



# Review: Is Parent–Child Attachment a Correlate of Children’s Emotion Regulation and Coping?

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## Abstract

Attachment theorists have described the parent–child attachment relationship as a foundation for the emergence and development of children’s capacity for emotion regulation and coping with stress. The purpose of this review was to summarize the existing research addressing this issue. We identified 23 studies that employed validated assessments of attachment, which were not based on self-report questionnaires, and separated the summary into findings for toddlers/preschool, children, and adolescents. Although most associations were weak and only a minority of the multiple possible associations tested was supported in each study, all studies (but one) reported at least one significant association between attachment and emotion regulation or coping. The evidence pointed to the regulatory and coping problems of toddlers showing signs of ambivalent attachment or the benefits of secure (relative to insecure) attachment for toddlers, children, and adolescents. Toddlers who showed signs of avoidant attachment relied more on self-related regulation (or less social-oriented regulation and coping), but it was not clear whether these responses were maladaptive. There was little information available regarding associations of ambivalent attachment with school-age children’s or adolescents’ emotion regulation. There were also few studies that assessed disorganized attachment.

## Keywords

Emotion regulation, stress experiences, parenting, attachment, coping

The security or insecurity of the parent–child attachment relationship is one of the relationship factors identified as particularly important to the development of an offspring’s capacity for effectively regulating his or her emotion (Kobak, Cassidy, Lyons-Ruth, & Zir, 2006; Kopp, 1989; Morris, Silk, Steinberg, Myers, & Robinson, 2007). For example, in two descriptions of attachment theory and summaries of research, Cassidy (1994) and Brumariu (2015) described how securely attached children will seek and receive caregiver support and balance this with self-regulation to effectively regulate their emotions. In contrast, emotion regulation is more challenging for children when caregiver–child relationships are classified as insecure–ambivalent (also sometimes called resistant or anxious) or insecure–avoidant, with insecure–ambivalent children expected to develop strategies to display their emotion and to heighten their call for support from others and insecure–avoidant children expected to suppress emotions and limit their calls to caregivers for soothing (Bridges & Grolnick, 1995; Kerns, 2008; Lyons-Ruth & Jacobvitz, 2008).

Given that most, if not all, forms of psychopathology involve reduced emotional competence, difficulties with regulation of some emotions, and challenges when dealing with stress (Compas, Connor-Smith, Saltzman, Thomsen, & Wadsworth, 2001; Southam-Gerow & Kendall, 2002), it has been argued that it is regulatory capacity and ability to cope that then explains when and why the parent–child attachment relationship has such wide-ranging effects on children’s adjustment, adaption and psychopathology (e.g., see Brenning, Soenens, Braet, & Bosmans, 2012; Contreras, Kerns,

Weimer, Gentzler, & Tomich, 2000; Kullik & Petermann, 2013; Morris et al., 2007; Wei, Heppner, & Mallinckrodt, 2003). However, despite the increasing focus on attachment and emotion regulation in adolescence and adulthood, and the premise that these associations are built on a history of parent–child attachment relationships in the early years of life, there has been no previous review of what is known about the associations between attachment and emotion regulation among toddlers, school-age children and adolescents. Thus, the purpose of the present review was to systematically identify and review the evidence related to this theoretical proposition. We reviewed studies that examined the associations between attachment and emotion regulation where the average age of participants was 18 years or under.

We also extend this review to include studies of attachment as related to child or adolescent coping with stress. We did this because of the conceptual overlap that can be found when

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examining definitions and research on emotion regulation and coping, and (sometimes) the use of similar measures across the two domains (Compas et al., 2014; Eisenberg, Fabes, & Guthrie, 1997; Skinner & Zimmer-Gembeck, 2007). Emotion regulation has been defined as processes that are used to modulate, manage, and modify emotional reactions to accomplish a goal (Thompson & Meyer, 2007), or more comprehensively

“the process of initiating, avoiding, inhibiting, maintaining, or modulating the occurrence, form, intensity, or duration of internal feeling states, emotion-related physiology, attentional processes, motivational states, and/or the behavioral concomitants of emotion in the services of accomplishing affect-related biological or social adaptation or achieving individual goals. (Eisenberg & Spinrad, 2004, p. 338)

However, in studies of children, emotion regulation is generally used to refer to “behaviors and strategies that children use to control and communicate affect and arousal, especially negative affect” (NICHD Early Child Care Research Network, 2004, p. 46). This definition points to the sharing of conceptual space and convergence between views of emotion regulation with coping responses to stress. In fact, coping has been defined as action regulation under stress, with coping heavily dependent on emotion regulation as well as other regulatory responses to stress (Skinner & Zimmer-Gembeck, 2007). Compas et al. (2014) and Eisenberg et al. (1997) make clear arguments for the close connection between emotion regulation and coping by describing the prominent conceptual overlap between descriptions of coping with stress and emotion regulation when each is discussed in the psychological literature.

Although there has been no previous review of studies of attachment and emotion regulation or coping with stress that extends across the age periods of infancy to age 18, there has been a recent review published on attachment and emotion regulation in middle childhood (Brumariu, 2015). This review concluded that children classified as secure show signs of better emotion regulation capacity in typical environments, as well as in threatening or challenging environments. Yet, the evidence regarding associations of insecure attachment strategies with emotion regulation was not so clear, partly because few studies were identified for the review. There have also been reviews of research on attachment and temperament, which included negative emotionality, and investigated some aspects of self-regulation (see Mangelsdorf & Frosch, 1999; Vaughn & Bost, 1999; Vaughn, Bost, & van IJzendoorn, 2008). In these reviews, the general conclusion was that attachment and temperament seem to be overlapping domains, but that each contributes independent information. For instance, in one meta-analysis (27 samples), negative reactivity was strongly and negatively correlated with attachment security, as indicated by mother-sorted Attachment Q-set (AQS) scores (van IJzendoorn, Verijken, Bakermans-Kranenburg, & Riksen-Walraven, 2004). Yet, this association was more modest in size when observers conducted the sorts.

The present review differs from these past reviews by expanding to a focus on a greater age range of both children and adolescents, and including studies of emotion regulation and coping with stress. Also, our central focus is on whether attachment might be a foundation for the development of a range of ways of behaviorally or cognitively regulating emotion, and/or coping with stress, rather than having a central focus on determining whether attachment constructs could explain temperament or vice versa, or whether temperament might predict attachment classification. Moreover,

some of the regulatory and coping strategies we examined in the current review might overlap with the temperament domain, but others might capture strategies that are not typically assessed with temperament measures. The current review also places a direct emphasis on ideas that have emerged from these previous reviews, that (1) temperamental differences early in life may bias an infant toward security or insecurity, *but* it is the caregiving environment that determines attachment, and (2) both attachment and temperament are “antecedent to and underlie individual differences in behavior, cognition, and affect” (Vaughn et al., 2008, p. 203). Thus, we provide the first review of what is known about whether the caregiving environment can explain individual differences and development of a range of emotion regulatory and coping responses found among toddlers, school-age children, and adolescents.

## Attachment Theory

According to the classic attachment theory of Bowlby (1969, 1973, 1988), infants universally form an emotional attachment to their primary caregiver during the first year of life, and the quality of that attachment relationship is dependent on the sensitive responding and availability of the caregiver (see Fonagy, Lorenzini, Campbell, & Luyten, 2014). Sensitive and responsive caregiving promotes confidence in the availability of care and facilitates development of confidence in oneself and the world (Sroufe, 1996); in other words, the caregiver serves as a secure base from which the child can confidently explore their world, knowing support will be provided if needed (Bowlby, 1988).

Ainsworth and Wittig (1969) delineated three coherent attachment classifications into which infants could be categorized based on behavioral organization upon reunion with caregivers following brief separations. The insecure-avoidant category reflects a pattern of minimizing distress cues (attachment classification A), insecure-ambivalent (or resistant or anxious) reflects a pattern of maximizing distress cues (attachment classification C), and secure reflects those who are quickly soothed by caregivers, and who demonstrate confidence in caregiver availability (attachment classification B). However, a portion of infants could not be adequately classified according to the ABC criteria, leading to the formulation of a fourth classification by Main and Solomon (1990), referred to as disorganization (attachment classification D; van Rosmalen, van IJzendoorn, Bakermans-Kranenburg, 2014). Disorganized infants demonstrate lapses in the organization of their responses to caregivers upon reunion, which is theorized to result from the irresolvable conflict of the primary caregiver whose role is to provide comfort and protection, but who is also at times a source of fear (Fonagy et al., 2014). Notably, the ABC+D classifications have been studied extensively and are considered valid descriptors of different parent-child relationship functioning (van Rosmalen et al., 2014).

## Attachment Theory and Emotion Regulation

An explicit aspect of classic attachment theory is that the parent-child attachment relationship sets in motion the development of a range of adaptive and maladaptive patterns of socioemotional and behavioral functioning across childhood, adolescence, and adulthood (Ainsworth, 1979; Bowlby 1969, 1973; Carlson & Sroufe,

1995; Kobak et al., 2006). This has been echoed in many contemporary theories of the roles of parenting, family relationships, emotion regulation, and stress and coping in child and adolescent functioning (Allen & Miga, 2010; Cassidy & Berlin, 1994; Compas, Worsham, & Ey, 1991; Ein-Dor, Mikulincer, & Shaver, 2011; Mikulincer & Florian, 2003; Shaver & Mikulincer, 2002). Attachment is expected to have such a broad impact, because it is argued to be a foundation for the development of children's capacity to effectively recognize and regulate their emotions and to adaptively cope with stressful events. For example, Kopp (1989; see also Zeman, Cassano, Perry-Parrish, & Stegall, 2006; Zimmer-Gembeck & Skinner, in press) has described how caregivers are crucial for assisting children to express emotions, especially negative affect, in ways that are socially acceptable, while also providing assistance and guiding them toward strategies that reduce their distress. Moreover, a secure attachment relationship between an infant and a caregiver has been described as founded on the caregiver's appropriate sensitivity to the infant (Ainsworth, 1979; Weinfield, Sroufe, Egeland, & Carlson, 1999). This sensitivity can be considered a kind of "co-regulation" (Fogel, 1993) in which caregivers are sensitive to infants' cues, and infants provide clearer and clearer messages to their caregiver, thus resulting in good communication about how to cope with challenging and potentially threatening encounters (Diamond & Aspinwall, 2003; Lewis & Ramsay, 1999; Sroufe, 1996). Caregiver–infant interactions build the infants' capacity for self-directed emotion regulation and coping. In other words, emotion regulatory strategies, such as asking or motioning for support or using distraction (e.g., play or looking away) to alleviate distress, are first aided by the external assistance or modeling of the caregiver and later become more self-directed (Kopp, 1989; Nachmias, Gunnar, Mangelsdorf, Parritz, & Buss, 1996; Panfile & Laible, 2012; Sroufe, 1996). Such dyadic regulatory behaviors between caregivers and children build attachment bonds during the first year of life, but also provide a foundation for the development of emotion regulation patterns that differ between children (Siegel, 2001; Sroufe, 1996).

Although theory suggests attachment and emotion regulation are associated beginning in infancy, such connections have been investigated most thoroughly by researchers who have studied adolescents or adults. For example, some theories of adult attachment (e.g., Mikulincer, Shaver, & Pereg, 2003) highlight the notion of secondary attachment strategies. By linking a history of parent–child attachment to these secondary attachment strategies, this theory depicts how attachment should identify individuals with different configurations of emotion regulatory strategies used when dealing with, managing, or confronting stressful life events. Individuals deemed secure are described as easily co-regulating distress by balancing self- and other-reliance, and adaptively coping with their distress. In contrast, individuals classified as ambivalent (or anxiously) attached are referred to as hyperactivating; they are expected to emotionally overreact and make more attempts to elicit attention from others when distressed (Wei, Vogel, Ku, & Zakalik, 2005). Individuals classified as avoidantly attached are described as suppressing negative emotions and having a tendency to distance themselves from others when distressed (Mikulincer et al., 2003). Hence, avoidant individuals are referred to as deactivating. Finally, those who are assessed as disorganized in their attachment orientation are expected to have trouble choosing between hyperactivating and deactivating strategies, commonly displaying both in an incoherent way (DeOliveira, Bailey, Moran, & Pederson, 2004; Mikulincer & Shaver, 2007). A few researchers have extended this range of secondary attachment

strategies under investigation to consider how attachment could be associated with all the core families of coping—from support seeking and active problem-solving to emotion expression, avoidance, distraction, and withdrawal during infancy (Roque, Verissimo, Fernandes, & Rebelo, 2013), adolescence (Gaylord-Harden, Taylor, Campbell, Kesselring, & Grant, 2009), and adulthood (Holmberg, Lomore, Takacs, & Price, 2010; Wei et al., 2003).

## Assessing Attachment

In general, measures of attachment differ in whether they are interpretive (also including interview based) or in questionnaire format. These differences closely align with the two primary perspectives within attachment theory, namely the developmental/clinical perspective (e.g., Waters, Crowell, Elliott, Corcoran, & Treboux, 2002) and the social/personality perspective (e.g., Mikulincer & Shaver, 2007). The developmental approach generally assesses the attachment relationship with a primary caregiver or within another intimate relationship via non-self-report instruments, including semi-structured interviews and behavioral assessments (e.g., Bernier & Dozier, 2002; Solomon & George, 1999). The social/personality approach generally assesses attachment via self-reported patterns of expectations, needs, and behaviors relating to the attachment behavioral system (e.g., Mikulincer & Shaver, 2007; Shaver & Mikulincer, 2002; Wilson & Wilkinson, 2012). These self-report measures sometimes also include questions about emotional reactions.

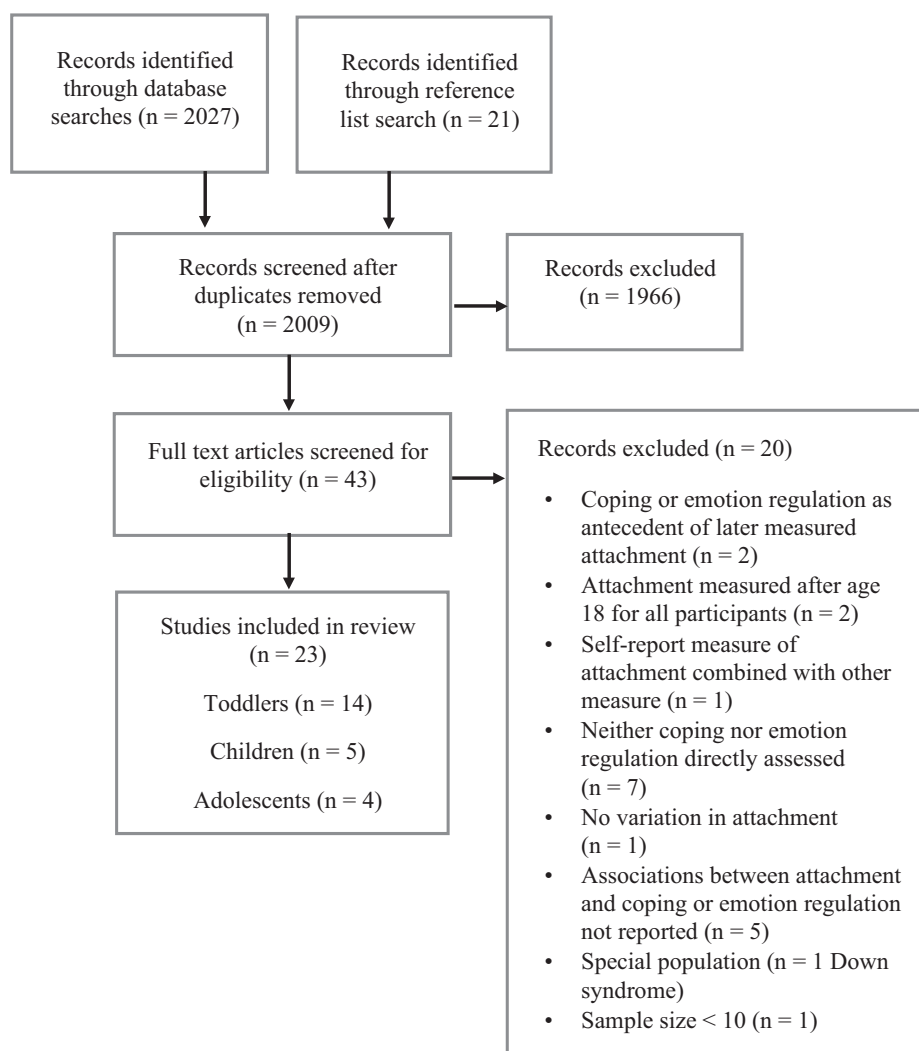
These, many, measures are all referred to as attachment, and most of them are empirically validated (Jacobvitz, Curran, & Moller, 2002; Roisman et al., 2007; Solomon & George, 1999). However, there can be little to only moderate convergence between interpretive and questionnaire measures of attachment (Bartholomew & Shaver, 1998; Jacobvitz et al., 2002; Roisman et al., 2007). For example, some scholars have concluded that self-report and non-self-report methods of assessment may be tapping related but somewhat distinct aspects of attachment (Bernier & Dozier, 2002). Consistent with this proposition is evidence that attachment assessed by the Adult Attachment Interview (AAI) Q-sort predicted different features of adult relationships compared to attachment assessed via self-report (Roisman et al., 2007). Because of these differences in self-report and other attachment measures, and our greater reliance on developmental theory as a foundation for this review, we restricted our review of studies to those that used validated, interpretive measures of attachment.

## Aims and Organization of the Review

In summary, the purpose of this review was to systematically summarize the existing research on the associations of attachment with emotion regulation and/or coping with stress among children and adolescents. We focused only on studies that employed validated assessments of attachment that were not based on self-report questionnaires. The study designs and measurement methods of included studies are briefly summarized, before we provide a review of the existing evidence. This evidence is organized by age period, separating studies into those of infants and toddlers, children, and adolescents.

## Method

We searched electronic databases (PsycInfo and Medline) to identify studies of attachment and coping or emotion regulation that met



**Figure 1.** Search strategy and results.

our inclusion and exclusion criteria published prior to 2014. Included studies published in English had to have examined associations between (a) attachment and (b) emotion regulation or coping with stress in individuals age 18 (on average) or under. Also, (a) and (b) had to have been assessed either concurrently or (a) had to have been assessed prior to (b), and (a) and (b) had to have been assessed with reference to the target young person. Studies with a sample size under 10 or with a very selected group of participants (e.g., children with Down's syndrome) were excluded.

After meetings with experts in the field of attachment and a preliminary examination of a convenience sample of literature, a set of terms was selected to begin the literature search. Search terms included Q-sort, strange situation, coping, affect regulation, emotion regulation, stress, emotionality, emotional reactivity, emotional reaction, emotional response, appraisal, stress reaction, stress response, distress, frustration, sadness, fear, anger, anxiety, and temperament, which were combined with attachment and limited to the age range 0 to 18 years (2027 articles). To supplement these searches, we searched the reference lists of reviews and retrieved empirical articles (21 articles). See Figure 1 for more details on the search outcomes and exclusion process.

Information extracted from each study included the stated purpose, study design, sample characteristics, retention, procedures for handling missing data, constructs assessed, measures, analytic methods, results as described, and univariate and multivariate effect sizes or other statistical results (see Tables 1 and 2). Findings were summarized paying particular attention to gender, race/ethnicity, age differences, number of covariates, and other characteristics of study sample or design that could account for variability in study findings. In the following sections, we first provide an overview of the literature search and brief descriptions of study designs and measurement methods, and describe our methods used to classify studies for presentation in a table describing each study (see Table 1) and a table that provides a briefer summary of effect sizes (or other findings when effect sizes were not reported) from each study (see Table 2).

## Results

Overall, findings from 23 manuscripts based on 20 different samples were included in this review. Of these, 14 manuscripts from 11 studies focused on infants/toddlers/preschool age children,

**Table 1.** Description of Included Studies.

Authors; Study title if used in more than one study	N; % boys; % white; country	M age and/or age range	Attachment measure	Emotion regulation / Coping measure
<b>Toddlers/preschool</b>				
Bosquet & Egeland, 2006	155; 54%; 70%; USA	12 mnths at T1, 18 mnths at T2, 42 mnths at T3	Strange Situation at 12 and 18 mnths: number of times the infant was insecurely attached (range 0–2)	Emotion regulation at 42 mnths: Barrier Box task – child was observed in a potentially frustrating situation without the mother present
Braungart & Stifter, 1991; Penn Infant and Child Dev Project	80; NR; NR; USA	12 mnths	Strange Situation: classification secure, avoidant, preoccupied	Regulation of negative affect during Strange Situation: people orientation and object orientation, toy exploration and self-comforting; reactivity
Brumariu & Kerns, 2013; NICHD	1097; NR but estimated at 51%; NR but estimated at 76%; USA	15 to 36 mnths at T1, 1st to 3rd grade at T2	Strange Situation at 15 and 36 mnths: number of times in each category (range 0–2)	Adapted Affectivity Scale in 3rd grade: inability to manage intense emotions
Crughola et al., 2011	39; 64%; 100%; Italy	13.9 mnths	Strange Situation: classification secure, avoidant, preoccupied	Emotion regulation strategies
Diener et al., 2002	85; 48%; 96%; USA	12 to 13 mnths	Strange Situation: classification secure, avoidant, preoccupied	Behavioral strategies during Competing Demands Task: emotion regulation, emotional expressions, regulatory styles
Fish & Belsky, 1991; Penn Infant & Child Dev Project	98; 58%; 100%; USA	12 mnths	Strange Situation: classification secure, avoidant, preoccupied	Separation tolerance: seven-episode laboratory procedure: emotion and emotion regulation observed during 23 mins separation episode, and a teaching task/cleanup with mother present. Coded negative and positive affect
Gilliom, 2002; WIC Pittsburgh	N = 310 T1, 282 T2, 189 T3; 100%; 54%; USA	1.5 yrs at T1, 3.5 yrs at T2; range 6 to 17 mnths	Strange Situation at 18 mnths: classification secure, insecure	Anger expression during frustration task (cookie task) at 3.5 yrs using coding system (Agreement with master coder was 89–96%, kappas = .64–.79); anger regulation during frustration task (cookie task) at 3.5 yrs, coding facial action and vocal cues
Hagekull & Bohlin, 2004	87; 51%; NR; Sweden	11 to 15 mnths at T1, 20 to 37 mnths at T2	Strange Situation at M age 15.5 mnths: classification secure, avoidant, preoccupied	Emotion regulation at 11 and 15 mnths: negative emotions; emotion regulation at 20, 28, and 37 mnths: emotionality, soothability
Nachmias et al., 1996	77; 51%; 100%; USA	18 mnths; range 18 to 19 mnths	Strange Situation: classification secure, avoidant, preoccupied	Cope Session: mother non-involvement period. Mother involvement period; Toddler Behavior Assessment Questionnaire; Social Fear Scale (Mother report); saliva cortisol
NICHD Early Child Care Research Network, 2004; NICHD	1023; 51%; 76%; USA	15 mnths at T1, 24 mnths at T2, 36 mnths at T3	1. Strange Situation at 15 mnths: classification secure, insecure–avoidant, insecure–resistant, disorganized/unclassifiable. 2. Q-set at 24 mnths. 3. Modified Strange Situation at 36 mnths: classification secure, insecure–avoidant, insecure–resistant, and insecure–controlling/insecure–other	Affect Dysregulation: observation of mother and child play and cleanup of toys. Coded defiant noncompliance and negative affect
Panfile & Laible, 2012	63; 52%; 81%; USA	36 mnths	Attachment Q-set: scores closer to 1 representing more secure children	Emotion regulation: calculated from subscales of the Child Behavior Questionnaire (CBQ) Short Form and Emotion Regulation Checklist
Roque et al., 2013	55; 49%; 51%; Portugal	21 mnths; range 18 to 26 mnths	Attachment Behavior Q-set: classification secure (score $\geq 0.35$ ), insecure (score $< 0.35$ )	Emotional regulation and expression during three episodes (positive, frustration, fear)
Spangler & Grossmann, 1993	41; 58%; 100%; Germany	12 mnths	Strange Situation: classification secure, insecure, avoidant	Orientation during Strange Situation: look to mother or to specific objects, object manipulation, unspecified looking; infants' heart rate over Strange Situation episodes

(continued)

Table 1. (continued)

Authors; Study title if used in more than one study	N; % boys; % white; country	Age and/or age range	Attachment measure	Emotion regulation / Coping measure
Vondra et al., 2001; WIC Pittsburgh	223; 54%; 46%; USA	12 mnths at T1, 18 mnths at T2, 24 mnths at T3, 3.5 yrs at T4	Strange Situation at 12 & 18 mnths: classification secure, avoidant, resistant, disorganized. Strange Situation at 24 mnths coded using Preschool Assessment of Attachment	Emotional and behavioral regulation; Early Coping Inventory (coders); Infant Behavior Record (coders)
<b>School-age children</b>				
Ackerman & Dozier, 2005	39; 54%; 20%; USA	62 mnths; only assessment at age 5 relevant	The Puppet Interview: child's representations of self, and the Separation Anxiety Test: emotional security; assessed at age 5	Separation Anxiety Test: Quality of Coping; assessed at age 5
Borelli et al., 2010	97; 57%; 87%; USA	8 to 12 yrs	Children's Attachment Interview: narrative coherence	Emotion Regulation Checklist (mother and father report); positive and negative affect startle (fear potentiated startle computer task) in safe and threat conditions (child report)
Brumariu et al., 2012	87; 45%; 67%; USA	11 yrs; range 10 to 12 yrs	Story Stem Task: 5-point rating and classification of secure, avoidant, ambivalent, disorganized based on highest rating	Children's interpretations of events: Negative Cognitive Error Questionnaire; catastrophizing, overgeneralization, personalizing, selective abstraction (child report); Children's Coping Strategies Scale: active coping and support seeking (mother report)
Kerns et al., 2007	52; 50%; 85%; USA	11 yrs; range 9 to 11 yrs	1. Security Scale: mean of responses. 2. The Attachment Doll Story Completion Task: overall score of completion task, and score for reunion story	Children's coping strategies scale (mother report); Frustration Tolerance: Teacher-Child Rating Scale
Waters et al., 2010	73; 55%; 57%; USA	5 yrs	Attachment Q-set: convergence of child's Q-set with the security criterion sort for the prototypically secure child	Avoidance of discussion of negative emotion; negative emotion understanding
<b>Adolescents</b>				
Hershenberg et al., 2011	74 dyads; 0%; 89%; USA	14 yrs	Family Attachment Interview: content of reports + reporting style formed security score by subtracting ratings of the two insecure patterns from the rating of the secure pattern	Parent-adolescent interaction task, included coding of adolescents' emotional dysregulation
Kobak et al., 1993	48; 44%; NR; USA	16 yrs; range 14 to 18 yrs	Adult Attachment Interview & Q-set: secure/anxious dimension; deactivation/hyperactivation dimension	Parent-child dysfunctional anger; parent-child avoidance of problem-solving; parent-child support-validation
Scharf et al., 2004	88; 100%; 100%; Israel	17 to 18 yrs	Adult Attachment Interview at 17 to 18 yrs: classification secure-autonomous, insecure-dismissing, insecure-preoccupied, and unresolved trauma or loss	The Ways of Coping Scale: emotion-focused and problem-focused coping (adolescent report); Peers' Appraisal of Adjustment Questionnaire: distress, instrumental and social functioning (peer report)
Zimmerman, 1999	43; 49%; 51%; Germany	15 to 16 yrs	Adult Attachment Interview at 16 yrs: classification secure, preoccupied, dismissing	Adaptive emotion regulation: scored from responses to social rejection vignettes (adolescent report); Ego-resiliency Q-set: ability to control impulses, emotions, and desires (parent, best friend, and psychologist report)

Note. NR = not reported; T1 = Time 1; T2 = Time 2; T3 = Time 3.

**Table 2.** Effect Sizes of Included Studies.

Authors	Attachment subscale/comparison	Emotion regulation or coping subscale	Result ( <i>t</i> , <i>F</i> , <i>r</i> , <i>b</i> , or $\beta$ )
<b>Toddlers/preschool</b>			
Bosquet & Egeland, 2006	Insecure attachment history	Preschool emotion regulation	$r = -.22, p < .01$
Braungart & Stifter, 1991	Avoidant vs. B1-B2 vs. B3-B4 vs. ambivalent	People orientation, separation	$F(3, 73) = 3.47, p < .05$ B1-B2 of secure < B3-B4 of secure; avoidant < B3-B4
Braungart & Stifter, 1991	Avoidant vs. B1-B2 vs. B3-B4 vs. ambivalent	Object orientation, separation	$F(3, 73) = 3.56, p < .05$ B1-B2 < B3-B4; B3-B4 > resistant ( $p < .08$ ); avoidant < B3-B4
Braungart & Stifter, 1991	Avoidant vs. B1-B2 vs. B3-B4 vs. ambivalent	Self-comforting, separation	$F(3, 73) = 2.50, p < .07$ Avoidant > B1-B2; avoidant > B3-B4
Braungart & Stifter, 1991	Avoidant vs. B1-B2 vs. B3-B4 vs. ambivalent	Toy exploration, separation	$F(3, 73) = 4.59, p < .01$ B1-B2 > B3-B4; avoidant > B3-B4
Brumariu & Kerns, 2013	Attachment security	Inability to manage intense emotions (mother report)	$r = -.08, p < .05$
Brumariu & Kerns, 2013	Attachment security	Inability to manage intense emotions (father report)	$r = -.12, p < .01$
Crugnola et al., 2011	Avoidant vs. secure vs. ambivalent	Negative social engagement mother	Kruskal-Wallis (2) = 3.16, $p = .21$
Crugnola et al., 2011	Avoidant vs. secure vs. ambivalent	Negative social engagement stranger	Kruskal-Wallis (2) = 2.95, $p = .22$
Crugnola et al., 2011	Avoidant vs. secure vs. ambivalent	Negative social engagement vocal	Kruskal-Wallis (2) = 18.76, $p < .001$ Secure > avoidant, ambivalent > secure, ambivalent > avoidant
Crugnola et al., 2011	Avoidant vs. secure vs. ambivalent	Negative social engagement total	Kruskal-Wallis (2) = 18.12, $p < .001$ Secure > avoidant, ambivalent > secure, ambivalent > avoidant
Crugnola et al., 2011	Avoidant vs. secure vs. ambivalent	Positive social engagement mother	Kruskal-Wallis (2) = 15.23, $p < .05$ Secure > avoidant, ambivalent > avoidant
Crugnola et al., 2011	Avoidant vs. secure vs. ambivalent	Positive social engagement stranger	Kruskal-Wallis (2) = 5.70, $p < .05$ Secure > avoidant, ambivalent > avoidant
Crugnola et al., 2011	Avoidant vs. secure vs. ambivalent	Positive social engagement vocal	Kruskal-Wallis (2) = 2.11, $p = .36$
Crugnola et al., 2011	Avoidant vs. secure vs. ambivalent	Positive social engagement total	Kruskal-Wallis (2) = 5.93, $p < .05$ Secure > avoidant
Crugnola et al., 2011	Avoidant vs. secure vs. ambivalent	Object orientation	Kruskal-Wallis (2) = 9.79, $p < .01$ Secure > ambivalent, avoidant > ambivalent
Crugnola et al., 2011	Avoidant vs. secure vs. ambivalent	Self-comforting	Kruskal-Wallis (2) = 1.04, $p = .60$
Crugnola et al., 2011	Avoidant vs. secure vs. ambivalent	Mother searching behavior	Kruskal-Wallis (2) = 6.89, $p = .03$ Secure > avoidant
Crugnola et al., 2011	Avoidant vs. secure vs. ambivalent	Self-vocalization	Kruskal-Wallis (2) = 8.66, $p < .01$ Secure > ambivalent, avoidant > ambivalent
Crugnola et al., 2011	Avoidant vs. secure vs. ambivalent	Crying when alone	Kruskal-Wallis (2) = 2.82, $p = .26$
Crugnola et al., 2011	Avoidant vs. secure vs. ambivalent	Autonomic stress indicators	Kruskal-Wallis (2) = 12.44, $p < .01$ Ambivalent > secure, ambivalent > avoidant
Crugnola et al., 2011	Avoidant vs. secure vs. ambivalent	Disorganization	Kruskal-Wallis (2) = 2.28, $p = .18$
Diener et al., 2002	Avoidant vs. secure vs. ambivalent (father)	Distracters vs. multiple strategy users vs. self-soothers	$\chi^2(4) = 13.02, p < .01$ Avoidant more likely distracters and self-soothers than expected by chance; secure less likely self-soothers than expected by chance; ambivalent more likely self-soothers and multiple strategy users than expected by chance
Diener et al., 2002	Avoidant vs. secure vs. ambivalent (mother)	Distracters vs. multiple strategy users vs. self-soothers	ns
Fish & Belsky, 1991	Avoidant vs. secure vs. ambivalent	Separation tolerance	$\chi^2(2) = ns$
Fish & Belsky, 1991	Secure vs. insecure	Separation tolerance	$\chi^2(1) = ns$
Fish & Belsky, 1991	Secure vs. insecure	Separation tolerance	$\chi^2(1) = 3.67, p = .06$ Separation intolerant: 5/38 avoidant, B1, and B2 of secure; 18/60 B3 and B4 of secure and ambivalent

(continued)

Table 2. (continued)

Authors	Attachment subscale/comparison	Emotion regulation or coping subscale	Result ( <i>t</i> , <i>F</i> , <i>r</i> , <i>b</i> , or $\beta$ )
Gilliom, 2002	Attachment security (1 = secure, 2 = insecure)	Anger regulation: distraction age 3.5 yrs	$r = -.15, p < .05$
Gilliom, 2002	Attachment security (1 = secure, 2 = insecure)	Anger regulation: passive waiting age 3.5 yrs	$r = -.15, p < .05$
Gilliom, 2002	Attachment security (1 = secure, 2 = insecure)	Anger regulation: info gathering age 3.5 yrs	$r = -.17, p < .05$
Gilliom, 2002	Attachment security (1 = secure, 2 = insecure)	Anger regulation: comfort seeking age 3.5 yrs	$r = .07, ns$
Gilliom, 2002	Attachment security (1 = secure, 2 = insecure)	Anger regulation: focus on delay/object/task age 3.5 yrs	$r = .09, ns$
Gilliom, 2002	Attachment security (1 = secure, 2 = insecure)	Anger regulation: distraction age 3.5 yrs	$\beta = -.18, p < .05$
Gilliom, 2002	Attachment security (1 = secure, 2 = insecure)	Anger regulation: passive waiting age 3.5 yrs	$\beta = -.15, p < .05$
Gilliom, 2002	Attachment security (1 = secure, 2 = insecure)	Anger regulation: info gathering age 3.5 yrs	$\beta = -.18, p < .05$
Gilliom, 2002	Attachment security (1 = secure, 2 = insecure)	Anger regulation: comfort seeking age 3.5 yrs	$\beta = .06, ns$
Gilliom, 2002	Attachment security (1 = secure, 2 = insecure)	Anger regulation: focus on delay/object/task age 3.5 yrs	$\beta = -.01, ns$
Hagekull & Bohlin, 2004	Attachment security	Preschool negative emotionality	$r = -.23, p < .05$
Nachmias et al., 1996	Secure vs. insecure	Coping competence	$F(1, 61) = 14.38, p < .05$ Secure $M = .23 (.17)$ ; insecure $M = -.57 (.29)$
Nachmias et al., 1996	Secure vs. insecure	Comfort seeking	$F(1, 61) = 1.39, ns$
Nachmias et al., 1996	Secure vs. insecure	Comfort seeking	$F(1, 61) = .03, ns$
NICHD Early Child Care Research Network, 2004	15-mnth avoidant vs. secure	24-mnth emotional dysregulation	$B = 0.76 (0.23), p < .01$
NICHD Early Child Care Research Network, 2004	15-mnth ambivalent vs. secure	24-mnth emotional dysregulation	$B = -.020 (0.32), ns$
NICHD Early Child Care Research Network, 2004	15-mnth disorganized vs. secure	24-mnth emotional dysregulation	$B = -.024 (0.26), ns$
NICHD Early Child Care Research Network, 2004	24-mnth attachment	24-mnth emotional dysregulation	$B = -1.10 (0.62), ns$
NICHD Early Child Care Research Network, 2004	15-mnth avoidant vs. secure	36-mnth emotional dysregulation	$B = 0.08 (0.20), ns$
NICHD Early Child Care Research Network, 2004	15-mnth ambivalent vs. secure	36-mnth emotional dysregulation	$B = -.015 (0.38), ns$
NICHD Early Child Care Research Network, 2004	15-mnth disorganized vs. secure	36-mnth emotional dysregulation	$B = 0.20 (0.28), ns$
NICHD Early Child Care Research Network, 2004	24-mnth attachment score	36-mnth emotional dysregulation	$B = -.077 (0.72), ns$
NICHD Early Child Care Research Network, 2004	36-mnth avoidant vs. secure	36-mnth emotional dysregulation	$B = -.004 (0.50), ns$
NICHD Early Child Care Research Network, 2004	36-mnth ambivalent vs. secure	36-mnth emotional dysregulation	$B = 0.42 (0.28), ns$
NICHD Early Child Care Research Network, 2004	36-mnth disorganized vs. secure	36-mnth emotional dysregulation	$B = -.022 (0.310), ns$

(continued)



Table 2. (continued)

Authors	Attachment subscale/comparison	Emotion regulation or coping subscale	Result ( <i>t</i> , <i>F</i> , <i>r</i> , <i>b</i> , or $\beta$ )
Panfile & Laible, 2012 Roque et al., 2013	Security score Secure vs. insecure	Emotion regulation Behavioral regulation in fear condition with mother constrained	$r = .53, p < .01$ $t$ not reported, ns
Roque et al., 2013	Secure vs. insecure	Behavioral regulation in frustration condition with mother constrained	$t$ not reported, ns
Roque et al., 2013	Secure vs. insecure	Behavioral regulation in positive affect condition with mother constrained	$t$ not reported, ns
Roque et al., 2013	Secure vs. insecure	Behavioral regulation in fear condition with mother involved	$t$ not reported, ns
Roque et al., 2013	Secure vs. insecure	Behavioral regulation in frustration condition with mother involved	$t$ not reported, ns
Roque et al., 2013	Secure vs. insecure	Behavioral regulation in positive affect condition with mother involved	$t(53) = 2.65, p < .01$ Secure < insecure
Spangler & Grossmann, 1993	Avoidant vs. secure vs. disorganized (only I resistant, so not compared)	Negative vocalization over 7 Strange Situation episodes	Main effect attachment $F(2, 34) = 4.10,$ $p < .05$ ; Attachment x episode interaction $F(6.2, 105.4) = 3.22, p < .01$ Low occurrence of vocalization in avoidant, change in vocalization over episodes for secure and disorganized
Spangler & Grossmann, 1993	Avoidant vs. secure vs. disorganized (only I resistant, so not compared)	Object orientation over 7 Strange Situation episodes	Main effect attachment $F(2, 34) = 9.86,$ $p < .01$ ; Attachment x episode interaction $F(10.6, 184.9) = 2.61, p < .01$ Changes in object manipulation for all groups; decrease in secure and disorganized, increase in avoidant with highest during first reunion.
Spangler & Grossmann, 1993	Avoidant vs. secure vs. disorganized (only I resistant, so not compared)	Cardiac changes over 7 Strange Situation episodes	Attachment x episode interaction $F(5.7, 77.3) = 2.41, p < .05$ Increase HR in second separation; increase greatest for disorganized with disorganized > avoidant and disorganized > secure
Vondra et al., 2001	Stable avoidant vs. secure vs. ambivalent (12, 15/18, 24 mnths)	Adaptable regulation 24 mnths	$F(2, 70) = 19.88, p < .001$ Secure $M = 37.27$ , avoidant $M = 38.07$ , ambivalent $M = 26.56$ ; ambivalent < avoidant; ambivalent < secure
Vondra et al., 2001	Stable avoidant vs. secure vs. ambivalent (12, 15/18, 24 mnths)	Assertive regulation 24 mnths	ns
Vondra et al., 2001	Stable avoidant vs. secure vs. ambivalent (12, 15/18, 24 mnths)	Sociable regulation 24 mnths	$F(2, 67) = 3.61, p < .05$ Secure $M = 28.33$ , avoidant $M = 25.78$ , ambivalent $M = 24.31$ ; ambivalent < secure
Vondra et al., 2001	Stable avoidant vs. secure vs. ambivalent (12, 15/18, 24 mnths)	Competent exploration 24 mnths	$F(2, 69) = 9.46, p < .001$ Secure $M = 30.80$ , avoidant $M = 28.31$ , ambivalent $M = 25.44$ ; ambivalent < secure
Vondra et al., 2001	Frequency avoidant	Adaptable regulation 24 mnths	$r = .21, p < .01$
Vondra et al., 2001	Frequency secure	Adaptable regulation 24 mnths	ns
Vondra et al., 2001	Frequency ambivalent	Adaptable regulation 24 mnths	$r = -.39, p < .01$
Vondra et al., 2001	Frequency disorganized	Adaptable regulation 24 mnths	ns
Vondra et al., 2001	Frequency avoidant	Assertive regulation 24 mnths	ns
Vondra et al., 2001	Frequency secure	Assertive regulation 24 mnths	$r = .18, p < .05$

(continued)

Table 2. (continued)

Authors	Attachment subscale/comparison	Emotion regulation or coping subscale	Result ( <i>t</i> , <i>F</i> , <i>r</i> , <i>b</i> , or $\beta$ )
Vondra et al., 2001	Frequency ambivalent	Assertive regulation 24 mnths	ns
Vondra et al., 2001	Frequency disorganized	Assertive regulation 24 mnths	$r = -.24, p < .01$
Vondra et al., 2001	Frequency avoidant	Sociable regulation 24 mnths	ns
Vondra et al., 2001	Frequency secure	Sociable regulation 24 mnths	$r = .25, p < .01$
Vondra et al., 2001	Frequency ambivalent	Sociable regulation 24 mnths	$r = -.18, p < .05$
Vondra et al., 2001	Frequency disorganized	Sociable regulation 24 mnths	ns
Vondra et al., 2001	Frequency avoidant	Competent exploration 24 mnths	ns
Vondra et al., 2001	Frequency secure	Competent exploration 24 mnths	$r = .30, p < .01$
Vondra et al., 2001	Frequency ambivalent	Competent exploration 24 mnths	$r = -.19, p < .05$
Vondra et al., 2001	Frequency disorganized	Competent exploration 24 mnths	$r = -.24, p < .01$
<b>School-age children</b>			
Ackerman & Dozier, 2005	Emotional security	Quality of Coping	$r = .72, p < .001$ (in correlation matrix $r = .72, p < .01$ (in text))
Ackerman & Dozier, 2005	Positive vs. negative representation of self	Quality of Coping subscale of Separation Anxiety Test test 9 pt continuous scale; higher scores reflect higher coping	$r = .16, p > .05$
Borelli et al., 2010	Overall narrative coherence	Emotional experience (positive emotion)	$\beta = .27, p < .01$ (controlling for age and gender);
Borelli et al., 2010	Overall narrative coherence	Emotional experience (positive emotion)	Non-significant in regression model
Borelli et al., 2010	Overall narrative coherence	Emotional experience (emotion control)	Non-significant in regression model
Borelli et al., 2010	Overall narrative coherence	Emotion regulation	Non-significant in regression model
Borelli et al., 2010	Overall narrative coherence	State affect (positive emotion baseline)	$b = 1.51, p < .001$
Borelli et al., 2010	Overall narrative coherence	State affect (positive emotion increase)	$b = -0.48, p < .05$
Borelli et al., 2010	Overall narrative coherence	State affect (negative emotion baseline)	ns
Borelli et al., 2010	Overall narrative coherence	State affect (negative emotion decrease)	ns
Borelli et al., 2010	Overall narrative coherence	Positive affect startle (positive affect increase)	ns
Borelli et al., 2010	Overall narrative coherence	Negative affect startle (negative affect decrease)	$b = -.035, p < .01$
Borelli et al., 2010	Overall narrative coherence	Cortisol (baseline)	$b = 0.01, p < .01$
Borelli et al., 2010	Dismissing attachment category	Decrease in cortisol over Child Attachment Interview	$b = 0.04, p < .05$
Borelli et al., 2010	Preoccupied attachment category	Pre-Child Attachment Interview cortisol	$b = 0.12, p < .001$
Borelli et al., 2010	Preoccupied attachment category	Decrease in cortisol over Child Attachment Interview	$b = -0.08, p < .01$
Borelli et al., 2010	Dismissing attachment category	Threat startle magnitude	$b = 0.94, p < .01$
Borelli et al., 2010	Dismissing attachment category	Decrease startle magnitude	$b = 0.40, p < .05$
Borelli et al., 2010	Overall narrative coherence	Startle magnitude baseline	$b = 0.22, p < .001$
Borelli et al., 2010	Overall narrative coherence	Decrease in startle magnitude	$b = 0.10, p < .001$
Brumariu et al., 2012	Attachment rating	Lack of emotional awareness	Security $r = -.26, p < .05$ ; ambivalence $r = .16, ns$ ; Avoidance $r = .09, ns$ ; disorganization $r = .20, p < .10$

(continued)

Table 2. (continued)

Authors	Attachment subscale/comparison	Emotion regulation or coping subscale	Result ( <i>t</i> , <i>F</i> , <i>r</i> , <i>b</i> , or $\beta$ )
Brumariu et al., 2012	Attachment rating	Catastrophizing	Security $r = -.18$ , $p < .10$ ; ambivalence $r = .09$ , ns; Avoidance $r = -.04$ , ns; disorganization $r = .30$ , $p < .01$
Brumariu et al., 2012	Attachment rating	Overgeneralization	Security $r = -.15$ , ns; ambivalence $r = .13$ , ns; avoidance $r = .01$ , ns; disorganization $r = .19$ , $p < .10$
Brumariu et al., 2012	Attachment rating	Personalizing	Security $r = .20$ , $p < .10$ ; ambivalence $r = .14$ , ns; Avoidance $r = .10$ , ns; disorganization $r = .09$ , ns
Brumariu et al., 2012	Attachment rating	Selective abstraction	Security $r = -.11$ , ns; ambivalence $r = .02$ , ns; avoidance $r = .09$ , ns; disorganization $r = .12$ , ns
Brumariu et al., 2012	Attachment rating	Active coping	Security $r = .11$ , ns; ambivalence $r = -.06$ , ns; Avoidance $r = -.07$ , ns; disorganization $r = -.22$ , $p < .05$
Brumariu et al., 2012	Attachment rating	Social support seeking	Security $r = .05$ , ns; ambivalence $r = .01$ , ns; avoidance $r = -.04$ , ns; disorganization $r = -.15$ , ns
Brumariu et al., 2012	Attachment rating	Avoidant coping	Security $r = -.06$ , ns; ambivalence $r = .07$ , ns; Avoidance $r = -.05$ , ns; disorganization $r = .13$ , ns
Kerns et al., 2007	Attachment classification: secure vs. avoidant vs. disorganized/ambivalent	Constructive coping	ANOVA not significant (authors do not report values)
Kerns et al., 2007	Attachment classification: secure vs. avoidant vs. disorganized/ambivalent	Frustration tolerance	ANOVA not significant (authors do not report values)
Kerns et al., 2007	Doll Story Completion Task (overall scriptedness score)	Constructive coping	$r = .27$ , ns
Kerns et al., 2007	Doll Story Completion Task (overall scriptedness score)	Frustration tolerance	$r = .33$ , $p < .05$
Kerns et al., 2007	Doll Story Completion Task (reunion scriptedness subscale)	Constructive coping	$r = .42$ , $p < .01$
Kerns et al., 2007	Doll Story Completion Task (reunion scriptedness subscale)	Frustration tolerance	$r = .52$ , $p < .001$
Waters et al., 2010	Attachment security Q-sort (mother report)	Avoidance of discussion of negative emotion (coded)	$r = -.30$ , $p < .01$ ; $\beta = -.21$ , $p < .05$ (when controlling for child emotion understanding)
Waters et al., 2010	Attachment security Q-sort (mother report)	Negative emotion understanding	Not reported / non-significant
<b>Adolescents</b>			
Hershenberg et al., 2011	Overall security score	Emotion dysregulation	$r = -.26$ , $p < .05$
Kobak et al., 1993	Attachment security (vs. anxiety)	Emotion regulation: parent-teen dysfunctional anger	Sons: $r = -.45$ , $p < .05$ ; daughters: $r = -.36$ , $p < .05$
Kobak et al., 1993	Attachment security (vs. anxiety)	Emotion regulation: parent-teen avoidance of problem-solving	Sons: $r = -.50$ , $p < .01$ ; daughters: $r = -.29$ , $p > .05$
Kobak et al., 1993	Attachment security (vs. anxiety)	Emotion regulation: parent-teen support/validation	Sons: $r = -.04$ , $p > .05$ ; daughters: $r = .29$ , $p > .05$
Kobak et al., 1993	Attachment deactivation (vs. hyperactivation)	Emotion regulation: parent-teen dysfunctional anger	Sons: $r = .53$ , $p < .01$ ; daughters: $r = .12$ , $p > .05$
Kobak et al., 1993	Attachment deactivation (vs. hyperactivation)	Emotion regulation: parent-teen avoidance of problem-solving	Sons: $r = .23$ , $p > .05$ ; daughters: $r = .13$ , $p > .05$
Kobak et al., 1993	Attachment deactivation (vs. hyperactivation)	Emotion regulation: parent-teen support/validation	Sons: $r = .33$ , $p > .05$ ; daughters: $r = .18$ , $p > .05$
Scharf et al., 2004	Autonomous vs. dismissing attachment	Emotion-focused coping	$t(78) = 0.11$ , $p > .10$ Autonomous $M = 1.93$ (0.53), dismissing $M = 1.92$ (0.65)

(continued)

Table 2. (continued)

Authors	Attachment subscale/comparison	Emotion regulation or coping subscale	Result ( <i>t</i> , <i>F</i> , <i>r</i> , <i>b</i> , or $\beta$ )
Scharf et al., 2004	Autonomous vs. dismissing attachment	Problem-focused coping	$t(78) = 2.07, p < .05$ Autonomous $M = 3.18 (0.41)$ , dismissing $M = 3.02 (0.28)$
Scharf et al., 2004	Autonomous vs. dismissing attachment	Peer-reported coping – distress	$t(56) = -1.80, p < .10$ Autonomous $M = 2.01 (0.62)$ , dismissing $M = 2.32 (0.70)$
Scharf et al., 2004	Autonomous vs. dismissing attachment	Peer-reported coping	$t(56) = 2.63, p < .01$ Autonomous $M = 4.12 (0.38)$ , dismissing $M = 3.74 (0.70)$
Zimmerman, 1999	Secure attachment	Adaptive emotion regulation	$r = .50, p \leq .001$
Zimmerman, 1999	Dismissing attachment	Adaptive emotion regulation	$r = -.53, p \leq .001$
Zimmerman, 1999	Preoccupied attachment	Adaptive emotion regulation	$r = -.31, p \leq .05$
Zimmerman, 1999	Secure attachment	Ability to modulate affect and behavior (“ego-resiliency”)	$r = .37, p \leq .05$
Zimmerman, 1999	Dismissing attachment	Ability to modulate affect and behavior (“ego-resiliency”)	$r = -.32, p \leq .05$
Zimmerman, 1999	Preoccupied attachment	Ability to modulate affect and behavior (“ego-resiliency”)	$r = -.41, p \leq .05$

Note. ns = not significant.

5 studies focused on children in the primary/elementary school years, and 4 studies investigated attachment and emotion regulation or coping in adolescents. If studies were longitudinal, but the measures of interest in this study were assessed concurrently, the study is described as “cross-sectional” in design in the following sections.

### Measures of Attachment

In all but two studies of toddlers and preschool children, the Strange Situation (SS; Ainsworth & Wittig, 1969) was used to measure attachment. The other two studies used the Attachment Q-set (Panfile & Laible, 2012; Roque et al., 2013). One study also supplemented the SS with the Q-set (NICHD Early Child Care Research Network, 2004).

In studies of elementary school children, the measures of attachment were diverse, including the story stem task (Brumariu, Kerns, & Seibert, 2012), Child Attachment Interview (Borelli et al., 2010), the attachment doll story completion task (Kerns, Abraham, Schlegelmilch, & Morgan, 2007), representations of self and others (Ackerman & Dozier, 2005), and attachment Q-sort (Waters et al., 2010). In studies of adolescents, measures of attachment included either the family attachment interview (Hershenberg et al., 2011), Attachment Q-set (Kobak, Cole, Ferenz-Gillies, Fleming, & Gamble, 1993), or the AAI (Scharf, Maysel, & Kivenson-Baron, 2004; Zimmerman, 1999).

### Measure of Emotion Regulation or Coping

Measures of emotion regulation or coping were rarely repeated across studies. Regarding toddlers and preschool age children, many studies relied on observation. This included coding coping behaviors in stressful, frustrating, and/or free play situations (Bosquet & Egeland, 2006; Diener, Mangelsdorf, McHale, & Frosch, 2002; Gilliom, Shaw, Beck, Schonberg, & Lukon, 2002; Nachmias et al., 1996; NICHD Early Child Care Research Network, 2004; Roque et al., 2013; Vondra, Shaw, Swearingen, Cohen, & Owens, 2001), or assessing behavior when distressed during the SS

(Braungart & Stifter, 1991; Crugnola et al., 2011; Fish & Belsky, 1991; Spangler & Grossmann, 1993). Two studies relied on reports from parents to assess emotion regulation in young children (Brumariu & Kerns, 2013; Hagekull & Bohlin, 2004; Panfile & Laible, 2012).

Regarding children, measures of coping and emotion regulation varied across studies, and included researcher coding of child responses to hypothetical parent–child separations to assess coping (Ackerman & Dozier, 2005), and behavioral observations (Waters et al., 2010). Two studies assessed coping and emotion regulation via child reports (Borelli et al., 2010; Brumariu et al., 2012), and others included parent reports of coping and emotion regulation processes (Borelli et al., 2010; Brumariu et al., 2012; Kerns et al., 2007), and teacher reports of frustration tolerance (Kerns et al., 2007). One study also utilized physiological and behavioral indices of coping including cortisol and startle response (Borelli et al., 2010).

In studies of adolescents, two relied on observation of emotion regulation. These observations occurred during a parent–adolescent interaction task that was primed to be positive (Hershenberg et al., 2011) or problem-focused (Kobak et al., 1993). One study assessed emotion regulation using a Q-set task completed by two psychologists, and a friend and parent (Zimmerman, 1999). This study also assessed adolescents’ self-reported emotion regulation through responses to vignettes depicting social rejection. Similar to Zimmerman (1999), Scharf et al. (2004) also examined self-reported coping in addition to peer-reported coping. Specifically, adolescents rated their use of emotion-focused and problem-focused strategies for coping with stressful situations, and two peers rated participant adjustment and coping with military training.

### Results of Studies of Toddlers/Preschoolers

**Summary of findings.** Of the 11 studies conducted, 4 study designs (6 publications) were longitudinal. Seven studies (8 publications) were cross-sectional, 1 of which also had an experimental design element (Roque et al., 2013). Sample sizes ranged from 39

(Crugnola et al., 2011) to 1097 (Brumariu & Kerns, 2013). Most children were first assessed between 11 and 15 months ( $n = 8$ ), in two studies children were first assessed at age 18 to 26 months, and one study began when children were age 3.

The proportion secure ranged from 51% (Crugnola et al., 2011) to 73% (Roque et al., 2013), with most reporting that between 53% and 60% of caregiver–child dyads were classified as secure (Brumariu & Kerns, 2013; Gilliom et al., 2002; Hagekull & Bohlin, 2004; Nachmias et al., 1996; Spangler & Grossmann, 1993). The proportion of parent–child dyads classified as avoidant or ambivalent varied from study to study, ranging from 5% to 31%. Of the studies that reported this information, most either reported a higher proportion of avoidant than ambivalent caregiver–child dyads, or reported similar proportions in each group. The proportion of caregiver–child dyads that were identified as disorganized was rarely reported. Table 2 provides a summary of measures and effect sizes or results as presented in each study.

**Cross-sectional study findings.** The evidence across cross-sectional studies of young children illustrates that those classified as secure seem to be better able to make calls to others for aid, to rely on social responses to assist with regulation, or are better regulated overall (Crugnola et al., 2011; Nachmias et al., 1996; Panfile & Laible, 2012). Those avoidantly attached were reported to be good explorers of the environment, using more toy exploration and distracting acts than other children when they need to manage their emotions and/or cope with stress (Braungart & Stifter, 1991; Crugnola et al., 2011; Diener et al., 2002; Spangler & Grossmann, 1993). They also are more likely to self-soothe, to be less vocal regardless of whether the vocalizations were negative or positive in valence, to rely less on caregivers, and to be less people oriented when regulating emotions or coping with stress (Braungart & Stifter, 1991; Diener et al., 2002; Spangler & Grossmann, 1993). In contrast to secure and avoidant children, young children classified as ambivalently attached seek out others for soothing more than other children, they engage in less self-distracting acts and are less object oriented, they are less adaptable, they are less tolerant of separation from caregivers, and they are less competent copers overall (Crugnola et al., 2011). In one study, ambivalent young children were more likely to be “multiple strategy users,” relying on a greater range of strategies than did secure or avoidant children (Diener et al., 2002). When young children classified as insecure (either avoidant or ambivalent) were contrasted with secure, the findings tended to be similar to the findings for the ambivalent group—insecure relative to secure young children were more dysregulated and less competent copers.

One study demonstrated that the association between attachment and emotion regulation may depend on whether attachment is assessed when the mother is present versus when the father is present (Diener et al., 2002). The SS was used to assess attachment when interacting with fathers when infants were 12 months of age and attachment when interacting with mothers when infants were 13 months of age. Infants completed the competing demands task at 12 months to assess emotion regulation (engaging parent; social referencing; distraction; self-soothing; directed fussing; passive disengagement; leave taking). Cluster analysis was used to organize infants into clusters on the basis of their use of four emotion regulation behavioral strategies (distraction, social referencing, engaging parents, and self-soothing). Three clusters were found when fathers were present and three clusters were found when mothers were present. These clusters were labeled distractors, multiple strategy users, and self-soothers. Infants in the avoidant category with

fathers were more likely distractors and self-soothers, whereas the secure group was less likely to be classified as self-soothers. Infants in the resistant category were more likely self-soothers and multiple strategy users. For mother–infant attachment, there were no differences in ER.

**Longitudinal study findings.** The strongest evidence for associations between attachment and young children’s emotion regulation or coping with stress comes from the four longitudinal studies (in six publications) that were located. All of these studies examined whether attachment assessed at least 9 months prior was associated with later emotion regulation, and all found associations of earlier attachment with later emotion regulation or coping. First, attachment at 15 months (avoidant higher than secure, but no difference between other insecure groups and secure) was associated with 24-month dysregulation, as were maternal caregiving (less sensitive and stimulating averaged across 6 to 24 months), and child’s cognitive functioning at 15 months (NICHD Early Child Care Research Network, 2004). Attachment was not uniquely associated with 36-month emotion dysregulation. Second, in correlations, children more often categorized as secure were rated by their mothers and fathers as showing less inability to manage negative emotions (Brumariu & Kerns, 2013). Ambivalent and avoidant attachment were not related to emotion regulation. Similar associations were found in structural equation models controlling for temperament.

Third, attachment classification pattern was associated with both concurrent and subsequent ratings of child emotional and behavioral regulation, and this was most apparent for a 24-month attachment classification and for children with stable attachment classifications from 12/18 to 24 months (Vondra et al., 2001). In particular, security across all assessments was associated with better emotional and behavioral regulation rated concurrently by observers. Also, in the same study, frequency of security (across 12, 18, and 24 months using the SS) was moderately associated with greater concurrent behavioral and emotional regulation on 3 of 4 broad, composite measures. Frequency of ambivalent attachment was associated almost exclusively with poorer regulation during the 24-month lab visit on 3 of 4 measures. Frequency of avoidant attachment was associated with more adaptable regulation on 1 of 4 measures. When this study was extended, boys classified as insecure at 1.5 years were less likely than secure boys to regulate their anger at age 3.5 using self-distraction, passive waiting, and to ask questions about the task, after accounting for the effects of maternal behavior during the cookie task, and child’s negative emotionality at 1.5 years (Gilliom et al., 2002). No associations with comfort seeking or focus on object/task were found.

The final two longitudinal studies comprised smaller samples of either unselected families (i.e., not selected for high risk; Hagekull & Bohlin, 2004) or those selected because of low family income (Bosquet & Egeland, 2006). Security was associated with less negative emotionality early (11 and 15 months); no other correlations between attachment and emotionality were reported. Finding a similar association between attachment and emotion regulation, Bosquet and Egeland (2006) relied on the SS at 12 and 18 months, and calculated a score to indicate the number of times each child was classified as insecure. Emotion regulation was assessed at 42 months using the barrier box task (Harrington, Block, & Block, 1978), whereby the child is observed in a potentially frustrating situation without the mother present. Insecure attachment history was associated with poorer emotion regulation, and a similar association

was maintained in a structural equation model when controlling for neonatal bio-behavioral reactivity/regulation.

**Disorganized attachment.** Of all the studies of young children, four assessed disorganized attachment (Brumariu & Kerns, 2013; NICHD Early Child Care Research Network, 2004; Spangler & Grossmann, 1993; Vondra et al., 2001). In one study, disorganized children were more distressed than other young children and differed more from avoidant than ambivalent children (Brumariu & Kerns, 2013). In a second study, frequency of disorganization was modestly associated with poorer regulation concurrently on 2 of 4 measures (Vondra et al., 2001). In the third study, disorganized children showed the greatest increase in heart rate in the second separation of the SS, but were not different from secure children otherwise (Spangler & Grossmann, 1993). Finally, in the fourth study, the reported frequency of disorganization (across 12, 18, and 24 months using the SS) was associated with less assertive regulation and less competent exploration (Vondra et al., 2001).

### Results of Studies of Children

Five studies based on five independent samples reported associations between attachment and indices of coping in middle childhood. Although one study (Ackerman & Dozier, 2005) was longitudinal in design, this study only reported cross-sectional associations between attachment and emotion regulation. Consistent with the findings of Brumariu (2015) in her review of attachment and emotion regulation in middle childhood, the results suggest that attachment (or emotional) security is associated with more adaptive emotion regulation, including less avoidance of discussing negative emotion with mothers (Waters et al., 2010), less difficulty identifying emotions (Brumariu et al., 2012), and more adaptive coping with imagined separations (Ackerman & Dozier, 2005). In contrast, narrative coherence (security) was not significantly associated with parent reports of emotion regulation in one study (Borelli et al., 2010), and attachment classification (secure, avoidant, or disorganized/ambivalent) was not associated with coping or frustration tolerance in a separate study (Kerns et al., 2007). Kerns et al. (2007) did also examine whether overall scriptedness (i.e., presence of secure-base prototypic scripts) and reunion scriptedness, as continuous measures of attachment security, predicted emotion regulation and coping outcomes. Overall scriptedness was not associated with coping, but was associated with higher frustration tolerance. Reunion scriptedness predicted greater coping and frustration tolerance.

Regarding insecure attachment, attachment disorganization predicted increased catastrophizing and poorer coping, but ambivalence and avoidance were not associated with emotion regulation processes in one study (Brumariu et al., 2012). Thus, there was little evidence for these associations within preadolescent school-age children.

In one study focused on physiological indicators (Borelli et al., 2010), narrative coherence during the Child Attachment Interview was associated with lower cortisol levels at baseline but was unrelated to cortisol pre or post a startle exercise. Coherence was also associated with higher initial startle magnitude during threat, but a faster decrease in startle magnitude, suggesting that secure individuals may initially respond to threat with greater arousal, but they are better able to regulate this threat.

### Results of Studies of Adolescents

Four papers based on four independent samples examined the relationship between attachment and emotion regulation or coping during late adolescence. Three studies were cross-sectional and each reported that attachment security was concurrently associated with more adaptive emotion regulation or coping among adolescents, including increased positivity, coherence of content and affect, lower emotion dysregulation (Hershenberg et al., 2011), less dysfunctional anger in sons and daughters, less mother-son avoidance of problem-solving (Kobak et al., 1993), and higher adaptive emotion regulation, as assessed via responses to vignettes detailing social rejection and failure (Zimmerman, 1999). Attachment insecurity was not associated with any measure that reflected emotion regulation, although it was associated with emotionality (e.g., deactivation was associated with less anger; Kobak et al., 1993). Thus, as found in studies of children, there was also little evidence of an association between attachment insecurity and emotion dysregulation or maladaptive coping.

In the only study that examined attachment as a prospective antecedent to adolescents' coping (Scharf et al., 2004), Israeli male adolescents completed the AAI during their senior year of high school (17 to 18 years). Coping in relation to their transition to military training was assessed one year later. Adolescents who were classified as secure in their senior year of high school subsequently reported using more problem-focused coping, but not emotion-focused coping, during their transition to military training, compared to avoidant adolescents. Results were maintained even when controlling for participants' psychological functioning during high school (i.e., self-esteem, locus of control, and supportive and close relationships with parents).

### Discussion

The aim of this review was to summarize what is known about the association between observational and interpretative (and interview-based) measures of attachment, such as the SS, the AAI or the Q-sort measures, on the one hand, and children's or adolescents' emotion regulation or coping when under stress on the other hand. These associations are key propositions of many descriptions of attachment theory, both classic theory (Bowlby, 1969, 1973, 1988) and contemporary extensions of this theory (Cassidy, 1994; Contreras & Kerns, 2000; Main, 1990; Mikulincer et al., 2003; Shaver & Mikulincer, 2002; Sroufe, 1996; Thompson & Meyer, 2007). In fact, given the widespread beliefs in the prominent roles of emotion dysregulation and poor coping on psychopathology in children and adolescents (Compas et al., 2001; Southam-Gerow & Kendall, 2002; Zimmer-Gembeck & Skinner, in press), such associations are often described as some of the key mechanisms that explain why attachment has implications for a range of mental health and social problems (Brenning & Braet, 2013; Brumariu et al., 2012; Kobak et al., 2006; for a review see Zimmer-Gembeck & Skinner, in press).

Twenty-two of the 23 included studies included in the present review found some significant association ( $p < .05$ ) of attachment with emotion regulation or coping, and the 23rd study (Fish & Belsky, 1991) made a case for the importance of their findings, although no analyses quite reached the typical critical level of significance. Thus, the studies included in this review provide some support for theory regarding the role of attachment relationships in the formation of offspring emotion regulation and coping with stress. Much of the evidence pointed to the regulatory and coping

problems of infants/preschool age children showing signs of ambivalent (i.e., anxious-resistant) attachment. Evidence also supported the notion that a higher security score or secure (relative to insecure) attachment is a benefit for adaptive emotion regulation and coping with stress in toddlerhood, childhood, and adolescence. Nevertheless, many significant associations were small in size, and a number of possible associations were tested within many of the studies, with only a minority of those tested finding support.

When considering the prominence of this attachment theory proposition, we identified fewer studies than we had anticipated, especially when the focus was on school-aged children or adolescents. Even more surprising, most of the 23 included studies were cross-sectional and, probably not so surprisingly, they assessed a very diverse range of emotion regulation or coping strategies. Diversity in assessment was not surprising because it is necessary for many of these studies, given the complexity of identifying and measuring the key aspects of attachment, emotion regulation, and coping relevant for understanding these processes, and the different contexts and age groups studied. The diversity also reflects that many of the studies of young children had to rely on behavioral displays of external coping or emotion regulation (i.e., proximity seeking, calls to the caregiver, or other ways of requesting support) or behaviors that suggested more internal or self-reliant coping or emotion regulation, whereas studies of older children and adolescents included a wider range of both behavioral and cognitive emotion regulation or coping strategies. Together, this diversity across all important aspects of study design results in a literature that appears rather exploratory in nature and lacking in its own coherence. It also makes it difficult to clearly summarize the findings without describing each study in some detail, which is what we did in this review.

These findings provide significant support for what has been found in associations of attachment and coping using (usually self-report) questionnaire measures of attachment. For example, several studies have shown that attachment quality (as measured, for example, by the Parent and Peer Attachment measure usually completed by children or adolescents; Armsden & Greenberg, 1987) is associated with more adaptive coping, such as active problem-solving or support seeking, in children and adolescents (e.g., Dusek & Danko, 1994; Gaylord-Harden et al., 2009; Kliever, Fearnow, & Miller, 1996). Similar findings exist in studies of adults. For example, Shorey, Snyder, Yang, and Lewin (2003) reported that adults higher in attachment anxiety and avoidance, gathered via a self-report questionnaire, were less optimistic about their capacity to cope with stress. Similarly, secure adults have been found to report that they are more able to manage their emotions, remaining more emotionally stable, when coping with stress (for a review see Mikulincer et al., 2003). However, although we have not undertaken a thorough review of the literature using self-report measures of attachment and emotion regulation or coping, the effects found in the present review seem to be much smaller and less consistent than those found when using self-report measures of attachment.

### Measurement Issues

Because measures differed substantially within and between studies of toddlers, school-age children, and adolescents it is challenging to be confident in conclusions about developmental patterns of associations between attachment and emotion regulation or coping.

However, putting this measurement issue aside, associations were larger in studies of adolescents than in studies of younger children, and in a few studies, associations in studies of preadolescent school-age children were stronger than associations in studies of toddlers or other preschool age children. This suggests that attachment is a stronger correlate of coping *after* interpersonal and intrapersonal forms of emotion regulation and coping have been fully internalized, which we have argued takes place by early adolescence (Skinner & Zimmer-Gembeck, 2007; Zimmer-Gembeck & Skinner, 2011). This may help to explain why studies of adolescents and adults, compared to studies of children, typically find more consistent associations between attachment categories and patterns of coping. For example, in one study of adults, the two types of insecure attachments (avoidant and anxious) were differentially associated with theoretically-specified ways of coping: attachment avoidance, but not attachment anxiety, was associated with less use of social support; attachment anxiety, but not attachment avoidance, was associated with more use of emotion-focused coping (Holmberg et al., 2010).

A more refined assessment of attachment, rather than a focus on the typical attachment classifications, seems relevant for understanding its links with emotion regulation and coping. Studies using continuous measures of attachment insecurity/security (or counts of times coded as secure) tended to report stronger associations with emotion regulation and coping than did studies comparing attachment groups. Yet, the comparison of attachment groups also adds to these findings by showing that the associations of attachment and emotion regulation or coping may not always be so straightforward. There may be particular subgroups of those classified as insecure who are at particular risk of certain emotion regulation difficulties and this differs depending on the emotion regulation strategy—especially whether the strategy depends on others (support seeking, looking to mother) or is more an indication of self-reliance (manipulation of objects, problem-solving). There may even be subgroups of children classified as secure that are at higher risk of emotion regulation difficulties than are others classified as secure.

Associations of attachment with emotion regulation or coping also depend on how emotion regulation and coping are assessed and in response to what stressor or context (actual separation from parent, relationship stressors with parents and peers, problem discussion with parents, vignettes/hypothetical scenarios). Yet, surprisingly consistent associations of attachment with both self-reported and observer rated ER/coping were found across these various stressor contexts.

### Limitations of the Reviewed Studies, and Future Directions

There are a number of limitations of the existing studies to highlight because they identify future research directions. First, theorists argue that attachment relationships have enduring impacts on emotion regulation and coping, especially when attachment is assessed early in life. Yet, few studies identified for this review were longitudinal, with the longest interval among those that were, only about 2 years. It is clear that more longitudinal research is needed across every age group. As theory and measures of emotion regulation are advancing rapidly, this research can now be conducted.

Second, another limitation also follows from the cross-sectional design of most of the studies reviewed here. We have argued and relied on attachment theory, which tends to propose that attachment relationships are a foundation of the development of emotion

regulation (or dysregulation) and optimum coping responses to stress (or not). It is also quite likely, and evidence supports the view (Campos, Mumme, Kermoian, & Campos, 1994; Izard, 1991), that the ability to recognize and manage emotion, especially negative emotion, and good coping ability precede the development of more secure attachment relationships. For example, the newborn's intact neurophysiological and communication subsystems, the caregiver's sensitive responsiveness, and their emerging joint secure attachment, should co-create a calmer and more stable infant stress reactivity subsystem that is easier to soothe and also provides clearer communication to the caregiver, which in turn informs and sustains sensitive responsive caregiving and lays down implicit infant learning that supports benign appraisals of ambiguous interactions, and triggers constructive coping through focused exploration and proximity seeking. Especially in the early years of life, attachment and emotion regulation or coping are co-developing adaptive systems that are bidirectionally associated over time.

We excluded studies that examined attachment as a correlate of emotionality without also assessing a construct referred to as regulation or coping. This was a difficult distinction to make. Many scholars note the difficulty differentiating emotionality from emotion regulation or coping—especially in studies of young children (e.g., Campos, Frankel, & Camras, 2004; Eisenberg, 2000; Eisenberg & Spinrad, 2004). Thus, our exclusion of the studies that focused on emotionality as a correlate of attachment only, rather than focusing on emotion regulation or coping as a correlate of attachment, may have meant that we overlooked some literature relevant for the conclusions drawn here. Although conducted more than 10 years ago, we can refer the interested reader to other reviews that have focused on attachment and emotionality (van IJzendoorn et al., 2004; Vaughn & Bost, 1999).

Although there are many directions for research that follow from these findings, one key question emerged for us from reviewing these studies—does context matter? More specifically, are attachment orientation and history most relevant to regulating distress within some contexts, such as distress in response to relationship stressors (or interpersonal stress, more generally), or does it play a similar or equal role across all kinds of stressor contexts, including those outside of relationships? In theory, attachment should play a far-reaching role by supporting a sense of security to rely on relationships to manage distress of all forms and in all contexts, but to also be self-confident and competent in autonomous actions, regulation, and coping when needed. Thus, a secure attachment relationship should help with heteronomous regulation (e.g., compliance, guided by caregivers) but also assist toward autonomous regulation (or self-regulation, guided by the young child's core self). Secure attachment should set the foundation for a child's development of his or her own coping agency but also should be a source of the child's capacity to intentionally coordinate his or her coping efforts with the needs and desires of social partners (Eisenberg, Valiente, & Sulik, 2009). However, an examination of the differences in the association between attachment and emotion regulation or coping between contexts was never explicitly a focus of the research we reviewed here, although the idea was embedded in the kinds of stressors studied and the types of emotion regulation and coping responses examined (i.e., some relied on others, and others were more self-reliant or object-related). Future research might be more explicit about the stressor context (or context more generally) and compare across contexts to begin to address this issue (e.g., see Clear & Zimmer-Gembeck, in press).

Another possibility is to examine how early caregiver-child attachment may be associated with the parental emotion coaching and socialization examined in other research (Calkins & Hill, 2007; Keenan, 2000; Kliewer et al., 1996; Power, 2004). Emotion coaching involves assisting children, even young children, to identify and discuss differentiated emotions, as well as their causes, and jointly examine strategies for tolerating or alleviating them (aka strategies for emotion regulation or emotion-focused coping) (Dunn, Bretherton, & Munn, 1987; Kopp, 1989; Miller & Sperry, 1987). Overall, we believe that a better integration of attachment theory, emotion and emotion regulation theory, and stress and coping theories and related research would yield many important and novel directions for future research, including the investigation of context, which is known to be relevant to appraisals, coping responses and outcomes (Zimmer-Gembeck & Skinner, 2011), and the multiple mechanisms that could better account for exactly why attachment organization is associated with intraindividual differences in emotion regulation and coping capacity over time.

## Conclusion

Taken together, although this is very dependent on the measure of coping or emotion regulation under consideration, the research reviewed here shows that attachment does have small to moderate associations with coping and emotion regulation in toddlerhood, childhood, and adolescence. This suggests that attachment relationships may set a template for current strategies for young children's and adolescents' coping and emotion regulation. Children identified as anxious-resistant show signs of challenges with coping and some dysregulation; children who show signs of avoidant attachment rely more on self-regulatory strategies and less on others for support to cope or manage emotions (yet, they also have some signs of more physiological distress); children who show signs of secure attachment have a range of advantages but also sometimes do not differ from their more anxious-resistant or avoidant peers—falling in between these two groups. Although children who show signs of disorganized attachment seem to have many difficulties with coping and regulation, this conclusion is very tentative given the limited research currently available that has assessed disorganization. Overall, however, it is hard to claim that any form of attachment is a precursor of these capacities for, or problems with, adaptive coping and regulation of emotion. Such a claim awaits more longitudinal research that relies on observations of attachment across many age groups and continued focus on the many different ways of coping or regulating emotions within and between different contexts.

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