The Preschool Assessment of Attachment: Construct validity in a sample of depressed and nondepressed families

DOUGLAS M. TETI[a] AND DONNA M. GELFAND[b]
[a]*University of Maryland Baltimore County; and* [b]*University of Utah*

Abstract
Construct validity of the newly developed Preschool Assessment of Attachment (PAA) was examined in a sample of depressed and nondepressed mothers and their preschoolers, focusing on attachment related differences in children's general caregiving environments, maternal psychosocial functioning, and child behavior during interactions with mother. Mothers of secure children were more emotionally and verbally responsive to their children than were mothers of insecure children, and secure children were emotionally more positive to their mothers than were insecure children. Mothers of secure children also reported higher levels of social supports than did mothers of insecure children. Finally, dyads with children who lacked unitary, coherent attachment strategies (i.e., anxious depressed, defended/coercive, and insecure other) showed the worst functioning in all domains relative to all other attachment groups. Similar but slightly less robust findings were obtained with socioeconomic variables statistically controlled. These results lend support to the PAA as a valid system for the conceptualization and measurement of quality of attachment among preschoolers. Future research applications with the PAA are discussed.

The last decade has witnessed significant advances in the conceptualization and measurement of quality of attachment in the preschool years (e.g., Bretherton, Ridgeway, & Cassidy, 1990; Cassidy, 1988; Crittenden, 1992a; Greenberg, Cicchetti, & Cummings, 1990; Main, Kaplan, & Cassidy, 1985; Waters & Deane, 1985), a trend tied directly to the success of attachment theory in accounting for the developmental significance of parent–child relationships in infancy (see Bretherton, 1985; Sroufe, 1988; Teti & Nakagawa, 1990, for reviews). In this study, we examined the construct validity of a newly developed system for assessing quality of attachment among preschoolers, the Preschool Assessment of Attachment (PAA; Crittenden, 1992a, 1992b), in a sample of preschoolers with clinically depressed or nondepressed mothers.

Valid assessment of preschool attachment presumes a theoretical framework that encompasses preschoolers' newfound capabilities in perspective taking and linguistic arenas and qualitative advances in the nature of parent–child communication. The preschool child's emerging skills require a reconceptualization of the functions of attachment in relation to preschool developmental tasks (see Cicchetti, Cummings, Greenberg, & Marvin, 1990, for an excellent review). Such a theoretical framework should also adequately account for any continuities in individual attachment strategies previously established in infancy, and for the development, function, organization, and expression of new attachment strategies that evolve under the influence of preschoolers' emerging social–cognitive com-

petencies and fluency with language (Cicchetti et al., 1990; Crittenden, 1992).

The PAA (Crittenden, 1992a, 1992b, 1993) owes its development to several lines of inquiry, including Bowlby's (1969/1982) seminal formulations about the nature of attachments in goal-corrected partnerships in the preschool years; Ainsworth's (Ainsworth, Blehar, Waters, & Wall, 1978) now-classic identification of secure and insecure attachment patterns among infants in her Strange Situation paradigm; Main's (1981) conceptualization of attachment behavioral organizations as reflective of underlying strategies for accessing attachment figures; Marvin's (1973, 1977) formulations concerning developmental changes in attachment behavior beyond infancy, including the emergence of coy behavior; and Cicchetti's integration of attachment research within a developmental psychopathology framework (e.g., Cicchetti & Greenberg, 1991; Cummings & Cicchetti, 1990). Crittenden's own observations over the last decade have revealed the subtlety and complexity of preschoolers' behavior in low- and high-risk samples, leading to her identification of new attachment patterns that expand upon Ainsworth's original tripartite system (Crittenden, 1988a, 1988b, 1988c; Crittenden & DiLalla, 1988; Crittenden, Partridge, & Claussen, 1991).

Although attachment continues to ensure protection and survival throughout early childhood, the function of attachment beyond infancy expands to include the development of behaviors that serve as precursors of those required of a parent (Crittenden, 1992a). Having more advanced cognitive–linguistic skills allows the preschooler to share plans with the caregiver, assert greater control over their relationship, promote their safety and well-being, and foster development in other domains of functioning. Successful goal-corrected partnerships foster four skills that contribute directly to future parenting success: effective communication, accurate perspective-taking skills, the ability to empathize with others' distress, and the ability to take responsibility for regulating relationships. These elements are central aspects of the goal-corrected partnerships that children first establish in the pre-

school years. Although only precursors of these skills are manifest at this time, the degree to which these abilities are successfully inculcated at this point and beyond should bear importantly on the degree of one's ultimate success in functioning in the parental role (Crittenden, 1992a).

The PAA is based upon the original tripartite infancy classification system of Ainsworth (Ainsworth et al., 1978) and identifies the basic attachment patterns of insecure–avoidant (Type A), insecure–resistant (Type C), and secure (Type B) in the Strange Situation paradigm. Like Main (1981), Crittenden views these attachment patterns as reflective of underlying, organizational strategies for accessing attachment figures in times of stress. However, the PAA expands upon the original tripartite system in several important ways to incorporate the more complex behavior patterns characteristic of preschoolers in goal-corrected contexts. The first is the reconceptualization of the avoidant strategy as *defended* (type A), based on observations of high-risk preschoolers' defensive behavior patterns that extend beyond simple avoidance. The second is the reconceptualization of the resistant strategy as *coercive* (type C), in which elements of the resistant behavior patterns become organized into a strategy that forces the attachment figure to comply with the children's needs. The third is the recognition that preschoolers can deploy defended and coercive attachment behavior patterns simultaneously or sequentially (*defended/coercive*, type A/C) as predictable, strategic responses to variations in the caregiving environment. In addition, the PAA includes Insecure Other (type IO) and Anxious Depressed (type AD) to classify children who do not manifest a reciprocal partnership with the caregiver, as secure children do, and whose behavior patterns do not reflect an organized, cohesive strategy. Children classified as Anxious Depressed also show some mixture of sadness, lethargy, and extreme distress. Finally, Crittenden (1992a, 1993) has deemphasized the concept of disorganization (Main & Solomon, 1990) in the preschool years, viewing traditionally accepted indices of disorganization in infancy (e.g., stilling, dazed behavior, behaviors out

of typical sequence) alternatively as indicative of a reorganization of attachment strategies that accompany maturation and accommodation to new information. The reader is referred to Crittenden (1992a) for a comprehensive overview of the theoretical framework and derivation of the PAA.

Several laboratories have provided evidence for the construct validity of the PAA. Teti, Gelfand, Messinger, and Isabella (1995) found PAA classifications to relate predictably and significantly to maternal depression status, with children of depressed mothers showing a lower percentage of secure attachments and higher percentages of coercive, AD, and IO classifications than children of nondepressed mothers. In addition, mothers of AD and IO children were found to be more chronically and severely depressed, more stressed as parents, and less behaviorally competent with their children than were mothers of children with coherent, organized attachment strategies. In another validation study of the PAA, Ziegenhain and Rauh (1993) reported predictable and significant associations between PAA classifications at 21 months and earlier assessments of the quality of mother–infant interaction at 3 and 12 months, with higher quality parenting associated with mothers of secure children. Crittenden (1993) reported associations between PAA secure attachment and paternal warmth and supportive home environments, and between PAA defended classifications and parental emotional abuse and neglect. Finally, Fagot (1993) found that changes from a secure strategy at 18 months to a coercive strategy at 30 months were associated with major shifts in the quality of parent–child relationships (i.e., parental divorce or remarriage) during this same time period. In addition, both mothers and teachers of children classified as coercive rated them as more aggressive and oppositional than did mothers of defended and secure children.

The Present Study

This investigation extends earlier findings of Teti et al. (1995) by examining a variety of additional indicators of mother–child behavioral and psychosocial functioning in relation to PAA classifications in a sample of depressed and nondepressed mothers and their preschoolers. All in this group were participating in a longitudinal study of maternal depression and child development, beginning in the first year of life. Attachment classification differences in three arenas of maternal and child functioning were assessed.

General caregiving domain

The caregiving environment was examined with the Home Observation for Measurement of the Environment (HOME; Caldwell & Bradley, 1984), which includes three dimensions of maternal behavior (Emotional and Verbal Responsivity of Mother, Avoidance and Restriction of Punishment, and Maternal Involvement with Child) and three indices relating to the quality of organization and stimulation in the caregiving environment (Organization of Physical and Temporal Environment, Provision of Appropriate Play Materials, and Opportunities for Variety in Daily Stimulation). Consistent with attachment theory (Ainsworth et al., 1978; Bretherton, 1985; Crittenden, 1992a), we expected the maternal behavioral domains of the HOME to be more favorable for secure children than for insecure children. In addition, maternal behavioral domain scores of the HOME were expected to be least favorable among mothers of AD and IO children, given earlier findings that mothers of AD and IO children had the highest levels of interactional dysfunction among the four PAA attachment groups (Teti et al., 1995). Also of interest was to determine if similar associations existed between PAA categories and HOME indices tapping organization and variety of stimulation in the home environment, domains traditionally considered to be important to children's cognitive development (Bradley & Caldwell, 1976, 1980). Less clear was whether differences in the general caregiving environments would be observed between defended and coercive attachment categories, and thus hypotheses were withheld.

Maternal psychosocial functioning

This study also examined PAA correlates among maternal psychosocial dimensions of

dyadic adjustment, social supports, life stressors, and perceptions of infant temperament. Several investigations have reported associations between the quality of social–contextual dimensions of social–marital supports and life stressors and *infant* attachment, with better functioning among mothers of secure infants than among mothers of insecure infants (Belsky & Isabella, 1988; Crockenberg, 1981; Durrett, Otaki, & Richards, 1984; Goldberg & Easterbrooks, 1984; Vaughn et al., 1992), although it is important to note that relations between social–contextual indices and infant attachment appear less robust than relations between measures of maternal–infant behavior and infant attachment (Spieker & Booth, 1988). The present study assessed if similar attachment related differences characterized the preschool years. Consistent with prior research, we expected mothers of secure children to report more harmonious marriages, more supportive environments, and fewer life stressors than would mothers of insecure children. In addition, we expected mothers of AD and IO children to score least optimally on these measures than would mothers of children in the remaining three attachment groups, given that mothers of AD and IO children had the highest levels of depressive symptoms and parenting stress among the four PAA groupings (Teti et al., 1995). Less clear were expectations regarding differences between mothers of defended and mothers of coercive children, and thus hypotheses were withheld. In addition, no hypotheses were advanced regarding attachment group differences in mothers' perceptions of infant temperament, given the controversial nature of these relations (e.g., Calkins & Fox, 1992; Sroufe, 1985; Vaughn, Lefever, Seifer, & Barglow, 1989; Weber, Levitt, & Clark, 1986).

Child behavioral indices

Finally assessed in this study were relations between preschoolers' interest in and responsivity to mother and general affective tone during interactions with mother. Again, more optimal scores on these measures were expected of secure children than insecure children, based on theory and empirically established associations between secure attachment and children's quality of compliance and positive orientation towards their mothers (Crittenden, 1992a; Londerville & Main, 1981; Waters, Kondo–Ikemura, Posada, & Richters, 1990). The least optimal scores on these measures were again expected to be associated with the AD and IO categories, based on the premise that children without clear, organized attachment strategies are at higher risk for behavioral dysfunction than are children with organized strategies (Cicchetti & Barnett, 1991; Rodning, Beckwith, & Howard, 1991; Teti et al., 1995). Predictions regarding differences between defended and coercive children were again unclear, and hypotheses were withheld.

Method

Participants

Subjects were 54 mother–child dyads (31 depressed and 23 nondepressed). All subjects were taking part in a larger, ongoing study of the effects of maternal depression on children. All mothers and their children (all of whom were physically healthy) were recruited during the children's first year of life (3–13 months of age, $M = 8.5$, $SD = 2.5$). Twenty-two children were female. Fifty-one mothers were White, three were Hispanic, and all ranged in age from 18 to 45 years ($M = 30.14$, $SD = 5.6$). The majority of the mothers were married (80%), LDS (Mormon; 87%), high school graduates (91%), and did not work outside the home (61%).

Thirty-one of the 54 mothers were depressed and in therapy at the time of recruitment into the larger study. All had received DSM-III-R (American Psychiatric Association, 1987) diagnoses from their therapists of major depression ($n = 25$), dysthymia ($n = 3$), or adjustment disorder with depressed mood ($n = 3$). These mothers had been referred to the study by their therapists and appeared to be representative of a typical outpatient sample of middle-class White clinically depressed women with infants and small children. The remaining 23 nondepressed mothers were recruited from the same areas of the city as the depressed mothers through the assistance of

the Utah Department of Vital Statistics. The mean Beck Depression Inventory (BDI; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961) scores for this depressed subsample were 23.32 (SD = 11.38) at recruitment time (Time 1) and 16.00 (SD = 11.46) approximately 1 year later (Time 2), when quality of child–mother attachment was assessed. Thus, mothers in the depressed subsample were moderately-to-severely depressed, according to criteria established by Beck, Steer, and Garbin (1988), during their children's first and second years. By contrast, the mean BDI scores of the nondepressed women were 7.96 (SD = 4.34) at Time 1 and 7.26 (SD = 4.45) at Time 2, both of which indicate subclinical symptomatology, as expected. The reader is referred to Teti et al. (1995) for additional information on recruitment procedures, the full sample, and the larger study.

Procedure

At both Time 1 (within 1 month of recruitment) and Time 2 (approximately 1 year later), mother–child dyads were visited three times in their homes by two trained research assistants who were blind to all maternal identifying data. Each home visit assessment lasted between 1.5 and 2 h.

Measures at Time 1 and Time 2. At both time points, mothers completed a variety of questionnaires that assessed demographics, depressive symptomatology (BDI; Beck et al., 1961), dyadic adjustment (The Dyadic Adjustment Scale, adapted from Locke & Wallace, 1959, and Spanier, 1976), number of major negative life events occurring in the past 6 months (the Life Experiences Questionnaire [LEQ; Sarason, Johnson, & Siegel, 1978]), daily hassles (Kanner, Coyne, Schaefer, & Lazarus, 1981), social support (a questionnaire adaptation of the Interview Schedule for Social Interaction [ISSIQ]; Henderson, Byrne, & Duncan–Jones, 1981), and maternal perceptions of child temperament (the Fussy–Difficult subscale from the Infant Characteristics Questionnaire [ICQ]; Bates, Freeland, & Lounsbury, 1979). The Dyadic Adjustment Scale was administered only to those mothers with spouses or partners. The ISSIQ yielded

four support scores, including Availability of Social Integration, Adequacy of Social Integration, Availability of Attachment Figures, and Adequacy of Attachment Figures. Because these four scales were highly interrelated (standardized item α = .75 and .73 at Time 1 and Time 2, respectively), they were standardized and summed to create a composite Social Support index, which was used in analyses.

Home visitors also completed the HOME (Caldwell & Bradley, 1984), which assessed the general caregiving environment along dimensions of Emotional and Verbal Responsivity of Mother, Avoidance and Restriction of Punishment, Maternal Involvement with Child, Organization of Physical and Temporal Environment, Provision of Appropriate Play Materials, and Opportunities for Variety in Daily Stimulation. The HOME was completed at the end of the third visit to the home at Times 1 and 2. Interrater reliability was performed on seven dyads between a graduate trainer and all undergraduate raters and was found to be adequate on four of the six HOME dimensions (Pearson r = .91, .81, .99, and .77 for Emotional and Verbal Responsivity of Mother, Avoidance and Restriction of Punishment, Maternal Involvement with Child, and Opportunities for Variety in Daily Stimulation, respectively) but inadequate for Organization of the Physical and Temporal Environment (Pearson r = .42) and Provision of Appropriate Play Materials (Pearson r = .37). As a result, these latter two dimensions were dropped from analysis.

Observer ratings of mother–child interaction in the home were also conducted in contexts of feeding (10 min) and free play (10 min), the latter with a Shelcore "Infant Soft Play Set" and other simple toys for the preschoolers. In this report we focus on two ratings of child behavior adapted from the Infant Behavior Record of the Bayley Scales of Infant Development (Bayley, 1969),[1] Interest in and Responsivity to Mother, which assessed children's responsiveness toward mothers' bids and the degree to which children initiated

---

1. Ratings of maternal behavior in relation to PAA classifications have been previously reported by Teti et al. (1995).

interaction; and General Emotional Tone, which tapped children's positive affectivity and animation during interaction. Both scales were used for the feeding and free play contexts, which yielded four scales at each time point, and were rated on 5-point Likert-type scales, with higher scores reflecting more desirable behavior. Interest in and Responsivity to Mother scores between the feeding and free play contexts were significantly correlated at Time 1 (Pearson $r(50) = .56$, $p < .01$) and Time 2 ($r(50) = .46$, $p < .01$). General Emotional Tone scores during feeding and free play were also significantly intercorrelated (Time 1: $r(50) = .58$, $p < .01$; Time 2: $r(50) = .58$, $p < .01$). Thus, composite scores for Interest in and Responsivity to Mother and for General Emotional Tone were created at Time 1 and Time 2 by summing the corresponding scores across the feeding and free play context. Interrater reliability, performed between two graduate trainers and four undergraduate raters on 44 mother–child dyads, was adequate on both composited scores (Pearson $rs = .68$ for Interest in and Responsivity to Mother, and .75 for General Emotional Tone).

Time 2 assessments. Within 1 month of the Time 2 home visit, mothers and their children visited the university laboratory to be videotaped in the Ainsworth Strange Situation procedure (Ainsworth et al., 1978). Children ranged in age from 21 to 32 months ($M = 24$ months, $SD = 2.8$) when PAA classifications were derived.

Like Ainsworth's original infancy classification system (Ainsworth et al., 1978), the PAA identifies three predominant classifications as representing organized strategies for assessing the attachment figure, including *Secure* (Type B), *Defended* (Type A), and *Coercive* (Type C). The *Secure* (Type B) strategy is characterized by free and open access to attachment figures in times of stress, competent exploration of the environment when security needs are met, and open and shared communication about feelings and desires with attachment figures when necessary. During reunions, secure children quickly resolve any differences with the attachment figure and

move on to other activities while using the attachment figure as a secure base from which to explore the environment. Negotiations (e.g., about separations) between secure children and their caregivers are open, direct, and typically easily resolved. There are three subtypes: *Secure-Reserved* (B1-B2), who appear to be the most independent, tolerating separations well and engaging in little close proximity seeking with their caregivers; *Secure-Comfortable* (B3), who also tolerate separations well but are more likely than Secure-Reserved children to seek the proximity of their caregivers', especially in the context of play; and *Secure-Reactive* (B4), who require more reassurance and tolerate separations less well than do B1-B2 and B3 children but are able to present these concerns and resolve them adequately with their attachment figures, leading to competent exploration and secure base behavior. A fourth but rare subtype, *Secure-Other,* is used for children whose behavior does not clearly fit into the B1-B2, B3, or B4 categories, but who give evidence of having a clearly reciprocal goal-corrected partnership with the caregiver.

The *Defended* (Type A) strategy functions to allow children access to the attachment figure without the probability of emotional confrontation or involvement. Thus, defended children engage in false, sometimes overbright affect, do not communicate with their attachment figures directly, and monitor attachment figures' behavior so as to *infer* their plans. The net result is a behavior pattern that strikes a balance between physical availability and emotional distance (close, but not too close), drawing attention *away* from problems in the relationship and toward more neutral topics, such as play with toys. Relative to secure children, defended children regulate their emotions almost solely through their own efforts, inhibit or appear to falsely display affect, engage in little if any negotiation of plans with their attachment figures, and do not use them as a secure base. There are three defended subtypes: *Inhibited* (A1-A2), characterized by inhibition and tight control of negative affective signals and avoidance of close interaction, with a strong focus on toy play especially during reunions when it is

used to deflect attention away from the relationship; *Compulsively Caregiving* (A3), denoted by a mixture of avoidance, inhibition of negative affect, and the use of overbright overtures designed to cheer and nurture a withdrawn, lethargic attachment figure; and *Compulsively Compliant* (A4), identified by excessive tension, fear, and vigilance of the attachment figure, and strong gaze aversion and hyperalertness to attachment figures' movements, facial expressions, and body postures.

The *Coercive* (Type C) strategy aims to force the availability and involvement of the attachment figure as much as possible by coordinating threatening or angry behavior with disarming, helpless behavior, which serves to draw in and keep the attachment figure off balance as s/he continually attempts to meet the child's needs. Children with coercive strategies heighten and exaggerate problems in the relationship, giving most of the responsibility for regulating their affect to attachment figures and rarely allowing themselves or their caregivers to relax and attend to other things. Thus, coercive children's exploration of their surroundings is typically incompetent because of their enmeshment with their caregivers. Negotiations between the attachment figure and the coercive child are typically leveraged, with trickery and coercion characteristic of the attachment figure's behavior. Coercive children fall into three subtypes: *Threatening* (C1), characterized by the deployment of resistant behaviors such as threats to gain the attachment figure's attention and agreement to the child's demands; *Disarming* (C2), in which the predominant behavior pattern involves the use of coy, sweet, helpless behaviors serving to seduce the attachment figure into compliance with their wishes; *Punitive* (C3), identified by extreme anger, punishing behavior, and open rejection as a means of controlling and embarrassing the attachment figure into submission and compliance; and *Helpless* (C4), in which helplessness is exaggerated to such a degree that children seem overwhelmed by their own incompetence while the adult is present but paradoxically appear to show more exploratory competence in caregivers' absence.

In addition to these three basic attachment types, the PAA describes three additional and somewhat less common classifications. The first, *defended/coercive* (type A/C), is identified as an *organized* strategy characterized by merged or alternating defended and coercive behavior patterns tied to shifts in the attachment figure's behavior. The second, *insecure other* (type IO) is employed for children who do not manifest a reciprocal partnership in the relationship with the attachment figure (which characterizes secure children) and who do not present any clear-cut, recognizable strategy with their attachment figures. Finally, *anxious depressed* (type AD) is employed for insecure children without a clear, identifiable strategy (similar to IO children) but who are also marked by some mixture of the following: prolonged displays of sad affect in the parent's presence, zoning in the parent's presence (e.g., expressions or behavior that is dazed, blind, or unfocused), extreme lethargy, and extreme distress and panic during separations that do not alleviate during reunions with the parent.

Strange Situation videotapes were classified by the first author, who was trained by P. Crittenden on a separate set of tapes and who was blind to all maternal and child identifying data. Interrater reliability between the first author and P. Crittenden was established on 22 mother–child dyads on major category (Types A, B, C, A/C, IO, and AD), with a κ of .86.

Results

Depressed and nondepressed groups were combined in order to capture the full range of functioning among mothers and children in analyses. Initial descriptive analyses of all children revealed 14 securely attached dyads (Type B: 25.9%; 1 B3, 12 B4, and 1 Secure Other), 12 defended (Type A: 22.2%; 6 A1-2, 6 A3), 17 coercive (Type C: 31.5%; 8 C1, 3 C2, 6 C3), 9 anxious depressed (Type AD: 16.6%), 1 insecure other (Type IO: 1.9%), and 1 defended/coercive (Type A/C: 1.9%). All analyses involved comparisons among major classifications only, because there were very small numbers of individual subclassifications, and no B1-2, A4, or C4 children were

identified. In addition, because AD, IO, and A/C categories were characterized by the lack of any unitary, coherent strategy in accessing their attachment figures and represented more anomalous and problematic attachments, children so classified were combined into a single AD-A/C-IO group for analysis. As reported in Teti et al. (1995), security of attachment related significantly to maternal depression status, with higher overall proportions of insecure attachments, in particular including AD-A/C-IO attachments, among children of depressed mothers than among children of nondepressed mothers.

Analytic strategy

A mean substitution procedure, calculated from the full sample for each time point, was used for missing dependent variable data so that the full complement of 54 subjects could be used in analyses that compared the four attachment groups, to preserve statistical power. With one exception, none or very small numbers of subjects had missing data on the dependent measures ($n = 0$–4; 0–7.4% of the full sample), and thus this procedure had little impact on individual attachment group means. A somewhat larger complement of subjects ($n = 11$; 20.4%) had missing data for dyadic adjustment at one or both time points, however, since the Dyadic Adjustment Scale was administered only to mothers with spouses or partners at each time point. Seven of these 11 mothers listed no spouse or partner, and thus missing dyadic adjustment data, at both time points. Thus, analyses of attachment group differences involving dyadic adjustment excluded these seven subjects for whom no dyadic adjustment data were available at either time point, and a mean substitution procedure was employed for the remaining four mothers for whom dyadic adjustment data was missing at only one time point.

The general analytic strategy employed for examining relations between continuously measured DVs and PAA classifications was univariate (ANOVA) or multivariate analysis of variance (MANOVA—when DVs were conceptually and statistically related), with hypothesis-driven contrasts between secure vs. all insecure groups combined (i.e., B vs. non-B, the AD-A/C-IO group vs. all other groups combined, and defended vs. coercive [A vs. C]). When appropriate, χ^2 analyses were employed for categorical data.

Demographic information

The first set of analyses assessed relations between family demographic variables and PAA security. These data are presented in Table 1. Oneway ANOVAs revealed no associations between PAA groupings and maternal age, number of hours mothers worked outside the home, and children's ages at Time 1 and Time 2. In addition, a series of χ^2 analyses, which contrasted all four PAA groupings, and also type B versus non-B, were conducted to examine for any associations between PAA security and sex of child, religion (LDS-Mormon vs. non-Mormon), and marital status (single vs. married/living with partner). None of these analyses was significant.

Maternal education, coded originally as 1 = <*8th grade*, 2 = *9th–12th grade*, 3 = *high school graduate*, 4 = *some college/vocational*, 5 = *college graduate*, 6 = *graduate/professional school*, and family income were significantly intercorrelated (Pearson $r(52) = 41$, $p < .01$). Relations between these socioeconomic indices and PAA classifications were thus assessed with a oneway MANOVA, the multivariate F for which approached significance, $F(6, 100) = 1.80$, $p = .106$. Univariate contrasts revealed significantly lower educational attainment in the AD-A/C-IO group relative to the remaining groups combined ($F(1, 50) = 7.34$, $p = .009$) and significantly higher family income levels in the secure group relative to all insecure groups combined ($F(1, 50) = 4.62$, $p = .037$). No other univariate contrasts were significant. Weak and predominantly nonsignificant correlations were found between maternal education and family income and the indices of general caregiving (mean absolute $r = .22$), psychosocial functioning (mean absolute $r = .26$), and infant behavior (mean absolute $r = .21$). However, because individual contrasts indicated maternal education and family income to be clearly associated with attachment group status, results

Table 1. *Sample demographics in relation to PAA groupings*

| | Classification[a] | | | |
| | A (*n* = 12) | B (*n* = 14) | C (*n* = 17) | AD-A/C-IO (*n* = 11) |
Variable				
Maternal education[b,c]	4.08	4.07	4.00	3.27
	(0.79)	(0.73)	(0.94)	(0.90)
Mean yearly income[d]	$23,666	$34,960	$26,605	$16,861
	(19,194)	(24,594)	(16,017)	(12,620)
Mean maternal age (years)	30.24	30.38	30.50	29.23
	(5.27)	(4.74)	(5.11)	(8.08)
Mean hours/week working	10.55	9.31	11.06	8.27
outside home	(14.54)	(15.48)	(16.89)	(13.81)
Mean child age (months)				
Time 1	8.83	8.64	8.76	7.63
	(2.03)	(2.43)	(3.05)	(2.15)
Time 2	23.50	23.54	23.88	24.00
	(1.68)	(2.75)	(3.50)	(2.76)
Sex of child				
Female	2	7	6	7
	(16.7%)	(50%)	(35.3%)	(63.6%)
Male	10	7	11	4
	(83.3%)	(50%)	(64.7%)	(36.4%)
Mother's religion				
LDS (Mormon)	10	13	12	10
	(83.3%)	(100%)	(70.6%)	(100%)
Non-LDS	2	0	5	0
	(16.7%)	(0%)	(29.4%)	(0%)
Mother's marital status				
Single	3	3	2	3
	(25%)	(21.4%)	(11.8%)	(27.3%)
Married/living with partner	9	11	15	8
	(75%)	(78.6%)	(88.2%)	(72.7%)

[a]A, defended; B, secure; C, coercive; AD-A/C-IO, combined group of Anxious Depressed, Defended/Coercive, and Insecure Other children.
[b]Analyzed as the following ordinal scale: 1 = *<8th grade*, 2 = *9th–12th grade*, 3 = *high school graduate*, 4 = *some college/vocational*, 5 = *college graduate*, 6 = *graduate/professional school*.
[c]AD-A/C-IO group significantly different from the remaining groups combined, *p* < .01.
[d]Secure group different from the remaining groups combined, *p* < .05.

below are first reported without using maternal education and family income as covariates, followed by reporting any changes in results when maternal education and family income were covaried.

General caregiving environment

Pearson correlations among the four HOME indices revealed low to moderate associations at Time 1 ($r(52) = .05–.52$, $M = .27$) and at Time 2 ($r(52) = .06–.40$, $M = .20$), and thus relations between HOME indices and PAA groups were assessed with a 4 (PAA classifi-

cation: defended, secure, coercive, and AD-A/C-IO attachment groups) × 2 (Time: Time 1, Time 2) MANOVA with time as a repeated measures factor. These data are presented in Table 2. This analysis yielded a significant multivariate main effect of PAA grouping ($F(12, 147) = 2.34$, $p = .009$), with a significant B vs. non-B contrast for Emotional and Verbal Responsivity of Mother ($F(1, 50) = 5.09$, $p = .028$), favoring the mothers of type B children; and significant univariate contrasts comparing the AD-AC-IO group vs. all other groups combined for Emotional and Verbal Responsivity of Mother ($F(1, 50) =$

Table 2. *Means and standard deviations of mother–child measures broken down by PAA grouping*

	Classification[a]							
	A (n = 12)		B (n = 14)		C (n = 17)		AD-A/C-IO (n = 11)	
General Caregiving Environment[b]	Time 1	Time 2	Time 1	Time 2	Time 1	Time 2	Time 1	Time 2
Emotional/verbal	8.42	9.17	9.00	9.43	8.24	10.42	6.19	7.18
responsivity of mother[c–e]	(1.88)	(0.94)	(2.15)	(1.22)	(2.68)	(0.80)	(2.28)	(2.04)
Maternal involvement[d]	3.33	3.58	3.64	4.07	3.47	4.12	2.54	2.70
	(1.50)	(1.24)	(1.34)	(1.39)	(1.66)	(1.27)	(1.75)	(1.40)
Opportunities for variety in	2.83	3.42	2.86	4.21	3.65	3.82	2.64	3.15
daily stimulation[e]	(1.19)	(1.00)	(1.17)	(0.80)	(0.79)	(1.02)	(1.03)	(1.39)
Avoidance and restriction of	6.17	5.33	6.36	6.14	6.12	6.00	5.65	5.73
punishment	(1.34)	(0.89)	(0.84)	(1.17)	(1.22)	(0.94)	(1.21)	(1.01)
Maternal Psychosocial Functioning								
Dyadic adjustment[d]	132.10	131.05	118.33	118.50	111.14	114.91	84.22	90.17
	(15.07)	(9.85)	(36.09)	(28.41)	(26.20)	(26.35)	(21.82)	(39.40)
Social supports[c,d]	.13	−.77	.86	1.60	.95	.93	−1.95	−2.17
	(3.04)	(3.35)	(3.24)	(2.18)	(1.62)	(2.30)	(2.52)	(2.79)
Perception of infant fussy	27.25	27.92	28.14	27.43	27.24	27.59	35.91	35.36
difficultness[d]	(5.38)	(7.24)	(9.05)	(8.89)	(8.46)	(7.37)	(7.18)	(7.31)
Number of major	5.17	5.18	5.00	2.36	3.77	3.41	6.73	6.27
negative life events[d]	(4.24)	(3.95)	(4.85)	(2.53)	(2.28)	(1.94)	(5.75)	(3.82)
Daily hassels[f]	25.33	30.42	35.93	20.29	35.18	27.00	27.82	31.73
	(13.57)	(19.55)	(21.11)	(8.84)	(22.12)	(20.15)	(19.23)	(17.86)
Child behavioral indices								
Interest in and	6.91	6.92	6.86	7.43	7.17	7.10	6.46	5.64
involvement with mother[d]	(1.56)	(1.98)	(1.75)	(1.02)	(1.55)	(1.62)	(1.29)	(1.57)
General emotional tone[c,d]	7.47	7.45	8.14	7.95	7.39	7.33	7.27	6.46
	(1.50)	(1.50)	(1.23)	(.90)	(1.05)	(1.04)	(1.19)	(1.37)

Note: Numbers in parentheses are standard deviations.
[a]A, defended; B, secure; C, coercive, AD-A/C-IO, combined group of Anxious Depressed, Defended/ Coercive, and Insecure Other.
[b]From the HOME Inventory.
[c]Significant difference between secure group and insecure groups combined, $p < .05$.
[d]Significant difference between AD-A/C-IO Group and all other groups combined, $p < .05$.
[e]Time 2 scores significantly different from Time 1 scores, $p < .05$.
[f]Time 2 scores significantly different from Time 1 scores for secure group only, $p < .05$.

28.29, $p < .001$) and Maternal Involvement with Child ($F(1, 50) = 8.03$, $p = .007$), with mothers of AD-A/C-IO children receiving lower scores. Contrasts comparing the defended and coercive groups were not significant. This analysis also revealed a main effect of Time ($F(4, 47) = 7.30$, $p < .001$), with significant univariate effects for Emotional and Verbal Responsivity of Mother ($F(1, 50) = 9.40$, $p = .003$) and for Opportunities for Variety in Daily Stimulation ($F(1, 50) = 22.26$, $p < .001$). In each case, scores were significantly higher at Time 2 than at Time 1. The

multivariate PAA classification × Time interaction term in this analysis was not significant.

Similar but less robust findings were obtained when maternal education and family income were used as covariates, with the multivariate main effect of PAA grouping approaching significance, $F(12, 119.35) = 1.77$, $p = .06$. Contrasts again showed that, when compared to all other groups, mothers of AD-AC-IO children had lower scores on Emotional and Verbal Responsivity ($F(1, 48) = 16.76$, $p < .001$), with the contrast for Mater-

nal Involvement with Child approaching significance $(F(1, 48) = 3.45, p = .07)$. The B–non-B contrast on Emotional and Verbal Responsivity of Mothers was no longer significant $(p = .13)$. Similar results as those found without using covariates were found for all remaining effects.

Maternal psychosocial functioning

Social–marital supports. Also presented in Table 2 are data pertaining to relations between PAA attachment groupings and indices of dyadic adjustment, social supports, life stressors, and perceptions of infant temperament. Dyadic adjustment and the social support composite scores were significantly correlated to both Time 1 and Time 2 (Pearson $r(45) = .44$ and .40, respectively, $ps < .01$), and thus these conceptually related indices were jointly analyzed with a 4 (PAA grouping: defended, secure, coercive, AD-A/C-IO) $\times$ 2 (Time: Time 1, Time 2) MANOVA. As mentioned earlier, these analyses excluded the seven mothers with no spouses or partners at Time 1 and Time 2. A multivariate main effect of PAA grouping was obtained, $F(6, 86) = 4.76, p < .001$. Univariate contrasts revealed significantly higher social support scores among mothers of secure children relative to mothers of insecure children $(F(1, 43) = 4.82, p = .034)$ and significantly lower dyadic adjustment $(F(1, 43) = 14.67, p < .001)$ and social support scores $(F(1, 43) = 9.74, p = .003)$ among mothers of AD-A/C-IO children relative to mothers in the other three groups combined. No other univariate contrast was significant, and neither the multivariate main effect of Time nor the multivariate interaction of PAA grouping $\times$ Time was significant.

When maternal education and family income were covaried, the multivariate main effect of PAA grouping remained significant $(F(6, 80) = 3.31, p = .006)$, with univariate contrasts again showing mothers of AD-AC-IO children reporting poorer dyadic adjustment $(F(1, 41) = 8.75, p = .005)$ and social support $(F(1, 41) = 4.29, p = .045)$ when compared to mothers in the remaining three groups. However, the univariate contrast comparing mothers of secure children with mothers of insecure children on social supports was no longer significant $(p = .18)$. All other effects were similar to those obtained without covariates.

Life stressors. Number of major negative life events and daily hassles were significantly intercorrelated at Time 1 and at Time 2 (Pearson $r(52) = .43$ and .50, $ps < .01$), and thus relations between these two conceptually related indices of life stress and PAA groupings were assessed with a 4 (PAA grouping: defended, secure, coercive, and AD-A/C-IO) $\times$ 2 (Time: Time 1, Time 2) MANOVA. The multivariate main effect of PAA grouping in this analysis was marginally significant $(F(6, 100) = 1.92, p = .085)$, and univariate contrasts revealed significantly more negative life events reported by mothers of AD-A/C-IO children relative to the other three PAA groups $(F(1, 50) = 4.88, p = .032)$. No other univariate contrasts were significant or approached significance. The multivariate PAA grouping $\times$ Time interaction was also marginally significant $(F(6, 100) = 2.12, p = .058)$, and the univariate interaction term for daily hassles was significant $(F(3, 50) = 3.70, p = .017)$. Analyses of simple effects indicated a significant drop in number of daily hassles from Time 1 to Time 2 among mothers of secure children $(F(1, 50) = 9.91, p < .01$; see Table 2), relative to the remaining three PAA groups (see Table 2). The multivariate main effect of Time was not significant.

This analysis with covariates no longer yielded a marginally significant effects of PAA grouping $(p = .30)$, and the univariate contrast comparing mothers of AD-A/C-IO children with mothers in the remaining three groups on negative life events was no longer significant $(p = .38)$. Similar findings, however, were obtained for the multivariate PAA grouping $\times$ Time interaction $(F(5, 94) = 2.10, p = .06)$, with the univariate interaction term again significant for daily hassles $(F(3, 48) = 3.32, p = .03)$ and a significant drop in the number of daily hassles from Time 1 to Time 2 among mothers of secure children $(p < .05)$ but no changes in the remaining three PAA groups. All other effects were similar to those obtained without covariates.

Perceptions of infant temperament. A final 4 (PAA grouping: defended, secure, coercive, and AD-A/C-IO) × Time (Time 1, Time 2) ANOVA performed on perceptions of infant fussy-difficultness also yielded a main effect of PAA grouping ($F(3, 50) = 4.29$, $p = .009$), with a univariate contrast indicating that mothers of AD-A/C-IO children reported their children's temperament to be significantly more difficult than mothers of children in the remaining three groupings, $F(1, 50) = 12.76$, $p = .001$. No other contrasts were significant, nor were the main effects of Time or the interaction of PAA grouping × Time.

This analysis with covariates yielded a marginally significant effect of PAA grouping ($F(3, 48) = 2.42$, $p = .077$), with a univariate contrast again finding that mothers of AD-AC-IO children reported more difficult temperaments in their children relative to mothers in the other three groups ($F(1, 48) = 6.93$, $p = .011$). All other findings were similar to those obtained without covariates.

Child behavioral indices

Infant interest in and responsivity to mother and infant general emotional tone were significantly correlated at Time 1 and at Time 2 (Pearson $r(52) = .46$ and .52, $ps < .01$), and relations between these indices of child behavior and PAA groupings were assessed with a 4 (PAA grouping: defended, secure, coercive, and AD-A/C-IO) × Time (Time 1, Time 2) MANOVA. These data are included in Table 2. The multivariate main effect of PAA grouping was significant ($F(6, 100) = 2.27$, $p = .043$), and univariate contrasts revealed significantly more optimal emotional tone in secure children relative to insecure children ($F(1, 50) = 7.67$, $p = .008$). Univariate contrasts also revealed significantly less interest in and responsivity to mother ($F(1, 50) = 6.72$, $p = .012$) and less positive general emotional tone ($F(1, 50) = 5.54$, $p = .023$) among AD-A/C-IO children relative to the remaining three PAA groups. No other univariate contrasts were significant, nor were the multivariate main effect of Time or the multivariate PAA grouping × Time interaction.

These analyses with covariates no longer

yielded a significant multivariate effect of PAA grouping ($p = .20$); however, univariate contrasts between the AD-AC-IO group vs. all other groups remained significant for children's interest in and responsivity to mothers ($F(1, 48) = 4.32$, $p = .04$), again showing poorer scores among AD-A/C-IO children. The contrast comparing AD-A/C-IO children with all other children for general emotional tone was no longer significant. However, the contrast comparing B with non-B children for general emotional tone also remained significant ($F(1, 48) = 3.86$, $p = .05$), with B children showing more positive emotional tone than non-B children. All remaining findings were similar to those obtained without covariates.

Post hoc cumulative risk analyses

A final set of analyses was conducted to assess relations between PAA classifications and number of social–contextual risk factors to which the children were exposed. These analyses represented an attempt to replicate the cumulative risk analyses of Belsky and Isabella (1988), who demonstrated that proportions of insecure infants increased in direct relation to cumulative risk scores derived from measures of maternal personality, quality of marriage, and maternal perceptions of infant temperament. The present study sought to replicate these findings using PAA classifications with preschoolers as an additional test of the system's construct validity. Because maternal education and family income were associated with PAA grouping, and that results tended to be somewhat less robust when maternal education and family income were covaried, these two socioeconomic indices were incorporated into the risk index analyses.

Relations between PAA classifications and cumulative risk were assessed following general procedures outlined by Belsky and Isabella (1988), in which a cumulative risk index was created by splitting at the median those social–contextual risk indicators that related significantly to attachment security, assigning a score of "1" to the less optimal half of each distribution and "0" to the more optimal half, and then adding these scores for each subject.

For the present study, these measures included (a) a total HOME score, calculated by summing the scores for Emotional and Verbal Responsivity of Mother, Avoidance and Restriction of Punishment, Maternal Involvement with Child, and Opportunities for Variety in Daily Stimulation; (b) severity of maternal depressive symptoms (BDI), which Teti et al. (1995) found to be significantly higher among mothers of AD-A/C-IO children relative to mothers in all other PAA groups; (c) perceptions of infant temperament (fussy–difficultness); (d) a composited socioeconomic index, derived by standardizing maternal education and yearly family income scores and summing the standard scores; and (e) a composited social–marital supports score, created by standardizing dyadic adjustment and social support scores and then summing the standard scores.[2] For those seven mothers without partners at both time points, only the social support index was used. The cumulative risk index thus was calculated by assigning a score of 1 to the less optimal halves of the five distributions (e.g., lower total HOME scores, lower social–marital supports, more depressive symptoms, lower socioeconomic scores, higher infant difficulty) and "0" to the more optimal halves, yielding an index ranging from 0 to 5, with higher scores indicating higher levels of risk.

Descriptive analyses were first conducted to assess the distribution of B–non-B PAA groupings, and AD-A/C-IO versus all else, in relation to cumulative risk. These distributions are given in Table 3, which defines low risk as cumulative risk scores of 0–1, moderate risk as cumulative risk scores of 2–3, and high risk as cumulative risk scores of 4–5. Monotonic increases in the proportion of overall insecure attachment were associated with increasing cumulative risk scores. Slightly over half of the preschoolers were classified as insecure, and none as AD-A/C-

---

2. Composite HOME, social–marital support, and socioeconomic scores were used in the development of the cumulative risk index because of conceptual and statistical relations among the four HOME indices, among dyadic adjustment and social support scales, and among maternal education and family income, as reported earlier.

Table 3. *Overall insecure and AD-A/C-IO children in relation to cumulative social–contextual risk*

Cumulative Risk[a]	Overall Insecure[b]		AD-A/C-IO[c]	
	n	*%*	*n*	*%*
Low	11	58	0	0
Moderate	14	78	2	11
High	15	88	9	53

[a]See text for a description of the derivation of the cumulative risk index. Low risk = a risk index score of 0–1; moderate risk = a risk index score of 2–3; high risk = a risk index score of 4–5.
[b]Related to cumulative risk, $p = .11$, χ^2 test; and $p < .05$, Mantel–Haenszel test for linear association.
[c]Related to cumulative risk, $p < .001$, χ^2 test; and $p < .001$, Mantel–Haenszel test for linear association.

IO, when cumulative risk was low. By contrast, the percentage of insecure children rose to over 75% when cumulative risk was moderate or high, and the proportion of AD-A/C-IO classifications reached over 50% of all classifications when cumulative risk was high.

Analyses were then conducted to assess the significance of relations between PAA security and cumulative risk. A 2 (secure vs. insecure) × 3 (low, moderate, high risk) χ^2 analysis approached significance ($\chi^2(2) = 4.49$, $n = 54$, $p = .11$), and the increase in the proportion of insecure children as cumulative risk increased reflected a significant linear trend (Mantel–Haenszel test for linear association (1) = 4.27, $n = 54$, $p = .039$). The 2 (AD-A/C-IO vs. all else) × 3 (low, moderate, high risk) χ^2 analysis was also significant ($\chi^2(2) = 16.93$, $p < .001$), as was the test for linear association (Mantel–Haenszel statistic (1) = 14.91, $n = 54$, $p < .001$). Thus, proportions of insecure preschoolers in general, and of preschoolers with AD-A/C-IO classifications in particular, increased reliably with cumulative social–contextual risk in this sample.

Discussion

The present findings lend additional support to the validity of the Preschool Assessment of

Attachment in assessing the quality of child–parent attachment in the preschool years. Significant attachment group differences, consistent with predictions from attachment theory, were associated with measures of the maternal caregiving domain, maternal psychosocial functioning, and the quality of children's behavior during interactions with their mothers, and findings were generally maintained when maternal education and family income were statistically controlled. The present, variable-risk sample of depressed and nondepressed mothers may have been particularly well suited for this investigation, because measurement variability in this sample is likely to be greater than that in a more homogeneous, low-risk group. These results add to a growing body of work (Crittenden, 1993; Fagot, 1993; Teti et al., 1995; Ziegenhain & Rauh, 1993) supporting the construct validity of the PAA for use with children 21 months of age and older, at which point the validity of infancy classification systems becomes suspect because of developments in language and social–cognitive domains.

Our discussion begins with a focus on results that were robust to whether education and income were covaried. HOME Inventory maternal behavioral domains of Emotional and Verbal Responsivity of Mother and Maternal Involvement with Child were found to relate predictably to PAA classifications. Mothers of children who lacked coherent, unitary attachment strategies (the AD-A/C-IO group) were the most dysfunctional with regard to the caregiving domain, showing the worst scores among the four attachment groups on emotional/verbal responsivity of mother and maternal involvement. AD-A/C-IO children, in turn, were the least interested in and responsive (with secure children the most affectively positive) toward their mothers of the children in the four attachment groups. These results are consistent with the hypothesis, based on work with disorganization in infancy and with Teti et al.'s (1995) earlier findings on AD-A/C-IO children and their mothers, that children with inchoate strategies for accessing their attachment figures are likely to be the most at-risk in terms of the caregiver–child relationship and, per-

haps, for psychopathology over the long term (Spieker & Booth, 1988; Teti & Nakagawa, 1990). Indeed, some of the Strange Situation behaviors of AD-A/C-IO children ("zoning," dazed behavior, lethargy, mixed avoidance and resistance) as a group bore a striking resemblance to some of the behaviors used to identify disorganized–disoriented (Type D) infants (Main & Solomon, 1990). Reconceptualizing these anomalous PAA classifications as variants of a broader category of disorganization in the preschool years would be consistent with Main and Solomon's (1990) original formulations of disorganization in infancy, and in our view is worthy of serious consideration.

The association of AD-A/C-IO children with highest risk status was additionally borne out by the findings that mothers of these children had significantly worse scores on psychosocial measures relative to mothers in all other attachment groups. Mothers of AD-A/C-IO children had the most embattled marriages, the worst social supports, and perceived their children to be the most fussy–difficult in comparison with mothers in the remaining three groups. Mothers of secure children also reported a significant drop in daily hassles from Time 1 to Time 2 relative to mothers in the remaining attachment groups. Collectively, these differences were consistent with expectations, which was particularly gratifying in view of the fact that relations between early attachment and various measures of mothers' psychosocial functioning have been ephemeral at best (Belsky & Isabella, 1988; Spieker & Booth, 1988). Of course, any relation between mothers' reports of the quality of their social–ecological niches and a more "objective" assessment thereof is unclear, and thus we specifically employed the label "perceptions of infant fussy–difficultness," rather than just "infant fussy–difficultness," because such a measure in the preschool years may be as much a reflection of mothers' perceptions of their relationships with their children as a true indicator of temperament (see Mebert, 1991; Seifer, Sameroff, Barrett, & Krafchuk, 1994; Teti & McGourty, 1996, for more comprehensive discussions of this issue).

At several points the results obtained when maternal education and family income were not statistically controlled differed from results obtained when education and income were covaried. First, when education and income were not controlled, mothers of secure children were judged as more emotionally and verbally responsive to their children (from the HOME Inventory) and reported higher levels of social supports when compared to mothers of insecure children. These differences were no longer significant at $\alpha = .05$ when maternal education and income were controlled ($p = .13$ and $.18$, respectively). Second, without education and income covaried, mothers of AD-A/C-IO reported more negative life events, and AD-A/C-IO children were less affectively positive toward their mothers in comparison to the remaining three groups. These differences again were no longer significant at $\alpha = .05$ when education and income were controlled ($p = .38$ and $.16$, respectively). These discrepancies are the likely result of several interrelated factors: First, a loss of statistical power occurred with the addition of these two socioeconomic indices as covariates, each of which were actually entered in twice (once for Time 1, and once again for Time 2, resulting in having 4 degrees of freedom pulled from the error terms rather than two) in the present study's repeated measures analyses. Second, the use of these covariates may have increased the probability of Type II error (i.e., the failure to reject a false null) in light of the fact that maternal education and income were more clearly related to PAA groupings than to the dependent variables under analyses, resulting in an overadjustment of PAA group means. Finally, maternal education and family income correlated significantly (and, in the case of the former, strongly) with severity of mothers' depressive symptomatology (BDI scores) at Time 2: Pearson $r = -.49$, $p < .01$; and Pearson $r = -.32$, $p < .05$, respectively. A significant strength of the present sample lies in the fact that it contains mothers who vary widely in severity and chronicity of depression, which in itself accounts for much of the observed variability in the dependent variables in this study. Statistically controlling demographic variables that also correlated strongly with maternal depression, which in turn was significantly associated with PAA attachment groups (Teti et al., 1995), may have overly penalized attempts to establish meaningful correlates of PAA groupings. Tabachnick and Fidell (1983) advise caution in using analysis of covariance in these circumstances, since covariance procedures, which in effect readjust group means, can minimize and potentially eliminate meaningful group differences. Although the bulk of findings remained similar whether or not income and education were controlled, we do not wish to dismiss the significance of the results obtained without the use of covariates. Indeed, that mothers of secure children were more emotionally and verbally responsive is in direct support of the premise, from theory and research on attachment in infants, that qualitative indices of mothering, in particular maternal sensitivity and emotional warmth, are of primary importance in the development of attachment security (Ainsworth et al., 1978; see reviews by Bretherton, 1985; Teti & Nakagawa, 1990). Further, it extends findings of Teti et al. (1995), who found higher behavioral competence and lower parenting stress scores among mothers of secure children than among mothers of insecure children *using maternal education and income as covariates.* Finally, the findings that mothers of AD-A/C-IO children had the highest negative life event scores, and that AD-A/C-IO children had the poorest emotional tone is consistent with the premise, embodied in this report and in Teti et al. (1995), that the AD-A/C-IO group is at highest risk of all four attachment groups.

The absence of any defended versus coercive attachment differences was of interest given the very different behavioral patterns and overall attachment strategies used by these two groups of children in the Strange Situation paradigm. The lack of A versus C differences in children's behavior and emotional tone with mothers in the home is consistent with Ainsworth's earlier work with infants showing more similarities than differences in A and C children in the home (Ainsworth et al., 1978). In terms of maternal caregiving and psychosocial functioning, however,

the measures employed in this study may not have adequately tapped areas of mother–child functioning relevant for highlighting A versus C differences. Caregivers of A and C children theoretically display different types of insensitivity, with the former exhibiting intrusive, rejecting behavior and the latter inconsistent, unresponsive behavior (Ainsworth et al., 1978; Cassidy & Berlin, 1994; Main, 1981; Teti & Nakagawa, 1990). As the measure of maternal behavior in the present study, the HOME enables raters to make very global judgments about overall quality of maternal behavior but does not allow raters to discriminate between different manifestations of parental insensitivity. The lack of significant A versus C differences in measures of maternal psychosocial functioning in this study is also consistent with Spieker and Booth (1988), who conducted similar analyses involving maternal psychosocial variables and infant attachment classifications. The present findings pertaining to A versus C differences are (unfortunately) consistent with the bulk of attachment research, which has been primarily concerned with B–non-B differences and less informative with regard to the caregiving antecedents of A versus C attachments (Lamb, Thompson, Gardner, & Charnov, 1985). Research efforts specifically designed to capture individual differences in parental caregiving and psychosocial precursors of A versus C attachments would contribute importantly to the field.

The present study replicated Belsky and Isabella (1988) in demonstrating significant relations between proportions of insecure attachment and level of cumulative risk. This was particularly true of AD-A/C-IO attachments, again underscoring the point that extremely high levels of environmental risk are associated with attachments that lack unitary, coherent behavior patterns. Also evident in these analyses were the relatively high proportions (58%) of insecure attachment (but not AD-A/C-IO) at low levels of risk. This findings relates directly to the propensity of the PAA to identify, with low risk samples, approximately equal proportions (i.e., 30–33%) of secure, defended, and coercive at-

tachments (e.g., Crittenden, 1993; Fagot, 1993; Sakin & Teti, 1996). In our view, an important challenge facing students of preschool attachment in general, and users of the PAA in particular, is to determine as precisely as possible if a range of maladaptation exists within the defended attachment patterns, and within the coercive patterns. If so, it may be reasonable to separate more maladapted from less maladapted patterns within a particular insecure category. For example, is the coy, manipulative behavior characteristic of disarming (C2) children as insecure and problematic as the threatening, resistant behavior characteristic of C1 children, or the overtly punishing behavior of punitive (C3) children? Similarly, are the role-reversing patterns of compulsively caregiving (A3) children, and the fearful, wary behavior of compulsively compliant (A4) children indicative of greater relational maladjustment than the inhibited patterns of A1-2 children? Affirmative answers to these questions suggest the importance of conducting analyses not just for differences between major PAA categories but also between subgroups within the defended and coercive categories. Such comparisons would require a sample of sufficient size, and a sample significantly larger than that in the present study. Nevertheless, we believe these efforts are crucial to the continuing validation of the PAA.

This study, in conjunction with earlier work from this laboratory and others' (Crittenden, 1993; Fagot, 1993; Teti et al., 1995; Ziegenhain & Rauh, 1993), contributes importantly to the "nomological net" of relations (Cronbach & Meehl, 1955) in support of the construct validity of the PAA. However, much remains to be done. Additional work with the PAA is needed to establish the PAA's predictive validity. For example, there are no published data addressing the question of whether a secure attachment in the preschool period predisposes more optimal functioning in relational and instrumental domains in middle childhood than does an insecure attachment. In addition, nothing is yet known about the degree to which parenting strategies associated with instrumental competence (au-

thoritative parenting) versus incompetence (authoritarian, permissive, neglecting) (Baumrind, 1970; Darling & Steinberg, 1993; Smetana, 1995) among school-aged children map onto the PAA classifications of the preschool years. Further work is also required to assess if the apparent disadvantages associated with the lack of clearly identifiable, unitary attachment strategies in the preschool years carry forward into middle childhood. We hope to be able to address some of these questions in the coming years and to see others engaging in longitudinal research of this kind with the PAA.

In addition, there remains a need to build a knowledge base regarding the stability of child–parent attachments from infancy to the preschool period, and in particular to determine whether changes in attachment security relate to maturational and/or to environmental events. A longstanding assumption in attachment theory and research is that goal-corrected attachments, once formed and in the context of a stable caregiving environment, will tend to remain stable over time and to be increasingly resistant to change (Bretherton, 1985; Main, Kaplan, & Cassidy, 1985). It is noteworthy, however, that stability coefficients of attachment security in infancy have varied widely (e.g., 96% in Waters, 1978; 53% in Thompson, Lamb, & Estes, 1982). Further, although some studies have found instability in infant attachment to relate to changes in family life circumstances and/or inadequate care (Egeland & Sroufe, 1981; Thompson et al., 1982; Vaughn, Egeland, Sroufe, & Waters, 1979), other studies have found no clear environmental links with attachment instability (Belsky, personal communication, July 24, 1995). With respect to preschool attachment, Crittenden (1995) has proposed that some instability from infancy to the preschool period is to be expected, a direct function of maturation and the emergence of more advanced social–cognitive and linguistic skills, which some preschoolers learn to use manipulatively with adults. These developments in turn predispose a shift from security in infancy to coercive patterns of attachment in the preschool years. That several applica-

tions of the PAA with low-risk samples have identified approximately equal proportions of defended, secure, and coercive classifications (i.e., between 30 and 33%; Fagot, 1993; Crittenden, 1993; Sakin & Teti, 1995) lend support to this claim. Crittenden (1995) thus has broadened the conceptualization of child–parent attachment by incorporating developmental maturation as a potential correlate of instability in attachment from infancy to the preschool period. At the same time, it behooves attachment researchers to determine why this shift from secure attachment in infancy to coercive attachment in the preschool period only characterizes some but not all preschoolers. More specifically, additional work needs to address whether there are certain temperamental, caregiving, and/or family characteristics that predispose such a shift, especially in the absence of shifts in major environmental events. Further, given Main et al.'s (1985) findings of strong concordance of attachment classifications from infancy to early school age (6 years of age), an equally relevant question is whether the putative shift toward coercive attachment in the preschool years is short lived. Posed differently, do coercive preschoolers who were formerly secure in infancy revert back to secure attachment after 6 years of age, when linguistic, perspective taking, and representational competencies are more firmly established and consolidated?

The preschool years appear to be an especially challenging period for the development of a valid attachment classification system, perhaps because it is during this period that the transition takes place from wholly preprepresentational, procedural expressions of attachment security, characteristic of infancy, to the more clear-cut representational expressions of attachment security that characterize the school years and beyond. We view the PAA as a theoretically rich system for examining attachment security in the preschool years, and we believe the present study contributes importantly to its construct validity. Although this system is newly developed, we are encouraged by the findings to date, and hope that efforts continue toward this end.

References

Ainsworth, M. D. S., Blehar, M. C., Waters, E., & Wall, S. (1978). *Patterns of attachment: A psychological study of the Strange Situation.* Hillsdale, NJ: Erlbaum.

American Psychiatric Association. (1987). *Diagnostic and statistical manual of mental disorders* (3rd ed., rev.). Washington, DC: Author.

Bates, J. E., Freeland, C. A., & Lounsbury, M. L. (1979). Measurement of infant difficultness. *Child Development, 50,* 794–803.

Baumrind, D. (1970). Socialization and instrumental competence in young children. *Young Children, 26,* 104–119.

Bayley, N. (1969). *Manual for the Bayley Scales of Infant Development.* San Antonio, TX: Psychological Corporation.

Beck, A. T., Steer, R. A., & Garbin, M. G. (1988). Psychometric properties of the Beck Depression Inventory: Twenty-five years of evaluation. *Clinical Psychology Review, 8,* 77–100.

Beck, A. T., Ward, C. H., Mendelson, M., Mock, J., & Erbaugh, J. (1961). An inventory for measuring depression. *Archives of General Psychiatry, 4,* 561–571.

Belsky, J., & Isabella, R. (1988). Maternal, infant, and social–contextual determinants of attachment security. In J. Belsky & T. Nezworski (Eds.), *Clinical implications of attachment* (pp. 41–94). Hillsdale, NJ: Erlbaum.

Bowlby, J. (1969/1982). *Attachment and loss: Vol. 1. Attachment.* New York: Basic Books.

Bradley, R. H., & Caldwell, B. M. (1976). The relation of infants' home environments to mental test performance at fifty-four months: A follow-up study. *Child Development, 47,* 1172–1174.

Bradley, R. H., & Caldwell, B. M. (1980). The relation of home environment to cognitive competence and IQ among males and females. *Child Development, 51,* 1140–1148.

Bretherton, I. (1985). Attachment theory: Retrospect and prospect. In I. Bretherton & E. Waters (Eds.), *Growing points of attachment theory and research. Monographs of the Society for Research on Child Development, 50*(1–2, Serial No. 209), 3–35.

Bretherton, I., Ridgeway, D., & Cassidy, J. (1990). The role of internal working models in the attachment relationship: An attachment story completion task for 3-year-olds. In M. T. Greenberg, D. Cicchetti, & E. M. Cummings (Eds.), *Attachment in the preschool years: Theory, research, and intervention.* Chicago: University of Chicago Press.

Caldwell, B., & Bradley, R. (1984). *Home Observation for Measurement of the Environment.* Unpublished manuscript, University of Arkansas at Little Rock.

Calkins, S. D., & Fox, N. A. (1992). The relations among infant temperament, security of attachment, and behavioral inhibition at twenty-four months. *Child Development, 63,* 1456–1472.

Cassidy, J. (1988). Child–mother attachment and the self in six-year-olds. *Child Development, 59,* 121–134.

Cassidy, J., & Berlin, L. J. (1994). The insecure/ambivalent pattern of attachment: Theory and research. *Child Development, 65,* 971–991.

Cicchetti, D., & Barnett, D. (1991). Attachment organization in maltreated preschoolers. *Development and Psychopathology, 3,* 397–411.

Cicchetti, D., Cummings, E. M., Greenberg, M. T., & Marvin, R. S. (1990). An organizational perspective on attachment beyond infancy: Implications for theory, measurement, and research. In M. T. Greenberg, D. Cicchetti, & E. M. Cummings (Eds.), *Attachment in the preschool years: Theory, research, and intervention* (pp. 3–49). Chicago: University of Chicago Press.

Cicchetti, D., & Greenberg, M. T. (1991). The legacy of John Bowlby. *Development and Psychopathology, 3,* 347–350.

Crittenden, P. M. (1988a). Distorted patterns of relationship in maltreating families: The role of internal representational models. *Journal of Reproductive and Infant Psychology, 6,* 183–199.

Crittenden, P. M. (1988b). Family and dyadic patterns of functioning in maltreating families. In K. Browne, C. Davies, & P. Stratton (Eds.), *Early prediction and prevention of child abuse* (pp. 161–189). London: Wiley.

Crittenden, P. M. (1988c). Relationships at risk. In J. Belsky & T. Nezworski (Eds.), *Clinical implications of attachment* (pp. 136–174). Hillsdale, NJ: Erlbaum.

Crittenden, P. M. (1992a). Quality of attachment in the preschool years. *Development and Psychopathology, 4,* 209–241.

Crittenden, P. M. (1992b). *Coding manual: Classification of quality of attachment for preschool-aged children.* Unpublished manuscript, University of New Hampshire, Family Research Laboratory.

Crittenden, P. M. (1993). Comparison of two systems for assessing quality of attachment in the preschool years. In P. M. Crittenden (Chair), *Quality of attachment in the preschool years.* Symposium conducted at the Ninth Biennial Meeting of the International conference on Infant Studies, Paris.

Crittenden, P. M. (Chair) (1995, March). *Quality of attachment in the preschool years.* Symposium conducted at the Biennial Meeting of the Society for Research in Child Development, Indianapolis, IN.

Crittenden, P. M., & DiLalla, D. (1988). Compulsive compliance: The development of an inhibitory coping strategy in infancy. *Journal of Abnormal Child Psychology, 16,* 585–599.

Crittenden, P. M., Partridge, M. F., & Claussen, A. H. (1991). Family patterns of relationship in normative and dysfunctional families. *Development and Psychopathology, 3,* 491–512.

Crockenberg, S. B. (1981). Infant irritability, mother responsiveness, and social support influences on the security of infant–mother attachment. *Child Development, 52,* 857–865.

Cronbach, L. J., & Meehl, P. E. (1955). Construct validity in psychological tests. *Psychological Bulletin, 52,* 281–302.

Cummings, E. M., & Cicchetti, D. (1990). Attachment, depression, and the transmission of depression. In M. T. Greenberg, D. Cicchetti, & E. M. Cummings (Eds.), *Attachment in the preschool years: Theory, research, and intervention* (pp. 339–372). Chicago: University of Chicago Press.

Darling, N., & Steinberg, L. (1993). Parenting style as context: An integrative model. *Psychological Bulletin, 63,* 1266–1281.

Durrett, M. E., Otaki, M., & Richards, P. (1984). Attach-

ment and the mother's perception of support from the father. *International Journal of Behavioural Development, 7,* 167–176.

Egeland, B., & Sroufe, L. A. (1981). Attachment and early maltreatment. *Child Development, 52,* 44–52.

Fagot, B. I. (1993, June). Attachment: Infancy to preschool. In P. M. Crittenden (Chair), *Quality of attachment in the preschool years.* Symposium conducted at the Ninth Biennial Meeting of the International Conference on Infant Studies, Paris.

Goldberg, W. A., & Easterbrooks, M. A. (1984). Role of marital quality in toddler development. *Developmental Psychology, 20,* 504–514.

Greenberg, M. T., Cicchetti, D., & E. M. Cummings (Eds.). (1990). *Attachment in the preschool years: Theory, research, and intervention.* Chicago: University of Chicago Press.

Henderson, S., Byrne, D. G., & Duncan–Jones, P. (1981). *Neurosis and the social environment.* Sydney: Academic Press Australia.

Kanner, A. D., Coyne, J. C., Schaefer, C., & Lazarus, R. S. (1981). Comparison of two modes of stress measurement: Daily hassles and uplifts versus major life events. *Journal of Behavioral Medicine, 4,* 1–39.

Lamb, M. E., Thompson, R. A., Gardner, W., & Charnov, E. L. (1985). *Infant–mother attachment: The origins and developmental significance of individual differences in Strange Situation behavior.* Hillsdale, NJ: Erlbaum.

Locke, H., & Wallace, L. (1959). Short marital-adjustment and prediction tests: Their reliability and validity. *Marriage and Family Living, 21,* 251–255.

Londerville, S., & Main, M. (1981). Security of attachment, compliance, and maternal training methods in the second year of life. *Developmental Psychology, 17,* 289–299.

Main, M. (1981). Avoidance in the service of attachment: A working paper. In K. Immelmann, G. Barlow, L. Petrinovich, & M. Main (Eds.), *Behavioral development: The Bielfeld interdisciplinary project* (pp. 651–693). New York: Cambridge University Press.

Main, M., Kaplan, N., & Cassidy, J. (1985). Security in infancy, childhood, and adulthood: A move to the level of representation. In J. Bretherton & E. Waters (Eds.), *Growing points of attachment theory and research. Monographs of the Society for Research in Child Development, 50*(1–2, Serial No. 209), 66–104.

Main, M., & Solomon, J. (1990). Procedures for identifying infants as disorganized-disoriented during the Ainsworth Strange Situation. In M. Greenberg, D. Cicchetti, & E. M. Cummings (Eds.), *Attachment in the preschool years: Theory, research, and intervention* (pp. 121–160). Chicago: University of Chicago Press.

Marvin, R. M. (1973, April). *The development of coy expressions in young children.* Paper presented at the Biennial Meeting of the Society for Research in Child Development, Philadelphia, PA.

Marvin, R. M. (1977). An ethological–cognitive model for the attenuation of mother–child attachment behavior. In T. M. Alloway, L. Krames, & P. Piner (Eds.), *Advances in the study of communication and affect, Vol. 3. The development of social attachments* (pp. 25–60). New York: Plenum.

Mebert, C. J. (1991). Dimensions of subjectivity in parents' ratings of infant temperament. *Child Development, 62,* 352–361.

Rodning, C., Beckwith, L., & Howard, J. (1991). Quality of attachment and home environments in children pre-

natally exposed to PCP and cocaine. *Development and Psychopathology, 3,* 351–366.

Sakin, J., & Teti, D. M. (1995). *Maternal and child correlates of attachment quality among toddlers.* Unpublished manuscript, University of Maryland Baltimore County.

Sarason, I. G., Johnson, J. H., & Siegel, J. M. (1978). Assessing the impact of life changes: Development of the life experiences survey. *Journal of Consulting and Clinical Psychology, 46,* 932–946.

Seifer, R., Sameroff, A. J., Barrett, L. C., & Krafchuk, E. (1994). Infant temperament measured by multiple observations and mother report. *Child Development, 65,* 1478–1490.

Smetana, J. G. (1995). Parenting styles and conceptions of parental authority during adolescence. *Child Development, 66,* 299–316.

Spanier, G. B. (1976). Measuring dyadic adjustment: New scales for assessing the quality of marriage and similar dyads. *Journal of Marriage and the Family, 1,* 251–276.

Spieker, S. J., & Booth, C. L. (1988). Maternal antecedents of attachment quality. In J. Belsky & T. Nezworski (Eds.), *Clinical implications of attachment* (pp. 95–135). Hillsdale, NJ: Erlbaum.

Sroufe, L. A. (1985). Attachment classification from the perspective of infant–caregiver relationships and infant temperament. *Child Development, 56,* 1–14.

Sroufe, L. A. (1988). The role of infant–caregiver attachment in development. In J. Belsky & T. Nezworski (Eds.), *Clinical implications of attachment* (pp. 18–38). Hillsdale, NJ: Erlbaum.

Tabachnick, B. G., & Fidell, L. S. (1983). *Using multivariate statistics.* New York: Harper & Row.

Teti, D. M., Gelfand, D. M., Messinger, D. S., & Isabella, R. (1995). Maternal depression and the quality of early attachment: An examination of infants, preschoolers, and their mothers. *Development Psychology, 31,* 364–376.

Teti, D. M., & McGourty, S. (1996). Using mothers versus trained observers in assessing children's secure base behavior: Theoretical and methodological considerations. *Child Development, 67,* 597–605.

Teti, D. M., & Nakagawa, M. (1990). Assessing attachment in infancy: The Strange Situation and alternate systems. In E. D. Gibbs & D. M. Teti (Eds.), *Interdisciplinary assessment of infants: A guide for early intervention professionals* (pp. 191–214). Baltimore: Paul H. Brookes.

Thompson, R. A., Lamb, M. E., & Estes, D. (1982). Stability of infant–mother attachment and its relationship to changing life circumstances in an unselected middle class sample. *Child Development, 53,* 144–148.

Vaughn, B. E., Egeland, B., Sroufe, L. A., & Waters, E. (1979). Individual differences in infant–mother attachment at twelve and eighteen months: Stability and change in families under stress. *Child Development, 50,* 971–975.

Vaughn, B. E., Lefever, G. B., Seifer, R., & Barglow, P. (1989). Attachment behavior, attachment security, and temperament during infancy. *Child Development, 60,* 728–737.

Vaughn, B. E., Stevenson–Hinde, J., Waters, E., Kotsaftis, A., Lefever, G. B., Shouldice, A., Trudel, M., & Belsky, J. (1992). Attachment security and temperament in infancy and early childhood: Some conceptual clarifications. *Developmental Psychology, 28,* 463–473.

Waters, E. (1978). The reliability and stability of individual differences in infant–mother attachment. *Child Development, 49,* 483–494.

Waters, E., & Deane, K. E. (1985). Defining and assessing individual differences in attachment relationships: Q-methodology and the organization of behavior in infancy and early childhood. In I. Bretherton & E. Waters (Eds.), *Growing points of attachment theory and research. Monographs of the Society for Research in Child Development, 50*(1–2, Serial No. 209), 41–65.

Waters, E., Kondo–Ikemura, K., Posada, G., & Richters, J. E. (1990). Learning to love: Mechanisms and milestones. In M. Gunnar & L. A. Sroufe (Eds.), *Minnesota symposia on child psychology* (Vol. 23, pp. 217–255). Hillsdale, NJ: Erlbaum.

Weber, R. A., Levitt, J. J., & Clark, M. C. (1986). Individual variation in attachment security and strange situation behavior: The role of maternal and infant temperament. *Child Development, 57,* 56–65.

Ziegenhain, U., & Rauh, H. (1993, August). *Attachment classification procedures: Ainsworth, Main, and Crittenden in comparison.* Paper presented at the Sixth European Conference on Developmental Psychology, Bonn, Germany.