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ABSTRACT

A longitudinal study explored the effects of different aspects of child care on infants' attachment security. Child care variables examined included age of entry; the quality, amount, stability, and type of care; and mother's sensitivity to the child's needs. When the validity of the Strange Situation was tested by comparing children with low and high amounts of child care outside the home, it was determined that infants distress during mothers' absence in the Strange Situation was not significantly different between the two groups, indicating that the Strange Situation was equally valid for both groups. Other results indicated that non-maternal child care by itself does not constitute a threat to the security of the infant-mother attachment, nor does it foster secure attachment. Instead, there was consistent evidence that poor quality, unstable or more than minimal amounts of child care added to the risks already inherent in maternal insensitivity. The combined effects of these child care variables and maternal insensitivity were worse than those of maternal insensitivity alone. Results suggest that the effects of child care on attachment, and the nature of the attachment relationship itself, depend on the nature of ongoing interactions between mother and child. (JPB)

Infant Child Care and Attachment Security: Results of the NICHD Study of Early Child Care

NICHD Early Child Care Research Network[1]

Symposium, International Conference on Infant Studies
Providence, RI, April 20, 1996

[1] This study is directed by a Steering Committee and supported by NICHD through a cooperative agreement (U10), which calls for scientific collaboration between the grantees and the NICHD staff. The participating investigators are listed in alphabetical order with their institutional affiliations designated by number: Mark Appelbaum (14); Dee Ann Batten (14); Jay Belsky (2); Cathryn Booth (12); Robert Bradley (4); Celia Brownell (9); Bettye Caldwell (4); Susan Campbell (9); Alison Clarke-Stewart (5); Jeffrey Cohn (9); Martha Cox (8); Kaye Fendt (1); Sarah Friedman (1); Kathryn Hirsh-Pasek (3); Aletha Huston (6); Bonnie Knoke (1); Nancy Marshall (15); Kathleen McCartney (7); Marion O'Brien (6); Margaret Tresch Owen (10); Deborah Phillips (11); Henry Ricciuti (1); Susan Spieker (12); Deborah Lowe Vandell (13); Marsha Weinraub (3). The institutional affiliations, in alphabetical order, are the National Institute of Child Health and Human Development (1); Pennsylvania State University (2); Temple University (3); University of Arkansas at Little Rock (4); University of California, Irvine (5); University of Kansas (6); University of New Hampshire (7); University of North Carolina-Chapel Hill (8); University of Pittsburgh (9); University of Texas-Dallas (10); University of Virginia (11); University of Washington (12); University of Wisconsin-Madison (13); Vanderbilt University (14); Wellesley College (15). We wish to express our appreciation to the study coordinators at each site who supervised the data collection, to the research assistants who collected the data, and especially to the families and child-care providers who welcomed us into their home and workplaces with good grace and cooperated willingly with our repeated requests for information.

Infant Child Care and Attachment Security: Results of the NICHD Study of Early Child Care

Welcome

Welcome to our symposium, "Infant Child Care and Attachment Security: Results of the NICHD Study of Early Child Care". The author of this symposium is the NICHD Early Child Care Research Network, comprising the following investigators listed in alphabetical order: Mark Appelbaum, Dee Ann Batten, Jay Belsky, Cathryn Booth, Robert Bradley, Celia Brownell, Bettye Caldwell, Susan Campbell, Alison Clarke-Stewart, Jeffrey Cohn, Martha Cox, Kaye Fendt, Sarah Friedman, Kathryn Hirsh-Pasek, Aletha Huston, Bonnie Knoke, Nancy Marshall, Kathleen McCartney, Marion O'Brien, Margaret Owen, Deborah Phillips, Susan Spieker, Deborah Vandell, and Marsha Weinraub. The past chairs of our Steering Committee were Henry Ricciuti and Bettye Caldwell, and our current chair is Lew Lipsitt.

Those of us who will be speaking represent the entire group, and the text from which we will speak has been approved by everyone. The presenters are myself, Cathryn Booth, Sarah Friedman, Alison Clarke-Stewart, Susan Spieker, Jay Belsky, and Kathleen McCartney. Eleanor Maccoby is our discussant. We have allowed time for discussion at the end, so please hold your questions and comments until then. If you would like to receive a complete copy of this presentation, please sign up at the table in the back of the room.

Role of NICHD and History of Study

By the time you walk out of this invited symposium you will have heard findings about the effects of different aspects of child care on the attachment security of 1153 infants. This outcome is one of many we are measuring in the NICHD Study of Early Child Care, which is the largest and most comprehensive ongoing longitudinal study of child development and of the effects of child care on such development in the first seven years of life.

The authorship list for the presentations you will hear is longer than any we are used to in our scientific field. This calls for an explanation. Therefore, I will pose and answer two questions: First, how did the many investigators who work collaboratively on this study get together to form a network ?

The National Institute of Child Health and Human Development, or NICHD, routinely supports "cooperative agreements," which are research projects that are initiated by NICHD and are carried out by a small number of NICHD staff in collaboration with many other investigators in the scientific community. Cooperative agreements are established to address scientific or important public health concerns that cannot be addressed by small studies.

Concerns about the effects of early child care on the development of children have been addressed by scientists for many years, but no one investigator or team mounted an investigation that could take into account all the critical family, child, and child-care variables that are hypothesized to influence the development of young children. Dr. Duane Alexander, the Director of NICHD has been aware of the high prevalence of early child care and the concerns of the public regarding such care. Following a National Academy of Science conference on the topic that pointed out the need for research, he

asked NICHD staff to work with the scientific community to develop an NICHD-supported, comprehensive, cutting-edge study about the effects of child care.

Early in 1988, NICHD issued a request for applications calling on investigators to participate as members of a research network. Of those interested, 10 teams of scientifically meritorious investigators were selected. It so happens that those invited to participate in the network included investigators who championed different interpretations of the then available information about the effects of early child care on the attachment of infants to their mothers.

I will now turn to question # 2: How have the many investigators managed to collaboratively plan and implement such a large study ? The NICHD and the participating investigators have established organizational structures and lines of communication that made it possible to plan one study to be carried out at ten sites. All scientific plans have been made centrally by the Steering Committee, which consists of an independent chairperson, one representative from each of the ten grantee teams, and representatives from NICHD, from the central Data Coordinating Center, and from the central Data Analysis Center. In other words, the 14 members of the Steering Committee are the collective Principal Investigator for the study.

Briefly, the response to the second question is that the many investigators manage to collaboratively plan and implement the study thanks to their wish to work together, thanks to the availability of centralized organizational structures established for the purpose of coordinating important aspects of the study (including training and certification of research assistants, coding of videotaped data, data management, and data analysis), and thanks to extensive electronic and face-to-face communications.

So, as you listen to the results about the effects of early child care on attachment, please remember that the findings are the product of a true collaboration of many minds.

Introduction

The prospect that routine nonmaternal care in the first year of life might adversely affect the security of the infant's attachment to mother has been a subject of much discussion and debate over the past decade and a half, and discussion and debate continue to this day. It began when people realized that the dangers of institutional rearing, which were known to cause serious cognitive and emotional deficits in young children, might apply to children in child care. And it received support when it was discovered that children in full-time nonmaternal child care during infancy were more likely that those cared for at home by their mothers to exhibit insecure attachments to their mothers. In one of the first multi-study analyses of published research linking infant child care and attachment classifications, Belsky and Rovine, in 1988, evaluated child-care effects in five homogenous samples of maritally-intact, middle-and working-class families, with a total N of 491. They found that infants who experienced 20 or more hours per week of routine nonmaternal care in the first year were significantly more likely to be classified as insecurely attached to their mothers between 12 and 18 months of age than were infants with more limited child-care experience. The difference was particularly marked for insecure-avoidance. In a subsequent analysis of 1247 infants from a more heterogeneous set of studies, some of them unpublished, Clarke-Stewart documented a similar significant association in 1989. Quite consistent across these two multi-study investigations was the extent to which early and extensive child care, defined as 20 or more hours per week of routine nonmaternal care in the first year, increased the risk of insecure infant-mother attachment.

A variety of explanations were advanced to account for these differences. Barglow, Vaughn, and Molitor (1987) interpreted the elevated rates of insecure attachment, especially insecure-avoidant attachment, as evidence that babies experience daily separations as maternal rejection. Jaeger and Weinraub (1990) suggested that proximal processes of mother-infant interaction might be the mediator that was affected. Brazelton (1985) argued that time away from baby might undermine a mother's ability to respond sensitively to the child and this would reduce the probability that a secure relationship would develop. And Sroufe (1988) suggested that daily separations might both cause the infant to lose confidence in the availability and responsiveness of the parent and reduce the opportunities for "ongoing tuning of the emerging infant-caregiver interactive system".

But the studies that demonstrated this difference in attachment security related to hours in child care, were conducted in the late 1970's and the early 1980's, at a time when it was less common for mothers of infants to work full time than it is today. Today, more than half the mothers of infants under one year of age are in the labor force, and in the NICHD Study, over half of the infants were receiving 30 or more hours of nonmaternal care by the end of the first year. It is of interest, then, that a more recent investigation of child care by Roggmann, Langlois, Hubbs-Tait & Rieser-Danner (1994) revealed no significant relation between nonmaternal care experience and attachment security. These investigators suggested that inquiries like theirs, yielding nonsignificant findings, are likely to succumb to the "file-drawer problem," thereby skewing the data that find their way into the published literature in the direction of significant differences between groups of children with and without child-care experience. However attractive this explanation might be, the possibility must be entertained that in the arena of child-care research, the opposite problem can also occur. That is, in a field of inquiry where the results are controversial and politically sensitive, findings of significant differences, too, may be relegated to the file cabinet.

The NICHD Study of Early Child Care was undertaken, in part, to establish convincingly whether, in the 1990s, there is an association between participation in nonmaternal infant child care and infants' attachment to mother, and if so, how such an association might be explained. The sample of infants assessed in the NICHD Study is as large in terms of sample size as all the studies combined in Clarke-Stewart's multi-study meta-analysis. 1364 infants were enrolled in the study soon after birth, and 1201 continued through the first 15 months and were assessed in the Strange Situation. This Study has the advantage of being a prospective, longitudinal investigation, in which subjects were identified at birth, before their child care had begun. The kinds and amount of child care the children received were determined solely by their parents and tracked and observed by the researchers over the first three years of life.

The study design of the NICHD Study was unique in the opportunity it provided to examine the effects of child care "in context." As the overhead (**Figure 1**) shows, child outcomes were studied in the context of family and maternal characteristics, such as maternal personality and attitudes, social stresses and supports; family demographic characteristics, such as income and education; the home environment, including physical, organizational and behavioral qualities; and child characteristics. This feature of the project is an important one for trying to understand the causes of any differences observed. The research that has demonstrated elevated rates of insecurity among infants with early and extensive child-care experience in the past has not found insecurity among ALL infants in early and extensive child care. In fact, according to the multi-study analyses, the majority--about 60%--of the infants with early and extensive child-care experience do develop secure attachments to their mothers. Thus, whether infant child-care experience leads to insecurity may depend upon the nature of the care received and

the ecological context in which it is embedded. More specifically, the effect of child care may depend on characteristics of the care itself, such as the type of care, the quality of care, the amount of care, the age at which the infant entered care, and the stability of care. In addition, the effect of care may depend on characteristics of the child, especially the child's sex and temperament. And third, the effect of care may depend on characteristics of the family, including the mother's social, psychological and economic resources. These components of the child-care context may interact with one another in shaping developmental outcomes, including attachment security. It was our goal to examine the effects of nonmaternal care in the context of these factors. For that reason, we included measures of multiple features of the family, the child, and the child's nonmaternal child-care experience.

Our primary aim was to test three general hypotheses about how these potentially influential factors might operate. The first is the "main effects hypothesis," which suggests that children in early, extensive, unstable, or poor quality care will have an increased likelihood of insecure attachment, independent of conditions at home or in the child. The second hypothesis is the "dual-risk hypothesis," which stipulates that large amounts of care or poor quality of care or changes in care arrangements over time would promote insecure attachment principally when the child is otherwise at risk, for example, by having a difficult temperament, being a male, or residing in a home in which mother is depressed or the quality of care she provides is relatively insensitive. The third hypothesis is the "compensatory hypothesis." This hypothesis, in contrast to the others, stipulates that when family or child risks are high, then nonmaternal care that is early, extensive, or of high quality will stabilize the child's experience and thereby foster the formation of a more secure infant-mother attachment.

Before the hypotheses were tested, however, we examined the validity of the Strange Situation for assessing attachment in children with extensive child-care experience. This was necessary because the argument has been made by Clarke-Stewart (1989) and others that the observed difference in attachment security between children with and without child care experience could be a result of the fact that children who have experienced the multiple separations associated with child care are not especially stressed by the Strange Situation episodes designed to elicit attachment behavior. As a consequence, these children engage in less proximity seeking and more exploration during the critical reunion episodes than other children, which may be mistakenly regarded by coders as avoidance. Thus, some children who are actually securely attached to their mothers and behave as independent explorers in the Strange Situation may be classified erroneously as insecure-avoidant, thereby elevating the rate of insecurity among children with child-care experience and creating the effect documented in the multi-study meta-analyses.

Therefore, we undertook a "preliminary" set of analyses to compare a subsample of infants who experienced extensive nonmaternal care, with a sample of infants who experienced very little nonmaternal care during their first 15 months, in terms of their distress during separations in the Strange Situation and the confidence with which coders assigned them secure or insecure classifications.

In brief, then, the purpose of the work we will describe in this symposium was four-fold: (1) first, to determine if attachment classifications were equally valid for infants with and without extensive child care experience in the first year of life; (2) second, to identify differences in the probability of attachment security in infants with varying child-care experience, in terms of quality, amount, stability, age of entry, and type of care; (3) third, to identify the combination of factors (mother/child and child-care) under which nonmaternal care experience was associated with increased or decreased

rates of attachment security; and (4) fourth, to determine whether early child care experience was associated specifically with insecure-avoidant attachment.

Method

Participants in the NICHD Study of Early Child Care were recruited from 31 hospitals throughout 1991 at 10 locations around the country. **Table 1** lists the participating sites: Little Rock, Arkansas; Orange County, California; Lawrence and Topeka, Kansas; Boston, Massachusetts; Philadelphia, Pennsylvania; Pittsburgh, Pennsylvania; Charlottesville, Virginia; Morganton and Hickory, North Carolina; Seattle, Washington; and Madison, Wisconsin.

Characteristics of the families for whom we have Strange Situation data, which is 84.5% of those recruited, are provided in **Table 2**. Participants were selected in accordance with a conditionally-random sampling plan. The recruited families did not differ significantly from the families in the catchment areas on the major demographic and employment plan variables. Actual percentages for employment plans in the three groups at the end of recruitment were 53% full time, 23% part time, and 24% in exclusive maternal care.

A partial Overview of Data Collection, including only those variables used in the present report, is depicted in **Table 3.**

Home visits to the families occurred when the infants were 1, 6 and 15 months old. At all home visits mothers reported on household composition and family income. In addition, at the 1-month visit, mothers completed the NEO Personality Inventory and a modified Attitude Toward Maternal Employment questionnaire; at 6-months, a modified Infant Temperament Questionnaire; and at 1, 6, and 15 months, the Center for Epidemiologic Studies Depression Scale. At the 6 and 15 month home visits mothers and infants were videotaped in a 15-minute semi-structured play interaction and the home visitor completed the Infant/Toddler HOME scale.

Observations in child care arrangements were conducted when the infants were 6 and 15 months old, using the Observational Record of the Caregiving Environment, or ORCE, which was developed for this project. Telephone interviews to update child care information were conducted at 3, 5, 9, 12, and 14 months.

The Strange Situation assessment of infant attachment security was conducted in a laboratory playroom visit when the infants were 15 months old.

A major challenge to all studies of child care is the fact that care experience is not randomly assigned. In order to reduce the risk of generating spurious findings, a number of possible selection effects variables tapping family, mother and child care characteristics were correlated with the child care parameters under study, that is, quality, amount, stability, age of entry, and type of care, and with attachment security. Two variables met our criteria for covariates in that they were related to both attachment security and child care parameters, and were not highly correlated with any other eligible covariate. These two were an Income-To-Needs Ratio and Beliefs About Benefits Of Maternal Employment.

An income-to-needs ratio was computed from maternal interview items collected at each home visit. Income was divided by the appropriate poverty threshold determined by the year in which the income was earned, total family size, and number of full-time children in household. This variable was averaged across the three assessments to create

an overall Average Income to Needs ratio. Higher income-to-needs ratios were found to be associated with higher quality care, more hours in care per week, more care arrangements started, and earlier entry into care. Families with secure infants had higher average income-to-needs ratios compared with families of insecure infants.

The Beliefs about Benefits of Maternal Employment scale was created by summing five 6-point items from the Attitude Toward Employment questionnaire administered at the 1-month visit. Cronbach's alpha was .80. Higher scores reflected the belief that maternal employment was beneficial for children. Mothers who more strongly believed that maternal employment had benefits for children's development began care earlier, for more hours, than the children of mothers with weaker beliefs about the benefits of maternal employment. Mothers of secure infants had weaker beliefs about the benefits of maternal employment for child development compared with the mothers of insecure infants.

Mother and Child measures are listed in **Table 4**.

A composite measure of the mother's Psychological Adjustment was created based on three scales of the NEO Personality Inventory: Neuroticism, reflected; Agreeableness; and Extraversion; plus the average of the three CES-D depression scores, reflected. Cronbach's alpha was .80.

A maternal Sensitivity In Play composite was constructed on the basis of ratings of videotaped episodes of mother-child play. Tapes from all sites were coded by a single team of coders, using 4-point scales. A composite was created from the sum of the individual scales for Sensitivity to Nondistress, Positive Regard, and Intrusiveness (reflected). Cronbach's alphas were .75 and .70, for the 6- and 15-month composites, respectively, and interobserver agreement was .87 AND .83 respectively. These two scores were averaged to create the overall Sensitivity in Play composite.

A maternal Sensitivity in the Home composite was also constructed. The Infant/Toddler HOME is a structured interview/observational procedure which involves the home visitor answering a set of binary questions based upon maternal response to specific queries, observations of materials in the home, and observations of the mother's behavior toward the child. A sensitivity composite was computed by summing the Positive Involvement factor score, and the Lack of Negativity factor score. The alphas for the 6- and 15-month scores were, respectively, .60 and .64, and interobserver agreement with a gold standard was maintained at a minimum of .91. The 6 and 15 month scores were averaged to create the Sensitivity in the HOME score used in these analyses.

A Difficult Temperament score was created from fifty-five 6-point items from the ITQ. Large scores reflect a more "difficult" temperament. Cronbach's alpha was .81.

Child care variables are listed in **Table 5**.

Observations of the child care settings were conducted on two half-days that were scheduled within a two-week interval. During these sessions, observers scored child care quality using the ORCE. Because the ORCE is used to assess the quality of caregiving for an individual child rather than what happens at the level of caregivers or classrooms, it is an instrument that can be used in home and center settings alike.

Data collection using the ORCE consisted of four 44-minute cycles spread over two days. Each 44 minute cycle was broken into four 10-minute observation periods.

Observers recorded the occurrence of specific behaviors directed to the study infant for each minute during the first three 10-minute cycles. At each age a composite variable was created by summing three standardized variables: Positive Behavior, Responsivity, and Stimulation, created from individual items from the ORCE behavior scales. The composite had very good internal consistency. The average of the composite scores at 6 and 15 months resulted in the quality variable of Positive Caregiving Frequency.

At the end of the fourth cycle, observers made qualitative ratings of the observed caregiving. A second composite was based on 4-point qualitative ratings of the same dimensions of caregiving behavior that were rated for the mothers in the structured play task with their infants. The qualitative rating composite was created by summing sensitivity to nondistress, stimulation of cognitive development, positive regard, and the reflection of detachment and flatness of affect. This composite also had very good internal consistency and very good interobserver reliability. The average of the composite scores at 6 and 15 months resulted in the quality variable of Positive Caregiving Rating. Interobserver agreement on the Positive Caregiving Frequency and the Positive Caregiving Ratings composites ranged from .86 to .98.

Table 6 describes the child-care characteristics of the sample used in these analyses. Mothers provided information at the telephone calls and interviews that was used to calculate the monthly average for number of hours in care per week. A composite for Amount of Care was created by computing the mean hours per week of the monthly care average from 4 through 15 months. Children who received no non-maternal care through 15 months received scores of "0". Age of Entry into child care was classified into 4 time periods. The oldest age category was also used for children not in care. Frequency of Starts of care arrangements was the number of different arrangements the child experienced through the first 15 months. At 5 and 14 months, information from the phone calls was used to classify Type of Care arrangement: mother, father, relative, in-home non-relative, child-care home, and child-care center, for the arrangements that were observed at 6 and 15 months.

The Attachment variables are listed in **Table 7.** The Strange Situation is a 25-minute procedure containing brief episodes of increasing stress for the infant, including two mother-infant separations and reunions. On the basis of the Strange Situation procedure, the nature of the child's attachment relationship with mother is categorized as secure, B, or insecure, A, C, D, or U. When stressed, secure infants seek comfort from their mothers, which is effective and permits the infant to return to play. Insecure-avoidant, A, infants tend to show little overt distress and to turn away from or ignore the mother on reunion. Insecure-resistant, C, infants are distressed and angry, but ambivalent about contact, which does not effectively comfort and allow the children to return to play. Examples of insecure-disorganized/disoriented, D, behaviors are prolonged stilling in contact, rapid vacillation between approach and avoidance, severe distress followed by avoidance, and expressions of fear or disorientation at the entrance of the mother. Occasionally, a case that cannot be assigned an A, B, C, or D classification is given the unclassifiable, or "U" code. The U classifications, comprising 3.5% of the sample have been eliminated from the major analyses in this report.

The Strange Situation was administered according to standard procedures by research assistants who had been trained and certified according to a priori criteria to assure that the assessments were of very high quality. The Strange Situation episodes from all sites were shipped to a central location which was different from the one responsible for coding mother-child interaction, and rated by a team of three highly experienced and intensely supervised coders.

The three coders double-coded all Strange Situation assessments. All disagreements were viewed by the group and discussed until a code was assigned by consensus. Across all coder pairs, before conferencing, agreement on the 5-category A-B-C-D-U classification system for the 1153 cases used in these analyses was 83% and Kappa was .69. Agreement for the 2-category, secure/insecure classification system was 86%, and Kappa was .70.

Individual coders rated their Confidence in each classification on a 5-point scale. The five-point confidence rating was related to inter-rater agreement in expectable ways. When both coders' confidence ratings were 3 or higher, as they were for 87% of the cases, agreement on A B C D U was 94%, and Kappa was .86.

Distress during each mother-absent episode was rated on a 5-point scale. Distress ratings were summed across the three separation episodes to create a total Distress score, which could range from 3 to 15. Cronbach's alpha was .84, and intercoder agreement was excellent.

Results

Two sets of results will be presented, a preliminary set addressing issues of the validity of the Strange Situation, and a primary set addressing the effects of child care.

The preliminary analyses were undertaken to evaluate both the internal and external validity of the Strange Situation. Two analyses were conducted in order to explore the "internal validity" of the Strange Situation for children with varying amounts of early child care. In these analyses we examined only two extreme groups of children: those with less than 10 hours of child care per week for every month from 0 to 15 months, the "low intensity" group, with an n of 263, and those with 30 or more hours per week in every month from 3 to 15 months, the "high intensity" group, with an n of 257. In these preliminary analyses the 5-category classification, A B C D U, was used.

As mentioned earlier, one theoretical challenge to the validity of the Strange Situation for children with extensive child care is the hypothesis that they are not distressed by separation from their mothers. We examined this possibility in the first internal validity analysis: a 2 by 5, Intensity Group by Attachment Classification ANOVA on the Distress rating. The results are shown in **Table 8**. The difference between extreme child-care groups was not significant. A significant Intensity Group by Attachment Classification interaction resulted from the D infants in the high intensity child care group showing more distress than their counterparts in the low intensity group .

The differential validity of the Strange Situation would be supported by finding lower confidence ratings in the high intensity group compared with the low intensity group. Such a finding would suggest that infants in the high intensity group exhibited behavior that made judging the quality of their secure base behavior difficult. **Table 8** gives the results of the second internal validity analysis: a 2 by 5, Intensity Group X Attachment Classification ANOVA on the Confidence rating. The difference between the two extreme groups was not significant. A significant Intensity Group by Attachment Classification interaction resulted from the U infants in the high intensity group being coded with higher confidence than the U infants in the low intensity group.

Neither this nor the earlier interaction regarding distress were theoretically predicted. Therefore, we concluded that the Strange Situation was equally valid for children with early and extensive child care, and for those without.

We proposed that the "external validity" of the Strange Situation at 15 months would be demonstrated by showing that more children whose mothers scored in the highest quartiles for Sensitivity in Play, Sensitivity in the HOME, and Psychological Adjustment were securely attached compared with children whose mothers were in the lowest quartile on these three predictors .

Table 9 shows that this cross tabulation was significant for two of the three analyses. Overall, mothers in the lowest quartiles for Sensitivity in the HOME and Psychological Adjustment had fewer secure infants compared with mothers in the highest quartile . Based on these analyses, we concluded that the attachment classifications in this study were related in expectable ways to external correlates.

Having demonstrated the internal and external validity of the Strange Situation, we proceeded with the primary analyses. Two parameterizations of attachment categories were selected: Secure vs. Insecure, and Secure vs. Insecure-Avoidant . Use of the Secure/Insecure dependent variable afforded the testing of child-care effects at the most global level of adaptive versus maladaptive child outcomes. Use of the Secure/Avoidant dependent variable parameterization afforded the testing of the proposition that infant child-care experiences may specifically elevate the incidence of insecure-avoidant attachment to mother.

In a series of logistic regression analyses, the dependent variable, either Secure/Insecure or Secure/Avoidant, was predicted from (a) one of five characteristics of the mother or child, (b) one of five characteristics of child care, and (c) the interaction between the two selected variables. The mother/child variables, as shown in **Table 10** were: maternal Psychological Adjustment, maternal Sensitivity in Play, maternal Sensitivity in the HOME, child Temperament, and Sex. The child-care variables, also shown in **Table 10**, were the two observational measures of quality, Positive Caregiving Frequency and Positive Caregiving Ratings, as well as Amount of Care, Age of Entry, and Frequency of Care Starts.

We judged this analysis plan to be preferable to one that included all 5 mother/child variables, all 5 child-care variables, and all possible interactions among these variables in a single analysis, because of concerns about multicollinearity among predictors. In addition, it was impossible to include all subjects in a single analysis because some of the child-care variables, namely, age of entry, amount of care, and stability of care, involved the total sample, whereas the positive caregiving frequency and the positive caregiving ratings were available only for those subjects observed in nonmaternal care.

In each regression analysis, control variables reflective of selection effects, namely, Income-to-Needs Ratio, and Benefits of Work, were entered first and then the "main effect" of a mother or child characteristic was tested.

In the first set of logistic regression analyses, Secure/Insecure was the dependent variable. Among the five mother/child variables, two were significant predictors of Secure/Insecure, as shown in **Table 11**, namely, Psychological Adjustment and Sensitivity in the HOME. As expected, mothers who exhibited greater sensitivity towards their infants and who had better psychological adjustment were more likely to have securely-attached infants. Neither child temperament nor sex, nor maternal sensitivity in play predicted attachment security, as main effects, once control variables were included.

As shown in **Table 12,** none of the five child-care variables, entered after the mother/child variables, significantly predicted attachment security. That is, variations in the observed quality of care, the amount of care, the age of entry, and frequency of care starts did not, in and of themselves, increase or decrease a child's chances of being securely- or insecurely attached to mother.

Six of the 25 interaction terms, shown in **Table 13**, were significant predictors of attachment security: (a) Sensitivity in Play X Positive Caregiving Frequency, (b) Sensitivity in Play X Positive Caregiving Ratings, (c) Sensitivity in Play X Care Starts, (d) Sensitivity in the HOME X Positive Caregiving Ratings, (e) Sensitivity in the HOME X Amount of Care, and (f) Sex X Amount of Care.

The nature of these significant interactions was explored in more detail by transforming the continuous variables into discrete categories by the following procedure. For maternal sensitivity and quality of care variables, such as the Sensitivity in Play X Positive Caregiving Frequency interaction shown in **Table 14**, the continuous form of the variable was transformed into discrete categories reflecting low, moderate, or high sensitivity or low, moderate, or high quality. Subjects who were in the highest quartile on any given variable (such as Sensitivity in Play) were in the "high" group, and subjects in the lowest quartile were in the "low" group. The "moderate" group comprised the subjects in the middle 50% of the distribution for that particular variable.

Examination of the three tables corresponding to the significant maternal sensitivity by child-care quality interactions indicate a consistent pattern, namely, the lowest proportion of secure attachment was obtained under "dual risk" conditions. **Table 14** shows that when Sensitivity in Play was low and Positive Caregiving Frequency was also low, the proportion of secure attachment was lowest. **Table 15** shows a similar pattern for the Sensitivity in Play X Positive Caregiving Ratings interaction, and this pattern is repeated in **Table 16** for the Sensitivity in the HOME X Positive Caregiving Ratings interaction. Taken together, these three tables indicate that the risk of insecure attachment is elevated when the mother is relatively insensitive and the quality of child care is relatively poor.

For two of the remaining significant interactions, the dual-risk theme was evident but less pronounced. **Table 17** shows the Sensitivity in the HOME X Amount of Care interaction. For Amount of Care we used cut points reflecting full time (>30 hrs/wk), part-time (10 - 30 hrs/wk) and minimal care (<10 hrs/wk). We found that security was less likely under conditions of low maternal sensitivity, coupled with 10 or more hours of care.

Table 18 shows the Sensitivity in Play X Care Starts interaction. For Care Starts, the discrete categories were 0, 1, or >1 start. The children experiencing low maternal sensitivity combined with relatively unstable care had among the lowest rates of secure attachment.

A different pattern was evident in **Table 19**, which shows the Sex X Amount of Care interaction. The proportion of security was lowest among boys in more than 30 hours of care per week, but was equally low for girls in less than 10 hours of care per week.

For the Secure/Insecure analyses yielding significant two-way interactions, we sought to determine whether consideration of additional child-care conditions would further illuminate the dual-risk pattern of results. For example, among children experiencing low maternal sensitivity and low-quality child care, could the increased risk

of insecurity be explained by the number of hours in child care? Within the subsample of participants at dual risk in any given analysis, attachment security was crossed with an additional child care variable, that is, quality, amount of care, age of entry, care starts, type of care at 5 mos, and type of care at 14 mos, grouped into the discrete categories already described. For example, Security was crossed with Amount of Care within the group of children at dual risk due to maternal insensitivity on the HOME and poor-quality child care, as measured by positive caregiving ratings. The results indicated that the dual-risk interpretations could not be illuminated further by the consideration of additional child-care variables.

In addition to considering additional child care variables in the context of dual risk, we sought to determine whether a compensatory effect of high-quality child care was present in the group receiving low maternal sensitivity and high-quality care. One way to look at this is that compensatory effects are simply the flip side of dual risk, that is, among relatively insensitive mothers, the proportion secure should increase as quality of child care increases. Another way to test for compensatory effects is to look at the effect of number of hours spent in high-quality child care among the children experiencing low maternal sensitivity. We reasoned that if compensatory processes were operating, then under conditions of low maternal sensitivity, the proportion of secure attachment would be greater in full-time high-quality child care than in part-time high-quality care.

As shown in **Table 20,** for the Sensitivity in Play X Positive Caregiving Frequency analysis, the proportion of secure attachment increased as the quality of child care increased in the low sensitivity group. However, among the children who received high-quality care, the proportion of security was .56 FOR children spending more than 30 hrs/wk in care and .65 FOR those spending 10-30 hrs/wk, which is the opposite of what we expected.

For the Sensitivity in Play X Positive Caregiving Ratings analysis shown in **Table 21,** a linear increase in security as quality increased was not observed. However, the proportion of security was higher in full-time care than in part-time, as expected. For the Sensitivity in the HOME X Positive Caregiving Ratings analysis shown in **Table 22,** security increased with quality, but the proportion was higher for part-time care than for full-time care.

As a final piece of evidence, **Table 23** shows that the less time children of insensitive mothers spent apart from them in child care, the more likely they were to be securely attached. If compensatory processes were operating, we would expect security to be less probable in this group. In sum, data on compensatory effects were mixed and not as consistent as those pertaining to dual risks.

Table 24 summarizes the results of the Secure/Insecure logistic regression analyses, showing the main effects for mother/child variables, the lack of main effects for child-care variables, and the significant interactions.

The set of logistic regression analyses used to predict Secure/Insecure were repeated for the Secure/Avoidant dependent variable. As shown in **Table 25,** two of the five mother/child predictors were significant, namely, Sensitivity in Play and Sensitivity in the HOME. Infants whose mothers behaved in sensitive ways towards them were more likely to be securely attached than insecure-avoidant. The main effects of Psychological Adjustment, Temperament, and Sex were not significant.

As shown in **Table 26,** none of the five child-care variables was significant as a main-effect predictor of the Secure/Avoidant variable. Finally, **Table 27** shows that only one of the 25 interaction terms was significant, namely, Care Starts X Sensitivity in Play. Examination of the data in **Table 28** indicated that the group with low maternal sensitivity and relatively unstable care had one of the lowest proportions of secure attachment.

Table 29 summarizes the results of the Secure/Avoidant logistic regression analyses, showing the main effects for mother/child variables, the lack of main effects for child-care variables, and the significant interaction.

In the final set of analyses, the effects of Type of Care on attachment security were evaluated. Chi-square analyses were performed on Attachment Security X Type of Care at 5 months and at 14 months of age. **(Table 30)** The types of care used were: mother (that is, not in nonmaternal child care), father, other relative, in-home non-relative, child-care home, and child-care center. The results indicated that type of care was not significantly related to Secure/Insecure or Secure/Avoidant at either age.

Additional analyses were performed to determine whether various aspects of child-care were related to attachment security within two types of care--relative, that is, mother, father, or other relative; and nonrelative, that is, in-home non-relative, child-care home, and child-care center. A logistic regression procedure was employed in which each child-care variable was used to predict attachment security separately within the two types of care. None of the analyses yielded significant results.

Discussion

I would like to begin by noting some of the important features of the NICHD Study of Early Child Care. First, the participants are diverse. They come from nine different states and vary in SES, race, and family structure. Second, the child-care settings included all types of providers, such as fathers, other relatives, in-home caregivers, child care home providers, and center teachers. In addition, child care settings varied from a single child with a formally trained nanny to a center with 30 children in the class. Third, this study included extensive observational procedures at 6 and 15 mos to assess both child-care contexts and maternal behavior. Fourth, a large sample size was used to provide adequate power for multivariate models that include interactions between mother, child, and child-care factors. Fifth, and most important, this study is a prospective, longitudinal study that began immediately following children's births. For this reason, the meaning of these results can ultimately be considered as part of a developmental sequence.

As i am discussing the results of the study, please refer to **Table 31** which summarizes the major points.

The first purpose of the present paper was evaluate the internal and external validity of the Strange Situation assessment procedure. Comparison of infants experiencing extensive child care and those experiencing very little child care during the first 15 months of life yielded no significant differences between these two groups for ratings of the infants' distress during mothers' absence in the Strange Situation or for coders' ratings of their own confidence in assigning attachment classifications. Thus, there was no evidence of differential internal validity for the Strange Situation as a function of child-care experience. There was evidence in support of the external validity of the Strange Situation: higher rates of attachment security were associated with higher levels of maternal psychological adjustment and sensitivity to the child observed in the

HOME assessment. These findings are consistent with a substantial theoretical and empirical literature linking infants' attachment security to their mothers' psychological adjustment and sensitive caregiving.

The second purpose of the study was to examine differences in the rates of attachment security and insecurity for infants with varying child-care experiences. In all analyses, we controlled for "selection effects" associated with child care experience and attachment. Results were clear and consistent: There were no significant differences in attachment classifications related to child-care participation. Rates of attachment security were not related to variations in the observed quality of nonmaternal child care, to the amount of care, to the age of entry into care, the stability of care, or to the type of care used. Comparison of these results with those of previous studies in which such differences have appeared must give substantial weight to the present findings because of the advantages of this study, its methodological strengths, its control for family selection effects, and its recency.

Our third purpose in this paper was to identify conditions under which child care might be associated with increased or decreased rates of attachment security, by examining interactions between child-care parameters and mother/child measures. Six of the 25 two-way interactions were significant. This is consistent with Bronfenbrenner's (1979) prediction that "in the ecology of human development the principal main effects are likely to be interactions."

A pattern observed across five of the six significant interactions supported the hypothesis that children's attachment is affected by "dual risk." The children who experienced dual risks had among the highest rates of insecurity with their mothers. This was most clearly demonstrated by children whose mothers and nonmaternal caregivers were least sensitive to their needs and behavior. Children who received insensitive, poor quality caregiving in child care, and insensitive, poor quality care from their mothers had the highest rates of insecurity, ranging from .49 to .56, depending on the analysis. Children in less risky conditions, that is, with better child care or better maternal care, had a rate of insecurity of only .38. A similar but less pronounced effect was observed for children who experienced the dual risks of less sensitive mothering combined with either more time spent in child care or more child care arrangements over time, with rates of insecurity of .46 and .44, compared, respectively, with rates of .38 and .37 under less risky conditions. These results each support a cumulative risk model of development.

Another pattern suggested different developmental processes for boys and girls. Whereas more time in care was associated with more insecurity for boys, it was associated with more security for girls. These data bring to mind two sets of findings in the developmental literature. First, there is evidence that boys tend to be more vulnerable than girls to psychosocial stress generally. Second, there is evidence that during middle childhood, girls benefit from having their mothers in the work force.

Efforts to illuminate further the nature of the dual-risk findings proved unsuccessful. Although multiple two-way interactions were obtained, we repeatedly failed to obtain evidence that these interactions were moderated by additional features of child care.

The interaction analyses also provided evidence relevant to the third hypothesis, namely, that when children receive relatively poor caregiving from their mothers, high quality CHILD care can foster the formation of a secure infant-mother attachment bond. In the significant interaction tables, it appeared that the proportion of attachment security among children with the most insensitive mothers increased as child care quality

increased, in two of the three relevant analyses. In contrast, a further test of the compensatory hypothesis provided evidence (in two of the three analyses) that children with insensitive mothers who received a smaller amount of high quality child care were more likely to be securely attached than children who received a greater amount of high quality child care. Nor did these children of insensitive mothers benefit from being away from them for longer hours in general. In sum, compensatory effects were mixed and not as consistent as those pertaining to dual risks.

The fourth purpose of this paper was to determine whether child-care experience was associated with an increased rate of insecure avoidance, as reported in previous studies. Analyses of secure versus insecure-avoidant children revealed no main effects of child care, and only one of the 25 interactions tested was significant. Thus, in contrast to the results of earlier research there was no evidence that child-care experience is associated with avoidance per se.

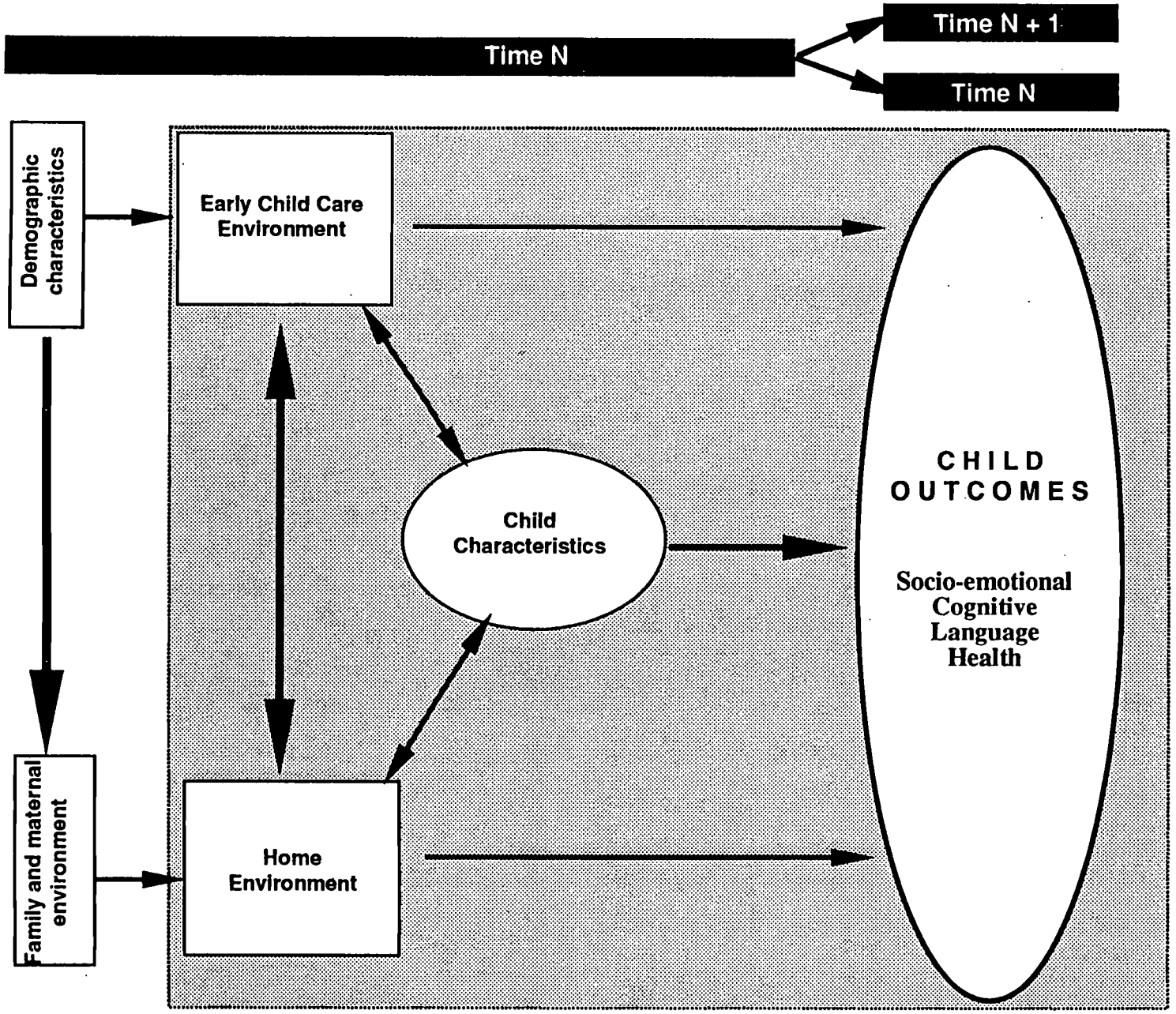
In conclusion, the results of this study clearly indicate that nonmaternal child care by itself does not constitute a threat to the security of the infant-mother attachment relationship. Nor does it foster secure attachment. Instead, there was consistent evidence that poor quality, unstable, or more than minimal amounts of child care added to the risks already inherent in maternal insensitivity. In other words, the combined effects of these child care variables and maternal insensitivity were worse than those of maternal insensitivity alone. Such results suggest that effects of child care on attachment, as well as the nature of the attachment relationship itself, depend on the nature of ongoing interactions between mother and child. In addition, there was also evidence that the influence of amount of care on attachment security varied as a function of the child's sex.

Our continuing, longitudinal investigation of children's development in the NICHD Study of Early Child Care will determine the ultimate importance of these findings for developmentalists, policy makers, and parents, as we consider the effects of early child care on longer-term outcomes and on the broader variety of social-emotional, cognitive, and health outcomes the study was designed to assess. To the extent that evidence emerges in future analyses that early child care is associated with problem behavior or developmental deficits at older ages, these mother-infant attachment findings will take on greater importance. To the extent, however, that there is no evidence of developmental disadvantages associated with early child care, then any concerns raised here about dual risks with respect to attachment security would be mitigated. In sum, the full meaning of the findings reported here will not become clear until more is known about the development of the children participating in the NICHD Study of Early Child Care.

Infant Child Care and Attachment Security: Results of the NICHD Study of Early Child Care

The NICHD Early Child Care Research Network

Mark Appelbaum
Dee Ann Batten
Jay Belsky
Cathryn Booth
Robert Bradley
Celia Brownell
Bettye Caldwell
Susan Campbell
Alison Clarke-Stewart
Jeffrey Cohn
Martha Cox
Kaye Fendt
Sarah Friedman
Kathryn Hirsh-Pasek
Aletha Huston
Bonnie Knoke
Nancy Marshall
Kathleen McCartney
Marion O'Brien
Margaret Owen
Deborah Phillips
Henry Ricciuti
Susan Spieker
Deborah Vandell
Marsha Weinraub


Time N
Time N + 1
Time N
Demographic characteristics
Early Child Care Environment
Child Characteristics
CHILD OUTCOMES
Socio-emotional
Cognitive
Language
Health
Family and maternal environment
Home Environment

SUMMARY OF RESEARCH QUESTIONS

1. **Is the Strange Situation valid for infants with extensive nonmaternal care?**

2. **Is attachment security related to child-care experiences?**

3. **Under what combination of conditions (mother/child and child care) does the rate of security increase or decrease?**

4. **Is insecure-avoidant attachment related to child-care experiences?**

TABLE 1

NICHD STUDY OF EARLY CHILD CARE

RECRUITMENT SITES--31 HOSPITALS IN OR NEAR:

Little Rock, AK
Orange County, CA
Lawrence and Topeka, KS
Boston, MA
Philadelphia, PA
Pittsburgh, PA
Charlottesville, VA
Morgantown and Hickory, NC
Seattle, WA
Madison, WI

TABLE 2

NICHD STUDY OF EARLY CHILD CARE

CHARACTERISTICS OF THE SAMPLE IN THESE ANALYSES

Child Ethnicity	
White, non-Hispanic	81.5%
Black, non-Hispanic	11.9%
Hispanic	5.7%
Other	.9%
Child Sex	
Girls	49.4%
Boys	50.6%
Maternal Education	
< 12 years	8.4%
High School or GED	20.2%
Some college	34.2%
BA	21.9%
Post-graduate	15.3%
Husband/partner in the home	86.9%
Child Care Plans at Birth:	
Full time	53%
Part Time	23%
None	24%

TABLE 3

OVERVIEW OF DATA COLLECTION IN THIS REPORT

	Months							
	1	3	5	6	9	12	14	15
HOME VISITS Household composition and family income	X			X				X
NEO Personality Inventory (select scales) (Costa & McCrae, 1985)	X							
Attitude Toward Maternal Employment (Greenberger et al., 1988)	X							
Infant Temperament Questionnaire (Carey, & McDevitt, 1978)	X			X				
Center for Epidemiologic Studies Depression Scale (Radloff, 1977)	X			X				X
Semi-Structured Play Interaction				X				X
CHILD CARE Observational Record of the Caregiving Environmnent (ORCE				X				X
Phone Calls		X	X		X	X	X	
LABORATORY VISIT Strange Situation								X

TABLE 4
MOTHER AND CHILD VARIABLES

Maternal Psych.Adjustment Alpha=.80

Neuroticism (reflected)

Aggreeableness

Extroversion

CES-D 1,6,15 month average (reflected)

Maternal Sensitivity--Play
(average of 6 and 15 months) Alphas=.70, .75

Sensitivity to Nondistress

Positive Regard

Intrusiveness (reflected)

Maternal Sensitivity--HOME
(average of 6 and 15 months) Alphas=.60, .64

Positive factor score

Lack of negativity factor score

Infant Difficult Temperament:
55 ITQ items Alpha=.81

Child Sex

TABLE 5

CHILD CARE VARIABLES

ORCE Positive Care Frequency
average of 6 and 15 months — Alphas=.88, .78

ORCE Positive Care Ratings
average of 6 and 15 months — Alphas=.89, .88

Amount of Care
mean hours/week each month, 4-15 months
0 = no non-maternal care

Age of Entry
1 = 0-3 months
2 = 4-6 months
3 = 7-15 months
4 = 15+ months, including those not in care

Frequency of Care Starts

Type of Care (5 and 14 months)
Mother
Father
Relative
In-Home
Child-Care Home
Child-Care Center

TABLE 6

CHILD CARE CHARACTERISTICS OF THE SAMPLE IN THESE ANALYSES

Amount of Care (average 4-15 months)

< 10 hours	34.1%
10-30 hours	25.1%
> 30 hours	40.8%

Age of Entry into care

1 = 0-3 months	58.1%
2 = 4-6 months	14.7%
3 = 7-15 months	12.1%
4 = 15+ months	15.9%

Frequency of Care Starts

0	15.0%
1	20.1%
>1	64.9%

Type of Care	5 mos	14 mos
Mother	36.9%	29.6%
Father	11.7%	14.7%
Relative	15.8%	14.0%
In-Home	7.9%	8.9%
Child-Care Home	18.6%	20.7%
Child-Care Center	9.0%	12.1%

TABLE 7

ATTACHMENT VARIABLES

Final Classifications (n=1153)

Coder agreement: (83%; Kappa=.69)

A	**14.1%**
B	**61.8%**
C	**8.8%**
D	**15.4%**

Secure/Insecure

Coder agreement: (86%; Kappa=.70)

Confidence Ratings

Separation Distress

TABLE 8

INTERNAL VALIDITY OF THE STRANGE SITUATION

	Intensity of Care from 3-15 Months		
	Low: < 10 hrs/wk (n = 263)	High: > 30 hrs/wk (n = 257)	
Distress			
A	6.0	6.5	
B	10.5	10.4	
C	13.4	13.9	
D[a]	9.3	11.8	
U	9.4	8.8	
Total	9.7	10.3	p = NS
Coder Confidence			
A	3.0	3.2	
B	3.9	3.9	
C	3.3	2.9	
D	2.8	3.3	
U[b]	2.6	3.9	
Total	3.1	3.4	p = NS

NS: Nonsignificant

[a] Intensity X ABCDU $p < .05$

[b] Distress X ABCDU $p < .05$

TABLE 9

EXTERNAL VALIDITY OF THE STRANGE SITUATION

RATE OF SECURITY AS A FUNCTION OF SCORING IN TOP AND BOTTOM QUARTILES ON PREDICTOR

Predictors	Top Quart	Bottom Quart	p
Sensitivity--Play	63.3	57.3	.145
Sensitivity--HOME	68.4	55.0	.001
Psych. Adjust.	66.9	56.7	.012

TABLE 10

CONTROL AND PREDICTOR VARIABLES

1) CONTROL VARIABLES:

Income-to-Needs Ratio
Benefits of Work

2) MOTHER/CHILD VARIABLES:

Psychological Adjustment
Sensitivity--Play
Sensitivity--HOME
Temperament
Sex

3) CHILD-CARE VARIABLES:

Positive Care. Frequency
Positive Care. Ratings
Amount of Care
Age of Entry
Frequency of Care Starts

4) INTERACTION TERMS

TABLE 11

SECURE/INSECURE ANALYSES

MOTHER/CHILD EFFECTS

Psych. Adjust.*	Secure > Insecure
Sensitivity--Play	---------
Sensitivity--HOME**	Secure > Insecure
Temperament	---------
Sex	---------

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

TABLE 12

SECURE/INSECURE ANALYSES

CHILD-CARE EFFECTS

Pos. Care. Freq.	---
Pos. Care. Ratings	---
Amt. of Care (hrs)	---
Age of Entry (mos)	---
Care Starts	---

TABLE 13

SECURE/INSECURE ANALYSES

SIGNIFICANT MOTHER/CHILD X CHILD-CARE INTERACTIONS

	Pos. Care Freq	Pos. Care. Ratings	Amt. Care	Age Entry	Care Starts
Psych Adjust					
Sens. – Play	*	*			*
Sens. – Home		*	*		
Temperament					
Sex			*		

*p< .05

TABLE 14

SECURE/INSECURE ANALYSES

SENSITIVITY--PLAY X POSITIVE CARE. FREQUENCY--ADJUSTED PROPORTION SECURE

		Positive Caregiving Frequency		
		Low	Mod.	High
Sensitivity--Play	Low	.51	.56	.58
	Mod.	.73	.62	.58
	High	.69	.61	.53

TABLE 15

SECURE/INSECURE ANALYSES

SENSITIVITY--PLAY X POSITIVE CARE. RATINGS--ADJUSTED PROPORTION SECURE

		Positive Caregiving Ratings		
		Low	Mod.	High
Sensitivity--Play	Low	.44	.62	.53
	Mod.	.65	.65	.59
	High	.73	.54	.61

TABLE 16

SECURE/INSECURE ANALYSES

SENSITIVITY--HOME X POSITIVE CARE. RATINGS--ADJUSTED PROPORTION SECURE

		Positive Caregiving Ratings		
		Low	Mod.	High
Sensitivity--HOME	Low	.45	.57	.63
	Mod.	.64	.60	.55
	High	.72	.70	.62

TABLE 17

SECURE/INSECURE ANALYSES

SENSITIVITY--HOME X AMOUNT OF CARE--ADJUSTED PROPORTION SECURE

		Amount of Care (hrs)		
		≥30	10-30	≤10
Sensitivity--HOME	Low	.54	.52	.62
	Mod.	.63	.64	.59
	High	.66	.73	.66

TABLE 18

SECURE/INSECURE ANALYSES

SENSITIVITY--PLAY X CARE STARTS--ADJUSTED PROPORTION SECURE

		Care Starts		
		≥1	1	0
Sensitivity--Play	Low	.56	.60	.60
	Mod.	.66	.59	.64
	High	.64	.54	.62

TABLE 19

SECURE/INSECURE ANALYSES

SEX X AMOUNT OF CARE-- ADJUSTED PROPORTION SECURE

		Amount of Care (hrs)		
		≥30	10-30	≤10
Sex	Boys	.58	.60	.65
	Girls	.66	.65	.58

TABLE 20

SECURE/INSECURE ANALYSES

SENSITIVITY--PLAY X POSITIVE CARE. FREQUENCY

COMPENSATORY EFFECT?

		Positive Caregiving Frequency		
		Low	Mod.	High
Sensitivity--Play	Low	.51	.56	.58
	Mod.	.73	.62	.58
	High	.69	.61	.53

FT: .56

PT: .65

TABLE 21

SECURE/INSECURE ANALYSES

SENSITIVITY--PLAY X POSITIVE CARE. RATINGS

COMPENSATORY EFFECT?

Positive Caregiving Ratings

		Low	Mod.	High
Sensitivity--Play	Low	.44	.62	.53
	Mod.	.65	.65	.59
	High	.73	.54	.61

FT: .55

PT: .49

TABLE 22

SECURE/INSECURE ANALYSES

SENSITIVITY--HOME X POSITIVE CARE. RATINGS

COMPENSATORY EFFECT?

Positive Caregiving Ratings

		Low	Mod.	High
Sensitivity--HOME	Low	.45	.57	.63
	Mod.	.64	.60	.55
	High	.72	.70	.62

FT: .59

PT: .67

TABLE 23

SECURE/INSECURE ANALYSES

SENSITIVITY--HOME X AMOUNT OF CARE--ADJUSTED PROPORTION SECURE

		Amount of Care (hrs)		
		≥30	10-30	<10
Sensitivity--HOME	Low	.54	.52	.62
	Mod.	.63	.64	.59
	High	.66	.73	.66

TABLE 24

SECURE/INSECURE ANALYSES--SUMMARY

MOTHER/CHILD MAIN EFFECTS:

Psych. Adjustment
Sensitivity--HOME

CHILD-CARE MAIN EFFECTS:

None

INTERACTIONS:

Sensitivity--Play X Pos. Care. Freq.
Sensitivity--Play X Pos. Care. Ratings
Sensitivity--HOME X Pos. Care. Ratings
Sensitivity--HOME X Amount of Care
Sensitivity--Play X Care Starts
Sex X Amount of Care

TABLE 25

SECURE/AVOIDANT ANALYSES

MOTHER/CHILD EFFECTS

Psych. Adjust.	---
Sensitivity--Play**	**Secure > Avoidant**
Sensitivity--HOME**	**Secure > Avoidant**
Temperament	---
Sex	---

** $p < .01$

TABLE 26

SECURE/AVOIDANT ANALYSES

CHILD-CARE EFFECTS

Pos. Care. Freq.	---------
Pos. Care. Ratings	---------
Amt. of Care (hrs)	---------
Age of Entry (mos)	---------
Care Starts	---------

TABLE 27

SECURE/AVOIDANT ANALYSES

SIGNIFICANT MOTHER/CHILD X CHILD-CARE INTERACTIONS

	Pos. Care Freq	Pos. Care. Ratings	Amt. Care	Age Entry	Care Starts
Psych Adjust					
Sens. – Play					*
Sens. – Home					
Temperament					
Sex					

*p< .05

TABLE 28

SECURE/AVOIDANT ANALYSES

SENSITIVITY--PLAY X CARE STARTS--ADJUSTED PROPORTION SECURE

		Care Starts		
		≥1	1	0
Sensitivity--HOME	Low	.76	.76	.80
	Mod.	.84	.79	.80
	High	.90	.70	.86

TABLE 29

SECURE/AVOIDANT ANALYSES--SUMMARY

MOTHER/CHILD MAIN EFFECTS:

Sensitivity--Play
Sensitivity--HOME

CHILD-CARE MAIN EFFECTS:

None

INTERACTIONS:

Sensitivity--Play X Care Starts

TABLE 30

SECURE/INSECURE ANALYSES

TYPE OF CARE AT 5 AND 14 MOS--PROPORTION SECURE

	5 mos	14 mos
Mother	.62	.61
Father	.59	.62
Relative	.59	.56
In-home Non-rel.	.62	.59
Child-Care Home	.65	.63
Child-Care Center	.66	.70

TABLE 31

SUMMARY OF RESULTS

- The Strange Situation was not less valid for children with a lot of child care than for children with little child care.

- Secure, compared with insecure infants had mothers who were more sensitive and better adjusted psychologically.

- Child-care features, in and of themselves, were unrelated to attachment security or to insecure avoidance specifically.

- Low-quality child care, unstable care, and more than minimal hours in care were each related to increased rates of insecurity when mothers were relatively insensitive.

- Extensive care for boys and limited care for girls were associated with somewhat elevated rates of insecurity.

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