THE SCIENCE OF EARLY CHILDHOOD DEVELOPMENT

A SUMMARY REPORT OF
FROM NEURONS TO NEIGHBORHOODS

NATIONAL RESEARCH COUNCIL, INSTITUTE OF MEDICINE

SUMMARY SOURCE

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999 Third Avenue, Suite 1200
Seattle, WA 98104-4039
www.metrokc.gov/health

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PREPARED BY PUBLIC HEALTH – SEATTLE & KING COUNTY

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EXECUTIVE SUMMARY AND KEY CONCEPTS

EXECUTIVE SUMMARY

Public Health-Seattle & King County presents this report for use by child advocates, elected public officials, planners, educators and interested members of the public concerned with child development. The purpose is to establish a common knowledge base in order to move with confidence toward enacting public policies that positively shape the environments in which our youngest children (birth to age 5) grow. The knowledge base is summarized from the book, *From Neurons to Neighborhoods*, published by the National Academy of Sciences in 2000.

The report is intended to focus the public's attention on the social and economic forces that influence whether or not all of our children have the opportunities necessary for positive development. While the everyday actions of individual parents, caregivers and teachers are key, it is the social, cultural and economic environments that determine whether these individuals are able to do the right things for their children.

By strengthening advocacy, we can build public will to address the environmental factors that shape the prospects for young children. Because child health, well-being and competence all have essentially the same basic determinants, the objectives of a wide variety of private institutions and governmental departments, whether federal, state, county or city, can be met by supporting a common policy agenda.

A 14-point policy agenda based on this common knowledge has already been developed by a large group of King County and Washington State stakeholders and is summarized in a leaflet entitled *From Neurons to King County Neighborhoods: The Science and Policies of Early Childhood Development*, available from Public Health-Seattle & King County (206 296-6817).

FINDINGS OF THE NATIONAL ACADEMY OF SCIENCES COMMITTEE ON INTEGRATING THE SCIENCE OF EARLY CHILDHOOD DEVELOPMENT

Over the past several decades two profound changes have coincided to alter the landscape for early childhood development in the United States. First, an explosion of research in the neuro-biological, behavioral, and social sciences has led to major advances in understanding the conditions that influence whether children get off to a promising or a worrisome start in life. Second, the capacity to use this knowledge constructively has been constrained by a number of dramatic transformations in the social and economic circumstances under which families with young children are living in the United States. Among the most significant are changes in parental work patterns, economic hardship among families with young children, increasing cultural diversity, more children spending long hours in childcare of questionable quality, and family and community problems.

An educated public would be better informed about early childhood development by a clear understanding of state-of-the-art concepts than by the rote memorization of age-specific milestones and highly prescriptive advice. To this end, the

Committee on Integrating the Science of Early Childhood Development presents the following scientific conclusions:

SCIENTIFIC CONCLUSIONS

(taken directly from pages 412-413, From Neurons to Neighborhoods)

- The development of the brain begins before birth, continues throughout life, and is influenced by both genetics and experience.

- All behavior and development reflect brain function, but currently there are very few scientific data that link specific experiences at specific times with specific effects on the developing central nervous system. Moreover, more is known about the adverse impacts of deprivation than the beneficial effects of enrichment, and most of the knowledge about development comes from studies of adults and animals other than humans.

- The astonishing developmental achievements of the earliest years occur naturally when parents and other caregivers talk, read, and play with young children and respond sensitively to their cues. There are no special programs or materials that are guaranteed to accelerate early learning during infancy.

- Nurturing, stable, and consistent relationships are the key to healthy growth, development, and learning, and there are many ways to be a successful parent. The best enrichment comes from loving interactions with people who provide a rich variety of opportunities for exploration and discovery.

- The early years of life are an important time of active development, foundation building, and clear periods of reorganization. There is, however, no sharp break at age 3 (or 5), and there is no scientific reason to believe that the behavioral consequences of negative early experiences cannot be ameliorated by interventions initiated in later childhood, or that positive early experience provides permanent protection against later adversity.

- There are many variations along the road to competence, and a wide range of individual differences among normally developing children can present quite formidable challenges to parents and other caregivers along the way.

- The developing brain is dependent on the inputs of a variety of early sensory, perceptual, and motor experiences (e.g., sound, binocular vision, movement through space) that are easily met, unless a child is born with an auditory, visual, or motor deficit. The early detection and remediation of such problems are essential components of primary health care.

- Efforts to protect early brain development are best embedded in an overall strategy of general health promotion and disease prevention. This includes attention to the importance of adequate nutrition (beginning during the prenatal period), the avoidance of harmful exposures (e.g., drugs, viruses, and environmental toxins), and protection from the stresses of chronic under-stimulation or significant maltreatment (i.e., abuse or neglect).

- There is considerable variability among child-rearing environments that promote healthy development, much of which is embedded in different values and cultural practices that are passed on from one generation to the next and are continually transformed by each generation.

- Well-described deviations that exist in all cultures (e.g. extreme and persistent poverty, serious parental psychopathology, family violence) can be extremely damaging. Specific threats to development can originate from within the child or the environment, but significant vulnerability results less from a single source and more from the cumulative burden of multiple risk factors. The combined impact of both biological and environmental risk presents the greatest threat.

- The early detection of problems and the prompt provision of an appropriate intervention can improve developmental outcomes (i.e., shift the odds) for both children living in high-risk environments and children with biologically-based disabilities. However, not all interventions are effective; when they do work they are rarely panaceas, and (unlike immunizations followed by an occasional booster) they do not confer a lifetime of protection.

In summary, the well-being and "well-becoming" of young children are dependent on two essential conditions. First is the need for stable and loving relationships with a limited number of adults who provide responsive and reciprocal interaction, protection from harm, encouragement for exploration and learning, and transmission of cultural values. Second is the need for a safe and predictable environment that provides a range of experiences to promote cognitive, linguistic, social, emotional, and moral development. The majority of children in the United States today enjoy the benefits of both. A significant number do not.

KEY CONCEPTS FROM KEY CHAPTERS

EARLY CHILDHOOD ENVIRONMENTS

Early environments matter. Virtually every aspect of early human development, from the brain's evolving circuitry to the child's capacity for empathy, is affected by the environments and experiences that are accumulated, beginning early in the prenatal period and extending throughout the early childhood years.

Nurturing Relationships

• Children require certain things from early close relationships:

  a. reliable support that establishes confidence and trust in the adult

  b. responsiveness that strengthens a child's sense of agency and self-efficacy

  c. protection from harm and unforeseen threats

  d. affection through which a child develops self-esteem

  e. opportunities to experience and resolve human conflict cooperatively

  f. support for growth of new skills and capabilities that are within a child's reach

  g. reciprocal interaction: a child learns mutual give and take

  h. experience of being respected by others and respecting them

• In these ways, nurturing relationships shape the development of self awareness, social competence, conscience, emotional growth, and other accomplishments.

• Attachments buffer against behavior problems by strengthening human connections and providing a structure for monitoring a child's behavior.

• Stability and consistency in a relationship are important.

• The longer a child remains in care that is threatening or fails to meet basic needs, the greater the challenge in getting the child on a healthy trajectory.

• The quality of caregiving has diverse roots in family ecology, marital relationships, and adults' pasts. Improving the quality of care requires carefully designed interventions that take these social and cultural features of families into consideration.

• It is important to reduce the stresses that impinge on parents such as work-related pressures and community violence.

Family Resources

• Over the last quarter century, more young children are growing up in single parent homes, more mothers of young children hold full time jobs, and more children are growing up poor.

• Poverty during the early years is especially harmful. Welfare reform experiments suggest that the success of tax and transfer policies affecting family income may hinge on simultaneously linking families and children to early interventions and mental health services.

• It is most accurate to say that poverty reduces the chances of success, rather than that poverty leads inevitably to diminished attainment.

• The kinds of jobs parents have affect child development. It is the income earned, the proportion of the day that an infant is getting secure care, and related effects on family functioning that lie at the heart of how maternal employment affects young children. Non-standard working hours (a large share of jobs for poor working women) pose risks for children. Infants are at greater risk when their mothers work for long hours.

• Children in single-parent families are at greater risk for poor developmental outcomes, but there is limited understanding of why this is so; it may be related to the fact that single-parent households are more likely to be poor than two-parent households.

• Parents' mental health is important. Punitive parenting, reduced monitoring, parental psychological distress, and substance abuse as well as less parental support for children's early learning, are all more prevalent in low-income families.

Neighborhood/Community

• Perhaps neighborhoods matter most when other risk factors are present, such as family poverty or mental health problems.

• The combination of family poverty and neighborhood poverty poses a double risk to a substantial number of children. For children living in dangerous environments, neighborhood conditions may matter a great deal and pose potent risk factors.

• Experimental evidence suggests that moving from high-poverty to low-poverty neighborhoods enhances the physical and psychological health of children and reduces violent crimes committed by adolescents.

• Evidence about the effects of neighborhood conditions on children's early development is complex and raises many ques-

tions. For children outside inner cities, neighborhood conditions appear to be far less consequential for child development than conditions within the family. Population-based studies show more variation in achievement, behavior, and parenting within neighborhoods than across neighborhoods.

Child Care: Early Care and Education

- The basic elements of high-quality care closely resemble the qualities of good parenting. Consistent, sensitive, and stimulating care involves the same caregiver behavior whether in the home or in child care. When the home environment fails to offer this care, child care environments that do provide it can protect and promote early development. Poor quality child care can compound the consequences of problematic parenting.

- Quality of child care is consistently associated with children's developmental outcomes. These associations are seldom large, but consistent and statistically significant.

- When child care is very high-quality, positive effects endure into early adult years, particularly for children from the poorest home environments.

- Even small improvements in caregiver-child ratios and caregiver training, and relatively modest increases in provider wages and benefits, can produce tangible improvements in the quality of care.

Access to Early Interventions

- Well-designed early interventions that are child-focused produce immediate gains on standardized developmental measures. These findings have been replicated in multiple studies of children living in a variety of adverse circumstances and those with a wide range of diagnosed disabilities. The largest benefits are typically found in model demonstration projects involving high costs per child. High-quality interventions bring economic benefits to individuals and the general public.

- For poor children, the short-term benefits of early intervention may fade during middle childhood; however, long lasting improvements in academic achievement have been documented in controlled studies.

- Long term follow-up of poor children in early interventions provides some evidence of improvement in high school graduation, employment, less need for public assistance, and decreased involvement in crime.

- The measurable effects of parent-focused interventions on standardized child development scores in economically dis-

advantaged families are less conclusive than for families of children with cognitive, language, or sensory impairments.

- There is little empirical documentation that nonspecific, general family support models for high-risk families, which typically are less expensive to deliver, have significant effects on either parent behavior or assessed child performance.

- There is considerable evidence that model programs that deliver carefully designed interventions with well-defined goals can affect both parenting behavior and the developmental trajectories of children who are threatened by socioeconomic disadvantage, family disruption, or diagnosed disability. Programs that combine child-focused educational activities with explicit attention to parent-child interaction patterns and relationship-building have the greatest effects.

- In contrast, services that are supported by more modest budgets and based on generic support, often without a clear definition, appear to be less effective for families facing significant risk.

CONCLUSIONS

The time has come to engage parents, communities, business, and government in order to develop a shared agenda that provides the conditions for a rewarding childhood and a promising future for all children. Central to this agenda is the matching of needs and capabilities. Families, for example, are the best source of loving, caring relationships and safe, nurturing environments that promote healthy physical, cognitive, linguistic, social, emotional, and moral development. Communities are ideally situated to provide a wide range of supports for families through formal and voluntary organizations and informal social networks. Businesses have the opportunity to support family well-being through creating positive work environments, offering flexible work schedules, and providing important financial benefits, such as family health insurance and child care. Local, state, and federal governments have substantial opportunities to influence the quality of family life and the availability of resources to support child needs through such diverse mechanisms as tax policies to alleviate economic hardship (e.g. earned income and child care tax credits), minimum wage laws to boost the incomes of low-wage workers, policies to support working parents and promote the health and development of their children (e.g., child care standards and subsidies), policies to support parent choice regarding employment (e.g. paid family leave), and funding for early intervention programs, among others. No single locus of responsibility can address all the needs of young children and their families. Effective policies clearly require shared responsibility.

INTRODUCTION

WHAT THIS REPORT OFFERS

This research summary, *The Science of Early Childhood Development,* is intended as a resource and guide to local and statewide action for policy makers, educators, child advocates, early childhood specialists, and interested members of the public.

The *Science of Early Childhood Development* is a summary of the book, *From Neurons to Neighborhoods: The Science of Early Childhood Development* (Jack P. Shonkoff and Deborah A. Phillips, Editors, Board on Children, Youth and Families, National Research Council and Institute of Medicine, Washington, D.C: National Academy Press, 2000). The summary is organized into three sections:

> INTRODUCTION
> EARLY CHILDHOOD ENVIRONMENTS
> APPENDICES

The main part of the report, Early Childhood Environments, provides evidence of the important role of early environments as they shape early development. These chapters review research on the multiple, overlapping contexts in which development unfolds, beginning with the most active ingredient of early environmental influences, namely the parent-child relationship. Next is the contribution of the economic niche of the family, the influence of child care, and role of the community in which the child lives. Together, these discussions paint a vivid picture of the environments and experiences that foster or impede adaptation and well-being. The final chapter is an overview of what is known about the effectiveness of early childhood interventions.

The Appendices provide information that actually appears first in the book; but, for the sake of this summary, this information is considered less central to the challenge of policy development than the information contained in the chapters that deal with environment. The first appendix presents the development of children as a highly complex process that is influenced by the interplay of nature and nurture. The influence of nurture consists of the multiple nested contexts in which children are reared, which include the home, extended family, child care setting, community, and society. Each of these are in turn embedded in the values, beliefs, and practices of a given culture.

The appendices that focus on The Tasks of Early Development address the nature of early development. What develops dur-

ing the earliest months and years of life? What are the major behavioral and developmental tasks of the early childhood period? These appendices start with the child's emerging capacity for self-regulation, reflecting a shift in what developmentalists now believe to be a hallmark of early development. Next they discuss the remarkable accomplishments in language and learning that characterize this age, and then the critical challenges of getting along with other children.

References for those studies cited in the summary are provided in alphabetical order at the end of the report.

A NOTE ON NATURE, NURTURE, AND CULTURE

Nurture as a concept referes to the multiple nested contexts in which children are reared — their homes, extended families, child care settings, communities and society, each of which is embedded in the values, beliefs, and practices of a given culture. The influence of nature is deeply affected by these environments and, in turn, shapes how children respond to their experiences. Giving young children a good early start increases but does not guarantee later success, and children who begin life at a disadvantage are not doomed to enduring difficulty.

Culture influences every aspect of human development. Culture prescribes how and when babies are fed, as well as where and with whom they sleep. It affects the customary response to an infant's crying and a toddler's temper tantrums. It sets the rules for discipline and expectations for developmental attainments. It affects what parents worry about and when they begin to become concerned. It influences how illness is treated and disability is perceived. It approves certain arrangements for child care and disapproves others.

The literature on typical development is based overwhelmingly on studies of middle-class children of European-American ancestry. In contrast, much of the research on children of color has focused on the impacts of poverty, drawing its samples from homogeneous communities in high-risk urban environments. Moreover, relatively little is known about the effects of racism, and other forms of systematic discrimination on early childhood development. This weakness in the knowledge base should be kept in mind as people read the summary.

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EARLY CHILDHOOD ENVIRONMENTS

ENVIRONMENT #1: NURTURING RELATIONSHIPS

- Children require certain things from early abiding relationships:

  a. reliable support that establishes confident security in the adult

  b. responsiveness that strengthens child's sense of agency and self-efficacy

  c. protection from any harm that may frighten children and threats of which they may be unaware

  d. affection by which child develops self-esteem

  e. opportunities to experience and resolve human conflict cooperatively

  f. support for growth of new skills and capabilities that are within the child's reach

  g. reciprocal interaction – child learns mutual give-and-take

  h. experience of being respected by others and respecting them

- In these ways, the parent-child relationship shapes the development of:

  a. self awareness
  b. social competence
  c. conscience
  d. emotional growth
  e. other accomplishments

- Attachments buffer against behavior problems by strengthening human connections and providing structure for monitoring behavior.

- Stability and consistency in relationships is important.

- The longer children remain in care that is threatening or fails to meet their basic needs, the greater the challenge in getting them on a healthy trajectory.

- The quality of caregiving has diverse roots in family ecology, marital relationships, and the adults' individual past. Improving quality of care requires carefully designed interventions that take these social and cultural features of families into consideration.

- It is important to reduce stresses that impinge on parents, such as work-related pressures and community violence.

The connection between children and their parents is easiest to observe when watching a contented infant being fed by its mother. Mother and infant happily make eye contact as they softly coo back and forth to one another. The reliance of the infant on its mother or other adult caregiver to meet basic needs is clear. Less evident is the need for nurturing that supports the developing mind from birth through adolescence.

A vast store of research has confirmed that what young children learn, how they react to the events and people around them, and what they expect from themselves and others are deeply affected by their relationships with parents, the behavior of parents, and the environment of the homes in which they live (Bradley et al., 1988; Collins and Laursen, 1999; Dunn, 1993; Hartup and Rubin, 1986; Maccoby and Martin, 1983). It is important to clarify that we use the term "parenting" to capture the focused and differentiated relationship that the young child has with the adult (or adults) who is (are) most emotionally invested in and consistently available to him or her. Usually this is a birth or adoptive parent, but sometimes it is a grandparent, a foster parent, or another primary caregiver. The quality of the relationship this person establishes with the child is more important than the person's identity.

The research discussed here on the multifaceted dimensions of parenting is primarily focused on mothering. Fathering, in contrast, has received less attention, and existing literature has tended to focus on men's economic contributions to their families, the developmental consequences of father absence, and distinctions between the roles of fathers and mothers. Contemporary research on fatherhood has highlighted several themes:

- Fathers seem to be both more and less involved in their children's lives today than was true even a decade ago. While there are higher rates of single fathers raising children, greater involvement of fathers in child care, and more self-reported time spent by fathers with children, at the same time, there are unprecedented numbers of children now spending part or all of childhood in single-mother households.

- Fathering is increasingly viewed as involving multiple functions that go well beyond the role of breadwinner.

- Despite the rapid changes affecting the ethnic and racial composition of the nation's families, there is almost no research on how the roles of fathers and other men in young children's lives are evolving in the context of diverse values and family structures.

ATTACHMENT

The key to understanding the effects of nurturing relationships is the concept of "attachment security." This is defined as the "development of security, confidence and trust between infants, toddlers and their parents." The early work of Mary Ainsworth (1973) established a method still used for categorizing the relationship between infants and toddlers and their primary caregivers (most often mothers). This laboratory assessment of young children's separation and reunion behavior with their mothers was important because of its correlation with other facets of development. Infants categorized as "securely attached" interact positively with their caregivers and play happily in their presence. Though distressed when the caregivers leave, they are easily comforted by the caregivers' return and resume their play. In contrast, "insecurely attached" infants show greater anger and upset when their caregiver separates and are not able to play following caregiver return. More recently, researchers have used this paradigm to study children from a variety of cultures and diverse backgrounds. As a result, attachment classifications have been refined to reflect subtle variations in relationships.

Attachment security is an important correlate of children's functioning in a variety of areas. Researchers posit that secure attachments allow infants and toddlers to develop a sense of efficacy and control over their environment (Carson and Park, 1996; Cassidy et al., 1992; Denham et al., 1997; Hooven et al., 1994). This leads to positive self-esteem and also buffers children from stress. Personal efficacy and control appear to be important underpinnings for many developmental attributes. A review of studies relating the quality of attachment between infants and young children and their caregivers to developmental outcomes reveals that securely attached young children are found to have an easier time developing positive, supportive relationships with teachers, friends, and others whom they encounter as they grow up (Sroufe and Egeland, 1991; Sroufe et al., 1993; Thompson, 1998 a, 1999a). They also have a more balanced self-concept, more advanced memory processes, a more sophisticated grasp of emotion, a more positive understanding of friendship, and show greater conscience development than insecurely attached children (Belsky et al., 1996; Kirsh and Cassidy, 1997; Laible and Thompson in press; Verschueren, et al., 1996). Secure attachments, fostered by sensitive, responsive caregiving, are of pivotal importance and reverberate in many areas of a child's life.

Research indicates that children vary in their attachments to different caregivers and that attachments can change over time. For example, infants can be securely attached to one parent but not another, or securely attached to a mother but insecurely attached to the childcare provider. As might be expected, infants fare best when securely attached to caregivers as well as

parents. Early secure attachments shift the odds toward more adaptive development, but subsequent experiences and relationships can modify their longer term impacts, sometimes substantially.

FOSTERING COOPERATION AND CONSCIENCE

The kind of care that promotes secure attachments (responsive, sensitive) also appears to support reciprocity in the relationship between children and their parents (Goodnow, 1999). This reciprocity lays the foundation for the later development of social skills and problem solving abilities as children enter the wider world outside the family.

Cooperation is an interactional process in which a child's capacities to understand, agree with, and be motivated by, a positive parent-child relationship are important (Grusec and Goodnow, 1994; Kucynski et al., 1997). Interactions that, at one extreme, become highly coercive and engage parents and children in escalating battles of will can contribute to the mix of factors that place children on a path toward dysfunctional social behavior (Dodge, 1990; Patterson et al., 1992). Alternatively, when these interactions are characterized by clear and consistently enforced limits, low levels of emotional arousal, ample affection, and a de-emphasis on the use of power, threats, and criticism (Campbell, 1997; Herrera and Dunn, 1997; Lepper, 1981; Maccoby, 1992; Zahn-Waxler et al., 1979), children learn to observe and ultimately internalize their parents' standards of conduct.

Early moral understanding and the development of conscience thrives best in children reared in the context of a warm relationship where their views are respected and parental power and control are not priorities. A secure, positive relationship with parents is the best predictor of early moral growth (Kochanska, 1991, 1993, 1995).

ENCOURAGING EXPLORATION AND LEARNING

Infants whose parents can interpret, adjust their own behavior and respond appropriately to their children's bids for attention, moods and states, expressions of interest, and efforts to communicate their needs are more advanced on virtually all assessments of developmental and cognitive status. Sensitive give and take between parent and infant appears to get children off to a good start on early markers of cognitive growth, just as it facilitates secure attachments. Other aspects of par-

enting that have shown positive associations with these outcomes include encouragement of exploration (in contrast to highly restrictive parenting), provision of a rich verbal environment, and ample amounts of nurturance and warmth (Clarke-Stewart et al., 1979; Cowan et al., 1991; Olson et al., 1986; Pettit et al., 1997).

Maternal speech patterns predict vocabulary growth during the first three years of life (Hart and Risley, 1995; Huttenlocher et al., 1991), as well as prekindergarten measures of literacy and print-related skills (De Temple and Snow, 1991). Parents encourage learning very explicitly through frequent trips to the library, routine reading to children, and games that stimulate notions of quantity. These practices show strong associations with early literacy and numeracy skills and later academic achievement (Ginsberg et al., 1998; Griffin and Morrison, 1997). Of particular importance for the early acquisition of literacy and numeracy skills are the language and social interactions that surround such activities as storybook reading and board games that involve number concepts (Case and Griffin, 1990; Snow, 1993).

The home environment is most commonly assessed with the Home Observation for Measurement of the Environment (HOME) Inventory (Caldwell and Bradley, 1984), which assesses the materials, activities, and transactions that occur within the family setting and are supportive of early learning, defined largely in terms of IQ and traditional academic skills. Literally hundreds of studies have reported significant associations between HOME scores and children's IQ, cognitive and language development, and school performance. These relations hold for white, black, and Hispanic children from low and middle socioeconomic groups, although the patterns of relations may vary somewhat across ethnic groups (Bradley et al., 1989). Results on virtually every item on the HOME inventory distinguishes poor from nonpoor families both within and across white, black, and Hispanic families.

DISRUPTIONS IN PARENTING: DEPRESSION, ABUSE AND NEGLECT, POVERTY

Given the importance of early relationships to the young child's developing sense of self, researchers have examined factors that promote or limit a young child's chance to receive sensitive nurturing care. Temperamental as well as developmental difficulties in young children can make it harder for parents to respond sensitively to their needs. For example, irritable infants might require additional time and attention. Their behavior can feel "rejecting" to parents, who then withdraw, powerless to help their infants feel better. Stressed parents may not be able to provide the necessary feedback to foster a secure attachment with their infant. Other factors which may interfere with a parent's capacity to foster secure attachments include serious mental health problems, economic concerns and marital strife. Maternal depression has long been associated with disruptions in attachment (Dawson et al., 1992; Murray and Cooper, 1997; Seifer et al., 1996) and increased developmental risk in children (Campbell et al., 1995; Cummings and Davies, 1999; Frankel and Harmon, 1996; NICHD Early Child Care Research Network, 1998a). Studies have found that many depressed mothers show disrupted patterns of interactions with their infants (Teti et al., 1996). Depressed mothers do not always show these disruptions. Such disruptions are present when mothers face additional challenges like poverty, youth, drug addiction and poor social support. Fathers (whose role has not been well studied) play an important supportive role when mothers are compromised by depression.

The social context in which children are raised is related to the quality of care they receive. Poverty, illness, and disrupted relationships all can be barriers to caregivers providing optimal care for children. As might be expected, children exposed to abuse and neglect suffer a range of adverse consequences. Child victims of physical abuse have more aggressive behavior coupled with lower social competence and less empathy for others (George and Main, 1979; Dodge et al., 1990). Deficits have also been noted in IQ scores, language ability, and school performance. Research within the last five years has examined the relationship between fear-stress experience in childhood and brain development. Preliminary research suggests that fear/stress response in children produces high levels of cortisol and adrenaline production which may account for brain differences noted in abused children as compared to non-abused peers (DeBellis et al., 1999a,b; Cicchetti, 1994).

Study of orphanage-reared children as well as children who have experienced abuse and neglect highlights the damage of inadequate care and traumatic experience on the developing mind. Fortunately, long-term studies of these children illustrate the ability of many children to make rapid gains in all areas when they are placed in loving and attentive homes. However, the quality of these children's attachment relationships varies considerably. A substantial minority have difficulties establishing secure attachments with adoptive or foster parents (Chisholm, 1998; Hodges and Tizard, 1989b; O'Connor et al., 1999). Additional study is needed to understand what allows for resiliency in many children. The presence of a close supportive relationship can buffer children from significant stress. Further, the degree of harm children experience seems to be "dose" related; the longer children face abusive or neglectful circumstances, the greater the chance of permanent disability.

IMPROVING PARENTING

Efforts to improve parenting range from direct interventions aimed at remediating specific behaviors to generally improving the quality of the parent-child relationship. The review of the literature on efforts to improve parenting in at-risk families suggests that intervention programs are most effective when they also address the larger socio-economic problems of the family, and when they involve adults other than just the mother and utilize program staff who are specifically qualified to work with multi-problem families (Cowan et al., 1998; Teti, 1999).

SUMMARY

Relationships are among the most significant influences on healthy growth and psychological well-being. Sensitive, responsive, loving and committed caregiving may not always be easy to achieve, but it is vital for the optimal development of children. Given what is known about the importance of relationships, efforts must be made to address the obstacles that impede parents and communities to support the well-being of young children. These efforts must include reducing the stresses families face, from lack of services and livable wages to community violence. Although further research is warranted, there is clear evidence that children benefit from nurturing relationships and that with commitment and hard work barriers can be lifted.

> Maternal depression has long been associated with disruptions in attachment and increased developmental risk in children. Such disruptions are present when mothers face additional challenges like poverty, youth, drug addiction and poor social support.

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KEY CONCEPTS

- Over the last quarter century, more young children are growing up in single parent homes, more mothers with young children now hold full time jobs, and more children are growing up in poverty.

- Poverty during the early years is especially harmful. Welfare reform experiments suggest that the success of tax and transfer policies affecting family income may hinge on simultaneously linking families to early interventions and mental health services.

- It is most accurate to say that poverty reduces a child's chances of success, rather than leading inevitably to diminished attainment.

- While mothers' education is associated with positive child outcomes, there is little strong evidence that increasing parental education would produce measurable benefits for child development.

- Children in single-parent families are at greater risk for poor developmental outcomes—but a lack of financial resources in single-parent families are probably the reason.

- It is not mothers' employment per se, but the circumstances of work, such as income, proportion of the day that her infant is getting secure care and related effects on family functioning that lie at the heart of how maternal employment affects young children.

- Non-standard working hours (a major share of jobs for poor working women) pose risks for children.

- Working for long hours during a child's first year may pose risks.

- Punitive parenting, reduced monitoring, parental psychological distress, and substance abuse as well as less parental support for children's early learning, are all more prevalent in low-income families.

- These family factors (income, education, work, family structure) are usually studied in isolation but are likely to occur in positive or negative clusters.

Parenting occurs in a context larger than the family unit. The socioeconomic context of the family setting includes income, parents' education, parents' work, and family structure. The question is not whether the family's resources affect child development, but why and how. And the issue is complicated by the reality that resources vary over time; family incomes are often not stable throughout a child's life, and the effects on children vary according to which developmental stage the child is in when the income increases or decreases.

Because welfare reform has had a significant impact on family resources for numerous families, there is increased interest in working poor families on the part of researchers and policymakers.

Parents with less education and lower wage jobs, or no job at all, are probably less able to purchase safe housing, nutritious meals, high-quality child care, and other opportunities that foster health and learning (Becker, 1981; Brooks-Gunn et al., 1995). Also, if families have limited resources, it can mean lower psychological well-being for the mothers in particular, which leads to less than ideal parenting practices (Brooks-Gunn and Duncan, 1997).

RESOURCES DO MATTER

Work

Two recent dramatic trends that have affected child development are the increased number of working-poor families (work no longer guarantees economic security) and the increased number of mothers who work outside the home. While work may increase family income, some of that income will be necessarily spent on work-related child care. This means that the family's resources (especially time and money) may be distributed differently rather than increasing overall.

The pattern of employment in families varies widely: full-year and full-time work for one or both parents (though sometimes at very low wages); intermittent work; multiple family members (including older children) with multiple part-time jobs; shift work so that child care stays in the family, etc. There is evidence that if the mother works full-time in the child's first year, and especially if she works long hours, there are negative effects on the child (Baydar and Brooks-Gunn, 1991; Belsky and Eggebeen, 1991; Ruhm, 2000; Desai et al., 1989; Vandell and Corasaniti, 1988; Han et al., 2000; Waldfogel et al., 2000). There is also some evidence that the father's time with the child is important (Ruhm, 2000).

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Beyond the financial strain created by periods of unemployment, it may compromise parent-child relationships by creating tension and hostility as well as reducing warmth and supportiveness in the home. These adverse home environments brought on by sustained unemployment have been found to have negative consequences for children's development in the short and long term (Conger and Elder Jr., 1994; McLoyd, 1989; Tomblin et al., 1997).

On the other hand, just having a job is not enough. Parents' experiences of employment are affected by whether or not the work is rewarding to them. If parents (especially mothers) have control and flexibility in their work, and if they do not have to perform boring and repetitive work but instead experience challenges, then they are likely to experience more intellectual flexibility and other positive qualities such as self-direction. These positive attributes in parents, in turn, translate into improving children's cognitive outcomes and social skills (Alessandri, 1992; Greenberger and O'Neil, 1991; Howes et al., 1995a; Jencks et al., 1988; Menaghan and Parcel, 1994, 1995; Parke and Buriel, 1998; Kohn and Schooler, 1973).

Studies that have focused specifically on cognitive outcomes indicate that low-income children are not hurt by and may even benefit from maternal employment. This is especially true for working class children (Desai et al., 1989; Gold and Andres, 1978; Hoffman, 1979; Zaslow, 1987). Benefits may be due to the positive effects on the mother's sense of well-being, the father's involvement in child care activities, and the quality of parenting (Hoffman et al., 1999).

Employment is just one resource, however. Despite the advantages resulting from maternal employment for many low-income children, other socioeconomic factors are very important for their cognitive, language, and social development outcomes, and these outcomes for low-income children are consistently worse than for children in higher-income homes. This difference is largely attributable to characteristics such as mothers' education, family size, mothers' depression, social support, parenting quality and attitudes, as well as to the degree of satisfaction parents experience in their jobs, as noted above. Another reason for poorer outcomes may be that children in poverty are more likely to have mothers who work a non-day shift, with its resulting family instability.

The effects of parents' work on children, then, depend on many factors: the features of the work, the income it generates, the nature and structure of the job, its timing and total hours—and the environments and relationships that children experience when they are not in the care of their parents.

EFFECTS OF FAMILY RESOURCES ON CHILD DEVELOPMENT

RESOURCE TYPE	CHILD OUTCOMES
Income/Financial Resources	• There is a strong and consistent association between poverty and poor developmental outcomes. • Economic conditions in early years are more important than in later years.
Mother's Work	• Low-income children may benefit from mothers' work in terms of cognitive outcomes. • Challenging, flexible work can be beneficial to children.
Parent Education	• More parental education is associated with higher child achievement and positive behavior. • More highly educated mothers give more intellectual challenges to their children.
Family Structure	• Children in single-parent families have more problems and worse outcomes than others. This is probably due to lower incomes of single parent families and greater stress.
Psychological Well-being	• Lower-income parents are at greater risk for psychological distress. • Poor mental health is related to harsh, inconsistent parenting.
Parenting Beliefs & Practices	• There are some differences in discipline strategies by income level. • Important parent values do not differ by social class.
Home Learning Environment	• Stimulation, emotional support, structure, safety, and frequency of interaction are all associated with the well-being of both lower and higher-income children.

Poverty

Research shows that increasing the income of families with young children can have positive effects on children's outcomes. The strength and consistency of associations between poverty and critical aspects of child development are striking (Brooks-Gunn and Duncan, 1997). In the United States, children (especially minority children) are now the age group most likely to live in poverty. In addition, the gap between the haves and the have-nots is widening—we have more poor and more rich children in the U.S. than in the past (and a wider disparity between the two than most other Western countries). Without intervention, individual differences among children at school entry that are linked to poverty often persist over time (Stipek, 2001).

Researchers now recognize that family income varies over time and can be quite volatile across the family life-span. This means that a child may experience various levels of financial stability during his or her childhood, so that even two siblings may experience different levels of stability. Also, it seems to make a difference during which developmental stage a child experiences financial instability. Economic conditions in early childhood may be far more important for shaping children's ability, behavior and achievement than conditions later in childhood. This has been confirmed by non-experimental studies, one of which found that a child whose family is $10,000 wealthier over the first five years of its life has 2.8 times the chance of graduating from high school than the child in the baseline family (Duncan et al., 1998). Furthermore, income effects across early childhood are more powerful for lower-income children than for higher-income children.

Poverty during the early years is more powerfully predictive of later achievement than is poverty at any subsequent stage of development. Children living in poverty are more likely today than in the recent past to have working parents, many of whom work consistently and for substantial hours. While evidence indicates that parental work is usually a neutral or positive influence, particularly for children living in poverty, its benefits appear to be lessened or lost when low wages mean continued poverty, low job complexity, and perhaps employment that occurs during a child's first year of life.

Preliminary evidence from the new generation of welfare reform studies suggests that, in the absence of positive changes in home environments, parental mental health, and parenting,

> Research shows that increasing the income of families with young children can have positive effects on children's outcomes. The strength and consistency of associations between poverty and critical aspects of child development are striking

increases in family income and reductions in poverty are not in and of themselves sufficient to benefit young children.

Parent Education

Developmental studies have shown consistent and large associations between parental schooling levels and children's achievement and behavior. Researchers also find that parental education levels are strongly associated with the home literacy environment, parental teaching styles, and investments in a variety of resources that promote learning (e.g., high-quality child care, educational materials, visits to libraries and museums) (Bradley et al., 1989; Laosa, 1983; Michael, 1972). It is not clear, however, that parental education directly affects the development of young children rather than simply prepares children for formal schooling. In developing countries, educating mothers just to the primary school level benefits both public health and children's literacy and verbal skills (Dexter et al., 1998; Hobcraft et al., 1984; Richman et al., 1992). U.S.-based studies have tried to show how much children's outcomes improve when mothers complete high school, but the research has not been conclusive. From a policy point of view, it may be that the increments in skills gained with the completion of high school or an associate degree are too small to make much of a difference for children. This does not, however, answer whether larger changes in parents' education or gaining basic literacy would benefit young children in the United States.

Family Structure

Single-parent families are set up and use their limited resources differently than two-parent families (McLanahan and Sandefur, 1994). Overall, children from single-parent families appear to face more problems and have worse outcomes than those from two-parent families. There are numerous reasons for these differences. Most single-parent families are headed by women. Women earn lower wages and female-headed single parent households are more likely to be poor than those headed by males. Children in these families may have less contact with adult male role-providers, and due to time constraints, the children may also have less contact with their mothers. If mothers cannot be as involved in their children's lives, the children may have less support and cognitive stimulation at home. Both social and academic well-being of children in single-parent households is lower than that of children who live with their married parents (Cherlin, 1999; McLanahan and Sandefur, 1994).

Divorce is but one path to single parenthood and it is important to distinguish it from child-rearing by unmarried women. The studies that have compared these two groups have found

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few differences between children of divorced parents and children of never-married parents; both groups are at risk for poorer achievement and behavior compared with children from two-parent families (Cooksey, 1997; McLanahan, 1997). Therefore, the phenomenon of single-parenting is a concern since there are increasing numbers of children living with only one parent (and more likely a never-married mother) compared with the past. The main challenge in trying to understand the effects of being raised by a single parent is to determine if the poorer outcomes are due to the single-parenting itself, or to the fact that many single-parent families have far fewer resources than two-parent ones. Most researchers agree that the resource deficit plays the bigger role.

Genetic Factors

Two types of studies show that even when the sum of genetic endowments are considered, family resources have important impacts on child development. The first type of study looked at the effects of socioeconomic status (SES) on a child's achievement before and after genetic characteristics of the mother were taken into account. The mother's characteristics, specifically maternal cognitive abilities, turned out to account for only one-quarter of the connection between SES and child achievement (Phillips et al., 1998). The second type of study looked at the relationship between SES and a child's achievement by comparing biological and adoptive children. Parents' SES was found to impact both biological and adoptive children's SES. This implies that SES impacts on childhood IQ cannot be attributed primarily to genetic factors (Loehlin, Horn and Willerman, 1989; Scarr and Weinberg, 1976; Phillips et al., 1998). In fact, most children have higher IQs after adoption and children who are adopted by higher-SES families have significantly larger gains in IQ than do children adopted into lower-SES families. Because the children and their adoptive parents are genetically unrelated, these SES effects carry no genetic influence (Duyme et al., 1999).

On the other hand, studies that look at the development of twins and siblings raised apart seem to imply that children's shared environments (that is, living with the same families) account for very little (almost always less than 10 percent, usually less than 5 percent) of the variability in ability and personality found in the population (Bouchard et al., 1990). Does this mean that family settings don't matter? One answer might be the issue of the volatile nature of family resources, income in particular. If siblings raised in the same family experience different childhood resource levels and at different developmental stages (some stages more vulnerable than others), then the notion of "shared" environment has questionable meaning for them and thus also for twins and siblings raised apart (Duncan, 1988; Duncan and Raudenbush, 1999). The

more important question is what resource level and family structure does the individual child experience at each developmental stage?

OTHER FAMILY INflUENCES

Parent Psychological Distress

Economic hardship has negative effects on mental health (McLoyd, 1997) and poor mental health is related to harsh, inconsistent and detached parenting. This translates into poor outcomes for children, depending especially on the age and gender of the child. Low-income parents are at greater risk for depression and other forms of psychological distress, such as low self-worth and negative beliefs about control (Gazmararian et al., 1995; Pearlin and Schooler, 1978; Rosenberg and Pearlin, 1978). Edin and Lein (1997) describe low-income parents' constant struggles to provide food, housing and other necessities, as well as to keep their children out of danger, resulting in constant stress for the parents and the fear that precarious child care, housing and medical arrangements could give way at any moment.

Child abuse is more common and more reported among lower-income families. Also, substance abuse constitutes another risk factor associated with decreased mental health and economic hardship among parents. However, because substance abuse often co-occurs with other psychiatric problems and disadvantaged circumstances, it is hard to know whether the parenting practices of substance-abusing parents are uniquely impaired by their drug habits (Mayes, 1995).

Parent Beliefs

Parenting styles and child-parent interactions of lower-income families are not vastly different from those of higher-income families. Some modest differences are worth noting. Higher-SES parents have been found to rely more than lower-SES parents on shame, guilt and reasoning as disciplinary strategies and less on commands and imperatives (Kohn, 1969). lower-income parents tend to value conformity, whereas higher-income parents value self-direction (Gecas, 1979). Differences in value systems between social classes, however, have declined over time (Alwin, 1984; Hoff-Ginsberg and Tardiff, 1995; Wright and Wright, 1976). Moreover, there is evidence that important parental values (e.g., about academic achievement) do not differ by social class (Warren et al., 1993), and that social class is only one of many potential influences on parents' belief systems (Sigel et al., 1992).

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Home Learning Environment

The "home environment" is defined here to include the stimulation, emotional support, structure, safety, and frequency of interactions and learning experiences that parents provide for their children. Family socioeconomic resources are closely associated with the home learning environments of poor children. Almost half of the gap in test scores of young children can be explained by the difference between more and less positive home environments (usually in high vs. low-income homes) (Smith et al., 1997). Stimulation, emotional support, structure and safety are associated with the well-being of both low-income and high-income children (Bradley et al., 1994). Poverty and persistent poverty are strongly associated with less optimal home environments (Garrett et al., 1994).

More educated mothers give their children more intellectual challenges. Mothers with higher levels of education use more verbal reinforcement, inquiry, modeling strategies, and reading with their preschool children (Laosa, 1983). Also, parents who have more intellectually interesting occupations tend to offer more stimulation to the child in the home environment, even

when parents' education, pay and working hours are taken into account (Parcel and Menaghan, 1994). Given all this, improving the literacy and learning environment of the home offers a potentially promising focus for efforts to promote early learning in poor families.

SUMMARY

Over the last 25 years more young children are growing up in single-parent homes, many more mothers with young children now hold full-time jobs than before, and more children are growing up in poverty. While improved maternal education may have modestly positive effects on early development, the effects of shifting family structures—and to an even greater extent the effects of maternal employment—will depend on a variety of work-related and child care-related conditions. Persistent poverty during a child's early years will likely have a profound negative effect on development.

Family resources, especially as they support the mental health of the parent(s) and the quality of the home environment, are crucial to children's development. Policy interventions should aim at improving families' incomes while children are young, and simultaneously linking families and children to early intervention and mental health services. Children raised in single-parent homes are particularly at risk. Also, maternal employment (much more than education) is a central factor. It is the circumstances of work, such as the income it generates, the proportion of the day the infant is spending in the presence of a security-giving, trusted caregiver, and related effects on family functioning that lie at the heart of how maternal employment affects children. In particular, there is now evidence that non-standard working hours—which now make up a major share of jobs for poor working women—pose risks for children, and that going to work for long hours especially during the child's first year poses a risk to child development. This may be especially true when trade-offs are involved, as they often are, from time in sensitive and stable parental care at home to time in poorer quality alternative care.

The pathways through which family resources may affect young children are the mental health of parents and the quality of the home environment. Punitive parenting, reduced monitoring, parental psychological distress, and substance abuse, as well as less parental support for children's early learning, are all more prevalent in low-income families. Unfortunately, these factors often occur together within families which, in turn, place children at higher risk of poorer outcomes. While many children growing up in poverty do eventually become productive adults, it is most accurate to portray low socioeconomic status as reducing the chances of success rather than leading inevitably to negative developmental outcomes.

ENVIRONMENT #3: CHILD CARE—EARLY CARE AND EDUCATION

Second only to the immediate family, child care is the context in which early development unfolds, starting in infancy and continuing through school entry for the vast majority of young children in the United States. It is the setting in which most children first learn to interact with other children on a regular basis, establish bonds with adults other than their parents, receive or fail to receive important inputs for early learning and language development, and experience their initial encounter with a school-like environment. Early and extensive enrollment in child care has become the norm in U.S. society.

In 1999, the National Household Education Survey, which asks families about non-parental child care arrangements regardless of the employment status of the mother, reported that 61 percent of children under age four were in regularly scheduled child care, including 44 percent of infants under one year, 53 percent of one year olds and 57 percent of two year olds. While parents and relatives continue to provide vast amounts of early child care, rapid growth in reliance on center-based arrangements as the primary source of child care has occurred for children of all ages, accompanied by a decline in the use of home-based care by non-relatives.

KEY CONCEPTS

- The basic elements of high-quality care closely resemble the qualities of good parenting:

  Consistent, sensitive, and stimulating care transcends the difference between home and child care. When the home environment fails to offer this care, child care environments that do provide it can protect and promote early development. But also, poor-quality child care can compound the consequences of problematic parenting.

- Quality care is associated with positive developmental outcomes. The associations are seldom large, but consistent and statistically significant, starting in infancy and continuing to older aged children. When child care is very high-quality, positive effects endure into early adult years, particularly for children from the poorest home environments.

- Even small improvements in child-caregiver ratios and provider training, and relatively modest compensation initiatives, can produce tangible improvements in the observed quality of care.

ENTRY INTO CHILD CARE

Corresponding to the rapid growth in labor force participation of mothers with children age 1 and younger, the majority of parents now enroll their children in child care during the first year of life (Hofferth et al., 1998; U.S. Bureau of the Census, 1997). In the National Institute of Child Health and Human Development (NICHD) Study of Early Child Care, 72 percent of the infants experienced some nonparental child care in the first year of life, with an average age at entry of 3.31 months (NICHD Early Child Care Research Network, 1997b). About three-quarters of those who entered care during the first year of life entered prior to age 4 months and they were in care for an average of 28 hours per week. The picture these data provide is thus one of very early entry into extensive child care.

Parental Leave

It is well documented that use of non-parental infant care is substantially lower in countries that have generous parental leave policies (Kamerman and Kahn, 1995). Prior to passage of the Family and Medical Leave Act (FMLA) in 1993, the United States was the only industrialized country without a federal law guaranteeing a job-protected maternity leave. This law requires employers with 50 or more workers to offer a job-

protected family or medical leave of up to 12 weeks to qualifying employees (those who have worked at least 1,250 hours in the previous year) who need to be absent from work for reasons that meet the terms of the law, including the need to care for a newborn, a newly adopted child or new foster child.

It is estimated that these provisions of the FMLA leave 89 percent of all private-sector work sites and 53.5 percent of the nation's private-sector employees uncovered (Commission on Family And Medical Leave, 1996). Nevertheless, the law appears to have had a major impact on the number of companies who are now offering job-protected leaves for maternity and other family and medical reasons, as well as on increased use of leave by employees (Waldfogel, 1999a, 1999b). The law does not require the leave to be paid, but it does require that employers who provide health insurance coverage continue to do so during the leave period. This raises questions about who takes advantage of leave and who does not. National survey data collected by the U.S. Department of Labor following implementation of the FMLA (Cantor et al., 1995) reveals that only 17 percent of covered employees took leave during 1994-1995 and an additional 3.4 percent indicated that they needed but did not take leave. Two-thirds of workers who needed but did not take a leave indicated that they could not afford the associated loss of wages. Parents who have access to parental leave benefits and can afford to make use of them do

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so, suggesting that the enrollment of very young infants in child care is not entirely voluntary. Results from the NICHD Study of Early Child Care indicate that the families who placed their infants in child care at the youngest ages (before 3 months) were heavily or entirely dependent on the mother's wages to escape poverty, and that many had previously been poor or dependent on public assistance (NICHD Early Child Care Research Network, 1997c).

Parents' Arrangement for Child Care

As has historically been the case, a surprisingly large number of employed parents with young children do not rely on others for child care at all. In 1997, for example, a little over one-quarter of families with at least one employed parent and an infant or toddler under age 3 relied primarily on parental child care while the primary caretaker was working. Hispanic fami-

Child care provided by fathers while mothers work has crept upward from 15 percent to 21 percent of all infant and toddler care arrangements between 1977 and 1994.

lies are somewhat more likely than others to rely on parents for infant and toddler care (32 percent did so in 1997; Ehrle et al., 2000) but it is also very common among white (27 percent) and black families (22 percent) (Capizzano et al., 2000; Ehrle et al., 2000).

Child care provided by fathers while mothers work has crept upward from 15 percent to 21 percent of all infant and toddler care arrangements between 1977 and 1994 (U. S. Bureau of the Census, 1997). Fathers provided one in four of the first child care arrangements made for the infants in the NICHD Study of Early Child Care (NICHD Early Child Care Research Network, 1997b).

A considerable number of parents are making the effort to care for their own children, usually at home, perhaps at considerable cost to their family incomes. If parents turn to others for assistance with child care, grandparents and other relatives are the caregivers for many families, including 27 percent of children under age three and 17 percent of three and four year olds. Hispanic families are particularly likely to rely on relatives for infant and toddler care when compared with black and white families (Capizzano et al., 2000; Ehrle et al., 2000).

At the same time, there has been extremely rapid growth in reliance on center-based care not only for preschoolers, but also for infants and toddlers. The proportion of children under age three in child care centers, preschools, Head Start programs, and other early childhood education programs tripled between 1977 and 1994, from eight percent to 24 percent of children with employed mothers (U.S. Bureau of the Census, 1982, 1997). In contrast to patterns of family-based care, center-based care is used much more by black and white families than by Hispanic families (Capizzano et al., 2000; Ehrle et al., 2000).

In sum, vast numbers of infants spend substantial portions of their time in child care, often starting within a few months after birth. While much of this very early care remains within the family—with parents who are juggling their work schedules and with relatives—young children move rapidly into nonrelative care as they enter the toddler and preschool years. Although we know virtually nothing about the factors that influence parents' decisions about when to first rely on child care, it appears that these decisions are affected by a complex mix of factors, including access to parental leave, the capacity to forgo wages, new policies requiring work from mothers formerly receiving public assistance, and the availability of child care arrangements (including sharing care between two parents). In this context, issues concerning equity of access to family leave benefits become important, as do questions about the extent to which families in differing circumstances (e.g., those without a partner to share child care responsibilities) feel that they are not able to exert their preferences regarding when and how they arrange for the care of their infants.

THE EFFECTS OF CHILD CARE

Two questions arise regarding the developmental effects of child care. The first centers on the mother-infant relationship and asks, "Will this relationship be harmed or diminished in significance as a result of the daily separations that occur when a baby is placed in child care?" This concern is reasonable. Child care, insofar as it reduces the amount of time available for the mother to learn the baby's signals and rhythms, might also adversely affect her ability to respond sensitively to the baby and establish a secure attachment relationship (Brazelton, 1986).

The second question focuses directly on the child: "Will the young child's cognitive, language, and social-emotional development be compromised as a result of spending time in child care?" This is an especially relevant concern in light of the recent phenomenon of early and extensive child care enrollment. The National Research Council summarized the evidence on these questions a decade ago (National Research Council, 1990). Since then research has both confirmed and expanded on the earlier panel's conclusion that the effects of child care result not from its use or nonuse but from the quality of the experiences it provides to children.

Effects of Child Care on The Mother-Infant Relationship

Attachment: The mother remains the primary attachment for infants in child care (Ainslie and Anderson, 1984; Farran and Ramsey, 1977; Howes and Hamilton, 1992; Kagan et al, 1978). Moreover, the "attachment relationship" is largely protected even when there is early entry into childcare and long hours of care, as well as poor quality care (NICHD Early Child Care Research Network, 1997a; Roggman et al, 1994; Symons, 1998). The important factor in whether the attachment relationship is strong and stays strong is the sensitivity of

the care that is provided by the mother (namely her supportive presence, positive regard, and lack of intrusiveness and hostility). This is equally true for children spending very little time in child care and those in a lot of child care (NICHD Early Child Care Research Network, 1998b).

Interaction: Looking at the NICHD study, infants and toddlers in more hours of child care, regardless of its quality, experienced somewhat less sensitive mothering and were less positively engaged with their mothers than other children not enrolled in child care (NICHD Early Child Care Research Network, 1999a). The negative relationship was not of sufficient magnitude to disrupt the formation of a secure infant attachment, however. And, when comparing infants and toddlers in higher and lower quality of child care (regardless of hours in care) those in the higher quality arrangements experienced greater maternal sensitivity.

A number of other studies have found that when very young children are exposed to risk factors at home and to extensive or poor-quality early child care, the chances of those infants and toddlers experiencing insensitive mothering increase (Belsky et al., 1996c; Clark et al., 1997; Tresch Owen and Cox, 1988). The nature of this relationship is not yet clear. Some researchers suggest that early reliance on child care undermines the mother's ability to respond sensitively and, as a result, diminishes the child's involvement with the mother, while others do not find these associations between early child care and maternal sensitivity

Protective effects: Child care can protect children from some risks based in the home. This has been a primary reason for early intervention programs that provide high-quality center-based child care for children living in poverty and for children in the child welfare system. Naturalistic studies (observing existing programs) of typical child care have also demonstrated protective influences. For example, mothers participating in the NICHD study who were living in or near poverty and

EFFECTS OF CHILD CARE ON CHILD DEVELOPMENT

TYPE OF EFFECT STUDIED	OUTCOME
MOTHER-INFANT RELATION	
Attachment	No effect as long as mother's care is strong and sensitive
Interaction	Not clear. For poor families, use of high-quality child care may be protective
CHILD'S DEVELOPMENT	
Cognition & Language	Effect is protective if child is in high-quality child care
Social & Emotional Development	Effect is protective, especially if child care is stable

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whose infants were in full-time, high-quality child care were observed to show more positive involvement with their 6-month-olds (i.e. spontaneously vocalizing, responding verbally to the child, voicing positive feelings, hugging, kissing, praising) compared with similarly poor mothers who were rearing their babies at home or were using full-time, lower-quality infant care (NICHD Early Child Care Research Network, 1997d). Others have found that child care can protect infants and older children from the negative effects of both poverty (Caughy et al., 1994) and maternal depression (Cohn et al., 1986, 1991).

In sum, despite persistent concern about the effects of child care on the mother-infant relationship, the weight of the evidence is reassuring, with the possible exception of recent findings regarding very early, extensive exposure to care of doubtful quality. If anything, the child care research of the past decade has shed more light on the powerful influence of parents on early development. When child care effects are examined beyond parental effects on child outcomes, the behaviors and beliefs of parents show substantially larger associations with their children's development than do any features of the child care arrangement.

Studies that have controlled for family influences when examining how child care affects child development have been carried out only in the past decade. Unfortunately, even with extensive controls for family influences, it is impossible to be completely sure that we are capturing the effects of child care untainted by influences that result from the fact that families with different features (e.g. higher incomes) are able to place their children in higher-quality care.

Effects of Child Care on Children's Development

One of the most consistent findings in this literature links the quality of child care to virtually every measure of development that has been examined. While hours of care, stability of care, and type of care are sometimes associated with developmental outcomes, it is the quality of care—and, in particular, the quality of the daily transactions between child care providers and the children for whom they are responsible—that is important. This conclusion is based on correlational studies of typical child care, as well as on experimental studies linking enrollment in very high-quality early intervention programs to both short and longer-term outcomes for both school success and prevention of delinquency for high risk children (Barnett, 1995; Currie, 2000; Shonkoff and Meisels, 2000; Yoshikawa, 1994, 1995).

Cognition and language: The strongest and most compelling evidence comes from experimental studies of planned early interventions for economically disadvantaged children or for

those at risk for developmental problems. The findings are consistent. Intensive, high-quality, center-based interventions that provide learning experiences directly to the young child have a positive effect on early learning, cognitive and language development, and school achievement (Barnett, 1995; Brooks-Gunn et al., 1994; Burchinal et al, 1997; Feagans et al., 1995; Lamb, 1998; Ramey and Ramey, 1998; Roberts et al., 1989). Sometimes the effects dissipate during the early school years, but the impacts of some programs have been found to continue well into the school years and even into adulthood (Campbell and Ramey, 1994; Currie and Thomas, 1995; Lazar and Darlington, 1982; Luster and McAdoo, 1996; McLoyd, 1997; Yoshikawa, 1994, 1995). The strongest effects of high-quality care are found for children from families with the fewest resources and under the greatest stress.

Correlational research on typical child care settings also finds associations between high-quality care in the infant and toddler years and children's cognitive and linguistic development (Burchinal et al., 1996; Galinsky et al., 1994; Howes and Rubenstain, 1985; McCartney, 1984; Peisner-Feinberg and Burchinal, 1997; Peisner-Feinberg et al., 2000). Studies of typical child care suggest that cumulative experience in high-quality, center-based care starting in the second year of life may be particularly beneficial to cognitive development (Broberg et al., 1997; Hartmann, 1995; NICHD Early Child Research Network, 2000). Some studies find that center-based care is especially beneficial for children from low-income families (Caughy et al., 1994), but others find that all children benefit regardless of their family background (NICHD Early Child Care Research Network, 2000).

Social and emotional development: For virtually every outcome that has been assessed, quality of care shows positive associations with early social and emotional development after family influences on development are controlled. (NICHD Early Child Care Research Network, 1998c and reviews by Lamb, 1998; National Research Council, 1990; Scarr and Eisenberg, 1993). The experimental literature on early interventions also has demonstrated significant effects on young children's social skills and, in particular, on reduced conduct problems (Yoshikawa, 1994, 1995). When children enter high-quality child care earlier and spend more time in these arrangements, positive effects on social competence can continue on into the elementary years (Peisner-Feinberg et al., 2000) and even preadolescence (Anderson, 1989; Field, 1991), although this is not consistently the case.

The child's relationship with his or her child care provider seems to play an especially important role. Children form secure attachments to their providers when the relationship is stable. These attachments, in turn, are associated with adaptive social development, just as they are for children and parents (Howes et al., 1992; Oppenheim et al, 1988; Peisner-Feinberg

et al., 2000; Pianta and Nimetz, 1991; Sroufe et al., 1983). Howes and her colleagues have found, for example, that children who are securely attached to their providers show more competent interactions with adults and more advanced peer play (Howes and Hamilton, 1993; Howes et al., 1988, 1994), both during the child care years and on into second grade (Howes, 2000).

Other researchers have found associations between the stability of child care providers in center-based programs and the quality of children's interactions with their providers (Baras and Cummings, 1994), as well as their social competence with peers, active engagement with materials in the classroom, and vocabulary levels (Howes et al., 1992). The stability of the peer group may matter as well. Children who remain longer with the same group of children are more peer-oriented and less solitary over time than those whose peer groups have changed frequently (Galluzo et al., 1990; Harper and Huie, 1985; Holmberg, 1980; Howes, 1988a, 1988b) and they are friendlier toward peers in distress (Farver and Branstetter, 1994).

In sum, the positive relation between child care quality and virtually every facet of children's development that has been studied is one of the most consistent findings in developmental science. While child care of poor quality is associated with poorer developmental outcomes, high-quality care is associated with outcomes that all parents want to see in their children, ranging from cooperation with adults to the ability to initiate and sustain positive exchanges with peers, to early competence in math and reading. The stability of child care providers appears to be particularly important, an association that is likely due to the attachments that are established between young children and more stable providers. For cognitive and language outcomes, the verbal environment that child care providers create appears to be a very important feature of care.
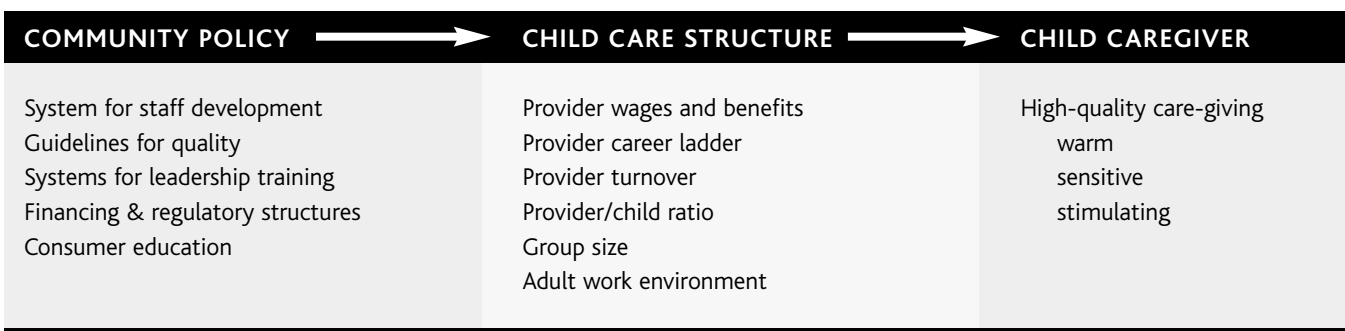
WHAT IS QUALITY CHILD CARE?

In general, three tiers of variables have been examined in the studies of child care quality: the child-provider relationship, the structural features of care, and the surrounding community and policy context.

The Caregiver

Young children whose caregivers provide ample verbal and cognitive stimulation, who are sensitive and responsive, and who give them generous amounts of attention and support are more advanced in all realms of development compared with children who fail to receive these important inputs (see Lamb, 1998; Smith, 1998). This conclusion applies to infants, toddlers, and preschoolers and also applies to all forms of child care, ranging from relatives to center-based programs (NICHD Early Child Care Research Network, 1998c, 2000). Stability and skill appear to go together. More stable providers have been found to engage in more appropriate, attentive, and engaged interactions (Raikes, 1993; Rubenstein et al., 1977; Whitebook et al., 1990). It is not a coincidence that the high-quality interventions that have provided strong experimental evidence of positive developmental effects have employed highly qualified staff and experienced virtually no teacher turnover (National Research Council and Institute of Medicine, 2000).

Stable child care providers are rare, unfortunately. Turnover rates among them are among the highest of any profession that is tracked by the U.S. Department of Labor (U.S. Bureau of Labor Statistics, 1998), hovering at 30 percent per year. By contrast, 6.6 percent of public school teachers and 21 percent of home health aides leave their jobs each year. Multi-site, observational studies of child care centers have reported turnover rates in the 1990's ranging from 25 percent (Phillips et al., 1994) to over 40 percent (Whitebook et al., 1990, 1997).

WHAT LEADS TO QUALITY CHILD CARE?

COMMUNITY POLICY ➡	CHILD CARE STRUCTURE ➡	CHILD CAREGIVER
System for staff development	Provider wages and benefits	High-quality care-giving
Guidelines for quality	Provider career ladder	warm
Systems for leadership training	Provider turnover	sensitive
Financing & regulatory structures	Provider/child ratio	stimulating
Consumer education	Group size	
	Adult work environment	

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Structural Features (ratios, group size, and adult work environment)

The structural features of child care are associated with warm, sensitive, and stimulating interactions on the part of child care providers and teachers. Solid evidence has documented associations among a provider's behavior, her self-reported training and education, and the immediate context in which she works, including ratios, group size, and the adult work environment (Lamb, 1998; Love et al., 1996; Smith, 1998). Some intriguing recent evidence suggests that the staff-child ratio may be relatively more important for infants and toddlers, and that the educational level of the provider may become more important as children move beyond the infant years into toddlerhood and beyond (NICHD Early Child Care Research Network, 1996, 2000).

Both formal education levels and recent, specialized training in child development have been found quite consistently to be associated with high-quality interactions and children's development in center-based, family child care and even in in-home sitter arrangements (Dunn, L., 1993; Fischer and Eheart, 1991; Kontos et al., 1994, 1995; Lamb, 1998; NICHD Early Child Care Research Network, 1996, 2000; Whitebook et al., 1990). Caregivers with more child-centered and less authoritarian beliefs about childrearing have also been found to provide warmer and more sensitive care (NICHD Early Child Care Research Network, 1996, 2000; Phillips et al., 1987a). Experience as a child care provider, in contrast, shows a much less consistent relationship to quality care (Dunn, L., 1993; Galinsky et al., 1994; Kagan and Newton, 1989; Kontos, 1994; Kontos and Fiene, 1987; Ruopp et al., 1979; Whitebook et al., 1990).

The ratio of children to caregiver has held up over time as one the most sensitive indicators of quality care in all settings, as, to a lesser extent, has group size (Burchinal et al., 1979; Smith, 1998; Whitebook et al., 1990). Importantly, it appears that fairly minor changes in ratios and group sizes can affect the quality of care. For example, infants in centers with ratios of three or fewer children per caregiver have been found to receive significantly more sensitive and appropriate caregiving (Howes et al., 1992), and to score above those children in centers with larger ratios on a measure of communication skill, even after adjusting for family factors that affect development (Burchinal et al., 1996).

More recent studies have examined aspects of the adult work environment such as provider wages and benefits in studies of child care quality. This research has revealed strong relationships, comparable to those found for training and ratios, between staff wages and child care quality in both center-based and family day care arrangements (Cost Quality and Outcomes Study Team, 1995; Helburn, 1995; Kontos et al.,

1995; Phillips et al., 1991, 1996; Scarr et al., 1994; Whitebook et al., 1997). Wages are also the primary, although not the only, determinant of staff turnover; when wages are increased, turnover declines (Whitebook and Bellm, 1999; Whitebook et al., 1997).

In light of this evidence, it is of concern that the average hourly wage of child care workers is $6.38 and that of family child care providers is $3.37 (U.S. Bureau of Labor Statistics, 1996). This is less than the hourly wage of parking lot attendants and bus drivers and substantially below the wages of kindergarten teachers ($19.16). Wages are not only low, but they have also not kept pace with inflation, and they often do not reflect the educational levels of child care providers (Whitebook, et al., 1990).

The Community and Policy Environment

Important elements of this environment include the financing and regulatory structures that bear on the child care market, community based planning systems, consumer education and involvement, systems for staff development and leadership training, and interconnections among providers working in different sectors of the market (Gormly et al., 1995; Kagan, 1993; Phillips, 1996). Child care regulations appear to establish a floor of quality for regulated dimensions of care (i.e., ratios, group size), which, in turn, is associated with differing quality (Cost Quality and Outcomes Study Team, 1995a; Helburn, 1995; Howes et al., 1995b; Phillips et al., 1992).

Why standards matter: Child care centers that voluntarily meet widely accepted guidelines for quality, such as those recommended by the American Public Health Association and the American Academy of Pediatrics (1992) provide better care, and the children in these programs show better outcomes than their peers in programs that do not meet these guidelines. For example, the mean school readiness scores for children in classrooms meeting none of the APHA/AAP standards was about 14 percentage points below the population norm; the scores for children in classrooms meeting all of the standards was just above the population average (NICHD Early Child Care Research Network, 1998c). Children in centers that met more of the standards had higher scores than did children in centers meeting fewer of the standards. In other words, there were no clear thresholds above which outcomes were markedly improved—more was better. It is notable that state child care standards fall far short of the APHA/AAP standards and vary enormously.

In sum, quality is based in the child care provider, whether it is the grandmother, an unrelated sitter, or a center-based teacher. The providers' characteristics are critical—notably their education, specialized training, attitudes about their work

and the children in their care, and the features of child care that enable them to excel in their work and remain in their jobs (notably small ratios, small groups, and adequate compensation). Regulatory and voluntary systems that support higher levels of quality on these dimensions are associated with variation in the quality of care that is found in different states, communities, and programs. Even small improvements in ratios and education are reflected in more sensitive, appropriate, and warm caregiving, suggesting useful targets for investments in quality.

The success story of the U.S. Department of Defense's efforts to improve its child care program is a good example of upgrading the quality of care in the United States (see box at right).

THE DISTRIBUTION AND COST OF QUALITY CARE

Virtually every systematic effort to characterize the quality of child care in the United States has found that about 10 to 20 percent of arrangements fall below thresholds of even adequate care (Cost Quality and Outcomes Study Team, 1995; Galinsky et al., 1994; Helburn, 1995; Whitebook et al., 1990). This is the case regardless of the type of care being examined. Researchers see caregivers who more often ignore than respond to young children's bids for attention and affection, a dearth of age-appropriate or educational toys, and children who spend much of their time wandering aimlessly around, unengaged with adults, other children, or materials. Even the NICHD Study of Early Child Care, which provides a more favorable picture of child care quality than do other studies, reported that one in four infant caregivers were moderately insensitive, only 26 percent were moderately or highly stimulating of cognitive development, and 19 percent were moderately or highly detached (NICHD Early Child Care Research Network, 1996).

It is not unusual for basic safety to be compromised in child care settings, as illustrated by the 1998 Consumer Product Safety Commission (CPSC) study of 220 licensed child care settings. The study reported pervasive health and safety violations. An earlier investigation conducted by the Office of the Inspector General (1994) found more than 1,000 violations in 169 child care facilities in five states, including fire code violations, toxic chemicals, playground hazards, and unsanitary conditions.

The range of quality is particularly worrisome when noting the evidence about who experiences better and worse care in the United States. Children from poorer and more stressed homes receive lower-quality child care than other children (Howes and Olenick, 1986; NICHD Early Child Care Research Network, 1997c; Phillips et al., 1994). There is, however, one

CHILD CARE FOR U.S. MILITARY FAMILIES

The U.S. armed services oversee a child care system that serves more than 200,000 children every day at over 300 worldwide locations and includes families from all four branches of the military. The military child care system includes child development centers, family care, and before-and-after-school programs.

In 1989, the Military Child Care Act (MCCA) was enacted by Congress in response to General Accounting Office reports and congressional hearings that detailed the extremely poor condition of the child care available to military families. The goal of the act was to improve the quality, availability, and affordability of military child care. It addressed the creation of new child care staff positions, staff training and compensation, inspections, parent fees based on family income, and other issues. After just 10 years, the military child care system is now considered a model for the nation.

Because of its link to low-quality care, staff turnover was one of issues that the MCCA required the armed services to address. In 1989, the average annual turnover rate at military child care centers was 48 percent. By 1993, the turnover rate was reduced to less than 24 percent (Zellman and Johansen, 1998). This remarkable reduction in turnover is attributed primarily to the improvements that were made in child care workers' compensation and training. First, the rate of pay for child care workers was standardized and made comparable to other jobs on base that required similar levels of training, education, and responsibility. Second, advancement and salary increases were made contingent upon completing specific training programs. Third, at least one training and curriculum specialist was added to the staff of every child development center. The training and curriculum specialists are responsible for focusing on child development issues, as opposed to administrative issues. The costs of these quality improvements were not shifted to parents. In fact, because the U.S. military subsidizes the cost of its child care, military families actually pay on average 25 percent less for child care than do nonmilitary families. And 95 percent of all military child care centers (compared with 8 percent of civilian child care centers) meet the accreditation standards developed by the National Association for the Education of Young Children (NAEYC).

Source: Campbell et al., 2000; see also Zellman and Johansen 1998.

exception to this pattern. Among families using child care centers, the working poor and those whose incomes hover just above the poverty line receive poorer-quality care than either families living in poverty or families with solidly middle and upper incomes (NICHD Early Child Care Research Network, 1997c; Phillips et al., 1994). This findings appears to be based

on differential access to child care subsidies and programs such as Head Start and other publicly subsidized arrangements that are available to the very poor, but not to families with somewhat higher incomes. Quality of care in these programs is significantly higher than in other community-based child care centers (Layzer et al., 1993; Phillips et al., 1994; Whitebook et al., 1990).

The link between subsidized care and quality care is not surprising in light of estimates of what it costs to provide high-quality care. The cost of providing accredited center-based child care was estimated at $6,764 per child per year (in 1998 dollars) (U.S. General Accounting Office, 1990). A more recent analysis of the cost of care in Air Force child care centers, about 90 percent of which are accredited, estimated the per hour cost at $3.86 per child in 1997, which would amount to over $7,000 per year for 50 weeks of full time care (U.S. General Accounting Office, 1999). The average cost per child of Head Start was $5,021 in 1998—a largely part-day program serving 3 to 5 year olds for 34 weeks a year.

The most thorough analysis of who pays the costs of center-based care (similar analyses are not available for other forms of care) found that parent fees cover less than half the full cost of care (Helburn, 1995). A third of the costs (in 1993) was paid by federal and state governments and other subsidies and contributions. Even though some parents do not pay for child care, it represents a substantial financial burden to those who do pay and, in particular, to those who have meager incomes and lack subsidized care. This is not a small group. The vast majority of children with working mothers and family incomes below 200 percent of the poverty line receive no or almost no federal subsidies for their child care (U.S. Council of Economic Advisers, 1997). In 1998, only 15 percent of the children eligible for the Child Care and Development Fund—the major source of federal child care assistance for low-income families—actually received help (U.S. Department of Health and Human Services, 1999d).

Child care expenses are often the second or third largest item in a low-income working family's household budget. Families with meager incomes not only spend substantially more of their income, but also are priced out of higher-cost forms of care, namely centers and many licensed family day care homes (U.S. Department of Health and Human Services, 1999d). While the type of care selected is often a matter of personal choice, there is growing evidence that, without access to subsidies, low-income parents are often precluded from enrolling their children in more expensive center-based and other arrangements. In addition, a high proportion of low-income mothers (41 percent; U.S. Bureau of the Census, 1997) who work non-day shifts are largely precluded from using centers and regulated family day care homes (Hofferth, 1995; National Research Council and Institute of Medicine, 1995b; Siegel and Loman, 1991). Another constraint is the low supply of center-based and other arrangements in low-income neighborhoods (Queralt and Witte, 1998).

In sum, the child care that is available to parents with young children is highly variable in quality, unlikely to offer stability, and supported primarily by parent fees. Several comprehensive studies have now reported that a sizable minority of children receive substandard care, and two federal investigations have found rampant safety and health violations in regulated programs. There is an immense range in quality. The higher-quality programs are inequitably distributed and often beyond the reach of families with meager incomes, unless they are poor enough to receive heavily subsidized care and can adjust their work schedules to accommodate these arrangements. Finally, it is critical to recognize that prevailing fees for child care depend heavily on child care providers' low wages, which often fail to reflect their education attainment—a situation that fuels extremely high rates of turnover and instability for children and their parents.

CARE FOR CHILDREN WITH DISABILITIES

Data from the U.S. Bureau of the Census indicate that nearly 4 percent of households included a preschooler with a disability (Brandon, 2000). Like all families with young children, those whose children have a disability or special health care need are faced with the challenges of finding good-quality, affordable child care. But the inability or unwillingness of many child care providers to accept children with disabilities (Berk and Berk, 1982; Chang and Teramoto, 1987), compounded by transportation and other logistical problems, difficulties with coordinating early intervention and child care services, and the scarcity of appropriately trained caregivers (Kelly and Booth, 1999; Klein and Sheehan, 1987) make the effort a tremendous challenge for these families.

Little is known about patterns of child care usage or the quality of care received by children with disabilities. Available evidence suggests that children with disabilities begin child care at older ages, are enrolled for fewer hours, are more likely to be cared for by relatives, including fathers, and less likely to be in child care centers than other children (Booth and Kelly, 1998; Brandon, submitted; Landis, 1992; Warfield and Houser-Cram, 1996). One study reported that approximately 60 percent of infants with disabilities were receiving relatively high-quality care. Moreover, the children in higher quality care had more advanced motor development and higher adaptive behavior scores than children staying at home with their mothers at 30 months of age (Booth and Kelly, 1998, 1999; Kelly and Booth, 1999). Other studies have also reported benefits to children with disabilities that results from child care, as well as benefits to their families (Guralnick, 1976; Ispa, 1981).

In sum, little is known about the conditions that support or hinder disabled children's access to care, their experiences in care, or how factors such as the type or severity of the disability or the family circumstances affect these issues. Even less is known about these issues from the perspective of child care providers, for whom anecdotal reports are beginning to reveal serious concerns with respect to the administration of medical procedures, inadequate training, and even explicit fears about children with disabilities.

SUMMARY

A sizeable minority of parents care for their children during the earliest months and years of life without relying on others, despite the lost income that this may involve. For the many parents who do arrange for nonparental child care, it is reassuring that child care is not the inevitable risk factor that some have portrayed it to be, nor does it replace parents as the major influence on early development.

The basic elements of high-quality care closely resemble the qualities of good parenting. Children's needs for consistent, sensitive, and stimulating care transcend the difference between home and child care. Moreover, when children's home environments fail to offer them this care, child care environments that do provide it can protect and promote their early development. By the same token, poor quality child care can compound the consequences of problematic parenting.

When child care is of very high-quality, as is the case for model early intervention programs, the positive effects on developmental outcomes can endure into the early adult years, particularly for children from the poorest home environments. Apart from this evidence, the day-to-day quality of young children's lives is profoundly affected by the quality and continuity of their experiences in child care. Even small improvements in ratios and training, and relatively modest compensation initiatives, can produce tangible improvements in the observed quality of care.

The larger need is for communities to create more viable systems of child care. Such systems ensure safe and stimulating settings, actively promote and reward high-quality care, stem the tide of staff turnover, and enable parents at all income levels to avail themselves of quality care for their children (Kagan and Cohen, 1996; National Association of State Boards of Education, 1991; National Research Council, 1990).

Several comprehensive studies have report that a sizable minority of children receive substandard care, and two federal investigations found rampant safety and health violations in regulated programs.

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ENVIRONMENT #4: NEIGHBORHOOD AND COMMUNITY

- Evidence regarding the impacts of neighborhood conditions is complex and raises more questions than answers. For children outside inner cities, neighborhood conditions appear to be far less consequential for child development than conditions within the family. Population-based studies are consistent in showing more variation in achievement, behavior, and parenting within than across neighborhoods. Perhaps neighborhoods matter most when other risk factors are present, such as family poverty or mental health problems.

- The combination of family poverty and neighborhood poverty poses a double risk to a substantial number of children.

- For children living in dangerous environments, neighborhood conditions may matter a great deal.

- Experimental evidence suggests that moving from high-poverty to low-poverty neighborhoods enhances physical and psychological health of children and reduces violent crimes committed by adolescents.

Children who experience both family and neighborhood poverty are at greater risk than those who experience only family poverty. High-poverty urban settings have grown substantially in size in recent years. The fraction of poor urban families living in high-poverty neighborhoods (i.e., with 40 percent or more of residents in households with incomes below the poverty line) nearly doubled, from 17 percent in 1970 to 28 percent in 1990 (Kasarda, 1993). Black and Hispanic children are more likely to live in high-poverty urban neighborhoods than white children (Kasarda, 1993). While most poor children do not live in high-poverty urban neighborhoods, the combination of family and neighborhood poverty is much more prevalent among black children than either Hispanic or white children. Some 27 percent of poor black children live in high-poverty urban neighborhoods, compared with 20 percent of Hispanic and only 3 percent of white children. These children thus experience the double risk of family and neighborhood poverty.

NEIGHBORHOOD CONDITIONS AND CHILD DEVELOPMENT

Evidence concerning the extent to which neighborhoods affect child development is mixed. Some researchers believe that

where children grow up can have effects on their development (Avenilla 2001), while others see much more limited effects (Shonkoff and Phillips, 2000). Although our understanding of the exact mechanisms at work is unclear, there is considerable circumstantial evidence that neighborhood and community factors do matter and that their influence is reflected in both family and individual behaviors. In a general sense, we know that families with time and resources may put considerable effort into checking out schools, parks, and general neighborhood characteristics before moving into a particular neighborhood or community. More specifically, we know that at the neighborhood level factors such as higher rates of poverty are often, but not always, associated with a host of child health, developmental and social problems such asthma, low birth weight, domestic violence, child maltreatment, slower cognitive development, behavior problems, teenage childbearing and juvenile delinquency (O'Brien Caughy, 1999).

Information on the importance of neighborhoods for early childhood development, however, is very limited. Much of the literature is devoted to studies concerning adolescents living in high-poverty urban settings where serious problems are manifest. Furthermore, although most low-income families do not live in high-poverty urban settings, national census data suggest that the concentration of poor families into these areas has been growing. This concentration of poverty within urban areas in recent decades has been especially true among black and Hispanic families (Shonkoff and Phillips, 2000).

Numerous theories to understand the effects of neighborhoods on child and adolescent development have been proposed and summarized (Earls and Buka, 2000, Shonkoff, 2000; Phillips, 2000). These theories generally fall into four categories:

- Stress theory, which emphasizes the importance of exposure to violence or environmental toxins such as lead or air pollution

- Social organizational theory, based on the importance of role models and value consensus in the neighborhood, which in turn limits and controls problem behaviors

- Institutional explanations, which focus on such factors as the presence and quality of schools, libraries, police, programs for children and youth

- Epidemic theories, which are based on the power of peer influences to spread problem behaviors.

A stressful physical or social neighborhood environment may be very important with respect to early childhood development in several ways. Toxins such as lead which are often more commonly associated with older and poorer housing may result in cognitive impairment. Some poor communities may

be at risk for other environmental risks because they are close to heavy industry, major highways, or hazardous waste sites which may discharge or release many hazardous substances. Asthma, which is linked to poor air and housing quality, for example, is much more common in poorer communities than in more affluent areas. With respect to social issues such as crime and violence, studies which have examined the effects of witnessing or experiencing violence among children and adolescents show that these children and adolescents are more likely to exhibit symptoms of depression, anger, anxiety, dissociation, and post-traumatic stress (Singer 1995). Other studies have linked many of these symptoms to school failure, reduced interest in play, and suicidal ideation.

Social organization within a neighborhood is also considered important by some researchers. For example, the more parents know each other, the more easily they may be able to monitor the behaviors of neighbors' children (Sampson, 1992; Sampson and Groves, 1989). Contact among parents may lead them to share ways of dealing with the problem behavior of their children, encouraging their talents, connecting to community health and other resources, and organizing neighborhood activities (Klebanov et al., 1997). Family management styles may also adapt to different environments. A family living in a "high risk" neighborhood, for instance, may be more restrictive of children's activities due to their concerns for safety. Many aspects of social organization have been grouped under the general heading of social capital, which generally denotes the existence of formal and informal resources and social networks that are available to promote the community's good. Collective efficacy is another term that is used to describe a community's active sense of engagement on the part of residents and their ability to bring about intended changes in their community (Sampson, 2001).

Institutions such as schools, libraries, community centers, and children's programs may also play an important role in child development. The availability of programs—such as early educational intervention during preschool years and programs that provide comprehensive education, family, and health services to families with young children—has been demonstrated to be effective in promoting high school completion and reducing school dropout and juvenile delinquency (Reynolds 2001). Parents' perceptions about neighborhood safety are especially relevant here, however, since their willingness to take advantage of neighborhood resources may depend on how safe they feel going to the institutions where such programs are offered.

Epidemic theories of neighborhood influence on child development generally describe the extent to which children model behaviors of peers and adults. Although peer and adult interactions may be more frequent for older children and adolescents, very young children may also have considerable interaction with adults and other children in settings such as child care, preschool, religious institutions, and in interactions with other family members and neighbors (Shonkoff and Phillips, 2000).

EVIDENCE OF ASSOCIATION

Determining the actual extent to which neighborhoods influence child and adolescent development is very difficult. Several studies have found more variation of factors within neighborhoods at the family or individual level than between neighborhoods. This does not necessarily mean that neighborhoods are not important. One subtle but serious problem inherent in studying this association is the fact that families are not randomly assigned to neighborhoods. Parents make decisions on where they will live, where and how much to work, and whether to place their child in day care. Moreover, the choices parents make may be greatly influenced by their socioeconomic status and other factors such as discrimination. This complication means that researchers might mistakenly attribute effects to neighborhood factors that are really caused by unmeasured differences in children's parents and their choices. For example, families with young children tend to be highly mobile, with about one-fourth of young children ages 1 to 5 moving to a new home in the course of a year (Shonkoff and Phillips, 2000).

The availability of programs such as early educational intervention during preschool years and programs that provide comprehensive education, family, and health services to families with young children have been demonstrated to be effective in promoting high school completion and reducing school dropout and juvenile delinquency.

Most evidence from broad-based studies of neighborhood effects on young children indicates that there are many more differences in families and children within neighborhoods than between them (Klebanov et al., 1997; Darling and Steinberg, 1993). Neighborhood factors also do not account for much of the variation in parental mental health or family management practices (Klebanov et al., 1994; Furstenberg et al., 1999).

The study of Sampson, Raudenbush, and Earls (1997) provides important evidence of an association between neighborhood "collective efficacy" and neighborhood problems. This potentially important component of a neighborhood's social organization was measured by conducting a survey of adult residents in sampled neighborhoods. The measure combines social cohesion (the extent to which neighbors trust each other and share common values) with informal social control (the extent to which neighbors can count on each other to monitor and supervise youth and protect public

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order). The study found that collective efficacy relates strongly to neighborhood levels of violence, personal victimization, and homicide in Chicago.

More specialized studies that focus on high poverty neighborhoods suggest a greater potential for effects on children. In a sample of patients in a Boston pediatric clinic, researchers found that 1 in 10 children witnessed a violent event prior to age 6 (Taylor et al, 1992). Other researchers estimated that about 1 in 4 urban youths reported having seen someone murdered during childhood (Buka and Birdthistle, 1997; Buka et al., 2001). There are no corresponding figures for children raised in higher-income neighborhoods. Psychiatric problems ranging from post-traumatic stress and aggression to externalizing behavioral disorders are more common among children and youth who witness violence (Singer et al., 1995). Neighborhood violence may also have indirect effects on development if mothers in physically dangerous neighborhoods restrict their children's interactions with peers and adults (Lipsey and Wilson, 1993).

Among physiological hazards, lead poisoning continues to be a threat to child development, and disproportionately to low-income children of color living in central cities. Excess lead in blood is tied to such neurobehavioral problems as attention deficits (Brody et al., 1994). Epidemiologists have linked the elevated levels of lead in poor urban children to old housing, which often still contains lead-based paint and other environmental contaminants, such as leaded gasoline. Despite the discontinuation of leaded gasoline in the 1980's, soil with elevated levels of lead remains in central cities that are heavily congested with traffic (Mielke et al., 1997).

EXPERIMENTAL EVIDENCE

Two studies that looked at the effects of low-income family relocation programs demonstrated significant effects on children's well-being in Chicago and Boston (Shonkoff and Phillips, 2000). These studies included families living in low-income housing projects who obtained subsidized housing in more affluent neighborhoods. The Chicago study showed positive effects for adolescents in terms of lower school drop-out rates and higher college enrollment (Rosenbaum 1991). In Boston, positive effects for children between the ages of 6 and 15 were reported, including lower rates of violence and health and behavior problems (Katz et al., 1999).

SUMMARY

Although neighborhood effects on child development are difficult to measure, neighborhood environment does seem to matter. The impact, however, may be much greater for children living in more dangerous areas where factors such as crime, violence, and environmental toxins may be more concentrated and, therefore, deleterious in their effects. For children living outside the nation's inner cities, neighborhood conditions appear to be far less consequential for children's development than conditions within the family. Helping low-income families move out of high poverty neighborhoods may have positive effects, but the effects of changes to neighborhoods themselves, however, are less well-understood and documented.

ENVIRONMENT #5: EARLY INTERVENTIONS

KEY CONCEPTS

- Generally speaking, well-designed early interventions that are child-focused produce immediate gains on standardized developmental measures, most commonly IQ scores. These findings have been replicated in multiple studies of children living in a variety of adverse circumstances and with a wide range of diagnosed disabilities. The largest benefits are typically found in model demonstration projects with high costs per child. High-quality interventions bring economic benefits to individuals and the general public.

- For poor children, the short-term benefits of higher IQ typically fade out during middle childhood, but persistent intervention-control group differences favoring those who receive early services have been documented in academic achievement, retention in grade, and referral for special education.

- Long term follow-up data on poor children provide some evidence of intervention-control group differences in high school graduation, employment, dependence on public assistance, and involvement in crime.

- Family-focused interventions: The measurable effects of parent-focused interventions on standardized child development scores in economically disadvantaged families are less conclusive than for families of children with cognitive, language, or sensory impairments.

- There is little empirical documentation that nonspecific, general family support programs for high-risk families, which typically are less expensive to deliver, have significant impacts on either parent behavior or assessed child performance.

- There is considerable support for model programs that deliver carefully designed interventions with well-defined goals in terms of affecting both parenting behavior and the developmental trajectories of children who suffer socioeconomic disadvantage, family disruptions, or diagnosed disability. Combining the child-focused educational activities with explicit attention to parent-child interaction and relationship-building has the greatest impact.

What is the best way to support and optimize the development of young children? Adults, families and communities struggle with this question. It becomes even more complex as we consider that family privacy and self-reliance are highly prized in U.S. society. These factors can limit the role of the broader community and significantly limit the amount of government involvement and investment in early childhood programs.

THE CONCEPT OF EARLY INTERVENTION

Early childhood intervention encompasses a diverse array of services, ranging from broad, community-based prevention and health promotion programs to specific programs that may target children experiencing a range of conditions from developmental or physical disability to parental mental health or substance abuse concerns. Services may be delivered in the home or at a center and may focus on either the child or the parent or both. This range, variety and breadth of programs make it difficult to capture a complete picture of just what early intervention is. While specific services such as language or physical therapy may be the most effective "early intervention" for a child experiencing developmental or physical delay or disability, for a child affected by parental substance abuse or economic despair, changing the larger socio-economic environment in which they live may be the most effective intervention.

RESEARCH, EXPERIENCE AND CURRENT PRACTICE

A wide diversity in models and target populations, and consequent lack of comparable outcomes, limit the ability to draw significant conclusions from empirical research. However, some of the core findings that have emerged from available research and evaluation include:

- Short term effects on the cognitive development of young children living in high-risk environments are greater when the intervention is goal-directed and child-focused in comparison to generic family support programs (Farran, 2000; Guralnick, 1998).

- Measured short-term impacts on the cognitive and social development of young children with developmental disabilities are greater when the intervention is more structured and focused on the child-caregiver relationship, although the effects are highly variable in view of the marked diversity of child impairments and their severity (Farran, 2000; Guralnick, 1988, 1998; Shonkoff and Hauser-Cram, 1987).

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- Short term IQ gains associated with high-quality preschool interventions for children living in poverty typically fade out during middle childhood, after the intervention has been completed. However, long-term benefits in higher academic achievement, lower rates of grade retention and decreased referral for special education services have been replicated (Barnett, 1995; Karoly et al., 1998; Lazar et al., 1982).

The variability of program design, staffing and evaluation make it difficult to compare outcomes. In general, however, programs that have demonstrated the largest and longest-lasting cognitive gains have been administered to children with multiple risks and have offered the most intensive and long-lasting services. In addition, programs that offer both a parent and a child component appear to be the most successful in promoting long-term developmental gains for children from low-income families.

EFFECTS ON DEVELOPMENTAL OUTCOMES

For decades, researchers and service providers have struggled to identify and measure significant child outcomes. Those using IQ have found that there is a clear pattern showing short-term effects on standardized test performance. Specifically, a wide variety of services, both for children living in poverty and for those with biological vulnerabilities, demonstrate significant early gains that fade towards middle childhood (Campbell and Ramey, 1994; Lally et al., 1988; McCarton et al., 1997; Schweinhart et al., 1993; Walker and Johnson, 1988).

Increasing numbers of early childhood investigators and service providers criticize the conventional use of intelligence testing as an outcome measure because it relies on the use of a single instrument in standardized settings. As an alternative, critics have suggested greater focus on assessing the processes of social and emotional development. Among the potential target areas for greater attention in measuring program effects, three are particularly noteworthy: self-regulation (Barton and Robins, 2000; Field, 1979; Goldberg et al., 1980), interpersonal skills and relationships (Brooks-Gunn et al., 2000; Kelly and Barnard, 2000; Zeanah et al., 2000), and knowledge acquisition of skills and problem-solving abilities. As yet, the program evaluation literature in these new domains of interest is extremely limited.

Measuring school achievement provides another set of criteria by which the effect of early intervention services may be examined. Beginning with the data syntheses of the Consortium for Longitudinal Studies (Lazar et al., 1982) early childhood researchers in growing numbers have looked beyond the disap-

pointing fade-out of early IQ effects after the intervention is completed, focusing increasingly on intervention-control group differences in school achievement during middle childhood and adolescence. Results are not universal but generally show that early intervention services for children living in poverty that are provided during the first five years of life can reduce subsequent rates of grade retention and use of special education services in middle childhood.

Once again, the literature demonstrates positive program effects but the patterns are variable and not found universally. Taken together, the following body of literature provides abundant evidence of intervention-control group differences in academic achievement during middle childhood, but no consistent or distinctive pattern of advantage associated with a particular type of preschool curriculum or program format (Abcdarian Project, Campbell and Ramey, 1994, 1995; Perry Preschool, Schweinhart et al., 1993; Parent-Child Development Centers, Johnson and Walker, 1991; Infant Health and Development Program, McCarton et al., 1997).

A few early childhood interventions have followed their samples into the adolescent and adult years. In the High/Scope Perry Preschool Program, children were randomly divided into a program group, who received a high-quality, active learning preschool program, and a no-program group, who received no program. Graduates reveal statistically significant differences at age 27, favoring the intervention group over the controls in income and in rates of high school graduation, criminal arrests, and welfare participation, but no differences in teen pregnancy (Schweinhart et al., 1993). Intervention-control group differences in anti-social behavior and criminal behavior also were reported for the Syracuse Family Development Research Program (Lally et al., 1988) and for the follow-up of graduates of the Elmira Prenatal/Early Infancy Project (Olds et al., 1998a).

The Abecedarian Project was a carefully controlled study in which infants from low-income families were randomly assigned to receive early intervention in a high-quality child care setting and other infants were in a non-treated control group. The treated children received full-time educational intervention from infancy through age 5. Each child had an individual prescription of educational activities consisting of games that were incorporated into his or her day. These activities addressed social, emotional, and cognitive development but gave particular emphasis to language. Treated children scored significantly higher on tests of reading and math from the primary grades through middle adolescence. At age 21, measures of cognitive functioning, academic skills, educational attainment, employment, parenthood, and social adjustment showed that those who had received the intervention were doing better.

The Chicago Child-Parent Center Program in 25 sites for urban low-income children provided comprehensive education, family, and health services and included half-day pre-school, half or full-day kindergarten, and school-age services. A 15-year follow-up revealed that children who participated had higher rates of high school completion, more years of completed education, and lower rates of juvenile arrest, violent arrests, and school dropout. These findings are among the strongest evidence that established programs administered through public schools can promote children's long-term success (Reynolds et al, 2001). In a recent cost-benefit study (Reynolds et al, 2002), the researchers found that attendance in the preschool program for 18 months—averaging a cost of $6,692 per child—generated a return to society of $47,759 per participant. This figure includes increased taxes on earnings due to educational attainment ($7,243), savings to the criminal justice system ($7,130), reductions in school remedial services ($4,652) and averted tangible costs to crime victims ($6,127). Overall, every dollar invested in the preschool program returned $7.14 in individual, educational, social welfare and socioeconomic benefits. Every dollar invested also generated $3.85 to the general public through government and crime-victim savings.

EFFECTS ON FAMILY MEDIATORS OF CHILD WELL-BEING

The relationships between children and the adults who care for them are agreed to be of primary importance. And we know that economic stressors coupled with high rates of depression and post-traumatic stress in mothers living in poverty can lead to diminished parenting behaviors and poorer developmental outcomes. Several interventions in the area of parent-child relationships and enhanced home environments have been assessed. The evidence supporting potential positive impacts of programs to strengthen parent-child interaction is encouraging. Brooks-Gunn and her colleagues (2000) reviewed 24 parent-focused programs and found that 17 of the 20 that assessed parent-child interactions or relationships documented significant intervention effects.

One of the most well-documented findings in the literature related to the strong correlation between family socio-economic status and child health and development is that children in families with lower incomes and lower maternal educational attainment are at risk for a variety of poorer outcomes, including school failure, learning disabilities, behavior problems, mental retardation, developmental delay, and health impairment (Aber et al., 1997; Chase-Lansdale and Brooks-Gunn, 1995; Duncan and Brooks-Gunn, 1997, Huston, 1991;

McLoyd, 1998). Particularly vulnerable are poor children who are members of racial or ethnic minority groups (McLoyd, 1990; Shonkoff, 1982). As a source of risk, the home may reflect an atmosphere of disorganization, neglect, or frank abuse. As a source of resilience and growth promotion, it is characterized by regular daily routines and both a physical and a psychological milieu that supports healthy child-caregiver interactions and rich opportunities for learning. Positive effects of parent focused interventions have been documented in several program evaluations (Brooks-Gunn et al., 2000; Andrews et al., 1982; Bradley et al., 1989; Field et al., 1982; Wasik et al., 1990).

The quality of daily family life (e.g., emotional well-being, level of personal control, life satisfaction, and interpersonal relationships) serves as another important protective or risk factor for both child and family outcomes (Crnic et al., 1983; Sameroff et al., 1987). The protective influences of family cohesion, as well as the adverse impacts of family violence and parental mental illness, are particularly significant. Maternal depression or substance abuse, for example, presents a major threat to child health and development (Bauman and

Dougherty, 1983; Downey and Coyne, 1990; Field, 1995; Lester et al., 2000; Mayers, 1995; Seifer and Dickstein, 2000). Similarly, children who witness family violence or who are victims of physical abuse directly experience significant consequences, such as psychosomatic disorders, anxiety, fears, sleep disruption, excessive crying, and school problems (Cicchetti and Toth, 1995; Osofsky, 1995; Pynoos et al., 1995; Scheeringa et al., 1995). While few early childhood intervention programs include sufficient professional expertise to treat serious parent or family psychopathology, limited data suggest that attention to such needs may be fruitful (Barnard et al., 1988; Booth et al., 1989).

EFFECTS ON COMMUNITY MEDIATORS OF CHILD WELL-BEING

Community factors leading to poorer outcomes, indicating a need for community level interventions, include threats to physical health and safety, threats to social and educational opportunity, and severe deprivation. Racism and other forms of discrimination based on ethnic status, social class, or the presence of a developmental disability, for example, lead to both overt and subtle messages of social exclusion that can have significant debilitating effects on a young child's emerging sense of self (Garcia Coll and Magnuson, 2000; Stoneman,, 2001). Protective community factors include supportive social networks for families, inclusive community settings, and family-friendly social policies. Although the potential effects of community-level variables on child health and development have been well described, their explicit measurement in early intervention impact studies has been limited, and the extent to which they are amenable to change is unclear (Duncan and Raudenbush, 1999; Earls and Buka, 2000; Manski, 1993)

LESSONS LEARNED

Keeping in mind the difficulty in assessing effective interventions due to the diverse nature and limited evaluation to date, several essential features of effective interventions deserve closer attention. These include:

- **Individualization of service delivery:** Interventions that are tailored to specific needs have been shown to be more effective in producing desired child and family outcomes than services that provide generic support (Brooks-Gunn et al., 2000; Farran, 1990, 2000; Guralnick, 1998).

- **Quality of program implementation:** Many early intervention programs have suffered from a lack of adequate resources and a shortage of highly trained staff, leading to great variability in the quality of services delivered. The impact of quality has been particularly important for children from families who bear the burden of multiple risk factors (Currie, 2000; Peisner-Feinberg and Burchinal, 1997). The research literature on child care provides abundant evidence of the positive correlation between quality of care and developmental outcomes for children (Lamb, 1998; Love et al., 1996; Scarr and Eisenberg, 1993; and Smith, 1998).

- **Timing, intensity and duration of intervention:** While programs of longer duration and higher intensity have been associated with more positive outcomes, the outcomes seems to be dependent on a number of factors. These include whether the child has any special conditions and what those conditions are; what the specific characteristics of the target population are; and the degree to which families are able to incorporate specific techniques into their everyday life.

- **Provider knowledge, skills and relationship with family:** Well-trained, qualified teachers and staff are clearly linked with better child outcomes in study after study. This is particularly true for low-income children who are at risk for early developmental problems and later educational underachievement (Lamb, 1998). Shortages of well-trained and qualified providers, along with increasing pressure to do more with less, present enormous challenges in staffing programs. Children living in impoverished or disorganized environments are presumed to need compensatory, enriching experiences, and their parents are generally presumed to need help in addressing basic child-rearing needs.

- **Family-centered, community-based, coordinated orientation:** Although the empirical evidence for these concepts is thin, the theoretical and experimental support is strong. The essential features of a family-centered approach include (Turnbull et al., 2000):

  1. Treating families with dignity and respect, particularly regarding their cultural and socioeconomic characteristics;

  2. Providing choices that address family priorities and concerns;

  3. Fully disclosing information so that families can make informed decisions; and

  4. Providing support in a manner that is empowering and that enhances parental competence.

- **Costs and making choices among early childhood investments:** Since the early 1980s health and human service providers have been challenged to demonstrate the cost-effectiveness and cost-benefit of services. This has been particularly challenging given the relative lack of rigorous program evaluation in the early intervention field and the practical and ethical difficulties of such evaluations.

SUMMARY

Well-designed early interventions that are child-focused produce immediate gains on standardized developmental measures, most often IQ scores. However, for children at risk due to low socioeconomic status, the short term benefits of higher IQ scores generally fade out during the middle childhood years. The measurable effects of parent-focused interventions on standardized child development scores in economically disadvantaged families are less conclusive. There is little documentation that non-specific, general family support programs for high risk families, although less expensive to deliver, have significant impacts on either parent behavior or assessed child performance. Programs that combine child-focused educational activities with attention to parent-child interaction patterns and relationship building appear to have the greatest impacts.

The central question remains, however, of how different types of interventions influence specific outcomes for children and families who are experiencing different opportunities and vulnerabilities. Evaluators must weigh the strategies, acceptability, quality and cost-benefit as they consider this question.

A fundamental challenge facing the nation is to find an appropriate balance between long-term investment in human development and the moral responsibility to ensure that the quality of life for young children does not fall below a minimum level of decency. In other words, certain services are considered worthy of support because they generate significant long-term gains. Other programs are essential not because they result in later financial benefits but because they reflect society's commitment to those who are most vulnerable.

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APPENDIX I

NATURE, NURTURE AND CULTURE

THE DEVELOPING BRAIN

NATURE, NURTURE AND CULTURE

NATURE AND NURTURE

Beginning at the moment of conception, hereditary potential unfolds in concert with the environment. The dynamic interplay between gene action and environmental processes continues throughout life. Although their influences are so often distinguished in ancient philosophy and modern science, the inseparability of nature and nurture has profound implications for how we study and understand human development.

Virtually all contemporary researchers agree that the development of children is a highly complex process that is influenced by the interplay of nature and nurture. The influence of nurture consists of the multiple nested contexts in which children are reared, including their home, extended family, child care settings, community, and society, each of which is embedded in the values, beliefs, and practices of a given culture. The influence of nature is deeply affected by these environments and, in turn, shapes how children respond to their experiences.

In simple terms, children affect their environments at the same time that their environments are affecting them. Moreover, no two children share the identical environment, and no environment is experienced in exactly the same way by two different children. The transactional-ecological model of development provides a useful framework that moves far beyond the misleading and tired old nature-nurture debate. It helps people think in more sophisticated ways about the complex determinants of successful adaptation and health as well as those of maladaptation and disorder (Sameroff and Chandler, 1975; Bronfenbrenner, 1979; Horowitz, 1999).

Children vary in their behavioral style. Some are high-strung and some are laid-back; some are agile and some are clumsy.

Children are raised in a wide variety of social circumstances and cultural contexts. Some conditions are secure and others are unstable; some encourage competition and others promote cooperation. Behaviors that are highly adaptive in one society (e.g., competitiveness among preschoolers in the United States) may not be so in another (e.g., individual assertiveness among preschoolers in Japan). Different childrearing environments promote distinctive patterns of skill development (e.g., some may reinforce active, physical performance while others encourage quiet, artistic expression).

Environmental influences are not just external: a child's responses to the family, the neighborhood, and the culture

Virtually all contemporary researchers agree that the development of children is a highly complex process that is influenced by the interplay of nature and nurture.

hinge to a great extent on genetically based ways of feeling, interpreting, and responding to environmental events. For parents and other caregivers, this underscores the importance of taking into account each child's individuality in order to create conditions of care that accord with the child's inherited attributes.

Children who inherit vulnerabilities do not always manifest them because of positive experiences in their environments. That is why early negative experiences of abuse, neglect, poverty, and family violence are of such concern. They are likely to enlist the genetic vulnerabilities of some children into a downward spiral of progressive dysfunction. By contrast, when children grow up in more supportive environments, the hereditary vulnerabilities that some children experience may never be manifested in problematic behavior.

Giving young children a good early start increases but does not guarantee later success, and children who begin life at a disadvantage are not doomed to enduring difficulty. The interaction of nature and nurture underscores the importance of creating current conditions of care that respect inherited characteristics, recognizing that nature-nurture is a source of continuing potential change across the life course.

CULTURE

Culture influences every aspect of human development and is reflected in childrearing beliefs and practices designed to promote healthy adaptation. The influence of culture on the rearing of children is fundamental and encompasses values, aspirations, expectations, and practices. Understanding this is central to efforts to understand the nature of early experience, what shapes it, and how young children and the culture they share jointly influence each other over the course of development. The effects of culture are pervasive. It prescribes how and when babies are fed, as well as where and with whom they sleep. It affects the customary response to an infant's crying and a toddler's temper tantrums. It sets the rules for discipline and expectations for developmental attainments. It affects what parents worry about and when they begin to become concerned. It influences how illness is treated and disability is perceived. It approves certain arrangements for child care and disapproves others. In short, culture provides a virtual how-to manual for rearing children and establishes role expectations for mothers, fathers, grandparents, older siblings, extended family members, and friends.

One of the most extensively studied examples of contrasting developmental values is the difference between cultures that

promote individualism (found mainly in European and European-American societies) and those that favor interdependence (reflected most predominantly in Asian, African, and Latin American societies) (Greenfield, 1994; Greenfield and Suzuki, 1998; Markus and Kitayama, 1991; Triandis, 1988). Those that place greater emphasis on the former socialize their children in a way that promotes a greater sense of independence and a strong orientation toward individual achievement and self-fulfillment. Those that favor the latter socialize their children to focus on the importance of their responsibilities to others and the value of viewing personal achievements in terms of their contribution to collective goals. Neither orientation is intrinsically more adaptive or more "normal" than the other. Each reflects the desire for a certain kind of society, with both benefits and costs. When greater emphasis is placed on interdependence, there is a stronger sense of connectedness, sharing, and solidarity, but there may be a real cost in the form of suppression of individual development. When greater autonomy and self-reliance are promoted, there is often a considerable level of material productivity and individual liberty but there may be a serious cost in the form of strained relationships and social alienation (Kim, 1987).

In the United States, where autonomy and independence are highly valued traits, most children sleep alone in a separate room away from their parents (Abbott, 1992; Lozoff et al., 1984; Morelli et al., 1992). In most of Asia, Africa, and Latin America, where interdependence and solidarity are preferred, children routinely sleep with one or more of their parents or siblings, even when separate rooms are available (Caudill and Plath, 1966; Konner and Worthman, 1980; Shweder et al., 1995). There is also considerable subgroup variability within the United States, with evidence that very few babies under one year of age in white, urban, middle-class, two-parent families sleep in their parents' bedroom in contrast to much higher rates of parent-child cosleeping for black children in similar urban areas (Litt, 1981). In a predominantly white, blue-collar community in Appalachia, cosleeping is as high as 71 percent of children between 2 months and 2 years of age, and 47 percent between 2 and 4 years (Abbott, 1992).

Given the magnitude of its influence on the daily experiences of children, the relative disregard for cultural influences in traditional child development research is striking. The literature on typical development is based overwhelmingly on studies of middle-class children of European-American ancestry, often involving samples drawn from university communities. In contrast, much of the research on children of color has focused on the impacts of poverty, drawing its samples from homogeneous communities in high-risk urban environments. Moreover, relatively little is known about the impacts of racism and other forms of systematic discrimination on early childhood development, independent of the adverse effects of low maternal education and socioeconomic status. Consequently, knowledge of the full range of environmental influences on young children and their relation to typical variations during early childhood is highly skewed and incomplete. Similarly, the ability to disentangle the confounding impacts of economic hardship and minority group status is severely compromised (Garcia Coll and Magnuson, 2000).

As children grow up, they are not simply passive products of the culture in which they are reared. Quite the contrary, they are active agents who pick and choose selectively from among the influences to which they are exposed, thereby shaping their own distinctive cultural context over time (Miller and Goodnow, 1995). Fundamental to this concept is the increasing recognition that cultures themselves are also dynamic and continually modified by the people who experience them. This phenomenon is most obvious in the acculturation of immigrant children, as they navigate the borders between their native and adopted cultures. It is also very visible in any society during times of social change.

The significant social and economic transformations that affected U.S. society over the past few decades provide vivid examples of powerful influences on the lives of children and families. Increases in maternal employment and greater utilization of nonparental child care, for example, have dramatically altered the daily life experiences of infants and toddlers by introducing a greater variety of adult relationships and earlier exposure to organized peer group activities. The proliferation of early childhood enrichment activities and intense competition for admission to prestigious preschool programs for children from affluent families have increased performance demands within the relatively narrow range of competencies at increasingly younger ages. The considerable amount of time that toddlers and preschoolers spend watching television and playing with video games have transformed the nature of imagination and play during the preschool years.

The influence of cultural context on early childhood development is widely acknowledged. The literature in this area, however, is underdeveloped. This weakness in the knowledge base is particularly problematic in view of the increasing racial and ethnic diversity of the population of the United States. In short, the basic concept is compelling, the database is thin, and the imperative for extensive research is clear.

THE DEVELOPING BRAIN

The brain is a remarkable organ that orchestrates our movements, communication, relationships, intellect, and learning to allow a complex spectrum of interactions with the world around us. Fascination with how we gain these capacities is not new. However, new technologies and research are giving us a clearer picture of the workings of the brain. Over the past 20 years there has been unprecedented progress in understanding brain development. These insights are creating renewed interest in young children's learning and well-being. And well they should. The organization and function of the human brain is subject to the effects of both nature and nuture, and may be adversely affected by genetic and environmental influences that can whittle away at the maximal achievement and life satisfaction of individuals.

WHAT IS BRAIN DEVELOPMENT?

What happens during the prenatal period and in the first three years of life has a major impact on brain development. At birth the infant's brain is the most undifferentiated organ in the body and is still very much a work in progress. A newborn's brain is only about one-quarter the size of an adult's brain, and grows to be 90% of an adult size by 5 years of age. One hundred billion brain cells (neurons) are present at birth, but the communication between them is still emerging. The way that brain cells connect and organize is an important factor in determining adult capabilities. Although the formation of connections (formally termed "synapses") continues to some extent throughout life, these connections are being richly created and 'pruned' during the early years of life. Pathways that are used consistently are strengthened, and those unused or rarely used pathways are less richly interconnected within the brain or are removed.

There are a few critical periods in brain development during which impairment of stimulation of the nerve pathways will forever limit functioning (e.g. vision development during infancy and preschool years). Fortunately, however, for most aspects of brain development remarkable "plasticity" (the ability to change) remains, thus allowing for continued learning and adaptation throughout the life span. The window is not closed at age five! Plasticity, however, is a double-edged sword. The developing fetus and young child are receptive to positive influences and vulnerable to harm (environmental deprivation of multiple types, toxic exposures, etc.). Early brain development is clearly promoted by nurturing adults. At the same time, there is suggestive evidence that young children may be particularly vulnerable to very detrimental experiences from aberrant caregiving and serious economic hardship.

It is important to recognize that the brain is particularly absorbent during the early years of life and the number of brain connections made depends on the richness and variety of experiences to which a child is exposed. However, early evidence is emerging that overly stimulating environments may also be harmful. There is little scientific evidence that special stimulation activities above and beyond normal growth-promoting experiences lead to 'advanced' brain development in infancy.

In addition to the hard wiring (neurons and their connections via dendrites and synapses), there are over sixty chemicals that have been identified as active messengers in the brain. These neurochemical systems in the brain can be changed by the environment. For example, there is evidence in rats that the licking and grooming of an offspring by the mother increases the production of serotonin and thyroid hormone. Both of these compounds are important in the neurochemistry of brain development. In another example, the fats and sugars in breast milk stimulate taste receptors that are linked to natural opioid (painkiller) pathways in the brain, thus stimulate mild analgesia. Touch around the mouth, e.g. while feeding, stimu-

lates neurochemicals that affect brain pathways controlling distress. The brain is able to alter its sensitivity to a chemical messenger resulting in greater or lesser sensitivity to the chemical messenger. This is achieved by a number of mechanisms, including changing the place where the chemical comes to rest (the receptor site), changing the amount of the chemical available, and even by directing changes in brain structure by way of nerve growth factors.

The brain's neurochemistry is exquisitely sensitive to behavioral and environmental stimuli. There is a lot of research on the effects of prenatal and perinatal environments (before birth and the first months of life) on the developing nervous system. Research is also beginning to elucidate the importance of environmental influences after the first few months of life. Early experiences can uniquely prepare the brain for later learning by laying the groundwork skills at a time when development is more responsive to stimulation. At the same time, absence of these early experiences may lead to permanent dysfunction because of the lack of a base upon which to build further abilities. Patricia Kuhl and her colleagues have shown that an infant focuses her attention to the unique sounds of her caregiver's native language during the second half of the first year of life, thus becoming more attentive to the native language sounds and losing the ability to distinguish sounds not in the native language but present in another language (Gopnik et al., 1999). This ability of the brain uniquely lays the receptivity for further development, in this case the comprehension and expression of the language of the child's primary culture.

ENVIRONMENTAL EXPOSURES AND BIOLOGIC INSULTS

Each of the following has been demonstrated to have detrimental effects on overall growth and development.

- Environmental deprivation and stress

- Chemicals/neurotoxins—alcohol, lead, tobacco, methylmercury, aluminum, polychlorinated biphenyls (PCBs), ionizing radiation

- Infectious diseases—e.g. congenital rubella, congenital cytomegalovirus

- Inborn errors of metabolism such as phenylketonuria

- Nutritional deficiency—e.g. decreased total calories, iron deficiency

- Preterm birth (prematurity)

Deprivation

There is accumulating evidence that environmental deprivation can adversely affect the development of offspring in ways ranging from conduct and attachment disorders seen in children raised in non-nurturing orphanages to sysmptoms of child neglect from environmental influences such as maternal depression or marked family stress. Failures of parenting can result in failure to thrive and the well documented 'psychosocial dwarfism' associated with abnormal secretion of human growth hormone from the child's pituitary gland. Removal from the problematic environment reverses the disorder and growth resumes, if done early enough. There are relatively few neuroscience studies of young children and studies of young animals are more prevalent, but require caution in applying results to humans. There is good evidence that rats raised in deprived environments have fewer synaptic connections, whereas, those rats raised in complex environments show much more complexity of many brain components. In addition, increasing the complexity of the environment before or after brain damage in developing and adult rats enhances recovery from impairments resulting from the injury (Kolb and Whishaw, 1998).

Stress

Stress resulting from marked *threats to physical or psychological well-being* can have dramatic effects on health and development. (Johnson et al., 1992). In animal studies, the biochemical changes induced by stressors that cause emotions such as fear and anxiety over time may lower the threshold for activating the fear-stress system (Makino et al., 1994). This appears to lead to an animal that more readily experiences fear, anxiety, and stress, as well as one that experiences more difficulty in dampening that response—looking much like post-traumatic stress syndrome. Studies in rats have shown that disruption of the maternal environment can affect the offspring's stress system, whereas doing things to the nest that result in better organized maternal behavior (e.g. predictable food sources) results in infant rats that develop into less fearful, less stress-reactive adults (Deneberg, 1999; Levine and Thoman, 1970). Harlow et al. (1971) and Young et al. (1973) found infant monkeys deprived of normal social stimulation grow into socially incompetent and fearful adults. Psychosocial risks that affect maternal behavior include poverty, family violence, and maternal depression. Supportive and nurturing caregiving can help protect offspring from these adverse outcomes.

Chemical and Neurotoxin Exposure

There are a number of substances that are currently known to have detrimental or direct toxic effects on the developing brain. Examples of some of the more common toxic substances include alcohol, lead, tobacco, cocaine, methylmercury, and excess chemicals associated with disorders of metabolism (specific genetic disorders) such as phenylalanine excess in phenylketonuria.

Fetal alcohol syndrome (FAS) and fetal alcohol effects (or alcohol-related neurodevelopmental disorder) provide a prime example of the evidence of adverse effects of a toxin on the brain and development. Abnormalities attributed to prenatal alcohol exposure fall along a continuum of severity, from miscarriage and stillbirth at one extreme to difficulties in speech development, motor development, and behavior problems. The toxic effect of alcohol comes from ethanol as well as its metabolites resulting in interference with cell migration as well as other indirect mechanisms. These toxic effects can occur with light, heavy and rare binge drinking episodes, as well as the more commonly recognized excessive regular intake of alcohol. Timing of exposure to alcohol during pregnancy, along with severity and chronicity of exposure are important considerations in understanding the resulting birth defects and brain abnormalities. However, the effects of alcohol are not inevitable, as even with high doses not all fetuses develop symptoms of fetal alcohol syndrome or the related neurodevelopmental disorder. Yet, alcohol-caused malformation of the fetus is the leading cause of preventable birth defects and one of the top three known causes of mental disability in the western world (Alberta Partnership on Fetal Alcohol Syndrome). Worldwide incidence of infants with full-blown fetal alcohol syndrome is 0.5-3 per 1000 live births in the general population – rising to 10 per 1000 births in high risk populations. Alcohol related neurodevelopmental disorder is estimated to be ten times more common than the full syndrome. Alcohol related brain disorders range from structural changes such as microcephaly (small brain), decreased volume of the basal ganglia, and facial deformities to dysfunction of behavior and/or cognition (Archibald et al., 1996). Less severe central nervous system disabilities seen in those exposed prenatally to alcohol include disorders of attention, language, reasoning and memory. The brain dysfunctions in alcohol-exposed children without the full syndrome expression are often as severe as those seen in children with full-blown FAS. In addition, superimposed adverse environments can lead to secondary effects such as insecure attachment. Full discussions of the range of prenatal alcohol exposure abnormalities are available in the literature (Sokol and Clarren, 1989). A variety of interventions can ameliorate some of the prenatal effects of alcohol in animal models. However, the interventions typically do not result in functioning levels seen in non-exposed offspring. Although early detection and treatment are important, the case for prevention of FAS is particularly compelling.

Lead is a persistent environmental toxin for children. When the blood-brain barrier is immature, it allows transport of lead to the brain quite readily. Thus young children are at increased risk for neurological damage from lead compared to adults (Bearer, 1995). A moderate blood lead exposure in adults may produce hypertension, muscle-weakness, neurological dysfunction, and nephritis; these same symptoms may occur in young children with blood lead levels at very low levels. Exposure to lead may produce multiple effects, depending on the age of the child and the amount of lead exposure. Estimates are that for every 10 micrograms per deciliter of lead measured in blood among young children, a 2.5 point loss in intelligence as measured on IQ tests is found (Bellinger et al., 1991, 1992; Needleman and Gatsonis, 1990). Children with low-level lead insults can present with reading and learning disabilities, impaired hearing, hyperactivity, and behavioral problems (Benson and Lane, 1993; Dietrich et al., 1992; Kahn et al., 1995; Minder et al., 1994; Needleman et al., 1990; Schwartz and Otto, 1991; US Environmental Protection Agency, 1996).

High blood lead levels have been reduced in the United States over the past 20 years (Pirkle et al., 1994), yet low-to-moderate elevations in blood lead levels persist. In most cases, lead is taken into the body through incidental and accidental ingestion of house dust or soil, or consumption of lead-contaminated water. Children will eat paint chips that contain lead and chew on windowsills that are painted with lead paint. Other factors are children's hand-to-mouth activities, dietary intake and individual nutritional status (Schneider and Freeman, 2000).

Prematurity

Low-birthweight, premature infants account for about 7.5% of all births (i.e. 75 per 1000). Normal gestation is about 40 weeks, with infants born after 37-38 weeks gestation considered full-term. The death rate is high for infants born at the very edge of viability, which is 22-24 weeks gestation. However, due to technological advances, over 50% of infants born at the low end of viability currently survive. Of those surviving extremely-to-very-low birthweight babies, a high percentage have significant neurodevelopmental impairment. Even in the group of infants born at low-birthweight and considered "low-risk" (between 27-34 weeks gestation), a significant percentage will demonstrate cognitive difficulties and cannot be assumed to have caught up with their full-term counterparts in all aspects of cognitive development.

Preterm infants are in reality fetuses who develop in extrauterine settings at the time when their brains are growing more

rapidly than at any other time in their life (McClellan, 1972). The premature birth disrupts the normal intrauterine stimuli and may interrupt the provision of specific nutrients and other factors important for growth. The extrauterine setting contributes to negative effects on the brain by both an environment that a human at this age would not normally encounter (from the neonatal intensive care unit environment with noise and handling the infant, etc., to nutrients not arriving through the umbilical cord) and by events that directly injure the developing brain (such as bleeding in and around the brain and hypoxia). In general, the more premature the infant, the greater the disruption of the intrauterine environment and the greater the exposure to potential injury to the developing brain. Indeed, general developmental status and intelligence scores decrease with greater degrees of prematurity.

Evidence continues to accumulate that an extrauterine environment for late gestation brain growth is less than optimal even without known adverse events (Chapieski and Evankovish, 1997; Cherkes-Julkowski, 1998; Davis et al., 2001, Huppi et al., 1996). For example, infants born between 27 and 34 weeks gestation with unremarkable neonatal intensive care stays still demonstrate poorer performance on tasks of medial temporal lobe function when compared to full-term infants (deHaan et al., 2000). There is evidence that early childhood intervention programs with individualized developmental care and parenting interventions improve the health outcomes and decrease the developmental problems seen in the preterm population (Infant Health and Development Program 1990; Gross et al., 1997). This mitigation of the effects of prematurity is hopeful, but prevention remains a greater priority.

SUMMARY

We are only beginning to understand the implications of brain research for parenting and childraising. To date, there are ***four important themes*** to be taken from this information:

1. Developmental neuroscience research tells us a lot about conditions that pose dangers to the developing brain, but little at this time about how to enhance or accelerate brain development.

2. There are a few aspects of brain development that require particular experiences at particular times (critical periods and plasticity, e.g. visual acuity development). Though highly important for those particular capabilities, this is more the exception than the norm. The developing brain is open to influential experiences over broad periods of development.

3. Experiences needed for early brain development are ubiquitous in typical early human experience. Particular concern should be directed at children with deficits that alter experiences (hearing or vision impairments, major movement impairments, etc.).

4. Known risks for adverse effects on brain development include abusive or neglectful care, dangerous or toxic environments and drugs, inadequate nutrition, specific infections, and related conditions. In these areas, we need to work to protect the developing brain from harm. Beyond these extremes, the nature and boundaries of environmental conditions necessary for healthy brain development are less well known and is an area of cutting-edge research.

APPENDIX II

THE NATURE AND TASKS OF EARLY DEVELOPMENT

TASK #1: ACQUIRING SELF-REGULATION

TASK #2: COMMUNICATING AND LEARNING

TASK #3: MAKING FRIENDS AND GETTING ALONG

TASK #1: ACQUIRING SELF-REGULATION

The human infant's task of achieving self-regulation is multidimensional and spans years. These tasks are fundamental to the development of behavioral, emotional and cognitive self-regulation, which are essential to successful functioning throughout life (Bronson, 2000; Kopp, 2000).

An infant must transition first from a complete physiological dependence on the biological mother while in the womb to accomplishing such tasks as breathing, eating, and regulating body temperature on one's own outside the womb. Simultaneous to this transition is a complete dependence on nurturing adults to respond to the infant's signals and needs, without whom the infant would die. The earliest regulation involves conforming to day-night rhythms, and learning to soothe and settle oneself after basic needs have been met.

KEY CONCEPTS

- Early development involves a gradual transition from extreme dependence on others to acquiring competence in the following areas:
  a. emotion
  b. behavior
  c. attention

- Regulation is deeply embedded in relationships with others--transactions between infants and caregivers and the more enduring perceptions and patterns of interactions that are subsequently put in motion in the family.

- Identifying and intervening with children who need extra help is fraught with ambiguity and runs the risk of over-diagnosis and unnecessary treatment.

- Nevertheless, some children are struggling with serious mental health problems and need help.

- Cultural values have a profound impact on how young children learn to interpret and express their emotions and on the behaviors seen as appropriate in different circumstances.

EARLY REGULATORY TASKS

Most of the regulatory tasks of early development are deeply connected to the infant's relationships with others. While the cultural orientation and care-giving practices of the family give shape to the manner in which these early transitions occur, babies thrive and achieve self-regulation in a wide variety of cultural contexts. The expectations regarding these tasks and

the interpretation of difficulties with particular tasks of self-regulation, such as establishing day-night rhythms or excessive crying, appear to be culturally based and influenced by the reactive patterns of caregivers and families. The perception of problems with the establishment of day-night patterns of sleep, for example, is very much couched in the family's cultural expectations regarding normative goals for the infant. In some cultures infants are in constant contact with the mother, being carried continually through the day and sleeping with the mother at night. In other cultures the infant is separated from the mother for varying amounts of time throughout the day and is expected to sleep separately at night. The comparative long-term impact of different approaches to care giving has not yet been systematically studied. What is clear is that the accomplishment of early regulation is dependent upon the relationship between infants and their caregivers. These early dynamic interactions between infants and caregivers are more challenging when the infant is premature or medically fragile because the ability to self-regulate may be more difficult for the infant and the ability of the caregiver to perceive the infant's signals may be more compromised (Beckwith and Rodning, 1992; Barnard and Kelly, 1990).

Day-Night Wake-Sleep Rhythms

The way that infants' sleep patterns are organized evolves rapidly in the first 3 to 4 months of life (Anders, 1975; Elligson and Peters, 1980; Gerhart and Maccoby, 1980). Newborns sleep a great deal of the time with an average of 16 to 17 hours per day (Coons and Guilleminault, 1982). The total sleep time decreases over time to about 14-15 hours per day and the periods of sleeping and wakefulness begin to extend to longer periods of time (Anders et al., 1992; Bernal, 1973; Coons and Guilleminault, 1982). At birth the longest period of sleep is about four hours whereas by three months it can be as long as 8 to 10 hours and for most infants, occurs at night (Anders et al., 1992; Bernal, 1973).

Whether or not an infant sleeps through the night without waking the parents seems to be associated with the infant's ability to settle back into sleep after briefly waking in the night. Babies who aren't able to settle themselves cry out and rouse their parents. There has been speculation that the manner in which the infant falls asleep initially—for example, in contact with a caregiver—conditions the infant into needing those same conditions to fall back to sleep when they rouse briefly in the night. Patterns of feeding can also impact these cycles, with bottle-fed babies sleeping for longer periods at an earlier age than breast-fed babies. However, babies that are not given breast milk get sick more often than their breast-fed counterparts (Beaudry et al., 1995). It has been postulated that

these interrupted cycles of sleep may be advantageous to the infant, given the concern that babies will sleep so deeply that they will fail to react when airways are blocked. Some researchers have postulated that because breast-feeding and co-sleeping induce shorter bouts and lighter sleep, they protect the infant from sudden infant death syndrome (SIDS) (McKenna, 1990; McKenna and Mosko, 1990). The cultural variation in these practices is broad and infants adapt to many styles of caregiving.

Crying

While there is considerable cultural variation in beliefs about how caregivers should respond to crying, there is great similarity in the soothing patterns that caregivers adopt once they do respond (Barr, 1990). There are also similar courses of development for infants with respect to crying across many and very different cultures (Barr, 1990; Barr et al., 1987, 1996). The amount of time spent crying appears to increase during the infant's day until it peaks between 6 and 8 weeks of age after which it begins to decline.

Variations in caregiving practices, whether cultural or individual, can affect crying in the early months of life. Ultimately, infants who are consistently and readily responded to are best equipped to reduce their crying in the long run. As the first year progresses, babies whose caregivers have been more responsive to their distress and sensitive to reading the infant's signals transition more smoothly into patterns of noncrying communication and spend increasingly more time in less distressed states (Crockenberg, 1981). Babies who are never responded to also learn not to cry, yet one must wonder—at what cost? Infants who are sometimes responded to and sometimes not tend to be more fussy and whiny. As the infant grows she achieves more physiological balance, reflecting the growing maturity of the infant's brain. With this development comes an emerging ability to replace crying with other forms of communication.

Emotions

While human emotion is rooted in biology and manifested through temperament, it is also significantly developed in the early years of life in the context of social interactions and relationships. The ability of the child to regulate emotion is critically important, because it can contribute to or undermine the development of new skills and competencies in the young child. The study of emotional development in young children is relatively new and as such, not yet well defined. The facets of emotional development under study include the capacity to identify one's own feelings, the development of empathy, and

the ability to constructively manage strong emotions (Mascolo and Griffin, 1998).

The infant's emotional life at first is centered around feelings with respect to physical states (e.g. hungry, tired, cold, wet). As the child grows there is an increase in the range of experiences that elicit emotion. During the preschool years children develop capacity to anticipate, discuss, and manage their emotional experience (Thompson 1990, 1994). Because of the relational nature of human emotion (Emde, 1987, 1998), they emerge from and provide the basis for human attachments, social communication, and prosocial as well as antisocial behaviors with other people (Emde, 1987, 1998; Izard, 1991). Children increasingly are able to read and adjust their own responses to others' emotions.

Interactions with parents and caregivers are powerful forces in the socialization of emotional development. Under ideal circumstances, the parents or caregivers are able to provide coaching of appropriate emotional expressions in social situations (Miller and Sperry, 1987) and conversations with the child about emotional events (Kontos et al., 1994). When the emotional climate of the home is suboptimal, such as in situations of familial dysfunction (Cummings, 1987; Cummings and Davies 1994a; Davies and Cummings, 1994; Grych and Fincham, 1990; Lieberman and Van Horn, 1998), or a parent suffers from depression or other affected disorders (Dawson et al., 1994; Garber et al.,1991; Zahn-Waxler and Kochanska, 1990; Zahn-Waxler et al., 1991), young children can face overwhelming emotional demands and at the same time, lack that parent as a resource for managing these demands (Thompson and Calkins, 1996; Thompson et al., 1995). These children are more likely to experience difficulties with emotion regulation and a subset of these children may be predisposed to develop affective disorders of their own. Therefore, as a result of their reliance on the emotional support of their caregivers in understanding, experiencing, and managing their own feelings, young children may be especially vulnerable to emotion-linked disorders when parent-child relationships are insecure or coercive.

When parents respond to an infant's emotional expressions, help to manage a child's feelings, and assist in labeling and discussing emotional experience, they help the child to understand and organize early emotional experience. This emerging understanding and skill grows in connection with the development of other forms of knowledge and learning in early childhood. Through this development the child learns to differentiate the self from others, to empathize, and to reflect on feelings about himself or herself.

With the development of a better understanding of emotions, young children become more able to manage their feelings (Fox, 1994; Garber and Dodge, 1991; Kopp, 1989; Thompson, 1990, 1994). Emotion regulation, probably the most challenging aspect of emotional development, has critical

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implications for relating successfully to other people. Organizing children's experiences around routines that are manageable and predictable reduces the emotional demands of daily life. Children are also aided in this development by the coaching parents can provide in dealing with specific situations. The relationship with the parent or caregiver provides security and confidence, which gives the child the resources he or she needs to deal daily with feelings that have the potential to overwhelm him or her.

REGULATION OF ATTENTION AND EXECUTIVE FUNCTION

In addition to learning to control their emotions, infants and young children must also learn to control behavior and regulate mental processes. This involves the development of attention, memory, and executive function, which provides the foundation for many complex activities and behaviors that the child will need to engage in school, relationships and life (Lyon, 1996). The development of precursors to these skills occurs in coordination with frontal lobe development during infancy and throughout early childhood (Anderson, 1998; Bell and Fox, 1992, 1994; Levin et al., 1991; Posner et al., 1998; Thatcher, 1991; Welsh and Pennington, 1988). Early signs of this development include the ability to orient to important features in the environment, anticipate events, and represent the world symbolically (Barkley, 1996; Borkowski and Burke, 1996; Denckla, 1996; Pennington et al., 1996).

Another skill that emerges in later infancy (8-12 months of age) is "means-end behavior" in which the infant will remove an obstacle to retrieve a toy (Piaget, 1952). With the emergence of goal-directed behavior, infants begin to learn to use language to represent the world symbolically, which is believed to be a critical prerequisite for working memory and executive problem solving (Goldman-Rakic, 1987). Self-control is a third skill that begins to emerge in infancy and continues to develop throughout childhood (Kopp, 1982). The capacity to use these developing abilities to regulate behavior and emotions in order to achieve social goals and respond to situational demands is often referred to as "effortful control." Comparatively little is known about how parents, other caregivers, and features of children's early environments affect the development of attention regulation and emerging executive functions. Clearly these influences matter (Carlson et al., 1995), and there is evidence that these abilities can be environmentally influenced (Borkowski and Burke, 1996; Graham and Harris, 1996), but researchers have yet to identify the mechanisms that account for individual differences among young children.

The presence of deficits in executive function and the ability to maintain one's attention have received considerable attention because of the link between these skills and the ability to optimally function in school (Lyon, 1996). These skills are also essential for social competence. Deficits in these abilities are thought to be integral to disorders such as attention deficit hyperactivity disorder (ADHD). An understanding of the processes that give rise to deficits of this kind is an essential precursor to efforts to develop appropriate interventions. With ADHD, for example, which is thought to be a relatively common disorder, the true prevalence and cause remain unknown (Zametkin and Ernst, 1999). Additionally, the diagnosis of ADHD for preschoolers is complicated by the fact that many of the behaviors associated with this disorder are normal for young children. There is no information about the validity of ADHD below the age of 4. A further challenge relevant to both research and clinical practice is the ability to differentiate ADHD from other possible coexisting conditions such as learning disabilities, oppositional-defiant disorder, conduct disorders, and anxiety disorders.

SUMMARY

The emergence of the various components of active, internally-guided regulation of attention, behavior and emotion emerge in inextricably interrelated ways at the end of the first year of life and continue to develop during the toddler and preschool years (Kopp, 1982; Rothbart and Bates, 1998). This emergence occurs in the context of caregiving relationships with adults that help to guide the child from complete dependence on adults to a self-reliance in regulating behaviors and feelings. The young child's transition from helplessness to competence involves development of capacities for self-regulation, ranging from sleeping and self-soothing in the earliest weeks of life to the preschooler's emerging ability to manage his/her emotions, inhibit inappropriate behaviors and focus attention on important tasks. Success in these areas is highly interrelated, with success fueling further success in other areas and problems in one area undermining development in another.

Clearly, the particular manifestations of the development of self-regulation take place and are deeply connected to the child's relationship with others, the cultural context in which the child lives, and the unique temperament and physical and cognitive capacities that the child possesses. Efforts to understand and address these developmental milestones must therefore consider all of these forces.

There is much to be learned about normative and non-normative progression of development of these capacities. Such knowledge would provide guidance regarding which practices facilitate successful development and which interventions are most appropriate to address.

COMMUNICATING AND LEARNING

KEY CONCEPTS

- The motivation and learning of newborns to act on and learn about surrounding world and people in it flourish during the early childhood years.

- There is no evidence that the age of three or five years marks a sensitive period in human cognition. With respect to language development, the evidence of a sensitive period is restricted to pronunciation and complex morphological properties of language.

- Language and early learning are resilient processes and quick to recover; we have a lifelong capacity for growth and learning.

- There are critical aspects of learning that remain vulnerable to environmental variation. For example, young children's academic attainments are more susceptible to the negative influence of poverty than those of older children.

- The less flexible or resilient aspects include number concepts, letter-sound associations, and executive functioning

  These are precisely the aspects that distinguish children at school entry and that account for the links between preschool capabilities and educational outcomes in adolescence.

  Early interventions can attenuate these differences at school entry

- Children with disabilities can also benefit from specially-designed interventions.

- There is no evidence that any specialized kind of short term input improves intelligence or learning--no sort of toy, class, etc.

- When problems occur, basically it is not that parents are doing terribly wrong things, but they are not doing quite the right things, or doing enough of them:
  a. talking more
  b. using more elaborate talk
  c. exploring number concepts
  d. reading more often and/or for longer periods of time
  e. exploring words and pictures in books

Some aspects of early language development and learning are very resilient; they will develop in the face of an unfriendly environment and lack of adequate input. They will also show surprising recovery if the environment improves, or the child is in a new environment with better conditions. Other elements are more easily disrupted and take more intervention for recovery to occur. These less resilient elements are influenced by factors associated with socioeconomic resources of the young children's families.

The skills children acquire before entering school appear to be linked to long term academic success, which is in turn linked to life success. Failure to complete high school is linked to numerous life problems, including substance abuse, unemployment, low-income, welfare dependency, delinquency, and crime. (Haveman and Wolfe, 1984; Hawkins and Lishner, 1987; Hinshaw, 1992; Loeber and Stouthamer-Loeber, 1987; Rutter et al., 1998; Steinberg et al., 1984).

Children's cognitive skill level upon school entry is important to later school success (Chen et al., 1996; Cunningham and Stanovich, 1997; Luster and McAdoo, 1996; Weller et al., 1992). Children's cognitive skills before they enter kindergarten show strong associations with achievement in elementary and high school (Hess and Hahn, 1974; Stevenson and Newman, 1986). Although these associations are very strong, interventions can make a substantial difference, and many children defy the odds. The ability to communicate more effectively improves children's ability to get what they want from others around them and to understand and modify the environment. Even before children actually go to school, weak language and cognitive skills are associated with and seem to worsen behavioral problems, including the ability to pay attention (Arnold, 1997; Hinshaw, 1992; Morrison et al., 1989). It isn't that interventions to improve language will necessarily fix the other problems, but they may contribute to solutions.

ACQUIRING LANGUAGE AND COMMUNICATION

Almost all children learn to talk without instruction. Reading is much less certain. Not everyone achieves fluent reading—and to do so, instruction seems to be necessary.

Language learning turns out to be remarkably similar across cultures. Six-month-old infants can distinguish the full range of sounds used in the world's languages. By age 1 they have lost many of those distinctions as they focus on their own culture's language. Children the world over say their first words

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between 10 and 15 months. Most 18-month-olds are learning words rapidly, learning on average 9 new words a day. By the time children are 3 years old they speak in full sentences. The similarity in language learning occurs even when children are exposed to language in widely varying ways. In some cultures children are spoken to directly and in others children listen to others talk to each other. Children learn language at roughly the same pace even when they are learning two languages simultaneously (de Houwer, 1995; Hakuta, 1986; National Research Council and Institute of Medicine, 1997).

Some environments are so socially and linguistically deprived that children do not develop language (Brown, 1958; Skuse, 1988). Many of those children develop language if the environment improves. Also, some children have disorders that don't allow the development of language even when the environment is favorable. For example, children with severe autism have difficulty in every aspect of speech and language.

Resilience

The resilience of language is tied not only to spoken language (Klima and Bellugi, 1979). Children who are exposed to conventional sign language from birth acquire that language as effortlessly and in the same developmental sequence as children acquiring a spoken language (Newport and Meier, 1985). Deaf children raised with hearing parents without sign language, despite the lack of a language model, learn to use their hands to communicate. The deaf children's gestures resemble the early communications systems of children learning conventional languages, signed or spoken (Goldin-Meadow, 1997). The fact that children will produce a communication system with structural properties, even without guidance from a conventional language model, suggests that these properties are not maintained in human language merely by being transmitted from one generation to the next.

Language learning proceeds in situations of varied linguistic input. Hearing children with deaf parents, who themselves are not fluent speakers, can acquire spoken language normally if they receive as little as 5 to 10 hours per week of exposure to hearing speakers (Schiff-Meyers, 1988). Another example of variation in input is those children with intermittent conductive hearing losses that cause their linguistic input to vary in amount and pattern. These children, too, for the most part acquire language normally (Klein and Rapin, 1988). Children who are blind acquire language with little difficulty. In conclusion, children acquire language with very little environmental support. However, the specific language they learn and certain qualities of their language depend on specific features of the environment. Children can be at risk in society, not because they do not have mastery of a language, but because they do not have mastery of the dominant language of their society, particularly at the time of formal school entry.

Not All Language Learning is Resilient

The most dramatic example of how language varies with environmental influences is the role of timing of language inputs in language proficiency. Considerable evidence suggests that early exposure to a language results in greater proficiency in that language than late exposure. For example, deaf children of hearing parents are typically not exposed to conventional sign language at birth and may not receive their first exposure to it until adolescence or later. Findings from these studies suggest that certain aspects of language – morphological properties – are affected by the age at which the learner is first exposed to sign language. Morphological properties are such things as how smaller parts of words make up bigger words and affect word meaning (e.g.,"eat"+"ing" = "eating"). Late learners, although able to converse in sign, do not have complete con-

trol over many of the complex morphological properties of the language (Newport, 1991).

Similar patterns arise in second language learning (Newport, 1991). Learners first exposed to their second language after puberty find certain aspects of the language difficult to master even after decades of use while others such as word order are relatively easy. The ability to learn the fragile components of language does not drop off precipitously, but appears to decline after age six or seven and continues to decline through late adolescence. And while early learners' pattern of language acquisition is very consistent, late learners vary a lot.

Linguistic Input

Research indicates that the amount mothers talk to their children is strongly associated with the children's vocabulary growth (Hart and Risley, 1995; Huttenlocher et al., 1991) as well as with the children's performance on measures of emergent literacy and print-related skills (De Temple and Snow, 1992). In one study the number of utterances a child heard in an hour varied from 793 to as few as 56. These differences tend to be stable over time (Hart and Risley, 1995). This means that some children hear a great number of words and sounds, and others very few.

Researchers have used videotape to study young mothers and their children's interaction. In one study (Hoff-Ginsberg, 1991), the researchers taped mothers while they dressed, fed and played with their 18 to 29 month old children. The children whose mothers talked more during these activities had larger vocabularies. These differences appear to be associated with social class. There are interventions that can improve children's accomplishments, even without the advantages of social class. The increased vocabulary at age three of those whose mothers talked to them more carried into their vocabulary and reading comprehension scores at third grade. It was not associated with children's third grade scores in the academic skill areas of reading, writing, spelling or arithmetic. Most research on language input focuses largely on white, middle class children in the United States and on mothers' speech directed to their children, and does not explore the role that talk around and about the child might play in language acquisition. This may be particularly important in other cultures in which children are more likely to be involved in relationships in which conversation takes place around them, but is not directed at them (Rogoff et al., 1993).

Evidence of the importance of verbal input during the years of rapid verbal development also comes from research on childcare. Children whose teachers talk to them a lot have higher test scores on both verbal and general ability. Environmental input can play a large role in determining the rate at which children acquire and use language, and use of language may be an important factor in cognitive growth and cognitive functioning.

In one large study, children tested when they were five years old displayed vocabularies that ranged from the level of a typical one year nine month old to the level of a 10 year eight month old (Morrison et al., 1997, 1998). These individual differences not only emerge early, but they also appear stable over time. These early and quite stable individual differences are consistently linked to the social class of the children's families. There is some evidence to suggest that socioeconomic factors exert their most powerful effects on children's achievement during early childhood and that these early influences contribute to sustaining socioeconomic effects on achievement throughout the school years and beyond (See *Family Resources*, page 10). These important aspects of language do not show critical or sensitive periods; with sufficient and appropriate input children can catch up. The amount of additional exposure a child needs to catch up increases over time and at some point becomes impractical to provide.

Parents across the globe provide what children need for them to learn to talk. Where problems arise it is generally not because parents do the wrong thing but because they are not doing enough of the right things.

Language Impairment

Sometimes things go awry. Language impairment during childhood is a significant limitation in language ability as indicated by poor performance on language tests and concern about the child's language skills on the part of family members and educators. The prevalence of specific language impairments was estimated in the most extensive epidemiology study to date as 7.4 percent at age five (Tomblin et al., 1997). Children with persistent language impairments are at risk for social and academic problems. Distinguishing those children whose language problems constitute a true disorder and may persist from children who may catch up is not always easy.

THINKING AND LEARNING

Infancy, toddlerhood and the preschool years are times of intense intellectual engagement, little of which was understood as recently as 30 years ago. Infants have memories, they explore cause-and-effect sequences, and engage in numerical reasoning. Children from birth to five engage in making sense of the world on many levels: language, human interactions, counting and quantification, spatial reasoning, physical causality, problem solving, categorization. The wealth of abilities

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present even in infancy have led to researchers describing babies as "wired to learn," "computers made of neurons," and as "having inborn motivation to develop competencies." The policy issue is not getting children ready to learn but rather how to craft policies and programs that build on their considerable capacity.

Nearly all children develop the capacity to understand causality, adopt the perspective of another person, and sort objects by categories. But children arrive at school with vast individual differences in their understanding of number concepts, familiarity with the alphabet and its relationship to sounds and printed words, and capacity to reason through problems. Another area where children starting kindergarten differ is in what is called executive functioning, the ability to self-regulate, sequence, plan and organize. Deficits in any of these areas typically result in problems in school (Lyon, 1996).

Sensitive Periods?

The notion of sensitive periods in early cognition is not based on research. Studies have not been done in part because the naturally occurring situations without input that scientists use to study language sensitive periods don't occur in cognitive development. Where cognitive deprivation does occur it is often with social, emotional and language deprivation. This means that strong claims about the inherently irreversible effects of early experience on later cognition in humans are not scientifically well founded. It is also clear that important intellectual development continues into adulthood. Other evidence for continued cognitive growth is the striking growth of scientific knowledge and reasoning, mathematical understanding and reading and writing skills of children past age 5. This conclusion is qualified by the recognition that early developmental sequences may provide important foundations for later development.

Motivation

Young children appear to be disposed toward positive motivation (Harter and Pike, 1984; Stipek, 1992). This applies across the board to children from families with both high and low socioeconomic status (Stipek and Ryan, 1997). Not all young children, however, show this positive bias and not all aspects of motivation are so robust. Achievement motivation includes: (1) mastery motivation, or the child's propensity to explore, manipulate, persist and derive pleasure in mastery-related behaviors and achievement (White, 1959); (2) intrinsic motivation, or the child's engagement in an activity without pressure or rewards for doing so (Deci and Ryan, 1985; Lepper, 1981); and (3) cognitive aspects of motivation, includ-

ing expectations of success, challenge seeking and self-perceptions of competence (Atkinson, 1964).

Not every child has motivational resilience. Some children as young as four react to failure with a set of negative thoughts, behaviors and emotions that researchers refer to as "learned helplessness" (Cain and Dweck, 1995; Diener and Sweck, 1978, 1980; Dweck, 1991; Smiley and Dweck, 1994). The positive beliefs of most children decline precipitously upon school entry (Stipek and Hoffman, 1980; Stipek and Tannatt, 1984; Wigfield et al., 1997). Both developmental and contextual factors seem to contribute to this decline. Children are developing the ability to make social comparisons and school provides explicit and comparative standards for performance.

Early Learning Environments

Enriched input can lead to enhanced learning at least on a short term basis. What isn't as clear is what the longer term outcomes of that earlier learning is. It isn't clear either that early learning is more effective than later learning. For example there is no evidence that teaching children to count at 2 instead of 4 has any long term effect on that child's mathematical ability. And as much interest and enthusiasm as there is for classical music, particularly Mozart, there is no evidence that it supports enhanced learning.

Children do not need expensive toys or explicit early instruction. Most children have access to objects to sort, and a world to make sense of. What is important are the relationships provided for the child. The features of those relationships that are so important are parents' interactions with young children, parental beliefs about learning and children's capacity, the home learning environment and family organization. These are the elements that account for the big differences in learning opportunities for children and for the wide disparities in knowledge and abilities that characterize kindergartners (Duncan et al., 1994).

Child care and preschool experiences do influence children's learning. But even for children who spend hours every day in child care or preschool, the home environment accounts for the lion's share of the variation in what young children know and are ready to learn when they start kindergarten (NICHD Early Child Care Research Network, 2000).

Motivation and Early Environments

The effects of home and classroom environments as well as the lack of fit between them can undermine the natural optimism and enjoyment of learning by young children. Motivation suffers when parental behavior is intrusive, highly directive, and critical, and when teachers stress individual performance and

de-emphasize personal warmth. Mastery motivation is encouraged by parent's support of autonomy in task situations with nonintrusive assistance and encouragement (Frodi et al., 1985; Grolnick et al., 1984). For toddlers and preschoolers intrusive behavior from parents and teachers discourages mastery behavior as does criticism and directive comments instead of praise, giving suggestions and information, and demonstrating effective strategies (Fagot, 1973; Farnham-Diggory and Ramsey, 1971; Hamilton and Gordon, 1978; Henderson, 1984).

Although there is minimal variation in achievement motivation in preschool children, the variation that exists is significantly associated with the classroom climate. Highly didactic, performance oriented early childhood classrooms have been found to depress young children's motivation (Stipek et al., 1995, 1998).

There is a growing awareness of the need to better understand how children growing up in "cultures that differ substantially from the norm" are affected when they enter the classroom. How do these differences manifest themselves in children's classroom behavior, motivation to learn, and achievement? Classroom adaptations that are designed to accommodate young children's differing approaches to learning have been found to reduce disruptive and inattentive behaviors (Au and Mason, 1981; Gallimore et al.,1974; Vogt et al., 1987; Weisner et al.,1989), but effects on achievement have not been demonstrated.

Family Socioeconomic Status (SES)

Of all aspects of children's early environment, the family's socioeconomic status is most powerfully associated with children's cognitive skills when they enter school. And because these differences in skills at school entry are important predictors of life long educational achievement, the class-related differences are of serious concern. Even though there is no evidence for sensitive periods of development, school entry is a critical transition point when SES-linked individual differences can become solidified and amplified, or the gap narrowed. Because these differences in cognitive skills at school entry are so predictive of later school success, the influence of socioeconomic status during early childhood years appears to be stronger than SES in later years. For a discussion of possible family and community pathways through which poverty and other factors of family SES affect developmental outcomes, see *Family Resources* chapter, page 10.

SUMMARY

The years from birth to school entry are a period of remarkable linguistic and intellectual growth. Children move from no language to expressing the subtleties of intention, cause–and-effect and emotions. Children demonstrate enormous capacity to interact and learn about the surrounding world and the people in it. There is no evidence for or against a sensitive period for cognitive growth that ends at the age of 3 or 5. The evidence for a sensitive period in language development is restricted to pronunciation or structural properties. In fact both language development and early learning appear to be relatively resilient, largely protected from adverse circumstance and quick to recover when those circumstances improve.

While there may not be a sensitive period per se, chronic exposure to the experience of poverty can have a long-term impact on language and learning. Some aspects of language and learning are vulnerable to poverty. Those less resilient aspects include the extent of the child's vocabulary, uses of language, understanding number concepts, letter-sound associations, and executive functioning (sequencing, planning, organizing). These appear to be the aspects that influence early school performance. Early interventions can make a difference in these individual differences. The school environment then either sustains or undermines those gains.

Despite the interest in finding ways to accelerate early talking and learning, there is no evidence that any specialized short term input improves intelligence or learning in an appreciable way. When problems arise, it is less that parents are doing terribly wrong things than that they are not doing quite the right things or enough of them, such as talking more and more elaborately, using number concepts, reading more, and exploring words and pictures in books.

The years from birth to school entry are a period of remarkable linguistic and intellectual growth. Children move from no language to expressing the subtleties of intention, cause–and-effect and emotions.

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TASK #3: MAKING FRIENDS AND GETTING ALONG WITH PEERS

One of the major developmental tasks of early childhood is learning to establish relationships with other children (Rubin et al., 1998). Children's abilities in this area are important to their developing sense of self-worth, competence, and how they view the world (Harter, 1982; Ladd and Price, 1986). Their level of competence is also important because it is predictive of their success with the tasks of middle childhood and adolescence (Barclay, 1966; Kupersmidt and Coie, 1990; Ollendick et al., 1992). Learning to play nicely, along with making and sustaining friendships, are not easy for young children and place considerable demands on their developing cognitive and emotional capacities (Howes and Matheson, 1992).

Researchers use techniques to understand early peer relations, including the use of teachers and parents as informants, and direct observation of the types and complexity of play and assessments of how well children appear to be getting along and the emotions they are expressing (Ladd and Price, 1993). Researchers have also classified groups of children into categories of popular, rejected, neglected, controversial or average based on reports of who they "like" and "dislike" (Coie and Dodge, 1983; Newcomb and Bukowski, 1983). These classifications are likely to be culturally determined and have limited stability over time (Newcomb and Bukowski, 1983).

Despite their limitations, these measures have yielded important findings. In particular, children who by school-age are in the "rejected" classification are at greater risk for poor school performance (Coie et al., 1992; Ollendick et al., 1992; Wentzel and Asher, 1995), psychiatric problems in adulthood (Cowen et al., 1973), and contact with the law (Kupersmidt and Coie, 1990).

Although problems with peer relationships emerge well before school entry, efforts to improve the quality of peer relationships have focused primarily on school-age children (Webster-Stratton, 1990). In order to develop appropriate interventions for young children, an understanding of the manner in which social interactions evolve over the early years of life is essential.

PLAY

Beliefs about the development of peer relations have changed considerably over the last 50 years (Rubin et al., 1998). Earlier, it was believed that babies weren't interested in one another and that while toddlers could have playmates, they were incapable of developing friendships. These views have undergone considerable modification toward a current appreciation of the

KEY CONCEPTS

- Learning to play nicely, making friends and sustaining friendships are not easy tasks; children who do them well tend to have been provided well-structured experiences with peer interactions in toddlerhood and preschool, and in particular, opportunities to play with familiar and compatible peers.

- Also important is having secure relationships with parents who deliberately create opportunities for peer interaction, encouraging keen observational skills and coaching in constructive attitudes and skills.

- Peer rejection is a risk factor for subsequent problems such as conduct disorder and depression.

- Because it is difficult to predict outcomes from early problem behavior, the most appropriate perspective for early intervention may be one of fostering prosocial behavior for all children, rather than trying to prevent delinquency for a few.

interest, capacity, and skills that young children bring to their peer relationships. This increase in awareness has occurred during a period in the United States in which the amount of time children spend with other unrelated children is considerably greater than that of previous decades.

Babies do show an interest in one another from as early as 2 months of age, getting excited at the sight of other infants and staring intently at each other (Eckerman, 1979). Babies try to get the attention of other babies by 6 to 9 months of age and will smile and babble to one another (Hay et al., 1982; Vandell et al., 1980). By 9 to 12 months of age, babies begin to imitate each other in behavior that begins to resemble play (Mueller and Silverman, 1989). Beginning at 1 to 2 years of age, young children's interactions become longer, more complex, and involve bouts of reciprocal imitation. These very basic abilities are thought to lay the groundwork for coordinated play (Howes, 1992).

Several factors contribute to the successful establishment of early play routines. Cognitive development facilitates the emergence of these early skills as does language ability. Children who are able to clearly communicate their ideas have an easier time getting and keeping play going (Howes, 1992). Familiarity with playmates appears to expand the types of play that toddlers engage in if they are emotionally and cognitively compatible and if they share play preferences (Rubin et al., 1994). Another important factor in how much and how well

young children play together is how well adults structure play environments for the children and arrange for opportunities to play with familiar and compatible peers (Howes and Unger, 1989).

Conflict and aggression in toddler play and friendships are inherent and increase in frequency to a peak between two and three years of age before declining (Brown and Brownell, 1990; Hay and Ross, 1982). Interestingly, moderately aggressive toddlers and preschoolers are also more often the most socially outgoing and seek opportunities to play with other children (Brown and Brownell, 1990). While aggression, if it continues to occur as the child ages, may become associated with peer rejection, children who are completely non-aggressive, withdrawn or submissive are more often rebuffed by their peers than their more socially outgoing counterparts (Rubin, 1985).

It is thought that some conflict may play a positive role in children's development (Azmitia, 1988; Hartup, 1996; Piaget, 1932; Roy and Howe, 1990; Vygotsky, 1978). The challenge to young children to figure out what is needed to get play back on track when conflict occurs can provide an important learning opportunity. This is particularly true when adult caregivers assist in providing language and strategies for understanding and resolving conflict.

How Adults Can Help

Secure attachment relationships with parents help children to negotiate the challenges to successful development of peer relationships (Pastor, 1981; Booth et al., 1991; Erickson et al., 1985; LaFreniere and Sroufe, 1985; Park and Waters, 1989). It is thought that the association between security of attachment and behaviors with peers has to do with the positive ideas children develop about themselves and others, the skills they bring to their peer group and their emotional state.

Parents and other caring adults do many other things that can support or impede their children's relations with other children. Parents of socially competent toddlers and preschoolers believe that helping their children develop skills in playing with other children is important to their role as a parent (Goodnow et al., 1985). They do this by arranging for opportunities for their children to play with others, teaching their children how to play appropriately with other children (Rubin et al., 1989), monitoring their children's encounters with peers, sanctioning unacceptable peer-related behaviors (Bhavnagri and Parke, 1991; Ladd et al., 1992; Pettit and Mize, 1993), and helping them to develop good observational skills (Briggs, 1991; Ellis and Gauvain, 1992; Ochs, 1988).

Parents' perspectives on their children's social mistakes appear to be associated with the level of competence children exhibit in these areas. Parents of children who were generally socially successful attributed social gaffes to transitory, fixable factors such as being tired, etc. (Goodnow et al., 1985). Parents of children who are generally less socially appropriate attributed their children's lack of skill as more inherent to their personality and tended to be less involved in assisting their children in the development of these skills (Rubin et al., 1989). Furthermore, if parents respond punitively to their children's social misbehavior it may set up circular patterns of hostility that can fuel children's aggressive and angry behavior (Hart et al., 1992; Rubin and Mills, 1990). Training parents to monitor their children's interactions with other children and provide coaching and feedback may be an effective intervention for children who are having difficulty in early peer relationships (Webster-Stratton, 1990; Webster-Stratton et al., 1989).

Temperament

The temperament of the child conveys a greater or lesser degree of challenge to the child and parents in developing the ability to get along with other children. Much of the focus to date has been on children who can be characterized as anxious and inhibited. Feeling comfortable with other children is a real struggle for these children (Fox et al., in press; Kagan et al., 1987). Many of these children, with parental support and given plenty of time to develop relationships, do quite well (Asendorpf, 1989).

Highly active, rambunctious children who thrive on novelty and some level of risk have recently received more attention from researchers (Rubin et al., 1995b). Children on the far extremes of this temperament dimension face challenges because their behavior may be perceived as overwhelming to other children. This is particularly true if they have difficulty with self-control (Rubin et al., 1995b). Learning to regulate their expression of who they are is a factor in successful development whether they are shy and anxious or highly outgoing children. This ability, however, doesn't appear to be independent of temperament and the temperament of the child may make this more or less of a challenge.

Impact of Disability on Peer Interactions

Children with disabilities may have special difficulty accomplishing the social tasks of gaining entry into peer groups, maintaining play, and resolving conflicts. Therefore they may be at greater risk for social isolation and negativity. Given the complexity and challenge of social interaction for any young child, it is not surprising that children with disabilities have

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more of a challenge. Knowing how to support these children requires an understanding of the different types of developmental challenges that children with different types of disabilities face. Programs that have attempted to improve social skills of young children with disabilities have often failed to produce substantive and sustainable gains.

Early Conduct Problems

There is increasing evidence that adolescent and adult behavior problems have their roots in disruptive behavior that can be detected as early as age three (Campbell et al., 1986a; Olson and Hoza, 1993; Rutter et al., 1998). Furthermore, scientists have identified evidence that anti-social behavior that begins at an early age is more likely to persist into adolescence and adulthood compared to that which originates in the adolescent period (Caspi and Moffitt, 1995; Maughan and Rutter, 1998; Moffitt, 1997).

While it is hard to predict which children exhibiting behavior problems in early childhood will continue to exhibit them later in life, there is an association between rejected-aggressive children and later problems with behavior or mental health. The numbers of young children involved are not insignificant, with 5 to 10 percent of school age children exhibiting serious conduct problems (Kaiser and Hester, 1997). Children with conduct problems generally do poorly in school, and poor academic performance exacerbates the conduct problems. There are many factors thought to be associated with the emergence of early conduct problems; less is known about the conditions under which they persist. Children with behavior problems are more likely to come from a family with a history of psychiatric illness such as depression and bipolar disorder, adult criminality and substance abuse (Rutter et al., 2001; Webster-Stratton, 1990). Dysfunctional or abusive family and community environments are associated with aggressive and disruptive behaviors among preschoolers. Effective prevention opportunities include: interventions with children in the early elementary grades (Asher, 1985; Asher et al., 1996; Bond and Compas, 1989; Eisenstadt et al., 1993; Forehand et al., 1982; Kazdin, 1993; Olweus, 1991, 1993), and working with preschool parents and child care environments to develop skills in care-giving adults to monitor and coach children in peer interactions (Webster-Stratton, 1990, Kaiser and Hester, 1997;

Odom et al., 1994). In addition to efforts focused on children with conduct disorders, the best approaches to early intervention will likely involve parallel efforts to create early environments that foster pro-social behavior for all children (Asher et al., 2000)

SUMMARY

Developing relationships with other children is an important task of early childhood. Children's success in this arena can impact their later sense of competence or deviance as they move into middle childhood and adolescence. The tasks involved in establishing and maintaining friendships are not easy and children who do them well tend to have well-structured experiences with familiar and compatible peers beginning in toddlerhood and preschool. Children who are functioning well socially tend to have secure and stable relationships with parents who believe that their role as a parent includes fostering their children's social relationships by providing them appropriate opportunities for interaction, monitoring their behaviors with peers and coaching their children in constructive attitudes and skills. The role of a child's temperament must also be considered in examining the factors that facilitate or challenge a child's (and parent's) success in this area.

Children with developmental disabilities face major hurdles in achieving success in establishing friendships, and much greater attention is needed to develop more effective interventions for these children.

We do know that peer rejection and aggressive behavior is a risk factor for an array of subsequent problems, including conduct disorders and depression. Early manifestations of problems in this area are evident for a large number of children, yet the predictive value of this behavior on the likelihood of future problems is limited. Given the interactive and interrelatedness of the issues involved in the development of these skills, it makes most sense to focus on approaches that involve all children, approaches that work simultaneously to eliminate disruptive behaviors and develop positive social behaviors.

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