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# 2 The Development of Emotion Self-Regulation

## *The Whole and the Sum of the Parts*

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### INTRODUCTION

Emotional self-control is highly valued in Western and Eastern cultures. The British “stiff upper lip,” the American “poker face,” the Chinese emphasis on propriety, and a focus on *thiken* (feeling okay) among the Nepalese Tamang underscore its importance in diverse cultural contexts. Emotion regulation has also been valued historically. For centuries, it has been viewed as essential to moral behavior and character development and as a manifestation of rational control over irrational, primitive emotional impulses. These enduring cultural beliefs provide a foundation for contemporary scientific study of emotion regulation that has shown empirically how differences in emotional self-control are associated with personal well-being, social competence, achievement, and other positive psychosocial outcomes.

Developmental study of emotion regulation has also been influenced by these cultural beliefs. Children become emotionally more self-regulating with increasing age, and developmental studies show that this occurs as prefrontal brain regions relevant to inhibitory control progressively mature, and children acquire more flexible, mentalistic strategies for managing their feelings (Thompson, Lewis, & Calkins, 2008). Developmental scientists have found that, consistent with cultural expectations, children acquire strategies for emotional self-control in the context of parenting that coaches emotion management and familiarizes children with the feeling and display rules of the culture (Gottman, Katz, & Hooven, 1997). Developmental psychopathologists have extended this view to characterize affective psychopathology as a problem of emotion dysregulation, often deriving from an interaction of genetic vulnerability with aversive family environments (Fox, Henderson, Marshall, Nichols, & Ghera, 2005).

Contemporary research findings on emotion regulation have thus been largely consistent with societal views about the importance of developing rational management of affective processes. Yet, in some respects, the empirical picture has also been more complex than what we expected, as is often true of science. Neuroscientists and behavioral scientists have learned, for example, that emotion regulation involves not only the top-down imposition of inhibitory control over emotional reactions, but also the bottom-up influence of affective appraisals and expectancies on higher regulatory systems (Kober, Barrett, Joseph, Bliss-Moreau, Lindquist, & Wager, 2008). Functionalist emotions theorists note that the strategic management of emotion, while often resulting in social competence and personal well-being, may sometimes yield less constructive outcomes, especially in contexts of emotional risk to the individual (Shackman & Pollak, 2005). Studies of the socialization of emotion regulation in the family are showing that the development of emotional self-control involves not only explicit coaching but also emotional influences that are implicit in the family

environment and children's developing understanding of emotions and how they are managed (Eisenberg, Cumberland, & Spinrad, 1998).

Emotion regulation and its development are thus familiar to us, owing to longstanding cultural beliefs about its importance. But current research is increasingly revealing unexpected aspects of these processes. In this respect, the whole is much greater than the sum of its parts. This chapter is devoted to exploring what we are learning about the development of emotion regulation, including work from our lab, and the new directions for research revealed by contemporary findings. We conclude that the components of this developmental process are yielding a picture of emotion regulation that is much more compelling and complex than the one we began with.

We begin by considering briefly in the next section the developmental neurobiology of emotion regulation, highlighting how the bidirectional influences among widely distributed brain systems contribute to emotion regulation, not just the inhibitory influence of prefrontal centers. We then consider functional accounts of emotion regulation, which emphasize the goals underlying self-regulatory efforts, and how these goals may be influenced by immediate and long-term objectives that may sometimes be in conflict. The focus of our discussion is the third section, in which we consider the socialization of emotion regulation in the family. In work from our own lab as well as others, we have learned that this socialization process incorporates multifaceted influences from the parent, the child, and their relationship that highlight new directions for future inquiry.

## DEVELOPMENTAL NEUROBIOLOGY OF EMOTION REGULATION

Emotion is a deeply rooted quality of human behavior. It is also biologically complex owing to its role in motivation, social communication, responses to threat, self-awareness, stress and coping, and other psychological processes. Emotional reactions involve coordinated sympathetic and parasympathetic nervous system activation as well as neuroendocrine activity. Neuroimaging studies show that responses to emotion tasks are widely distributed throughout the brain, including lower brain areas commonly regarded as relevant to emotion activation (including the amygdala, hypothalamus, brain stem, and central gray) and higher cortical areas often viewed as relevant to emotion regulation (including medial and ventral prefrontal cortex and anterior cingulate) (Thompson, 2011; Thompson, Lewis, & Calkins, 2008).

Emotion regulation develops as slowly maturing regions of the cerebral cortex, particularly the prefrontal cortex, progressively exert inhibitory control over limbic structures and enable capacities for response inhibition, cognitive flexibility, rule switching, and increased working memory that facilitate children's use of cognitive strategies for purposes of emotional self-control. But this account of cortical control over lower emotion centers is not the complete story. In addition, emotion regulation occurs through the mutual activity of higher and lower brain regions. In a meta-analysis of 162 neuroimaging studies of responses to emotion tasks, for example, Kober and colleagues (2008) reported that frontal cortical regions were found to coactivate with limbic system areas, with little evidence that these were exclusively negative (or inhibitory) influences. Other researchers have reported similar findings (e.g., Barrett & Bar, 2009; Ochsner et al., 2009). In emotional responding, in other words, both higher and lower brain areas are coactive.

In the coordinated activity of higher and lower brain areas relevant to emotion, there is growing evidence that limbic systems influence the functioning of cortical brain regions, especially by altering perceptual sensitivity to affective cues (Lewis & Todd, 2007). Activation of the amygdala is associated, for example, with enhanced perceptual sensitivity to cues of danger, consistent with its role in affective learning (Ochsner et al., 2009; Surguladze et al., 2003; see also Barrett & Bar, 2009). The neural circuits connecting the amygdala and other limbic structures with the anterior cingulate help to account for their influence on emotional appraisals and self-regulatory processes (Cardinal, Parkinson, Hall, & Everitt, 2002; Quirk, 2007; Woltering & Lewis, 2009). As a consequence of the mutual influences of limbic and cortical systems, therefore, emotion regulatory processes can be biased by the activity of lower brain regions. In one study, for example, 2-year-olds who were behaviorally identified as shy/inhibited or uninhibited were later studied as adults, and

functional magnetic resonance imaging (fMRI) analyses revealed heightened amygdala activation in the shy/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, even as higher cortical inhibitory systems are developing. 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). Taken together, therefore, emotion regulation should be regarded not only as inhibitory control by cortical areas but also as a widely distributed process involving bidirectional associations among many emotion-relevant regions, consistent with a systems view of emotion and emotion regulation (Thompson, 2011).

Early experience can bias neurobiological emotion regulatory systems through their influence on higher and lower brain regions. The development of emotional reactivity and self-regulation are affected by the quality of early experiences and, in particular, the responsiveness of caregivers. Children growing up in adversity, especially absent the buffering benefits of caregiving support, are more sensitive to contextual demands, more likely to become biologically and emotionally reactive to challenge, and less capable of adaptive self-regulation (Boyce & Ellis, 2005). This can be manifested behaviorally as children who easily become negatively aroused in response to benign stressors and have difficulty managing their affect. This derives both from the hyperreactivity of the limbic-hypothalamic-pituitary-adrenocortical (L-HPA) axis in response to cues of threat or danger, and impaired inhibitory functioning of prefrontal systems (Gunnar et al., 2006; Gunnar & Vasquez, 2006). With respect to the concurrent maturation of parasympathetic regulation, individual differences in neurobiological self-regulation are also affected by the quality of care experienced early in life and its influence on the regulation of stress (Propper & Moore, 2006). Sensitive parenting support is associated with more optimal behavioral and physiological reactivity and regulation.

The development of emotion regulation is thus guided not only by the progressive maturation of cortical brain regions that exert inhibitory control over limbic areas, but also by the reciprocal influence of limbic regions over cortical processing, and how these higher and lower brain areas are affected by the quality of early experience and genetic vulnerability (Blair, 2010). This emergent view of the neurobiology of emotion regulation is relevant to understanding the development of individual differences in emotional self-control, particularly those associated with the growth of affective psychopathology. There is increasing evidence that vulnerability to internalizing and externalizing disorders can arise from biologically or experientially based emotion biases encoded in the functioning of emotion-related brain systems at higher and lower levels of the neuroaxis.

Research on maltreated children has shown, for example, altered functioning of the L-HPA axis in a manner consistent with their behavioral profile of stress hyperreactivity (Gunnar et al., 2006). Other research indicates that maltreated children are also perceptually hypersensitive to adult expressions of anger. In one study, for example, 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 blended expressions as angry than were nonmaltreated children (Pollak, 2002; Pollak & Kistler, 2002). This was true only for anger expressions. 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 to nonmaltreated children, but there were no differences in their responses to pictures of happy or fearful expressions (Pollak, Klorman, Thatcher, & Cicchetti, 2001). Taken together, and in light of research indicating the importance of responsive caregiving to the healthy development of biological stress systems, these findings suggest that early maltreatment can alter the functioning of emotion-related brain systems at various levels of the neuroaxis in a manner that contributes to the behavioral problems these children exhibit in coping with stress. These children are more perceptually attentive to

threat-related cues in the environment and overreact emotionally to them, and have difficulty managing the negative emotion that results. Similar self-regulatory challenges may also exist for children with anxious psychopathology and other emotion-related disorders (Thompson, 2000).

Research on the developmental neurobiology of emotion regulation is thus increasingly showing that emotion is activated and regulated through the reciprocal influences of multiple emotion-related brain systems. Although emotion regulation is facilitated by the maturation of prefrontal inhibitory systems, considerable management of emotion occurs through the influence of limbic areas on these cortical systems. This is an especially important consideration with respect to young children with biological vulnerability or environmental risk, for whom emotion neurobiology is altered in a manner that may heighten their sensitivity to and reactions to stress, and thus make these emotions much more difficult to manage. It is less useful to simply characterize these children as emotionally dysregulated without recognizing how the circumstances that place them at risk have often contributed to neurobiological systems that function more poorly to manage negative arousal.

Much more research is needed to better understand the organization of neurobiological systems relevant to emotional arousal and emotion regulation, and how they are adapted to early experience. Although there is growing appreciation of the complex influences of prefrontal systems on multiple aspects of behavioral self-regulation, much less is known about how lower brain systems influence the functioning of these prefrontal areas. In addition, a better understanding of how the mutual influences among multiple emotion-relevant brain systems contribute to enhanced or impaired emotion management would contribute to add to our knowledge of the developmental neurobiology of emotion regulation. Particularly important is research with animal and human populations to examine the plasticity of these systems, especially the extent to which the effects of early experience on L-HPA axis arousal thresholds and prefrontal functioning can be reversed when children are in more supportive environments of care. Research of this kind will benefit from neurobiological models that abandon traditional distinctions between biologically antecedent emotion arousal systems and consequent regulatory processes to recognize how much emotion regulation is an intrinsic component of emotion itself (Thompson, 2011; Thompson et al., 2008).

## **EMOTION REGULATION: FUNCTIONALIST IMPLICATIONS**

Why does emotion regulation occur? Virtually all definitions of emotion regulation underscore its functionalist origins: emotions are managed to accomplish an individual's goals in particular situations (e.g., Frijda, 1987; Holodynski & Friedlmeier, 2006; Thompson, 1994). Such a view is consistent with our everyday experience of managing emotions and with research findings: children and adults who are more competent at emotion regulation are more successful in social interaction, capable of focused problem solving, prioritizing delayed rewards over immediate ones, and achieving emotional well-being. A functionalist approach means that any assessment of emotion regulation must take into account the goals of the individual in the contexts in which emotions are managed.

A functionalist analysis of emotion regulation is important to developmental inquiry because it requires researchers to comprehend a child's goals in an emotionally evocative situation to accurately determine whether emotions are being managed competently or not. Adults who misunderstand children's goals for emotion management may perceive children as emotionally dysregulated in situations in which they are functioning adaptively as emotional tacticians, such as when a preschooler fusses to elicit nurturance from an adult after a fall, or to coerce a treat in the supermarket. When emotion regulatory efforts lead to socially inappropriate conduct it does not necessarily mean that children are dysregulated, but perhaps that children's goals are different from those assumed by observers in these circumstances. As we shall see in a later section, it is surprisingly easy for adults to misconstrue children's goals in everyday situations and, as a result, misinterpret children's emotions and the efficacy of their efforts to manage those emotions (see Levine, Stein, & Liwag, 1999; see also later).

Adding complexity to a functionalist analysis of emotion regulation is that the goals underlying self-regulatory efforts are often context specific. Children learn early, for example, that different feeling rules prevail in peer contexts compared to adult-child interactions because peers respond differently to a child's emotional displays, such as expressions of distress or anger (Thompson & Waters, 2010). It may be better, therefore, to suppress expressions of distress after a fall when other children are around. Children's efforts to manage their feelings also vary according to sociocultural practices (Miller & Sperry, 1987) and cultural values. As a result of how emotion is represented in language and culture, for example, young Tamang children in Nepal say that it is useless to feel anger when wronged (instead endorsing shame), whereas Nepalese Brahman children endorse feeling angry but not expressing it, and children in the United States say they would feel and express anger, albeit within socially acceptable parameters (Cole, Bruschi, & Tamang, 2002). Any analysis of emotion self-regulation for Tamang, Brahman, or U.S. children would have to take these values into account. The context in which emotions are aroused is thus significant to a functionalist analysis of emotional self-regulation.

Moreover, children and adults may have more than one goal for their management of emotion, and sometimes multiple goals conflict. This is especially possible when immediate and long-term goals for emotion regulation are different. Consider, for example, a child who is being bullied. Responding to the bully's provocations may require choosing between venting distress (which may elicit the assistance of adults but do little to prevent further bullying), responding angrily (which may deter future bullying, but risks adult disapproval), avoidance (which may end the immediate problem but provides no long-term solutions to bullying), or other emotion regulatory strategies. There are likely to be different—and potentially inconsistent—immediate and long-term consequences of each strategy depending on the child's power relative to that of the bully, the values of the adults in this situation, expectations for the behavior of other children in the setting, and the overarching values of the sociocultural milieu. Understanding the child's behavior in such a situation from a functionalist perspective requires distinguishing between the immediate and long-term goals that might be accomplished by the child's self-regulation. The same is true of adults: a medical professional's self-regulation of distressed emotion in immediate emergency situations, for example, may blunt long-term empathic sensitivity in other contexts where it is needed.

This value of a functionalist analysis—especially the importance of recognizing potential conflict between multiple goals underlying emotion regulatory efforts—is also apparent in studies of children at risk for affective psychopathology. Young children with anxiety disorders, for example, show hypervigilance in situations associated with fearful events, attentional orienting to anxiety-provoking stimuli, and a tendency to construe benign situations as disproportionately negative or threatening, and these appraisal and preappraisal processes develop to accomplish the immediate goal of avoiding anxiety-provoking events (Fox et al., 2005; Thompson, 2000). But although these strategies may accomplish the short-term goal of avoiding contact with anxiety-provoking situations, they enhance the child's long-term anxiety and, in fact, can undermine therapeutic efforts. As earlier noted, research on maltreated children shows that these children are hypersensitive to cues of anger and threat in adults that is indexed behaviorally and neurobiologically. This hypersensitivity may be adaptive for enabling children to anticipate an abusive encounter and to flee, avoid, or otherwise prepare for it. But outside the home, their hypersensitivity to cues of anger and threat undermines competent emotion management and is more socially dysfunctional. Maltreated children are more physically and verbally aggressive toward their peers and are more likely to respond with aggression or withdrawal to peer distress (Cicchetti & Toth, 1995). In this respect, the hypersensitivity to potential threat that is a protective factor at home is a liability with peers when the social cues of other children are more likely to be misinterpreted and imbued with hostile intent (Thompson & Goodman, 2010).

A functionalist approach to emotion regulation shows, therefore, that effective emotion regulation often—but not always—yields socially competent and psychologically adaptive outcomes. Developmentally, children may regulate their emotions in ways that accomplish strategic goals but

that cause them to act in a manner that is socially inappropriate and to be perceived by adults as emotionally dysregulated (this is also often true of adolescents). For children at risk, the situation is even more complex because of the conflict between the emotion self-regulatory strategies that may be necessary for coping with immediate emotional demands and the strategies that may be necessary for long-term coping. In circumstances like these, children's emotion self-regulatory strategies involve inherent trade-offs that purchase immediate coping at the cost of long-term difficulty, and may ultimately increase rather than diminish their emotional problems. Emotion regulation is for these children a double-edged sword: the strategies that are most adaptive for accomplishing immediate emotional goals often render them more vulnerable to longer term problems (Thompson & Calkins, 1996; Thompson, Flood, & Lundquist, 1995). It is important to note, moreover, that this self-regulatory challenge exists not only for children in extremity but also for those in more typical conditions, such as when children are exposed to marital conflict (Davies & Woitach, 2008). For children in these situations, strategies for managing the emotions evoked by parental conflict, including becoming involved in parents' disputes or avoiding them altogether, may do little to promote children's long-term coping.

For children in such circumstances, there may be no optimal means of managing emotion. Their challenges are best characterized not merely as problems of emotion dysregulation except in a broadly descriptive sense. From a functionalist perspective, their problems derive from the inherently conflicting goals underlying emotional regulatory efforts in emotionally overwhelming circumstances. Understanding better the conflicting goals that guide the efforts of children at risk to manage their emotions in difficult emotional circumstances will help to enlist functionalist ideas about emotion into the developmental psychopathology of emotion regulation.

## **SOCIALIZATION OF EMOTION REGULATION IN THE FAMILY**

Sociocultural influences on the development of emotion regulation complement the biological and functionalist approaches discussed earlier because they establish the contexts in which emotion is managed. Cultures differ significantly in their social rules governing how people should feel and the emotions they can express in social situations. Within society, families vary in their expectations for emotional expressiveness and its management. In these nested social contexts, children acquire strategies of emotion regulation that are consistent with social values, family expectations, their personalities, and their goals for expressive behavior.

Considerable research has focused on the socialization of emotion regulation in the family (see Eisenberg, Cumberland, & Spinrad, 1998; Morris, Silk, Steinberg, Myers, & Robinson, 2007; Thompson & Meyer, 2007 for reviews). These studies highlight the variety of family processes by which styles and strategies of emotion self-management are socialized. These processes include parents' evaluations of the emotional expressions of offspring and coaching self-control, children's observation of the examples of parents' emotional expressions, adult interventions to directly manage their children's feelings, the emotional climate of family life, and the emotional support and responsiveness that arises from the quality of the parent-child relationship. Taken together, they indicate that when children's feelings are acknowledged, and parents model and coach constructive strategies of emotion self-regulation (such as problem solving) in the context of warm parent-child relationships, children acquire styles of emotion self-regulation that enable them to manage their feelings adaptively in different social situations.

These conclusions provide considerable insight into the socialization of emotion and intergenerational continuities in emotion self-regulation. But they also highlight potentially important new avenues for further research in this area. One avenue concerns young children's understanding of emotion regulation and the effectiveness of different self-regulatory strategies. Children's prior knowledge of how to manage emotions is likely to influence how they respond to the coaching and modeling they experience in family life, but this prior knowledge has not been well studied. A second issue is the importance of parent-child conversation about emotion, which is a significant

influence on the development of emotion understanding and may also influence developing knowledge about emotion regulation strategies. Third, better understanding of parents' representations of emotion in their own lives can contribute insight to how they perceive and respond to the emotions of their children.

In the pages that follow, we consider each of these new directions for studying the socialization of emotion regulation in the family in light of prior research. We also contribute the perspectives of findings from our own work in this area. In this study, the Preschool Emotional Development Study (PEDS), 73 children of four and a half years and their mothers participated in a series of tasks that assessed the child's knowledge about emotions and their management, the mother's awareness of her own emotions and their regulation, and the security of the parent-child attachment relationship, as well as assessments of other aspects of family life. We also observed mothers and children together as they conversed about recent experiences involving emotion in the child's life, and as they together sought to manage a mildly frustrating experience for the child (see Meyer, Thompson, Raikes, Virmani, & Waters, in prep.; Waters, Virmani, Thompson, Meyer, Raikes, & Jochem, 2010).

### YOUNG CHILDREN'S UNDERSTANDING OF EMOTION REGULATION

From a constructivist perspective, socialization influences are mediated by the child's prior knowledge and understanding (Laible & Thompson, 2007). How young children interpret parental messages about emotion, effective strategies for emotion management, and the social purposes for enlisting emotion regulation is influenced by their conceptual structures for understanding emotional processes.

This is especially true of young children, because limitations in theory of mind mean that they are unlikely to have a keen awareness of interpretive, attentional, and other cognitive processes that contribute to emotional arousal and that can be enlisted into emotion regulation. Indeed, prior research indicates preschoolers believe that emotions arise from situational causes—a frightening fall, a valued toy breaks—and emotions are managed primarily by behavioral strategies. Young children indicate, for example, that emotions can be regulated by restricting exposure (such as by covering the eyes or ears), removing or avoiding emotionally arousing situations, eliciting support from adults, finding a security object, or even by reassuring self-talk (Compas, Connor-Smith, Saltzman, Thomsen, & Wadsworth, 2001; Denham, 1998; Thompson, 1990, 1994). Although young children are also aware of some of the psychological processes involved in emotional arousal (such as that perceptual processes are relevant, which is why covering eyes or ears can manage emotions), it is not until later ages that children acquire a more differentiated mentalistic awareness of emotion that can guide their self-regulatory efforts (see Davis, Levine, Lench, & Quas, 2010). As a consequence, older children and adults are more likely to use strategies like reinterpreting the situation, altering goals or appraisals, or mental distraction in emotionally arousing situations.

There are at least two ways that prior knowledge of emotion and emotion regulation can influence young children's responsiveness to socialization efforts. First, children's expectations for the reactions of caregivers when they are upset may derive from their understanding of how emotions could be managed and may, in turn, affect their responsiveness to caregivers' assistance. These expectations can also, as attachment theorists claim, reassure the child of the parent's support, which also contributes to the management of distress. Second, children's knowledge of alternative strategies of emotion regulation and their effectiveness may influence the kinds of effort they enlist for themselves when they seek to manage their feelings.

Young children's expectations for how their parents will respond when they are upset have been studied by Denham (1997), based on a procedure by Roberts and Strayer (1987). In this study, a "dollhouse task" presented preschool children with a series of incomplete stories, told by the experimenter using dolls to represent the child and the parent and with animated emotional expressions by the experimenter. Mothers were not present while children responded to this task. Children were encouraged to identify with the child who is the central story character. The stories

describe the child in several circumstances provoking negative emotion (such as being scared by the dark at night), and after each story children were asked to identify the story character's emotion (as a check on understanding) and then given the parent doll to show what the adult does next. In Denham's (1997) study, children's expectations for their parents' reactions to their distress were correlated in anticipated ways with parents' self-reports of their socialization of emotion in offspring and with independent assessments of children's social competence with peers.

We used a modified version of the dollhouse task in our study and found, as did Denham (1997) and Roberts and Strayer (1987), each of whom also studied, four-and-a-half year old children that the majority of preschoolers expected their parents to respond with basic behavioral strategies to help manage their emotions. In these studies, the majority of young children's responses consisted of parental "appropriate action" (i.e., problem-solving strategies such as turning on the light in the dark bedroom), comforting the child, or discussing the child's feelings. Preschoolers' expectations for their parents' responses to their distress were consistent, therefore, with their own understanding of the kinds of strategies that could be effective in managing negative emotions such as sadness or fear.

A small number of children (ranging from 4% to 19%) in the PEDS study indicated that they did not know how their mothers would respond or that the parent would be unaware of their feelings. We found that children whose mothers reported high levels of depressive symptomatology on the Center for Epidemiologic Studies Depression Scale (CES-D) inventory (Radloff, 1977) were significantly more likely to report "don't know" for their mother's response to situations evoking sadness or fear, and were less likely to anticipate maternal comfort when feeling scared. In addition, children whose mothers endorsed suppression of emotion on the Emotion Regulation Questionnaire (Gross & John, 2003), a self-report measure of cognitive reappraisal and suppression as emotion regulatory strategies, significantly more often reported that their mothers would be unaware of their feelings. These findings add to the evidence of previous research that children's expectations of their parents' responses reflect their experience of emotion in the family. They also underscore how intergenerational influences on the development of emotion regulation may occur as caregivers respond to their children's emotions based on their own experiences and representations of emotion in their own lives.

It is apparent that preschoolers have substantial awareness of emotion regulation processes. To explore this further, we developed a new measure called the Emotion Regulation Problem Solving Interview (Waters, Raikes, Virmani, Meyer, Jochem, & Thompson, 2010). In this interview outside of the mother's presence, the experimenter enacted for the child a series of short story vignettes with puppets, with each story resulting in clear expressions of anger, sadness, or fear in the story character (using vocal tone and other cues) that were explicitly labeled by the experimenter. Following each story, the puppets enacted several different emotion regulation strategies (i.e., problem solving, avoidance, cognitive reappraisal, and venting emotion), and children used simple drawings of facial expressions to indicate whether the story character now felt better, the same, or worse than before. Their judgments constituted effectiveness scores for each emotion regulation strategy for each kind of negative emotion. As an example, an anger story depicted a child building a tower in the sandbox that another child knocks over. The story character is, in different story versions, subsequently shown starting to build another tower (problem solving), leaving the sandbox to do something else rather than addressing the situation (avoidance), thinking that perhaps the other child's action was an accident (cognitive reappraisal), or yelling "mad words" at the perpetrator (emotional venting). We included cognitive reappraisal among the emotion regulation alternatives because, even though this is not a strategy that young children spontaneously generate on their own, we were interested in whether four-and-a-half year old children would be capable of recognizing its potential effectiveness for managing different negative feelings. We also included venting, as have others (see Dennis & Kelemen, 2009), because although adults perceive young children's strong emotional expressions as reflecting poor self-control, children often accomplish their goals by doing so.

We learned from children's responses that they regard alternative strategies of emotion management as differentially effective for regulating sadness, anger, or fear. For sadness, nearly all children



endorsed avoidance (e.g., playing with another toy when a favored toy is broken), which children rated as significantly more effective than other strategies. For anger, problem solving was regarded as significantly more helpful than other strategies. For fear, there were no significant differences in children's endorsements of problem solving, avoidance, and cognitive reappraisal, although the last was endorsed most frequently. For each negative emotion, venting was consistently judged as the *least* effective means of managing emotion, and children often indicated that venting would increase rather than decrease their negative feelings. However, 40% of children indicated that when angry, venting would make them feel better, whereas only 16% of children had the same judgment for venting sadness. In general, how manageable are different negative emotions? We aggregated children's responses across different emotion regulation strategies, and found that average effectiveness scores were highest for anger, lowest for fear, with sadness in the middle.

Our findings are similar to those reported by two other research groups that have also examined preschoolers' understanding of the effectiveness of different emotion regulation strategies. Dennis and Kelemen (2009) used a series of puppet stories similar to ours to examine 3- and 4-year-olds' judgments of emotion regulation strategy efficacy using a paired-comparison procedure. They reported that preschoolers endorsed emotion regulation strategies on an emotion-specific basis, with "repair" (i.e., problem solving) viewed as most effective for managing anger; repair and "behavioral distraction" (i.e., avoidance) as most effective for sadness; and behavioral distraction as most effective for managing fear (cognitive reappraisal was not a response option in this study). Children were more likely than adults (who were presented comparable stories) to endorse venting as an emotion regulation strategy, especially for anger, similarly to the results of our study. Consistent conclusions were reported by Cole, Dennis, Smith-Simon, and Cohen (2008) using a similar procedure.

In personality research, adults often prefer one emotion regulation strategy over another. For example, some adults are described as "suppressors" of their emotions while others are deemed to be "cognitive reappraisers" (e.g., John & Gross, 2004). Is the same true of young children? Our findings were mixed. When we aggregated children's effectiveness ratings across the different negative emotions, more than one-third of the children reported the same overall effectiveness for more than one emotion regulatory strategy. They did not have a preferred strategy. Of the remaining children, comparable proportions endorsed problem solving, avoidance, and cognitive reappraisal most often (very few children consistently endorsed emotional venting). Taken together, therefore, although a majority of preschoolers had a preferred strategy, there was still a sizeable number without one. More research is needed.

There were differences in strategy endorsement by gender and attachment security. For feelings of fear, preschool girls were significantly more likely to endorse emotional venting than were boys, who instead endorsed cognitive reappraisal significantly more than did girls. Boys were also marginally more likely to endorse cognitive reappraisal for managing anger as well. In addition, children who were securely attached to their mothers were significantly less likely to endorse venting as an emotion regulatory strategy than were insecurely attached children.

Taken together, these findings indicate surprisingly astute knowledge about the effectiveness of alternative emotion regulation strategies by four-and-a-half year olds. Even the potential value of cognitive reappraisal, which preschoolers rarely nominate on their own, was understood to be comparable in effectiveness to more familiar strategies of problem solving and avoidance. Moreover, even though young children are often observed expressing strong emotion when angry or sad (and sometimes accomplishing strategic goals in doing so), these findings indicate that they recognize that venting is a poor strategy for managing emotions, and it sometimes makes them feel worse. They seem to recognize, in other words, that although fussing may cause an adult to acquiesce, you still feel upset. The emotion-specific judgments of strategy effectiveness revealed in their responses reflect young children's keen differentiation of different negative emotions in their representations of emotional experience and, quite likely also, their personal experience of trying to manage these feelings. Avoidance is best for managing sadness because it removes you from a situation of loss, while problem solving better manages angry feelings by removing obstacles to goals. Equally

important are findings indicating that children's emotion regulation knowledge is based on family experience, such as the uncertainty expressed by young children of depressed mothers that their caregivers would be aware of their feelings or would provide comfort. Further inquiry into developmental changes and individual differences in children's understanding of emotion regulation strategies can contribute to a better appreciation of the expectations and beliefs that color young children's efforts to manage their emotions, and how these are rooted in family experience.

## PARENT-CHILD CONVERSATION AND EMOTION REGULATION

There has been considerable research interest in how parent-child conversation about the child's emotional experiences guides the development of emotion understanding (Thompson, Laible, & Ontai, 2003). Early emotional understanding is enhanced by the frequency of maternal conversational references to emotion (e.g., Dunn, Brown, & Beardsall, 1991; Raikes & Thompson, 2006) and by the quality of these conversations. In particular, mothers who are *elaborative*—that is, who ask *wh-* questions of the child, offer further narrative detail, and provide evaluative responses to the child's comments—and who use causal language in emotion-related conversations have children with enhanced emotion understanding (Laible, 2004; Ontai & Thompson, 2002). It is both what mothers say about emotion and the general style of their conversation that influences the growth of emotion understanding.

There has been much less inquiry into parent-child conversations as forums for the socialization of emotion regulation. In one study, Fivush, Berlin, Sales, Mennuti-Washburn, and Cassidy (2003) observed mothers with their 4-year-olds conversing about recent events that had provoked negative emotion in the child, and found that mothers more often discussed emotion "resolutions" when conversing about events provoking fear or sadness than for anger. But discussing how to resolve emotion is not the same as conversing about emotion regulation.

In the PEDS study, we asked four-and-a-half year olds and their mothers to talk together about recent events in the child's experience, identified by the mother, that had provoked sadness and anger. Although they were not explicitly instructed to do so, the large majority (88%) of the mothers spontaneously talked about different means of managing emotion in these situations, and many also commented about the effectiveness of these strategies for making one feel better. Mothers discussed similar emotion regulatory strategies across conversations discussing sadness and anger. Mothers commented most often on the effectiveness of problem-focused coping, emotion-focused coping, attentional redirection, and cognitive reappraisal when discussing emotion-evocative past experiences of the child. By contrast, and not surprisingly, the effectiveness of venting was rarely endorsed by these mothers. It is possible that one of the reasons that young children in this sample independently recognized that venting is not a good means of emotion regulation is that this is what they have heard from their mothers.

As earlier research has shown, it is not only *what* mothers say but also *how* they say it that influences the development of emotion understanding. Consequently, we also coded maternal discourse for the general quality of the mother's conversational approach. These variables included maternal *elaborative* discourse, as discussed earlier, and summary ratings of *validation* (i.e., the mother's understanding, acceptance, and focus on the child's viewpoint) and *autonomy support* (i.e., following the child's conversational initiatives rather than imposing her own agenda). These three indices of the quality of maternal discourse were moderately but significantly intercorrelated, suggesting that the mother's narrative elaboration is also often accompanied by a constructive, affirmative demeanor to the child's perspective and initiative.

In prior research on emotion conversations we have not found that measures of the quality and the content of maternal discourse were significantly associated (Raikes & Thompson, 2008). To explore whether this was true with respect to emotion regulation, we created a composite index of the mother's constructive emotion regulation coaching (i.e., discussing problem-solving coping, emotion-focused coping, attentional redirection, cognitive reappraisal, and/or apology to manage

feelings). This aggregate was significantly correlated with two of the three measures of conversational quality described earlier (and was marginally significantly associated with autonomy support). Thus the mother's constructive coaching of emotion regulation is often in the context of other positive conversational qualities that elaborate and affirm the child's emotional experience. Contrary to prior findings, therefore, the content of maternal discourse (i.e., constructive emotion coaching) was thus associated with its quality (i.e., elaboration, validation, and autonomy support).

We were also interested in the external correlates of these conversational features. Prior research has shown that the security of attachment is associated with constructive features of maternal discourse in a manner that is consistent with attachment theoretical views of the more open, emotionally accessible communication style shared by securely attached children with their mothers (Bretherton, 1993; Laible, 2004; Reese, 2002). The findings of this study yielded a similar conclusion. The security of attachment (as indexed by the Attachment Q-sort) was significantly correlated with a composite of the measures of elaboration, validation, autonomy support, and constructive emotion regulation coaching (see Raikes & Thompson, 2008, for similar findings in an independent sample). Moreover, attachment security was significantly and *negatively* correlated with a measure of the mother's minimizing of the child's emotional reactions during conversation. Mothers in secure relationships with their children were more affirmative and less dismissing of the child's feelings, contributed greater narrative elaboration in discussing emotional events, and coached constructive strategies for managing emotion.

These findings are important for broadening attachment theoretical views of the communication style shared in secure relationships, and also for better understanding how parent-child conversation contributes to the development of emotion regulation in young children. Mothers not only talk about emotion regulation but also provide explicit endorsement of constructive strategies, and their constructive coaching often occurs in contexts of conversational acceptance and affirmation of the child's emotional experience. Considerable understanding of emotion regulation is likely to be fostered by such conversations, and further investigation of these influences in parent-child discourse is warranted.

It is important to note that children often do not enjoy talking with their mothers about prior experiences in which they have felt angry, afraid, or sad. Such conversations are often upsetting, and researchers have long recognized that young children seek to avoid such conversational topics by changing the topic, evading the mother's queries, running away, or even explicitly refusing to talk further (see, e.g., Laible & Panfile, 2009). This is a natural response to maternal prompting to talk about uncomfortable or unsettling topics, and the maternal validation that we have measured may be one way that mothers make it easier for their young children to participate in such conversations. To determine whether this is true, we recoded the videotaped conversations about negative emotion to index verbal and behavioral indications of child avoidance, such as the reactions already described (Waters, Virmani, et al., 2010). As we had expected, the measure of maternal validation was significantly and negatively associated with child avoidance, such that when mothers were more understanding and accepting of the child's viewpoint, children were less likely to try to evade the conversation topic. We also found that the security of attachment was significantly associated with child avoidance: securely attached children were less evasive in talking about prior negative feelings than were insecurely attached children. This is consistent with the view that a secure attachment provides young children with a "psychological secure base" for sharing and exploring difficult and upsetting experiences.

Taken together, these findings indicate the multiple ways that parent-child conversational discourse is important to the early socialization of emotion regulation. In the content and style of their conversations about emotional events, mothers explicitly coach constructive emotion regulation strategies and also provide a relational context of support for exploring uncomfortable past emotional experiences. It is reasonable to expect that by providing this supportive context, the impact of mothers' messages about how to manage negative feelings is enhanced, and there is some evidence in our study and elsewhere (e.g., Laible & Panfile, 2009) that this is so. By enabling young children

to thoughtfully reflect on negative emotions and their management outside of the heated context in which they were originally elicited, and providing support for considering alternative ways of coping, these conversations are an important early context for developing emotion regulatory skills.

## PARENT EMOTION REPRESENTATIONS AND CHILD EMOTION REGULATION

The association between maternal validation and child avoidance of talking about negative emotional experiences highlights the importance of the mother's style of relating to the child about difficult emotions. Where does this style come from? One potential influence consists of how the mother experiences emotion in her own life. Mothers who believe that emotions provide important understanding of oneself and others, that they should not be ignored or dismissed (even when they are disturbing) but instead accepted and examined are likely to extend these beliefs to the child's feelings also. Mothers who instead believe that emotions get in the way of thinking and behaving competently and that there is little value in dwelling on their meaning are likely to approach a child's emotional experience and expressivity similarly.

The connection between parents' beliefs about emotion and their style of responding to children is what Gottman, Katz, and Hooven (1997) call a parent's "meta-emotion philosophy," defined as "an organized set of feelings and thoughts about one's own emotions and one's child's emotions" (p. 243). It includes adults' awareness of their own feelings, understanding and acceptance of the child's emotions, and management of the child's feelings (Hooven, Gottman, & Katz, 1995). Based on parental interviews, Gottman and his colleagues distinguish between "emotion coaching" and "emotion dismissing" philosophies. Emotion coaching parents are attentive to the emotions of themselves and their children, viewing the child's emotional expressions as an occasion to validate the child's feelings and to teach them about emotions, expression, and coping. Emotion dismissing parents tend to ignore their own emotions or belittle their importance, and they respond similarly to their children's emotions. Research based on this formulation has yielded supportive but mixed results that may be due, in part, to the complex interview procedure for identifying a parent's multidimensional philosophical perspective concerning emotions (see Gottman, Katz, & Hooven, 1996; Ramsden & Hubbard, 2002; see Lunkenheimer, Shields, & Cortina, 2007, for a methodological alternative).

In our research, we were also interested in how mothers' emotion representations affected their responsiveness to and regulation of the emotional expressions of offspring. But we approached the measurement of emotion representations more narrowly. Mothers in our study completed the Trait Meta-Mood Scale (TMMS; Salovey, Mayer, Goldman, Turvey, & Palfai, 1995), a measure of adults' acceptance, understanding, and regulation of their own emotions. There are three subscales: "clarity" measures adults' perception and understanding of their emotions; "attention" indexes beliefs about the importance of attending to and accepting emotional experiences; and "repair" measures efforts to reduce negative moods and maintain positive emotions. All three subscales are pertinent to parents' meta-emotion philosophies, and our expectation was that the "attention" subscale would be especially relevant to how mothers interpreted their children's emotional expressions, and "repair" would be particularly pertinent to coaching emotion regulation. Recall that we also asked mothers to complete the Emotion Regulation Questionnaire (ERQ; Gross & John, 2003), which indexes adults' use of cognitive reappraisal and suppression to manage their emotions. Because of their conceptual similarity and high intercorrelation, the "repair" subscale of the TMMS and the cognitive reappraisal scale of the ERQ were combined to create a "regulation" composite for further analysis.

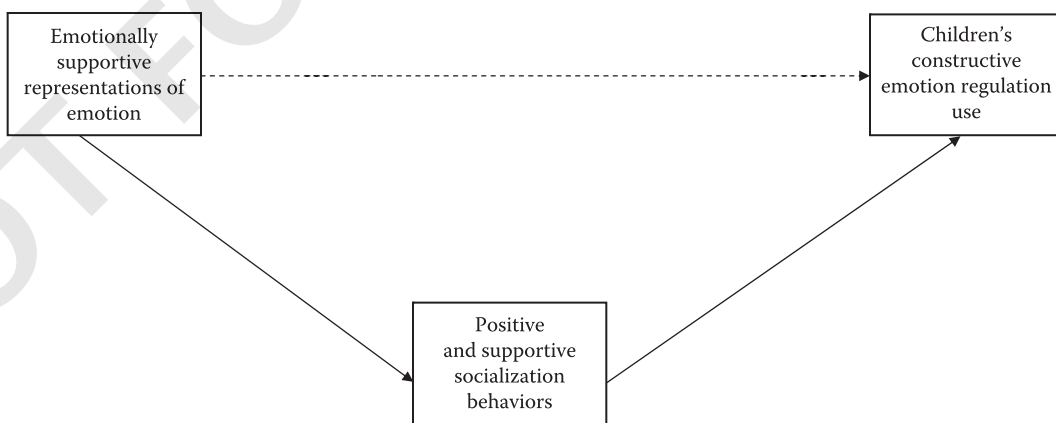
How were mothers' emotion representations associated with their responses to the emotions of their children? We explored this question by examining the emotional climate of the family and how children's emotions are managed within that environment. Mothers completed two questionnaires. One was the Self-Expressiveness in the Family Questionnaire (Halberstadt, Cassidy, Stifter, Parke, & Fox, 1995) that assessed the frequency of positive and negative emotional expressions in the family. The other was the Coping with Children's Negative Emotions Scale (Fabes, Poulin,

Eisenberg, & Madden-Derdich, 2002) that measured the mother's responses to children's negative emotional expressions for 12 hypothetical situations. Parental response options included emotion-focused comfort, validating the child's feelings, encouraging problem solving, responding punitively, and minimizing the child's emotional response.

We found that mothers' emotion representations were strongly predictive of their reported strategies for managing children's feelings and the family emotional climate (Meyer et al., in prep.). Maternal attention to her feelings and her own focus on constructive emotion self-regulation were each associated with constructive strategies for managing children's emotions (such as problem-solving encouragement) in the context of an atmosphere of positive emotional expressions in the family. Maternal use of emotional suppression of her own feelings generally had the opposite associations. In short, mothers' representations of their own emotions and their regulation were associated with their strategies for managing the feelings of their children.

We were also interested in the implications of these associations for children's self-regulation. Mothers completed the Children's Emotion Regulation Processes Survey (which we adapted from Eisenberg, Fabes, Bernzweig, Karbon, Poulin, & Hanish, 1993) in which they identified their child's most likely self-regulatory responses to hypothetical vignettes involving situations eliciting sadness and anger. This widely used maternal-report measure yielded two constructive general strategies—problem/emotion-focused strategies and attention-focused strategies—as well as less constructive general strategies associated with emotional venting. We then conducted a series of regressions to predict maternal reports of children's emotion self-regulatory strategies from mothers' emotion representations and their strategies for managing children's feelings. The results supported the mediational model depicted in Figure 2.1 (Meyer et al., in prep.). Mothers' emotionally supportive representations (i.e., attention to her feelings; her focus on constructive emotion self-regulation) were associated with children's constructive emotion regulation use (i.e., problem/emotion-focused strategies and attention-focused strategies) primarily through their association with positive, supportive emotion regulation socialization behaviors (i.e., maternal problem-solving encouragement, emotion-focused comfort, validating children's feelings, and positive family expressivity). The direct association between mothers' emotion representations and children's constructive emotion self-regulation was nonsignificant when maternal socialization behaviors were included in the regressions.

Taken together, these findings suggest that maternal emotion representations underlie her responses to the feelings of offspring and efforts to regulate them, and that through these socialization processes children's emotion self-regulation is shaped. In identifying the specific kinds of emotion-related representations that are influential in this manner, this study offers more insight into the



**FIGURE 2.1** General mediation path model of the association between maternal emotion representations, emotion-related socialization behaviors, and children's emotion self-regulation. Solid lines indicate significant paths. Dashed lines indicate nonsignificant paths.

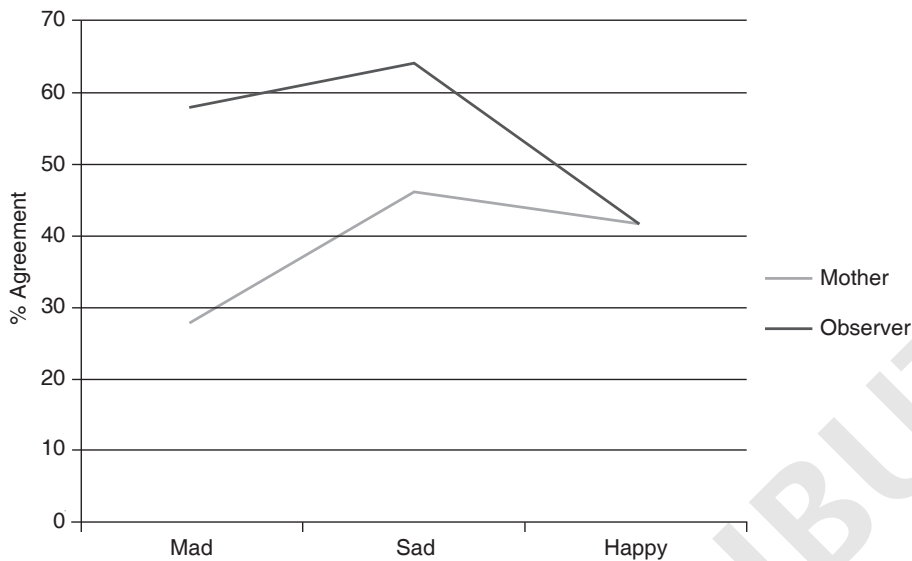
elements of the parental meta-emotion philosophy that are relevant to the socialization of emotion regulation.

But these findings provide a bird's-eye view of these family influences. We were also interested in studying, in the lab, the influence of these maternal emotion representations. As earlier noted, we were especially interested in examining how specific features of the mother's representations of emotion in her own life would be associated with her perception, response, and regulation of the negative feelings of her child. The importance of the mother's representations for coaching emotion regulation was highlighted in the preceding analyses. In the lab, we also studied whether maternal emotion representations would influence how she perceived and interpreted her child's emotional state. The ability to accurately detect the child's feelings is, of course, a necessary prelude to effective coaching of emotion regulation. A parent who seeks to assist the child in managing sadness will not be helpful or relevant if the child is instead feeling anger, fear, or a positive emotion. And although it has been rarely studied, parental decoding of the child's emotions is not necessarily a straightforward task. A study by Levine, Stein, and Liwag (1999) found, for example, that when parents and their preschoolers were independently prompted to remember shared events in the recent past in which the child felt happiness, sadness, anger, or fear, they often disagreed about the emotion experienced by the child. Subsequent analyses revealed that parent-child disagreement was attributable to conflicting perceptions of the child's goals because, in part, each person was experiencing the event differently. The same is likely to be true when mothers are coaching their children's emotion regulation: mothers may be most interested in quieting the child's distress, whereas children are committed to obtaining a desired object or treat. We were interested, therefore, in determining whether such parent-child discordance in interpreting the child's feelings might occur in an emotion regulation probe, and whether individual differences in their concordance might be associated with maternal representations of emotion.

For this reason, we observed mothers and their four-and-a-half year old children in an emotion regulation probe called the "denied request task" (from Stansbury & Sigman, 2000). During the lab visit, the child was allowed to choose a snack or candy as a reward from a variety of choices while the mother was out of the room. The experimenter told the child that it was OK to eat the treat immediately, but that first the child should consult with the mother after her return to the room. In another location, mothers were not informed of these instructions but were instead told by a second experimenter that they should ensure that the child *not* eat the snack until after they had returned home from the lab visit. Mothers and children were then reunited. This task has been shown in past research to induce moderate frustration in young children and has been used in studies of emotion regulation in preschoolers (Stansbury & Sigman, 2000; Stansbury & Zimmermann, 1999). Mothers and children were subsequently observed for 2 minutes, during which the experimenters who recorded the session jointly identified the peak of the child's emotional arousal and the time when this occurred. At the end of this period, the mother was given a prompt encouraging her to permit the child to eat the candy or snack immediately.

Later in the procedure, mothers and children were independently invited to a separate room where they were shown the videotape of the denied request task and interviewed about what happened. The tape was played from the beginning of the procedure and stopped at the moment of the child's peak emotional intensity earlier identified. Children were asked to identify how they felt at this time using words and by choosing one of a set of simple line drawings of facial expressions of emotion. Subsequently, mothers watched the same video vignette and were also asked how the child felt and why. Mothers could offer as many emotion attributions to the child as they wished, and they were scored as matching the child's self-report when *any* emotion the mother identified matched the child's self-report. Later, we also obtained ratings from an independent observer of the child's emotional expression at the same moment in the tape when children and mothers made their emotion judgments.

We found that mothers attributed emotions to the child that were consistent with children's self-reports only 40% of the time (Waters, Virmani, et al., 2010). Independent observers were significantly



**FIGURE 2.2** Percentage emotion attributions to the child by mother and independent observer that are concordant with the child's self-reports (from Waters, Virmani et al., 2010).

better, and were consistent with children's self-reports 54% of the time. Mothers and observers each varied in their consistency depending on the specific emotion the child reported, with mothers least consistent when children reported feeling angry, and most consistent with the child when children reported sadness (see Figure 2.2).

This rate of agreement is substantially lower than what was reported by Levine and colleagues (1999), even though the target event had occurred earlier in the lab session, mothers and children reviewed a videotape of the event, and there was considerably less ambiguity concerning the child's goals than in the situations sampled in the Levine study. Although in some cases it appears that preschoolers misreported their own feelings (such as reporting happiness when reliable, well-trained observers rated the child's facial and vocal expressions as sad or angry), this did not occur frequently. Rather, it appears that discordant perceptions of emotion arise because children are providing mixed emotional signals, mothers and children have different goals, and sometimes because certain emotion attributions are threatening (such as perceiving anger in a child whom you have denied a treat).

It appears, therefore, that parents face a greater challenge than is often assumed in supporting the development of competent skills of emotion regulation in young children because of the difficulty of accurately interpreting the child's feelings in the immediate situation. This is especially important in light of the fact that many strategies for emotion management are emotion specific (e.g., managing anger by changing or redirecting goals; regulating sadness by eliciting sympathetic support). If parents are responding with coaching that assumes a different emotion than what children themselves perceive that they experience, their efforts will be unhelpful, even harmful to the child's emotion self-regulation. For example, if parents respond sympathetically to perceptions of a child's sadness in response to a denied treat, but the child actually feels angry toward the parent, the parent's efforts may actually increase rather than pacify the child's negative emotional response.

Mothers varied in the extent to which their attributions of emotion were consistent with the child's self-reports. Individual differences in mother-child concordance were associated with two measures. First, as we anticipated, mothers' representations of their own emotions were important. Mothers who were higher on the "attention" subscale of the TMMS—that is, who endorsed the view that it is important to pay attention to and accept one's feelings—were more consistent with

children's self-reports. Mothers who were attentive to their own feelings were also more perceptive of their child's emotions. Second, mothers in secure attachment relationships with their children were also more concordant with children's self-reports. The latter is consistent with the attachment literature indicating that maternal sensitivity contributes to attachment security, and suggests that part of that sensitivity is greater perceptiveness of children's emotions (De Wolff & van IJzendoorn, 1997). Taken together, these findings suggest that although mothers may often misattribute emotion to their young children in situations requiring emotion regulation, those who are attentive to emotion in their own lives and have warm, secure relationships with their offspring are less likely to do so.

Were these maternal attributions of emotion related to their behavior in the denied request task? Surprisingly, we did not find a strong association between maternal emotion attributions and subsequent strategies to help children manage their feelings. Indeed, we have yet found little prediction of behavior in the denied request task from the variety of maternal and child assessments in this study. The reason, we realized, is the remarkably dynamic, self-organizing quality of mother-child interaction in this task, with each partner having somewhat different goals and strategies that evolved as their interaction continued. This is consistent with the functionalism underlying emotion regulation. This resulted, however, in the initiation of multiple strategies for managing the child's feelings from the contributions of each partner, and an outcome that might not have been predicted at the beginning.

Here is one example of the interaction of one four-and-a-half year old child and her mother:

*Mother:* Yeah. Well, you know what? Don't open it. You're not allowed to eat it yet.

*Child:* Why?

*Mother:* Because you need to wait until after lunch. Remember you just had sweet stuff this morning? You had chocolate chip pancakes, and now you have to wait until after lunch to eat more candy, OK?

*Child:* Or we can eat it at the arboretum first.

*Mother:* You know what? That's a great idea! You can eat it when we get to the arboretum. . . . So can I have it? Will you give it to me so that we can make sure?

*Child:* Save it for me.

*Mother:* I will save it for you.

*Child:* OK.

*Mother:* Shall I put it in my purse or in my pocket? . . . All right, I'm gonna put it in my purse, OK?

*Child:* Are we going?

*Mother:* No, not yet.

In this episode, mother invents a rationalization for denying her child the desired treat (i.e., he had already eaten a sweet breakfast), and proposes a later time when the candy can be eaten. The child responds with a compromise time—during their trip after the lab visit to the university's arboretum—to which the mother agrees. Mother then voices a second proposal to save the candy “so that we can make sure” that it is not eaten earlier. She reassures the child that she will save it, and offers the choice of where to put it until they reach the arboretum. The child's agreement is quickly followed by an inquiry about leaving. Mother offers strategies for managing the child's emotions that are within the capabilities of her four-and-a-half year old (i.e., tolerating a delay with a predictable limit; hiding a desired treat to promote self-control) and enlists her child's cooperation by offering explanations and choices. Like most preschoolers, the child responds with questions, alternatives, and eventual agreement.

By contrast with observations of children who are alone coping with a delayed reward, a locked box with an attractive toy inside, or another emotionally provocative situation (cf. Dennis, Cole, Wiggins, Cohen, & Zalewski, 2009), ours was the first study to examine in the lab the kinds of parent-child interaction by which emotion regulation skills are socialized in the family. We learned that maternal and child responses complexly build on each other as they together negotiate a means of constructively managing the child's feelings. Although each partner comes to this interaction with



the beliefs and knowledge that this study has documented—the child’s understanding of the efficacy of alternative self-regulatory strategies and expectations for the mother’s behavior; the mother’s representations of emotion and her strategies for supporting her child’s emotional self-control—their interaction assumed its own course that was not well predicted by either maternal or child characteristics. In this respect, the whole was greater than the sum of the parts contributed by each partner.

The findings of the PEDS study have provided important insights into the early socialization of emotion regulation but, like all studies, its conclusions are limited. In particular, follow-up studies are needed with more diverse participant samples and which enable us to examine more incisively the dynamic processes characterizing mother–child negotiation over emotion regulation. Follow-up research will require longitudinal designs to better clarify causal associations between maternal practices and children’s self-regulation that are suggested in this single-wave study. Future studies will also benefit from multiple informants concerning family processes to reduce reliance on maternal report, and broaden an understanding of the contributions of fathers and other family members.

Despite these limitations, the PEDS study highlights many new directions for future research on the development of emotion regulation. Further study of the growth of children’s knowledge of emotional regulatory strategies and their efficacy will contribute to better understanding of the expectations that children bring to their encounters with parents in emotionally evocative situations. Our findings confirm the importance of parents’ “meta-emotion philosophies” as a network of emotion representations that influence how adults perceive, interpret, respond, and seek to manage the emotions of offspring, and suggest that further inquiry into the specific representational systems that influence socialization efforts is warranted. This work has also highlighted the direct and indirect ways that parent–child conversation can contribute to the development of emotion self-regulation in young children, and how conversational discourse draws from adults’ emotion representations to provide both content and a context for children’s emotion understanding. Finally, we believe that because young children develop skills of emotion self-regulation not in isolated situations but in the social contexts of the family, greater attention to the give-and-take of parents and children as they negotiate emotion goals, propose and discuss coping strategies, and enact constructive solutions to manage children’s feelings will yield insight into this richly dynamic but vitally important socialization process.

## CONCLUDING THOUGHTS

In both developmental neurobiology and behavioral development, emotion does not develop from an early unregulated condition into a regulated psychological state. Instead, emotion is regulated in different ways throughout development. Initially, emotion is managed through parasympathetic regulation and the mutual influences of widely distributed brain systems, together with the social ministrations of caregivers and the newborn’s innate self-regulatory behaviors. With increasing age, emotion regulatory processes are supplemented by the growth of other cortical systems that contribute to the activation and regulation of emotional responses, and whose maturation enables the flexible mentalistic strategies for emotional self-control that children enlist to achieve more complex sociocultural goals. Viewing the growth of emotion regulation as the development of successive levels of control that function interactively with earlier developing regulatory systems is one way that current views are more complex than cultural beliefs about the growth of emotional management.

Future research is needed to better understand bottom-up influences on emotion activation, including neurobiological influences on the perceptual-cognitive appraisals that enter into emotional arousal, through functional neuroimaging (see, e.g., Kober et al., 2008). In addition, much more must be learned about the developmental plasticity of neurological and neuroendocrine systems, especially as they are influenced by early experiences of stress or, alternatively, supportively

nurturant care. Animal models will be necessary to understand the limits of neuroplasticity and how it is developmentally graded before generalizations to human functioning are possible. As the work of Pollak and his colleagues reviewed earlier suggests, however, insights into neurobiological plasticity can be gleaned from research programs that combine behavioral and biological methods with carefully selected participant samples.

Another way that current research is yielding a more complex view concerns the purposes served by emotion management. Contrary to a long tradition that connected character development with emotional self-control to support appropriate conduct, it is becoming increasingly clear that while this is often true, it is not a complete characterization of the functioning of emotion self-regulation. In addition, children and youth (and adults) are emotional tacticians who manage their emotions to accomplish goals that may require, at times, intense displays of anger, anguish, fear, distress, and other feelings that are manifestly “unregulated,” at least to outside observers. Especially when children are in circumstances requiring emotional self-regulation in which immediate emotional goals conflict with long-term well-being—such as monitoring the anger of an adult who has been abusive, or maintaining vigilance for anxiety-provoking events, or watching for anticipatory signs of marital conflict or domestic abuse—the strategies of emotion regulation that ensue may appear dysfunctional. This can be especially so when past experiences have altered neurobiological stress systems such that children are hypervigilant to the threats they encounter and physiologically overreactive to them.

Understanding the development of these self-regulatory processes requires an incisive appreciation of the functional goals and neurobiological developments that have led to them, as well as of the emotionally overwhelming circumstances in which children must manage their feelings, and the cost–benefit calculus entailing in alternative strategies of emotion regulation. At times, in other words, children and adults who are emotionally “unregulated” are managing their emotions as well as their environmental demands, neurobiological vulnerabilities, and calculus of near and long-term goals allow. Future studies can contribute to a better understanding of these adaptive processes of emotion self-regulation by analyzing the immediate and long-term goals influencing emotion regulatory efforts.

Finally, our cultural beliefs lead us to expect that skills of emotion regulation are socialized in children through parental coaching, modeling, and guidance concerning the emotion rules of the culture. The findings of our research and the work of others indicate that this is an important but limited part of the developmental story. Beyond this, parents’ emotional philosophies are influenced by their personal beliefs about emotion that affect their perceptions and interpretations of their children’s feelings. Children gradually acquire explicit knowledge of emotion by which they interpret parents’ guidance and derive their own judgments of the efficacy of alternative self-regulatory strategies. As children mature, they manage their feelings in more complex social contexts requiring consideration of multiple emotional goals, some of which may be in conflict. Most importantly, as parents and children interact with each other in the specific situations in which they are regulating a child’s emotional behavior, each responds to the other from the perspective of their respective perceptions, emotion goals, and interpretations to create a dynamic process by which a child’s emotional experience is shaped.

In light of these considerations, is it any wonder that the development of emotion regulation remains such a compelling, but challenging, developmental process to study? Mothers’ emotion representations may not always predict their emotion socialization efforts because they are responding in a specific context to a child who has different emotion goals in mind. Children’s emotion understanding may not reliably give insight into the child’s behavioral self-regulatory strategies because the demands of the situation, and of other social partners, alter the child’s strategy choices and their efficacy. Children’s understanding of emotion regulatory strategies are not a direct result of parents’ socialization efforts because children have different representations, based on their experience, of the expected outcomes of different self-regulatory approaches (such as venting). There are, however, consistencies in this dynamic, self-organizing developmental process. The

mother's emotion representations are an important influence on her interpretations and responses to the emotions of her children. Children's knowledge of emotion regulation develops in sophistication and coherence in ways that are related, at least indirectly, to their strategies for emotional self-control. A warm, secure parent-child relationship is an important resource to the growth of competent emotion regulation because it is a source of support, a context for parent-child discourse about emotion, and a relational environment for mutual emotional understanding. Future research on the development of emotion regulation would benefit from greater attention, through carefully designed developmental studies, of (a) constructivist processes in the growth of emotion regulation focused on children's understanding and expectations for self-regulatory strategies in relation to family socialization practices, (b) parents' representations of emotion in their own lives and their influence on their responses to children's emotions, and (c) the verbal and nonverbal aspects of parent-child conversation on emotional themes as a further arena for the socialization of emotion regulation.

In some views, the developmental study of emotion regulation is in crisis because the integrity of the concept of emotion regulation is in doubt (Campos, Frankel, & Camras, 2004). In our view, the challenge is not that an integral concept of emotion regulation does not exist, but that it has been oversimplified. When we put simplistic constructs aside and look at the neurobiological and psychological processes that contribute to the development of emotion regulation, it is apparent that the challenge is not the integrity of the concept, but its complexity and sophistication. That is where the fun of scientific inquiry begins.

## REFERENCES

- Barrett, L. F., & Bar, M. (2009). See it with feeling: Affective predictions during object perception. *Philosophical Transactions of the Royal Society B (Biological Sciences)*, *364*, 1325–1334.
- Blair, C. (2010). Stress and the development of self-regulation in context. *Child Development Perspectives*, *4*, 181–188.
- Boyce, W. T., & Ellis, B. J. (2005). Biological sensitivity to context: I. An evolutionary-developmental theory of the origins and functions of stress reactivity. *Development and Psychopathology*, *17*, 271–301.
- Bretherton, I. (1993). From dialogue to internal working models: The co-construction of self in relationships. In C. A. Nelson (Ed.), *Memory and affect in development: The Minnesota symposia on child psychology*, Vol. 26 (pp. 237–263). Hillsdale, NJ: Erlbaum.
- Calkins, S. D., & Hill, A. (2007). Caregiver influences on emerging emotion regulation: Biological and environmental transactions in early development. In J. Gross (Ed.), *Handbook of emotion regulation* (pp. 229–248). New York: Guilford.
- Campos, J. J., Frankel, C. B., & Camras, L. (2004). On the nature of emotion regulation. *Child Development*, *75*, 377–394.
- Cardinal, R. N., Parkinson, J. A., Hall, J., & Everitt, B. J. (2002). Emotion and motivation: The role of the amygdala, ventral striatum, and prefrontal cortex. *Neuroscience and Biobehavioral Reviews*, *26*, 321–352.
- Cicchetti, D., & Toth, S.L. (1995). A developmental psychopathology perspective on child abuse and neglect. *Journal of the American Academy of Child and Adolescent Psychiatry*, *34*, 541–565.
- Cole, P. M., Bruschi, C. J., & Tamang, B. L. (2002). Cultural differences in children's emotional reactions to difficult situations. *Child Development*, *73*, 983–996.
- Cole, P. M., Dennis, T. A., Smith-Simon, K. E., & Cohen, L. H. (2008). Preschoolers' emotion regulation strategy understanding: Relations with emotion socialization and child self-regulation. *Social Development*, *18*, 324–352.
- Compas, B. E., Connor-Smith, J. K., Saltzman, H., Thomsen, A. H., & Wadsworth, M. E. (2001). Coping with stress during childhood and adolescence: Problems, progress, and potential in theory and research. *Psychological Bulletin*, *127*, 87–127.
- Davies, P. T., & Woitach, M. J. (2008). Children's emotional security in the interparental relationship. *Current Directions in Psychological Science*, *17*, 269–274.
- Davis, E. L., Levine, L. J., Lench, H. C., & Quas, J. A. (2010). Metacognitive emotion regulation: Children's awareness that changing thoughts and goals can alleviate negative emotions. *Emotion*, *10*, 498–510.
- Denham, S. A. (1998). *Emotional development in young children*. New York: Guilford.

- Denham, S. A. (1997). "When I have a bad dream, Mommy holds me": Preschoolers' conceptions of emotions, parental socialisation, and emotional competence. *International Journal of Behavioral Development, 20*, 301–319.
- Dennis, T. A., Cole, P. M., Wiggins, C. N., Cohen, L. H., & Zalewski, M. (2009). The functional organization of preschool-age children's emotion expressions and actions in challenging situations. *Emotion, 9*, 520–530.
- Dennis, T. A., & Kelemen, D. A. (2009). Preschool children's views on emotion regulation: Functional associations and implications for social-emotional adjustment. *International Journal of Behavioral Development, 33*, 243–252.
- De Wolff, M., & van IJzendoorn, M. (1997). Sensitivity and attachment: A meta-analysis on parental antecedents of infant attachment. *Child Development, 68*, 571–591.
- Dunn, J., Brown, J., & Beardsall, L. (1991). Family talk about feeling states and children's later understanding of others' emotions. *Developmental Psychology, 27*, 448–455.
- Eisenberg, N., Cumberland, A., & Spinrad, T. L. (1998). Parental socialization of emotion. *Psychological Inquiry, 9*, 241–273.
- Eisenberg, N., Fabes, R. A., Bernzweig, J., Karbon, M., Poulin, R., & Hanish, L. (1993). The relations of emotionality and regulation to preschoolers' social skills and sociometric status. *Child Development, 64*, 1418–1438.
- Fabes, R. A., Poulin, R. E., Eisenberg, N., & Madden-Derdich, D. A. (2002). The coping with children's negative emotions scale (CCNES): Psychometric properties and relations with children's emotional competence. *Marriage & Family Review, 34*, 285–310.
- Fivush, R., Berlin, L. J., Sales, J. M., Mennuti-Washburn, J., & Cassidy, J. (2003). Functions of parent-child reminiscing about emotionally negative events. *Memory, 11*, 179–192.
- Fox, N. A., Henderson, H. A., Marshall, P. J., Nichols, K. E., & Ghera, M. M. (2005). Behavioral inhibition: Linking biology and behavior within a developmental framework. *Annual Review of Psychology, 56*, 235–262.
- Frijda, N. H. (1987). *The emotions*. New York: Cambridge University Press.
- Gottman, J. M., Katz, L. F., & Hooven, C. (1997). *Meta-emotion: How families communicate emotionally*. Mahwah, NJ: Erlbaum.
- Gottman, J. M., Katz, L. F., & Hooven, C. (1996). Parental meta-emotion philosophy and the emotional life of families: Theoretical models and preliminary data. *Journal of Family Psychology, 10*, 243–268.
- Gross, J. J., & John, O. P. (2003). Individual differences in two emotion regulation processes: Implications for affect, relationships, and well-being. *Journal of Personality and Social Psychology, 85*, 348–362.
- Gunnar, M. R., Fisher, P. A., & The Early Experience, Stress, and Prevention Network (2006). Bringing basic research on early experience and stress neurobiology to bear on preventive interventions for neglected and maltreated children. *Development and Psychopathology, 18*, 651–677.
- Gunnar, M., & Vasquez, D. (2006). Stress neurobiology and developmental psychopathology. In D. Cicchetti & D. Cohen (Eds.), *Developmental psychopathology* (2nd Ed.), Vol. III. *Risk, disorder, and adaptation* (pp. 533–577). New York: Wiley.
- Halberstadt, A. G., Cassidy, J., Stifter, C. A., Parke, R. D., Fox, N. A. (1995). Self-expressiveness within the family context: Psychometric support for a new measure. *Psychological Assessment, 7*, 93–103.
- Holodyski, M., & Friedlmeier, W. (2006). *Development of emotions and emotion regulation*. New York: Springer.
- Hooven, C., Gottman, J. M., & Katz, L. F. (1995). Parental meta-emotion structure predicts family and child outcomes. *Cognition and Emotion, 9*, 229–264.
- John, O. P., & Gross, J. J. (2004). Healthy and unhealthy emotion regulation: Personality processes, individual differences, and life span development. *Journal of Personality, 72*, 1301–1333.
- Kober, H., Barrett, L. F., Joseph, J., Bliss-Moreau, E., Lindquist, K., & Wager, T. D. (2008). Functional grouping and cortical-subcortical interactions in emotion: A meta-analysis of neuroimaging studies. *NeuroImage, 42*, 998–1031.
- Laible, D. (2004). Mother-child discourse in two contexts: Links with child temperament, attachment security, and socioemotional competence. *Developmental Psychology, 40*, 979–992.
- Laible, D., & Panfile, T. (2009). Mother-child reminiscing in the context of secure attachment relationships: Lessons in understanding and coping with negative emotions. In J. Quas & R. Fivush (Eds.), *Stress and memory development: Biological, social and emotional considerations* (pp. 166–195). NY: Oxford University Press.

- Laible, D. J., & Thompson, R. A. (2007). Early socialization: A relational perspective. In J. Grusec & P. Hastings (Eds.), *Handbook of socialization* (Rev. ed.) (pp. 181–207). New York: Guilford.
- Levine, L., Stein, N., & Liwag, M. (1999). Remembering children's emotions: Sources of concordant and discordant accounts between parents and children. *Developmental Psychology, 35*, 790–801.
- Lewis, M. D., & Todd, R. M. (2007). The self-regulating brain: Cortical-subcortical feedback and the development of intelligent action. *Cognitive Development, 22*, 406–430.
- Lunkenheimer, E. S., Shields, A. M., & Cortina, K. S. (2007). Parental emotion coaching and dismissing in family interaction. *Social Development, 16*, 232–248.
- Meyer, S., Thompson, R. A., Raikes, A., Virmani, E., & Waters, S. (in prep.). *Socialization of young children's emotion regulation strategies: Parental emotion representations, expressivity, and communication style*. Manuscript in preparation.
- Miller, P., & Sperry, L. L. (1987). The socialization of anger and aggression. *Merrill-Palmer Quarterly, 33*, 1–31.
- Morris, A. S., Silk, J. S., Steinberg, L., Myers, S. S., & Robinson, L. R. (2007). The role of the family context in the development of emotion regulation. *Social Development, 16*, 361–388.
- Ochsner, K. N., Ray, R. R., Hughes, B., McRae, K., Cooper, J. C., Weber, J., et al. (2009). Bottom-up and top-down processes in emotion generation: Common and distinct neural mechanisms. *Psychological Science, 20*, 1322–1331.
- Ontai, L. L., & Thompson, R. A. (2002). Patterns of attachment and maternal discourse effects on children's emotion understanding from 3 to 5 years of age. *Social Development, 11*(4), 433–450.
- Pollak, S. D. (2002). Effects of early experience on children's recognition of facial displays of emotion. *Developmental Psychology, 38*, 784–791.
- Pollak, S. D., & Kistler, D. J. (2002). Early experience is associated with the development of categorical representations for facial expressions of emotion. *Proceedings of the National Academy of Sciences, 99*, 9072–9076.
- Pollak, S. D., Klorman, R., Thatcher, J. E., & Cicchetti, D. (2001). P3b reflects maltreated children's reactions to facial displays of emotion. *Psychophysiology, 38*, 267–274.
- Pollak, S. D., & Tolley-Schell, S. A. (2003). Selective attention to facial emotion of physically abused children. *Journal of Abnormal Psychology, 113*, 323–338.
- Propper, C., & Moore, G. A. (2006). The influence of parenting on infant emotionality: A multi-level psychobiological perspective. *Developmental Review, 26*, 427–460.
- Quirk, G. J. (2007). Prefrontal-amygdala interactions in the regulation of fear. In J. J. Gross (Ed.), *Handbook of emotion regulation* (pp. 27–46). New York, NY: Guilford.
- Radloff, L. S. (1977). The CES-D Scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement, 1*, 385–401.
- Raikes, H. A., & Thompson, R. A. (2008). Conversations about emotion in high-risk dyads. *Attachment & Human Development, 10*, 359–377.
- Raikes, H. A., & Thompson, R. A. (2006). Family emotional climate, attachment security, and young children's emotion understanding in a high-risk sample. *British Journal of Developmental Psychology, 24*, 89–104.
- Ramsden, S. R., & Hubbard, J. A. (2002). Family expressiveness and parental emotion coaching: Their role in children's emotion regulation and aggression. *Journal of Abnormal Child Psychology, 30*, 657–667.
- Reese, E. (2002). Social factors in the development of autobiographical memory: The state of the art. *Social Development, 11*, 124–142.
- Roberts, W., & Strayer, J. (1987). Parents' responses to the emotional distress of their children: Relations with children's competence. *Developmental Psychology, 23*, 415–422.
- Salovey, P., Mayer, J. D., Goldman, S. L., Turvey, C., & Palfai, T. P. (1995). Emotional attention, clarity, and repair: Exploring emotional intelligence using the Trait Meta-Mood Scale. In J. Pennebaker (Ed.), *Emotion, disclosure, and health* (pp. 125–154). Washington, DC: American Psychological Association.
- Schwartz, C., Wright, C., Shin, L., Kagan, J., & Rauch, S. (2003). Inhibited and uninhibited infants "grown up": Adult amygdalar response to novelty. *Science, 300*, 1952–1953.
- Shackman, J. E., & Pollak, S. D. (2005). Experiential influences on multimodal perception of emotion. *Child Development, 76*, 1116–126.
- Stansbury, K., & Sigman, M. (2000). Responses of preschoolers in two frustrating episodes: Emergence of complex strategies for emotion regulation. *Journal of Genetic Psychology, 161*, 182–202.

- Stansbury, K., & Zimmermann, L. K. (1999). Relations among child language skills, maternal socializations of emotion regulation, and child behavior problems. *Child Psychiatry & Human Development, 30*, 121–142.
- Surguladze, S. A., Brammer, M. J., Young, A. W., Andrew, C., Travis, M. J., Williams, S. C. R., et al. (2003). A preferential increase in the extrastriate response to signals of danger. *NeuroImage, 19*, 1317–1328.
- Thompson, R. A. (1990). Emotion and self-regulation. In R. A. Thompson (Ed.), *Socioemotional development. Nebraska Symposium on Motivation*, Vol. 36 (pp. 383–483). Lincoln, NE: University of Nebraska Press.
- Thompson, R. A. (1994). Emotion regulation: A theme in search of definition. In N. A. Fox (Ed.), *The development of emotion regulation and dysregulation: Biological and behavioral aspects. Monographs of the Society for Research in Child Development, 59* (2–3), 25–52 (Serial no. 240).
- Thompson, R. A. (2000). Childhood anxiety disorders from the perspective of emotion regulation and attachment. In M. W. Vasey & M. R. Dadds (Eds.), *The developmental psychopathology of anxiety* (pp. 160–182). Oxford: Oxford University Press.
- Thompson, R. A. (2011). Emotion and emotion regulation: Two sides of the developing coin. *Emotion Review, 3*, 53–61.
- Thompson, R. A., & Calkins, S. (1996). The double-edged sword: Emotional regulation for children at risk. *Development and Psychopathology, 8*(1), 163–182.
- Thompson, R. A., Flood, M. F., & Lundquist, L. (1995). Emotional regulation and developmental psychopathology. In D. Cicchetti & S. Toth (Eds.), *Rochester symposium on developmental psychopathology*, Vol. 6. *Emotion, cognition, and representation* (pp. 261–299). Rochester, NY: University of Rochester Press.
- Thompson, R. A., & Goodman, M. (2010). Development of emotion regulation: More than meets the eye. In A. Kring & D. Sloan (Eds.), *Emotion regulation and psychopathology* (pp. 38–58). New York: Guilford.
- Thompson, R. A., Laible, D. J., & Ontai, L. L. (2003). Early understanding of emotion, morality, and the self: Developing a working model. In R. V. Kail (Ed.), *Advances in Child Development and Behavior*, Vol. 31 (pp. 137–171). San Diego: Academic.
- Thompson, R. A., Lewis, M., & Calkins, S. D. (2008). Reassessing emotion regulation. *Child Development Perspectives, 2*(3), 124–131.
- Thompson, R. A., & Meyer, S. (2007). The socialization of emotion regulation in the family. In J. Gross (Ed.), *Handbook of emotion regulation* (pp. 249–268). New York: Guilford.
- Thompson, R. A., & Waters, S. F. (2010). The development of emotion regulation: Parent and peer influences. In R. Sanchez-Aragon (Ed.), *Regulacion Emocional: Una Travesia de la Cultura a la Formacion de las Relaciones Personales (Emotion Regulation: A Crossing from Culture to the Development of Personal Relationships)* (pp. 125–157). Mexico: Universidad Nacional Autonoma de Mexico (National Autonomous University of Mexico).
- Waters, S. F., Raikes, H. A., Virmani, E. A., Meyer, S. C., Jochem, R., & Thompson, R. A. (2010, April). *What do children know about emotion regulation?* Poster presented at the biennial meeting of the Conference on Human Development, New York.
- Waters, S., Virmani, E., Thompson, R. A., Meyer, S., Raikes, A., & Jochem, R. (2010). Emotion regulation and attachment: Unpacking two constructs and their association. *Journal of Psychopathology and Behavioral Assessment, 32*, 37–47.
- Woltering, S., & Lewis, M. D. (2009). Developmental pathways of emotion regulation in childhood: A neuropsychological perspective. *Mind, Brain, and Education, 3*, 160–169.