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Early Childhood Development and Human Capital

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Since the Great Society era of the 1960s, hundreds of studies have documented positive effects of early childhood programs. Advances in knowledge have contributed not only to the development and improvement of programs but have also spurred expansion of services across the nation (Barnett, Epstein, Friedman, Sansanelli, & Hustedt, 2009; Zigler, Gilliam, & Jones, 2006).

These policy changes have been motivated by the synergy of three sets of findings. First, early childhood development (ECD) programs large and small, mostly focused on children ages 3 and 4, have demonstrated strong effects on school readiness, including language and literacy, numeracy, and socio-emotional skills (Camilli, Vargas, Ryan, & Barnett, 2010; Gormley, 2007; Karoly, Kilburn, & Cannon, 2005; Reynolds, Wang, & Walberg, 2003). Given the connection between school readiness and later performance, early education is a reliable strategy for enhancing child development outcomes. Second, ECD programs can affect broader well-being in ways ranging from preventing child maltreatment and crime to promoting health behavior (Campbell, Ramey, Pungello, Sparling, & Miller-Johnson, 2002; Reynolds et al., 2007; Schweinhart et al., 2005). Most other social programs do not show such broad and enduring impacts. Finally, ECD programs have demonstrated high levels of cost effectiveness by reducing the need for later remediation and treatment and increasing social benefits (Burr & Grunewald, 2006; Rolnick & Grunewald, 2003, 2007; Temple & Reynolds, 2007). Thus, they are widely considered to be more economically efficient investments than other social programs. Together, these findings have contributed to the high national priority placed on early education.

Increased attention to the early years of life also has sparked greater interest in prenatal to age 3 programs and services, which are increasingly viewed as central to optimal child and family outcomes (Olds, Sadler, & Kitzman, 2007; Sweet & Applebaum, 2004). Similarly, increased attention to the early years of life has strengthened interest in the transition to school and in the

Cambridge University Press

978-0-521-13233-6 - Childhood Programs and Practices in the First Decade of Life: A Human Capital Integration

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experiences in the early grades that can reinforce preschool gains and improve achievement (Bogard & Takanishi, 2005; Reynolds, 2003; Reynolds & Temple, 2008; Takanishi & Kauerz, 2008). Early childhood systems and practices that enhance the continuity of development over the first decade of life can promote well-being and have enduring effects over the life-course.

OVERVIEW: EARLY CHILDHOOD PROGRAMS AND HUMAN CAPITAL

To illuminate the expanding knowledge of the ECD field, this volume presents research findings on the effects of early childhood programs and practices in the first decade of life and their implications for policy development and reform. The contributors are leading researchers in the multidisciplinary field of human development and in early childhood learning. They describe effects and cost effectiveness of the most influential model, state, and federally funded programs, policies, and practices. The book is based on a national invitational conference that was held at the Federal Reserve Bank of Minneapolis in December 2007. The conference was sponsored by the Human Capital Research Collaborative (HCRC, Reynolds & Rolnick, 2009). The HCRC is a partnership of the University of Minnesota and the Federal Reserve Bank of Minneapolis dedicated to advancing knowledge on the identification, understanding, and use of cost-effective programs and policies from prenatal development to young adulthood.

ECD programs and practices are conceptualized as human capital investments. Investments of personal and financial resources in educationally enriching experiences and activities promote child well-being and can increase economic and social returns over the life-course. The focus on human capital is well tailored to multidisciplinary research and to public policy decision making. In addition, economic benefits relative to costs are a most relevant indicator for policy development. The value of public investments can be judged, at least in part, on efficiency. Moreover, a human capital perspective emphasizes the longer term effects of programs and practices. Demonstration of immediate and shorter term effects, although an important first step, is not the ultimate goal of most social programs. Indeed, long-term effects are a major focus of early childhood programs. A major question for social policy is whether short-term effects translate into long-term effects on adaptive life skills and behavior.

We define ECD broadly to include the first decade of life, including prenatal and infant development, early education and preschool, kindergarten, and early school-age programs and practices. This breadth maximizes the coverage of influential periods of development. Although it reports findings on achievement and other short-term outcomes, this volume emphasizes longer term effects and cost effectiveness.

Cambridge University Press

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HUMAN CAPITAL FRAMEWORK

As an organizing framework for the volume, human capital is a broad identifier for a variety of behaviors, skills, and attitudes that are instrumental for optimal learning and well-being. Originating from the work of moral philosopher Adam Smith (1776/1904), the concept of human capital in contemporary scholarship was developed and popularized by economists (Becker, 1964; Mincer, 1958; Schultz, 1961; Weisbrod, 1962). More recent contributions by, among others, Heckman (2000), Heckman and Krueger (2003), Karoly et al., (2005), Todd and Wolpin (2007), and Currie (2009) illustrate the expansion of the field. Applications to psychology (Foss & Spence, 1992) and public health (Victora et al., 2008) also have occurred within a human development perspective. The concept has been further broadened to social capital (Coleman, 1988), health capital (Grossman, 1972), and cultural capital (Bourdieu, 1977).

Historically, human capital emphasized the enhancement of education and training for economic success in the workforce. Becker (1964) contrasted general and specific human capital skills, with general skills (e.g., problem solving and communication) having greater transferability across contexts. Investment in educational enrichment to promote human capital skills in early childhood is believed to have a greater impact than later investment because positive early experiences are foundational to later learning and can reduce or prevent the occurrence of problem behaviors that require remediation or treatment. Given the high costs of treatment, early childhood investments also have the potential for greater levels of cost effectiveness (Heckman, Stixrud, & Urzua, 2006; Levin & McEwan, 2001; O'Connell, Boat, & Warner, 2009).

Our focus on human capital highlights the identification of effective and cost-effective programs for public policy as well as key elements of their benefits. To the extent that children's experiences in early learning are enriching and mutually reinforcing, continuity is maintained, and this continuity is an important condition for longer term effects. Encouraging continuity of experience also can yield synergistic effects of intervention. In addition to emphasizing investments that are made early in the life-course and that promote continuity, the human capital framework also values complementarity of services. Not only are effective programs implemented over different ages, they are also diverse in focus, with services ranging from parenting education to child-focused language instruction and combination programs that provide many services. Each type of program is part of a larger spectrum of services that address important goals. Thus, they are complementary rather than viewed as either-or alternatives or hierarchically.

Like other theoretical frameworks, including ecological systems theory (Bronfenbrenner, 1989) and the risk and protection model (Rutter & Rutter, 1993), human capital theory is a life-span perspective of well-being in which

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skills and experiences from one stage of development influence those in the next. Each framework also specifies the importance of timing, duration, and content of services in promoting child development outcomes. In addition to valuing the maintenance of continuity of experiences over time in improving well-being, human capital theory more directly emphasizes economically consequential indicators of well-being such as educational attainment, socio-economic status, and crime prevention from which the return on investments can be readily estimated.

Given the similarities across theories, human capital provides an integrative framework for understanding the impacts of ECD programs and practices. In ecological systems theory, for example, human capital develops as personal resources of the child interacting with family and larger social contexts to promote well-being (Bronfenbrenner, 1989). Investments in educational enrichment have an impact to the extent that they facilitate proximal processes of development, which are the social interactions and learning experiences that directly strengthen learning. The more comprehensive the services, the larger and more enduring the impacts can be. From the perspective of risk and protection (Rutter & Rutter, 1993), human capital investments are viewed as a process of building protective factors defined as individual, family, school, or broader levels of support that compensate or buffer child risks and vulnerabilities from poverty to family dysfunction. The dosage and quality of enrichment help initiate a chain of protective mechanisms that lead to cumulative advantages over time in educational, social, and psychological development. As in the human capital and ecological models, the earlier that services are provided in age-appropriate and meaningful ways, the larger the impact on well-being.

VOLUME THEMES

Based on the human capital and related perspectives, the chapters integrate four critical themes in the field. The first is children's stage of development. The focus is on the entire period of early learning from prenatal development to early school-age transitions. Not only are the intervention approaches matched to children's ages, they are also representative of the major contexts of learning, including family, center, school, and community. Among the interventions covered are WIC, the Nurse-Family Partnership, Early Head Start and Head Start, Child-Parent Centers, Perry Preschool, kindergarten programs, teaching practices, and the Tennessee STAR class-size reduction program. Although the principle of developmental continuity addresses the importance of alignment between programs across ages in yielding synergistic effects, the expectations for even the best ECD programs and experiences should be realistic. As cautioned by Zigler, Styfco, and Gilman (1993, pp. 21–22), "Do we really believe

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that a year of preschool can shape the course of human life? To do so is to ignore the many, many factors ranging from the quality of schooling to socialization influences from the family and community.”

The second major theme is cost effectiveness. Given the greater use of cost-benefit analysis in social and educational research, knowledge about the level of cost effectiveness of early childhood programs across stages of development is needed more than ever. The chapters summarize the latest knowledge about the cost effectiveness of different intervention approaches as well as identify the potential for cost effectiveness among newer programs and approaches. Although model programs and those with longer histories are more likely to have completed long-term cost-benefit analyses, the evidence from the programs presented in this volume provides valuable information about the possible benefits of high-quality and well-implemented interventions. The common elements of effectiveness across studies also can be derived.

The third theme is program focus, which includes the intervention goals, content, and services, ranging from prenatal nutrition and parenting education to school readiness and achievement. ECD programs may include family services, parenting classes, curriculum-based educational enrichment for children, health services, and outreach services in the community. The programs and approaches covered include the full range of these foci and content. Although programs that are relatively narrow in scope can be effective and cost effective in achieving their goals, those providing a broader array of services over longer periods of time have the potential for larger and more enduring effects.

The fourth theme is scale. Programs vary dramatically in size and scope, target populations, funding, and level of monitoring. They range from one-site intensive interventions to federal- or state-funded programs serving thousands of families at different levels of service. There are three levels of scale. Efficacy trials are the initial pilot projects implemented in a single setting with relatively small samples. They assess whether interventions are effective under ideal conditions. Effectiveness trials are replication projects implemented within existing service systems, usually with larger samples in different locations. Sustained programs and practices are upscaled and established services that are routinely implemented within existing service systems over longer periods of time. Most early childhood research emphasizes model programs (efficacy and effectiveness trials) over larger scale (sustained) programs, even though the latter have greater generalizability and relevance for current practice. This book includes the full continuum of scale, from model programs such as Perry Preschool and Abecedarian Project, to state-funded programs, as well as historical and more recent federally funded programs such as Head Start, WIC, and Early Head Start. It also covers school policies and practices such as full-day kindergarten, small classes, and teacher practices.

Together, these four themes provide a unique and comprehensive framework to better understand the complex effects of ECD programs, their contributions to society, and future opportunities for research.

TRENDS IN EARLY CHILDHOOD PROGRAMS AND INVESTMENTS

The acceleration of human capital research in early childhood development should be interpreted within the larger context of changes in public policies at the state and national level. Several trends in early childhood policy reflect the high priority given to the investments in young children that are examined in this volume. They include (1) increased investments in early childhood programs, (2) increased access and participation, and (3) advances in effectiveness and cost-effectiveness research.

Increased Investments in Early Childhood Development Programs

In the past decade, all levels of government have increased resource investments in early childhood programs and services, ranging from prenatal nutrition and child care to early intervention and preschool programs. The broad aim of these investments is to promote child health and well-being with a particular focus on children’s school readiness. Although the National Educational Goals Panel (1995) first proclaimed the goal that all children should begin school ready to learn, the resource investments needed to meet this goal have accelerated within the past decade.

As shown in Figure 1.1, total public investment in programs and services for children aged birth to 5 (before kindergarten entry) in 2007–2008 was approximately \$33 billion (Barnett et al., 2009; Child Care Bureau, 2009).¹ These annual expenditures were more than double that of a decade ago (U.S. General Accounting Office, 1999). Of this total, 56% (\$18.5 billion) was federal expenditures. The major categories of federal funding were Head Start (including Early Head Start; \$6.8 billion); Special Supplemental Nutrition Program for Women, Infants, and Children (WIC; \$4.7 billion); Child Care and Development Funds (CCDF; \$2.7 billion); block grants to the states for Temporary Assistance for Needy Families (TANF; \$1.6 billion); special education and early intervention services in the Individuals with Disabilities Education Act (IDEA, Parts B and C; \$810 million); and preschool funding from Title I of the Elementary and Secondary Education Act (ESEA; \$400 million). Notably, Title I funding to school districts for preschool education represented 3% of the

¹ Our estimates are inclusive of these sources. This estimate does not include expenditures from the Earned Income Tax Credit or the Dependent Care Credit. Also, expenditures from CCDF and TANF are exclusive to children from birth to age 5. Nationally, 55% of all children and youth served are in this age group; 75% of WIC participants are children from birth to age 5.

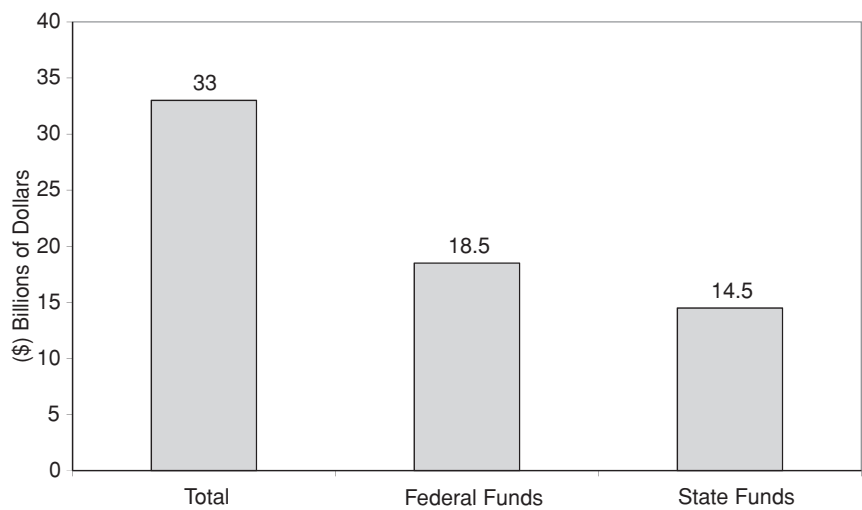


Figure 1.1. Public Investments in Early Childhood Programs, 2007–2008 (Authors’ estimates from several sources; see text).

\$14 billion total annual Title I expenditure. Among the largest increases in total funding since 1999 were for Head Start (\$4.7 to \$6.8 billion, or nearly a 45% increase) and CCDF (\$1.5 billion to \$2.7 billion, or nearly a 75% increase).

State and local government expenditures comprised the remaining 44% (\$14.5 billion). The major categories were state and school district expenditures for preschool special education under IDEA, Part B (\$5 billion); state-financed preschool programs for 3- and 4-year-olds (\$4.6 billion); state and school district expenditures for early intervention services (IDEA, Part C; \$2.3 billion); CCDF matching state funding (\$1.2 billion); and state and local Head Start matching funding (\$1.4 billion). Funding for state-financed preschool programs has nearly tripled since 1999 (\$1.7 billion to \$4.6 billion). In 2007–2008, 1 million preschool children were served in 38 states at an annual state expenditure per child of \$4,061 (Barnett et al., 2009).

Increased Participation in Early Childhood Programs

Increased investment in early education has led to corresponding increases in the number of children served in ECD programs. Figure 1.2 shows the pattern of participation of 3-, 4-, and 5-year-olds from 1983 to 2007, using data from the National Center for Educational Statistics (U.S. Department of Education, 2003, 2009). Participation is defined as enrollment in center-based care and education programs for at least part of the day. The programs for 5-year-olds are kindergarten.

Although rates of participation have increased substantially over the past two decades, they vary by age group. In 2007, there were 12.3 million 3- to 5-year

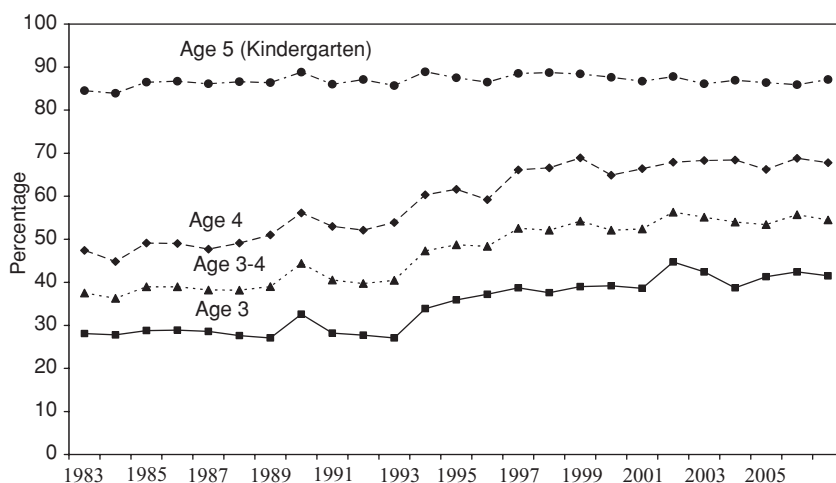


Figure 1.2. Percentage of U.S. Children in Early Childhood Programs (U.S. Department of Education, 2003, 2009).

olds, with 4.1 million in each of the three age groups (U.S. Department of Education, 2009). In that year, 67.8% of 4-year-olds were enrolled in center-based programs, an increase of 43% since 1983 (from 47.4%; Table 43, U.S. Department of Education, 2009). In the same year, 41.5% of 3-year-olds were enrolled in a center-based early education program, an increase of 48% since 1983 (from 28.1%). In 2007, considering all 3- and 4-year-olds, 54.5% were enrolled in center-based programs, an increase of 45% since 1983 (from 37.5%).

As expected, rates of participation vary by family income, education, and race/ethnicity. Based on data from National Household Education Surveys from 2005 (Table 44, U.S. Department of Education, 2009), children residing in families with annual earnings between \$15,000 and \$25,000 per year had a 29% rate of participation in center-based early education programs compared to 43% for those residing in families with annual earnings exceeding \$50,000. This is a 48% higher rate of participation for higher income families. Parent education followed a similar pattern, with those in families with greater educational attainment having higher rates of center-based early education. Children of high school graduates, for example, had a 30% rate of participation compared to 45% for children of bachelor's-degree recipients. Finally, Hispanic children had a substantially lower rate of participation in center-based programs (25.2%) than Black (43.8%) and White children (37.8%). The higher rate of participation for Blacks is entirely due to their greater enrollment in Head Start (13.3%) compared to Whites (2.8%) and Hispanics (6.2%).

Although rates of participation in ECD programs have increased substantially, barriers to access remain and relate to affordability, availability of high-quality and full-day programs, and service fragmentation. For example, early childhood systems in most states and nationally are fragmented. The

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different funding mechanisms and administrative structures make coordination difficult, and continuity across ages is low. The most typical publicly funded center-based arrangement in prekindergarten, for example, is a part-day program for one year with little opportunity for transition support in the early grades. Moreover, the quality of programs is variable at best and generally mediocre. The average yearly expenditure per child for state-financed programs of \$4,061 (Barnett et al., 2009) is based on minimum standards for class sizes and services. Expenditures exceed \$5,000 per child for programs showing long-term effects and cost effectiveness (Reynolds & Temple, 2008).

One gap is the lack of comprehensive services. Although more than 70% of center-based providers offer education programs, less than 10% provide medical services and referrals, parental supports, and social services (U.S. General Accounting Office, 1999). The discrepancy is even larger for family-based programs and is little changed in the past decade (Karloly et al., 2005; Reynolds, Mathieson, & Topitzes, 2009; Zigler et al., 2006).

The quality of child care is generally low and very uneven, primarily because of low staff compensation, a lack of educational credentials, and high staff turnover (Bowman, Donovan, & Burns, 2000). Subsidized child care via CCDF provides fewer services than many center-based preschool programs and often lacks a broad educational mission. The cost of full-day and high-quality programs is high, which is another barrier to access for low- and middle-income families. Because the effectiveness and cost effectiveness of programs are dependent on the quality, structure, length, and breadth of services, these elements need to be examined closely to achieve optimal health and well-being.

Advances in Understanding Effectiveness

Knowledge about the effects of ECD programs has provided a strong foundation for both increased participation and investments. In recent years, several advances have strengthened the policy and social significance of ECD programs. First, a large body of research shows that ECD programs from birth to age 5 promote well-being in many domains from school entry to adulthood (Karloly et al. 2005; Nelson, Westhaus, & MacLoed, 2003; Reynolds & Temple, 2008). Long-term effects on remedial education, delinquency, educational attainment, and socioeconomic status are especially significant (Campbell et al., 2002; Consortium for Longitudinal Studies, 1983; Reynolds, Temple, Robertson, & Mann, 2002; Schweinhart et al., 2005). These findings are consistent with the length, intensity, and ecological focus of intervention. More recent larger scale state and federal programs also have demonstrated positive effects on short-term cognitive and social skills (Barnett et al., 2009; Reynolds & Temple, 2008). These findings predict later benefits and cost effectiveness.

A second advance is that both the timing and duration of intervention matter. In the past decade, empirical support for the importance of these

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attributes has grown substantially (McCall, Larsen, & Ingram, 2003; Reynolds et al., 2009; Reynolds & Temple, 2008). The most effective childhood prevention programs spanning home visitation to center-based preschool education have been those that began no later than age 3, continue for multiple years, and provide support to families (McCall et al., 2003; Reynolds et al., 2009; Zigler & Berman, 1983; Zigler et al., 2006). That the duration of intervention can matter at least as much as timing is supported by human capital (Becker, 1964; Heckman, 2000) and ecological (Bronfenbrenner & Morris, 1998) theories, whereby large initial impacts accumulate over time.

The third advance is that generative mechanisms of effects are being identified and understood. One major mechanism is the cognitive advantage hypothesis, which is supported by studies of model (Campbell, Pungello, Miller-Johnson, Burchinal, & Ramey, 2001; Consortium for Longitudinal Studies, 1983; Schweinhart et al., 1993) and larger scale programs (Reynolds, 2000; Reynolds et al., 2004). Although the enhancement of cognitive and scholastic skills has been found to initiate longer term effects on school success and educational attainment, generalizability to social and health outcomes has been underinvestigated. In addition, the contributions of socio-emotional development, family-support behavior, and school context and quality, although sizable for some outcomes, are just beginning to be investigated comprehensively and into adulthood (Cunha & Heckman, 2008; Heckman et al., 2006; Reynolds, Ou, & Topitzes, 2004; Reynolds & Temple, 2008).

As shown in Figure 1.3, ECD programs can affect life-course outcomes through one or more of five pathways: cognitive advantage, family support, motivational advantage, social adjustment, and school support. These pathways are consistent with theories of early enrichment, intervention theories, and the accumulated research on intervention effects (Reynolds, 2000; Reynolds & Temple, 2008). To the extent that programs have a meaningful impact on more than one of the paths, long-term effects and cost effectiveness would be more likely to occur, although the paths of influence would be expected to be a chain of links among the five hypotheses. In the absence of direct effects of intervention on any of the paths, long-term effects would be unlikely.

Although early childhood research and policy have advanced rapidly, many challenges remain. What are the longer term effects of sustained large-scale programs? Do the mechanisms of intervention effects vary by outcome? What is the optimal combination of timing and duration of services? What are key principles of effectiveness? What are the gaps in knowledge?

OVERVIEW OF THE VOLUME

The goal of the volume is to enhance knowledge about the cost effectiveness of ECD intervention. The chapters are updated versions of the papers presented at the national invitational conference (see the Appendix for discussion and