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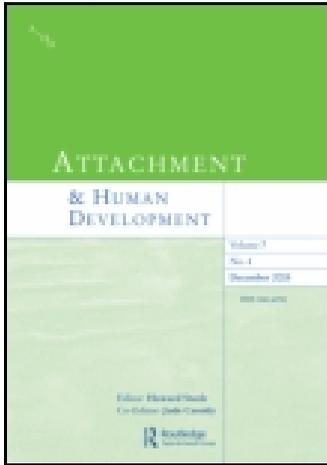
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Johanna Bick ^a, Mary Dozier ^a & Erica Perkins ^a

^a Department of Psychology, University of Delaware, Newark, DE, USA

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Convergence between attachment classifications and natural reunion behavior among children and parents in a child care setting

Johanna Bick*, Mary Dozier and Erica Perkins

Department of Psychology, University of Delaware, Newark, DE, USA

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The current study examined the convergence between young children's attachment classifications in the laboratory-based Strange Situation Procedure and children's and parents' behaviors during naturalistic reunions after a day in child care. Fifty-eight parent-child dyads participated in this study. Children's attachment security assessed from the Strange Situation Procedure was significantly associated with ratings of children's security, avoidance, and delight toward their parents during the natural reunion episodes, and with parents' responsiveness during the natural reunion episodes. These findings suggest that natural reunions at the end of the day in child care reflect the quality of attachment relationships between young children and their parents.

Keywords: naturalistic parent and child attachment behavior; Strange Situation classifications; parent-child reunions; early child care

Introduction

According to Bowlby's original attachment theory (1969/1982), infants are biologically predisposed to turn to their caregivers as a means of protection against danger. Bowlby further suggested that, over the first year of life, infants develop expectations about the manner in which their caregivers will respond to their needs. Based on her own careful observations of mother-infant interactions (an undertaking that was inspired by Bowlby's theory), Mary Ainsworth and colleagues (Ainsworth, Blehar, Waters, & Wall, 1978) developed the Strange Situation Procedure to systematically assess infants' "expectations" regarding the availability of their caregivers. Providing empirical support for Bowlby's theory, Ainsworth demonstrated that infants' attachment behaviors that emerged during the Strange Situation Procedure reflected the quality of care the infants received during their first year of life (Ainsworth, 1964, 1967). Since the release of these seminal findings, numerous studies have linked infants' Strange Situation classifications with mother-infant attachment behavior in naturalistic settings (De Wolff & van IJzendoorn, 1997). However, few studies have examined how attachment behavior elicited from the laboratory-based reunions and separations of the Strange Situation Procedure may relate to attachment behavior elicited from naturalistic separations and reunions, in which the caregivers' and children's attachment systems are similarly

*Corresponding author. Email: jbick@psych.udel.edu

activated. Therefore, we explored connections between infants' Strange Situation classifications and children's and parent's attachment behavior during reunions after full-day separations in child care.

The Strange Situation Procedure is designed to activate infants' attachment systems through the increasing stress of the unfamiliar setting, the introduction of the stranger, and the separations from and reunions with their caregivers (Ainsworth & Bell, 1970). Assessments of attachment security are based on the extent to which infants use their caregivers as a safe haven during reunion episodes by attempting to gain reassurance and comfort from their caregivers following distressing separations (Ainsworth & Bell, 1970).

Bowlby's original theory and Ainsworth's early research suggested that infants' attachment behavior is organized around the perceived availability of their caregivers. When infants are classified as secure with regard to attachment in the Strange Situation Procedure, they appear to have expectations that their caregivers will be accessible and responsive to them during times of distress. When reunited with their caregiver after a stressful separation, secure infants clearly signal their desire for proximity to their caregiver by reaching up or approaching their caregiver. Secure infants also attempt to maintain contact with their caregiver once in their caregiver's presence. Upon receiving comfort, secure infants are able to soothe and they often eventually return to exploring their environment (Ainsworth et al., 1978).

In contrast, infants may develop an insecure attachment if they perceive that their caregiver is not sufficiently responsive to their needs. Because they have not developed a confident expectation that their caregivers will respond to them at times of need, insecurely attached infants do not clearly signal their distress and desire for nurturance when reunited with their caregiver after distressing separations. This insecurity can be classified as either insecure-avoidant or insecure-resistant. Based on a history of being perpetually rejected or rebuffed during times of distress, insecure-avoidant infants may avoid their caregiver altogether and appear to not need their caregiver, despite their increased physiological distress (Ainsworth et al., 1978; Spangler & Grossman, 1993). Alternatively, due to an interaction pattern characterized by inconsistent parental responsiveness, insecure-ambivalent infants may display a mixture of angry avoidance of their caregiver while also trying to seek proximity and contact. Although not the focus of the current study, infants can also be classified as "disorganized" in their attachment behavior during reunion episodes, in addition to a classification of security or insecurity with regard to attachment. A disorganized attachment classification is assigned when children display a breakdown in their strategy when they are distressed and in their caregivers' presence. Disorganization is signaled through a variety of behaviors including stilling or freezing, disorientation or confusion, stereotypes, and interrupted, incomplete, or contradictory movements when in their caregiver's presence (Main & Solomon, 1990).

The validity of the Strange Situation Procedure is based, in large part, on the numerous studies that link infants' Strange Situation classifications with their attachment behaviors in natural settings (De Wolff & van IJzendoorn, 1997). Therefore, Strange Situation classifications have been found to be a valid indication of the way in which infants turn to their caregivers when their attachment systems are activated in natural settings. It is surprising, therefore, that infants' and caregivers' behaviors during the separations and reunions of the Strange Situation Procedure have not been directly compared with their behaviors during normative or naturalistic separations and reunions that occur in everyday life.

The current study took advantage of the context of the child care setting as a means of exploring this question. We hypothesized that young children who were securely attached to their parents, as measured in the Strange Situation Procedure, would show higher levels of secure behaviors (such as by clearly showing a desire for proximity to and contact with their parent during the reunion, or clearly acknowledging their parent) and lower levels of avoidance (such as by avoiding or turning away from their parent during times of contact), when compared with insecurely attached children. Past research using diary studies of home-based behavior did not reveal associations between Strange Situation classifications and children's resistance (Stovall & Dozier, 2000; Stovall-McClough & Dozier, 2004). Therefore, we did not expect resistant behavior during natural reunions to relate to children's Strange Situation classifications in the current study. For this reason, child resistance was not included as a variable in the current study.

As past research has revealed links between maternal responsiveness and infants' Strange Situation classifications, parents of children who were classified as secure in the Strange Situation Procedure were expected to show higher levels of responsiveness toward their children during the natural reunions than parents of children with insecure classifications (De Wolff & van IJzendoorn, 1997). Extending Ainsworth's early research on the association between parents' and children's attachment behaviors and child compliance, parental delight, and child delight (Ainsworth, 1967; Ainsworth et al., 1978; Stayton, Hogan, & Ainsworth, 1971), we examined whether children's attachment classifications predicted the amount of delight exhibited by parents and children during reunion episodes and ease with which children left the classroom setting with their parents at the end of the day. Because securely attached children have been found to show higher rates of compliance toward their caregivers' requests, we expected that children with secure attachments would show greater ease when leaving the classroom with their parents. As mothers' expressions of delight have been predictive of secure Strange Situation classifications, we also expected that parents of securely attached children would show higher levels of delight during reunion episodes when compared with parents of insecurely attached children. Further, secure children have been observed to show higher levels of delight (such as through smiling or displaying positive affect) when reunited with their caregivers after brief separations during the Strange Situation Procedure than non-secure children. Therefore, it was expected that children with secure attachments would show higher levels of delight toward their parents during natural reunion episodes than insecure children.

Method

Participants

Fifty-eight biological parent-child dyads participated in this study. Children ranged in age (at the time of the Strange Situation Procedure) from 11.7 months to 25.3 months old ($M = 18.7$, $SD = 2.7$). Forty-five percent of the children were females ($n = 26$) and 93% of the parents were females ($n = 54$). Fifty-seven percent of the dyads were White/non-Hispanic, 32% were African American, 5% were Hispanic, 2% were Asian American, and 4% were bi-racial. Forty-eight percent of the parents had completed graduate school, 35% had completed college, 10% had completed some college, and 7% had completed high school. Ninety-four percent of the parents were employed full time, 4% were employed part time, and 2% were not employed.

Ninety percent of the parents were married and 10% were single. Fifty-nine percent of the families had annual incomes (in USD) greater than \$100,000/year, 16% had incomes between \$60,000 to \$99,000/year, 9% had incomes between \$50,000 and \$59,000/year, 3% between \$19,000 to \$29,000/year, 11% between \$10,000 to \$19,000/year, and 2% made less than \$10,000 annually.

Children in the current study attended a full-day child care center at a university which was accredited by the National Association for the Education of Young Children (NAEYC), a voluntary accreditation system to help raise the quality of US childcare centers. Children in the current study were assigned to one of six classrooms. The number of children in each classroom ranged from five to 14. Each class had a primary teacher who remained in the classroom consistently throughout the day. Classrooms at the center were large, open rooms with adequate play space and age-appropriate toys and learning materials. The school day consisted of about two hours of outdoor play and a combination of teacher-directed activities and free play throughout the school day.

Ainsworth's Strange Situation Procedure

During the Strange Situation Procedure, children are observed as they encounter unfamiliar adults and experience two separations from and reunions with their primary caregivers in an unfamiliar setting. Attachment classifications are scored on the basis of the children's behavior toward their caregivers during the reunion episodes. Children are classified as secure if they are able to seek out the reassurance they need from their caregivers during reunions. Infants receive an insecure-avoidant classification if they avoid contact, do not seek proximity, or ignore their primary caregivers during reunion episodes. Children are categorized as insecure-resistant if they display a combination of contact maintenance and proximity seeking behaviors in addition to resisting the presence of their caregivers (Ainsworth et al., 1978). A fourth category, referred to as disorganized, is assigned to children in addition to the secure, insecure-avoidant, or insecure-resistant classification, if children show a breakdown in strategy toward their caregiver during the reunions episodes (Main & Solomon, 1990).

In the current study, Strange Situation assessments were videotaped in a laboratory setting according to the standardized procedure. Videotapes were coded in accordance with the Ainsworth et al. classification system by coders who were blind to the participants' characteristics (Ainsworth et al., 1978). All coders were certified as reliable coders of the Strange Situation Procedure. To achieve certification of reliability, coders attended a two-week training on the attachment classification system at the University of Minnesota and passed the reliability set of tapes prior to coding. To pass the reliability set, coders met the criterion of 80% agreement on a reliability test of secure, avoidant, resistant, and disorganized classifications. A subsample (30%) of the Strange Situation tapes in the current study was double-coded to assess inter-rater reliability. Percent agreement on four-way classifications was acceptable; percent agreement was 94% ($K = .638$).

Natural reunions

Natural reunions were filmed as parents picked up their children from the child care setting. For all children in this study, the natural reunion episode was filmed after the

Strange Situation Procedure was conducted. The time that elapsed between the Strange Situation Procedure and the natural reunion episodes ranged from 1.3 months to 10.4 months ($M = 5.5$, $SD = 3.9$). Natural reunions were filmed in an observation room through a two-way mirror so that neither parents nor children were aware of the observer or the video camera. Parents and children were filmed from the time the parents entered the classroom until the parents and children exited the classroom. Natural reunions were videotaped on two separate days for each dyad. Raters who coded children's and parent's natural reunion behaviors did not code children's Strange Situation classifications. Also, research assistants were blind to the families' characteristics and children's Strange Situation classification.

Children were coded for security and avoidance during the reunion episodes. Parents were coded for their amount of delight and responsiveness shown toward their children during the reunion episodes. Security in the natural reunions, consistent with the Strange Situation Procedure, was operationally defined as the extent to which children sought out their parents during reunions, maintained contact with their parents without resistance or avoidance, and greeted their parents upon the parents' entrance into the classroom. Avoidant behavior was defined as the extent to which children ignored or avoided their parents during the reunion episodes. Examples of avoidance included turning away from their parents when the parents entered the room, moving away from their parents when the parents approached with a toy, and/or turning their heads or bodies away if picked up by their parents.

In addition to these variables, children were also coded for their delight upon seeing their parents and the ease with which they left the classroom with their parents. Child delight was operationally defined as the degree to which children showed positive affect (such as smiling or vocalizing excitedly) upon the arrival of their parents into the classroom and throughout the reunion episodes. Both the intensity and the duration of the delight were taken into account when scoring this variable. Ease of leaving was operationally defined as the ease with which children left the classroom with their parents. Children scored high on this variable if they complied with their parents' requests and smoothly left the classroom with their parents. Children who exhibited petulance or an unwillingness to leave with the parents (such as by turning back into the classroom while their parent walked out the door) scored lower on this scale.

Parents were also coded for the amount of delight they showed toward their children. Parental delight was defined as the degree to which parents showed positive affect when they were reunited with their children as well as throughout the reunion episodes. Behaviors indicative of delight included positive facial expressions, vocalizations, and happiness with regard to seeing their children. Like child delight, the intensity and duration of the parental delight was considered in the final rating. Parents also received a score for their responsiveness toward their children. Responsiveness was defined as the degree to which parents responded to their children's bids for attention or signals of distress during the entire natural reunion episode. Child security, avoidance, ease of leaving, and parent delight and responsiveness were rated on seven-point Likert scales.

Reunion rating scores were averaged across the two days of observation for each category. Reunion behaviors were stable across the two different days in which data were collected (child security: $r = .78$, child avoidance: $r = .88$, child delight: $r = .85$, parent delight: $r = .83$, ease of leaving: $r = .75$, parent responsiveness: $r = .81$). Thirty-five percent of the natural reunion episodes were coded for inter-rater

reliability. Excellent inter-rater reliability was found for the measure of children's security ($r = .85, p < .05$), children's avoidance ($r = .86, p < .05$), children's delight ($r = .81, p < .05$), children's ease of leaving ($r = .83, p < .05$), parental delight ($r = .82, p < .05$), and parental responsiveness ($r = .83, p < .05$).

Results

Preliminary analyses

The matrix of intercorrelations of the dependent variables is presented in Table 1. First, the data were inspected to assess whether the distribution of the dependent variables differed from a normal distribution. The 95% CI for the skewness and kurtosis test statistics were calculated separately for each level of the independent variable (secure and insecure). For children in the insecure group, neither statistically significant skew nor kurtosis in the data was found. For children in the secure group, statistically significant skew was found for scores of avoidance (.99) and ease of leaving (-.856). Statistically significant and abnormally high kurtosis was also found for children's avoidance scores (1.65) and ease of leaving (1.59).

Whether the dependent variables met the assumption for homogeneity of variance at each level of the independent variable was explored using the Levene statistical test of homogeneity. Variances were found to be homogenous for all variables except parental delight, Levene (1, 56) = 6.850, $p = .011$, and parental responsiveness, Levene (1, 56) = 9.105, $p = .004$. Based on the skew, kurtosis, and a lack of homogeneity of variances for several variables, a log 10 transform was performed for the relevant dependent variables.

Because the duration of the reunion episode and the length of time children had spent in the child care setting might influence children's and parents' natural reunion behaviors, preliminary analyses investigated the statistical relationship between these variables. However, no significant correlations between these variables emerged, $p > .05$. Therefore, the length of time children had spent in child care and the duration of the natural reunion episodes were not included as covariates in primary analyses.

Primary analyses

Based on the significant correlations between several dependent variables, a multivariate analyses of variance was conducted, including Strange Situation classification (secure vs. insecure) as the independent variable and the parents' and

Table 1. Zero-order correlations between natural reunion variables.

	Child Security	Child Avoidance	Child Delight	Ease of Leaving	Parent Delight	Parent Responsiveness
Child Security	...	...	...	...	...	...
Child Avoidance	-.657**	...	...	...	...	...
Child Delight	.654**	-.533**	...	...	...	...
Ease of Leaving	.593**	-.346**	.361**	...	...	...
Parent Delight	.453**	-.328**	.518**	.457**	...	...
Parent Responsiveness	.625**	-.491**	.431**	.551**	.708**	...

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

children's natural reunion behaviors as the dependent variables. Sixty-seven percent of the children ($n = 39$) were classified as secure in the Strange Situation, 9% ($n = 5$) as avoidant, 14% ($n = 8$) as resistant, and 10% ($n = 6$) as disorganized. Of the six children who were classified as disorganized, three children received a primary classification of secure, and three children received a primary classification of resistant. To maximize statistical power, Strange Situation classifications were dichotomized as secure versus insecure similar to previous studies (see for example, van London, Juffer, & van IJzendoorn, 2007). Given that disorganized attachment has been associated with problematic outcomes, disorganized classifications were included in the insecure category (Carlson, 1998; Lyons-Ruth, 1996; Lyons-Ruth, Alpern, & Repacholi, 1993).

In terms of our first hypothesis, attachment security assessed by the Strange Situation Procedure was associated with child secure behaviors, $F(1, 56) = 7.745$, $p < .01$, and child avoidance, $F(1, 56) = 10.365$, $p < .01$, in the natural reunions (see Table 1). More specifically, children who were classified as secure in the Strange Situation Procedure showed higher levels of security and lower levels of avoidance during natural reunions than children with insecure classifications.

With regard to our second set of hypotheses, as expected, children with secure attachments had parents who were rated higher in responsiveness than children with insecure attachment classifications, $F(1, 56) = 5.770$, $p < .05$, see Table 2. However, attachment security did not significantly predict the amount of parental delight exhibited during natural reunions. In terms of our third set of hypotheses, children's attachment security as classified by the Strange Situation Procedure did not significantly predict the ease with which children left the classroom with their parents; however, children's attachment security was associated with child delight, $F(1, 56) = 4.404$, $p < .05$, in the natural reunions. Children with secure attachments showed more delight toward their parents than did children with insecure attachment classifications.

Table 2. Means and standard deviations of natural reunion behavior across Strange Situation classifications.

<i>Child Security during natural reunion</i>	<i>M</i>	<i>SD</i>
Secure	4.55	1.50
Insecure	3.31	1.74
<i>Child Avoidance during natural reunion</i>	<i>M</i>	<i>SD</i>
Secure	1.94	1.14
Insecure	3.15	1.68
<i>Child Delight during natural reunion</i>	<i>M</i>	<i>SD</i>
Secure	3.92	1.59
Insecure	3.03	1.34
<i>Child Ease during leaving in natural reunion</i>	<i>M</i>	<i>SD</i>
Secure	4.97	1.33
Insecure	4.69	1.45
<i>Parental Responsiveness during natural reunion</i>	<i>M</i>	<i>SD</i>
Secure	4.40	1.00
Insecure	3.58	1.57
<i>Parental Delight during natural reunion</i>	<i>M</i>	<i>SD</i>
Secure	3.94	1.04
Insecure	3.52	1.52

Discussion

Results from the current study indicate that young children's Strange Situation classifications relate to parents' and children's interactions in naturalistic reunions that occur in the child care setting. Children with secure Strange Situation classifications showed more security, less avoidance, and more delight when greeting their caregivers when compared with children with insecure Strange Situation classifications. Caregivers of children who were classified as secure according to the Strange Situation Procedure showed greater responsiveness toward their children during reunion episodes when compared with caregivers of children who were classified as insecure.

The findings from the current study enhance our understanding of the significance of parents' and children's attachment behavior in natural settings. First, measurements of parents' and children's behaviors across two days of natural observation were strongly correlated. Therefore, parent-child attachment behaviors at naturally occurring reunions appear to be relatively stable, at least in the context of child care. Second, parents' and children's attachment behaviors in the natural reunion episodes were significantly associated with children's Strange Situation classifications. These results converge with and extend Mary Ainsworth's original findings suggesting that Strange Situation classifications reflect parent-child interaction patterns.

In addition to providing further validity for the Strange Situation Procedure, the findings from the current study have important clinical implications. First, child care teachers have been found to play an important role in young children's social-emotional development (Birch & Ladd, 1997, 1998). As indicated by the results of this study, child care providers may be in a unique position to observe parents and children attachment-related interactions, such as during separations and reunions throughout the school day. With proper training, child care providers may be able to help parents respond sensitively to their child's behaviors during naturally occurring separation and reunions. Such intervention efforts may encourage secure communication patterns between parents and young children over time.

Although assessing attachment behaviors in the context of natural reunions appears to be of value, this method is not without limitations. The Strange Situation Procedure has been regarded as the "gold standard" method for assessing attachment classifications because it elicits attachment behavior in a controlled environment by activating children's attachment systems under *moderate* stress. Whereas too little stress would not adequately activate infants' attachment systems or elicit observable attachment behavior, too much stress would cause all infants to fall apart during reunion episodes and would lead to invalid disorganized classifications (Ainsworth et al., 1978; Solomon & George, 1999; Vaughn & Waters, 1990). Unlike the Strange Situation Procedure, children's attachment systems likely vary in the degree to which they are activated during the naturalistic reunion. Some children may experience significant stress from being separated from their caregiver during the school day, yet others may experience very little. Variables such as age, length of time spent in child care per day or week, and the degree to which day care teachers "buffer" children from the stress of the separation from one's primary caregiver likely contribute to this variability. Given this variability, for some children, the natural reunion with one's caregiver may be an opportunity to approach their caregiver and seek contact as a means of reducing distress. For those children who are less distressed, the interaction during the natural reunion may be

more about expressing joy, delight, and excitement as the child updates their caregiver of the day's events. Therefore, unlike the Strange Situation Procedure, there is likely wide variability in the degree to which children's attachment systems are activated during natural reunions at the end of the day in child care. For this reason, it seems remarkable that strong associations between attachment behavior observed in the Strange Situation Procedure and natural reunions still emerge.

Although the implications of the current findings are promising, limitations of the design of the current study should also be mentioned. Most especially, this sample was comprised of only 58 children. To maximize statistical power, Strange Situation classifications were dichotomized into secure versus insecure categories. Therefore, the results from this study contribute to the understanding of differences between securely and insecurely attached children, but they do not permit an understanding of variability between the avoidant, resistant, and disorganized classifications. Further research that includes a larger sample of children with a wider range of insecure Strange Situation classifications may help to extend these findings. Additionally, an important extension of this research would be to assess whether natural reunion behaviors relate to measurements of children's current and future social emotional-adjustment, as a means of providing further validity for this assessment technique. Nevertheless, the current findings provide an exciting direction for the observation of attachment behaviors among young children and parents after day-long separations.

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