sophistication, and flexibility in the use of different emotion regulation strategies, including capacities to manage emotion in contextually appropriate ways, substituting more effective strategies after others have proven ineffective, and using multiple strategies when needed (e.g., simultaneously enlisting attentional and cognitive strategies to control emotion).
- Enlisting emotion-specific self-regulatory strategies (such as managing fear but not anger through encouraging self-talk) as well as emotion-general strategies (e.g., withdrawal from situations that arouse negative affect).
- Growing sophistication in the social and personal goals underlying self-regulatory efforts (e.g., enlisting emotion regulation to manage social relations, improve cognitive functioning, support self-esteem), and incorporation of cultural and subcultural norms into self-regulatory efforts.
- Development of consistent individual differences in emotion regulation goals, strategies, and general style (e.g., people as emotion suppressors, avoiders) with the development and consolidation of personality.

In this light, the development of emotion regulation is a complex network of loosely associated, attentional, and self-referential achievement goals, many of which are emotion specific but many of which are not. These mature emotion self-regulation capacities are one reason why researchers have found individual differences in emotion regulation. These differences are based on a combination of innate neurobiological capacities with different environmental influences (see Calkins, Gill, Johnson, & Sroufe, 1996).

In this section, we consider models of emotion regulation in infancy, childhood, and adolescence (see also Eisenberg & Morris, 2002; Thompson, 1990, 1994). We then consider the developmental correlates of these capacities and what they tell us about development from developmental neuroscience.

Infancy and Preschool

Emotion regulation begins from birth, with infants and other caregivers to manage a range of emotions. It is notable that emotion regulation begins to develop in the face of maternal stress on fetal psychobiology (see Eisenberg & Hill, 2007). Beginning in infancy and childhood and adolescence, parents and other caregivers soothe children's emotional reactions by soothing play, organizing daily routines to create a sense of predictability, providing reassurance in uncertain circumstances, and providing support in emotionally demanding situations. Surprisingly early in life, these interventions have emotionally regulatory effects. Distressed infants begin quieting in response to their mother when they can hear her breathe softly, or testing loudly if the adult approaches them (Gekoski, Rovee-Collier, & Calkins, 1986). Together with the positive support provided by adults in parent-child relationships, these early experiences embed developmental pathways for emotion regulation in social interaction and the quality of the parent-child relationship.

Nascent capacities for emotion self-regulation are evident in newborns. Newborns have innate approach-withdrawal responses to aversive stimuli and are equipped with pre-reflective capacities (such as sucking) that help to manage arousal.

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In this light, the development of emotion regulation involves growth in a complex network of loosely allied neurobiological, conceptual, relational, and self-referential achievements, some of which are regulatory and emotion specific but many of which are not. Many of the constituents of mature emotion self-regulation are also slowly developing. Consequently, one reason why researchers have found that early-emerging individual differences in emotion regulation are not very stable over time is because these differences are based on a changing constellation of behavioral and neurobiological capacities with different maturational timetables and origins (see Calkins, Gill, Johnson, & Smith, 1999; Grolnick, Bridges, & Connell, 1996).

In this section, we consider major advances in the development of emotion regulation in infancy, childhood and adolescence, and adulthood (see also Eisenberg & Morris, 2002; Fox & Calkins, 2003; Kopp, 1989; Thompson, 1990, 1994). We then consider the developing neurobiological correlates of these capacities and what we learn about emotion regulation from developmental neuroscience.

Infancy and Preschool

Emotion regulation begins from birth in the heroic efforts of parents and other caregivers to manage a newborn's arousal (indeed, it is arguable that emotion regulation begins *prenatally* if we consider the effects of maternal stress on fetal psychobiological stress responsivity; see Calkins & Hill, 2007). Beginning in infancy and continuing throughout much of childhood and adolescence, parents directly intervene to manage children's emotional reactions by soothing distress, engaging in exuberant play, organizing daily routines to create manageable emotional demands, providing reassurance in uncertain circumstances, and offering assistance in emotionally demanding situations (Thompson & Meyer, 2007). From a surprisingly early age, these interventions create social expectations that have emotionally regulatory effects. By 6 months of age, for example, distressed infants begin quieting in apparent anticipation of the arrival of their mother when they can hear the adult's approaching footsteps, protesting loudly if the adult approaches but does not pick them up to soothe them (Gekoski, Rovee-Collier, & Carulli-Rabinowitz, 1983; Lamb & Malkin, 1986). Together with the positive expectations and self-regulatory support provided by adults in parent-infant play (Adamson & Frick, 2003), these early experiences embed developing capacities for stress tolerance and emotion regulation in social interaction and contribute to the developing quality of the parent-child relationship.

Nascent capacities for emotion self-regulation emerge early, however. Newborns have innate approach-withdrawal responses to pleasant or aversive stimuli and are equipped with primitive self-soothing behaviors (such as sucking) that help to manage arousal. Early in the first year, the maturation

tion of neurobiological attentional systems provides infants with greater voluntary control over looking and the ability to disengage from emotionally arousing events (Posner & Rothbart, 2000; Rothbart, Posner, & Boylan, 1990). Later in the first year, advances in motor control enable infants to be more deliberate in their efforts to manage distress by reaching toward caregivers for comfort, self-soothing (sometimes with a special toy or blanket), or avoiding or departing from unpleasant situations.

The importance of temperamental individuality further underscores the biological foundations of emotion regulation in the early years. Temperamental characteristics can affect emotion management in at least three ways (Thompson & Goodvin, 2007). First, certain qualities, particularly thresholds for the arousal of negative emotion, contribute to the intensity and persistence of emotional responses that require regulation. Toddlers who are high in emotional reactivity for fear or anger, for example, have been found to be lower in emotional self-control in independent assessments (Calkins et al., 1999; Calkins & Hill, 2007). Second, other temperamental qualities, such as effortful control, are directly associated with enhanced emotion regulation and behavioral self-control (Kochanska, Murray, & Harlan, 2000). Third, temperamental qualities may influence the development of emotion regulation through their interaction with caregiving influences: Temperament is important primarily in the context of certain qualities of care. In a study of the responses of 18-month-olds to moderate stressors, for example, Nachmias and her colleagues reported that the interaction of toddlers' inhibited temperament with an insecure parent-child relationship predicted elevations in cortisol levels (Nachmias, Gunnar, Mangelsdorf, Parritz, & Buss, 1996). Only toddlers who were both insecurely attached and highly inhibited exhibited physiological stress; for inhibited toddlers in secure relationships, the mother's presence helped to buffer the physiological effects of challenging events, and uninhibited toddlers functioned well regardless of the security of attachment. Studies such as these are important for underscoring that, although the biological foundations of emotion regulation are important, the most useful approach to understanding the growth of self-regulatory capacity is through the interaction of biological vulnerability or resiliency with social support or stress.

Childhood and Adolescence

With the growth of language in early childhood, emotions become represented mentally and better understood in relation to other events. This provides young children with greater conceptual tools for managing their feelings. By age 2, for example, they can be overheard making spontaneous comments about emotion, the causes of emotion, and even emotionally regulatory efforts (e.g., "I scared of the shark. Close my eyes" at 28 months) (see Bartsch & Wellman, 1995; Bretherton, Fritz, Zahn-Waxler,

& Ridgeway, 1986). During the preschool years, children begin to understand the associations between emotion and events that evoke them, the connections between internal states (such as perceptions, desires, and intentions) and emotional experience, and even the influence of social context on emotional experience (e.g., "Kato felt sad because she was coming, but really she was") and metacognition (e.g., "The adult's comment reminded you of a loss"). Advances in emotion regulation (see Thompson & Goodvin, 2006, for a review). As a consequence, children's emotional states can be managed by fleeing, removing oneself, or ignoring emotionally arousing events, or by using other forms of self-comforting and seeking the assistance of others to regulate their feelings (Thompson, 1990).

These conceptual advances in emotion regulation help to foster emotion self-regulation or social regulation. Toddlers' awareness of the associations between internal states and desires may cause them to become inhibited or to seek help before they can feel better. An older preschooler's knowledge of emotional experience (i.e., that other people have feelings) can contribute to teasing and social interaction, such as when a 5-year-old smiles at a friend in the presence of the gift giver. Taken together, these advances in emotion understanding of early childhood help to foster emotional experience and enhance emotion regulation. Growing self-awareness and development of social skills are incentives to enlist these skills. Children who will be praised by adults who matter to them.

The growth of young children's emotion understanding also provides further opportunities for parents to contribute to emotion regulation. Encouraging children to say how you feel" enlists children's use of emotional self-control and illustrates the importance of regulatory strategies for young children. In everyday circumstances, parents assist children in using specific strategies that might be used to regulate ("It's just a game") to problem-focus ("Let's think about this?") to attention shifting ("Let's talk about something else") to enhance young children's developing emotion regulation (Miller & Sperry, 1987). Their encouragement in the context of a warm parent-child relationship helps children's developing beliefs in the efficacy of their knowledge of what they can do. Emotion regulation in the context of everyday conversation helps children to understand about their own feelings or the feelings of others and adults provide information about emotion.

ems provides infants with greater ability to disengage from emotion- (2000; Rothbart, Posner, & Boylan, in motor control enable infants to manage distress by reaching toward sometimes with a special toy or blanket pleasant situations. Individuality further underscores regulation in the early years. Temperament management in at least (2007). First, certain qualities, particularly negative emotion, contribute to the responses that require regulation. Activity for fear or anger, for example, emotional self-control in independent (2007). Second, other temperament control, are directly associated with behavioral self-control (Kochanska, Temperamental qualities may influence on through their interaction with important primarily in the context of the responses of 18-month-olds to (2007) and her colleagues reported elevated temperament with an insecure elevations in cortisol levels (Nachreiner & Buss, 1996). Only toddlers who highly inhibited exhibited physiologic relationships, the mother's presence effects of challenging events, and regardless of the security of attachment for underscoring that, although regulation are important, the most growth of self-regulatory capacity is vulnerability or resiliency with social

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& Ridgeway, 1986). During the preschool years, young children comprehend the associations between emotions and the situations that commonly evoke them, the connections between emotions and other psychological states (such as perceptions, desires, and expectations), the subjectivity of emotional experience, and even the association between emotions and mistaken beliefs (e.g., "Kato felt sad because he *thought* his mother wasn't coming, but really she was") and memory (e.g., feeling sad because an adult's comment reminded you of a lost pet) (see Thompson & Lagattuta, 2006, for a review). As a consequence, young children are aware that emotions can be managed by fleeing, removing, restricting their perception of, or ignoring emotionally arousing events; they are also aware of the value of self-comforting and seeking the assistance of caregivers for managing their feelings (Thompson, 1990).

These conceptual advances in emotion understanding do not always foster emotion self-regulation or socially appropriate conduct, however. Toddlers' awareness of the association between sadness and unfulfilled desires may cause them to become insistent on getting what they want before they can feel better. An older preschooler's awareness of the privacy of emotional experience (i.e., that others can be misled about how you are feeling) can contribute to teasing and deception but also to social sensitivity, such as when a 5-year-old smiles after opening a disappointing gift in the presence of the gift giver. Taken together, the conceptual achievements in emotion understanding of early childhood contribute complexity to emotional experience and enhance emotion regulation. Young children's growing self-awareness and developing self-image also provide motivational incentives to enlist these skills to manage their feelings in ways that will be praised by adults who matter to them.

The growth of young children's conceptual understanding of emotion also provides further opportunities for parents and other caregivers to contribute to emotion regulation. The familiar parental maxim "Use words to say how you feel" enlists developing language ability into emotional self-control and illustrates the growth of parental coaching of self-regulatory strategies for young children (Thompson & Meyer, 2007). In everyday circumstances, parents assist in emotion regulation by suggesting specific strategies that might be helpful, from cognitive reframing ("It's just a game") to problem-focused coping ("What can you do to fix this?") to attention shifting ("Let's think of something else to do") that enhance young children's developing self-regulatory capacities (see, e.g., Miller & Sperry, 1987). Their encouragement of these strategies, especially in the context of a warm parent-child relationship, contributes to young children's developing beliefs in the manageability of their feelings and knowledge of what they can do. Emotion regulation is also socialized in the context of everyday conversations in which parents and children comment about their own feelings or the emotions of others, and during which adults provide information about emotion and its causes, convey sociocul-

tural expectations for emotion and its expression, and comment on strategies for emotion management (Thompson, Laible, & Ontai, 2003). These conversations also become a context for learning gender differences in emotion and its expression (Fivush, 1998). The growth of language-based mental representations of emotion in early childhood thus significantly expands the scope of socialization influences by which children learn to manage their feelings.

Early socialization of emotion regulation is multilayered and complex, however. It is influenced, for example, by how caregivers evaluate young children's emotional responses in sympathetic and constructive ways or instead by dismissing, denigrating, or criticizing them, particularly when children are expressing negative feelings. Considerable research indicates that children develop more constructive emotion regulatory capacities when parents respond acceptingly and supportively to their negative emotions (see Denham, Bassett, & Wyatt, 2007; Eisenberg, Cumberland, & Spinrad, 1998). However, parents sometimes misidentify children's feelings and, as a consequence, may coach emotion regulation strategies in ways that are unhelpful or irrelevant. In our lab, mothers and their 4½-year-old children participated in a frustration task and afterward separately watched a videotape of this task and were interviewed about how the children felt. Nearly 60% of the mothers reported *different* emotions from those the children self-reported, even though children's reports were confirmed by observational ratings of the frustration task. Maternal representations of emotion in their own lives (e.g., beliefs about the importance of attending to emotional experience) and the quality of the mother-child relationship were important predictors of mother-child concordance in this study.

Finally, early socialization of emotion regulation is also affected by the broader emotional climate of family life and its emotional demands, models of emotional coping, and expectations for emotional self-control. An emotionally positive home environment fosters the development of more constructive emotion regulatory capacities in children than one characterized by intrafamilial anger and hostility (Halberstadt, Crisp, & Eaton, 1999; Halberstadt & Eaton, 2003). Consistent with this view, young children with secure attachments to their caregivers are more competent at managing their negative emotions than are children with insecure attachments (see Thompson & Meyer, 2007, for a review).

With the conceptual advances of middle childhood and adolescence, emotion understanding and emotion regulation incorporate deeper insight into the mental, attitudinal, personality, and motivational qualities that also inform self-understanding (Thompson, 1990, 1994). Older children are more competently self-reflective, and as they think about their emotional experiences and those of others, they become more competently self-managing. Children's developing awareness, for example, of how emotional intensity gradually dissipates over time, how personal background and personality can yield unique emotional reactions, and how

the same event can provoke mixed emotions, inform their use of informed strategies of emotion regulation. Older children and adolescents recognize how emotions can be regulated (such as thinking of happy things in response to negative thoughts) and cognitively reframing the situation (such as recognizing that negatives have been frustrated), acting in ways that regulate their emotional response (such as behaviorally coping with or altering the physiological dimension of the emotion). Older children and adolescents (Thompson, 1990). These approaches are complemented by strategies such as playing music that has special meaning or seeking support from close friends.

One reason why older children and adolescents are more cognitively oriented emotion regulators is their more developed executive functions that include strategic planning, error correction, and inhibitory control (Thompson & Ham, 2007). The neurobiological foundation for these functions (primarily in the prefrontal cortex) continues its maturational course, and the growth of these capacities through adolescence has important implications for behavioral and emotional regulation. In childhood, these developing capacities enable children to become more competent and careful problem solvers and to regulate their emotions in a more strategic manner.

A broadened social context also influences the development of emotion regulation. Peer relationships (including sibling relationships) present children with new models, and incentives for emotion regulation. Beginning in the preschool years, children requires young children to coordinate their emotions with others (children who are less competent socially). Children learn to negotiate over shared resources, to resolve conflict, well as accurately perceive and respect the "feeling rules" of the peer environment. These relationships are important for emotion regulation, and research indicates that social competence with peers is significantly related to emotion regulation competence, including their skills in regulating their own emotions (Thompson et al., 2003). With the increasing importance of peer relationships in middle childhood, furthermore, emotion regulation takes on a more important form of affective self-disclosure and self-regulation for feeling rules as well as offering support to others in emotion self-regulation (Gottman & Levenson, 1992). It is important, therefore, because the sk

pression, and comment on strategies (Laible, & Ontai, 2003). These learning gender differences in early childhood thus significantly influence the ways by which children learn to

regulation is multilayered and complex, especially how caregivers evaluate young children's athletic and constructive ways or criticize them, particularly when they are sad. Considerable research indicates that children's emotion regulatory capacities when they are exposed to their negative emotions are related to their caregivers' ability to identify children's feelings and, as a result, to use regulation strategies in ways that are sensitive to their needs. For example, mothers and their 4½-year-old children were asked to watch a video about how the children felt. Nearly 80% of the children's emotions from those the children reported were confirmed by observational coding of their external representations of emotion. The importance of attending to emotion in the mother-child relationship were consistent with the findings of this study.

Emotion regulation is also affected by the child's temperament and its emotional demands, models, and opportunities for emotional self-control. An environment that fosters the development of more opportunities in children than one characterized by high reactivity (Halberstadt, Crisp, & Eaton, 2003) is consistent with this view, young children's caregivers are more competent at regulating their own emotions than are children with insecure attachment (for a review).

In middle childhood and adolescence, children's regulation incorporate deeper cognitive, personality, and motivational qualities (Thompson, 1990, 1994). Older children are more reflective, and as they think about their own and others, they become more complexly aware, for example, of how their own attitudes over time, how personal background influences emotional reactions, and how

the same event can provoke mixed emotions leads to more psychologically informed strategies of emotion regulation. In middle childhood, young children recognize how emotions can be managed by internal distraction (such as thinking of happy things in difficult circumstances), redirection of thoughts (such as analyzing the technical qualities of a scary movie), cognitively reframing the situation (such as changing goals when initial objectives have been frustrated), acting in a manner that fosters a competing emotional response (such as behaving indifferently in anxious situations), altering the physiological dimensions of emotional arousal (e.g., breathing deeply), or concentrating on the benefits of managing one's feelings or their expression (Thompson, 1990). In adolescence, these self-regulatory approaches are complemented by strategies that are unique and personal, such as playing music that has special meaning to evoke desired feelings or seeking support from close friends.

One reason why older children are capable of enlisting these psychologically oriented emotion regulation strategies is because of growth in executive functions that include strategic planning, error detection and correction, and inhibitory control of initial responses (Zelazo & Cunningham, 2007). The neurobiological foundations of these executive functions (primarily in the prefrontal cortex) emerge early but have a prolonged maturational course, and the growth of executive functions in childhood and adolescence has important implications for thinking and problem solving as well as for behavioral and emotional self-control. In middle childhood, these developing capacities enable children to be more thoughtful and careful problem solvers and to respond emotionally in a less impulsive and more strategic manner.

A broadened social context also contributes to developing sophistication in emotion regulation. Peer relationships (and, to a lesser extent, sibling relationships) present children with different emotional demands, models, and incentives for emotion regulation than do parent-child relationships. Beginning in the preschool years, social competence with peers requires young children to coordinate their behavior with that of other children (who are less competent social partners than adults), manage conflict, negotiate over shared resources or interests, and assert self-interest as well as accurately perceive and respond to others' feelings and master the "feeling rules" of the peer environment. These are formidable challenges for emotion regulation, and research has shown that young children's social competence with peers is significantly affected by their emotional competence, including their skills in emotion self-regulation (Denham et al., 2003). With the increasing importance of peer relationships in middle childhood, furthermore, emotion talk between friends becomes a significant form of affective self-disclosure and a way of acquiring group norms for feeling rules as well as offering and receiving support for competent emotion self-regulation (Gottman & Parker, 1986). Peer relationships are important, therefore, because the skills of emotion regulation required in

the family or other adult contexts may not generalize well to the norms and demands of the peer environment; thus, interactions with other children provide a forum for broadening a child's repertoire of self-regulatory skills as well as learning how to adapt skills to different social contexts.

Adulthood

The development of emotion regulation does not end with adolescence, and its continuing growth underscores the importance of the personal goals and social contexts governing emotional self-control. Although there are important individual differences in self-regulatory styles and biases, by early adulthood most individuals have acquired a basic repertoire of strategies for managing emotions and their social expression (John & Gross, 2007). These skills enable adults to function successfully in the employment, familial, recreational, and other social contexts that characterize their lives. In concert with personality, gender, and cultural influences on emotion regulation, these contexts guide expectations for emotional self-control and the goals for emotional management that individuals must achieve (compare, e.g., the requirements for emotional management of a judge, a medical doctor, a professional athlete, and an entertainer). To be successful, adults must refine the repertoire of self-regulatory skills needed to function in the different contexts in which they live and work, perceptive of the emotional goals that must be achieved in these contexts, and acting consistently with self-perceived personality characteristics, gender expectations, and cultural norms.

Emotion regulation also changes developmentally during the adult years in ways that are consistent with this analysis. According to socioemotional selectivity theory (Carstensen, Isaacowitz, & Charles, 1999; Charles & Carstensen, 2007), changing time perspective during the adult years alters the priority accorded different investments of time and energy. When the future time horizon is long, investment in activities with future payoffs (e.g., knowledge and skill acquisition) is emphasized, but when the future time horizon is shorter, investment in activities that are emotionally meaningful is more important. As a consequence, older adults are more concertedly self-regulatory of their emotional experiences, striving to maintain close relationships that are affirming (such as with family members), biased to appraise situations more positively, and actively modifying their circumstances to create more manageable emotional demands (such as avoiding people and contexts that create anxiety). The view that older adults engage in these strategies as part of a broadly self-regulatory approach to emotional experience emphasizes the importance of these emotional goals and context and contrasts with traditional theories of later-life emotion that emphasize either social disengagement or the association of aging with decline in neurobiological emotion systems.

Neurobiology and the Development of Emotion Regulation

Emotion fundamentally involves a duality of excitatory and inhibitory systems. These neurobiological systems are present at birth. Subcortical structures of the limbic system and hypothalamus, function in concert with the hypothalamic-adrenocortical (HPA) axis to activate and arouse the newborn. The HPA axis follows a developmental course, and there are important developmental changes in the early years that are influenced, in part, by the environment (Gunnar & Vazquez, 2006). Inhibitory control systems (particularly the dorsolateral PFC and anterior cingulate, and the parasympathetic system) develop later (Porges, Doussard-Roosevelt, & Nelson, 2007). In the early years, the gradual maturation of these systems also helps to account for developmental changes as the transition from the reactive, uncontrolled, and ungraded of the young child. Maturation of these systems is also associated, as earlier noted, with the development of inhibitory control over impulses that involve more reasoned responding, strategic planning, and self-regulation. These developing neurobiological changes provide the foundation for emotional regulation and also contribute to the developmentally responsive and manageable nature of the developmental neurobiology of emotion regulation. The maturational unfolding of higher-order regulatory control over lower limbic system structures is a key feature of emotional activation.

This straightforward story is, in fact, complicated. It is mentioned in favor of a more complex view that emphasizes the continuing interaction between "regulatory" emotion systems (e.g., Limbic system; Quirk, 2007; Thompson, Lewis, & Graybiel, 2007) and the limbic structures: The PFC exerts inhibitory control over the amygdala, for example, but the amygdala also exerts influence on the PFC, leading to emotional meanings that have been discussed elsewhere (Graybiel & Todd, 2007; Quirk, 2007). In this view, the development of emotion regulation occurs through the interaction between these systems, not just the inhibitory influence of the PFC on the amygdala.

A second reason why research on emotion regulation is a promising approach, consistent with the foregoing

generalize well to the norms and interactions with other children repertoire of self-regulatory skills in different social contexts.

It does not end with adolescence, the importance of the personal emotional self-control. Although there are different self-regulatory styles and biases, by age 3, children require a basic repertoire of strategies for social expression (John & Gross, 2007) and function successfully in the employment, social contexts that characterize adolescence, and cultural influences on the development of expectations for emotional self-management that individuals must learn for emotional management of a professional athlete, and an entertainer). To be successful in these contexts, and to achieve the self-regulatory skills needed in these contexts, and to understand personality characteristics, gender

developmentally during the adult years. According to socioemotional theory (Lachar, & Charles, 1999; Charles & Charles, 1999), the investment perspective during the adult years involves investments of time and energy. Investment in activities with future benefits (such as education) is emphasized, but when the investment in activities that are emotionally demanding (such as family membership) is emphasized, older adults are more likely to invest in emotional experiences, striving to manage them positively, and actively modify them to meet manageable emotional demands that create anxiety). The view that emphasizes the importance of these strategies contrasts with traditional theories of emotional regulation, such as social disengagement or the association of emotion systems.

Neurobiology and the Development of Emotion Regulation

Emotion fundamentally involves a dynamic relation between arousal and inhibitory systems. These neurobiological systems are active but immature at birth. Subcortical structures of the limbic system, including the amygdala and hypothalamus, function in concert with the hypothalamic–pituitary–adrenocortical (HPA) axis to activate sympathetic nervous system activity and arouse the newborn. The HPA system has an extended maturational course, and there are important declines in systemic lability during the early years that are influenced, in part, by the responsiveness of caregivers (Gunnar & Vazquez, 2006). Inhibitory systems also have a long maturational course and include multiple regions of the prefrontal cortex (PFC) (particularly the dorsolateral PFC and the orbitofrontal cortex), the anterior cingulate, and the parasympathetic nervous system (Ochsner & Gross, 2007; Porges, Doussard-Roosevelt, & Maiti, 1994; Zelazo & Cunningham, 2007). In the early years, the gradual maturation of these inhibitory systems also helps to account for developmental changes in emotionality, such as the transition from the reactive, all-or-none quality of newborn arousal to the more graded, controllable, and environmentally malleable emotions of the young child. Maturation of the prefrontal cortex later in childhood is also associated, as earlier noted, with the growth of executive functions that involve inhibitory control over impulsive reactions and the substitution of more reasoned responding, strategic planning, and error correction. These developing neurobiological capacities have significant implications for emotional regulation and also make emotional reactions more environmentally responsive and manageable through extrinsic incentives. Thus, the developmental neurobiology of emotion regulation can be regarded as the maturational unfolding of higher cortical inhibitory systems that exert regulatory control over lower limbic and neurohormonal systems governing emotional activation.

This straightforward story is, however, becoming increasingly questioned in favor of a more complex neurobiological account that emphasizes the continuing interaction between lower “activational” and higher “regulatory” emotion systems (e.g., Lewis & Todd, 2007; Ochsner & Gross, 2007; Quirk, 2007; Thompson, Lewis, & Calkins, 2009). A primary reason is the mutual influence that exists between regulatory cortical systems and limbic structures: The PFC exerts inhibitory control over the amygdala, for example, but the amygdala also constrains cortical processing according to emotional meanings that have been previously established (Lewis & Todd, 2007; Quirk, 2007). In this view, therefore, emotion regulation occurs through the interaction between higher and lower brain systems, not just the inhibitory influence of cortical systems alone.

A second reason why researchers favor a more integrative systems approach, consistent with the foregoing, is that the effects of early-emerging

emotional biases may exert strong influence throughout emotion-relevant brain systems. In one study, for example, 2-year-olds who were behaviorally identified either as emotionally shy/inhibited or as uninhibited were later studied as adults, and functional magnetic resonance imaging analyses revealed heightened amygdala activation in the inhibited group when viewing novel (vs. familiar) faces but no differences in the uninhibited group (Schwartz, Wright, Shin, Kagan, & Rauch, 2003). Although more longitudinal research is needed, these findings suggest that a strong biological bias toward fearful reactions to unfamiliar events based in limbic system thresholds may color emotional processes to maturity, despite the growth of higher cortical inhibitory systems. Importantly, these early biases can be established temperamentally, experientially (such as through chronic fear activation), or by an interaction between biological predispositions and caregiving quality (Calkins & Hill, 2007). Finally, a neurobiological systems view is consistent with the recognition that emotion regulatory influences do not always follow emotional activation but may precede it. This occurs, for example, through antecedent-focused emotion regulation strategies that manage emotion through anticipatory appraisals, situation selection, and other strategies intended to avert anticipated emotional reactions before they occur (Gross & Thompson, 2007). Such antecedent-focused self-regulation strategies are likely based on a combination of lower and higher neurobiological systems.

What does this updated developmental neurobiological account mean for the development of emotion regulation? First, differences between emotion and emotion regulation cannot be directly mapped onto the distinction between antecedent activation processes and consequent inhibitory processes. Instead, emotion regulation must be viewed as a continuing component of emotion itself, with the interaction between higher and lower neurobiological systems regulating emotional reactions (Thompson et al., 2009). This does not mean that emotion regulation cannot be studied as a distinct process, but rather that the focus should be on the reciprocal influences of multiple emotion-related brain systems rather than designating some systems as exclusively "activation" and others as specifically "regulatory." Second, the developmental neurobiology of emotion regulation is not just the maturation of higher cortical inhibitory systems but also their continuing interaction with more basic emotion systems lower in the neuroaxis. As earlier suggested, this developmental systems view means that early emotional biases may have a long-standing influence on developing neurobiological emotion systems. Finally, as we discuss further next, this systems view of emotion regulation means that regulatory processes do not necessarily result in psychologically constructive or even healthy outcomes. Particularly for individuals at biological vulnerability or environmental risk, the multilevel regulation of emotion may result in emotional functioning that has potentially maladaptive outcomes owing to the growth of stable interactions between lower and higher emotion systems

that contribute, for example, to depressive concomitants (Thompson et al.

Implications for Development and

A significant impetus to research on the development of emotion regulation is the association between difficulties in emotion regulation and psychopathology, including developmental psychopathology, including depression, bipolar disorder, and anxiety disorders. Other internalizing and externalizing disorders, such as posttraumatic stress disorder and conduct disorder, are also characterized by difficulties in emotion regulation, even young children's inability to adaptively regulate emotions may contribute to problems in social competence. Research on emotion regulation potentially enhance risk for affective disorders. Further research on emotion regulation is clearly evident.

Emotion regulation research continues to be a major focus in characterizing major psychological problems. It is also relevant to understanding emotion dysregulation and its functional consequences. In this chapter, for example, we have drawn on research on the development of children's emotions and the family's role in emotion self-regulation, which is often referred to as "expressed emotion"—parental criticism and hostility—in a number of clinical conditions. Research by Brody, Faraone, & Rosenbaum, 1999, on the role of emotion regulation in the etiology of anxiety and mood disorders includes the influence of emotion regulation on the maintenance of anxiety and mood disorders. With respect to assessment, Luby and Cohen's (1994) model of emotional dysregulation in children with attention-deficit/hyperactivity disorder includes the influence of emotion regulation on the clinical profiles in terms of variability in clinical profiles in terms of variability in clinical profiles, also the latency, rise time, duration, and amplitude of emotional responses. These and other formulations from the literature also have potential therapeutic implications.

One of the most important applications of emotion regulation research to clinical understanding is the role of emotion regulation in the development of children and adults at risk for emotional and behavioral problems. The emphasis on emotion goals and conditions in which individuals are able to manage emotions and the goals of emotion regulation whenever assessing the adaptiveness

ence throughout emotion-relevant 2-year-olds who were behaviorally inhibited or as uninhibited were later tested. Genetic resonance imaging analyses in the inhibited group when viewing faces in the uninhibited group (Kagan et al., 2003). Although more longitudinal studies suggest that a strong biological bias exists from early in life to maturity, despite the growth and maturation, these early biases can be important (such as through chronic interactions between biological predispositions and environment; Thompson, 2007). Finally, a neurobiological account of emotion regulation suggests that emotion regulatory processes may precede attentional activation but may precede it. Attention-focused emotion regulation involves anticipatory appraisals, situation appraisals, and attentional control (Thompson, 2007). Such antecedent processes are likely based on a combination of biological and environmental factors.

What is the neurobiological account of emotion regulation? First, differences between inhibited and uninhibited children cannot be directly mapped onto the developmental processes and consequent inhibition must be viewed as a continuous interaction between higher and lower emotional reactions (Thompson, 2007). Emotion regulation cannot be studied in isolation; the focus should be on the reciprocal interactions between different brain systems rather than designating "inhibited" and "uninhibited" as specifically defined neurobiology of emotion regulation. Cortical inhibitory systems but also subcortical basic emotion systems lower in the inhibited group. The developmental systems view means that the influence of development on emotion regulation is significant, as we discuss further next, which means that regulatory processes can be either socially constructive or even healthy. Biological vulnerability or environmental factors of emotion may result in emotional adaptive outcomes owing to the interaction between lower and higher emotion systems

that contribute, for example, to depressed or anxious affect and their cognitive concomitants (Thompson et al., 2009).

Implications for Development and Psychopathology

A significant impetus to research on emotion regulation is its applications to psychopathology, including developmental psychopathology. It is not difficult to see why. Many major affective disorders (such as depression, bipolar disorder, and anxiety disorder) involve dysregulated affect, and other internalizing and externalizing disorders (such as conduct problems, posttraumatic stress disorder, and attention-deficit/hyperactivity disorder) are also characterized by emotion undercontrol. Furthermore, even young children's inability to adaptively manage their feelings can contribute to problems in social competence and emotional adjustment and potentially enhance risk for affective psychopathology. The connections between research on emotion regulation and psychopathology seem self-evident.

Emotion regulation research contributes more, of course, than merely characterizing major psychological problems as difficulties of emotion dysregulation. It is also relevant to understanding the processes leading to emotion dysregulation and its functions in clinical populations. In this chapter, for example, we have drawn attention to how parents' evaluations of children's emotions and the family emotional climate influence adaptive emotion self-regulation, which is relevant to the influence of family "expressed emotion"—parental criticism, hostility, and emotional overinvolvement—in a number of clinical problems (Hirshfeld, Biederman, Brody, Faraone, & Rosenbaum, 1997). Our definition of emotion regulation includes the influence of emotion appraisals and self-monitoring, owing partly to the importance of these constructs to the onset and maintenance of anxiety and mood disorders (Campbell-Sills & Barlow, 2007). With respect to assessment, Luby and Belden (2006) have used Thompson's (1994) model of emotional dynamics to characterize the emotional regulatory difficulties of children with mood disorders, describing different clinical profiles in terms of variability in not just in the intensity but also the latency, rise time, duration, and recovery of emotional reactions. These and other formulations from the emotion regulation research literature also have potential therapeutic applications.

One of the most important applications of research on emotion regulation to clinical understanding is how we characterize the emotion dysregulation of children and adults at risk. Consistent with the functionalist emphasis on emotion goals and context, it is essential to understand the circumstances in which individuals with emotional problems are striving to manage emotions and the goals that they are seeking to accomplish whenever assessing the adaptiveness or maladaptiveness of their emotion

regulation strategies. In our view, the self-regulatory challenges faced by many children and adults at risk is not primarily that they are enlisting inappropriate or maladaptive strategies of emotion management, but that they are trying to cope with emotionally impossible conditions in which there may be no more adaptive manner of regulating emotion. Their self-regulatory strategies are likely to involve inherent trade-offs that purchase immediate coping at the cost of long-term difficulty and that ultimately increase rather than diminish their emotional problems (Thompson & Calkins, 1996; Thompson, Flood, & Lundquist, 1995). Because of this, emotion regulation is for them a double-edged sword: The strategies that are most adaptive for accomplishing immediate emotional goals often render individuals more vulnerable to longer term problems.

Emotion Regulation and Child Maltreatment

The importance of this approach to understanding emotion regulation is evocatively illustrated in the case of maltreated children. These children have elevated rates of a number of psychological disorders, including conduct disorder, attention-deficit/hyperactivity disorder, mood disorders, posttraumatic stress disorder, and substance abuse, so it is appropriate to view child maltreatment as a significant risk factor for psychopathology (Cicchetti & Toth, 1995). Children who experience physical or sexual abuse or chronic neglect are faced with a formidable challenge in emotion regulation: A caregiver who should be the source of support for coping is instead the source of distress. In this sense, we can view maltreated children as doubly disadvantaged: forced to manage the frequent, intense emotional trauma associated with their abuse without the assistance of caregiver support.

In this light, we would anticipate that maltreated children would be seriously deficient in skills of emotion self-regulation, but research evidence does not support this simple deficit model. Instead, a number of studies indicate that maltreated children acquire a repertoire of self-regulatory strategies that enable them to adapt to the unpredictable and potentially dangerous caregiving environment in which they live. These strategies confer some benefits to children at home but are a liability especially when these children enter other social settings, such as school or peer environments.

An important emotion regulation strategy is attention deployment: focusing on certain elements of the environment in ways that contribute to emotion management (Gross & Thompson, 2007). Several studies indicate that maltreated children are hypersensitive to adult expressions of anger, perhaps because this enables them to anticipate and prepare for abusive conduct before it begins. In one study, when pictures of adult facial expressions of emotion were progressively "morphed" from one prototypical expression (e.g., sadness) to another (e.g., anger), maltreated

children were more likely to identify the angry face than nonmaltreated children. Maltreated children also exhibit a lower level of anger in the vocal expressions of the woman) (Shackman & Pollak, 2005). Maltreated children are socially disengaging from perceived anger. In a study using event-related brain potentials (ERPs), maltreated children showed higher ERP responses to pictures of angry faces compared with nonmaltreated children, especially for pictures of happy or fearful faces (Thompson, Thatcher, & Cicchetti, 2001). Taken together, maltreated children are sensitized to anger, potentially because this sensitization teaches children to anticipate and prepare for anger. Children who have been abused in the past. In a socially overwhelming attack of an abuser, children may anticipate it and flee, avoid, or other

Outside the home, however, this sensitization undermines emotion management at school. Maltreated children are more physically aggressive than their peers (Cicchetti & Toth, 1995) and are more likely to withdraw from peer distress. In this respect, the hypersensitivity to anger at home is a liability at school, where children are more likely to be misinterpreted.

This double-edged sword of emotion regulation is apparent for other conditions of child maltreatment. Children with anxiety disorders, some of whom are hypersensitive to anxious affect, exhibit heightened sensitivity to provoking stimuli, active (sometimes over)attention to internal cues or overarousal, and overattention to internal cues or overarousal. Maltreated children purchase immediate relief from fear-provoking events but, at the same time, they purchase their pathology and undermine development (Thompson, 2000). Similar self-regulatory strategies are used by children who are offspring of mothers who are themselves at risk of child maltreatment and who are themselves at risk of child maltreatment. This combination of genetic and experiential factors (Thompson & Calkins, 1996). For maltreated children, the lesson they have learned is that anger cannot be controlled, it can at least be anticipated. Anticipating negative arousal these children may experience dysregulation.

self-regulatory challenges faced by maltreated children are primarily that they are enlisting the help of emotion management, but that they are often in socially impossible conditions in which they must regulate emotion. Their self-regulatory strategies are often the result of inherent trade-offs that purchase short-term relief and that ultimately create long-term problems (Thompson & Dahlquist, 1995). Because of this, the double-edged sword: The strategies that mediate emotional goals often render them long-term problems.

Understanding emotion regulation in maltreated children. These children have comorbid psychological disorders, including conduct disorder, mood disorders, and substance abuse, so it is appropriate to consider maltreatment a significant risk factor for psychopathology. Children who experience physical or sexual abuse face a formidable challenge in emotion regulation. In this sense, we can view maltreatment as a liability at school, where the social cues of other children are more likely to be misinterpreted and imbued with hostile intent.

That maltreated children would not use self-regulation, but research supports a deficit model. Instead, a number of children acquire a repertoire of self-regulatory strategies to adapt to the unpredictable and often hostile environment in which they live. These strategies are often learned at home but are a liability especially in social settings, such as school or

One strategy is attention deployment: Children learn to regulate their environment in ways that contribute to their well-being (Thompson, 2007). Several studies indicate that children are hypersensitive to adult expressions of anger and learn to anticipate and prepare for anger. In one study, when pictures of adult faces were progressively "morphed" from one expression (e.g., anger), maltreated

children were more likely to identify blended expressions as angry than were nonmaltreated children (Pollak, 2002; Pollak & Kistler, 2002). Maltreated children also exhibit a lower attentional threshold for detecting anger in the vocal expressions of their mothers (but not of an unfamiliar woman) (Shackman & Pollak, 2005) and have more difficulty attentionally disengaging from perceived angry cues (Pollak & Tolley-Schell, 2003). In a study using event-related brain potential (ERP), maltreated children showed higher ERP responses to pictures of angry facial expressions compared with nonmaltreated children, but there were no differences in their responses to pictures of happy or fearful expressions (Pollak, Klorman, Thatcher, & Cicchetti, 2001). Taken together, these findings argue that maltreated children are sensitized, not habituated, to signals of adult anger, potentially because this sensitivity manages emotion by enabling children to anticipate and prepare for aversive encounters with adults who have abused them in the past. In a sense, if one cannot avert the emotionally overwhelming attack of an abusive adult, it is helpful to be able to anticipate it and flee, avoid, or otherwise prepare for it.

Outside the home, however, their sensitivity to cues of anger and threat undermines emotion management and is more socially dysfunctional. Maltreated children are more physically and verbally aggressive toward their peers (Cicchetti & Toth, 1995) and are more likely to respond with aggression or withdrawal to peer distress (Klimes-Dougan & Kistner, 1990). In this respect, the hypersensitivity to threat that may serve as a protective factor at home is a liability at school, where the social cues of other children are more likely to be misinterpreted and imbued with hostile intent.

This double-edged sword of emotion regulation for children at risk is apparent for other conditions of developmental psychopathology. Children with anxiety disorders, some of whom are biologically vulnerable to anxious affect, exhibit heightened efforts to anticipate fearful arousal through self-regulatory strategies that include their hypervigilance to fear-provoking stimuli, active (sometimes aggressive) avoidance of these stimuli, and overattention to internal cues of physiological arousal that anticipate or accompany anxious overarousal. By enlisting these strategies, anxious children purchase immediate relief from the turmoil of encountering fear-provoking events but, at the same time, consolidate and perpetuate their pathology and undermine developmentally appropriate functioning (Thompson, 2000). Similar self-regulatory challenges arise for children who are offspring of mothers who are depressed or have bipolar disorder and who are themselves at risk of internalizing disorders because of the combination of genetic and experiential risk conferred by their caregivers (Thompson & Calkins, 1996). For these children, as for those who are maltreated, the lesson they have learned is that if their negative emotion cannot be controlled, it can at least be anticipated, but in learning to anticipate negative arousal these children become vulnerable to longer term dysfunction.

Conclusion

In characterizing emotion regulation as “more than meets the eye,” our goal is to show that this familiar, everyday phenomenon is psychologically, developmentally, and neurobiologically complex, particularly when emotion regulation is applied to psychopathology. More important, what is “more than meets the eye” contributes to the developmental and clinical applications of emotion regulation research.

In developmental analysis, research findings (including our own) convince us that children’s emotion self-regulation at any age is based on sophisticated emotion appraisals, goals, and contextual influences that are developmentally changing and yields responses that may be perplexing unless they are interpreted in this light. In applications to psychopathology, it is equally apparent that emotion regulation efforts are adapted to complex biological and environmental risks and the trade-offs between immediate and long-term goals that are relevant to psychological pain. In each case, we believe, greater insight into the functions of emotion regulation in typical and atypical functioning is achieved when emotion regulation is regarded not just as the imposition of higher behavioral or neurobiological control but as an interaction between higher and lower systems related to emotional activation and its management. As other chapters in this volume indicate, perspectives to emotion regulation that incorporate these complexities yield therapeutic applications that begin to address the emotion goals underlying emotion dysregulation, the appraisals and constructs that perpetuate self-defeating emotion management styles, and the contextual influences that help to create the emotionally impossible environments with which distressed individuals must cope.

In a culture like ours, where emotional experience underlies the peaks and valleys of human experience, it is natural to hope that processes of emotion regulation will help to elevate the valleys and refine the peaks of that experience. The constructive—sometimes reconstructive—process by which emotion regulation accomplishes this reveals much about how deeply interconnected are emotion and its management in development and psychopathology.

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CHAPTER 3

How We Heal What We Don't Want

THE FUNCTIONAL NEURAL OF EMOTION REGULATION

**Bryan T. Denny, Jennifer A. Sil
and Kevin N. Ochsner**

Whether trying to mollify a fear of fl
fic, the need to adaptively regulate
of its ubiquity, in the past decade
emotion regulation has exploded.
ify the consequences of specific re
which they are most appropriately
attempted to delineate the functio
tion and emotion regulation (Ocl
work offers an opportunity to dete
healthy individual to keep an even
these mechanisms varies across he
est interest for the present volum
these neural mechanisms might fa

This chapter seeks to address t
emotion and emotion regulation in
a framework for understanding ho
cess of generating an emotion, and
regulation strategy known as reaq
review neuroimaging methods us
evidence for a working model of t
In the third part, we apply this m