EXAMINING THE EFFECTIVENESS OF A MULTIPLE ANTECEDENT INTERVENTION FOR INCREASING SECURE INFANT ATTACHMENT

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ABSTRACT
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One of the most robust theories in the psychology of child development is attachment theory (Svanberg, 1998). A continually growing body of research finds that a secure attachment of a child to his or her mother provides a foundation for resilience to life's stressors and the basis for later psychological adjustment, social competence, and academic and vocational achievement. Studies typically find, however, that only 55% to 65% of infants become securely attached by one year of age. Increasing this proportion would have important benefits for individuals, families, and society. Past interventions designed to promote secure attachments have typically focused on one or two of the antecedent maternal behaviors which are believed to promote secure attachment. The present study focused on promoting five of these maternal behaviors.

This study examined the effectiveness of providing attachment information and a psychoeducational intervention on increasing the proportion of securely attached infants in a sample which included 64 infants and their mothers. The intervention was designed to maximize the chances that a secure attachment would develop by promoting a combination of maternal behaviors which have been found in past research to be associated with secure attachment. These five factors included (1) psychological availability or the attention paid to the child by a mother; (2) physical availability or the actual presence of the mother; (3) maternal sensitivity or the prompt and appropriate

responding to infant cues; (4) body contact which included breastfeeding, holding, use of a cloth carrier, infant massage, and room sharing; and (5) psychological warmth or the joyful reciprocal play between mothers and infants. Participants were randomly assigned to one of two intervention groups, both of which were designed to promote secure attachment. These included an attachment information plus home visit group and an attachment information-only group with no home visits.

The dependent variable in the study was the infants' attachment classification which was measured by the Strange Situation procedure when the infants were 12 months of age. Psychological availability and psychological warmth were measured using the Still-Face procedure, maternal sensitivity was measured using a modified version of the Ainsworth Scale, and physical availability and body contact were measured through mothers' self-report.

The results of the study found a 94% rate of secure attachment in the attachment information plus home visit group, and an 81% rate of secure attachment in the attachment information-only group. These appear to be the highest rates of secure attachments found in any research study to date. A logistic regression analysis found that 98.4% of the infants' attachment classifications (rated when the infants were 12 months of age) were correctly classified by a model which included the following predictor variables all measured when the infants were either 3 or 6 months of age: hours spent at work, long-term absences away from one's infant, amount of holding, amount of room sharing (sleeping with the baby in the same room), amount of infant massage, psychological warmth, and maternal sensitivity. Only one insecure infant was not correctly identified through this model.

A post-hoc examination of the ability of the antecedent variables to predict the specific attachment classifications (i.e., the avoidant, secure, anxious, and disorganized groups) found that infants in each of these groups tended to experience specific patterns of stress-producing and stress-reducing maternal behaviors.

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Chapter I

OVERVIEW OF THE LITERATURE

Evidence continues to accumulate that secure attachment between mother and child is "a powerful predictor of life success" (Lewis, Amini, & Lannon, 2000, p.74). Securely attached individuals have been found to be more socially competent, self-reliant, empathic, flexible, assertive, less anxious, and display more leadership qualities than those who are insecurely attached (Bischof-Koehler, 2000; Englund, Levy, & Hyson, 1997; Lutkenhaus, Grossmann & Grossmann, 1985; Kestenbaum, Farber, & Sroufe, 1989; Sroufe, 1983; Sroufe, Carlson, & Shulman, 1993; Urban, Carlson, Egeland, & Sroufe, 1991; Weinfield, Ogawa, & Sroufe, 1997). At the cognitive level, securely attached children have been found to have longer attention spans, exhibit greater curiosity, show more perseverance at a task, and display more resourceful problem solving (Frankel & Bates, 1990; Lutkenhaus et al., 1985; Matas, Arend, & Sroufe, 1978; Sroufe, 1983).

In addition, research has shown that securely attached children have an advantage in developing resilience (Fonagy, Steele, Steele, Higgitt, & Target, 1994; Pianta, Egeland, & Sroufe, 1990; Sroufe, Egeland, & Kreutzer, 1990; Svanberg, 1998). Indeed, the effect is so strong that John Bowlby (1988), the founder of attachment theory, wrote, "The pathway followed by each developing individual and the extent to which he or she becomes resilient to stressful life events is determined to a very significant degree by the pattern of attachment developed during the early years" (p. 177). Finally, securely attached children have also been found to have a physical advantage. They have steadier

heart rhythms than insecurely attached infants (Izard et al., 1991) and have stronger immune systems than those who suffer from prolonged separation from the mother (Ader, Cohen, & Felten, 1995).

Conversely, insecurely attached children are at risk for developing a range of psychological symptomatology. Research has shown that insecurely attached children are more prone to developing anxiety disorders, depression, dissociative symptoms, and other psychopathology (Kraemer, 1992; Lewis et al., 2000; Ogawa, Sroufe, Weinfield, Carlson, & Egeland, 1997; Shore, 1997; Warren, Huston, Egeland, & Sroufe, 1997). Behaviorally, insecurely attached children have been shown to display more dependency, hostility, anger, and aggression. They are more likely to become victims or bullies and are more likely to engage in controlling behavior (Lyons-Ruth & Jacobvitz, 1999; Sroufe et al., 1993; Sues, Grossmann, & Sroufe, 1992; Troy & Sroufe, 1987).

The consistency of the outcomes associated with secure and insecure infant attachment styles suggest that attachment creates a developmental pathway to different patterns of psychosocial functioning. The period of infancy is also critically important in this process because secure attachment has only a small window of opportunity to develop. Several researchers have theorized that internal working models are created in the infant through the attachment process and that these models cannot be easily changed (Amini et al., 1996; Bowlby, 1969/1982; Bretherton & Munholland, 1999; Main, Kaplan, & Cassidy, 1985)—indeed, attachment has been found to be a relatively stable phenomenon from infancy through adolescence and into young adulthood (Bretherton, Ridgeway, & Cassidy, 1990; Hamilton, 2000; Main, 1995; Main & Cassidy, 1988; Urban et al., 1991; Wartner, Grossmann, Fremmer-Bombik, & Sues, 1994; Waters,

Merrick, Trebous, Crowell, & Albersheim, 2000). In light of the evidence regarding the advantages of secure attachment and the consistency of the phenomenon, it is disheartening that only 55%-65% of the children in the United States are securely attached (Berk, 2001; Lyons-Ruth, 1996; Svanberg, 1998; van IJzendoorn, 1995).

A critical obstacle to developing interventions designed to increase the proportion of securely attached children, however, is that researchers have not yet identified the necessary and sufficient antecedents. In his book *Attachment and Loss*, Bowlby (1969/1982) stressed the importance of determining the antecedent factors that promote the development of attachment (De Wolff & van IJzendoorn, 1997). He reported that Ainsworth (Ainsworth & Wittig, 1969), through her observations, thought there were possibly four antecedents: frequent and sustained physical contact with the infant, providing a regulated and predictable environment, maternal sensitivity, and mutually enjoying each other's company. Bowlby (1969/1982) felt that there would also be psychobiological influences on the processes involved in attachment in addition to psychosocial influences. He mentioned a mixture of visual, auditory, tactile, kinesthetic and olfactory processes. In discussing the various types of antecedents, Bowlby writes: "Questions thus posed are: which, if any, of these modes of interaction are indispensable for attachment to develop, and which are the most powerful for the purpose?" (p.319).

Although great progress has been made since 1969 in identifying possible antecedents of attachment, the two questions that Bowlby raised have not yet been answered. Mary Main (1999) stressed the importance of answering these questions and called for more studies when she wrote: "I believe that the set of still-missing studies concerning the mechanism(s) of tie formation is critical" (p. 849). Therefore, this study

is designed to attempt to answer Bowlby's two questions of which antecedents are necessary and which ones are the most powerful to the attachment process by focusing on the knowledge already accumulated on the psychosocial aspects of maternal interaction and adding to it an emphasis in the intervention process on the psychobiological influence as well, especially in the areas of alleviating stress and increasing body contact through mechanisms such as breastfeeding, infant massage, and holding. By intervening on all antecedents believed to have a significant effect, it will be possible through statistical analysis to determine which antecedents are the most powerful and which ones create a sufficient condition for a secure attachment to occur.

The five antecedents I have chosen have been derived from Ainsworth's description of possible antecedents of attachment and from successful research that shows what maternal behaviors impact attachment. The antecedents are similar to Ainsworth's with the exception that the first one she mentions, frequent and sustained physical contact, implies presence and body contact. I have separated that antecedent into physical availability of the mother and body contact to better examine what would be necessary and sufficient on both factors and the relative importance of each. Thus, the five antecedents in this study are physical availability (i.e., the actual presence of the mother), psychological availability (i.e., the focus of the mother on the child as opposed to being preoccupied with other matters), maternal sensitivity (i.e., the prompt and appropriate responding to the infant's signals without intrusion or rejection), body contact (i.e., cuddling, holding, nursing, co-sleeping, and massaging), and psychological warmth (i.e., the warmth felt by the child through synchronous, modulating, and mutually enjoyed interaction with the mother). Other factors have been investigated, but they can

be considered aspects of these broader categories. Although in past research each of these antecedents appear to affect mother-infant attachment, it has also been shown that not all need to be operative in order for a secure attachment to occur. It is also still not known which antecedent or antecedents are the most important or if the absence of some can be compensated for by the presence of others. Bowlby (1969/1982) suggested that in all likelihood not all of the suspected antecedents needed to be present and that strengths in some areas could compensate for weaknesses in other areas. He wrote: "The wisest position to take at present is that in all likelihood all modes of social interaction play a major role, but that, thanks to considerable redundancy in the organization of attachment behaviour, a shortfall in one mode can, perhaps within wide limits, be made good through some other mode" (p. 321). Thus, another goal of this study will be to determine whether particular antecedents appear to be sufficient for creating a secure attachment and if strengths on one or more antecedents can overcome weaknesses on others.

Finally, most studies to date have focused on only one or two antecedents that were suspected to impact attachment. It is not known if interventions on multiple antecedents will have a synergistic effect and substantially increase the chances for a secure attachment. Therefore, this study will focus the intervention on all five antecedents in hopes of maximizing the development of secure attachments. Following is a brief discussion of the five selected antecedents and why they were chosen as factors in developing a secure attachment. Both psychosocial and psychobiological influences will be discussed. A more detailed description will follow in chapter two. For the purpose of simplicity, the term "mother" will be used to refer to a child's primary caregiver and encompasses anyone who has assumed the mother role for the infant.

Antecedents to Developing a Secure Attachment

Physical Availability

The importance of the physical availability of a mother for a secure attachment has been documented in several research studies (Avierser, Sagi, Joels, Ziv, & Yair, 1999; Belsky & Rovine, 1988; Bowlby, 1988; Clarke-Stewart, 1988; Freud, 1974; Spitz, 1945; Zinsmeister, 1998). Bowlby thought that attachment evolved as a survival process in that infants benefited if their mothers were close by for protection. Her presence also provided a secure base from which the infant felt free to explore and learn. However, more recent research which has examined heart-rate, body temperature, immunological functioning, and cortisol levels (indicating stress) suggests that it also serves a metabolic purpose in the infant. The physical presence of the mother may close a homeostatic loop involving body functions and affect centers of the developing infant brain (Amini et al., 1996; Field, 1985; Hofer, 1995; Insel, 1992; Kraemer, 1992; Reite & Capitano, 1985; Shore, 2000; Spangler & Grossmann, 1993). When the mother is not present, the infant's disarray is both psychological and physical, which provides the basis for a strong drive in the infant to do all that is possible to keep the mother nearby. For example, in a recent study by Watamura, Donzella, Alwin, and Gunnar (2003) the researchers found that cortisol levels for children who attended full-day childcare increased throughout the day whereas for many children at home cortisol levels decreased throughout the day. According to Shore (1997), how maternal absence impacts a child psychologically depends on what the mother does when she returns. He believes it is possible to alleviate

some separation distress by timely interactive repair. However, he also feels that if this repair is not forthcoming the affective centers in the maturing limbic system can be adversely affected and attachment compromised. Studies involving large numbers of infants have shown that the absence of a mother for more than 20 hours a week significantly lessens the probability of a secure attachment between mother and child (Belsky & Rovine, 1988; Clarke-Stewart, 1988). On the other hand, a study by the National Institute for Child Health and Development (1997) found that absences longer than 20 hours per week do not necessarily preclude secure attachment. Thus, physical availability as an antecedent appears to be very important, but it also appears that secure attachment can occur under less than desirable circumstances of maternal presence, perhaps because of successful interactive repair on the part of the mother.

Psychological Availability

In contrast, there are suggestions that psychological availability may be necessary for secure attachments to develop. As mentioned earlier, psychological availability refers to a mother's thoughts that are available to and about her child, such that she is not distracted or preoccupied with other priorities. The effect of psychological unavailability on infant mammals has been demonstrated in a classic study by Rosenblum and Andrews (1994). They found that monkey mothers who were placed in a situation where they were anxious about obtaining food and preoccupied with foraging had infant monkeys with damage to their neural pathways. The infant monkeys in that group also were more submissive and less social than infant monkeys whose mothers were afforded a consistent amount of food and consequently were more attentive to their young. Thus, psychological unavailability affects animals both physically and socially. In human

infants Egeland and Erickson (1987) found that psychological availability was essential to the attachment process. When comparing groups of children who suffered neglect, hostility, physical maltreatment, and psychological unavailability, they found the children who suffered from psychological unavailability were the most affected. Of the children who had psychologically unavailable parents, not one was found to be securely attached, whereas there were at least some children in each of the other groups that were securely attached. Whether psychological availability is a necessary condition for secure attachment to occur is not yet known, as this is but one study, but it may very well be the "indispensable" antecedent that Bowlby was looking for. This study also showed that psychological availability, although appearing necessary, was not sufficient to insure a secure attachment, for there were some children who had psychologically available parents but were still not securely attached. Therefore, it appears that strengths on additional antecedents may need to be operating as well.

Maternal Sensitivity

Sensitive interaction has long been thought of as the primary antecedent to achieving a secure attachment between mother and child (De Wolff & van IJzendoorn, 1997). Sensitivity as conceptualized by Ainsworth and her colleagues (Ainsworth et al., 1974) is concisely defined as "promptness, consistency and appropriateness" in an interaction (van den Boom, 1994, p. 593). Bowlby (1969/1882) firmly believed that the mother's sensitivity when interacting with her infant was a critical factor in the development of a secure attachment. Supporting this belief were the findings from the "Baltimore Study" by Ainsworth et al. (1978) which involved more than 70 hours of observation of 26 middle class mother-infant dyads. The researchers found that the most

important aspect of maternal behavior associated with a secure attachment was a "sensitive responsiveness to infant signals and communications" (Ainsworth, et al., 1978, p. 152). The importance of maternal sensitivity was also dramatically demonstrated in a study by van den Boom (1994) who worked with the mothers of 100 infants identified as irritable to develop more sensitive interaction between them and their children. After just three sessions, the proportion of secure attachments in the treatment group was 68% as compared to 28% in the control group. In a replication study by Juffer, Hoksbergen, Riksen-Walraven, & Kohnstamm (1997), similar positive results were found with 90 adoptive infants and their mothers. After four home visits during which time mothers were encouraged to develop sensitive interactions with their infants, the proportion of secure attachments in the group receiving the home visits was 90% as compared to 70% in the control group. From these studies it is apparent that maternal sensitivity is a very important element in developing securely attached children. However, in a meta-analysis of parental antecedents of attachment, De Wolff and van IJzendoorn (1997) found only a moderate effect size of .24 between maternal sensitivity and secure attachment, a weaker effect than what would be anticipated by Ainsworth or Bowlby.

Body Contact

Body contact is gaining support through the research as a very strong contributing factor in achieving a secure attachment. For example, Anisfeld, Casper, Nozyece, & Cunningham (1990) found a difference of 50 percentage points between the proportion of securely attached babies who were carried close to the mother in cloth carriers and those who were carried in a hand held carrier. Field et al. (1996) found that mothers who spent 15 minutes massaging their infants 2 times a week had infants who showed greater

improvements in emotionality, sociability, and soothability compared with infants who were rocked by their mothers. Keller's (2000) recent research across different cultures suggests that when infants sleep close to their mothers and are nursed on demand, family bonds are characterized by greater strength and loyalty (Greenfield, 1994; Nsamenang & Lamb, 1991; Rabinovich, 1998). McKenna (1996) found that babies who co-sleep with their parents also realize physiological benefits. Co-sleeping babies had less apnea, steadier heart rates, less crying, higher body temperatures, and a lower rate of SIDS than babies who did not sleep with their parents. Physiological effects that translate into bonding experiences may also be the result of chemical releases discovered in research involving breastfeeding. Insel (1992, 1997) has studied this process in a variety of mammals and has found that body contact through nursing of an infant increases oxytocin in both mother and infant. This was also found in human studies (Nissen, Gustavsson, Widstrom, Uvnas-Moberg, 1998; Nissen, Lilja, Widstrom, Uvnas-Moberg, 1995; Uvnas-Moberg, Widstrom, Werner, Matthiesen, & Winberg, 1990). Oxytocin is considered by some researchers as the "bonding hormone" because it increases maternal behaviors and creates a sense of well-being in the child (Palmer, 2001). Suckling also increases the chemical prolactin in the mother which promotes maternal behaviors and stimulates opioid release. This results in a classically conditioned response pairing the maternal behaviors with pleasant sensations which contributes to feelings of closeness in the relationship (Battin, Marrs, Fleiss, & Mishell, 1985; Lozoff, Felt, Nelson, Wolf, Meltzer, & Jimenez, 1995; Sobrinho, 1993).

Thus, be it nursing, holding, massaging or cosleeping, it is becoming apparent that body contact and closeness have a surprisingly strong effect on the bonding process.

Psychobiologists Shore (2000) and Wang (1997) maintain that "mutually entrained" physiological rhythms mediate attachment bond formation, a position that is consistently being supported by recent empirical studies.

Psychological Warmth

Besides body contact, warmth can also be expressed psychologically through positive mutuality. Mutuality is a sharing of activity where enjoyment is heartfelt between the infant and caregiver and affectionate interchanges are easily observable. It is the antecedent that had the highest effect size for attachment (.32) in the meta-analysis of attachment antecedents by De Wolff and van IJzendoorn (1997). This effect size is also higher than that of maternal sensitivity (.24), which had for so long been thought to be the most important antecedent. Moreover, evidence from throughout the literature indicates that insecurely attached avoidant babies have parents whose style of interacting is noticeably devoid of warmth (MacDonald, 1992).

Psychological warmth which can be measured through mutuality is seen most readily in play situations which are thought to enhance the opportunity for attachment. According to Kiser, Bates, Maslin, & Bayles, (1986), "Dyadic communication in the form of play, because of its emphasis on a shared frame of reference and positive affect, may be especially relevant to building the emotional bond" (p. 69). Shore (2000) stressed the importance of play to the attachment process when he wrote: "Attachment is not just the reestablishment of security after a deregulating experience and a stressful negative state; it is also the interactive amplification of positive affects, as in play states" (p. 21). Kiser et al. (1986) performed their famous experiment on mutuality and attachment using a play situation from the Still-Face paradigm developed by Tronick et al. (1978). This