Objective: To evaluate studies of child care with specific attention to the impact of age at entry and amount, quality, and type of care on children's adaptive functioning.

Data Sources: MEDLINE, PsychINFO, and the SAGE Full-Text Collection.

Study Selection: The review considers correlational and experimental research conducted throughout the world that includes an adequate description of the type of care provided.

Main Exposures: Amount, quality, and type of child care.

Main Outcome Measures: Language, cognitive and social competence, achievement, behavioral problems, relationships with parents, communicable illnesses, and asthma.

Results: Children who began care early in life and were in care 30 or more hours a week were at increased risk for stress-related behavioral problems. Elevated risk was more likely if they had difficulties interacting with peers or had insensitive parents. Children in day care centers had higher language scores and early school achievement, especially if they came from disadvantaged backgrounds and the centers offered high-quality care. Attending arrangements with 6 or more children increased the likelihood of communicable illnesses and ear infections, albeit those illnesses had no long-term adverse consequences.

Conclusions: Child care is a multidimensional phenomenon. Guidance on when to place a child in nonparental care and what kind of care to use is complicated because of the multiplicity of sometimes offsetting effects on children. Child care experiences interact with experiences at home and the child's own characteristics, and research indicates that the quality of child care matters.

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In 2002, the US Bureau of the Census estimated that 11,596,000 children younger than 5 years routinely spend a significant amount of time in nonparental care. Child care arrangements vary widely in quality, amount, and type. Consequently, concerned parents and public officials wonder about the impact of child care. Several recent large-scale studies, in conjunction with almost 4 decades of smaller-scale studies, offer more authoritative answers to key questions about the quality, amount, and type of child care children receive.

Providing definitive information about child care is challenging because most research is correlational, with researchers identifying statistical associations rather than causal effects. In only a few studies have researchers used random assignment to study nonparental care. Even those studies had significant limitations in terms of the questions posed or samples used. In the absence of random assignment, researchers have included family and child measures as covariates to minimize selection bias. Only recently have researchers incorporated extensive covariates. Although using multiple covariates reduces the likelihood of drawing erroneous conclusions about child care, this strategy can yield conservative estimates of effects. Another problem with the child care literature is that less formal and unregulated settings are underrepresented in most studies. Their omission has likely resulted in conservative estimates of the effects of child care quality on children's development. Another challenge is that child care is a complex phenomenon that varies along multiple dimensions (eg, amount, type, and quality), making it difficult to isolate the effects of just 1 dimension. Recent research has attempted to segregate the impact of each dimension by...
controlling for the other ones, but it is not possible to fully disentangle the dimensions of care yet still provide meaningful estimates of the effects of each dimension. The most comprehensive study about this topic is the Study of Early Child Care (SECC), which is funded by the National Institute of Child Health and Human Development (NICHD). This prospective, longitudinal study includes detailed assessments of child care (amount and timing, quality, and types of care settings) for more than 1200 children who have been studied from birth through middle childhood. Children initially resided near 10 research sites but now reside in 38 states.

This review aims to provide some context to research on child care. It summarizes what is known about 3 aspects of nonparental care (age at entry and amount of care, type of care, and quality of care) and how each affects children’s social, physical, and cognitive development. To identify studies of child care appropriate for this review, we searched MEDLINE, PsychINFO, and the SAGE Full-Text Collection. We then selected studies that focused on correlational and experimental research conducted throughout the world that included an adequate description of the type of care provided.

AGE AT ENTRY AND AMOUNT OF CHILD CARE

As the number of women entering the workforce increased rapidly in the 1970s, so did the number of children entering child care. Researchers, policymakers, and the public at large began to ask questions regarding the possible negative consequences of nonparental care, especially large amounts of care beginning in the first year of life. It is not easy to determine the effects of beginning care early in life or spending lots of time in care because children who enter care early also tend to spend large amounts of time there. Data from the SECC show that 84% of children experience nonmaternal care on a routine basis by age 12 months. Of this group, 72% enter care by age 4 months. At first entry, infants are in care for 29 hours a week on average. Once initiated, the amount of time spent in care on a weekly basis remains essentially stable throughout early childhood. However, nonparental care is anything but a consistent experience for many young children. On average, 34% of children younger than 3 years experience multiple arrangements, with 44% of 3- and 4-year-olds experiencing multiple arrangements. In summary, natural confounding occurs among the ages at which children begin child care, the amount of care, and the number of arrangements, making it difficult to isolate the effects of any 1 aspect of the child care experience. Granting this limitation, evidence has indicated that spending large amounts of time in child care from early infancy can have negative consequences.

Attachment

Some child care studies published in the 1980s and 1990s provided evidence of elevated rates of attachment insecurity for children who began full-time care early in life, but none of these studies controlled for child care quality, and most did not control for family factors. In the SECC, when quality and type of care were controlled for along with family background, children exposed to large amounts of care were at increased risk for attachment insecurity only if their mothers were highly insensitive.

Mother-Child Interactions

Although some studies published in the 1980s and 1990s reported the amount of early care to be related to more negative mother-infant interactions, others found positive effects or no effects. Much of this initial research was limited because of small sample sizes, few controls for family background, and reliance on a single time of measurement. The SECC addressed these concerns: mother-child interactions were observed at 6, 15, 24, and 36 months for more than 1000 families. These observations were evaluated by trained raters who were blinded to children’s child care backgrounds. More hours in child care were linked to less maternal sensitivity and less positive engagement between the child and the mother, controlling for quality and type of child care, family income, maternal educational level, marital or partner status, maternal depression, maternal separation anxiety, child sex, child temperament, and ethnicity. In a follow-up report at 54 months and during the first grade, a higher number of hours in care was associated with less maternal sensitivity and less positive engagement in white children but greater maternal sensitivity and more positive engagement in African American and Latino children.

Behavioral Problems

Another area of investigation concerns the link between time in nonparental care and children’s behavioral problems. The NICHD Early Child Care Research Network has reported a series of carefully controlled analyses showing that amount of time in nonparental care is associated with poor peer interactions and adjustment problems from the age of 2 years to the end of kindergarten. In follow-up analyses at grades 3 and 5, relations between hours and behavioral problems were no longer statistically significant, suggesting a fade-out effect. To more precisely delineate the relation between amount of care and behavioral problems, the SECC controlled for quality of interactions with caregivers and mothers, type of care, and family background. These controls resulted in modest reductions in the hours effect, but the effects continued to be statistically significant.

Cortisol Levels and Peer Relationships

Several studies implicate the role played by peer relationships in the observed association between amount of care and behavioral maladjustment. Salivary cortisol levels tend to increase from midmorning to midafternoon on days when children are in child care but not on days they stay at home. Cortisol levels increased across the day, especially for children who had difficulty regulating negative emotions and behavior, who were more fearful, who were less involved in peer play, and who were less socially competent. Rises in cortisol levels tend to increase from midmorning to midafternoon on days when children are in child care but not on days they stay at home.
tisol levels occurred more in toddlers and preschoolers than infants and school-aged children.38-46 These findings suggest that toddlers and preschoolers who are learning to negotiate with peers may experience group settings as stressful. Although less socially competent children exhibit greater increases in cortisol levels in peer group activities.41-43 Temperamental differences in children suggest that toddlers and preschoolers who are learning to entertain themselves and managing challenges. A French study51 showed that children who spent time in child care manifested more self-confidence, were more outgoing, and showed less distress in new situations. Although research provides some evidence that nonparental care may enhance social competence, the evidence is mixed.52-54 In the SECC, analyses performed with careful controlling for home experience and child characteristics indicated that although nonparental care was associated with more positive and skilled peer play in child care, it was not associated with improved competence in peer play in a laboratory situation or as rated by parents.34

Social Competence

Evidence has shown that spending time in nonparental care increases children’s social knowledge and skills.48,49 Morales and Bridges50 found that children with experience in child care were more accomplished at entertaining themselves and managing challenges. A French study31 showed that children who spent time in child care manifested more self-confidence, were more outgoing, and showed less distress in new situations. Although research provides some evidence that nonparental care may enhance social competence, the evidence is mixed.52-54

Language and Achievement

Findings are mixed with respect to amount (and timing) of child care and children’s cognitive, language, and academic performance. Analyses conducted by the NICHD Early Child Care Research Network11,34,36,37,50 found no relation between amount or timing and cognitive and language measures from infancy through the fifth grade, controlling for other aspects of care and family factors. Other researchers, however, have detected amount or timing effects with some conditions but only at some ages or only for some income or ethnic groups.37-40

Communicable Illness

Not surprisingly, spending time in child care, especially in care with large numbers of other children, increases the likelihood that children will be exposed to common pathogens and experience more bouts of common communicable illnesses.61-65 Studies show an increased prevalence of diarrheal illness especially in the first 2 years of life for children who attend child care. However, by the age of 3 years little difference was found between children in nonparental care and those reared at home.61-63 Studies62,64,65 also show an increased prevalence of upper respiratory tract infections and otitis media in children who attend child care, with some evidence suggesting that experience in child care during the first 3 years of life might afford some immunity to colds as children reach elementary school. The major factor that contributed to respiratory infections was the number of other children present in the child care arrangement; number of hours of care was insignificant.61,62,64,65

Asthma

Research on the relation between asthma and experience in child care has been inconsistent. Some studies66-67 show that child care is associated with an increased likelihood of asthma symptoms, but these studies may reflect transient wheeze more than persistent asthma,68 especially for children with a family history of atopy.68 One of the studies69 that showed an increased risk was conducted in Norway, where children do not enter care until after the age of 1 year. Other studies68-72 showed no relation or a decreased likelihood of asthma for children who attended child care, consistent with arguments that respiratory syncytial virus infections help promote the TH1 phenotype that is protective against atopic asthma.73-75 Recent unpublished findings from the SECC also indicated that time in care before the age of 1 year was associated with a decreased likelihood of late-onset asthma.

QUALITY OF CHILD CARE

Established Standards

The American Public Health Association (APHA) and the American Academy of Pediatrics (AAP) have established standards for assuring quality of out-of-home child care.76 These standards, often referred to as structural quality, address such issues as age-based caregiver-child ratios, group size, health and safety practices, and qualifications and continuing education for child care providers. Consistent with recommendations made by the APHA and AAP, research demonstrates that high caregiver-child ratios, small group size, and well-trained caregivers result in higher-quality care.77 In settings where child-adult ratios were lower, caregivers spent less time managing children and children were less apathetic and distressed78; caregivers were more stimulating, responsive, and supportive.78,80 Caregivers were also more responsive, more socially stimulating, and less restrictive when fewer children were in the group.78,80 Caregivers tend to be more stimulating and supportive, organize materials better, and provide more age-appropriate experiences when they have more education and child-related training.78,81,82 These findings suggest that higher structural quality increases the likelihood of higher process quality conceptualized as supportive quality.
interactions with caregivers, positive interactions with peers, and opportunities for cognitively stimulating play. Consistent with this argument, the SECC\(^6\) observed positive developmental outcomes, controlling for maternal educational level and parenting quality, when children attended centers that were in compliance with the APHA’s and AAP’s recommended guidelines. Children who attended centers that met child-adult ratio standards displayed fewer behavioral problems and more positive social behaviors.\(^{11}\) Similar relations emerged between structural or caregiver characteristics and child developmental outcomes in child care homes.\(^{81}\)

In their review of child care studies, the Committee on Family and Work Policies of the National Academy of Sciences concluded that when process quality was higher and adult-child ratios were higher, children appeared happier and more securely attached to caregivers in care settings.\(^{77}\) When child-adult ratios were higher and caregivers were more sensitive and positive, children appeared more prosocial and positively engaged with peers. Children were also rated as more cognitively competent in child care settings that offered more opportunities for art, blocks, and dramatic play and in settings where caregivers had college degrees and more early-childhood training. Twenty-three studies were cited by the National Academy of Sciences\(^{77}\) as finding relations between process quality and children’s cognitive and social-emotional development, after controlling for family and child background factors. Since the National Academy of Sciences report was prepared, other investigators\(^{65-67}\) have also found higher-quality care to be associated with better cognitive performance and fewer behavioral problems.

### Long-term Adaptive Functioning

High-quality care appears to be associated with long-term adaptive functioning as well. In the SECC,\(^{36,55,56,88}\) caregiver behavior predicted children’s performance on standardized cognitive and language assessments through fifth grade, controlling for amount and type of care and an extensive list of family covariates. In the Cost, Quality, and Outcomes Study,\(^3\) a prospective longitudinal study of 579 children who attended 151 centers in 4 states, child care quality predicted cognitive, language, and social development during the early grade-school years. Children who had closer relationships with their preschool teachers were more sociable in kindergarten, controlling for earlier child adjustment and family factors. Children who were enrolled in higher-quality child care displayed better math skills during kindergarten and second grade. In addition, children who had closer relationships with their caregivers at the age of 4 years were reported by their second-grade teachers to be more socially competent with peers, controlling for family factors and previous child functioning.\(^{89}\)

### Stress Reduction

More positive child care environments appear to reduce stress in children.\(^{90}\) Children who attended high-quality child care homes showed decreases in cortisol levels from morning to afternoon, whereas children in low-quality child care homes showed increases. This rise is the opposite of the typical pattern for circadian rhythm of cortisol but similar to a rise across the workday that has been recorded in adult executives who were under high pressure.

### Health Outcomes

To date, few studies have investigated the relations between quality of child care and children’s physical health. Results from the SECC indicated links between group size and communicable illnesses: children who attended centers with more than 6 children in a group had more bouts of common communicable illnesses.\(^{62,63}\) Other studies\(^{64-66}\) have obtained similar results. In one of the few experimental studies directed at hygiene practices, Kotch\(^90\) reported that staff from 60 randomly selected centers were trained in personal hygiene and environmental sanitation practices. They increased their hand washing, sanitary food handling, disinfection of diapering areas, and use of step cans for diaper disposal and reduced their preparation of food in diapering areas. The result was fewer cases of diarrhea.

### Child Care Quality and Family Risk

Although not every study has observed significant associations between child care quality and child well-being, most have, especially those that measured quality on more than 1 occasion. The effects tend to be modest and more often observed for outcomes such as language and academic achievement.\(^{91}\) In some domains, poor-quality care appears to function as a risk factor. In the SECC, low-quality care, coupled with low maternal sensitivity, was associated with infant-mother attachment insecurity.\(^{23}\) In other cases, high-quality child care served as a protective factor for children who were otherwise at risk. For example, children of depressed mothers appeared to be more positively engaged with their mothers when they attended higher-quality child care.\(^{31}\) In analyses of school readiness, receptive language, and expressive language, higher-quality child care was found to buffer young children from the negative effects of poverty.\(^{92}\)

A major limitation of studies on child care quality is that the poorest-quality child care settings have been difficult to observe; thus, the effect of quality may well be underestimated. Such an underestimation is particularly problematic given that quality estimates derived from the SECC suggest that child care quality is not high. Positive caregiving was rated as “not characteristic” in 60% of the settings that were observed, and only 10% were rated as “excellent.”\(^2\) To better understand the effects of quality, the factors that are examined as part of quality must be expanded. The quality of the peer environment in child care may be especially important to consider given the negative impact of poor peer relations on stress.\(^{30,93}\) The specific strategies caregivers use to promote children’s social skills and to handle children’s noncompliance and aggression may help to explain the effects associated with quantity of care.
Three recent nationwide studies of Head Start families indicate that center-based care of even modest quality can confer social and cognitive benefits to low-income children. However, the effects do not appear to be as widespread as the effects of high-quality day care centers, and it is not yet clear whether the effects will be as long lasting or apply to all children. For example, results from the Head Start Impact Study provide little evidence of positive impact on children from Spanish-speaking families. An effort is under way, under the auspices of the Institution for Education Sciences at the US Department of Education, to determine whether carefully constructed preschool curricula can be brought to scale with good success. Efforts to provide prekindergarten programs for all children whose parents seek it are being mounted in many states as well. A significant number of these efforts are also being evaluated to determine effectiveness. These state and federal efforts should clarify the impact of moderate-quality to high-quality center-based preschool programs.

All in all, day care centers appear to accelerate children’s language and cognitive development, and for low-income children, time spent in centers of moderate to high quality appears to provide an even wider array of advantages. However, there seems to be a trade-off regarding type and quality of care. In centers, more children are present but caregivers have more professional training; therefore, these children are more likely to have structured stimulation but perhaps less likely to receive sensitive individual care.

Family Influences

In the United States, there are deeply held beliefs about the primacy of the family. Such beliefs are buttressed by psychological theories that see parents as having the principal role in shaping children's futures. As children have begun spending large amounts of time in nonparental care, worries have emerged about whether child care might supplant the family. As part of the SECC, information about the families was collected during face-to-face contacts at ages 1, 6, 15, 24, 36, and 54 months as well as during the first, third, and fifth grades. Information was collected about family structure and size, parental employment, income, psychosocial characteristics of the mother and father, attitudes and beliefs about parenting and child care, depression, and quality of parenting in observed interactions with the child. Physical characteristics of the home, including the opportunities it provides for social and cognitive enrichment, were assessed. In a series of analyses through grade 5, family factors were found to be consistently stronger predictors of children’s cognitive, language, social-emotional, and behavioral outcomes. Family effects, on average, were 2 to 3 times as large as the effects of child care. In addition, similar-size family effects were obtained for children with extensive child care experience and those with less or no child care experience. In summary, the impact of the family on child behavior and development does not seem to have abated as a consequence of children spending substantial time away from their parents. That is not to say,
however, that family influences may not wane as children get older and spend increasing amounts of time with the media and persons outside the family.

CONCLUSIONS

Although much progress has been made in understanding the effects of early child care, further research is clearly needed. Despite the uncertainties that remain, it is probably fair to conclude that it matters where children get their care, when they start care, how much care they get during infancy and early childhood, and whether the care they get meets standards of quality. Children who spend many hours in care beginning in infancy appear to be at increased risk for stress-related behavioral problems. Behavioral problems are more likely if the child struggles when interacting with peers and if parents do not provide high-quality care. Day care centers appear to confer some advantage to language development and achievement, especially for poor children and if the centers offer high-quality care. Children in arrangements that meet the standards established by the APHA and AAP tend to receive better care and to have better developmental outcomes. However, attending arrangements with 6 or more children increases the likelihood of communicable illnesses and ear infections, albeit those illnesses appear to have no long-term adverse consequences. Pediatricians can help provide guidance on child care decisions. In addition, they can provide perspective on the issues, including reminding parents that what children experience at home accounts for substantially more variance in child outcomes than does what they experience in child care.105 Thus, parents need to remain vigilant for signs of stress, ready to spend time with their children in productive and enjoyable activities, and cognizant of the child's needs for structure and routines.106

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