Factors Affecting Attachment in International Adoptees at 6 Months Post Adoption

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Abstract

This pilot study examined the effect of five child and maternal factors on the attachment security of international adoptees at six months post adoption. Results from the sample of 22 adoptive mother-infant dyads showed that age at adoption, developmental status, length and quality of preadoption care, and maternal attachment representations were not significant predictors of child attachment status. The number of preadoption placements and the child's stress level did significantly predict attachment status, accounting for approximately 40% of the variance in attachment security. Number of preadoption placements uniquely contributed 14% of that variance (p=.007) while stress level uniquely contributed 12% (p=.01). Children who had fewer preadoption placements had higher attachment security; similarly, children who had lower stress levels had higher attachment security. Results suggest that consistency of preadoption care was more important than its length or quality. Further, the relationship between stress level and attachment security raises the possibility that a lower stress level functions as a protective factor for the developing attachment with the adoptive mother.

Keywords

adoption; attachment; stress response; HPA axis; early deprivation

1. Introduction

According to attachment theory (Ainsworth, Blehar, Waters, & Wall, 1978; Bowlby, 1969/1982), a child's everyday experiences with caregivers determine the quality of the child's attachment bond. When caregivers respond quickly and appropriately to a child's signals, the child feels secure, knowing that her caregivers are available to meet her needs. But if caregivers are unavailable or respond inappropriately, this sense of security is compromised. Over the first year of life, children internalize these repeated experiences of security and insecurity and by 12 months have formed a cognitive model (also called an

"internal working model") of what they can expect from caregivers in times of need (Bretherton, 1999). Although these models are actively constructed—and thus capable of further construction during development—they are somewhat resistant to change. This is because cognitive models shape children's ongoing perceptions of their caregivers and thus predispose children to experience their caregivers in particular ways.

Since the most recent wave of international adoption began in the early 1990s, there has been concern about the attachment security of adoptees. However, studies have shown that children adopted very early in life (typically by 4 months of age) from both moderately (Juffer & Rosenboom, 1997) and severely (Chisholm, Carter, Ames, & Morison, 1995) depriving environments often resemble their non-adopted peers in attachment status. In contrast, children adopted later in the first year or after show remarkable variability in their attachments (Marcovitch et al., 1997; O'Connor, Marvin, Rutter, Olrick, & Britner, 2003; Pugliese, Cohen, Farnia, & Lojkasek, 2010; Rutter et al., 2007; van Londen, Juffer, & van IJzendoorn, 2007). This variability suggests that international adoption itself does not put a child at risk for attachment insecurity and that further research is needed to identify the factors that do so. This pilot study adds to our knowledge by examining the influence of four child factors—the child's preadoption care, age at adoption, developmental status, and stress level—as well as one maternal factor, the adoptive mother's attachment representations

1.1. Preadoption Care

The preadoption care of adoptees varies between and even within countries, but few children experience the kind of responsive care needed to foster attachment security. Overall, the trend since 1990 has been for increasing numbers of children to be institutionalized prior to adoption. In that year, less than 60% of children adopted internationally had lived in an institution, but by 1998, over 80% had been institutionalized, most for at least 8 months (Hellerstedt et al., 2008). Studies show that although children do form selective attachments to orphanage caregivers, the percentage of securely attached children ranges from 19% (Zeanah, Smyke, & Koga, 2005) to 24% (Vorria et al., 2003), much lower than the approximately 67% secure found in low-risk dyads (van IJzendoorn, Goldberg, Kroonenberg, & Frenkel, 1992). Further, whether children come from orphanage or foster care they often have several placements prior to adoption—children may, for example, move from orphanage to foster care as it becomes available; from a regional orphanage to an urban center that processes international adoptions; or between sections of the same orphanage, with completely new caregivers. Although the effect of these placements has not been studied in international adoptees, evidence from foster care suggests that multiple placements may compromise the child's attachment security (Leathers, 2002). Finally, even adoptees with more optimal preadoption care, such as extended time with birthparents or high quality foster care, will have made at least one major transition in care by the time they reach their adoptive homes. Following attachment theory, these previous caregiving experiences will have shaped adoptees' expectations of attachment figures—and thus influence the developing attachment with adoptive parents.

Given the theory's emphasis on early caregiving, suboptimal care of many adoptees should make this an important factor for explaining variability in attachment security. However, research is limited by adoptive parents' lack of knowledge about their children's preadoption care. Further investigation is needed to make use of all the information adoptive parents typically have, such as the length of time in birth parent and foster care, and number of preadoption placements—as well as parents' more limited knowledge of the quality of preadoption care.

1.2. Age at Adoption and developmental status

Infants in typical circumstances begin attaching to their caregivers at or before birth, but they are not considered attached until they can organize their behavior around a few preferred caregivers. This organization typically occurs between 7 and 12 months, when 2 developmental milestones have been achieved—the ability to distinguish means and ends and the ability to mentally represent the caregiver, even when absent (Bowlby, 1969/1982). International adoptees, however, follow a different trajectory in attaching to their adoptive mothers. This is because (1) infants are often not adopted until late in the first year or in the second year of life (Hellerstedt et al., 2008), thus they begin attaching to their adoptive parents at an older age, and (2) adoptees are often developmentally delayed at adoption, making their chronological and developmental age discrepant in at least some domains (Miller, 2005). While it seems likely that these factors might affect the kind of attachment behavior adoptees exhibit and the pace at which an attachment develops, findings on the effects of age at adoption have been mixed. European samples of children adopted in the first months of life have typically shown more normative rates of attachment security than samples adopted at older ages, but the effect of age within samples or within groups in a sample has been insignificant (Juffer & Rosenboom, 1997; van Londen et al., 2007), even when the age range at adoption is as large at 8 to 68 months (Chisholm et al., 1995). A recent meta-analysis, in contrast, reported a large effect (d=.80) when comparing groups adopted before and after 12 months of age (van den Dries, Juffer, & van IJzendoorm, 2008). Those adopted before 12 months of age were as securely attached as their non-adopted peers, whereas those adopted after 12 months were not. Thus the differences between meta-analytic and individual study findings still need explanation.

In regards to developmental status, the most consistent finding is that delay persisting 3-13 months after adoption predicts lower levels of attachment security (Judge, 2004; van Londen et al., 2007). What is unknown, however, is whether this more persistent delay results from adverse preadoption care, individual differences in response to that care, or from other factors.

1.3. Stress Level (Basal Salivary Cortisol)

Investigations of the relationship between a child's stress level and attachment behavior are relatively new and rely heavily on animal models. Work with rat pups, for example, has shown that contact with the mother early in life deactivates the hypothalamic-pituitary-adrenocortical (HPA) system, a system that plays a central role in the mammalian stress response. This deactivation protects the rat pup's developing brain from the adverse effects of high levels of glucocorticoids that are secreted during stress. But if the pup is separated from the mother, the pup's HPA axis will again become reactive (Caldji et al., 1998; Hofer & Sullivan, 2001; Suchecki, Rosenfeld, & Levine, 1993). While somewhat inconsistent, research on human infants indicates that they also experience a buffering of the HPA axis if they receive consistent, sensitive care (Gunnar & Donzella, 2002; Vazquez & Levine, 2005). In contrast, it appears likely that ongoing exposure to increased cortisol can result in the HPA-axis being hypo- or hyper-responsive, making it more difficult for children to cope effectively with internal and external stressors (Gunnar, 2006).

International adoptees, especially those who have been institutionalized prior to adoption, are unlikely to have experienced the buffering of the HPA axis that comes from high quality care. It is not yet clear, however, how severe deprivation must be to affect adrenocortical functioning. Some studies have reported elevated basal cortisol levels or altered diurnal rhythms in moderately (Bruce, Kroupina, Parker, & Gunnar, 2000) and severely (Gunnar, Morison, Chisholm, & Schuder, 2001) deprived adoptees, even when the severely deprived group had been in their adoptive homes 6.5 years. Yet other research has shown that only

children with growth delay below World Health Organization (WHO) norms at adoption had altered basal cortisol levels (Kertes, Gunnar, Madsen, & Long, 2008). Further, when groups of moderately deprived and severely deprived adoptees as well as a non-adopted control group were compared, the moderately deprived group had the lowest cortisol levels, while the remaining two groups did not differ from each other (Gunnar, Frenn, Wewerka, & Van Ryzin, 2009). These findings raise the interesting possibility that lowered cortisol levels in at-risk children represent resilience rather than hypocortisolism (as such levels have previously been interpreted (Bruce et al., 2000; Fernald, Burke, & Gunnar, 2008; Kertes et al., 2008)).

None of these studies have examined the relationship between stress level and attachment security. Thus the possibility that HPA axis functioning may function as a risk or protective factor in the child's developing attachment to the adoptive mother has yet to be explored.

1.4. Maternal Attachment Representations

Although Bowlby (1969/1982) believed that variations in infant behavior could influence the mother's responses to her child, he believed that "what the mother brings to the [relationship]… is far more complex," and thus more influential, than what the infant brings (p. 342). Initially, maternal sensitivity was considered the key maternal factor contributing to a child's attachment security (Ainsworth, 1967), but more recent research has focused on the mother's attachment representations. These representations originate in the mother's attachment experiences in her own childhood, becoming organized by adulthood into a cognitive model that underlies her thoughts and feelings about attachment (Main, Kaplan, & Cassidy, 1985). In the Adult Attachment Interview (AAI), the first measure designed to assess these representations, mothers fall into one of four categories based on their appraisal of their attachment history: (1) *autonomous* mothers value attachment needs and have resolved attachment issues from their childhood, (2) *dismissing* mothers tend to idealize their parents but discount the importance of attachment in their childhood, (3) *preoccupied* mothers show angry involvement with childhood attachment figures and have difficulty separating their history from the current situation, and (4) *unresolved mothers* have difficulty talking about attachment issues in an organized way, often due to a history of trauma or abuse (Hesse, 1999). Maternal attachment representations, in turn, powerfully predict the infant's attachment status (van IJzendoorn, 1995). Although it is speculated that this is in part because the mother's representations influence her responsiveness to her infant's signals and thus the child's developing attachment, these representations have been found to be a better predictor of infant attachment than maternal sensitivity (Belsky, 1999; van IJzendoorn, 1995).

Since internationally adopted infants come into the adoptive home with heightened attachment needs, the mismatch between those needs and a mother with insecure attachment representations is likely to have a greater effect on the child's attachment behavior than in low-risk dyads. Thus far, however, research on international adoptees has focused on maternal sensitivity (Juffer & Rosenboom, 1997; van Londen et al., 2007) or commitment to the parental role (Chisholm et al., 1995). Interestingly, in these studies the relationship between maternal sensitivity and infant attachment status has not been significant. Maternal attachment representations have been assessed, however, in studies of children adopted domestically out of orphanages (Verissimo & Salvaterra, 2006) and children in foster care (Dozier, Stovall, Albus, & Bates, 2001), with both reporting a significant relationship between the mother's and child's attachment security. Thus although these studies are small in number, results suggest that maternal attachment representations may be a better predictor of attachment security in international adoptees than maternal sensitivity.

The current pilot study was conducted to identify potential effect sizes of these child and maternal factors in children adopted late in the first year or in the second year of life. The study's specific aims were to:

1. Determine the degree to which the child's preadoption care (length of time in birth parent, foster, and orphanage care; quality of care; number of placements), age at adoption, developmental status, and stress level (basal salivary cortisol level) contribute to attachment security at six months post adoption.

2. Determine the degree to which the mother's attachment representations contribute to a child's attachment security at six months post adoption.

2. Methods

2.1 Participants

The convenience sample consisted of 22 infant-mother dyads living in the greater San Francisco Bay Area. The majority of children were female (73%), and their mean age at adoption was 13 months (SD=5.35). Children came from 9 countries (68% from six Asian countries, 14% each from Africa and Central America, and 5% from Russia/Eastern Europe) and had experienced a variety of preadoption care: 23% had only foster or orphanage care, 63% experienced 2 kinds of preadoption care (birth parent, foster, or orphanage care) and 14% experienced all three kinds of care. Mothers were 42 years (SD= 4.77) on average and 82% were Caucasian. Most (86%) were married or in a partnered relationship. Family income was high, with all families earning over $75,000 per year and 55% earning more than $150,000 per year.

2.2. Procedures

Participants were recruited from 3 sources: an international adoption clinic, adoption agencies, and adoptive parent group listserves. Data were collected at 2 home visits in the sixth month post adoption. Prior to the first visit, mothers were mailed questionnaires on their child's development, behaviour, and preadoption care. At the first visit, the dyad was observed for 2 hours to assess the child's attachment behaviour, and the mother was instructed in how to collect saliva samples from her child. At the second visit, mothers completed a projective test assessing their attachment status and returned their child's saliva samples.

Human subjects' approval for this study was obtained from the Committee on Human Research at the University of California, San Francisco. Informed consent of the mothers was obtained by phone or email prior to the first visit, with the signed consent returned by mail.

2.3 Measures

2.3.1 Attachment Q-Set (AQS)—The AQS (Waters, 1995) assesses the quality of attachment behavior in a natural setting (most often the home) and is valid for children between 1 and 5 years of age. This measure consists of 90 statements describing children's behavior, each written on a separate card. After the researcher observes the child for a minimum of 2 hours the cards are sorted into 9 equal-numbered piles, from those cards most characteristic of the child to those least characteristic. This sort is then compared to an "expert sort" describing a prototypically secure child. The correlation between this prototypical child and the assessed child is the child's security score.

In this study, two components were added to the AQS procedure to create a more complete database from which to complete the sort. First, to assess the child's level of distress at

separation and behaviour upon reunion, mothers were asked to leave the room for 4-5 minutes, without telling the child that they were going or when they would return. During the separation, the researcher attempted to engaged the child in play. Second, mothers filled out a questionnaire consisting of the 90 items in the AQS, rating each item between 1 ("very unlike" the child) and 9 ("most like" the child). This questionnaire was used as additional information when completing the sort for items that could not be observed during the visit (for example: "Child often cries or resists when mother takes him to bed for naps or at night"). Although no pretesting of these components was performed with international adoptees, a similar adaptation of the AQS has been used successfully in previous research (Weiss & St. Jonn-Seed, 2002).

The AQS is considered one of two "gold standards" for assessing attachment security in infancy with demonstrated construct, criterion-related, and cultural validity (Eiden, Teti, & Corns, 1995; Posada et al., 1995; van IJzendoorn, Vereijken, Bakermans-Kranenburg, & Riksen-Walraven, 2004). Inter-observer reliability for the AQS ranges from .72 to .95 (Solomon & George, 1999; Waters & Deane, 1985); in the current study the range was .73 to .96 (M=.83). Sorts were completed within 24 hours of the observation.

2.3.2 Preadoption Care Questionnaire—The Preadoption Care Questionnaire was created for this study. Mothers reported information regarding the child's history of care that resulted in 3 scores: (1) a length of preadoption care score (the number of days spent in birth parent, foster, and orphanage care); (2) a quality of preadoption care score (the sum of the mother's responses on a 3-point scale regarding the amount of caregiver interaction, the amount of affection and warmth from caregivers, the amount of physical and mental stimulation, the quality of overall physical care, and the presence of harsh punishment or abuse experienced by the child in prior care); and (3) a preadoption placement score (the number of preadoption placements a child experienced). A placement was defined as a change in the kind or location of care (e.g. moving from birth parent to orphanage care; from one orphanage to another; or from one section of an orphanage to another, if this involved a complete change of caregivers).

2.3.3 Ages and Stages Questionnaire (ASQ)—The ASQ (Bricker & Squires, 1999) is a screening tool to detect developmental delays during the first five years of life. Parents fill out 30-item questionnaires that cover five areas—communication, gross motor, fine motor, problem solving, and personal-social. Professionals then convert parent responses of "yes," "no," or "not yet" to points (for a total possible score of 300), with higher scores indicating higher developmental status. A child's score in each area is then compared to cutoff points 2 standard deviations below the mean (these cutoff points were derived from combined samples of risk and non-risk children). Scores above the cutoff point indicate typical development while those below indicate that some action, such as referral or follow up, should be taken. The ASQ has received extensive psychometric testing (Bricker & Squires, 1999).

2.3.4 Basal Salivary Cortisol Level—Child saliva samples were collected by the mother on three days between 9 and 11 am. The mother placed two absorbent swabs in the child's mouth for 1 minute, moving them around to collect as much saliva as possible. She then placed the swabs in a tapered vial (labeled with time and date) and stored them in the freezer. Vials were mailed to the University of Trier and stored at -20 degrees C until assayed. These collection, storing, and mailing procedures are commonly used in research and do not affect cortisol levels (Clements & Parker, 1998; Donzella, Talge, Smith, & Gunnar, 2008). Samples were assayed in duplicate using a time-resolved fluorescence immunoassay (DELFIA). The intra-assay coefficient of variation was between 4.0% and 6.7%, and the corresponding inter-assay coefficients of variation were between 7.1% -9.0%.

For this study, the mean of the 3 samples was used in the analysis and outliers were winsorized (Tukey, 1977) to the closest value within 2 SD of the mean.

Since factors such as sleep, eating, teething, the use of medicines, a change in routine, and daily stresses can affect the integrity of salivary cortisol readings (Egliston, McMahon, & Austin, 2006), mothers were informed as to the appropriate context for collecting cortisol. They were taught how to collect the saliva and given a specific protocol to follow. Mothers also filled out a brief questionnaire about these factors on each of the three collection days and returned the questionnaire with the saliva samples.

2.3.5. Adult Attachment Projective (AAP)—The AAP (George, West, & Pettem, 1997) consists of eight simple line drawings, seven of which depict scenes—such as separation, illness, and death—designed to activate the attachment system. For each picture, participants are asked to construct a story, describing what is happening in the picture, what led up to the scene in the picture, what the character(s) are thinking or feeling, and what will happen next. Although the pictures function as projective stimuli, the format for administering the AAP combines projective and interview techniques, with the interviewer choosing from a list of standardized probes to elicit a complete story for each picture. From the transcribed audiotape, coders evaluate three aspects of the stories—content, discourse, and defensive processes—and then assign the individual a secure classification or one of three insecure classifications (dismissing, preoccupied, or unresolved):

The AAP was designed to assess attachment representations in a more efficient and cost-effective manner than the Adult Attachment Interview, the primary tool for assessing adult attachment representations (Hesse, 1999). The AAP has shown criterion-related validity (George & West, in press) with the Adult Attachment Interview, as well as test-retest reliability. In this study, the AAP was administered by a researcher trained in the use of the measure and coded by Carol George, co-author of the AAP. Dr. George was blind to all other information about study participants.

2.4. Data Analysis

Analyses were conducted in two steps. First, preliminary correlation coefficients and t-tests were computed to examine relationships between all child predictors and attachment security as measured by the AQS. Kruskal-Wallis tests were computed to identify differences in attachment security scores for children with mothers having autonomous, dismissing, preoccupied, and unresolved states of mind. Decisions regarding use of parametric versus nonparametric statistics were based primarily upon sample size (e.g., not all subjects experienced foster care, so fewer subjects were included in this correlation) and normality of distribution of each variable. Potential confounds were assessed by examining relationships between key study variables and all demographic variables (the mother's age, ethnicity, education, marital status, and family income—as well as the child's gender, ethnicity, birth country, and presence of siblings). Similarly, relationships between daily cortisol values and conditions that might have affected those values were assessed, such as minutes since awakening, timing of food or milk consumption, or atypical distress or routine on collection day. Second, based on these preliminary analyses, variables showing significant relationships to the AQS score were entered into a regression equation to see how these variables work together to contribute to the variance in attachment security. All analyses used an a priori alpha level of .05.

3. Results

3.1. Preliminary Analyses

The mean and standard deviation of all child-related variables are reported in Table 3.1.

3.1.1. Child Factors Affecting Attachment Security—Eighteen of the twenty-two participants completed the cortisol samples. Of the four who did not, one declined at the beginning of the study and three were unable to complete the samples due to noncompliance or illness. These four participants were excluded from the regression analysis (see below) since this statistical test requires complete data for all participants. There were no significant differences in attachment security between those who did and did not complete the cortisol sampling. In those completing the sample, there was no relationship between the child's stress level and potential confounds from saliva sampling.

Sociodemographic variables showed no relationship to the predictor variables. In the initial correlations between child factors and attachment security, none of the relationships were significant. However, there was a medium effect size (Cohen, 1988) for the correlation between the infant's stress level and attachment security. These results are shown in Table 3.2.

3.1.2. Maternal Factors Affecting Attachment Behavior—Eighty-six percent of mothers were given an insecure classifications on the Adult Attachment Projective. Mean ranks of the Kruskal-Wallis test (see Table 3.3) showed that the distribution between the four AAP classifications was not significant (X^2 (3) = .789, N=22, p=.852).

3.2. Final Analyses

Although none of the correlations of child factors in Table 3.2 were statistically significant due to the small sample size, the three predictors showing the greatest effect sizes— developmental status, number of preadoption placements, and stress level—were entered into an exploratory regression model to test Aim 1. The combination of these three predictors accounted for approximately 38% of the variance and the model was significant ($F_{(3,14)}$ = 4.524, p = .02). However, only two predictors made significant contributions to the model: number of preadoption placements (p=014) and stress level (p=016). There were no problems with multicollinearity.

The final model with these two predictors explained approximately 40% of the variance ($F_{(2, 15)}$ = 6.602, p = .009) as shown in Table 3.4. Number of preadoption placements independently accounted for 14% of the total variance in attachment security (p=.007), controlling for stress level (see Table 3.5). Stress level independently accounted for 12% (p=011) of the variance in attachment security, controlling for the number of preadoption placements. Both beta coefficients were negative, indicating that as the number of preadoption placements decreased, attachment security increased, after controlling for stress level. Similarly, as stress level decreased, attachment security increased, after controlling for number of preadoption placements.

In regard to Aim 2, preliminary analyses in Table 3.3 indicated that there was no relationship between maternal attachment representations (AAP) and children's security of attachment (AQS). As a result, this maternal variable was not entered into the regression model.

4. Discussion

4.1. Characteristics of Internationally Adopted Children in the Sample

The means in Table 3.1 indicate that this sample possessed somewhat different characteristics than those in previous studies of attachment in international adoptees. First, the mean age at adoption was approximately 13 months (and all but one child was adopted between 6 and 19 months), an age in which children are consolidating their attachment behavior around a few preferred caregivers. These children also fell above the screening cutoff in the domains tested in the Ages and Stages Questionnaire, indicating that their chronological and developmental ages were not highly discrepant by 6 months post adoption. Second, children in this sample experienced diverse forms of preadoption care—birth parent, foster, and orphanage care—with 77% receiving 2 or 3 kinds of care. If children spent time with birth parents, this was typically brief, with much longer stays in foster or orphanage care. In quality of care, mothers' average rating of their children's preadoption care indicated that children experienced moderate rather than severe deprivation (such as insufficient food or very high child/caregiver ratios). As such, this sample differs markedly from the most studied group of international adoptees to date— Romanian adoptees—whose age at adoption varied widely and who experienced severe institutional deprivation prior to adoption (Chisholm, 1998; Chisholm et al., 1995; Marcovitch et al., 1997; O'Connor et al., 2003). The current sample more closely resembles the second most studied group of adoptees—those adopted into the Netherlands from a variety of birth countries—in which children experienced moderately depriving preadoption care and often several different kinds of care (Juffer & Rosenboom, 1997; Stams, Juffer, & van IJzendoorn, 2002; van Londen et al., 2007). A key difference, however, is that the mean age at adoption for these European samples ranged from 7 weeks to 5.5 months. The current sample, then, represents a group of adoptees that has not yet been assessed—those adopted late in the first year or second year of life from moderately depriving environments.

Since stress level has not been assessed in previous studies on attachment in international adoptees, comparisons are limited to one study of international adoptees reporting mid-morning basal cortisol levels (Bruce et al., 2000) and to low-risk samples. Bruce and colleagues reported a mean of 3.89 nmol/l, while two studies of healthy, middle-class children aged 13 and 18 months (Gunnar, Mangelsdorf, Larson, & Hertsgaard, 1989; van Bakel & Riksen-Walraven, 2004) reported mid-morning means of 7.23 and 15.85 nmol/l, and a third study (McCarthy et al., 2009) of children aged 4-10 years reported a mean of 6.23. (Due to the lack of studies reporting mid-morning values for young children, the 7.23 figure is a baseline value in a study of stress reactivity, which was taken immediately upon arrival at the laboratory and thus should not be affected by the relatively slow-acting HPA system.) It is of interest that both the current sample mean of 4.89 nmol/l and Bruce et al.'s reported mean are lower than those found in low-risk samples. These lower values could be interpreted in three ways: (1) as within normal limits, since there is no "standardized 'normal range'" (Jessop & Turner-Cobb, 2008) for cortisol values in young children, (2) as hypocortisolism, and (3) as resilience (i.e. an HPA axis made more efficient in the face of manageable early life stress, as suggested by Gunnar et al. (2009)). Although there is no way to definitively decide between these interpretations, the fact that lower cortisol values predicted higher attachment security lends support to the first and third interpretations. For further discussion on the possible mechanisms supporting this level of function, see the section on Infant Stress Level below.

4.2. Preadoption Development/Care and Attachment Security

Findings for Aim 1 suggest that age at adoption and a child's developmental status did not predict attachment security at 6 months post adoption. In addition, length and quality of the

child's preadoption care were not predictors of attachment status. However, children experiencing fewer placements had higher attachment scores than children who experienced more placements—in fact, the number of preadoption placements accounted for the most variance in attachment security. This finding is of particular interest since the number of placements has been ignored in international adoption research to date, even while receiving much attention in the foster care literature. In foster care, however, the implications of this finding are more straightforward than in international adoption, since fewer foster care placements involve fewer separations from primary caregivers in the same kind of family setting. But in international adoption, placement consistency often means staying in an institution rather than moving into a family setting in foster care. Thus it is especially important to remember the context in which this finding occurred: (1) Children in this sample were relatively young at adoption, thus their exposure to institutional care was limited as well; (2) The quality of care score indicated that all children received at least average quality institutional care; and (3) Children were assessed in the early post adoption period, when preadoption transitions may exert greater influence on attachment security than after a longer time in the adoptive home. Therefore, these findings may not apply when adoptees experience less optimal care or even comparable quality care for longer periods.

However, these findings do raise important questions about how to weigh the risks and benefits of different aspects of preadoption care. The debate thus far has focused primarily on length of institutionalization and, to a lesser extent, on the quality of care—and this lens appears too narrow. Clearly more research is needed—both research that assesses consistency in addition to length and quality, and longitudinal research that assesses the impact of these variables on children's attachment trajectories after adoption.

4.3. Infant Stress Level (Basal Salivary Cortisol) and Attachment Security

Results showed that children with lower basal salivary cortisol levels exhibited more secure attachment behavior, while those with higher levels exhibited more insecure behavior. This link to attachment security provides an opportunity to expand the analysis of stress levels in children adopted internationally. To date, the international adoption literature has focused almost exclusively on preadoption care as the source of regulation and dysregulation after adoption (Bruce et al., 2000; Gunnar, 2001; Gunnar et al., 2009; Kertes et al., 2008; Wismer Fries, Shirtcliff, & Pollak, 2008). This approach would suggest that preadoption care in the current sample was "good enough" to support typical regulation or to foster resilience. But there are several possibilities for post adoption influence as well. First, expanding upon the interpretation of "good enough" preadoption care, HPA regulation at adoption may function as a protective factor that facilitates the developing attachment with the adoptive mother. The mother-infant attachment relationship, in turn, could foster increased HPA regulation through the buffering effects of responsive care. It is also possible that the HPA axis was able to recover from a (somewhat) dysregulated state prior to adoption, due to the developing attachment with the adoptive mother.

Although these interpretations must remain suggestive, it is noteworthy that the data provide support for the effects of both pre and post adoption influence. Ideally, future research will continue to broaden the scope of inquiry by assessing basal stress levels and attachment security longitudinally, beginning immediately after adoption, in order to better understand the differential contribution of these two caregiving environments.

4.4. Maternal Attachment Representations and Infant Attachment Security

Results for Aim 2 concerning maternal attachment representations were unexpected in 2 ways: (1) the high percentage of mothers rated insecure and (2) the lack of concordance between maternal and child attachment security. The percent of insecure mothers in the

sample is considerably higher than normative populations but roughly comparable to or slightly higher than non-normative groups (Bakermans-Kranenburg & van IJzendoorn, 2009; Odipo, 2002; Paperny, 2003; Santona & Zavattini, 2005; Stovall-McClough & Dozier, 2004). A possible explanation for the high rate of insecurity is the set of potentially stressful conditions associated with the experience of mothering an internationally adopted child. Santona & Zavatini (2005) list four factors affecting the transition to domestic adoptive parenting: (1) a history of infertility (for most women); (2) a lengthy institutional evaluation process; (3) uncertainty about when the adoption will take place; and (4) additional parenting responsibilities after the adoption, such as coming to terms with aspects of the child's history that may not have been disclosed, as well as understanding the unique physical and psychological needs of adopted children. These factors are all present—and all but the first is magnified—in the transition to parenting an internationally adopted child. International adoption, for example, involves the institutional practices of a second, foreign country in addition to U.S. procedures; adopting a child one may have never met, typically at least 6 months of age; having little or no medical information about the child or knowledge of preadoption care, even while knowing the child comes from a high-risk group; and traveling to the birth country where language and cultural barriers must be negotiated simultaneously with the transition to parenting. Thus it is possible—although research thus far has emphasized the stability of adult attachment representations, even across major life transitions such as marriage (Crowell, Treboux, & Waters, 2002) and motherhood (Benoit & Parker, 1994; Rothschild, 1996)—that the cumulative stressors of mothering an internationally adopted child shifted at least some mothers from a previously secure to an insecure classification. While there are as yet no studies assessing adoptive mothers attachment representations before and after adoption, at least one study has reached a similar conclusion about the effect of adoptive parenting on adult attachment security. In their sample of Russian children adopted into Spain, Palacio et al. (2009) found significantly lower attachment security scores in the adoptive mothers as compared to a control group of biological mothers. Interestingly, however, the adoptive mothers also had higher reflective functioning—a measure of their capacity to reflect on their children's experience and the mental states that gave rise to the children's behavior, a capacity that is considered important for sensitive caregiving (Slade, 2005). Researchers speculated that the stress of parenting an adopted child may have challenged the mothers' attachment system, accounting for the higher rate of insecurity, while at the same time fostering a more complex ability to reflect on their children's mental states.

It is also possible that recruitment and the context for administering the AAP in this study may have influenced the results. This study used a convenience sample and thus may have appealed to adoptive mothers who were especially interested in telling their story. According to AAP author Carol George (personal communication, May 10, 2009), women who choose to participate in attachment studies are more frequently in the preoccupied and unresolved categories for attachment representation. In addition, the AAP was administered in the context of a study about the mothers' adoption experience, including concerns about adequacy of their child's preadoption care. It is possible that a mother's focus on these issues may have affected her perception of the content of the AAP drawings, heightened her emotional response or anxiety, or motivated her to focus on attachment-related concerns more than would have occurred in a more neutral context.

If some of the AAP classifications were misclassified, then the lack of concordance between maternal and child attachment security is at least partially explained. But if the classifications are correct, then the lack of relationship may suggest that other factors actually contribute more powerfully to infant attachment security than maternal attachment representations or that these factors interact with a mother's attachment status to buffer it in some way. In addition to the factor of reflective functioning mentioned above, the possible

factors include: (1) couple attachment and marital quality (Cowan & Cowan, 2009; Dickstein, Seifer, & Albus, 2009); (2) cognitive models of appropriate parenting, which differ from attachment expectations (George & Solomon, 2006; Mayseless, 2006); (3) observed parenting behavior, including maternal sensitivity (Adam, Gunnar, & Tanaka, 2004; DeWolff & van Ijzendoorn, 1997; Peck, 2003; Slade, Aber, Belsky, & Phelps, 1999), and more generally, (4) healthy family functioning (Belsky, 1999). While none of these factors were measured in the current study, it is certainly possible that they, along with the strengths typically found in adoptive families (older, well-educated parents with adequate resources), may have helped create a family environment conducive to secure attachment in the adopted child—even when the mothers themselves were classified insecure.

5. Limitations of the Study

This study has a number of limitations. First, this was a convenience sample from the San Francisco Bay Area and may not be representative of the diversity in the population of internationally adopted infant-mother dyads. Second, the study was limited by the small sample size, resulting in a lack of power to detect aspects of the children's attachment behavior or the factors affecting that behavior. This limitation had particular implications for comparing degrees of infant attachment security among maternal attachment classifications. Third, the AQS (and other existing attachment measures) is designed to assess attachment security in children who have already formed an attachment. Since the children in this sample had been in their adoptive homes for only six months, it is possible that some of the children were still in the process of forming an attachment to their adoptive mothers. Fourth, parents have limited knowledge of their child's preadoption care, and thus their responses on the History of Care Questionnaire may have unmeasured biases. In addition, there was no psychometric testing of this measure.

6. Implications

Findings from this pilot study suggest that the number of placements adoptees experience and their stress level—two factors that have not been assessed in previous studies of attachment in international adoptees—are important for better understanding attachment security in this population. These findings are particularly useful because they rely on information adoptive parents typically have (i.e., the number of preadoption placements their child experienced) or biological specimens that can be collected post adoption. Further, the strength of the effect size for these two factors indicates that, even though it is difficult to recruit large samples for observational research (given the small number of international adoptees in any geographic area), significant results can be obtained from smaller samples. Future research, particularly longitudinal research, can help clarify when children consolidate their attachment bond after adoption and to investigate how children's stress levels may change during the first post adoption year.

Acknowledgments

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Research highlights

- Adoptees with fewer preadoption placements and lower stress levels (basal salivary cortisol) post adoption had higher attachment security at 6 months post adoption.

- Results suggest that consistency of preadoption care was more important than its length or quality.

- A lower stress level in adoptees may function as a protective factor for developing an attachment with the adoptive mother.

Table 3.1

Mean and Standard Deviation of Child-Related Variables

Variable	Mean (SD)
Age at Adoption (in months)	12.27
Developmental Status (ASQ)	240.00
Preadoption Care	
Length of Birth Parent Care[a]	1.86
Length of Foster Care[a]	3.90
Length of Orphanage Care[a]	3.56
Number of Preadoption Placements	1.41
Quality of Preadoption Care	2.64
Stress Level (Mean of 3 Days)	4.89

[a] A 5-level ordinal scale was created to better reflect the data, which clustered around certain numbers. The five levels were: 1-30 days, 31-100 days, 101-200 days, 201-300 days, and >300 days.

Table 3.2

Correlations Between Child's Attachment Security and Child-Related Variables

Variable	Correlation Coefficient
Age at Adoption	.176
Developmental Status (ASQ)	.289
Preadoption Care	
Length of Birth Parent Care[+]	.023
Length of Foster Care[+]	-.202
Length of Orphanage Care	.130
Number of Preadoption Placements[+]	-.253
Quality of Preadoption Care[+]	.046
Stress Level (Mean of 3 Days)	-.339

[+] Spearman rho correlations. All other correlations are Pearson correlations.

Table 3.3
Kruskal-Wallis Mean Ranks for Four AAP Classifications and Mean AQS Score

AAP Classification	N	Mean Rank	Mean AQS Score
F (Secure)	3	12.00	.48
Ds (Dismissing)	7	9.71	.44
E (Preoccupied)	6	12.50	.50
U (Unresolved)	6	12.33	.50

Table 3.4

Regression Model for Contribution of Child Stress Level and Number of Preadoption Placements to Attachment Security (n=18)

Model	R	R Square	Adjusted R Square	Std. Error	F	df1	df2	Sig.
1	.684	.468	.397	.12501	6.602	2	15	.009

Table 3.5

Coefficients for Predictors in Final Regression Model (n=18)

Variable	B	Std. Error	Beta	Sig.	Sr^2	CI for B
Number of Preadoption Placements	-.215	.068	-.648	.007	.35	-.360 to -.070
Stress Level	-.023	.008	-.598	.011	.30	-.039 to -.006