

The Effects of Day Care on the Social-Emotional Development of Children

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Talking Points

- Children who spend longer hours (30 hours/week) in day care are more likely to exhibit problematic social behaviors including aggression, conflict, poorer work habits and risk-taking behaviors throughout childhood and into adolescence.
- The negative effects of day care are more persistent for children who spend long hours in center-care settings.
- Although high quality day care has some positive effects, it does not reduce the negative effects associated with long hours in day care.
- Mothers whose children spend long hours in day care show a decrease in sensitivity in their interactions with their child during their child's early years.

Introduction

The purpose of this report is to review findings from the 30-year body of research evaluating the effects of non-maternal child care (day care) on children's social-emotional development. The report specifically focuses on findings from the large-scale National Institute of Child Health and Human Development Study of Early Child Care (NICHD-SECC-ECCRN) initiated in the early 1990s. The influence of non-maternal child care on two dimensions of social-emotional development is reviewed: children's relationship and attachment to their parents and children's social-behavioral adjustment, including social competence, compliance, behavior problems, peer interaction, and self-esteem.

Studies exploring the relationship between non-maternal child care and attachment security indicate that type, quality, or quantity of day care do not independently significantly predict

attachment security. Insensitive mothering¹ combined with increased quantity or decreased child-care quality, however, significantly predicts an insecure attachment.

Studies exploring the relationship between non-maternal child care and social-behavioral adjustment indicate that more hours in non-maternal care predicts negative social-behavioral outcomes. Specifically, entry into day care during the child's first year with continued, extensive day care (30 hours per week) throughout early childhood predicts less social competence and cooperation, more problem behaviors, negative mood, aggression, and conflict.

1. Maternal sensitivity was derived from observations of mother-child interactions that were rated for mothers' sensitivity to children's distress and non-distress, intrusiveness, detachment, disengagement, stimulation of cognitive development, positive and negative regard for the child, and flatness of emotional engagement with the child.

The unique effect of hours in day care on caregiver reports of child behavior at age 4.5 years was 152 percent as large as the effect size of parental quality and nearly the same as the effect size for poverty.

Negative effects associated with quantity of non-maternal child care (day care) during a child's early years were not ameliorated by higher-quality care. Further, although the effects were relatively small, they predicted persistent negative social-behavioral outcomes throughout development. Negative outcomes associated with extensive hours in early day care were identified across all of the years analyzed including the 1st grade, 3rd grade, 6th grade, and age 15 years. This review provides conclusive evidence to guide individual and policy decisions surrounding issues of non-maternal child care.

Dramatic changes in child rearing during recent decades have spurred interest in the effects of early non-maternal child care (day care) on children's social-emotional development. Some have hypothesized that non-maternal child care will negatively affect social-emotional development regardless of the quality of the care. Two-thirds of American parents in a national survey disagreed with the idea that "a top-notch day care center" would provide the same quality of care and attention that children would get at home (Farkas, Duffet, and Johnson, 2000). Others argue that non-maternal child care will have little or no effect and may positively affect development if high in quality (Scarr, 1998).

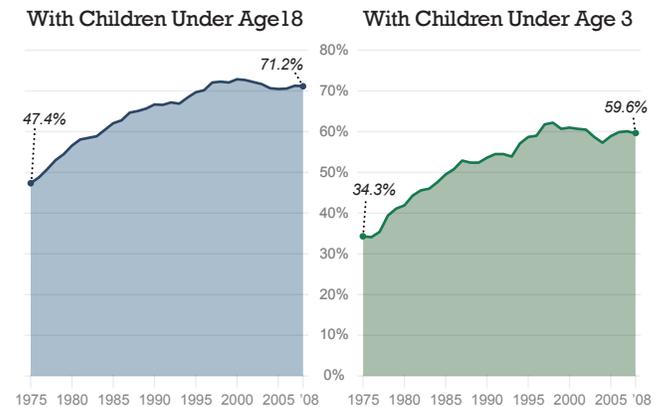
This 30-year debate has resulted in a plethora of research studies evaluating how child care interacts with factors of family background and child characteristics to impact social-emotional development. Studies have focused on two dimensions of social-emotional development: children's relationship and attachment to their parents and children's social-behavioral adjustment, indicated by social competence, compliance, behavior problems, peer interaction, and self-esteem. The purpose of this report is to review key findings from this body of research and summarize current understanding about the social-emotional effects of non-maternal child care.

FACT:

Seven in 10 mothers with children under age 18 are in the labor force

Since 1975, the share of working mothers has increased by 50 percent. The share of working mothers with young children has increased even more, by nearly 75 percent.

PERCENTAGE OF MOTHERS IN THE LABOR FORCE



Source: U.S. Department of Labor, Bureau of Labor Statistics, 2009.

This is not a comprehensive review. Rather, it presents key findings from the large body of child-care research, with a major focus on findings from the National Institute of Child Health and Human Development Study of Early Child Care Early Child Care Research Network (NICHD-SECC-ECCRN). Initiated in the early 1990s, the NICHD-SECC-ECCRN has provided the most conclusive findings to date on the effects of child care. This comprehensive longitudinal study of more than 1,300 children from 10 American communities has published analyses evaluating both the home and child-care contexts from infancy through age 15 years. These findings, supported by other studies presented in this review, provide answers to the "firestorm of controversy" provoked by seemingly inconsistent findings from earlier research.

The first section of the report provides background on the theoretical perspectives underlying research on the social-emotional effects of non-maternal child care. This is followed by a review of research evaluating the effects of non-maternal child care on parent-child attachment. The third section

presents conclusions from research evaluating the effects of non-maternal child care on social-behavioral adjustment. This section is followed by a review of the key findings and their implications.

With concern about the growing number of challenges for children today deepening, this review is timely (Shonkoff and Phillips, 2000). Its focus is warranted by continued dramatic changes in child rearing as well as the current push for universal, pre-K,

early childhood investment. Further, the findings inform policy approaches to welfare reform and the child-care issues affecting employability. These conclusive findings of child-care research illuminate the interrelated nature of family and child-care effects on children's development and enable more appropriate responses to the personal and political dilemmas surrounding these issues.

Section I

Theoretical Background for Child-Care Research

Research on child care emerges from a long history of theory emphasizing the importance of early relationships on the social-emotional development of children. The most influential of these theories is Bowlby and Ainsworth's attachment theory (1944, 1982). Thirty years of child-care research has refined original theoretical premises and added other frameworks. Bronfenbrenner's ecological theory, which focuses on the multiple influences of both home and child-care contexts on children's development, and life course theory, which focuses on the timing for these influences, have guided the most recent research. These three theories together illuminate the unique and interactive effects of family background, child characteristics, and child care on children's social-emotional development.

Attachment Theory

John Bowlby's attachment theory (1944, 1982) is recognized as the most historically influential theory and the intellectual foundation for research on the social-emotional effects of child care (Belsky, 2001). Bowlby's exploration of the early bonding of infants and caregivers was initiated after his work revealed a consistent pattern of disrupted mother-child relationships and later adult psychopathology. In his seminal work, "Forty-Four Juvenile Thieves: Their Characters and Home Life," Bowlby found that children who had been deprived of maternal care during extended

periods in their early lives seemed to develop into individuals who "lacked feeling, had superficial relationships, and exhibited hostile or antisocial tendencies" (Kobak, 1999, p. 23). This led Bowlby to conclude that continued attachment to the mother is critical for a child's healthy social-emotional development.

Margaret Ainsworth expanded on these concepts by identifying the importance of an *emotionally secure* attachment and the characteristics of mother-infant interactions that lead to an emotionally secure attachment (Ainsworth, Blehar, Waters, and Wall, 1978). In her studies of mothers in Uganda and Baltimore, Ainsworth found that a mother's ability to detect, interpret, and respond appropriately to her infant's characteristics and needs was critical to the development of an emotionally secure attachment (Ainsworth *et al.*, 1978). These findings led to extensive research into the biological and psychological roots of the mother-infant relationship and its essential role in healthy social development.

Bowlby and Ainsworth found that early attachment relationships are regulated by a behavioral-motivational system of interactions between the child and the attachment figure, generally identified as the mother. When the mother is consistently available, the child receives the physical and psychological protection necessary to foster playing, exploring, and appropriate social behaviors (Bretherton and

Munholland, 1999). If this security is threatened, fear activates the attachment system to reestablish access to the attachment figure. Fear that is not appropriately addressed may develop into feelings of depression, anxiety, aggression, and defensive distortions of vulnerable feelings (Kobak, 1999).

The attachment relationship provides the child with an “internal working model” for understanding and experiencing all other relationships (Bowlby, 1973, p. 203). When the attachment is secure, the infant learns to interpret and self-reflect about past and future attachment situations appropriately and to regulate relationship closeness and conflict resolution (Bretherton and Munholland, 1999). A secure attachment throughout development enables the child to develop the sophisticated models and feelings of deservingness of love that are necessary to appreciate, understand, and empathize with the feelings of others (Thompson, 1999). When the attachment is insecure, the infant develops “a mistrusting orientation” to relationships and is unable to understand and regulate social behavior appropriately. Continued insecurity prevents the child from developing appropriate social regulatory mechanisms.

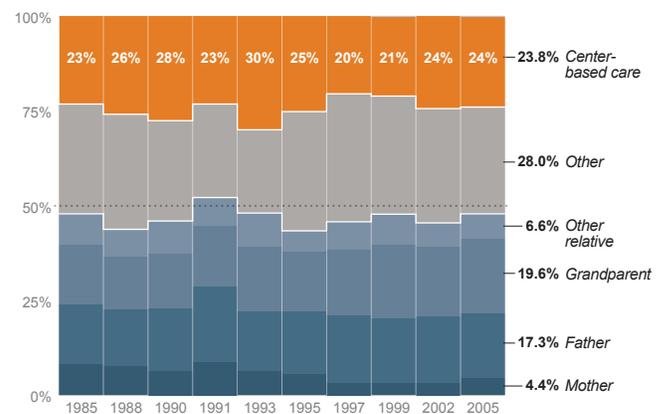
Subsequent research found support for Bowlby and Ainsworth’s hypotheses. Early attachment security emerged as a predictor of children’s social interactions, personality development, and behavioral problems as well as their attachment behaviors as adults with their own children (Berlin, Cassidy, and Belsky, 1995; Fagot, 1997; Sroufe, Carlson, and Shulman, 1993; Carlson, 1998; Steele, Steele, Croft, and Fonagy, 1999). Although not inherently pathological, an insecure attachment has been identified as an “initiator of pathways probabilistically associated with later pathology” (Sroufe, Carlson, Levy, and Egeland, 1999, p. 1). Ainsworth’s “maternal sensitivity” construct has also emerged as a significant predictor of attachment security as well as children’s social-behavioral adjustment (Koren-Karie, Oppenheim, Dole, Sher, and Etzion-Carasso, 2002; Belsky and Fearon, 2002a).

These findings raised important questions about the potential effects of early non-maternal child care. Parents, developmentalists, and policymakers

FACT:**Nearly one in four children with a working mother goes to day care**

Trends in child care arrangements for working mothers have remained relatively stable since 1985.

PRIMARY CHILD CARE FOR CHILDREN AGE 0 TO 4 WITH EMPLOYED MOTHERS



Source: Childstats.gov, America's Children: Key Indicators of National Wellbeing, 2010.

wondered whether the separation periods due to hospitalizations, illnesses, and incarceration that Bowlby found linked to psychopathology were comparable to separations resulting from maternal employment. Guided by attachment theory, two dimensions of the effects of non-maternal child care on social-emotional development became the focus of child-care research: children’s relationship and attachment to their parents and children’s social-behavioral adjustment, social competence, compliance, behavior problems, peer interaction, and self-esteem. The maternal sensitivity construct became a standard for evaluating the quality of parent-child interactions and their social-emotional effects.

Bronfenbrenner’s Ecological Theory

Bronfenbrenner’s (1979, 1999) ecological theory is the second theory that has contributed to the research questions and methodological techniques used in the most recent non-maternal child-care research. This theory illuminates the many contexts and factors that influence children’s social-emotional development and considers the complex interactions

among family circumstances, child characteristics, and child-care experiences. In the past 15 years, studies have focused on the unique effects of these contexts by evaluating family background and child characteristics as well as the child-care setting.

The systemic nature of Bronfenbrenner's ecological framework correlates with the dynamic systems concepts recently emphasized in child development theories. Like the ecological framework, dynamic systems concepts suggest that factors that affect development interact in dynamic ways. For example, according to this theory, socioeconomic status, marital status, and maternal education interact to affect maternal sensitivity and indirectly affect social-emotional development (Sroufe and Sampson, 2000). This theory recognizes that the protective role of early secure attachment may itself be compromised by difficult and chaotic life experiences such as abuse or divorce (Weinfield, Sroufe, and Egeland, 2000). Thus, while early attachment predicts social-emotional and cognitive functioning throughout early childhood, its enduring effects depend upon the level of social-contextual risk in which the child develops (Belsky and Fearon, 2002a—ID #7177).

Life Course Theory

Life Course Theory is the third theory identified in research on the social-emotional effects of non-maternal child care (Elder, 1998). According to life course theory, development is experienced through a series of events, some of which are normative cultural expectations and others of which are non-normative. Normative life events, such as starting school, are particularly influenced by the larger culture and occur at predictable ages in a predictable sequence. Non-normative events, such as divorce or changes in child care, are not part of the normal expected sequence of developmental experiences and may impact a person differently depending on the age when they occur. This theory has illuminated how the timing and transitions in non-maternal child care may interact with factors of family background and child characteristics to affect children's social-emotional development.

Questions for Child-Care Research

Together, these theories have resulted in five specific hypotheses for researching the effects of non-maternal child care on social-emotional development.

- The *primacy of early experience hypothesis* suggests that non-maternal child-care experiences in early development have continuous effects that outweigh experiences in later development.
- The *contemporaneous effects hypothesis* suggests, in contrast, that the influence of current child-care experiences outweighs the influence of child care in any earlier age.
- The *incremental hypothesis* incorporates both the early primacy and contemporaneous hypotheses by suggesting that the early child-care experience produces effects that are maintained, enhanced, or deflected by later contexts.
- The *magnification of small differences hypothesis* suggests that differences among children because of their early child-care experiences are magnified across time.
- Finally, the *sensitive periods hypothesis* suggests that children may be particularly sensitive to the effects of non-maternal child care at certain ages.

Based on these hypotheses, non-maternal child-care studies have evaluated how the average hours of child care experienced in infancy and the toddler years have indirectly or directly affected social-emotional development at later ages. Studies have also looked at whether the age that a child starts non-maternal child care uniquely affects social-emotional development. Others have evaluated whether changes in child-care settings during the early years have a more negative effect on social-emotional outcomes. The most recent research has specifically looked at how the effects of child care endure over time, whether they are stronger at particular ages, and whether they are affected by later experiences.

The sections that follow review the findings from studies on these hypotheses that provide answers to the questions raised by attachment, ecological, and life course theories.

Section II**Non-Maternal Child Care and the Quality of Parent-Child Attachments**

This section reviews findings from research that has looked specifically at the effects of non-maternal child care on the infant-parent attachment. A brief review of research prior to the NICHD-SECC-ECCRN will provide the context for a more thorough discussion of findings from the NICHD-SECC-ECCRN. This is followed by a summary of the key findings related to the relationship between non-maternal child care and the quality of the parent-child relationship.

In much of this research, the quality of the mother-child relationship has received far more attention than the quality of the father-child relationship. This is largely because research on attachment has generally focused on the developmental risks associated with separation from the primary caregiver, usually identified as the mother. With dramatic increases in maternal employment, there has been increasing interest in the effects on the mother-infant relationship associated with these resulting changes in traditional child rearing (Belsky, 2002; Chase-Lansdale and Owen, 1987). Though fathers' sensitivity was evaluated in the NICHD-SECC-ECCRN, it was not the focus of most published analyses. When included, it did not emerge as a major predictor of the dimensions of social-emotional development analyzed, though its importance is evidenced in several studies (NICHD-SECC-ECCRN, 2000; Lamb, 1997; Parke, 1996).

Summary of Findings Prior to the NICHD-SECC-ECCRN

The earliest research on the relationship between non-maternal care and mother-child interactions used a range of different methodologies with expectedly inconsistent findings. Several studies found no significant differences between children in non-maternal child care and children in exclusive maternal care (Caldwell, Wright, Honig, and Tannenbaum, 1970; Moskowitz, Schwarz, and Corsini, 1977; Portnoy and Simmons, 1978), while other studies found that children in non-maternal care had more

insecure attachment relationships with their mothers (Blehar, 1974; Ricciuti, 1974; Cochran, 1977; Doyle and Somers as cited in Belsky and Steinberg, 1978, note 23). Reviewing this research, Belsky and Steinberg (1978) concluded that "the total body of evidence...offers little support for the claim that day care disrupts the child's tie to his mother..." (p. 939). But these findings were interpreted with caution. Many of these early studies involved nonrepresentative, high-quality day-care environments and did not address broader questions and implications such as family background and quality of child-care setting.

The next "wave" of research evaluated the methodological approaches to research on child care more carefully and attempted to answer the inconclusive results of previous decades. Several studies found that non-maternal child care was associated with increased mother-child attachment insecurity (Vaughn, Gove, and Egeland, 1980; Thompson, Lamb, and Estes, 1984; Barglow, Vaughn, and Molitor, 1987). Early and extensive maternal employment, defined as starting maternal employment during the child's first year of life at more than 20 hours per week, was particularly associated with increased attachment insecurity. Although there were studies that found no association between extensive non-maternal care and attachment insecurity (Chase-Lansdale and Owen, 1987), the amassed findings suggested increased risk.

Belsky and Rovine's (1988—ID #5036) analysis of 491 cases found 43 percent of children in more extensive (>20–30 hours per week) child care to be insecurely attached, while Lamb and Steinberg's (1990) comparable analysis of 790 cases found 40 percent. Clarke-Stewart's (1989) analysis of 1,247 cases, some of which were unpublished cases and included impoverished and premature infants, concluded that 36 percent of the children of full-time working mothers had been classified as insecure. These percentages were significantly greater than

the 26 percent, 27 percent, and 29 percent of insecurely attached infants with more limited child care experiences.

Clarke-Stewart (1989) suggested that this difference was unimportant because the percentage of insecure children in non-maternal child care (36 percent) did not differ significantly from the percentage of insecure children in studies around the world (35 percent). She also criticized use of the Strange Situation technique validated by Ainsworth *et al.* (1978) and used in many child-care studies to evaluate attachment security. In the “strange situation,” the 12–18-month-old infant remains in a laboratory playroom while the parent and a female “stranger” alternately leave and return to the room. The infant’s responses to these “stressful” situations in the reunion episodes is evaluated to classify the child as secure or insecure. Clarke-Stewart asserted that infants in non-maternal care may be more adjusted to their mothers’ absence and are thus less stressed in the Strange Situation. This sign of “less stress” would be interpreted inaccurately as less secure.

This argument was refuted, however, in a study by Belsky and Braungart (1991—ID #6977), showing that infants with more nonparental care experience did not show less stress and greater independence, but “whimpered, fussed, and cried more and engaged in object play less” than their insecure-avoidant counterparts with less nonparental care experience. This research solidified use of the Strange Situation as an appropriate measure of attachment security.

At the close of the decade, Belsky’s (1990) summary of prior research concluded that children in center care, family day care, and nanny care for 20 or more hours per week, particularly when begun in the first year of life, are at elevated risk of being classified as insecure in their attachments to their mothers at 12 or 18 months, but Belsky acknowledged that the effects were not the same for *all* children in nonparental care for 20 hours or more per week. Children who entered low-quality care in the first year of life showed the most negative effects. This led him to conclude that “the probability of risk being realized increases when other sources of risk exist” (Belsky, 1990, p. 895). The “dual risk” concept

provided an important explanation for differences in the findings obtained up to this point.

Findings from the NICHD-SECC_ECCRN

The NICHD-SECC_ECCRN has addressed many of the inconsistencies in previous research. (For a more extensive review, see NICHD-SECC_ECCRN, 2005). The variety of observational and self-report measures, methods of analyses, and large, diverse sample make this study the most complete source of information about the effects of child care on the relationship between child care and children’s attachment relationship to their parents. Many earlier studies did not control for variables of home background and maternal sensitivity. Further, very few studies evaluated child-care quality. As a result, some researchers hypothesized that differences in attachment security attributed to child care were the result of differences in maternal competence, sensitivity, integration, empathy, marital quality, or the quality of the child care (Clarke-Stewart, 1989). More thorough evaluations of the family, work, and child-care contexts have clarified these claims (Belsky, 1990).

Three major groups of factors were evaluated in NICHD-SECC_ECCRN research analyses on attachment: family background including structure, economic status, home environment, and maternal sensitivity; child care including average hours in care, caregiving quality, and child-care type; and child characteristics including temperament, sex, and age of entry into child care. This section briefly reviews how these variables were measured in the NICHD-SECC_ECCRN, followed by a presentation of the findings obtained through analyses of the relationship between each group of factors and attachment outcomes. Family background factors will be discussed first, followed by child-care factors and child characteristics.

Review of Measures Used in the NICHD-SECC_ECCRN

Mothers provided information on many family background variables including age, marital status, household structure, maternal and paternal

employment, ethnicity, and maternal education in the NICHD-SECC-ECCRN. Maternal reports also provided information about the child's characteristics including gender, age of entry into child care, and birth order. A range of well-established questionnaires were used to measure maternal depression, maternal personality, maternal cognitive ability, social support, life stress, financial stress, marital quality, and attitudes toward employment and child rearing.

The well-known HOME Inventory (Caldwell and Bradley, 1984) was used to evaluate the quality and quantity of interaction, stimulation, and support provided in the home environment through mother interviews and observation when the child was 6, 15, 24, 36, and 54 months and in the 1st grade. Maternal sensitivity (and paternal sensitivity) was assessed through videotaped mother-child interactions in the home and laboratory and then coded for sensitivity ratings (NICHD-SECC-ECCRN studies).

Information about average weekly hours of non-maternal care and type of non-maternal child care was obtained through maternal reports at 3-month intervals. Quantity was calculated as a combination of average weekly hours in non-maternal care and a linear slope measure of change over time. Quality of non-maternal child care involved observation of quantity and quality of caregiver-child interactions during two half-day visits to the non-maternal child-care setting when children were 6, 15, 24, 36, and 54 months. The Observational Record of Caregiving Environment (ORCE) tool developed by the NICHD-SECC-ECCRN rated caregivers for positive affect, positive physical contact, response to vocalizations, stimulation of development, detachment, flatness of affect, fostering exploration, intrusiveness, and emotional climate (NICHD-SECC-ECCRN, 2001a).

To evaluate temperament, mothers filled out the Infant Temperament Questionnaire when their infant was 6 months old. Mother-child attachment was evaluated at 15, 24, and 36 months. The previously validated Strange Situation technique was used to evaluate mother-infant attachment at 15 months. At 24 months, attachment security was evaluated using an Attachment Q-Set, correlating 90 behavioral characteristics with the prototypical behaviors of a

secure child at 24 months. At 36 months, an adapted Strange Situation technique appropriate for 3-year-old development was used to assess attachment. The multiple assessments of attachment used in this study make it especially useful for evaluating predictors of attachment security.

Family Background Predictors of Attachment Security

The strongest independent predictors of attachment security in the NICHD-SECC-ECCRN were maternal sensitivity and psychological health. Mothers who showed greater sensitivity, including responsiveness to their child's behavior and signals, positive regard, lack of negativity and hostility, and lack of intrusiveness and respect for the child's autonomy, and who also had lower depression and higher extraversion and openness personality scores, were most likely to have securely attached infants at 15 and 36 months (NICHD-SECC-ECCRN, 1997—ID #7009). Children who had less sensitive mothers were significantly more likely to be insecurely attached at 15 and 36 months and to demonstrate more avoidant attachment behaviors at 36 months (NICHD-SECC-ECCRN, 1997, 2001b).

Children who changed from secure to insecure between the 15-month and 36-month assessments were more likely to have mothers with lower sensitivity between 24 and 36 months, while children who changed from insecure to secure were more likely to have mothers with greater sensitivity (NICHD, 2001b—ID #7129; ID #7134). In the 36-month attachment assessment, average combined ratings of maternal sensitivity for 6, 15, 24, and 36 months had a moderate .25 correlation with attachment security at 36 months. This correlation was consistent with previous research indicating that continued maternal sensitivity throughout childhood moderately predicts attachment security (van IJzendoorn and Kroonenberg, 1988).

- **Maternal sensitivity and the mother's psychological health are the most significant predictors of a secure attachment relationship for children both in and out of child care.**

Factors Predicting Maternal Sensitivity

In the NICHD-SECC-ECCRN, a mother's social, economic, and cultural background predicted her level of maternal sensitivity. Maternal sensitivity and a child's more positive engagement with his or her mother were greater for mothers with more education, White ethnicity, and higher socioeconomic status (NICHD-SECC-ECCRN, 2003b—ID #7036). Mothers who showed greater sensitivity also had lower life stress and maternal depression, more social support, and more financial resources than mothers who showed less sensitivity (Belsky and Fearon, 2002a—ID #7176). The fact that children from economically disadvantaged backgrounds were significantly more likely to have insecure attachments than were those with greater economic advantages suggests that economic stress is a risk factor for providing sensitive care (NICHD-SECC-ECCRN, 1997—ID #7035). These findings supported earlier research by Vaughn and Egeland (1980) showing that stressful life events, such as divorce, out-of-wedlock birth, or marriage, were associated with attachment security.

- **Greater maternal sensitivity is associated with more maternal education, higher income, and White ethnicity.**

Marriage and Maternal Sensitivity

Marriage also predicted greater maternal sensitivity. In the NICHD-SECC-ECCRN sample, having a spouse predicted significantly greater maternal sensitivity when children were 15, 24, and 36 months, with a stronger correlation at 36 months than at 6 months (NICHD-SECC-ECCRN, 1999—ID #7085; ID #7086; ID #7088). Married mothers also had more positive psychological well-being, believed in more progressive child-rearing ideas, and were less likely to believe in benefits for child development from maternal employment. Married mothers who were older, more educated, and financially secure showed better psychological adjustment and more social support than cohabiting or single mothers. They also reported less ambivalence and conflict and greater love and intimacy in their relationships with their partners (Aronson and Huston, 2004—ID #7224).

Findings indicating a difference in maternal sensitivity associated with marriage were consistent with previous studies (Teti, Sakin, Kucera, Corns, and Eiden, 1996—ID #7226).

Given the associated differences in maternal sensitivity, it naturally followed that infants of married mothers in the NICHD-SECC-ECCRN sample were more likely to be securely attached than were those of cohabiting or single mothers, even after controlling for age, ethnicity, and education. Married mothers were more likely to act more positively toward their infants and create more positive home environments than were cohabiting and single mothers in assessments at 6 and 15 months (Aronson and Huston, 2004—ID #7222). Their infants also behaved more positively during structured interaction, while there was no difference between infants in cohabiting and single families (Aronson and Huston, 2004—ID #7223). Of these groups of mothers, single mothers were least likely to have secure attachments with their infants.

To determine whether the differences in the relationships between these mothers and their infants was due to the selection effects of maternal age, ethnic group, or education, the analysis parsed out the individual effects of each factor. Findings suggested that maternal age, ethnic group, and education accounted for 40 percent to 61 percent of the differences between married, single, and cohabiting mothers with respect to maternal sensitivity, but “family structure differences remained even with all the predictors in the model, and even assuming that the other predictors could represent selection into marriage...” (Aronson and Huston, 2004, p. 15).

- **Marital status is a significant predictor of maternal sensitivity in mother-infant interactions.**
- **Married mothers are more likely than cohabiting and single mothers to behave positively toward their infants and have higher sensitivity ratings.**
- **Marital status is an important predictor of attachment security. Married mothers are more likely than cohabiting and single mothers to have securely attached infants.**

Single mothers are least likely to have securely attached children, followed by cohabiting mothers.

Maternal Attitudes Toward Maternal Employment and Maternal Sensitivity

A mother's attitude toward maternal employment was another predictor of maternal sensitivity in the NICHD-SECC-ECCRN. A positive attitude toward maternal employment was indicated by support for statements such as "Children whose mothers work are more independent and able to do things for themselves" in interviews with the mothers when the child was 1 month old. Previous research suggested that a mother's stronger career orientation was associated with increased likelihood of attachment insecurity (Belsky and Rovine, 1988). In the NICHD-SECC-ECCRN sample, mothers who expressed a stronger belief in the benefits of maternal employment were more likely to have insecurely attached children and to be less sensitive and responsive. These attitudes also predicted a child's entry into child care at an earlier age, more hours in child care, more changes in child care, and lower-quality care (NICHD-SECC-ECCRN, 1997—ID #7037).

- **Mothers who express more positive attitudes about maternal employment are significantly more likely to be less sensitive and to have less secure attachments.**

Quantity of Child Care and Maternal Sensitivity

Quantity of child care was not an independent predictor of attachment insecurity, but average weekly hours in child care was significantly associated with decreased maternal sensitivity. The NICHD-SECC-ECCRN analysis of mother-child interactions across the first three years of life found that when children spent more hours in child care, their mothers were less sensitive in interactions at 6, 15, 24, and 36 months. Their children also showed less positive engagement with their mothers at 15, 24, and 36 months. The negative effects of hours in care over the first three years of life extended through the 1st grade assessments, but for the White, mother-child dyads only (NICHD-SECC-ECCRN, 2003b—ID #7033).

Intriguingly, the effect of quantity of child care on mother-child interaction was negative for White mothers in this sample but not for non-White mothers. More hours in child care was associated with an increase in positive mother-child interactions for non-White families through the 1st grade. The different associations of child care with mother-child interactions for White and non-White children suggest that the use of child care may have different effects on family processes depending on family background, economic circumstances, parenting, employment attitudes and commitments, and cultural beliefs (NICHD-SECC-ECCRN, 2003b). Further study is needed to illuminate this difference between White and non-White mothers.

The effect size for the negative effect of quantity of child care on maternal sensitivity and child positive engagement was a moderate .15 standard deviations for the findings through the 36-month assessments (NICHD-SECC-ECCRN, 1999—ID #7084). Although this is significantly smaller than the effect of maternal education on increased maternal sensitivity (+.7), its importance is implicated by the critical role of maternal sensitivity in attachment security and later social-emotional development (NICHD-SECC-ECCRN, 1999—ID #7090). The findings indicate that the effects of child care extend to the mother as well as the child.

- **White mothers of children in more weekly hours of non-maternal child care were more likely to have lower maternal sensitivity and less positive mother-child interactions in assessments from infancy through the 1st grade.**
- **Non-White mothers of children in more hours of non-maternal child care were more likely to have higher maternal sensitivity and more positive mother-child interactions in assessments from infancy through the 1st grade.**

Researchers from the NICHD-SECC-ECCRN suggest that time away from a child may affect the mother's ability to know her child in ways that would allow her to respond sensitively to her child's needs.

Less maternal sensitivity interacts with less positive child engagement in ways that alter the quality of the mother-child interactions. Other research on maternal-child interaction has demonstrated that maternal-child interactions are most likely to be negatively affected when there is more than one risk factor, such as more non-maternal care as well as psychosocial risk factors. The relationship between hours in non-maternal care and maternal sensitivity suggests that non-maternal child care may be a risk factor for maternal sensitivity for White mothers.

An earlier study of 200 mothers' return to work following maternity leave found that shorter leaves predicted more negative maternal emotions and behavior and higher infant dysregulation and irritability when mothers had higher levels of depressive symptoms (Clark, Hyde, Essex, and Klein, 1997). When mothers did not experience short maternal leaves, their depressive symptoms were unrelated to negative maternal emotions and behavior and infant dysregulation. This finding further illuminates the relationship between risk factors, non-maternal child care, and the quality of mother-child interactions (Belsky, 1988).

Other research suggests that non-maternal child care itself may negatively affect the quality of mother-child interactions. A study of 267 high-risk mother-infant pairs in poverty found that mother-child interactions were significantly more stressed for children in child care, regardless of attachment security (Egeland and Heister, 1995—ID #6999). Mothers of securely attached infants who experienced day care showed significantly more hostile behaviors at 42 months, while their children showed significantly more negative, avoidant behaviors compared to the secure home-reared group (Egeland and Heister, 1995—ID #6998; ID #7000).

Quality of Child Care and Maternal Sensitivity

Quality of child care was also associated with maternal sensitivity in the NICHD-SECC_ECCRN. Higher-quality child care during the first three years was related to greater maternal sensitivity in assessments at 36 months and through the 1st grade but only when the child was in fewer weekly hours of child care (NICHD-SECC_ECCRN, 1997—ID #7089).

Higher quality of care was not associated with greater maternal sensitivity after age 3 when the child had experienced higher hours of child care prior to age 3 (NICHD-SECC_ECCRN, 2003b—ID #7034).

These findings suggest that children's relationships with their mothers "do not benefit from early high-quality child care if experienced on a full-time basis" (NICHD-SECC_ECCRN, 2003b, p. 365). Maternal support from good child-care providers may be greater when mothers are less pressured by long hours of work. Less demanding work hours may enable the child-care provider and mother to develop a closer partnership that enhances the quality of caregiving for both.

- **Higher-quality child care during the first three years is associated with greater maternal sensitivity from age 3 through the 1st grade for children in fewer weekly hours of child care.**

Child-Care Factors and Attachment Security

The child-care factors of quantity, quality, age of entry, and changes in child-care arrangement were not significant individual predictors of attachment security at 15 or 36 months (NICHD-SECC_ECCRN, 1997—ID #7011). However, when low maternal sensitivity was simultaneously combined with more than 10 hours per week of child care, low-quality child care, or more than one change in child-care arrangements, there was increased likelihood of attachment insecurity at 15 months (NICHD-SECC_ECCRN, 1997—ID #7019; NICHD-SECC_ECCRN, 2001b—ID #7135). Children of less sensitive mothers were more likely to be securely attached at 15 months if they spent less time in child care, regardless of its quality (NICHD-SECC_ECCRN, 1997—ID #7021). For children in low-quality child care, maternal behavior seemed particularly important: The probability of a secure attachment was low if the mother was less sensitive but much higher if the mother was highly sensitive (NICHD, 1997—ID #7020).

When attachment security was reassessed at 36 months in the NICHD-SECC_ECCRN sample, more than 10 hours of weekly child care was again related to a greater incidence of insecure attachment when mothers were less sensitive, but low-quality care or more

than one change in child-care arrangements did not increase the likelihood of insecurity for children with less sensitive mothers (NICHD, 2001b—ID #7135).

- **More than 10 hours per week in child care coupled with low maternal sensitivity predicts attachment insecurity at both 15 and 36 months.**
- **Lower-quality care coupled with low maternal sensitivity predicts attachment insecurity at 15 months.**
- **Children of less sensitive mothers are more likely to be securely attached if they spend less time in child care.**

Some researchers suggested that poorer-quality child care in Israel explains why quantity and type of child care independently predicted attachment insecurity in these studies. Yet the majority of child-care settings in the United States do not meet the standards specified by the American Public Health Association and the American Academy of Pediatrics (NICHD, 2001c, p. 483).

Indeed, in the NICHD-SECC-ECCRN assessment of child-care quality, only 20–36 percent of the U.S. child-care centers observed met appropriate standards for child-staff ratios (3:1 at 6 and 15 months, 4:1 at 24 months, 7:1 at 36 months); group size (6 at 6 and 15 months, 8 at 24 months, 14 at 36 months); and caregiver training (formal, post-high school training in child development, early childhood education, or a related field at all four ages) (NICHD, 2001c). Further, this does not include the child-care settings that refused participation in the NICHD-SECC-ECCRN because of anxiety about meeting appropriate standards. While child-care standards in the United States may be “better” than those found in Israel, most settings do not currently meet developmentally appropriate guidelines according to analyses by the NICHD-SECC-ECCRN.

Child Characteristics and Attachment Security

The third group of factors identified in previous research as possibly important predictors of attachment security are the gender and temperament of the child and the age of the child when entering child

care. Neither child temperament nor gender was a significant predictor of attachment security, but more time in child care was associated with a somewhat higher rate of insecurity for boys, while less time in child care was associated with a somewhat higher rate of insecurity for girls (NICHD, 1997).

In several earlier studies, boys were also at a higher risk of attachment insecurity, particularly with respect to their fathers, when their mothers were employed (Belsky and Rovine, 1988; Chase-Lansdale and Owen, 1987; Easterbrooks and Goldberg, 1984). A more recent longitudinal study of 77 White, middle-class families also found that boys from dual-earner families were more likely to be insecurely attached to their fathers (Braungart-Rieker *et al.*, 1999—ID #7118), but unlike previous research, they were not simultaneously more likely to be insecurely attached to their mothers (Belsky and Rovine, 1988; Chase-Lansdale and Owen, 1987). Some child development researchers suggest that boys are more vulnerable to psychosocial stress than girls are (Zaslow and Hayes, 1986). The psychosocial stress that may be induced by early non-maternal child care may therefore put boys in child care at special risk for developing an insecure attachment to their fathers.

- **Child temperament and child gender were not significant predictors of mother-child attachment security. More time in child care was associated with a slightly increased likelihood of insecurity for boys, but less time in child care was associated with a slight increase in the probability of insecure attachment in girls.**
- **Boys in child care may be at increased risk of insecure attachment to their fathers.**

Like child temperament and gender, the child’s age of entry into non-maternal care did not independently predict increased likelihood of attachment insecurity in the NICHD-SECC-ECCRN, but a change from security to insecurity between 15 and 36 months was associated with starting at least 10 hours per week of child care between 16 and 36 months. Although it was not a strong relationship, the finding suggested that some children respond to

entry into non-maternal care during the toddler and preschool years with insecurity (NICHD-SECC-ECCRN, 2001b—ID #7128). Earlier research, not supported by findings from the NICHD-SECC-ECCRN, suggested that entering child care during the first year might increase the risk of attachment insecurity (Belsky and Rovine, 1988—ID #5036), but a later study on a higher-risk sample found that entering child care between 12 and 18 months increased the risk of attachment insecurity (Vaughn, Gove, and Egeland, 1980; Egeland and Heister, 1995). This contradicted a previous finding that mother-child attachment security was unrelated to a mother's entering employment when the child was 12–20 months of age (Owen *et al.*, 1984).

- **Entering child care between 16 and 36 months predicts increased likelihood of changing from a secure to an insecure attachment at 3 years of age.**

Attachment Security and Social Behaviors

In the NICHD-SECC-ECCRN sample, attachment security measures done during the home observation when the children were 24 months old provided the strongest evidence that attachment is associated with behavioral problems (McCartney, Owen, Booth, Clarke-Stewart, and Vandell, 2004). Seventy percent of the children whose mothers rated them as having *internalizing* problems (social withdrawal, depression, anxiety) at 3 years of age were insecure based on the 24-month Q-set attachment assessment, and almost 90 percent of the children who showed *externalizing* problem behaviors (conflict, aggression, acting out) at 3 years of age were insecure based on this 24-month assessment. The relationship between attachment insecurity and externalizing behaviors was particularly strong for boys (McCartney *et al.*, 2004—ID #7229).

The 36-month Strange Situation attachment assessment was similarly associated with behavior problems. Insecure attachments at 36 months predicted both mothers' and caregivers' ratings of internalizing behaviors for boys and girls as well as externalizing behaviors for boys (McCartney *et al.*, 2004—ID #7230). While the Q-set may assess

dimensions of security not as easily observed in the Strange Situation technique, the consistency in these findings at both 24 and 36 months suggests a relationship between attachment security and behavioral problems.

- **Insecure mother-child attachment at 24 and 36 months predicts more internalizing behavior problems for boys and girls and more externalizing problem behaviors for boys.**

Attachment Security and Peer Interaction

In evaluations of peer interaction in the NICHD-SECC-ECCRN, children with secure attachments at 36 months tended to have friendships characterized by less instrumental aggression than was the case with children with insecure attachment histories, particularly insecure-avoidant attachments (McElwain, Cox, Burchinal, and Macfie, 2003—ID #7051). In other samples, children with avoidant attachment histories were also perceived by teachers to be more hostile and antisocial and to express less sympathy toward their classmates (Grossman and Grossman and Zimmerman, 1999, as cited in McElwain *et al.*, 2003).

The NICHD-SECC-ECCRN study also found consistent but rather modest associations between attachment security and positive measures of child emotions and compliance, as well as mother-reported social competence and behavior (NICHD-SECC-ECCRN, 2001—ID #7136). Children with secure attachment histories were less negative in their interactions, had more focus ability, and were more compliant in cleanup activities (NICHD-SECC-ECCRN, 1998—ID #7058). These findings seem to validate the assertion that secure attachments enable children to regulate their own emotions and appropriately identify and respond to the emotions of others.

- **Children with secure attachments to their mothers are more likely to have positive peer interactions, more positive emotions, and social behaviors.**

Attachment Security and Exploratory Behavior

In evaluations of exploratory behavior, children in the NICHD-SECC-ECCRN study with resistant

attachment histories showed greater dependence and less initiative than children with secure attachment histories (McElwain *et al.*, 2003—ID #7227). These children explored less and exhibited lower levels of pretend play at 36 months of age, indicating anxiety about staying close to the attachment figure.

Secure attachment at 15 months was an especially important predictor and continued to predict child–friend interaction and exploration even after controlling for attachment status at 36 months and maternal sensitivity from 6–36 months, but children who received high maternal sensitivity subsequent to the development of insecure attachment at 15 months showed consistently better functioning at 36 months than did children who experienced low maternal sensitivity following a secure attachment (McElwain *et al.*, 2003—ID #7228). Continued maternal sensitivity throughout the early years appeared to have a stronger influence on healthy social-emotional development than did attachment security in infancy.

- **Secure mother–child attachment is a significant predictor of more positive child–friend exploratory behavior and peer interactions.**

Attachment Security and Maternal Sensitivity

In the NICHD-SECC-ECCRN sample, the most “socially competent” 3-year-olds were those who had a history of attachment security at 15, 24, and 36 months *and* more sensitive mothering throughout the first three years. These children had fewer behavior problems, greater social competence, more developed language skills, and higher school readiness scores than any of the other children (Belsky and Fearon, 2002b—ID #7174; ID #7177). Such findings demonstrate the importance of maternal sensitivity as well as attachment security throughout childhood.

Children who had secure attachments as infants but less sensitive mothering subsequently, and children who had insecure attachments with the mother in infancy but subsequently experienced more sensitive mothering, outperformed those who had neither attachment security in infancy nor sensitive mothering throughout their first three years. These findings

indicate that better child outcomes are more likely when children are securely attached to mothers who continue to provide sensitive care throughout childhood.

- **Healthy social-emotional development is most likely when there is a secure attachment to a mother who continues to provide sensitive care throughout childhood.**

Summary of Findings on Child Care and the Quality of Parent–Child Attachments

The relationship between maternal sensitivity and attachment security is one of the most important conclusions from the NICHD-SECC-ECCRN. Use and control of comprehensive measures of family background, including maternal sensitivity and quality of the home environment as well as child-care quality, allowed a more careful analysis of the extent to which each factor uniquely predicts attachment security. Consistent with other research, maternal sensitivity emerged as the most important predictor.

This may seem to diminish the importance of factors of child care in predicting social-emotional outcomes, but the study also confirmed Belsky’s (1986, 1988) original risk-factor conclusion that child-care factors may increase the risk of attachment insecurity. The NICHD-SECC-ECCRN revealed that more than 10 hours per week of child care, more than a single child-care arrangement across the first 15 months, and (to a lesser degree) lower-quality child care are risk factors for attachment security, particularly when mothers are less sensitive. Further, more hours in child care was associated with less maternal sensitivity across all ages, at least for White mothers (NICHD-SECC-ECCRN, 2003b—ID #7033; NICHD-SECC-ECCRN, 1999—ID #7084).

The importance of attachment security lies in its relationship to children’s social-behavioral outcomes including social competence, compliance, behavior problems, peer interaction, and self-esteem. The analysis of the relationship between attachment and social behaviors in the NICHD-SECC-ECCRN provided further evidence that attachment is an important dimension of social-emotional development. Insecure mother–child attachment is associated with more

internalizing and externalizing problems, particularly for boys. Secure attachments, on the other hand, are associated with fewer behavior problems and more positive peer interactions and emotions. Children with secure attachments were also more likely to engage in exploratory behavior and peer interactions.

These findings support the conclusion that healthy social-emotional development is best ensured when there is a secure attachment to a mother who continues to provide sensitive care throughout childhood.

Section III

Non-Maternal Child Care and Social Behavior

A substantial body of research has also evaluated the direct relationship between non-maternal child care and children's social-behavioral adjustment. A brief review of research prior to the NICHD-SECC_ECCRN will provide the context for a more thorough discussion of findings from the NICHD-SECC_ECCRN. This is followed by a summary of the key findings related to the relationship between non-maternal child care and children's social-behavioral adjustment.

Research Prior to the NICHD-SECC_ECCRN

Much like the studies on attachment and child care, the earliest findings from research on child care and social-behavioral adjustment were inconsistent. Some studies found that children in non-maternal child care were more visually oriented and engaged with peers, while others found children in child care to be less interactive and engaged with their families and more physically and verbally aggressive, frustrated, and noncompliant with peers and adults (Ricciuti, 1974; Moore, 1975; Schwarz, Strickland, and Krolick, 1974; Lay and Meyer, 1974, cited in Belsky, 1978; Macrae and Herbert-Jackson, 1975; Moore, 1964, cited in Belsky and Steinberg, 1978; Lippman and Grote, 1974, cited in Belsky and Steinberg, 1978).

The decade that followed continued to provide contradictory findings. Some studies suggested that day-care children had more advanced perspective-taking skills, cooperative behavior, task orientation, and confidence in social interactions, while others found non-maternal child care to predict increased "displays of aggression, more negative affect, and

resistance to adult requests" (Phillips, Scarr, and McCartney, 1987, p. 537; Barton and Schwarz, 1981; Haskins, 1985; McCartney, Scarr, Phillips, and Grajek, 1985; Rubenstein and Howes, 1979). These contradictions were often attributed to variations in the quality of child care, differences in timing and history of child care, and family variables that interacted with the outcomes. As with the attachment research, clarifications of these contradictions required larger samples and more standardized and comprehensive measures of a home background, child-care environment, and child characteristics.

Findings from the NICHD-SECC_ECCRN

The complex interactions among these factors have been more thoroughly teased out using the large NICHD-SECC_ECCRN sample with its diverse methodological approaches and extensive evaluations of both home factors and the child-care setting. Use of a range of measures allowed a more comprehensive evaluation of the relationship between non-maternal care and multiple dimensions of a child's social-behavioral adjustment. These included behavior problems, social competence/skills, peer interaction, conflict with teacher and mother, work habits, risk-taking, and impulsivity. The components of each of these dimensions and when they were measured are reviewed below.

Behavior problems were assessed using mother, caregiver, and teacher reports from the well-validated Child Behavior Checklist (CBCL) (Achenbach, 1991) when children were 24, 36, 48, and 54 months;

kindergarten, 1st, 3rd, and 6th grades; and 15 years old. Behavioral problems included internalizing problems (too fearful and anxious) and externalizing problems (hits others, is disobedient at school, and argues a lot). Social competence/skills (such as cooperation, assertion, responsibility, self-control) was evaluated through mothers' reports when children were 24 and 36 months, and by teachers as well as mothers at 48 and 54 months, in kindergarten, 1st, and 3rd grades and by teachers in the 6th grade. In laboratory evaluations at 24 and 36 months, children were observed and rated for compliance, cooperation, and resistance to temptation in a clean-up task with the mother and test examiner.

Peer interaction was evaluated by observation when children were 24 and 36 months for positive sociability, complexity, and negative/aggressive behavior. Children were also observed and rated for negative social interactions, compliance, negative mood, and sustained attention and activity level in the child-care setting. Peer interaction and social skillfulness was evaluated by teachers in kindergarten, 1st, 3rd, and 6th grades. Measures included items such as "Generates good quality solutions to interpersonal problems" and "Is aware of the effects of his/her behavior on others."

Conflict with teachers and mothers was evaluated in kindergarten, 1st, and 3rd grades and with teachers in the 6th grade. Work habits were measured by teachers in the 3rd and 6th grades. Items included "Follows classroom procedures," "Works well independently," "Works neatly and carefully," "Uses time wisely," "Completes work promptly," and "Keeps material organized." Risk-taking and impulsivity was measured by adolescent report at age 15 years. For risk-taking, adolescents reported the extent to which, over the past year, they used alcohol, tobacco, or other drugs or behaved in ways that threatened their own safety (e.g., rode in a vehicle without the use of seatbelts). For impulsivity, adolescents reported how closely their behavior matched a series of statements including: "I'm the kind of person who will try anything once, even if it's not that safe"; "I should try harder to control myself when I'm having fun"; and "I do things without giving them enough thought."

Child-Care Factors and Social-Behavioral Adjustment

The relationship between non-maternal child-care quantity, quality, type, and social-behavioral adjustment will be discussed, followed by the relationship between child characteristics such as temperament and the outcomes associated with non-maternal care. Interactions among these factors and family background, including structure, economic status, home environment, and maternal sensitivity, are also discussed.

Quantity of Child Care

Quantity of non-maternal child care as indicated by average hours per week was the most significant and consistent child-care predictor of social-behavioral adjustment (negative), considering outcomes across all ages. More hours of care in the first two years predicted less mother-reported social competence and cooperation and more caregiver-reported problems (NICHD-SECC-ECCRN, 1998a—ID #7057; ID #7045). At 36 months, these negative effects seemed to disappear. But in the 54-month assessments, more hours per week in non-maternal child care predicted lower caregiver- and mother-reported social competence, higher caregiver-reported externalizing problems, more adult-child conflict reported by caregivers, and more negative dyadic play after controlling for maternal education, family income-to-needs ratio, child sex, infant temperament, ethnic group, and maternal depressive symptoms (NICHD-SECC-ECCRN, 2003a—ID #5572; ID #7147; ID #6766).

In the kindergarten assessments, more hours per week in child care predicted more externalizing behaviors in mother and teacher reports and more adult-child conflict reported by teachers (NICHD-SECC-ECCRN, 2003a—ID #5228; ID #5039; ID #7152). Similarly, Belsky's (1999) evaluation of 120 5-year-old children and their parents showed that more hours in child care predicted more mother- and father-reported externalizing problems as well as inappropriate social problem-solving, preference for negative stories, and more hostile attributions in hypothetical situations.

There was no indication of a noticeably greater effect on problem behaviors after a certain number

of child-care hours; rather, the effect seemed to reflect continuous, extensive care (NICHD-SECC_ECCRN, 2003a—ID #5027). As quantity increased, problem behaviors such as neediness (demands a lot of attention, demands must be met immediately, easily jealous); assertiveness (bragging/boasting, argues a lot); disobedience/defiance (talks out of turn, disobedient at school, defiant-talks back to staff, disrupts school discipline); and aggression (gets into many fights, cruelty-bullying-meanness, physically attacks others, destroys things) increased proportionally (Belsky, 2002—ID #7237). Contrary to previous assertions suggesting that the negative effects of child care were really just children expressing more assertiveness (Clarke-Stewart, 1989), caregiver and teacher behavioral assessments indicated that these behaviors were aggressive, disobedient, and negative.

The significant associations of quantity and negative behaviors were much stronger for caregiver-reported behavioral problems (partial correlation = .37) than for mother-reported problems (partial correlation = .07). When behavior reports from the mothers, caregivers, and observers were evaluated together, maternal sensitivity emerged as stronger and more consistent than quantity as a predictor of behavioral outcomes (NICHD-SECC_ECCRN, 2003a—ID #6767); but quantity of child care was a stronger predictor than maternal sensitivity in caregiver reports of behavior problems, with an effect size 152 percent as large ($d = .38$ standard deviations) as the effect of parental quality ($d = .25$ standard deviations), which included parental sensitivity and quality of home environment (NICHD-SECC_ECCRN, 2003a—ID #5228; NICHD, 2002a).

The effect sizes, measuring the relative strength of the relationship between quantity in child care and social-emotional outcomes, were never large but in several cases were moderate in magnitude, particularly in the 54-month assessments. Although most of the children's behavior problems were, on average, not in the at-risk range across the assessment period, the proportion scoring in the at-risk range increased as the amount of time in care increased (NICHD-SECC_ECCRN, 2003a—ID #5030).

The statistical effect size of average hours of child care ($d = .43$ standard deviations) was comparable to

the statistical effect size of poverty ($d = .47$ standard deviations) on caregiver behavior reports (NICHD-SECC_ECCRN, 2002—ID #7153). Where 5 percent of children who averaged under 10 hours per week of non-maternal care across the first 54 months had elevated or at-risk problem scores, 16 percent of children who averaged 30 or more hours per week across the first 54 months had higher problem scores, a difference three times as large. In kindergarten, the comparative rates were 9 percent and 17 percent for these two groups (Belsky, 2002—ID #7236). Family economic status, maternal education, quality of non-maternal child care, or caregiver familiarity with the child did not moderate these effects (NICHD-SECC_ECCRN, 2003a—ID #5572).

Negative outcomes associated with quantity of child care persisted in assessments of the same children in the 3rd and 6th grades and when 15 years old. By the 3rd grade, children who had experienced more hours of child care had significantly fewer social skills (NICHD-SECC_ECCRN, 2005) and poorer work habits, an outcome that had not been measured in previous assessments. This was an important finding, given that children's work habits by the end of the primary grades have been identified as "building blocks for later success at school" (NICHD-SECC_ECCRN, 2005, p. 565). Children with more hours of child care were also rated higher in externalizing behaviors and teacher conflict, but the effects were significant only for children who had experienced more hours in center care. The observed effects for children who had not experienced 30 hours per week of early child care were diminished in part because children with fewer hours of child care had become more similar to them in reported problem behaviors across the early elementary school years (NICHD-SECC_ECCRN, 2005).

In the 6th grade, quantity of child care in center care continued to predict more problem behaviors, while quantity of child-care hours in relative care or family day-care settings did not significantly predict behavioral problems (Belsky, Burchinal, McCartney, Lowe-Vandell, Clarke-Stewart, and Owen, 2007). Effects of non-relative care (center care) on teacher-child conflict, social skills, and work habits were not significant by the 6th grade. When these children had

become 15 years of age, however, adolescent measures revealed other potential problems. More hours of non-relative child care during their early years predicted significantly more problem behaviors; risk-taking behaviors (including using alcohol, tobacco, and other drugs); and impulsivity in participating in unsafe activities (NICHD, 2010).

- **Hours in child care is the most significant child-care predictor of lower social competence, higher externalizing problems, more adult-child conflict, and more negative dyadic play throughout the early-childhood and transition-to-school years.**
- **The effect of quantity of care is comparable to the effect of poverty in predicting behavioral problems. Problems observed included increased neediness, assertiveness, disobedience/defiance, and aggression.**
- **More hours in child care predicts significantly fewer social skills and poorer work habits in 3rd-grade measures. By the 6th grade, more hours in center care predicts more problem behaviors but is not associated with social skills and work habits. By age 15, more hours in non-relative child care during the early years predicts more problem behaviors and increased risk-taking and impulsivity.**

Age of Entry

Age of entry into child care is a factor that is closely associated with quantity of child care. Previous research suggested that high amounts of day care initiated in infancy were associated with increased risk of negative social adjustment, particularly when high amounts of day care continued beyond infancy (Bates, Marvinney, Kelly, Dodge, Bennett, and Pettit, 1994—ID #6995). Han, Waldfogel, and Brooks-Gunn (2001—ID #7858) found that entry into non-maternal child care in the first year, especially early in the first year, significantly predicted externalizing problems at age 4 and again at ages 7 and 8. Harvey (1999—ID #7231), which also used data from the nationally representative National Longitudinal Survey of Youth (NLSY), did not find significant negative effects but, unlike

Han *et al.* (2001), did not follow the same children over time.

Youngblade (2003) found significantly more negative behaviors and peer ratings for 3rd and 4th grade children whose mothers had been employed for at least 10 hours per week during their first year. These children were more likely to act out and demonstrate less frustration tolerance, according to teacher reports, and to be “nominated by peers for hitting and being mean” in peer reports (Youngblade, 2003—ID #6991; ID #6987). Male students showed more negative behaviors such as hitting and acting out than female students did. Children from lower socioeconomic levels also manifest more negative behaviors. But Youngblade (2003—ID #5551) found that the effect size for first-year employment on negative social-behavioral adjustment (R-squared = .06) was comparable to or larger than the effect sizes of gender (R-squared = .03, .10) and social class (R-squared = .05).

The NICHD-SECC studies compared the effects of average hours per week in specific periods during the first 4.5 years of life and found that cumulative quantity of care beginning in the first six months best predicted lower levels of social and behavioral functioning across all assessments. These effects remained even after controlling for multiple family background factors, including maternal sensitivity and family socioeconomic status, and the child-care factors of quality and stability. However, more time spent in non-maternal care during the earliest period, from 3–6 months, had the same predictive power as average quantity of care from 3 to 54 months for teacher-reported externalizing problems (NICHD-SECC-ECCRN, 2003a). Similarly, more time in child care during the third year (also accounting for time in care before and after) predicted more caregiver-reported externalizing problems and less caregiver-reported social competence at 54 months (NICHD-SECC-ECCRN, 2003b—ID #7018; ID #7055).

- **More hours in child care beginning in the first six months of life and continuing throughout childhood predicts negative social behaviors more strongly than does hours of child care at any specific period.**

- **More time in non-maternal child care between 3 and 6 months uniquely predicts behavioral problems in kindergarten measures, while more time in child care between the ages of 2 and 3 especially predicted behavioral problems at 54 months.**
- **Although age of entry into child care was not evaluated as an independent predictor of social-behavioral adjustment in 3rd grade, 6th grade, and age 15 measures, earlier behavior associated with age of entry predicts problematic behaviors in the 3rd grade, 6th grade, and age 15 measures.**

Other research has supported these findings. A recent analysis of the National Longitudinal Survey of Youth found that children whose mothers returned to work within 12 weeks of birth were more likely to manifest behavioral problems including aggressiveness, impulsivity, and defiance at age 4 (Berger, Hill, and Waldfogel, 2005—ID #7857). Other analyses similarly found negative social-behavioral outcomes from early and more extensive maternal employment for children at ages 3–4, 5–6, 8–9, and 10–12 (Vandell and Corasiniti, 1990; Belsky and Eggebeen, 1991; Baydar and Brooks-Gunn, 1991; Han, Waldfogel, and Brooks-Gunn, 2001; Harvey, 1999).

Higher amounts of non-maternal care also emerged as a risk factor in a unique study of behavior during the second year of 69 sons of maritally intact, middle- and working-class White families (Belsky, Woodworth, and Crnic, 1996—ID #7004; ID #7006). Families labeled moderate- or high-risk based on lower SES, marital negativity, or difficult work/family relations were significantly more likely to experience greater difficulty with the interactions and behaviors of their 2-year-old when they relied on more than 20 hours per week of non-maternal care. In contrast, the absence or limited use of nonparental care significantly reduced the probability of “troubled” behaviors and interactions between parents and their sons.

Quality of Child Care

Previous research evaluating the role of quality in child care suggested that higher overall quality, particularly sensitive caregiver-child interactions

and caregiver training, predicted positive behavioral outcomes more consistently than age of entry or family background measures of income and education (Phillips *et al.*, 1987). The oft-cited study of Swedish children in high-quality day-care settings found that children who entered child care earlier were rated as more persistent, independent, and socially confident than children who entered day care later and those in home care (Andersson, 1989), but it is important to note that the children who entered day care earlier in the Swedish study also came from more highly educated, higher-income families and were growing up in a society in which maternity leave was provided and quality of care was high, perhaps due to the fact that caregivers earned reasonable wages and were trained.

A larger United States study done nearly 10 years later evaluated the effect of quality of care for 720 young children ages 12–60 months in child care centers in three states. In this larger, more diverse sample, family structural characteristics such as income, educational levels, race, and number of children, as well as family processes involving parenting stress, work-family interface, and parental attitudes, significantly predicted children’s social adjustment and behaviors. Quality of care predicted statistically reliable but smaller effects (McCartney, Scarr, and Rocheleau, 1997—ID #7039).

These findings were consistent with the NICHD-SECC-ECCRN study. Child care quality was the most consistent predictor of compliance and problem behaviors in assessments for children at 24 and 36 months (NICHD-SECC-ECCRN, 1998—ID #6862). However, effects from the full set of child-care predictors at these ages never accounted for more than 3 percent of the variance in outcomes. Across all ages, quality was less predictive of social-behavioral adjustment than was quantity of child care (–); maternal sensitivity (+); or home quality (+). Unlike the cumulative effects of quantity of non-maternal child care, there was no evidence that more time in higher-quality child care through the first 15, 24, 36, or 54 months resulted in better social-behavioral adjustment than did less time in high-quality child care (Belsky, 2001).

Quality of care, especially as indicated by child-staff ratio, did predict fewer behavior problems and more positive social behaviors for children at 54

months (NICHD-SECC_ECCRN, 2003c—ID #7241; ID #5980). Children from socioeconomically at-risk families showed slightly fewer behavioral problems at 24 and 36 months when they were in higher-quality child care (NICHD-SECC_ECCRN, 2000—ID #7120; ID #7121). Children from minority families and non-partnered mothers in high-quality care were also more prosocial than children in low-quality care (NICHD-SECC_ECCRN, 2000—ID #7124; ID #7216) in measures at 24 and 36 months. No significant effects of quality of child care on social-behavioral adjustment emerged in assessments during kindergarten or the 1st, 3rd, or 6th grades. At the age 15 assessments, however, higher-quality child care in the early years predicted fewer self-reported problem behaviors by adolescents (NICHD, 2010).

The effects of high quality at any stage of development were not sufficiently strong to demonstrate consistent, significant benefits on social-behavioral adjustment. Indeed, “contrary to expectations, limited evidence was found to suggest child-care experiences moderate the negative associations between family risk and child outcomes” (NICHD, 2000, p. 153—ID #7122). After controlling for family income, child gender and ethnicity and parenting quality, maternal education, depression, and partner status, the effect sizes for quality of non-maternal child care were at the low end of the moderate range, from .19–.31 (NICHD-SECC_ECCRN, 2000).

- **Better child-care quality in the early years is associated significantly with some positive social-behavioral effects, including fewer behavioral problems at 24 and 36 months and fewer problem behaviors and more positive social behaviors at age 54 months. No significant positive effects of quality were observed in measures in 1st, 3rd, and 6th grade, however. By age 15, a “sleeper effect” emerged showing that higher-quality care was associated with fewer self-reported problem behaviors.**
- **The influence of higher-quality care in the age 15 measures is significant when comparing mid- to high-quality care but not when comparing low- to mid-quality care.**

Type of Child Care

In the NICHD evaluation comparing the effects of types of child care on social-behavioral adjustment, cumulative group care (defined as the total number of hours in a child-care setting with three or more non-siblings) predicted less negativity in mother-child interactions at 24 and 36 months but more negative behavior problems at 54 months. These findings emerged even after controlling for previous quantity or quality of child care (NICHD, 2004). Being in group day care before 12 months of age was also associated with more mother-reported behavior problems at age 3 (NICHD-SECC_ECCRN, 2003a—ID #5041).

Previous to the NICHD-SECC_ECCRN, research found that time in group day-care settings uniquely predicted negative social-behavioral outcomes. In the NICHD-SECC_ECCRN sample, the effects of group day-care experiences differed according to the age of the child and the source of the behavior report. The older children were at the time they entered day care and the less stable their day-care arrangement was, the more problem behavior they exhibited according to caregiver reports. Children in day care at the age of 2, in particular, exhibited more problem behavior in day care, were more active, and were more likely to have a negative mood and exhibit less sustained attention when interacting with their mothers (NICHD-SECC_ECCRN, 1998a—ID #7046). After the child was 3 years old, stability of the day-care arrangement or age at entry, except when there was continued, extensive child care, were not associated with behavioral outcomes (NICHD-SECC_ECCRN, 1998—ID #7057).

Center care emerged as a significant predictor of negative behavioral outcomes in the 6th grade outcomes. More hours in center care or non-relative care was associated with more problem behaviors, while quantity of child-care hours in relative care or family day-care settings did not significantly predict behavioral problems (Belsky, Burchinal, McCartney, Lowe-Vandell, Clarke-Stewart, and Owen, 2007). In fact, non-relative care was the only persistent predictor of negative social-behavioral adjustment across development. Where all types of non-maternal care had predicted negative social-behavioral outcomes

up to the 3rd grade, only non-relative care persisted in being associated with negative outcomes from 3rd grade through age 15.

Several hypotheses have been advanced as possible explanations for the persistent effects associated specifically with center care. The focus on academic development rather than behavior in center-care settings has been identified as a possible explanation. Another explanation suggests that negative peer processes in center-care settings resulting from the number of children and the lack of one-on-one adult interaction and supervision may inhibit development of appropriate social self-regulation (Belsky *et al.*, 2007). In such settings, children are less likely to get sensitive, attentive one-on-one nurturing.

- **Early child care in group settings of three or more non-sibling children is associated with more mother-reported behavioral problems at age 3 and caregiver-reported behavior problems at 54 months. Group care is also associated with more positive mother-child interactions at ages 2 and 3.**
- **Center care is specifically related to more problem behaviors and conflictual relationships in measures at kindergarten, 3rd grade, 6th grade, and when children were 15 years of age.**
- **Negative effects associated with non-maternal care persist through measures at age 15 years only for the non-relative types of non-maternal care. Where fathers, grandmothers, or other relatives provide early child care, negative effects do not seem to persist.**

Instability in Child Care

Changes in child-care settings also predicted negative social-behavioral adjustment. In the NICHD-SECC, multiple changes across the first three years predicted more mother-reported problem behaviors and observer-reported noncompliance at 36 months (NICHD-SECC_ECCRN, 1998a—ID #7046). Similarly, Youngblade's (2003) study of 3rd and 4th grade children found that the negative effects associated with early maternal employment were partially attributable to the number of different child-care settings

experienced in the first year. It should be noted, however, that stability of child care was rarely related to child outcomes in the NICHD-SECC_ECCRN.

- **More changes in child care before age 3 is associated with more problem behaviors at age 3.**
- **Stability of day-care arrangement or age at entry into child care is not associated with behavioral outcomes after age 3 except when early entry into child care includes continued, extensive child care.**

Child Characteristics: Race, Gender, and Temperament

Gender and infant temperament did not emerge as significant predictors of social-behavioral adjustment in the NICHD-SECC_ECCRN, except that teachers reported more conflict and less closeness with boys in the 1st grade assessments (NICHD, 2003d). Gender was a stronger predictor of social-behavioral outcomes in Youngblade's (2003) study of 3rd and 4th grade students. Boys whose mothers had been employed in the first year of their lives were more likely to be rated by teachers as acting out, but gender was not a significant predictor in two large nationally representative survey samples (Han *et al.*, 2001; Harvey, 1999).

Although race was not a significant predictor in the NICHD-SECC_ECCRN, it was a significant predictor of social-behavioral adjustment in Han *et al.* (2001), using the nationally representative National Longitudinal Survey of Youth sample. Compared to non-Hispanic White children, early maternal employment did not significantly predict negative behavior outcomes for African-American children.

Interactions Among Home, Child, and Child-Care Factors

Comprehensive reviews of the effects of maternal employment on children's behavior provide an important context for understanding the interaction among home, child, and child-care factors. A review of 69 studies conducted between 1960 and 2010 found that children from middle- and upper-class two-parent families had more behavioral problems

and performed worse on formal tests of achievement when their mothers worked full-time during the first three years of their lives. In contrast, children from low-income single-parent families did better on achievement tests and had fewer behavioral problems when their mothers worked full-time during their first three years. When mothers worked full-time during the first year of their child's life, however, children from lower- as well as middle- and upper-class families were likely to have lower achievement scores and more behavioral problems.

Although these findings were focused on the effects of maternal employment rather than the effects of non-maternal care, they are closely related because employed mothers are likely to have their young children in non-maternal care. The findings suggest that the effects of non-maternal care may not be the same for all children. Children with fewer resources may benefit from having a working mother whose added income increases their access to important resources. For families with more resources, non-maternal care arrangements may not be as emotionally supportive as the child's own mother, resulting in more negative outcomes.

In the NICHD-SECC studies, maternal sensitivity was the strongest and most consistent predictor of social-behavioral adjustment from infancy through 1st grade assessments regardless of economic mothering. Sensitive mothering throughout early childhood significantly predicted fewer mother-reported behavior problems, more positive peer relationships, more positive mother and child interactions in laboratory assessments, less negative mood, more ability to resist temptation at age 3, and fewer caregiver-reported problems and instances of peer aggression (NICHD-SECC_ECCRN, 2001a—ID #7143; NICHD-SECC_ECCRN, 1998a—ID #7059; NICHD-SECC_ECCRN, 1998b—ID #7083).

In support of these findings, Belsky (1999) also found parental sensitivity to be the strongest predictor of social-behavioral adjustment in research on 120 middle-class, two-parent families. In this study, paternal and maternal sensitivity mediated or diminished the negative effects of non-maternal care on behavior problems, but parental sensitivity only

slightly diminished the negative effects of quantity on other measures of social-behavioral adjustment such as social problem-solving, blaming, and preferences for negative stories.

Maternal psychosocial well-being, a factor related to maternal sensitivity, also significantly predicted social-emotional adjustment throughout infancy and early childhood in the NICHD-SECC_ECCRN. Across all ages, higher levels of maternal depression, lower maternal personality scores of extraversion and positive attitude, and higher neuroticism predicted poorer cognitive and social functioning (NICHD-SECC_ECCRN, 2000—ID #7119). This relationship was somewhat stronger for children who were cared for primarily by their mothers (NICHD-SECC_ECCRN, 1998b—ID #7064). Less family social support, increased parenting stress, and decreased marital quality also predicted poorer cognitive and social functioning (NICHD-SECC_ECCRN, 2000—ID #7119). Higher socioeconomic risk specifically predicted higher caregiver reports of behavioral problems and lower maternal reports of social competence (NICHD-SECC_ECCRN, 2000).

However, both the NICHD-SECC_ECCRN and Belsky (1999—ID #7859) found that more hours in child care predicted decreased paternal and maternal sensitivity. In the NICHD-SECC_ECCRN, mothers were less sensitive in interactions at 6, 15, 24, and 36 months when children spent more hours in child care. These same children showed less positive engagement with their mothers at 15, 24, and 36 months (NICHD-SECC_ECCRN, 2003b—ID #7033).

- **Maternal sensitivity is the most consistent predictor of children's social-behavioral outcomes throughout childhood.**
- **Children with mothers who have fewer depression symptoms and are more extroverted, more positive, and less neurotic have fewer behavioral problems.**
- **Children whose mothers lacked social support and experienced parenting stress and/or low marital quality are more likely to have behavioral problems and lower language scores.**

- **More weekly hours in non-maternal child care before the age of 3 is associated with more negative mothering and less positive fathering during the toddler years.**

Closely related to these factors is maternal marital status, which also predicted children's social-behavioral outcomes. Children from married and cohabiting mothers had higher (although nonsignificant) prosocial behavior and language outcomes in the NICHD sample than children of single mothers (NICHD-SECC_ECCRN, 2000—ID #7123), but the relationship between marital status and child functioning was greater for the children in the full-time care of their mothers. Having a single mother was a stronger predictor of poorer social-behavioral adjustment for children cared for by their mothers, and having a married mother was a stronger predictor of better adjustment for children cared for primarily by their mothers (NICHD-SECC_ECCRN, 1998—ID #7060).

- **The negative effects of single-parent family structure and the positive effects of a two-parent family structure are somewhat stronger for children exclusively in the care of their mothers than they are for children in child care.**

Maternal attitudes toward maternal employment and child rearing also predicted social-behavioral adjustment. Working mothers who perceived more costs associated with maternal employment reported higher levels of negative peer behavior in their children at 36 months (NICHD-SECC_ECCRN, 2001a—ID #7144). In contrast, children in the full-time care of their mothers who expressed stronger beliefs in the benefits of maternal employment showed more problem behaviors and less social competence (NICHD-SECC_ECCRN, 1998b—ID #7061).

- **Children's behavioral problems are associated with having an unemployed mother who perceives benefits from maternal employment for children.**

Nonauthoritarian child-rearing attitudes suggesting less coercion and more nurturing practices

predicted more positive social-behavioral adjustment among children in full-time maternal care (NICHD-SECC_ECCRN, 1998b—ID #7082). In highlighting these differences, it is important to point out that the large majority of associations between family factors and child outcomes were comparable for children in full-time non-maternal care and children in the care of their mothers (NICHD-SECC_ECCRN, 1998b). This affirms that family background remains the most consistent and important predictor of social-behavioral outcomes regardless of the amount of time spent in non-maternal child care.

Summary of Findings

Findings on the relationship between non-maternal child care and social-behavioral adjustment indicate that more hours per week in non-maternal child care and entry into non-maternal care in the first year of life are the most consistent and significant child-care predictor of negative outcomes across development including measures at age 15 years. Group non-maternal child care and multiple changes in child-care setting are also associated with more negative social-behavioral adjustment, particularly if they occur at younger ages. In contrast, being in higher-quality non-maternal child care predicts more positive social-behavioral adjustment but with smaller effect sizes than quantity.

When factors of home background including maternal sensitivity are considered together with factors of non-maternal child care, maternal sensitivity is the strongest and most consistent predictor of social-behavioral adjustment in maternal, caregiver, observer, and teacher reports. Extensive non-maternal child care is also associated with decreased parental sensitivity. Mothers' psychological health, marriage, and having positive or negative attitudes about the effects of maternal employment that were consistent with using or not using non-maternal child care also predict children's social-behavioral adjustment. As expected, socioeconomic status, maternal education, and race interact with factors of child care in their effect on social-behavioral adjustment.

Section IV

Summary of Research Findings and Implications for Research and Policy

This extensive review of a vast body of research on non-maternal child care in the United States indicates that the experience of child care in the United States today has important implications for children's social-emotional development. The following conclusions emerged from this review. Most are based on conclusions from the recent and comprehensive NICHD-SECC-ECCRN, which was the focus of this report.

Research Findings

1. Maternal sensitivity and the mother's psychological health is the strongest and most consistent predictor of a secure attachment relationship for children both in and out of child care.

2. Decreased maternal sensitivity and less positive engagement of children with their mothers is associated with children spending more hours in child care.

3. When behavior reports from the mothers, caregivers, and observers, were evaluated together, maternal sensitivity emerged as a stronger and more consistent predictor of behavioral outcomes than quantity, but quantity of child care was a stronger predictor than maternal sensitivity in caregiver reports of behavior problems.

4. Fewer maternal psychosocial risk factors, including fewer depressive symptoms, greater psychological adjustment in terms of extraversion and positive attitude, and less neuroticism, are associated with greater maternal sensitivity and fewer behavioral problems in children.

5. Marital status is an important predictor of both maternal sensitivity and child outcomes. Married mothers were rated as more sensitive than cohabiting or single mothers and were also more likely to interact positively with their child. Children of

married mothers were also significantly more likely to be securely attached. Married mothers were more likely to have higher education and income and to be White/non-Hispanic than single mothers. The positive associations of marriage with child outcomes were found even after adjusting for these other demographic differences between married- and single-mother families.

6. Maternal sensitivity is lower when children are in more hours of child care, regardless of the quality and stability of child-care experience. Across the NICHD-SECC-ECCRN sample, more hours in child care was associated with decreased maternal sensitivity and less positive child engagement at the 6-, 15-, 24-, and 36-month assessments. These same negative effects were maintained in the 54-month and 1st grade assessments for White mother-child dyads.

7. Quantity of child care significantly predicts more negative behaviors as reported by mothers, caregivers, and teachers even when controlling for maternal sensitivity and other features of child care (e.g., quality and type). More non-maternal care in the first two years predicted less mother-reported social competence and cooperation and more caregiver-reported problem behaviors, while non-maternal child care in the second year alone predicted greater activity level, more negative mood, and less sustained attention during mother-child interaction.

Although these effects seemed to disappear by age 3, they reappeared more strongly in the 54-month caregiver-reported behavior problem assessments. Extensive child care continued to emerge as a significant predictor of both teacher and mother ratings of externalizing problem behaviors and conflict in the kindergarten assessments. As quantity increased, problem behaviors such as neediness (demands a lot of attention, demands must be

met immediately, easily jealous); assertiveness (bragging/boasting, argues a lot); disobedience/defiance (talks out of turn, disobedient at school, defiant-talks back to staff, disrupts school discipline); and aggression (gets into many fights, cruelty-bullying-meanness, physically attacks others, destroys things) increased proportionally.

Negative effects associated with quantity of child care persisted throughout development, including the most recent analyses involving children at age 15 years. Children who had experienced more hours of child care had significantly fewer social skills and were also reported as having poorer work habits in the 3rd grade. In the 6th grade, children who had experienced more center care continued to show more problem behaviors, while quantity of child-care hours in relative or family day-care settings did not significantly predict behavioral problems. Measures at age 15 years indicated that children who had experienced more non-relative care reported more risk-taking behaviors and impulsivity including using alcohol, tobacco, or other drugs; behaving in ways that threatened safety; and not being able to control impulses appropriately.

8. Unlike the cumulative effects of quantity of non-maternal child care, there was no evidence that more time in higher-quality child care through the first 15, 24, 36, or 54 months resulted in better social-behavioral adjustment than did less time in high-quality child care. Better child-care quality was associated significantly with a few positive social-behavioral effects including fewer problem behaviors in measures at age 15 years, but child care quality did not consistently predict children's social-behavioral outcomes and emerged as significantly less important in either positive or negative social and emotional outcomes than anticipated.

Quality of care did not override the negative effects associated with a high-risk family environment. Indeed, "contrary to expectations, limited evidence was found to suggest child care experiences moderate the negative associations between family risk and child outcomes" (NICHD, 2000, p. 153). Associations between quality of care and child-care outcomes were equivalent whether children received

better or worse parenting, and having more high-quality care did not predict improved social-emotional performance.

9. Type of child care emerged as a potentially important factor in some behavioral outcomes. Experience in group day-care settings seemed to show positive effects on caregiver-reported behavior problems at ages 2 and 3, but group experience before 12 months was associated with more mother-reported behavior problems at age 3. More time in center care also predicted negative behaviors, including acting out and aggression, in caregiver reports at 54 months. Center care was specifically related to more problem behaviors and conflictual relationships in measures at kindergarten, 3rd grade, and 6th grade and when children were 15 years of age. Negative effects associated with non-maternal care persisted only through measures at age 15 years for the non-relative types of non-maternal care. Where fathers, grandmothers, or other relatives provided early child care, negative social-behavioral effects seemed to diminish across development.

10. Negative child outcomes are especially likely when child-care factors that may be construed as risk—extensive hours of care, poor-quality care, or multiple changes in child-care arrangements—are coupled with family risk factors. For example, attachment insecurity was more likely when low maternal sensitivity was combined with more than 10 hours per week of child care, more than one child-care arrangement, or lower-quality child care. Children who had insensitive mothering plus extensive or low-quality child care were at greatest risk for insecure attachments.

The same pattern emerged with social-behavioral adjustment. Less family social support, increased parenting stress, and decreased marital quality all predicted more negative outcomes. Higher socioeconomic risk specifically predicted higher caregiver reports of behavioral problems and lower maternal reports of social competence. This risk-factor association is an important consideration, particularly in light of the many families with several risk factors who rely on non-maternal child care.

11. Attachment security was positively associated with later positive social-emotional outcomes. A secure attachment predicted less negativity and more focus ability during mother–infant interactions at 15 and 24 months and fewer behavioral problems at 3 years of age. Indeed, the most “socially competent” 3-year-olds were those who had a history of attachment security at 15, 24, and 36 months *and* more sensitive mothering throughout the first three years. Attachment security at 36 months was also a significant predictor of less instrumental aggression in peer interactions and of less hostility and more sympathy toward classmates in kindergarten assessments.

12. Healthy social-emotional development is most likely when there is a secure attachment to a mother who continues to provide sensitive care throughout childhood and there are few hours per week in non-maternal child-care settings.

In support of the *primacy of early experience hypothesis*, non-maternal child-care experiences in early development have continuous effects that outweigh experiences in later development. Following the *incremental hypothesis*, there is evidence that extensive non-maternal child care in the earliest years of a child’s life, particularly in the first year, puts him or her on a trajectory of more negative social-behavioral development. The negative effects are carried by each developmental stage such that negative behaviors at age 2 lead a child to negative behaviors at age 4 that then predict negative behaviors at age 6, etc. The negative effects persisted but were not magnified across time.

Implications for Future Research

The longitudinal and comprehensive assessments used to obtain these findings have set an important standard for future research, but more research is needed to explore the mechanisms resulting in the negative behaviors associated with extensive non-maternal child care. Further research is also needed to explore why the effects of child-care quality are so much less significant than the effects of child-care quantity and parental sensitivity. Neurological and biological research may be fundamental to understanding these processes, as indicated in recent

research showing that children in child care have higher stress-induced cortisol levels throughout the infant and toddler years than children being cared for by their mothers (Watanabe, Donzella, Alwin, and Gunnar, 2003—ID #5588). Such research suggests one possible mechanism that may be operating in the associations that have been documented.

The finding that more time in child care is associated with diminished maternal and paternal sensitivity suggests that there may be something that happens to parents’ ability to understand and respond to their infant when they spend longer hours away from that child. It may also be that parents whose children spend longer hours in non-maternal child care parent differently from other parents or that the child-care experience alters children’s patterns of interaction with their parents. Why this response is different for White and non-White families also needs further study. By centering on the child only, the large majority of child development research has ignored the impact that child care has on the family system as a whole. These findings suggest that child care also impacts parenting and that, to the degree that this effect is negative, it negatively impacts the entire family system.

Most important, an acknowledged limitation of current research is the lack of representation of populations of greatest risk. The most negative outcomes were observed in children with multiple risk factors. The fact that these populations were under-represented in these samples suggests the need to further explore how their child-care needs differ from those of other children and how those needs might be addressed.

The longitudinal nature of the NICHD-SECC_ ECCRN has been fundamental to understanding the experience of child care across time. With more time, assessments of these children as adolescents will give further understanding as to the continued impact, if any, of the children’s child-care experiences in their preschool years. More longitudinal measures will also illuminate how the attachment relationship is experienced over time and how it relates to the attachment patterns of these youth through adolescence and into young adulthood and later marriage.

Policy Implications

The negative social-behavioral adjustment effects associated with early and extensive non-maternal care and the critical role of family background, particularly maternal sensitivity, also have important implications for government and workplace policies affecting families. Although the negative effects found in these studies were not large, like many public health concerns, even low or moderate risks are significantly multiplied by their widespread prevalence. This merits the development of policies that would allow parents to make choices that would reduce the amount of time children spend in non-maternal child care throughout the earliest years. Such strategies might include employers' expanding parental leave and changing benefit packages for part-time employees, enabling more parents to spend more time with their infants and toddlers without risking their employment. Tax policy should relieve the pressure on families rearing infants and young children.

The evidence of negative social-behavioral effects associated with outcomes of non-maternal care also raises questions as to the benefits associated with currently proposed universal pre-K educational plans. Evidence of cognitive benefits associated with high-quality pre-K educational plans has already been questioned, and this review presents a strong case for potentially negative social-emotional and behavioral outcomes associated with early child care.

Further, the negative social-emotional and behavioral effects did not seem to be ameliorated sufficiently by higher-quality child care. An informed discussion of public policy around universal pre-K plans should include consideration of this evidence for potentially negative social emotional outcomes.

Further, it is critical to note that the effect size for quantity of child care on measures at 54 months is comparable to the effect of poverty in children's behavioral outcomes. Policies directed toward reducing child poverty are numerous, but few if any policies take into account allowing parents to make household decisions that would reduce the number of hours their children spend in non-maternal care.

Understanding and addressing the impact of child care on children's social-emotional development is a complex task, both for researchers and for policymakers. Future child-care research should build on what is currently known to expand policymakers' understanding of the social-behavioral development of diverse children in today's wide range of child-care settings. We now have a clearer picture of outcomes for children experiencing child care in the United States. Experience demonstrates that when the needs of children are a primary focus, all benefit—the present as well as the future. When they are not, all suffer. With the knowledge about child care that is currently available, we are better prepared to address child-care issues and the needs of children and their families appropriately.

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