

Emanuel Miller Lecture

Developmental Risks (Still) Associated with Early Child Care

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In the mid to late 1980s a major controversy erupted when Belsky's (1986, 1988, 1990) analysis of research produced the conclusion that early and extensive nonmaternal care carried risks in terms of increasing the probability of insecure infant—parent attachment relationships and promoting aggression and noncompliance during the toddler, preschool, and early primary school years. Widespread critiques of Belsky's analysis called attention to problems associated with the Strange Situation procedure for measuring attachment security in the case of day-care reared children and to the failure of much of the cited research to take into consideration child-care quality and control for background factors likely to make children with varying child-care experiences developmentally different in the first place. In this lecture, research concerning the developmental effects of child care and maternal employment initiated in the first year of life that has emerged since the controversy broke is reviewed. Evidence indicating that early, extensive, and continuous nonmaternal care is associated with less harmonious parent—child relations and elevated levels of aggression and noncompliance suggests that concerns raised about early and extensive child care 15 years ago remain valid and that alternative explanations of Belsky's originally controversial conclusion do not account for seemingly adverse effects of routine nonmaternal care that continue to be reported in the literature.

Keywords. Aggression, behavior problems, child development, day care, parent—child interaction.

Abbreviations: NICHD-SECC: National Institute of Child Health and Human Development Study of Early Child Care; NLSY: National Longitudinal Survey of Youth.

It is indisputable that the childrearing landscape has changed greatly in the English-speaking world over the past several decades. This is particularly so in the United States, but true in the United Kingdom as well. When it comes to considering the rather dramatic changes that have taken place over a single generation in childrearing, perhaps none is more noteworthy than the timing of mothers' return to employment after the birth of a child (Leibowitz & Klerman, 1995) and thus the ever-growing reliance upon nonmaternal care in the first year of life. Whereas it was once the case that mothers who could afford to remain at home during the earliest years of their children's lives did so until school enrolment or perhaps a year or two earlier, American mothers today who re-enter the labour force after having a baby now routinely do so in the child's first year or even months of life. As a result, by 1990 rates of maternal employment for married mothers of 3-year olds and of 6-month-olds were virtually indistinguishable in the U.S. (Leibowitz & Klerman, 1995). Whereas roughly 38% of mothers of infants under 1 year of age were in the labour force in 1980, by 1990 the figure had risen to 54% (U.S. Bureau of the Census, 1992), and by 1994 to 55% (Bachu, 1995), where it basically remains today (U.S. Bureau of the Census, 1999). Although changes in maternal employment patterns have taken place somewhat later in the United Kingdom, by the end of the 20th century the situation in the U.K. looked decidedly similar to that of the U.S. By the Spring of 1999, 53% of British mothers with a child less than 5 years of age were employed, with the corresponding figure for mothers with infants under 1 year of age being 49% (Office for National Statistics, 2000).

Parents, policy-makers, and developmentalists have long wondered how this dramatic change in childrearing affects children's development. Reservations have been expressed about whether the changing childrearing landscape, at least as currently experienced, is in the best interests of children, families, and their societies. A recent report from the U.S. indicates that American parents of children under 5 remain convinced, despite years of some professional advice and research suggesting otherwise (Scarr, 1984, 1998), that having a full-time parental presence at home is what's best for very young children — and would most prefer that for their family (Farkas, Duffet, & Johnson, 2000). In fact, in this survey of 815 representative parents with children aged 5 and under, virtually two thirds disagreed with the notion that the care and attention children get from "a top-notch day care center" is just as good as that they would get at home with a parent.

As someone who has investigated the effects of child care on child development for more than two decades, and who co-authored an authoritative report on the subject in the late 1970s, which concluded that most concerns expressed about the subject could not be empirically substantiated (Belsky & Steinberg, 1978), I have come to share the reservations, if not convictions, of the recently surveyed American parents. These were expressed first, with multiple caveats and qualifications, in the middle and late 1980s, in a much-discussed and debated series of papers drawing attention to research addressing the routine, nonmaternal child care experienced by American children in their first year of life (Belsky, 1986, 1988, 1990). In this

body of work I highlighted evidence suggesting that more than 20 hours per week of such care posed risks for the infant—parent relationships and for psychological and behavioural adjustment during the toddler, preschool, and early primary-school years. My reading of the literature, based on what I described as a “slow steady trickle of disconcerting evidence” which I found increasingly difficult to explain away (as I had for years—and many still do), generated a firestorm of controversy, both in the scientific literature (Clarke-Stewart, 1988; Fox & Fein, 1990; Phillips, McCartney, Scarr, & Howes, 1987) and the popular press. This occurred despite the fact that I titled my initial paper in a purposefully nonalarmist, questioning manner, “Infant day care: A cause for concern?”, and made explicit that the argument I was advancing was “inferential “, based on “circumstantial evidence”; and that other scholars “could, would and should” read the data differently and draw different conclusions (Belsky, 1986). Dogmatic, I was not.

In the decade and a half since the advent of what have been (rightly) called “the day care wars” (Karen, 1994; Phillips & Adams, in press), a substantial amount of research has appeared on the effects of nonmaternal care initiated in the first year of life. Perhaps most significant has been the large-scale, well-funded, collaborative American investigation—The NICHD Study of Early Child Care—which brought together many of the academic antagonists in the day-care controversy with other developmental scientists to plan and conduct a comprehensive study of the effects of early child care that would address the core issues raised in the controversy (and much more). (NICHD stands for the National Institute of Child Health and Human Development, the American agency funding and collaborating in the research.) The results of this work, which some might regard as definitive, will figure prominently in this essay.

The NICHD Study of Early Child Care (hereafter labelled NICHD-SECC) longitudinally follows from birth more than 1300 children and their families residing in 10 different American communities. It is considered important because it has been able to overcome many of the limitations that plagued so much previous research. Perhaps most notably, considerable effort has been expended in measuring the quality of child care that infants, toddlers, and preschoolers experience, relying upon intensive and repeated observations of children’s day-to-day experiences in whatever nonmaternal child-care arrangements they routinely experienced when 6, 15, 24, 36, and 54 months of age. This focus is of critical significance because it has been repeatedly asserted that the reason why some studies highlight risks associated with infant day care was because those studies failed to take into account this all-important parameter of care.

However reasonable this argument, what is surprising is how quality of care came to be pitted against the parameters of timing (i.e., age of entry) and quantity of care (i.e., hours per week) in discussions of the effect of child care. It has always dismayed me that by drawing attention to issues of timing (i.e., first year of life) in my 1986 essay and extent or quantity of care in papers that followed shortly thereafter (Belsky, 1988, 1990; Belsky & Eggebeen, 1991; Belsky & Rovine, 1988), many readers inferred that I was dismissing quality of care as a factor in understanding how child care influences children’s development. As someone

who had written about quality of child care in the past, repeatedly underscoring its role in shaping child development (Belsky, 1984; Belsky & Steinberg, 1978; Belsky, Steinberg, & Walker, 1982), it was disappointing to see such work ignored and my 1986 essay and subsequent papers, including empirical ones (Belsky & Eggebeen, 1991; Belsky & Rovine, 1988), treated as some fundamentalist right-wing tract, grounded in the premise that the only appropriate place for women was in the kitchen, barefoot and pregnant. It is for this reason that Stephen J. Gould's (1990, p. 13) comments about scientific controversy in evolutionary biology rang so true for me when I ran across them soon after the child-care wars broke out:

I've been in this business (of academia) for nearly a quarter century now and nothing depresses me more than the rampant, seemingly inveterate mis-characterization that lies at the core of nearly every academic debate. We are not incapable of arguing about intellectual substance and empirical reality, but we seem to prefer misunderstanding as a subject for invective. The root of this lamentable behavior can only lie in careless habits of reading and thinking (or, worse, in our willingness to argue without reading at all).

The other important feature of the NICHD-SECC worth heralding early in this lecture, in addition to a focus upon child-care quality, is the attention being paid to selection effects. Because child-care experiences are not randomly assigned, and because our longitudinal study is not experimental, a wide variety of potential "third variables" are taken into account to reduce the likelihood that effects attributable to other factors are not mistakenly attributed to features of child care. Indeed, it was the failure of many prior studies to do just this that raised legitimate questions about (any and all) interpretations of much of the data purported to illuminate effects of day care.

It is my purpose in this lecture to revisit these controversial issues to determine whether concerns raised in the mid to late 1980s about developmental risks associated with routine nonmaternal care initiated during the first year of life, especially on a full- or near-full-time basis, were as misguided as many asserted then (ClarkeStewart, 1989; Phillips et al., 1987; Thompson, 1988) and thereafter (McGurk, Caplan, Hennessy, & Moss, 1993; Scarr, 1998). Thus, I begin by considering evidence pertaining to parent—infant relationships before moving on to research dealing with indicators of adjustment during the toddler, preschool, and early primary school years, most notably aggression, noncompliance, and behaviour problems. In the analysis to follow, I cite data from putative studies of both child care and maternal employment, so long as they can inform us—directly or indirectly—about nonmaternal care initiated in the first year of life. I regard it as quite appropriate to draw upon these inherently interrelated bodies of research because certainly in the first year of life maternal employment and nonmaternal care are virtually synonymous (Baydar & Brooks-Gunn, 1991; Borge & Melhuish, 1995), though this linkage most certainly weakens as children develop through the preschool years.

Because so much of the debate about infant day care focused upon issues of timing, quantity, and quality of care, it is these features of nonmaternal care that figure most prominently in this lecture. Child-care factors such as type and stability will rarely be mentioned, principally because it is widely recognised that, at least with regard to socioemotional development, quality of care is of far greater importance than type of nonmaternal care (e.g., Clarke-Stewart & Fein, 1983; Lamb, Hwang, Broberg, & Bookstein, 1988; Scarr, 1984) and that stability is substantially correlated with child-care history (i.e., age of entry, amount of care) (Howes & Stewart, 1987).

This lecture will also not deal with effects of infant day care (or any child care for that matter) on cognitive and language development, as there has been little debate about this topic. It is important to highlight, nevertheless, that data emanating from the NICHD-SECC continues to demonstrate, as has other work for quite some time now—from the U.S. (e.g., Burchinal, Roberts, Nabors, & Bryant, 1996; McCartney, 1984), Canada (Goelman & Pence, 1987), and the U.K. (Melhuish, Lloyd, Martin, & Mooney, 1990)—that quality of care is related to this domain of development, whereas quantity and timing rarely are (for review, see Lamb, 1998). Thus, the NICHD-SECC has found repeatedly that higher quality of care is associated with enhanced language and cognitive development during the first 3 years of life (NICHD Early Child Care Research Network, 2000a) and just prior to entry into school at age 4.5 years as well (NICHD Early Child Care Research Network, 2000c).

The Parent—Infant Relationship

For many years and for many scholars, Bowlby's (1969, 1973) theory of infant—parent attachment served as the intellectual foundation upon which rested concerns about the effects of nonmaternal care. This was because Bowlby's work highlighted the stress experienced by the child when separated from the mother (or principle caregiver) and developmental risks associated with extended separation from the attachment figure. This led some to assume that, or at least wonder whether, developmental risks were posed by the kind of daily separations characteristic of routine nonmaternal care (e.g., Barglow, Vaughn, & Molitor, 1987; Vaughn, Gove, & Egeland, 1980). As a result, much of the literature on early child care addressed this issue, relying upon what had become the standard procedure for evaluating the security of the infant—parent attachment relationship, the Strange Situation.

Of the many critiques wielded against much child-care research and my analysis of its findings, perhaps none was heralded more than the argument that the Strange Situation risked mischaracterising day-care reared infants as insecure when they were not (Clarke-Stewart, 1988, 1989; McGurk et al., 1993). This is why, when it came to planning the NICHD-SECC, there was an (appropriate) insistence that investigation of the effects of infant day care on the mother—child relationship should

not be restricted to this potentially problematic measurement strategy. In what follows, I review arguments as to why attachment evidence drawn from the Strange Situation might be invalid when it comes to studying the effects of day care and consider evidence addressing this claim. Thereafter, I summarise data pertaining to day care and the mother—infant relationship that focuses upon attachment security, measured by means of the Strange Situation. Then, attention is turned to non-attachment-based approaches to examining the effects of infant day care on the mother-child relationship. Finally, evidence pertinent to child care and the father-child relationship is considered and some conclusions are drawn regarding early child care and the parent-child relationship. Before proceeding in this manner, it should be made clear that the reason why now, as in 1986, a prominent place is accorded the study of parent-child relationships in efforts to understand the effects of infant day care is because of extensive theory and evidence highlighting the contribution of early experiences in the family to children's psychological wellbeing and adjustment (Maccoby & Martin, 1983; Thompson, 1998).

The Putative Invalidity of the Strange Situation

From the early 1970s into the 1980s, evidence emerged suggesting that infants and young children reared in day care were more likely than home-reared agemates to behave avoidantly toward their mothers in the Strange Situation, sometimes to the point of being classified as insecure-avoidant in their attachment relationship, though by no means did all data point in this direction (for review, see Belsky, 1984; Belsky et al., 1982). An important study documenting the link between insecure-avoidant attachment and nonmaternal care in the first year was discounted by myself (Belsky et al., 1982) and others because it focused upon infants from economically impoverished families being reared in all sorts of probably unstable, low-quality, nonmaternal care arrangements (Vaughn et al., 1980). By 1986, when I revisited the evidence, and 2 years later, when I published a relevant study (Belsky & Rovine, 1988), it was clear that linkages between attachment insecurity and especially insecure-avoidant attachment and infant day-care experience, particularly that lasting 20 or more hours per week, could not be so easily dismissed, as research now focused upon children from nonrisk families.

Clarke-Stewart (1989) advanced what would become a popular critique of pertinent evidence, arguing that such findings *might* be artefacts of the reactions of day-care infants when placed in the Strange Situation. Because of their familiarity with separations purposefully designed into this experimental procedure to stress the child and, thereby, stimulate anxiety and provoke the attachment behavioural system, Clarke-Stewart (1988, 1989) speculated that the Strange Situation may not stress day-care reared infants to the same extent that it does children less familiar with routine separations from mother. In consequence, the independent exploratory behaviour of day-care reared children might be misjudged as avoidance of the mother, resulting in appraisals of insecurity. What Clarke-Stewart (1989) neglected to point out when arguing that Belsky (1986, 1988) had “maligned” infant day care was that her own comprehensive meta-analysis of child-care

research revealed, contrary to her speculation, that day-care and home-reared children simply do not differ in the degree to which they are distressed by the separations within the Strange Situation (Clarke-Stewart & Fein, 1983; see also McCartney & Phillips, 1988)!

Beisky and Braungart (1991) extended this seemingly forgotten work, showing that infants with extensive child-care experience classified as insecure-avoidant were no less distressed or more exploratory in the reunion episodes of the Strange Situation (critical for evaluating security) than similarly classified infants with limited child-care experience. Subsequently, Berger, Levy, and Compaan (1995) observed that classifications of children's attachment security made on the basis of behaviour in a standard paediatric check-up which did not involve a separation from mother were highly concordant with Strange Situation classifications, irrespective of whether the infants had extensive child-care experience in the first year. This demonstrated that the separations designed into the standard attachment-measurement procedure did not distort evaluations of attachment security as Clarke-Stewart (1989) speculated *might* be the case. Finally, when the NICHD-SECC addressed the issue of the validity of the Strange Situation in the case of day-care reared infants, it too found no support for the Clarke-Stewart (1988, 1989) proposition, which has been reproduced so frequently in the child-development literature that it is often regarded as an established fact (e.g., McGurk et al., 1993) —when it clearly is not. In fact, not only were infants with limited and lots of routine nonmaternal care no different with respect to the distress they manifested when separated from mothers in the Strange Situation, but coders proved equally confident in assigning attachment classifications to them (NICHD Early Child Care Research Network, 1997a). Hence, the prevailing argument as to why the 1980s results linking elevated rates of insecure attachment with more than 20 hours per week of routine nonmaternal care in the first year emerged must be rejected on empirical grounds. Attention is now turned to the substantive (as opposed to methodological) evidence itself.

Infant Day Care and Attachment Security

By the late 1980s, a number of multi-study analyses appeared examining the proposition that nonmaternal care initiated in the first year of life was associated with elevated rates of insecure infant—mother attachment. Quite consistent across these investigations was the extent to which early and extensive child care, defined as 20 or more hours per week of routine nonmaternal care in the first year, increased the risk of insecure infant—mother attachment. In Belsky and Rovine's (1988) analysis of 491 cases purposefully drawn from five investigations of nonrisk families (given criticisms wielded against Vaughn et al.'s, 1980, data), 43% of infants in early and extensive care were classified as insecurely attached. In Clarke-Stewart's (1988) subsequent analysis of 1247 cases drawn from a wide range of published and (still-to-this-date) unpublished studies, including ones focused upon very premature infants, very impoverished infants, and even infants exposed to cocaine in utero, the comparable figure was 36%. And in Lamb and Steinberg's (1990) analysis of some 790 cases which followed, it was 40%. For infants with more limited child-care

experience, the percentages of insecure attachment in these American samples were significantly lower, 26%, 29% and 27 %, respectively, in the three multi-study investigations.

Subsequent studies of the relation between non-maternal care in the first year of life and infant—mother attachment security, which appeared since the aforementioned reports of more than 10 years ago, paint a mostly inconsistent picture. Although some investigators fail to discern any relation between attachment and early child care (Braungart-Rieker, Courtney, & Garwood, 1999; Howes & Hamilton, 1992), others detect associations in the anticipated direction (Pierrehumbert, Frascarolo, Bettschart, Plancherel, & Melhuish, 1991; Scher & Mayseless, 2000). For example, in a study of Dutch infants, more than 20 hours per week of care was related to elevated rates of insecure-avoidant attachment (Verweij, 1996), whereas in research carried out in Israel, where avoidant attachments are rarely found. (Sagi, Van Ijzendoorn, Aviezer, Donnell, & Mayseless, 1994), elevated rates of insecure-resistant attachment were related to more hours of nonmaternal care and (independently) to centre-based care (Scher & Mayseless, 2000). Relatedly, Weinraub and Jaeger (1990) reported extensive employment initiated during the first 8 months of the infant's life, but not thereafter, predicted increased rates of insecure attachment; and Stifter, Coulehand, and Fish (1993) found the combination of high levels of maternal employment and of work-related anxiety to forecast increased rates of insecure-avoidant attachment.

Upon failing to find any such associations between infant day care and insecure attachment when combining data from four samples, Roggmann and associates (Roggman, Langlois, Hubbs-Tait, & Rieser-Donner, 1994) concluded that the literature is biased against null results, as research failing to detect child-care effects simply does not get published, either because investigators file it away or because editors find it unworthy of valuable journal space. In support of this argument, Roggmann et al. (1994) cited a number of unpublished reports showing no association between early child care and infant—mother attachment security. But as the NICHD Early Child Care Research Network (1997 a, b) pointed out, the Roggman et al. claim, however attractive, fails to acknowledge that in an area of inquiry as contentious as the effects of infant day care, evidence of group differences that prove to be unpopular can also be withheld from publication or face questionable editorial decisions (see, for example, Black, 1990). Pertinent data can thus end up in the proverbial file drawer for reasons other than those assumed by Roggman et al.

Results of the NICHD-SECC may actually help to explain some of the inconsistency that remains evident in the most recent literature. This is because, like other investigations just cited, this large-scale study, which implemented a host of selection-effect controls, failed to detect a main effect of any feature of child care, including quantity of care or age of entry into care, on infant—mother attachment security. On the basis of these (non)findings, many have claimed—erroneously—that no effects of child care on attachment were detected in the NICHD-SECC (Braungart-Reiker et al., 1999). Indeed, one persistent critic of child-care research on attachment observed—inaccurately—that this investigation “of more than 1,000 infants has

shown no relationship between age of entry or amount of infant care and attachment as measured by the Strange Situation” (Scarr, 1998, p. 103). Although it seems appropriate to draw attention to Scarr’s uncharacteristic embracement of attachment data, given her history of totally repudiating such data when they highlight adverse effects of early child care (Scarr, 1984; Scarr & Eisenberg, 1993; Scarr, Phillips, & McCartney, 1989), more noteworthy is her misrepresentation of the NICHD-SECC findings. The fact of the matter is that although “analyses revealed no significant main effects of child care, it was not the case that child care was totally unrelated to attachment security” (NICHD Early Child Care Research Network, 1997a, pp. 875—876), as Scarr (1998) contended.

Indeed, consistent with Belsky’s (1986, 1988) original risk-factor conclusion and Bronfenbrenner’s (1979, p. 38) assertion that “in the ecology of human development the principal main effects are likely to be interactions”, the NICHD-SECC found a pattern of results “that support a dual risk model of development” (NICHD Early Child Care Research Network, 1997a, p. 876). More specifically, when mothers themselves provided relatively insensitive care for their infants, a variety of features of care (independently) increased the rate of insecure attachment. These included more than 10—not 20—hours of care per week, more than a single child-care arrangement across the first 15 months of life, and lower-quality child care. Of importance is that these same results emerged when children’s attachment to their mothers was studied at 3 years of age using a modified version of the Strange Situation and an age-appropriate coding system for categorising patterns of attachment (NICHD Early Child Care Research Network, 2000d). Such replicated results from the largest study to date, which includes extensive controls for selection effects, raises the prospect that at least some of the inconsistency in the literature on attachment and child care may be a function of the fact that most inquiries only examine main effects of child care, and then often without controlling for pre-existing differences between families that rely upon varying amounts and quality of care.

Infant Day Care and Parent—Child Interaction

As indicated earlier, one of the commonest critiques of evidence indicating that early and extensive nonmaternal care (or maternal employment) was associated with elevated rates of insecure attachment drew attention to possible problems with the Strange Situation. Critics argued that to study the parent-child relationship and understand the effects of early child care and maternal employment, mothers should be observed interacting with their children, not studied in some artificial procedure which requires mothers to behave in decidedly nonmaternal ways (i.e., abandoning their infants in a strange place with a person who is a complete stranger). Because this argument figured prominently in the planning of the NICHD-SECC, mother—infant interaction was observed repeatedly across the first 3 years of life in this work. Before reporting relevant results, related work merits consideration.

Despite theory suggesting that extensive time away from the infant may undermine the employed mother's ability to get to know her infant well and thus to behave in a sensitive, development-facilitating manner when with the child (Brazelton, 1986; Sroufe, 1988; Vaughn et al., 1980), most research fails to confirm this hypothesis. In fact, much research on mother-child interaction reported subsequent to the emergence of the child-care debate does not detect any differences between employed and non-employed mothers, or mothers working part-time or full-time, or mothers of children spending much or little time in routine nonmaternal care arrangements (BraungartReiker et al., 1999; Burchinal, Bryant, Lee, & Ramey, 1992; Goldberg & Easterbrooks, 1988; Gottfried, Gottfried, & Bathurst, 1988; Stifter et al., 1993; Stuckey, McGhee, & Bell, 1982; Zaslow, Pedersen, Suwalsky, & Rabinovich, 1989). With the exception of Belsky's (1999) recent research showing more time in care across the first 3 years of life to be associated with more negative mother-child interaction during the second and third years of life, and Black's (1990) investigation linking less synchronised mother-child communication patterns during the toddler and preschool years with centre-based care initiated in the first year, the handful of other reports documenting negative effects of amount of care in infancy on mother—infant interaction studied dyads in the first half of the first year (Campbell, Cohn, & Meyers, 1995; Owen & Cox, 1988; Schirtzinger, Lutz, & Hock, 1993). In contrast to such work, some research on 12—18-month-olds indicates that employed mothers, relative to mothers not in the labour force (or working fewer hours), may be more sensitive (Caruso, 1989, 1996), while manifesting less power assertion and more positive guidance when interacting with their toddlers (Crockenberg & Littman, 1991).

In light of justifiable criticisms wielded against investigations that fail to control for pre-existing differences between families that vary in child-care utilisation or maternal employment, it must be regarded as important that most studies just cited did not control for selection effects. In all fairness, most of these investigations did not proceed to conduct rearing-group comparisons until it had been determined whether group differences existed on some limited number of background factors. But because most samples were invariably small, power to detect differences was typically limited, so pre-existing differences were rarely discerned. The situation turns out to be quite different when larger samples are the focus of inquiry, as in two very recent investigations carried out in the U.S., which have controlled for an extensive set of background factors.

In the first, the focus of inquiry was the timing of almost 200 mothers' return to work following maternity leave; and mother—infant interaction during feeding, free play, and a structured task 4 months postpartum was observed while maternal education, parity, child gender, type of feeding, and work location (i.e., in home, out of home, both) were controlled (Clark, Hyde, Essex, & Klein, 1997). Earlier return to paid employment following the child's birth predicted more negative maternal affect and behaviour and higher levels of infant dysregulation and irritability. Findings pertaining to positive maternal behaviour were reminiscent of the NICHD-SECC's attachment data which led to a "dual-risk" conclusion. It was not earlier

return to employment by itself that forecast less positively affectionate, sensitive, and responsive maternal involvement in the Clark et al. (1997) research, but the combination of a brief maternal leave coupled with high levels of depressive symptomatology. When the latter occurred in isolation, it proved unrelated to positive maternal behaviour, clearly highlighting the risk-factor nature of early maternal employment/child care.

When the NICHD-SECC also instituted extensive controls for selection effects before examining the effects of child care on mother—child interaction at 6, 15, 24, and 36 months, main effects of child care repeatedly emerged (NICHD Early Child Care Research Network, 1999). With controls for child gender, temperament (at age 6 months), economic status, maternal education, marital status, maternal depression, and separation anxiety in place, a consistent, cross-age finding was that more time in nonmaternal care predicted less sensitive mothering and less positive engagement and responsiveness on the part of the child. When these findings were examined more closely in terms of component variables of composite measures of maternal and child behaviour, evidence suggested that quantity of child care may have first affected mothering and only thereafter child behaviour. This is because more time in care first predicted less sensitive mothering when infants were 6 months and then more negative mothering when 15 months, before predicting less positive engagement by the child of the mother when 24 and 36 months of age (NICHD Early Child Care Research Network, 1997b). Recently, Owen and associates (Owen, Booth, Clarke-Stewart, Vandell, & McCartney, 2001) re-examined the NICHD data and found that increases in maternal employment (and consequent child-care usage) between 2 and 3 years of age predicted declines in maternal sensitivity across this same developmental period, even with selection factors taken into account.

Although the effects of other features of child care on mother-child interaction proved less consistent than those for quantity of care in the NICHD-SECC, it is noteworthy that lower quality of child care also predicted less sensitive maternal behavior (NICHD Early Child Care Research Network, 1999). When care was of poorer quality, mothers were less positively involved with their infants at 15 months and less sensitive in their interactions at 36 months of age (NICHD Early Child Care Research Network, 1997b).

What About Fathers and Infants?

In the mid 1980s there was very little data on the father—infant relationship pertinent to early nonmaternal care or maternal employment. In the time since, only a handful of relevant studies have been reported. One finding that has now emerged on three separate occasions is for sons—but not daughters—to be at elevated risk of developing insecure attachments to their fathers when mothers are employed on a full- or near-full-time basis (Belsky & Rovine, 1988; Chase-Lansdale & Owen, 1987; Braungart-Rieker et al., 1999).

However nice it would be to be able to account for this result in terms of the prevailing theory of the determinants of attachment security, which emphasises the role of sensitive-responsive parenting, this does not seem to be possible. This is because data linking quality of fathering with maternal employment and/or child care is by no means consistent. Even though observations of father—infant interaction in one of the three relevant investigations did indicate that fathers were less affectionate with their sons when mothers were employed than when they were not (Braungart-Reiker et al., 1999), and others find that men from dual-earner households relative to men from single-earner ones interact less with their infants (Pedersen, Cain, Zaslow, & Anderson, 1982) and toddlers (Zaslow et al., 1989) or are less sensitive when interacting with their infants (Easterbrooks & Goldberg, 1984) and toddlers (Belsky, 1999), these results have not always been replicated (Clarke-Stewart, Gruber, & Fitzgerald, 1994; Zaslow et al., 1989). In fact, when the NICHD-SECC examined the determinants of fathering after implementing extensive controls for selection effects, there was no direct relation between amount of maternal employment (and thus nonmaternal care) and paternal sensitivity at 6 or 36 months of age, nor did interaction effects involving child gender emerge (NICHD Early Child Care Research Network, 2000b).

Conclusion

On the basis of relevant work that has appeared since the child-care wars broke out, it would seem that the conclusion that infant day care is a risk factor with respect to the parent—infant relationship is not as misguided as many once contended. Perhaps most notably, the NICHD-SECC found—at 15 and at 36 months of age—that more than just 10 hours of nonmaternal care initiated in the first year of life increased the risk of insecure infant—mother attachment relationships under certain conditions (i.e., when mothers were insensitive in their mothering), and indicated further that low quality of care and more than one caregiving arrangement in the first year of life also play a role in the development of insecure attachments (NICHD Early Child Care Research Network, 1997a, 2000d). Moreover, data from this study consistently indicate—across the first 3 years of life—that more time in care forecasts less sensitive patterns of mother-child infant interaction and, somewhat less consistently, that lower quality of care does so as well (NICHD Early Child Care Research Network, 1999). Finally, even though the data on father-child interaction and early nonmaternal care and maternal employment are mixed, father—son attachments consistently emerge as at risk for insecurity when non-maternal care is initiated on a full- or near-full-time basis in the first year (Belsky & Rovine, 1988; BraungartRieker et al., 1999; Chase-Lansdale & Owen, 1987).

Infant Day Care and Adjustment

Critics of my mid-1980s risk-factor conclusion regarding infant day care often attributed my putatively biased reading of the literature to an excessive concern with the infant—mother relationship and the assessment of attachment security by means of the Strange Situation (e.g. McGurk et al., 1993; Scarr et al.,

1989). But what many repeatedly failed to acknowledge was that the concerns raised rested upon two separate sets of data. One pertained to attachment security and the parent—infant relationship and the other to adjustment, particularly aggression and noncompliance, during the toddler, preschool, and early primary school years. In fact, as I repeatedly made clear at the time (Belsky, 1986, 1988, 1990), it was only as a result of the fact that these two independent sets of evidence highlighted developmental risks associated with infant day care that any concerns were raised in the first place.

Having considered more recent evidence regarding infant—parent relationships, attention is now turned to the second source of concern, data dealing with social-emotional adjustment during the toddler, preschool, and early primary school years, most especially aggression, noncompliance, and problem behaviour. I consider first investigations of early nonmaternal care and/or maternal employment that evaluate only effects of timing and/or quantity of care, not quality, before turning my attention to studies that assess child-care quality. This organisation is dictated by the fact that almost all research that illuminates the former issues virtually ignores the latter, and vice versa. In part this is because one set of investigations were not explicitly designed as studies of early child care and the other set apparently did not regard issues of dosage—that is, age of entry and amount of care—as relevant to understanding the effects of child care. The NICHD-SECC is an exception to this general rule, so its results will be considered in a third subsection which reviews data from the very few relevant studies that simultaneously consider issues of quality of care along with indices of dosage of care.

Timing and Quantity of Early Child Care/Maternal Employment

Soon after the day-care controversy broke, a number of studies were reported in direct response to it, endeavouring to illuminate the effects of early child care on psychological and behavioural adjustment. One of the first to provide additional evidence of the importance of considering dosage of child care was reported by Vandell and Corasiniti (1990) who focused not simply on non-maternal care in the first year of life, but children's entire child-care histories throughout their infant, toddler, and preschool years. In this research on more than 200 white 8—9-year-olds, children whose full-time (>30 hrs/wk) care was initiated in the first year and continued at this high level until school entry were rated by mothers and by teachers as more noncompliant and as getting along with peers more poorly than all other children, even with family socioeconomic status, marital status, family size, and concurrent after-school care controlled. These same children were also less liked by classmates, according to peer reports, and were rated lowest on conduct by teachers on their report cards. Children whose continuous full-time care began in their second year of life functioned almost as poorly.

Vandell and Corasaniti's (1990) creative strategy for examining child-care history directly informed Belsky and Eggebeen's (1991) empirical response to the day-care debate. In their investigation of the effects

of early and extensive maternal employment across the first 3 years of life, data on 565 children, aged 4–6 years, from the 1986 child assessment of the (U.S.) National Longitudinal Survey of Youth (NLSY) were examined. After controlling for a host of family-background variables (e.g., maternal education, maternal IQ, family poverty status), this research revealed that children whose mothers were employed full-time (i.e., greater than 30 hours/week) beginning in their first or second year of life and continuously thereafter through the third year scored more poorly on a composite measure of adjustment (i.e., behaviour problems, insecurity, noncompliance) than did children whose mothers were not employed during their first 3 years.

In light of McCartney and Rosenthal's (1991) claim not to be able to replicate these results using the NLSY database, it seems noteworthy that Baydar and Brooks-Gunn (1991) reported evidence also implicating early maternal employment in the development of behaviour problems upon restricting themselves to 572 non-Hispanic white children of the 1986 NLSY sample. Upon decomposing employment during the first 3 years, they found that it was first-year employment, especially during the first 9 months of life, and employment averaging more than 10 hours per week, that predicted greater behaviour problems at age 3–4, after controlling for family poverty status, maternal IQ, family size, and child gender. Importantly, a related large-scale study, this one based upon the nationally representative (U.S.) Panel Study of Income Dynamics, reported similar results. In an investigation of 519 children aged 3–4 years, Hofferth (1999) found entering child care during the first year of life to be associated with significantly higher scores on an index of behaviour problems, especially aggressive problems; and that entry in the second year also increased the child's behaviour problems, with the detrimental effect increasing from year one to year two. These effects held across socioeconomic strata and emerged after controlling for, among other things, child age, gender, family structure, parental employment, parental education, and family size.

Recently, Han, Waldfogel, and Brooks-Gunn (2001) re-examined the children from the NLSY using data collected at age 7–8, instituting the same controls as Baydar and Brooks-Gunn (1991). In contrast to analyses carried out by Harvey (1999), which failed to take into account family income, longitudinally analyse the NLSY data, or distinguish children on the basis of race, Han et al. (2001) observed that resumption of employment by mother in the first 9 months of the child's life predicted higher levels of mother-reported externalising behaviour problems in the subsample of 138 white children. These findings accord nicely with those of another recently reported study. In this investigation of 171 children aged 8 and 9 years from maritally-intact Caucasian families, Youngblade, Kovacs, and Hoffman (1999, p.2) found that children whose mothers were employed during the first year of life “evinced more acting out, less frustration tolerance, less skill with peers and were nominated more often by peers for ‘hitting’ and ‘being mean’ than children whose mothers were not employed”, findings which virtually all remained when mother's concurrent employment was controlled (see also Hoffman & Youngblade, 1999, pp. 170–172). Work by Egeland and Heister (1995) chronicling similar long-term effects of nonmaternal care in the first year on aggression and teacher-rated problems during the first and second years of school raise the prospect, however, that such effects may dissipate if not disappear entirely as children grow older.

In light of the data just reviewed implicating care in the first year, it is important to note that when the Han et al. (2001) sample from the NLSY was increased to include an additional 383 white children born to older mothers, the finding linking first-year care to problem behaviour at age 7—8 no longer obtained (Waldfogel, Han, & BrooksGunn, 2000). In a related British investigation of 1700 children aged 5—17 whose mothers were part of the 1958 birth cohort study, most of whom were born in the 1980s, Joshi and Verropoulou (2000) similarly failed to discern a relationship between maternal employment in the first year and problem behaviour.

One possible reason why the most recent NLSY report and the British study did not detect any associations between early maternal employment and later problem behaviour is because they focused exclusively upon the first year of life and, in the case of the U.S. work, number of hours per week that mothers were employed. Recall that Vandell and Corasaniti's (1990) and Belsky and Eggebeen's (1991) research drew attention to age of entry (first year), extent (hours), *and* continuity (years) of maternal employment/child care, raising the possibility that it is early (beginning in the first year), extensive (for more than 20—30 hours per week), and continuous (until entry into school) maternal employment/child care that characterises the condition which poses most risk for children (Belsky, 1994). Certainly consistent with this view are the unpublished results of analyses of the NLSY data undertaken by David Eggebeen and myself in which we again implemented extensive controls for selection effects. We found that cumulative hours of maternal employment across the first 3 years of life predicted elevated problem behaviour scores at ages 5—6 and 10-12 years (but not 7—9), but only in the case of white children (Belsky & Eggebeen, 2000).

Also consistent with this view are the results of a study examining the functioning of 105 Californian 5—7-year-olds whose mothers varied in their hours of working at this point in their lives, but who typically returned to work “full-time when the target child was 3 months of age” (Goldberg, Greenberger, & Nagel, 1996). Indeed, only 9 of the 73 mothers who returned to employment did so after their child's first year. After controlling for maternal education and child intelligence, total weekly employment hours predicted lower teacher-rated ego resiliency (i.e., capacity to handle new and stressful situations, adaptability, flexibility) and greater ego under-control (i.e., inability to modulate impulses, delay gratification, and express negative affect appropriately). Such results may explain, in part, Fox and associates' (Fox, Henderson, Rubin, Calkins, & Schmidt, 2001) recent findings indicating that among 4-month-olds expected to develop inhibited social orientations as preschoolers based upon their emotional behaviour and motor activity profiles at 4 months of age (i.e., highly negative and active), those who did not develop as anticipated experienced more nonparental care than those who became inhibited.

Building directly upon prior research underscoring the importance of considering timing, amount, *and* continuity of child care (Belsky & Eggebeen, 1991; Vandell & Corasaniti, 1990), Bates and associates (1994) examined the issue of child-care history across the preschool years with a sample of almost 600

American 5—6-year-olds entering 14 different schools who were enrolled in 145 different classrooms. After controlling for family socioeconomic status, family stress, family structure, and marital quality, this team of investigators found that children who spent more time in child care during their first 5 years scored lower on a composite measure of positive adjustment (i.e., peer popularity, teacher-rated peer competence) and higher on a composite measure of negative adjustment (i.e., teacher-rated behaviour problems, peer dislike, observed aggression) than children with less child-care experience. Even though child-care experience in the first year of life did not predict behavioural adjustment when child-care experience in the second through fifth year was controlled, extensive care in the first year, coupled with extensive care thereafter, was associated with increased problematic functioning in the first year of school (i.e., kindergarten). Once again such findings highlight the combination of lots of care across multiple years beginning in the first year of life as posing developmental risk, rather than care in the first year per se.

In addition to the studies that have explicitly addressed early, extensive, and continuous child-care experience, several other recent reports have examined cumulative child-care experience across multiple years and child adjustment. Park and Honig (1991) found, upon studying 105 middle-class 3—5-year-olds attending nine different child-care centres, that preschoolers who had been in full-time nonparental care from early infancy onward were rated by teachers blind to their child-care history as more hostile-aggressive (i.e., fights with others, destroys, kicks/ bites/hits others, blames others) and as evincing less compliance than were children who had never had full-time nonmaternal care as infants or toddlers; children who began full-time care after 9 months of age scored in between the other two sets of children. In a second study, this one of 120 firstborn sons, which controlled for family SES, income, and mothers' and fathers' educational levels, Belsky (1999) found that more time in nonmaternal care across the first 3 and 5 years of life predicted more mother-reported externalizing problems when children were 3 and 5 (and somewhat more father-reported externalizing problems at age 5). More time in non-maternal care across the first 5 years also predicted more negative adjustment on a composite lab-based measure of affective-cognitive functioning at age 5 (e.g., attributional bias, social problem solving). In a third relevant investigation which, like Bates et al. (1994), involved hundreds of children very early in their school careers ($N = 489$), Christian (1997) reported that more cumulative months in child care in the years prior to school entry predicted poorer teacher-rated interpersonal social skills (but not peer acceptance), after controlling for child IQ, reading ability, and family literacy environment. Finally, in a fourth study, this one of a complete cohort of 120 children from a single rural Norwegian community, Borge and Melhuish (1995, p. 37) found that after controlling for child IQ, SES, and gender, 10-year-old "children were rated by teachers to show higher levels of problems when there has been a higher degree of maternal employment (i.e., hours and years), hence nonparental care, in the first four years".

Not all recent research finds such seemingly adverse effects of care in the first year and/or lots of time spent in care across multiple years, including the first year (Balleyguier & Melhuish, 1996; Hegeland & Rix,

1990; Pierrehumbert, Ramstein, Karmaniola, & Halfon, 1996; Scarr & Thompson, 1994). Perhaps most noteworthy in this regard is work reported by McCartney and associates (1997) on 718 infants, toddlers, and preschoolers enrolled in 120 child-care centres in three states, Massachusetts, Virginia, and Georgia. Examination of both hours of child care per week and age of entry into care failed to reveal any negative (or positive) effects of child-care history. Important to consider in evaluating these null results, however, is that by looking at each of these dosage-related parameters of child care in isolation, this investigation failed to consider the emerging evidence that it is not just early child care *or* lots of time in child care at one point in time that may be most important for understanding developmental risks associated with early nonmaternal care, but rather the combination of lots of time in care, for multiple years, beginning very early in life.

What About Child-care Quality?

Virtually all of the work highlighting risks associated with early, extensive, and continuous child care can be criticised, as was related work to which I drew attention in the mid 1980s (Belsky, 1986), because of its failure to take into account the quality of child care, whether measured in terms of proximal processes (i.e., caregiver— child interaction) or structural features (e.g., child— caregiver ratio, group size, caregiver training). Fortunately, in the ensuing years not only have investigations been conducted on child-care and maternal-employment history, thereby highlighting the dosage effects just considered, but there have been studies of child-care quality as well. Before initiating consideration of this work, it seems relevant to point out that many of the results just reviewed regarding the timing and quantity of child care have been interpreted in terms of child-care quality, even when relevant data were not available for empirical consideration.

Most notable in this regard is the totally speculative interpretation frequently placed on the Vandell and Corasiniti (1990) findings which attributes the negative effects of early, extensive, and continuous care to the minimal child care standards in place in the state of Texas, where the research was conducted. The pressure to attribute all disconcerting child-care effects to the experience of poor-quality care inclined Bates et al. (1994) to also highlight the limited child-care standards in the states of Indiana and Tennessee when discussing their own results. Of significance, however, is that in the aforementioned study by McCartney et al. (1997), which purposefully sampled child care in states with dramatically contrasting child-care standards, no state-level effects could be detected. In fact, in this carefully implemented investigation of infant, toddler, and preschool care, process-oriented measures of quality failed to predict contemporaneous developmental outcomes when maternal education was controlled, much to the surprise of the investigators. Deater-Deckard, Pinkerton, and Scarr (1996) reported much the same when they longitudinally followed up this sample 4 years later, noting that “variation in center quality remained unrelated to behavioral adjustment after individual differences in home environment (e.g., SES, discipline, parenting stress)” were controlled (p. 945). And this study is not alone in this regard (see Scarr, 1998).

This is not to say, however, that child-care quality in the first year (or opening years) of life is unrelated to children's concurrent or future adjustment. In point of fact, a substantial amount of research dealing with the first years of life has emerged over the past 10-15 years highlighting the significance of child-care quality (e.g., Howes & Stewart, 1987). This is certainly how at least two sets of the first reports to appear following the emergence of the day-care controversy have been interpreted. In one, Field and associates (Field, Masi, Goldstein, Perry, & Park, 1988) found that in the case of children enrolled in a high-quality, university-based centre in their first year of life, more months enrolled through the preschool years proved to be associated with more cooperative play and positive affect in preschool and, by middle-childhood, with greater leadership, popularity, and assertiveness (Field, 1991). In the other work, conducted in Sweden, where child care did not begin until age 6 months and when it did was of uniformly high quality, care initiated in the first year of life, in comparison to care initiated thereafter (or not at all), predicted greater school adjustment at age 8 and greater social competence at age 13 according to teacher reports (Andersson, 1989, 1992). In both series of investigations, it is important to note, a variety of background factors were statistically controlled to account for selection effects.

Even more direct evidence implicating child-care quality comes from investigations that have examined variation in quality across child-care programs. This was the strategy that Howes and Olenick (1986) adopted, finding that toddlers enrolled in high-quality centres (in terms of caregiver-child ratio and caregiver training) were more compliant in day-care and more self-regulated in the laboratory than age-mates enrolled in lower-quality programs, after controlling for child gender, maternal education, and family structure. Subsequent work by Howes indicated that when children who had been enrolled in child care in their first year developed secure attachments to their primary caregivers, which was more likely when caregivers were responsive and involved (Howes & Hamilton, 1992; see also Goossens & Van Ijzendoorn, 1990), at age 4 they evinced greater social competence (Howes, Phillips & Whitebrook, 1992) and lower levels of hostile aggression (Howes, Hamilton, & Matheson, 1994). To be noted, however, is that these studies did not control for selection effects. When Rosenthal (1990) implemented controls for parental education in a study of Israeli infants and toddlers cared for in 41 family day-care homes, she found that higher-quality caregiving was related positively to a composite measure of competence reflecting prosocial behaviour, language use, and social and object play. The National Child Care Staffing Study carried out in the U.S. on 227 child-care centres serving infants, toddlers, and preschoolers in five metropolitan areas also chronicled analogous contemporaneous associations between child-care quality and children's social behaviour (Whitebrook, Howes, & Phillips, 1989), though it remains unclear whether selection effects were taken into consideration.

In light of the correlational nature of all the evidence considered through this point, the results of the Florida Child Care Quality Improvement Study are probably the most compelling with respect to the effects of child-care quality. In this work, caregiver behaviour and children's functioning in 450 classrooms in 150 licensed child-care programmes serving infants, toddlers, and preschoolers were examined before and 2 years

after legislation went into effect mandating changes in teacher-to-child ratios for infants (from 1:6 to 1:4) and toddlers (from 1:8 to 1:6). Not only was improvement witnessed in the quality of care, with caregivers becoming more sensitive and responsive and less reliant on negative disciplinary tactics over time, but so it was in child social behaviour, with fewer behaviour problems involving aggression, anxiety, and hyperactivity being reported (Howes, Smith, & Galinsky, 1995).

Quantity and Quality of Care

Findings such as those just considered are certainly not inconsistent with the possibility that the evidence reviewed earlier linking early, extensive, and continuous nonmaternal care with elevated rates of aggression, noncompliance, and problem behaviour could be principally a function of quality of care that has gone unmeasured in numerous investigations of early maternal employment/child care. At the same time, because research documenting effects of child-care quality routinely neglects child-care history, this body of work cannot tell us whether quality of care and timing/quantity (i.e., dosage) interact in shaping children's psychological and behavioural adjustment. More than a decade since the infant day-care controversy emerged, it is disappointing to discover that only a handful of reports are even in position to address this possibility or to determine whether effects of cumulative child-care history are a function of child-care quality. Also disconcerting is that when they are in this position, they do not always do so (Howes & Stewart, 1987; McCartney et al., 1997).

To my knowledge, only two investigations have measured and considered, simultaneously and interactively, indices of child-care dosage and quality when studying children's socioemotional adjustment and care initiated in the first year of life. Howes (1990) conducted the very first such study and found that although quality of care by itself repeatedly predicted children's socioemotional functioning across the 2—5-year age range, whereas age of entry into full-time care never did, many of the former effects were moderated by timing in a manner consistent with Belsky's (1986, 1988, 1990) original risk-factor conclusion. More specifically, it was the dual-risk condition of (1) low-quality care (2) initiated in the first year (rather than thereafter), which forecast increased noncompliance in the laboratory and in child care during the toddler period, greater child difficulty during the preschool years, and less consideration of others during the first year of school (as well as heightened distractability and lower task orientation).

The second investigation to examine interactive effects of amount and quality of care was the NICHD-SECC. But one of the most interesting results—or actually, nonresults—to emerge from it has been the total absence of significant quantity x quality interactions, whether attachment outcomes at 15 months (NICHD Early Child Care Network, 1997) or social-behavioural outcomes at 2 and 3 years of age (NICHD Early Child Care Research Network, 1998) or at 4.5 years are considered (NICHD Early Child Care Research Network, 2000c). The same is true, by the way, with respect to language and cognitive development (NICHD

Early Childcare Research Network, 2000a, c). In other words, no evidence has emerged to date suggesting that more time in higher-quality child care through the first 15, 24, 36, or 54 months of life yields greater developmental benefits than less time spent in high-quality child care. This is not to say, however, that either quality or quantity of care have proved to be unrelated to children's socioemotional functioning, as they have, and these results will be considered shortly.

Before proceeding to them, however, another important nonresult must be acknowledged. And that is that in whatever analyses have been carried out—whether on attachment, social-behavioural, or cognitive-linguistic outcomes—it has *never* been found to be the case that effects of quality of care account for detected effects of quantity of care, or vice versa (NICHD Early Child Care Research Network, 1997a, 1998, 1999, 2000a, c). And this now well-replicated finding in this investigation of more than 1000 children followed prospectively from birth cannot be attributed to lack of statistical power. In other words, this study, purposefully designed to address one of the issues central to the child-care controversy—namely, that apparent effects of child-care history are in all likelihood the product of unmeasured quality of care (McGurk et al., 1993; Phillips et al., 1987; Scarr et al., 1989; Thompson, 1988)—provides repeated and unambiguous indication that this favoured hypothesis must simply be rejected.

When it comes to the critical hypothesis advanced by Belsky (1986, 1988, 1990) that early nonmaternal care, as routinely experienced on a full-time or near full-time basis, poses risks with respect to the development of aggression, noncompliance, and problem behaviour, what has the NICHD-SECC found? When data on this issue were examined at ages 2 and 3, the results were decidedly mixed (NICHD Early Child Care Research Network, 1998). Even though 2-year-olds who spent more time in nonmaternal care across their first 24 months were reported by their mothers to be less cooperative and by their caregivers to exhibit more behaviour problems, by the time children were 3 years of age, no significant effects for amount of child-care experience could be detected. In contrast, higher child-care quality consistently predicted greater self-control and compliance and less problem behaviour.

The inconsistency of the quantity-of-care effects detected at 2 and 3 years of age raised two interpretations among collaborating investigators. One was that the 2-year findings highlighting potential risks associated with lots of time in care during the opening years of life was just a “blip” that was not of much importance given its disappearance 1 year later. The alternative was that in view of the fact that most other related evidence pertaining to aggression and noncompliance derives from studies of older children, negative effects of lots of time in care might well reappear when children were followed up longitudinally. Recently, the NICHD Early Child Care Research Network (2000c, 2001) examined relevant data just prior to children's school entry at age 54 months and during their first year of school (i.e., kindergarten). Results provided support for the latter interpretation.

Even though amount of nonmaternal care proved unrelated to mothers' reports of child behaviour problems at age 4.5 years, this was not the case with respect to caregiver reports. That is, more time in care across the first 4.5 years of life forecast higher levels of problem behaviour after controlling for a host of background factors, as well as child-care quality (NICHD Early Child Care Research Network, 2000c). And, by the time children were in kindergarten, approximately a year later, more time in care predicted higher levels of externalising problems as reported by mothers and teachers alike (NICHD Early Child Care Research Network, 2001). In other words, the relation between more time in child care and problem behaviour emerged when ratings by three separate sets of raters, each of whom observed children in three separate settings, were examined—caregivers in child care, mothers at home, and teachers in school.

Just as important as this replicated relation between quantity of child care and problem behaviour was the fact that across all raters, more time in care predicted high externalising scores, that is, scores one or more standard deviations above the mean (NICHD Early Child Care Research Network, 2001). At age 4.5 years, whereas 5% of children who averaged under 10 hours per week of nonmaternal care across their first 54 months of life received such elevated externalising problem scores on the basis of caregiver ratings, the rate of such high levels of problems was more than three times as great—16%—among children who averaged 30 or more hours per week of care across their first 4.5 years of life. At kindergarten age, the corresponding rates of high levels of problems was 9% and 17% for the two extreme groups who had experienced limited and full-time care throughout their infant, toddler, and preschool years.

Two other features of the NICHD results are notable. First, no quantity threshold could be detected at which more vs. less care had a noticeably greater or lesser impact on problem behaviour (NICHD Early Child Care Research Network, 2001). Thus, the relation between dosage of nonmaternal care and externalising problems reflected a constant dose-response relationship: As quantity of care increased, so did problem behaviour. Importantly, item-level analysis revealed that it was not just the case, as Clarke-Stewart (1989) theorised, that children with extensive child-care histories were simply more independent and assertive than other children. Rather, in the NICHD research, they were found to show evidence of neediness (e.g., demands a lot of attention, demands must be met immediately, easily jealous), assertiveness (e.g., talks too much, bragging/boasting, argues a lot), disobedience/defiance (e.g., talks out of turn, disobedient at school, defiant-talks back to staff, disrupts school discipline), and aggression (e.g., gets into many fights, cruelty-bullying-meanness, physically attacks others, destroys own things).

Clearly, these results are rather consistent with much of the work reviewed earlier highlighting risks associated with early, extensive, and continuous care and, in the main, with Belsky's (1986, 1988, 1990) original risk-factor conclusion. Worth noting, too, is that they held across the sample, as factors like family economic status, marital status, and maternal education did not moderate the effect of quantity of child care through kindergarten age on caregiver-reported behaviour problems. Neither, as could be inferred from the

preceding discussion, did quality of care moderate this effect. In fact, while consistently predicting behaviour problems at 2 and 3 years of age, it failed to do so at 4.5 years of age (NICHD Early Child Care Research Network, 2000c) and when children were in kindergarten (NICHD Early Child Care Research Network, 2001).

In point of fact, almost no findings from the NICHDSECC suggest that effects of child care are restricted to some particular racial, ethnic, or demographic group. It is for this reason that propositions regarding the greater or lesser susceptibility of some subgroups to either positive or negative effects of child care have not been entertained for the most part in this analysis of child care initiated in the first year of life. These include propositions that the economically disadvantaged children might especially benefit from early child care, especially high-quality care (e.g., Caughy, DiPietro, & Strobino, 1994), or that it is children from well-resourced families who might be most adversely affected when such a rearing environment is replaced with a less supportive one (Greenstein, 1993).

Especially important to understanding the effect of early child care on problem behaviour in the NICHDSECC are the effect size comparisons carried out to illuminate the effect of quantity of care relative to that of two well-known correlates of children's behaviour problems, economic impoverishment and parenting skill. As it turned out, the effect size of cumulative hours in nonmaternal care across the first 4.5 years of life was virtually the same magnitude as that of poverty and substantially larger than that of sensitive-responsive parenting (NICHD Early Child Care Research Network, 2000c). To be noted, however, is that they were modest in magnitude when viewed in absolute, rather than relative, terms. The contrast between children averaging less than 10 hours per week and 30 or more hours per week on externalising problems at 54 months results in an effect size, d , of .38, for example.

Despite the evidence emanating from the NICHDSECC that problem behaviour, at least within the child-care environment, and an extensive history of non-maternal care go together, what remains very much unexplained is why these, and other related findings obtain (NICHD Early Child Care Research Network, 2000c). That is, despite the implementation of controls for several plausible mediators of the quantity of child care effects—including quality of care, type of care, instability of care, and even observed parenting—more time in care still predicted higher levels of behaviour problems as reported by caregivers, mothers, and kindergarten teachers (NICHD Early Child Care Research Network, 2001). Thus, even though many investigations have now demonstrated that cumulative time spent in nonmaternal child care, seeming to reflect early, extensive, and continuous day-care experience, is predictive of indicators of poor adjustment, the reason why this is the case remains empirically uncertain. What is incontestable, though, is that quality of child care, as so long asserted, does not explain these potentially disconcerting effects of what has become a widespread experience for American and English children and that the effects detected concern truly aggressive and even destructive behaviour, not just independence and assertiveness.

Conclusion

However frustrating this state of affairs may be to developmental scientists, it seems indisputable that progress has been made in illuminating what proved to be core issues in the child-care controversy that emerged almost 15 years ago. No longer is it tenable for developmental scholars and child-care advocates to deride the notion that early and extensive nonnuternal care of the kind available in most communities poses risks for young children and perhaps the larger society as well. Importantly, even some one-time critics of this proposition have come to acknowledge that there is something about lots of time in nonmaternal care beginning in the first year of life that poses risks for children that may not be entirely attributable to the quality of care they receive (Phillips & Adams, in press). Moreover, appreciation is growing that child-care quality may not have as substantial an impact on child development as was often presumed was the case. Indeed, at least one past champion of the view that virtually any and all child-care effects are a function of child-care quality, whether measured or not, has come to seriously question the effect of child-care quality on child development (Scarr, 1998). If nothing else, such shifting views reflect active thinking and responsiveness to data among scholars and child-care experts, something presumably good in the long run for our understanding of both child-care and child development.

How, then, to evaluate and think about early child-care and its effects upon child development in the new millennium? The first important lesson, somehow lost in the child-care wars, derives directly from one of the not-as-yet mentioned findings which has emerged repeatedly in the NICHD-SECC—namely, that family factors and processes are typically more predictive of child functioning than child-care factors and processes. In other words, it appears that family matters more to children's developmental wellbeing than child care (see also Deater-Deckard et al., 1996), though this result may be as much (if not more) a function of shared genes as pure environmental effects.

This does not mean, however, that child-care does not matter to children's psychological and behavioural development. Even though there remains healthy debate about the size and meaningfulness of virtually all child-care effects, it must be remembered that more and more children seem to be spending more and more time at younger and younger ages in nonmaternal care arrangements in the English-speaking, if not Western, world. This means that even small effects, when experienced by many children, may have broad-scale consequences. After all, many of the most important risk behaviours from a public health perspective have low or moderate relative risk but are multiplied in importance because of their wide prevalence and links to problematic outcomes (Jeffrey, 1989). This may be the case for early, extensive and continuous nonmaternal care and for low-quality childcare.

Ironically, this state of affairs leads me to draw virtually the same policy-related conclusions that I drew a decade ago (Belsky, 1990), after first choosing not to draw any in order to keep separate scientific analysis and policy inference because I felt strongly that the latter is and should be shaped as much by social values as by empirical evidence (Belsky, 1986, 1988). First, it seems to me that the data considered in this paper should encourage the expansion of parental leave, preferably paid, ideally as lengthy as it is in some Scandinavian countries, or other strategies for reducing the time children spend in non-maternal care across the infant, toddler, and preschool years (e.g., part-time employment). One of the interesting questions that only history will answer is whether the cost of such leave will prove less than the consequences of its absence. Relatedly, tax policies should support families rearing infants and young children in ways that afford parents the freedom to make child-rearing arrangements that they deem best for their child, thereby reducing the economic coercion that necessitates many to leave the care of their children to others when they would rather not. Finally, given the clear benefits of high-quality child care, its expansion seems called for as well. Of significance is that all of these conclusions could be justified on humanitarian grounds alone.

From a scientific perspective the agenda clearly shifts to the continued and longitudinal study of multiple features of child-care, as exemplified by the NICHDSECC. As noted already, it remains problematic that quality of care seems to be the construct that must be measured for research to be considered state of the art, but the same standard has not held with respect to indicators of dosage of child care. For too long too many developmentalists have acted as if fundamental features of child care like timing and quantity are of no importance to understanding its effects, when this orientation would never be maintained in other arenas of inquiry with policy relevance. Ultimately, hard-headed work is called for to gain insight into the developmental mechanisms that give rise to the aggressive and noncompliant behaviour so often found to be related to early, extensive, and continuous nonmaternal child care. For sure the road does not end with the NICHD-SECC.

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