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Emotional Development in Children with Different Attachment Histories: The First Three Years

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The development of fear, anger, and joy was examined in 112 children using a longitudinal design. Children were observed at 9, 14, 22, and 33 months in standard laboratory episodes designed to elicit fear, anger, or joy. At 14 months, mother–child attachment was assessed in the Strange Situation. The attachment groups (avoidant, secure, resistant, and disorganized/unclassifiable) differed in the trajectories of emotional development, with the differences first apparent at 14 months of age. Resistant children were the most fearful and least joyful, and fear was their strongest emotion. More than secure children, they responded with distress even in episodes designed to elicit joy. When examined longitudinally, over the second and third years, secure children became significantly less angry. In contrast, insecure children's negative emotions increased: Avoidant children became more fearful, resistant children became less joyful, and disorganized/unclassifiable children became more angry. Higher attachment security uniquely predicted that at 33 months, children would show less fear and anger in episodes designed to elicit fear and anger, and less distress in episodes designed to elicit joy, even in conservative regression analyses controlling for all the earlier emotion scores.

INTRODUCTION

Mother–infant attachment has been one of the core topics in social–emotional development for almost 3 decades, in part because of the widely shared, albeit controversial, belief that it has considerable implications for later functioning. Many books and reviews summarize both classic and recent research (e.g., Thompson, 1998, 1999; Weinfield, Sroufe, Egeland, & Carlson, 1999).

Most of that work, however, has focused on social and emotional developmental outcomes that represent relatively complex constructs. With a few exceptions (e.g., Thompson & Lamb's 1984 study of basic parameters of distress in children varying in attachment organization) most studies have examined facets of competence or risk, such as resilience to stress, confidence, development of self, functioning in future peer and romantic relationships, behavior problems, psychopathology, or qualities of representation of self and others (e.g., Cassidy & Shaver, 1999; Sroufe, Egeland, & Carlson, 1999; Thompson, 1998, 1999). Surprisingly, however, we know relatively little about the qualities of functioning of the basic emotion systems in children with different attachment histories.

Attachment researchers have made theoretical claims about the possible links between early differences in children's attachment organization and their future patterns of emotional responding. Many scholars view early attachment, to a large extent, as the system of dyadic affect regulation (Sroufe, 1997), with caregivers helping infants manage emotional tension that exceeds their regulatory abilities. Data from human (Nachmias, Gunnar, Mangelsdorf, Parritz, & Buss, 1996) and animal (Hofer, 1994) research support such a view at the physiological level.

Relationships in general are considered to be a critical context for the development of emotionality (Thompson, 1994). In particular, caregivers' responsive, sensitive, and well-coordinated interactions with their young infants have been linked to the infants' improved emotion regulation. Belsky, Fish, and Isabella (1991) demonstrated in a longitudinal study that infants who at 3 months experienced sensitive, harmonious, engaged interactions with their caregivers expressed less negative and more positive emotionality by 9 months of age. Emotionality in that study was observed also in the context of the infant–caregiver relationship (crying or smiling during interactions with mothers and fathers, and mothers' ratings of emotionality). Additionally, the patterns of change in emotionality between 3 and 9 months were meaningfully related to attachment security at 12 months. Generally speaking, infants with more positive patterns of change were more likely to be securely attached at 12 months, indicating the interweaving of the child's developing emotion regulation and the developing attachment system.

Several researchers have articulated specific predictions regarding early attachment and children's emotionality. Cassidy (1994), following Main (Main, Kaplan, & Cassidy, 1985), proposed that children's

pattern of regulating (mostly negative) emotions evolves in part as a function of the history of the relationship with the mother. In this view, the individual organization of emotional strategies corresponds to the attachment patterns and is rooted in the child's history of repeated experiences in affective encounters with the parent. Secure children are thought to develop open, flexible emotion expression, with a predominance of positive affect. Avoidant children display a pattern of minimizing the expression of negative affect, mostly fear and anger, whereas resistant children develop heightened expressions of those emotions.

Several investigators have focused on the relations between attachment histories and children's processing of emotional themes and stimuli. Belsky and colleagues (Belsky, Spritz, & Crnic, 1996) identified biases in 3-year-olds' memories for affectively positive versus negative events that were meaningfully related to security of attachment at 1 year. Magai (1999) described attributional biases in children's decoding of ambiguous affective stimuli that were meaningfully related to the children's histories of early relationships with parents. Lay, Waters, Posada, and Ridgeway (1995) identified defensive biases in insecurely attached children's responses to mood induction, particularly involving a hypothetical mother figure. Laible and Thompson (1998) demonstrated relations between preschool children's attachment security and several aspects of their emotional understanding.

Taken together, the existing evidence, although sparse and not overly strong, supports the expectation of different patterns of emotional development as a function of early attachment history. Avoidant children may be expected to express somewhat minimized negative emotions, such as sadness, fear, or anger, or even increased positive affect, findings reported within the attachment model (Cassidy, 1994; Lutkenhaus, Grossmann, & Grossmann, 1985) and in other research (Calkins & Fox, 1992; Malatesta, Culver, Rich Tesman, & Shepard, 1989). In contrast, resistant children may be expected to develop a pattern of hightened negative emotionality (Cassidy, 1994; Kochanska, 1998). It should be noted, however, that the emotion regulation of insecure children may be more complex, and it may depend on the context in which it is assessed. This issue has arisen mostly with respect to avoidant children, who are thought to minimize negative affect when the attachment system is activated, for example, in the Strange Situation, or in a relationship with a particular caregiver, but not necessarily in other contexts. Berlin and Cassidy (1999) recently reviewed evidence suggesting that in peer contexts, avoidant children may display considerable negative affect, particularly anger and hostility.[1]

Recently, Chorpita and Barlow (1998) proposed that young children's experience of diminished control and unpredictability in early relationships with unresponsive caregivers (thus presumably linked to insecure attachment) leads to the development of anxiety. Their model, however, is silent with respect to the implications of the distinction between the two insecure patterns, avoidant and resistant.

Little work exists on positive affectivity, although some studies suggest that secure children, with age, become more positive or enthusiastic than insecure (avoidant and resistant), or specifically, more positive than avoidant (Matas, Arend, & Sroufe, 1978; Pastor, 1981; Waters, Wippman, & Sroufe, 1979). In these studies, however, positive affectivity was assessed in interactions with the mother or with peers, not in a standard emotion-eliciting context.

From a review of the research, it can be seen that although emotional development has been the central point of interest for attachment researchers, the existing data are somewhat constrained. Consistent with the spirit of attachment theory, emotionality has been typically studied in the context of relationships or interactions with caregivers or other partners, such as peers, or in the context of affective information processing. Consequently, relatively little research exists on the functioning of the basic emotion systems, or responses to relatively "pure" emotional stimuli, in which the affective significance of the stimulus is tied to the properties of the stimulus itself (rather than to a specific relational context); for example, novelty as the elicitor of fear, or physical restraint as the elicitor of anger.

This is an important gap because the pattern of basic emotional reactivity may constitute the "bare bones" or foundations of individual affectivity—the scaffolding or the basic structure around which more complex individual characteristics, typically studied as developmental sequelae of attachment, may subsequently be organized. For example, future conduct problems may have as their core, at least in part, early dysregulation of the anger system (Caspi, 1998; Cole, Zahn-Waxler, & Smith, 1994). Future anxiety, depression, and other internalizing problems may arise in the context of the diathesis of early fearfulness or early negative affectivity (Caspi, 1998; Kagan, 1998; Rothbart & Ahadi, 1994). Additionally, studying "pure" emotions, or emotional reactions to classic affective stimuli outside of the contexts of relationships, may elucidate in important ways the somewhat contradictory findings re-

[1]The author thanks an anonymous reviewer for suggesting this point.

garding negative affect expression in avoidant children (Berlin & Cassidy, 1999).

Such issues are typically addressed by temperament scholars interested in continuity of individual differences in emotional profiles (Kagan, 1998; Rothbart & Bates, 1998). In that tradition, parameters of future emotional functioning are often seen as unfolding out of early temperamental predispositions. Some of the most useful paradigms for studying emotionality have been developed within that framework. In particular, Goldsmith and Rothbart recently developed a set of sophisticated standard laboratory batteries to assess early emotion systems in young children from infancy to preschool age (Laboratory Temperament Assessment Battery [LAB-TAB], Goldsmith & Rothbart, 1996), which have been used succesfully in research on early affective development (Buss & Goldsmith, 1998; Kochanska, Coy, Tjebkes, & Husarek, 1998). Temperament researchers, however, are less interested in the role of early relationships in shaping future emotional functioning. Therefore, little is known about the significance of the early attachment organization in the mother–child dyad for the development of individual differences in basic emotional functioning.

The main objective of this study was to address the questions of interest in attachment research—individual differences in emotionality in children who have varied attachment histories—using highly standardized laboratory procedures to assess emotional responding. We examined longitudinally, from infancy to 3 years (at 9, 14, 22, and 33 months), the patterns of basic emotional responses to affective stimuli in a large sample of children who differed in their attachment histories. We focused on the fundamental emotion systems: fear, anger, and joy. Children's attachment was assessed at 14 months; thus, the emotion data included both the antecedent patterns of emotion (at 9 months) and those following the organization of attachment.

In addition to exploring the poorly understood development of "pure" (or basic) emotion systems assessed outside of the relational context as a function of early attachment, this study also examined the two negative emotion systems, fear and anger, most often studied in the context of attachment, as well as the positive affect system, joy, whose links with early attachment, although posited, have been much less studied (Belsky et al., 1991; Waters et al., 1979). Another goal was to focus not only on the emotional response that was consistent with the content or intention of the episode, but also on the emotional response that was inconsistent or incongruent with the stimulus (for example, distress in an episode designed to elicit joy). Expressing an emotion that is opposite to that intended by the experimental procedure likely reflects a particularly strong affective proclivity on the part of the child—strong enough to override the typical affective value of the stimulus. The expression of an opposite response, or both types of responses (e.g., responding with both fear and a smile to a stimulus intended to produce fear, or with both laughter and distress to a joy stimulus) has been previously noted in children. Therefore, both episode-consistent and episode-inconsistent emotions were coded and subsequently analyzed.

Another goal was to take advantage of the opportunity to study emotional responses of children with a history of disorganized attachment (D). Little work has been done on emotional development of D infants, despite the rapidly increasing interest in their future trajectories (Carlson, 1998; Lyons-Ruth, Alpern, & Repacholi, 1993). In this study, the group of children classified as D, albeit small ($n = 10$), was nevertheless available, and all children were retained throughout the study.

The final goal of this study was to examine attachment and emotional development in the context of a longitudinal design. Emotion expression was examined before the attachment organization was assessed (at 9 months), concurrently with the assessment (at 14 months), and following the assessment (at 22 and 33 months). Most of the existing evidence tends to be from one or two of these junctions, but not all of them. A longitudinal design allowed us to conduct a conservative test of the predictive power of early attachment on future emotions. When addressing the predictions regarding emotional responding at 33 months, a stringent and conservative approach was adopted, in which the unique contribution of early attachment security above and beyond the influence of the stability of each of the studied emotions was examined, going back to 9 months and thus to the period preceding the formation of attachment.

METHOD

Participants

Families of normally developing, term infants volunteered for the study, and were seen at 9 months ($M = 8.94$, $SD = .63$, $n = 112$: 56 girls, 56 boys); 14 months ($M = 13.65$, $SD = .74$, $n = 108$: 53 girls, 55 boys); 22 months ($M = 22.30$, $SD = .56$, $n = 106$: 53 girls, 53 boys); and 33 months ($M = 32.80$, $SD = .53$, $n = 104$: 52 girls, 52 boys). Extensive details about the characteristics of the sample are given in Kochanska et al. (1998). The families were mostly White. There was a broad SES range in terms of education and income, although approximately half of the parents had com-

pleted college or some postgraduate education (59% of mothers, 57% of fathers), and 58% had an annual income above $40,000. Mothers and children were seen at 9 months during a 1½- to 2-hour home session; at 14 months during a 1½- to 2-hour laboratory session; and at 22 and 33 months during two laboratory sessions at each age, with each session lasting 2½ to 4 hours.

Assessment of Attachment

The classic Strange Situation (Ainsworth & Wittig, 1969) was conducted at 14 months, as the first paradigm in the laboratory session. It was coded by two professional coders at another university, blind to all other data, and reliable with each other and with Sroufe's group (regarding A, B, and C classifications) and Main's group (regarding D ratings and classifications). The details of the procedure and coding are described in Kochanska (1998).

Among the 108 children, 58 (54%) were classified as secure (B), and 50 (46%) as insecure. Of those classified as insecure, 22 (20%) were avoidant (A), 18 (17%) were resistant (C), 8 (7%) were disorganized (D), and 2 (2%) were unclassifiable (U). Generally, D was the primary category when the rating of disorganization was 5 or higher (Main & Solomon, 1990). The two last groups, D and U, were combined in the analyses.[2]

In addition to the categorical scores, a continuous score of attachment security was also generated, following Richters, Waters, and Vaughn (1988, p. 517). To that effect, children's scores were standardized on the social–interactive behaviors (proximity–contact seeking, proximity maintaining, contact resistance, and avoidance) and crying in episodes 5 and 8 (reunions), multiplied by the respective weights, summed, and reversed ($M = .00$, $SD = 1.15$). Higher scores denote higher security (the B versus non-B dimension).

Assessment of the Emotion Systems

Procedure

At each age, carefully scripted, mostly multitrial paradigms were administered. They were executed by a female research assistant who conducted each session. The child's mother was typically in the same room (and participated in some episodes, for example Peek-a-Boo). Most paradigms were drawn from LAB-TAB (Goldsmith & Rothbart, 1996). LAB-TAB was developed to provide a standardized instrument to assess several dimensions of early temperament (Goldsmith & Rothbart, 1991). It describes highly scripted episodes designed to elicit specific emotions (or other temperament dimensions, such as activity or attention). During the episodes, the emotional stimulus often is presented in multiple trials. Each episode is divided into short coding epochs, varying in length from 5 s to 30 s, depending on the structure of the episode. LAB-TAB also provides well-defined guidelines for coding children's emotional responses. The coding includes latency to the first emotional expression, discrete emotion-related behaviors, and average and peak intensity of the emotion expressed in the facial, vocal, and bodily channels.

Several fear, anger, and joy episodes were drawn from LAB-TAB; other episodes developed in the author's laboratory (fear at 22 and 33 months) were added. At 9 months, there were four fear episodes. They included Stranger Approach (stranger approaching and picking up babies), Unpredictable Toy (an odd-looking dog moving rapidly toward babies along the track), Masks (experimenter consecutively putting on four frightening masks), and Parasol Opening (experimenter suddenly opening a large parasol). There were also three anger episodes, which included Arm Restraint (babies' arms pressed to their sides while they are engaged with a toy), Car Seat (babies confined in a car seat), and Toy Retraction (toy taken away from babies but kept in sight). Lastly, there were also three joy episodes, including Puppets (a hand puppet "show"), a Peek-a-Boo game, and Pop-Up Bunny (babies playing with a pop-up toy). At 14 months, there was one fear episode (Masks), one anger episode (Car Seat), and one joy episode (Puppets). At 22 months, there was one fear episode (Masks), two anger episodes (Car Seat), and two joy episodes (Puppets). At 33 months, there was one fear episode (Masks), one anger episode (Car Seat), and two joy episodes (Puppets). The extensive details of all episodes are described in Kochanska et al. (1998), and in the LAB-TAB manual (Goldsmith & Rothbart, 1996).

At 22 and 33 months, another fear assessment, a "Risk Room" paradigm, was added. This procedure, which was adapted from Kagan's work (Kagan, Reznick, & Gibbons, 1989; Kochanska, 1995), consisted of a sequence of mildly stressful or frightening events in an unfamiliar environment, and was considered particularly appropriate for toddler age.

Risk Room Paradigms

This 10- to 12-min paradigm was administered as the initial situation during the first session in the laboratory.

[2] For the 8 D infants, the coders reassigned these infants to the best-fitting ABC category: two A's, 3 B's, 2 C's, and 1 U/C1/A1.

Children were observed while exploring an unfamiliar room, furnished with odd, mildly threatening objects and toys (first 3 min), and then responding to a series of "Risky Acts." The Risky Acts consisted of interactions with a stranger who encouraged the children, using up to three prompts, to perform seven mildly threatening acts. At 22 months, these included driving a very strange car decorated with rubber snakes and animal masks, climbing a ladder, putting a hand into a big black box, allowing someone to wrap a blood pressure cuff around their arm, touching a remote-controlled strange dinosaur, putting on a furry ape mask, and playing and shaking hands with a person in a clown suit.

At 33 months, the room was refurnished, so that it again looked unfamiliar and again was filled with strange objects. The Risky Acts included riding a very odd tricycle, sliding down a slide decorated with strange objects, putting a hand into another strange-looking box, allowing a research assistant to measure the circumference of their head using a tape, putting on threatening-looking masks, touching a remote-controlled robot, and interacting with a person wearing a cow suit.

Coding of the Risk Room Events

The coded variables included (1) proximity to mother, coded every 30 s (touching or within arm's length, hovering close but further than arm's length, or more than ⅓ of the room's length away from mother); (2) latency to explore the first object in the room; (3) presence or absence of exploration, coded every 30 s, including extra credits for exploring particularly threatening objects; and (4) fearful response to each Risky Act, coded on a scale from 0 (act performed immediately after the demonstration and before the first prompt) to 5 (never performed). An extra point was given if the child showed distress while responding to a Risky Act.

Reliability of Coding of the Risk Room Events

The κs at 22 and 33 months, respectively, were: for proximity to mother, .78 and .98; for exploration, .89 and 1.00; and for fearful response to the Risky Acts, .91 and .96 (.93 for driving the car, .94 for the tricycle, both coded live). The latencies to explore were all coded within 1 s at both times.

Data Aggregation of the Risk Room Events

At each assessment period, the measures were standardized and averaged into one *Risk Room fear score.* They included the number of segments spent in direct proximity to mother, latency to explore, reversed exploration score, and the fearful response scores for each Risky Act. They were highly convergent; αs at 22 and 33 months were .84 and .85, respectively.

Coding, Aggregation, and the Final Emotion Scores (Episode-Consistent and Episode-Inconsistent)

In the LAB-TAB episodes, children's emotional responses that were *episode-consistent*, or congruent with the intention of the episode (fear in the fear episodes, anger in the anger episodes, joy in the joy episodes), and those that were *episode-inconsistent*, or incongruent with the intended effect (positive emotion in fear and anger episodes, expressions of distress in joy episodes) were coded.

Episode-Consistent Emotions

The coded variables for episode-consistent emotions included latency to the first expression of emotion, discrete behavioral act expressing the emotion (discrete emotion behavior), and average and peak intensity of vocal, facial, and bodily response. Codes were assigned to each segment (depending on the paradigm, typically 5–15 s) and were highly reliable (for details, see Kochanska et al., 1998): For fear, kappas ranged from .63 to 1.00, for anger, from .62 to 1.00, and for joy, from .78 to .98. The data were subjected to robust, multilevel aggregation within and across episodes, ultimately to produce overall episode-consistent emotion scores. To create a score for an episode, an aggregate was formed consisting of the reversed latency, sum of discrete emotion behaviors, and average and peak intensity of response (previously averaged across all channels—facial, vocal, and bodily), all standardized (see also Kochanska et al., 1998, for detailed description of aggregation and internal consistencies). The scores were then averaged across episodes, targeting the same emotion at each time of assessment.

Final fear scores. The final fear scores were: at 9 months, the composite of Stranger Approach, Unpredictable Toy, Masks, and Parasol Opening; at 14 months, the Masks score; and at 22 and 33 months, the composite of the Masks score and the Risk Room score.

Final anger scores. The final anger scores at 9 months were: the composite of Arm Restraint, Car Seat, and Toy Retraction; at 14 months, the Car Seat score; at 22

months, the mean of two Car Seat episodes; and at 33 months, the Car Seat score.[3]

Final joy scores. The final joy scores at 9 months were: the composite of the Puppets, Peek-a-Boo, and Pop-Up Bunny episode scores; at 14 months, the Puppets score; and at 22 and 33 months, the mean of two Puppets scores.

Episode-Inconsistent Emotions

The coding of the episode-inconsistent emotions was somewhat abbreviated, and included the latency to the first expression of emotion (smiling or distress), and average and peak intensity (of smiling or distress). For each episode (except for the Risk Room procedures, which did not lend themselves to such coding, so that at 22 and 33 months, the Masks were the only fear episodes used for this purpose) one aggregated score was also produced for the expression of the episode-inconsistent emotion. They were averaged in a manner analogous to the episode-consistent scores, across all the relevant episodes at each time of assessment. All descriptive statistics, for episode-consistent and episode-inconsistent (fear, anger, and joy measures) scores, are shown in Tables 1–3.

RESULTS

Overview

There were several directions of analyses. All analyses were conducted in an analogous fashion for the episode-consistent and episode-inconsistent emotions.

An alternative strategy would have been to bring together, in one multivariate analysis, both episode-consistent and episode-inconsistent scores, for all emotion systems, at four times of assessment and for four attachment groups. Then, the quality of response (consistent versus inconsistent), type of emotion, and time of assessment would have been the three within-subjects factors, and attachment group and gender would have been the two between-subjects factors. Such a design, however, although appropriate, would have been too complex to follow. Therefore, to facilitate the discourse, the data on episode-consistent and episode-inconsistent emotions have been analyzed and presented separately.

First, preliminary analyses were performed to explore the stability of each emotion over time. Second, emotional development in children who varied in their attachment histories was examined by conducting an omnibus MANOVA, which looked at the development of all three emotion systems, in the four attachment groups, across the four assessment periods (at 9, 14, 22, and 33 months), and for both genders. To "unpack" the significant multivariate effects, this MANOVA was followed by subsequent, more specific analyses.

Third, multiple regression analyses were performed to examine whether security of attachment at 14 months (continuous variable) could predict emotion scores at 33 months (outcome measure), above and beyond the stability of the respective emotion system. To control for this stability, scores were entered at 9, 14, and 22 months. In an extension of this approach, overall composites of negative and positive emotions were also created, at each time of assessment (encompassing both the episode-consistent and episode-inconsistent emotions, sharing the same affective valence). In an analogous manner, the prediction to the scores at 33 months was explored. All analyses used standardized emotion scores, and thus, expressed relative differences among groups rather than "absolute" differences.

Preliminary Analyses: Longitudinal Stability of the Emotion Systems

For each emotion system, correlations were computed across all assessments. There was some stability in all emotion systems.

Episode-Consistent Emotions

All correlations for episode-consistent emotions are presented above the diagonal in Table 4. The negative emotions, fear and anger, were significantly stable between 22 and 33 months, $p < .001$; fear was also stable between 14 and 22 months, $p < .01$. Joy was significantly stable between 9 and 14 months, $p < .01$, 9 and 22 months, $p < .001$, and 14 and 33 months, $p < .01$, and 22 and 33 months, $p < .001$.

[3] The anonymous reviewer asked whether it could be shown that the episodes meant to elicit fear and anger indeed elicited those specific emotions, or whether they each elicited both fear and anger, or a general negative emotion. The reviewer suggested this question be tested using factor analyses. PCA (VARIMAX rotation, loadings below .40 suppressed) conducted on the separate episodes' scores indicated that, indeed, the LAB-TAB fear and anger episodes elicited distinguishable emotions. At 9 months, the scores from all four fear episodes loaded on the first of two factors, and the scores from all three anger episodes loaded on the second one. At 22 months, the scores from the two fear episodes again loaded on the second of two factors, and the scores from the two anger episodes loaded on the first one. There were no cross-factor loadings. At 14 and 33 months there were not enough episodes to conduct a PCA; however, at 14 months, the fear and anger episode scores were unrelated, $r = -.01$. At 33 months, they were also unrelated (Car Seat with Masks, $r = .03$; Car Seat with Risk Room, $= .10$). Masks and Risk Room (both fear episodes) correlated, $r = .40$, $p < .001$. The author appreciates this contribution by the reviewer.

Table 1 Descriptive Data of the Emotions in Fear Measures for the Four Attachment Groups

	Emotions in Fear Episodes[a]									
	9 Months		14 Months		22 Months		33 Months		Overall (9–33 Months)	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Avoidant (A)										
Episode-consistent	−.21	.47	−.23	.55	−.16	.59	.16	.60	−.11	.36
Episode-inconsistent	.22	.79	.16	1.16	.08	1.08	−.17	1.01	.07	.67
Secure (B)										
Episode-consistent	.05	.47	−.03	.65	−.02	.48	−.13	.51	−.03	.33
Episode-inconsistent	−.04	.51	.05	.90	.00	.93	.08	.89	.03	.55
Resistant (C)										
Episode-consistent	.09	.41	.40	.67	.26	.54	.33	.64	.27	.38
Episode-inconsistent	−.05	.53	−.40	.46	−.22	.83	−.22	.95	−.22	.48
Disorganized/Unclassifiable (D/U)										
Episode-consistent	.02	.56	−.01	.56	−.02	.46	−.24	.51	−.06	.29
Episode-inconsistent	−.25	.43	.06	1.22	.21	.98	.34	1.18	.10	.80

Note: All means represent aggregates of standardized scores. At 14 (and thus at 9) months, there were 22 A's, 58 B's, 18 C's, and 10 D/U's. At 22 months, there were 22 A's, 56 B's, 18 C's, and 10 D/U's. At 33 months, there were 22 A's, 55 B's, 17 C's, and 10 D/U's. Episode-consistent response: fear in fear episodes; episode-inconsistent response: smiling in fear episodes.
[a] Emotions in fear episodes for 9 months: Stranger Approach, Unpredictable Toy, Masks, and Parasol Opening; for 14 months: Masks; and for 22 and 33 months: Masks and Risk Room.

Episode-Inconsistent Emotions

All correlations for episode-inconsistent emotions are presented below the diagonal in Table 4. The correlations indicated that smiling in fear and anger episodes was significantly stable longitudinally: Smiling in fear episodes was stable between 9 and 14, $p < .001$, and 9 and 33 months, $p < .025$, between 14 and 22, $p < .01$, and 14 and 33 months, $p < .001$, and between 22 and

Table 2 Descriptive Data of the Emotions in Anger Measures for the Four Attachment Groups

	Emotions in Anger Episodes[a]									
	9 Months		14 Months		22 Months		33 Months		Overall (9–33 Months)	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Avoidant (A)										
Episode-consistent	.10	.55	−.31	1.08	−.03	.69	.23	.78	−.01	.39
Episode-inconsistent	.14	.65	−.09	.95	.06	.83	−.17	.78	−.01	.39
Secure (B)										
Episode-consistent	−.07	.50	.16	.68	−.01	.80	−.17	.91	−.01	.48
Episode-inconsistent	−.01	.56	.06	.97	.02	.79	.09	.83	.03	.53
Resistant (C)										
Episode-consistent	.07	.40	−.01	.60	−.01	.89	−.21	.94	−.04	.49
Episode-inconsistent	−.02	.70	−.01	.91	.09	.96	.15	.92	.05	.47
Disorganized/Unclassifiable (D/U)										
Episode-consistent	.08	.40	−.23	.72	.16	.85	.86	.51	.19	.30
Episode-inconsistent	−.32	.14	−.10	.70	−.43	.36	−.53	.49	−.33	.33

Note: All means represent aggregates of standardized scores. At 14 (and thus at 9) months, there were 22 A's, 58 B's, 18 C's, and 10 D/U's. At 22 months, there were 22 A's, 56 B's, 18 C's, and 10 D/U's. At 33 months, there were 22 A's, 55 B's, 17 C's, and 10 D/U's. Episode-consistent response: anger in anger episodes; episode-inconsistent response: smiling in anger episodes.
[a] Emotions in anger episodes for 9 months: Arm Restraint, Car Seat, and Toy Retraction; for 14 months: Car Seat; for 22 months: Car Seat (2); and for 33 months, Car Seat.

Table 3 Descriptive Data of the Emotions in Joy Episodes for the Four Attachment Groups

	Emotions in Joy Episodes[a]									
	9 Months		14 Months		22 Months		33 Months		Overall (9–33 Months)	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Avoidant (A)										
Episode-consistent	.24	.51	.38	.57	.05	.75	.05	.80	.18	.43
Episode-inconsistent	−.17	.54	−.23	.59	−.05	.81	.31	1.16	−.03	.57
Secure (B)										
Episode-consistent	−.11	.68	.02	.80	.04	.54	.07	.64	.00	.42
Episode-inconsistent	−.04	.68	−.10	.75	−.08	.71	−.21	.64	−.09	.43
Resistant (C)										
Episode-consistent	.14	.48	−.48	.99	−.20	.71	−.33	.89	−.22	.55
Episode-inconsistent	.23	.83	.38	1.36	.19	.82	.20	1.02	.26	.51
Disorganized/Unclassifiable (D/U)										
Episode-consistent	−.21	.54	−.08	.95	.05	.62	.11	.74	−.03	.62
Episode-inconsistent	.10	.45	.43	1.51	.23	.90	.07	.56	.21	.60

Note: All means represent aggregates of standardized scores. At 14 (and thus at 9) months, there were 22 A's, 58 B's, 18 C's, and 10 D/U's. At 22 months, there were 22 A's, 56 B's, 18 C's, and 10 D/U's. At 33 months, there were 22 A's, 55 B's, 17 C's, and 10 D/U's. Episode-consistent response: joy in joy episodes; episode-inconsistent response: distress in joy episodes.
[a] Emotions in joy episodes for 9 months: Puppets, Peek-a-Boo, and Pop-Up Bunny; for 14 months: Puppets; and for 22 and 33 months: Puppets (2).

33 months, $p < .001$. Smiling in anger episodes was stable between 14 and 22, $p < .05$, and 14 and 33 months, $p < .05$, and between 22 and 33 months, $p < .001$. Distress in episodes that were meant to elicit joy was not stable.

Development of the Emotion Systems in the Four Attachment Groups

Episode-Consistent Emotions

An overall MANOVA was performed in which the scores for fear, anger, and joy (each at 9, 14, 22, and 33 months) were the dependent variables. Emotion (three levels: fear, anger, and joy) and time of assessment (four levels: 9, 14, 22, and 33 months) were the within-subjects factors, and attachment group (A, B, C, D/U) and gender of child were the between-subjects factors (all means are shown in Tables 1–3).

Effects Involving Attachment Group and Gender

Across all times of assessment, children with different attachment histories, and girls and boys, differed in their expressions of emotions, as indicated by the overall interaction effects of attachment group and emotion, $F(6, 190) = 2.62$, $p < .025$, and gender and emotion, $F(2, 94) = 5.05$, $p < .01$. To understand these effects, a composite score for each emotion across all the assessment periods (at 9, 14, 22, and 33 months) was created. These three composite scores (fear, anger, and joy) were the dependent variables in a new MANOVA, with emotion (one of the three) as the within-subjects factor,

Table 4 Longitudinal Stability Correlations for Episode-Consistent and -Inconsistent Emotions

	Emotions in Fear Episodes				Emotions in Anger Episodes				Emotions in Joy Episodes			
Month	9	14	22	33	9	14	22	33	9	14	22	33
9		.05	.14	.07		.13	−.01	.07		.27***	.38****	.19^{+}
14	.34****		.28***	.19^{+}	.06		.09	.16^{+}	.17^{+}		.18^{+}	.28***
22	.14	.27***		.60****	.07	.21*		.31****	.16	.13		.37****
33	.23**	.35****	.39****		.04	.20*	.35****		.17^{+}	.07	.16	

Note: Correlations above the diagonal refer to episode-consistent emotions, and those below the diagonal refer to episode-inconsistent emotions (smiling in fear and anger episodes, distress in joy episodes).
*$p < .05$; **$p < .025$; *** $p < .01$; ****$p < .001$; $^{+}p < .10$.

and gender and attachment group as the between-subjects factors. The multivariate interactions were again significant for the interaction of attachment group and emotion, $F(6, 200) = 2.54$, $p < .025$, and gender and emotion, $F(2, 99) = 5.49$, $p < .01$.

Effects of attachment group. To pinpoint the effects of the attachment group, three one-way ANOVAs (for each composite emotion: fear, joy, and anger) were subsequently conducted to compare the four attachment groups. The effect of the attachment group was mostly for fear, $F(3, 104) = 4.73$, $p < .005$. The Student-Newman-Keuls test, $p < .05$, indicated that the resistant children were more fearful than any other group (avoidant, secure, or disorganized/unclassifiable). There was also a trend for joy, $F(3, 104) = 2.42$, $p < .10$, indicating that resistant children were less joyful than avoidant children.

Effects of gender. The effects of gender were examined in separate ANOVAs for each composite emotion (fear, joy, and anger). Gender effects were significant for fear and anger. Boys were less fearful, $F(1, 100) = 5.68$, $p < .025$ (boys: $M = -.09$, $SD = .36$; girls: $M = .10$, $SD = .34$), and more angry, $F(1, 100) = 11.09$, $p < .001$ (boys: $M = .14$, $SD = .42$; girls: $M = -.14$, $SD = .44$). Boys also tended to be more joyful, $F(1, 100) = 3.46$, $p < .07$ (boys: $M = .09$, $SD = .38$; girls: $M = -.10$, $SD = .54$).

Effects Involving the Time of Assessment

The trajectories of emotional development across the times of measurement were different for children in the four attachment groups, as indicated by the overall multivariate effect of interaction of attachment group, emotion, and time of assessment, $F(18, 276) = 2.27$, $p < .005$. To "unpack" this effect, several more specific analyses were conducted.

A separate MANOVA for each emotion (fear, anger, and joy) was first performed. In each of these MANOVAs, the scores for the particular emotion at 9, 14, 22, and 33 months were entered as the dependent variables; time of assessment was the within-subjects factor; and attachment group and gender were the between-subjects factors. Each MANOVA was performed to look for, and consequently further explored, the interaction effects of time and attachment group. These effects were significant for each emotion system: for fear, $F(9, 288) = 2.51$, $p < .01$; for anger, $F(9, 285) = 2.53$, $p < .01$; and for joy, $F(9, 285) = 1.99$, $p < .05$.

These effects were followed up by (1) examining separately each attachment group to explore the longitudinal changes in each emotion, or the differences among the four time points (9, 14, 22, and 33 months); (2) comparing the four attachment groups at each time point, for each emotion; and (3) comparing the three emotions with each other, at each time point and within each attachment group, or a profile of emotionality in each attachment group.

Longitudinal changes in emotions within attachment groups. The analyses of longitudinal changes within each attachment group (using paired t tests) indicated that the avoidant children's fear increased substantially by 33 months. At 33 months, their fear was significantly higher than ever before: higher than at 9 months, $t(21) = -2.27$, $p < .05$, at 14 months, $t(21) = -2.52$, $p < .025$, and at 22 months, $t(21) = -3.56$, $p < .005$.

Secure children's anger scores first increased between 9 and 14 months, $t(57) = -2.34$, $p < .025$, and then decreased between 14 and 33 months, $t(54) = 2.45$, $p < .025$. Resistant children's joy scores declined after 9 months: they were lower at 14, 22, and 33 months than at 9 months, $t(17) = 2.73$, $t(17) = 2.20$, and $t(16) = 2.43$, respectively, all ps $< .05$.

The disorganized/unclassifiable children had higher scores on anger at 33 months than at any time before: at 9 months, $t(8) = -2.81$, $p < .025$, at 14 months, $t(8) = -4.69$, $p < .0025$, and at 22 months, $t(8) = -2.86$, $p < .025$. Their fear scores decreased between 22 and 33 months, $t(9) = 3.37$, $p < .01$.

Comparisons of emotions among attachment groups at each assessment. The four attachment groups for each emotion at each time point were compared using one-way ANOVAs and Student-Neuman-Keuls tests. No differences were found for any emotion at 9 or 22 months. There were differences among the groups, however, at 14 and 33 months. At 14 months, the one-way ANOVAs were significant for fear, $F(3, 104) = 3.43$, $p < .025$, and for joy, $F(3, 104) = 3.80$, $p < .025$. The resistant children were more fearful than were avoidant or secure children, and they were less joyful than avoidant children. At 33 months, the one-way ANOVAs were significant for fear, $F(3, 100) = 4.23$, $p < .01$, and for anger, $F(3, 99) = 4.50$, $p < .01$. The resistant children remained more fearful than the secure children; the avoidant children, however, were now also more fearful than the secure children. The disorganized/unclassifiable children were more angry than the secure or resistant children.

Emotion profiles within attachment groups at each assessment. The three emotions within each attachment group were then compared at each time point using paired t tests to examine the profile of the three emotions for each group. At 9 months, there was a significant difference among the three emotions for the avoidant children only: Fear was significantly lower than anger, $t(21) = -2.38$, $p < .05$, and it was significantly lower than joy, $t(21) = -2.74$, $p < .025$. There were no differences among the emotions for the other attachment groups.

At 14 months, there were significant differences

among the emotions in the two insecure groups, avoidant and resistant. For the avoidant children, fear was again significantly lower than joy, $t(21) = -3.17$, $p < .005$. Anger was also lower than joy, $t(21) = -2.90$, $p < .01$. In contrast, for the resistant children, fear was a stronger emotion than anger, $t(17) = 2.40$, $p < .05$, and stronger than joy, $t(17) = 3.59$, $p < .005$.

At 22 months, no emotion differed significantly from the other two in any attachment group. At 33 months, the profile for the resistant children resembled that at 14 months, with fear being a stronger emotion than anger, $t(16) = 2.26$, $p < .05$, and joy, $t(16) = 2.44$, $p < .05$. Among the disorganized/unclassifiable children, anger was a stronger emotion than fear, $t(8) = -4.30$, $p < .005$, and joy, $t(8) = -2.25$, $p = .05$.

Episode-Inconsistent Emotions

An analogous omnibus MANOVA was performed in which the scores for the expressions of emotions inconsistent with the intention of the episode (smiling in the fear episodes, smiling in the anger episodes, and distress in the joy episodes), each at four times of assessment (9, 14, 22, and 33 months), were the dependent variables. The type of (intended) emotion episode and time of assessment were the within-subjects factors, and attachment group and gender were the between-subjects factors.

Effects Involving Attachment Group and Gender

Across all times of assessment, children with different attachment histories, and girls and boys, differed in their expressions of emotions that were inconsistent with the intended stimulus, as indicated by the overall interaction effects of attachment group and emotion, $F(6, 190) = 2.70$, $p < .025$, and of gender and emotion, $F(2, 94) = 4.30$, $p < .025$. A composite score was created for each episode-inconsistent emotion across all the assessment periods (at 9, 14, 22, and 33 months). These three composite scores (smiling in fear episodes, smiling in anger episodes, distress in joy episodes) were the dependent variables in a MANOVA. The intended emotion (one of three: fear, anger, or joy paradigm) was the within-subjects factor, and gender and attachment group were the between-subjects factors. The multivariate interactions were again significant: attachment group and emotion, $F(6, 200) = 2.59$, $p < .025$, and gender and emotion, $F(2, 99) = 4.24$, $p < .025$.

Effects of attachment group. Subsequent one-way ANOVAs indicated that the attachment group effect was for the distress in joy episodes, $F(3, 104) = 3.06$, $p < .05$, with the resistant children more distressed than secure children, Student-Newman-Keuls, $p < .05$.

Effects of gender. ANOVAs showed that the gender effect was for smiling in fear episodes: Boys had higher scores than did girls, $F(1, 100) = 4.63$, $p < .05$ (boys: $M = .14$, $SD = .57$; girls: $M = -.13$, $SD = .58$).

Effects Involving the Time of Assessment

There were no significant multivariate effects involving the time of assessment for the episode-inconsistent emotions.

Security of Attachment at 14 Months as a Predictor of Emotional Development at 33 Months

Episode-Consistent Emotions

Three hierarchical multiple regressions were conducted to examine whether attachment security at 14 months contributed unique explained variance to the emotion scores at 33 months. A conservative approach was adopted in which the effect of security was tested after controlling for the developmental stability of the emotion itself. To that effect, in each regression, child gender was entered as Step 1, all the earlier emotion scores (at 9, 14, and 22 months) were entered at Step 2, and the continuous score on attachment security at 14 months was entered at Step 3. The findings are presented in Table 5.

Fear at 33 Months

Gender was not a significant predictor. The earlier fear scores accounted for 36% of the variance, due to the powerful effect of the score at 22 months. Attachment security added a unique and significant 6% of the explained variance: Children who had been more secure as infants were less fearful at 33 months.

Anger at 33 Months

Boys displayed significantly more anger at 33 months (10% of explained variance). The earlier anger scores added 9% of the variance, again mostly due to the score at 22 months. Attachment security added a significant 6% of the variance, with children who had been more securely attached as infants showing less anger at 33 months.

Joy at 33 Months

Boys showed more joy at 33 months, with gender accounting for 6% of the variance. The earlier joy scores contributed 16% of the variance, with the scores at both 14 months and 22 months adding to the prediction. Attachment security did not contribute significant explained variance.

Table 5 Prediction of Episode-Consistent Emotions at 33 Months: Multiple Regressions

	Step 1		Step 2		Step 3	
Predictors Added	*F*	β	*F*	β	*F*	β
Dependent variable: Fear at 33 months						
Gender	1.17	−.11	<1	.06	<1	.07
	$R^2 = .01$ $F_{ch} = 1.17$					
Emotion at 9 months			<1	−.01	<1	.00
Emotion at 14 months			<1	.03	<1	.04
Emotion at 22 months			50.59****	.61	55.77****	.61
			$R^2 = .37$ $F_{ch} = 18.47$****			
Attachment security at 14 months					10.07***	−.24
					$R^2 = .43$ $F_{ch} = 10.07$***	
			Overall $F(5, 98) = 14.50$****			
Dependent variable: Anger at 33 months						
Gender	11.69****	.32	8.35***	.27	9.28***	.27
	$R^2 = .10$ $F_{ch} = 11.69$****					
Emotion at 9 months			<1	.03	<1	.01
Emotion at 14 months			1.11	.10	2.19	.13
Emotion at 22 months			7.88***	.26	7.73***	.25
			$R^2 = .19$ $F_{ch} = 3.31$**			
Attachment security at 14 months					7.86****	−.25
					$R^2 = .25$ $F_{ch} = 7.86$****	
			Overall $F(5, 97) = 6.37$****			
Dependent variable: Joy at 33 months						
Gender	7.01***	.25	5.79**	.22	5.48**	.21
	$R^2 = .06$ $F_{ch} = 7.01$***					
Emotion at 9 months			<1	−.01	<1	.01
Emotion at 14 months			4.33*	.19	4.40*	.20
Emotion at 22 months			10.95***	.32	10.29***	.31
			$R^2 = .22$ $F_{ch} = 6.70$****			
Attachment security at 14 months					1.44	.11
					$R^2 = .23$ $F_{ch} = 1.44$	
			Overall $F(5, 98) = 5.97$****			

*$p < .05$; **$p < .025$; ***$p < .01$; ****$p < .001$.

Summary

All three equations were significant and the predictors accounted for 23% to 43% of the explained variance. For each emotion at 33 months, the earlier scores, particularly the more recent ones, were significant predictors. Gender was linked to significant differences in anger and joy. Children who had been more securely attached as infants were significantly lower in the two negative emotions (fear and anger) at 33 months, even after controlling for the effect of developmental stability of the given emotion and the child's gender.

Episode-Inconsistent Emotions

Three analogous hierarchical multiple regressions were conducted to examine whether early attachment security predicted the episode-inconsistent emotion scores at 33 months, beyond the stability of the emotion itself. The logic of the predictors' entry was the same as in the regressions for the episode-consistent emotions. The findings are shown in Table 6.

Smiling in Fear Episodes at 33 Months

There was no effect for gender. The earlier scores (smiling in the fear episodes at 9, 14, and 22 months) accounted for 21% of the variance, due to the scores at 14 and 22 months. Attachment security did not add any unique explained variance.

Smiling in Anger Episode at 33 Months

Girls smiled significantly more in the anger episode at 33 months (5% of the explained variance). The earlier scores (smiling in the anger episodes) added 14% of the explained variance, mostly due to the score at 22 months. Attachment security did not contribute to the equation.

Table 6 Prediction of Episode-Inconsistent Emotions at 33 Months: Multiple Regressions

	Step 1		Step 2		Step 3	
Predictors Added	*F*	β	*F*	β	*F*	β
Dependent variable: Inconsistent emotion (smiling) in fear episodes at 33 months						
Gender	2.08	.14	<1	.04	<1	.04
	$R^2 = .02$ $F_{ch} = 2.08$					
Emotion at 9 months			1.61	.12	1.68	.12
Emotion at 14 months			4.68*	.21	4.86**	.22
Emotion at 22 months			11.18****	.31	10.75***	.30
			$R^2 = .23$ $F_{ch} = 8.76$****			
Attachment security at 14 months					1.54	.11
					$R^2 = .24$ $F_{ch} = 1.54$	
			Overall $F(5, 97) = 6.10$****			
Dependent variable: Inconsistent emotion (smiling) in anger episodes at 33 months						
Gender	5.00**	−.22	6.01**	−.22	6.18**	−.23
	$R^2 = .05$ $F_{ch} = 5.00$**					
Emotion at 9 months			<1	−.01	<1	−.01
Emotion at 14 months			2.41	.15	2.05	.13
Emotion at 22 months			11.04****	.31	10.90***	.31
			$R^2 = .19$ $F_{ch} = 5.58$***			
Attachment security at 14 months					2.09	.13
					$R^2 = .20$ $F_{ch} = 2.09$	
			Overall $F(5, 97) = 4.95$****			
Dependent variable: Inconsistent emotion (distress) in joy episodes at 33 months						
Gender	<1	−.01	<1	.00	<1	.01
	$R^2 = .00$ $F_{ch} < 1$					
Emotion at 9 months			2.12	.15	2.15	.14
Emotion at 14 months			<1	.02	<1	−.01
Emotion at 22 months			1.64	.13	1.53	.12
			$R^2 = .05$ $F_{ch} = 1.62$			
Attachment security at 14 months					7.25***	−.26
					$R^2 = .11$ $F_{ch} = 7.25$***	
			Overall $F(5, 98) = 2.49$*			

* $p < .05$; ** $p < .025$; *** $p < .01$; **** $p < .001$.

Distress in Joy Episodes at 33 Months

There were no significant effects due to gender or to the earlier scores on distress in joy episodes. Security of attachment in infancy, however, made a unique contribution. Infants who had been less secure were more distressed in response to the joy episodes at 33 months.

Summary

All three equations were significant and the predictors accounted for 11% to 24% of the explained variance. Earlier scores predicted smiling in response to the episodes meant to elicit the two negative emotions, and being female was linked to smiling during the aversive restraint paradigm. The lower the security of attachment in infancy, the more distressed the child was in response to the stimuli designed to produce positive affect at 33 months.

Negative and Positive Emotions

To gain an overall view of the prediction of children's emotionality at 33 months, two large composites were created at each time of assessment. The negative emotion composite was the average of fear in the fear episodes, anger in the anger episodes, and distress in the joy episodes. The positive emotion composite was the average of joy in the joy episodes, and joy in the fear and anger episodes. Two analogous regressions were then conducted, one predicting the overall negative emotion at 33 months, and the other predicting the overall positive emotion at 33 months. Child gender was entered at Step 1; all the earlier emotion scores (negative and positive composites at 9, 14, and 22 months, created in an analogous manner to the composites at 33 months) were entered at Step 2; and the continuous score of attachment security at 14 months was entered at Step 3. The findings are presented in Table 7.

Table 7 Prediction of Negative and Positive Emotions at 33 Months: Multiple Regressions

	Step 1		Step 2		Step 3	
Predictors Added	*F*	β	*F*	β	*F*	β
Dependent variable: Negative emotion composite at 33 months						
Gender	2.20	.14	3.72+	.17	4.98**	.18
	R^2= .02 F_{ch} = 2.20					
Emotion at 9 months			1.09	.09	<1	.08
Emotion at 14 months			1.50	.11	2.12	.12
Emotion at 22 months			18.50****	.39	20.14****	.37
			R^2 = .21 F_{ch} = 7.78****			
Attachment security at 14 months					18.42****	−.35
					R^2 = .33 F_{ch} = 18.42****	
			Overall $F(5, 98)$ = 9.80****			
Dependent variable: Positive emotion composite at 33 months						
Gender	<1	.07	<1	−.02	<1	−.02
	R^2 = .00 F_{ch} < 1					
Emotion at 9 months			<1	.00	<1	.02
Emotion at 14 months			6.68**	.24	6.55**	.24
Emotion at 22 months			27.32****	.45	26.77****	.44
			R^2 = .32 F_{ch} = 15.63****			
Attachment security at 14 months					2.87+	.14
					R^2 = .34 F_{ch} = 2.87	
			Overall $F(5, 98)$ = 10.27****			

Note: Negative emotion composite = Average of fear in fear episodes, anger in anger episodes, and distress in joy episodes. Positive emotion composite = Average of joy in joy, fear, and anger episodes.
*$p < .05$; **$p < .025$; ***$p < .01$; ****$p < .001$; +$p < .10$.

Negative Emotion at 33 Months

Boys expressed significantly more negative emotion ($M = .07$, $SD = .54$) than did girls ($M = -.08$, $SD = .49$). The earlier scores accounted for a significant (19%) portion of the variance, due to the score at 22 months. Attachment security at 14 months added a unique 12.5% of the variance. Children who had been more secure showed less negative emotion, after controlling for gender and the developmental stability of negative emotion. The means of the overall negative emotion at 33 months in the four groups were entered into a one-way ANOVA: Overall negative emotion at 33 months was highest among the avoidant children ($M = .23$, $SD = .53$); significantly higher than in the secure group ($M = -.17$, $SD = .44$), $F(3, 100) = 4.52$, $p < .01$.

Positive Emotion at 33 Months

There was no gender effect. The earlier scores accounted for a significant (32%) portion of the variance, due to the scores at 14 and 22 months. Attachment security at 14 months added a marginally significant 2% of the variance. Children who had been more secure tended to show more positive emotion, after controlling for its very substantial developmental stability.

DISCUSSION

This study contributes to the field of social–emotional development in several ways. First, from a developmental perspective, the results elucidate and inform our knowledge of sequelae of emotional development in children with different attachment histories, including data preceding, concurrent to, and following the attachment assessment. In contrast to most existing research that has focused on relatively complex outcomes—such as facets of competence and (mal)adaptation, affective information processing, or emotionality in the context of relationships—this study investigated characteristics of the fundamental functioning of the three basic emotion systems (fear, anger, and joy), by studying responses elicited by relatively simple affective stimuli in standard laboratory paradigms. It is believed that basic differences in emotional responding to such relatively simple or "pure" affective stimuli, administered outside of the relational context, may constitute, at least in part, the foundation for the more complex effects. To address these questions, the newly developed laboratory batteries of emotion paradigms (LAB-TAB; Goldsmith & Rothbart, 1996) were used, thus supporting their usefulness as measures of the developing profiles of affective individuality.

Second, this study provided much needed information on the development of positive affect in children with different attachment histories, a topic that has received little attention. Third, the present investigation examined not only emotional responses consistent with the intended emotional content of the stimuli used in the laboratory episodes, but also responses opposite to or inconsistent with the content of the stimuli. To our knowledge, this is the first such attempt. Fourth, this study yielded much needed information about the emotional development of children who were classified as disorganized. Finally, useful evidence was collected on stability in emotion expression in very young children.

The findings of this study reveal complexities of emotional development in children with varying attachment histories. Differences were found in their developmental trajectories that were significant for each affect system—fear, anger, and joy. Generally, as they progressed from infancy to 33 months, children in the three insecure groups showed a significant increase in negative emotions or a decrease in positive emotion. Perhaps most interesting was the trajectory of the avoidant children, who at 14 months were the least fearful and most joyful, but by 33 months became much more fearful: significantly more so than ever before, and more so than secure children. Resistant children showed the greatest developmental decrease in positive emotion over time, and the most distress in episodes meant to elicit positive emotion. Disorganized children showed a substantial increase in anger by 33 months. Secure children's anger expression, which peaked at 14 months, decreased significantly by 33 months.

These findings are consistent with those found in several bodies of literature, but they also contribute new information. Avoidant children have often been portrayed as less prone than resistant children to the expression of negative emotion, although the nature and implications of this difference have been controversial. This pattern has been seen as an expression of a less fearful temperament or as a result of having adopted a strategy of minimizing negative emotion expression, or both (Calkins & Fox, 1992; Cassidy, 1994; Goldsmith & Harman, 1994; Kagan, 1982, 1998; Kochanska, 1998; Rothbart & Bates, 1998; Thompson, 1998). It is interesting, and pertinent to this study, that avoidant children have sometimes been found to be more affectively negative in contexts other than the Strange Situation or, more generally, the mother–child relationship (Berlin & Cassidy, 1999). There is also research indicating that in a stressful situation (e.g., separation from the caregiver), avoidant children, despite less overt distress, may nevertheless experience physiological arousal as high as or higher than that of secure children, and that their avoidant behavior is not effective as a coping strategy (Spangler & Grossmann, 1993).

This study's data collected at earlier ages were consistent with the portrayal of avoidant children as less expressive in terms of negative emotion. The data collected in the third year, however, revealed interesting developmental shifts that fit with some existing empirical evidence. By the time they turned 33 months, the avoidant children became much more likely to express fear, were no longer less fearful than the resistant children, and were more fearful than the secure children. In fact, when we examined the composite of all negative emotions at 33 months (fear in fear episodes, anger in anger episodes, distress in joy episodes), avoidant children's scores were the highest. More research is necessary to account for this finding, if indeed it is replicated in other samples. It is not clear, for example, whether the findings reflect some form of active suppression at the level of the display of the experienced negative emotion early in development, which for unknown reasons diminishes by 33 months, or whether they represent a change in the actual experience of the affective stimuli.

The developmental trajectories of the emotion systems in children who were classified as resistant at 14 months were most consistent with other data, particularly regarding their proneness to fear (Calkins & Fox, 1992; Kagan, 1982, 1998; Kochanska, 1998). The resistant children responded most fearfully not only to the fear-eliciting stimuli, but also to the joy-eliciting stimuli, and fear was the strongest of their emotions. The new contribution of this study is the finding of the marked and lasting (at least until 33 months) decrease in positive emotion after infancy.

The findings complement, and extend to an earlier age, several reports on the development of children with a history of disorganized attachment. At 33 months, the children who had been classified as D/U at 14 months had significantly higher anger scores than ever before, and higher than those of either secure or resistant children. These findings also complement the research. Shaw and colleagues (Shaw, Owens, Vondra, Keenan, & Winslow, 1996) reported that disorganized attachment was a significant predictor of clinically elevated aggression at age 5. Lyons-Ruth and colleagues (Lyons-Ruth et al., 1993) found that such attachment was the strongest single predictor of seriously hostile behavior toward peers, also at age 5. Aggression, hostility, and externalizing behavior problems are common themes in studies of implications of disorganized attachment (Lyons-Ruth & Jacobvitz, 1999). This study, with its finding of the significant, substantial increase in anger between 22 and 33

months and the simultaneous significant decrease in fear over the same interval, suggests a possible period of high risk for emerging early diathesis for future conduct problems in children with disorganized attachment.

Several features of the overall pattern of findings deserve attention, and they are not easily interpretable. At two times of assessment, 9 and 22 months, there were no significant differences among the attachment groups in terms of any emotion. Although the 9-month assessment was the only one conducted at home, which conceivably might have accounted for the lack of differences, the 22-month assessment took place in the laboratory, and thus, the lack of differences cannot be attributed to contextual factors. In general, the robustness of our findings did not appear to be clearly linked to the robustness of the measurements. In some ways, our emotion measures at 9 months were the most robust, because the episodes assessing fear, anger, and joy were more numerous and more diverse than at the later times.

Another interesting feature of the overall empirical picture is the pronounced difference in avoidant children's fear and disorganized children's anger at the 33-month assessment, both in terms of the comparisons among the groups, and in terms of the rise from the preceding year. Again, it is only possible to speculate about the possible interpretations. Kopp (1989, p. 349) mentions the heightened display of negative feelings in the toddler period, and its poorly understood causes. She further hypothesizes that the concurrent growth of language, particularly internal state language and emotion understanding (Bretherton, Fritz, Zahn-Waxler, & Ridgeway, 1986), offers children effective tools to regulate their distress. If security of attachment is indeed linked to children's increased emotional understanding (Bretherton, 1990), especially of negative emotions (Laible & Thompson, 1998), then insecurely attached children may have particular difficulty regulating their affect in the toddler period. The findings for the avoidant and disorganized children (although not for the resistant children) are consistent with this preliminary hypothesis.

To examine the unique contribution of attachment security to future emotional responding, regardless of the specific attachment classification, the continuous scores reflecting security in the Strange Situation, B versus non-B were employed (Richters et al., 1988). A conservative analytic design was adopted, where the predictive power of security was evaluated after accounting for the variance explained by the continuity of the studied emotion as measured both prior to and after the attachment assessment, at three previous time points.

In this context it is worthwhile to point out that although this was not the main objective of this study, modest longitudinal continuity in children's emotion expression in all three emotion systems was found. Fear expression appeared stable from 14 months to 33 months, with substantial stability after 22 months, and joy expression was stable from 9 to 33 months. Anger did not become significantly stable until 22 months.

The findings were consistent with the spirit of attachment theory. Higher security at 14 months uniquely predicted less expression of negative emotions approximately 20 months later. This was true for fear and for anger, as well as for the overall negative emotionality score that encompassed the responses in all episodes, including the expression of distress in response to joy stimuli. (Following a question by an anonymous reviewer, we examined—and eliminated—a possibility that the links between security at 14 months and emotions at 33 months were mediated by the intermediate emotions—at 14 and/or 22 months.)

Taken together, these findings are consistent with and extend the existing literature in an interesting way. Securely attached children have often been described by attachment scholars as more competent in various aspects of later development, functioning more successfully in future relationships, and developing fewer behavior problems (see, for example, reviews by Thompson, 1998, 1999; Weinfield et al., 1999), although the relations are typically modest. Multiple mechanisms have been implicated in those links, including trust in the caregiver, internal working models of self and others, emotional security (Davies & Cummings, 1994), interpersonal competence, and continuity of caregiving influences (Lamb, 1987; Sroufe, 1979). This study suggests another, not mutually exclusive, possibility. Early attachment organization may influence future outcomes through the mediating effect of basic features of the child's affective functioning.

In this regard, the present research is consistent with ideas that have been posed by others. For example, Sroufe and colleagues (Sroufe, 1983; Sroufe, Schork, Motti, Lawroski, & LaFreniere, 1984; Weinfield et al., 1999) proposed that differences in affective regulation in children with varying attachment histories are to a large extent responsible for their differing levels of competence later in development. Similarly, Thompson (1994) stated that early social relationships influence the child's emotion regulation capacities, which in turn are associated with aspects of future competence. This study provides empirical data that document differences in the basic parameters of the emotions of fear, anger, and joy as a function of early attachment organization. In the future, it will be worthwhile to examine whether these differences indeed mediate the oft-reported relations between early attachment and facets of future competence.

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