Abstract Title Page
Not included in page count.

Title:
Effects of Early Head Start Prior to Kindergarten Entry: The Importance of Early Experience

Author(s):

John M. Love, Ph.D. (Corresponding Author)
Senior Fellow
Mathematica Policy Research, Inc.
1016 Canyon Park Drive
Ashland, OR 97520
Phone: 541-941-5571 (cell)
Office: 541-488-6987
E-mail: jlove@mathematica-mpr.com

Abstract Body

Limit 5 pages single spaced.

Background/context:

Description of prior research, its intellectual context and its policy context.

The Early Head Start evaluation included 17 sites drawn from the first two waves of programs started more than a decade ago. By design, the Administration on Children, Youth and Families (ACYF) selected programs that would reflect the range of service options and context of all extant program rather than choosing a representative sample. The sites were distributed across the country. This was the first impact evaluation of services for poor pregnant women and families with children under age 3 in which the program offered center-based services in some sites and at least some home visiting in all sites. (The Comprehensive Child Development Program [CCDP] provided case management and home visiting during the same developmental period, but did not provide extensive home visiting or any center-based education). Previous evaluations of 1970s programs offering center-based care and home visiting, such as the Parent-Child Development Centers (PCDCs), the Milwaukee Project, Project Care, and the Abecedarian Program, had samples that were primarily African-American families (one PCDC provided services to Hispanic-American families). All focused on poor families, the same target population as Early Head Start. In the mid-1980s, the Infant Health and Development Program (IHDP) provided center-based education and home visiting across eight sites; its evaluation included all three ethnic groups but focused on low birth weight children, irrespective of family income or parental education, thus including both poor and non-poor families, unlike the other programs. Differences in cohorts (decade of initiation of programs), child health, and family characteristics will be important to consider when comparing results from Early Head Start with its predecessors. In addition, only one of the previous evaluations was able to compare the receipt of only home visiting with the receipt of home visiting plus center-based education. In Early Head Start, given the variability in what services could be provided in each site, some of the programs offered center-based care with a relatively low level of home visits; others offered both center-based care and home visits (i.e., not all families received the center-based care); while still others provided only home visiting. The Early Head Start evaluation examined impacts for these three types of programs.

The Early Head Start evaluation was also unique in its focus on implementation: extensive (and intensive) site visits were conducted several times at each site. These visits captured in-depth information about all program services covered by the then newly released Head Start Program Performance Standards for infant/toddler programs, but went beyond them as well. From these visits, it was possible to categorize sites in terms of the timing with which they fully met the standards: early implementers, later implementers, and incomplete implementers. Since multi-site trials often show variability in impacts across sites, the ability to document fidelity to treatment is critical. Related to fidelity is the issue of intensity of services received by each family.

Setting:
Description of where the research took place.

In fall 1995, ACYF funded the first 75 EHS programs. the following year, another 68 were added. From these 143 programs, ACYF selected 17 to be in the evaluation. These sites reflected the characteristics of all then-funded programs (urban-rural, all regions of the country, and so forth), and the enrolled families had characteristics that were also similar to families across all programs, even though the sites were not selected to be nationally representative (see next section).

Programs offered two major approaches to serving families: home visiting and early childhood centers. Some programs offered both, either by enrolling some families in home-based programs and others in center-based programs, or by enrolling families in both types of service—either at the same time or at different times during the families' enrollment period.

Population / Participants / Subjects:
Description of participants in the study: who (or what) how many, key features (or characteristics).

3,001 low-income families with either a child under the age of 1 year or while the mother was pregnant applied to be enrolled in the EHS program in each of the selected 17 sites. Mathematica randomly assigned about half to be in the program group and half in the control group. Families were distributed as follows along key characteristics:

- Teenage mother: 39%
- Primary caregiver married and living with souse: 25%
- African American: 34%
- Hispanic: 24%
- White: 37%
- Other: 5%
- Primary caregiver's main language not English: 20%
- Primary caregiver graduated from high school: 48%
- Primary caregiver employed: 23%
- Primary caregiver in school or training: 22%
- Primary caregiver neither employed nor in school: 55%
- Primary caregiver receiving welfare assistance (AFDC/TANF): 36%
- Primary caregiver pregnant at time of enrollment: 25%
- 61% of children were firstborn

Measures

See Table 1.

Research Design:
Description of research design (e.g., qualitative case study, quasi-experimental design, secondary analysis, analytic essay, randomized field trial).

The EHSREP was conducted with an experimental design, with random assignment occurring within each site. Impact analyses comparing treatment and control groups conducted

when children were 2 and 3 years old (and the treatment group was still enrolled in the program), and 5 years of age, two years after the intervention ended. Analysis of attrition showed that although there were significant treatment-control differences in response rates (Table 2) the treatment and control groups remained similar at each follow-up data collection point, with significant treatment-control differences on only a few baseline demographic characteristics (Table 3).

Findings / Results:
Description of main findings with specific details.

Overall, averaging across all program sites and all children and families in the sample, Early Head Start programs showed significant impacts on a wide range of child and parent outcomes when the children were 2 and 3 years old. These included impacts in cognitive, language, and social-emotional development (such as reduced aggressive behavior problems), and approaches to learning (including attention and engagement). The effects tended to appear as early as age 2 and were, for the most part, maintained through age 3. Two years later, significant impacts continued to be seen in the social-emotional (reduced behavior problems) and approaches to learning domains. However, the former Early Head Start group did not continue to show the impacts on vocabulary seen in the earlier years, except for the children who were still tested in Spanish a the prekindergarten follow-up, and Early Head Start children did not differ from control group children on measures of school-related achievement.

Equally important, in our view, were the impacts on parenting and the home environment, as these are crucial mediators of young children's development. The program enhanced parental support for children's language and literacy development, daily reading, and teaching activities at ages 2 and 3, with, for the most part, these effects continuing through age 5.

Growth curve analyses demonstrated that the Early Head Start program had a positive impact over time in four areas. These analyses showed that for children's cognitive ability and aggressive behavior, and for maternal supportiveness and the home learning environment (1) the positive program impacts appeared early and (2) the magnitude of the impacts remained relatively constant from age 2 to age 5. As other early interventions have found, while it is noteworthy that the program impacts did not diminish with time, neither did they increase (e.g., Barnett 1995; Brooks-Gunn 2004).

After the original evaluation ended and children left the program (or control condition) for whatever programs awaited them between ages 3 and 5, we tracked children's program attendance. Program group children were significantly more likely than their control counterparts to enroll in formal preschool programs ages 3-5 (47% versus 42%), and more likely to be in Head Start at some time between ages 3 and 5 (55% vs. 49%). Although we now see that the "treatment" group in this evaluation was significantly more likely to experience formal prekindergarten programs between 3 and 5, we also see that the control group was catching up in that there were not large differences in program participation rates in the two-year post-experiment period.

The results we have reviewed so far are from analyses conducted within the framework of the randomized experimental design. In addition to these, the team conducted nonexperimental analyses to tease apart the contributions of children's experiences 0-3 and their post-Early Head Start program experiences 3-5. The children and families who experienced Early Head Start *followed by* formal program enrollment (whether Head Start, preschool, or center child care) in the 3- to 5-year age period demonstrated the most favorable prekindergarten outcomes. These analyses are not based on randomization (i.e., children were not assigned to formal programs or not at the end of Early Head Start) and thus are subject to selection bias.

Conclusions:

Description of conclusions and recommendations based on findings and overall study.

Here are the seven main points about a very complex research and evaluation study, considering mainly the impacts at age 3, but also taking age 5 (prekindergarten) findings into account:

1. Combining home- and center-based services, with perhaps an emphasis on home-based, is more beneficial for children's development and for the home environment their parents provide.

2. Doing a better job of implementing the program performance standards benefits children and parents, especially while they are still in the program. Whatever experiences the Early Head Start and control group children have between ages 3 and 5 appear to somewhat counteract the importance of implementing the standards (but the explanation for this may lie in confounding we observed between program approaches and patterns of implementation.

3. There is no question but that—for whatever reason—African American children and families benefit more from Early Head Start *at all 3 ages* we looked at than the other two major racial/ethnic groups in the study.

4. The picture of how family risk factors relate to program impacts is a bit murky. In general, however, Early Head Start was more effective with the moderate-risk group (as we defined levels or risk). Impacts for the high-risk group, however, emerged later, with some important benefits at age 5.

5. The nature of children's and parents' engagement with the programs is more important than the duration or intensity of their participation, at least for the home-based programs. Evidence from other studies suggests that the number of days in center-based programs *is* important for child outcomes, although our Early Head Start analyses indicate that center *quality* also matters.

6. The Office of Early Head surely intended for Early Head Start to positively impact cognitive, language, and academic outcomes when children were in pre-k. However, we did not find that in the overall analyses (there, I said it—a negative impact!). The

good news is that Early Head Start achieved *overall* impacts on reducing aggressive behavior and improving positive approaches to learning for children and enhancing their home environments—both important for some long-term outcomes—and in addition showed vocabulary gains for African American children and Hispanic Spanish-speaking children. Again, showing the importance of looking at subgroups.

7. Finally, following Early Head Start at ages 0-3 with formal center programs like Head Start 3-5 creates the scenario that shows the strongest associations with the cognitive and academic measures the evaluation administered at age 5. Although children's formal center-based program attendance 3-5 was associated with *increased* behavior problems, when formal 3-5 programs were *preceded* by Early Head Start, this association weakened, as though Early Head Start buffered this negative influence of the prekindergarten programs, while benefiting from the positive influences in academic performance.

The main conclusion is that if programs (1) begin early, (2) continue until children enter kindergarten, and (3) sustain high quality and intensity of services, they have the best chance of making real differences for this country's neediest children and families.

Appendices

Not included in page count.

Appendix A. References

Administration for Children and Families. "Research to Practice: Preliminary Findings from the Early Head Start Prekindergarten Followup." Washington, DC: U.S. Department of Health and Human Services, April 2006. http://www.acf.hhs.gov/programs/opre/Early Head Start/Early Head Start_resrch/reports/prekindergarten_followup/prekindergarten_followup.pdf

Administration for Children and Families. *Making a Difference in the Lives of Infants and Toddlers and Their Families: The Impacts of Early Head Start.* Washington, DC: U.S. Department of Health and Human Services, June 2002. (a)

Administration for Children and Families. *Pathways to Quality and Full Implementation in Early Head Start Programs.* Washington, DC: U.S. Department of Health and Human Services, December 2002. (b)

Barnard, K. E. (1998). "Developing, Implementing, and Documenting Interventions with Parents and Young Children." *Zero to Three, 18,* 23-29.

Barnett, W. S. "Long-Term Effects of Early Childhood Programs on Cognitive and School Outcomes." *The Future of Children,* vol. 5, no. 3, 1995, pp. 25-50.

Brooks-Gunn, J. (2004). "Intervention and Policy as Change Agents for Young Children." In P. L. Chase-Lansdale, K. Kiernan, and R. J. Friedman (Eds.), *Human Development Across Lives and Generations: The Potential for Change.* New York: Cambridge University Press, 2004, pp. 293-340.

Brooks-Gunn, J. (2003). "Do You Believe in Magic? What We Can Expect from Early Childhood Intervention Programs." *Social Policy Report, Society for Research in Child Development, 17.* http://www.srcd.org/Documents/Publications/SPR/spr17-1.pdf.

Brooks-Gunn, J., & Markman, L. (2005). "The Contribution of Parenting to Ethnic and Racial Gaps in School Readiness. *The Future of Children, 15*(1), 138-167.

Brooks-Gunn, J., Gross, R. T., Kraemer, H. C., Spiker, D., & Shapiro, S. (1992). "Enhancing the Cognitive Outcomes of Low-Birth-Weight, Premature Infants: For Whom is the Intervention Most Effective?" *Pediatrics, 89,* 1209-1215.

Brooks-Gunn, J., Klebanov, P. K., & Duncan, G. J. (1996). "Ethnic Differences in Children's Intelligence Test Scores: Role of Economic Deprivation, Home Environment, and Maternal Characteristics." *Child Development, 67,* 396-408.

Campbell, Frances A., and Craig T. Ramey**.** "Cognitive and School Outcomes for High-Risk African American Students at Middle Adolescence: Positive effects of Early Intervention." *American Educational Research Journal,* vol. 32, 1995, pp. 743-772.

Caspi, A., Moffitt, T. E., Newman, D. L., & Silva, P. A. (1996). "Behavioral Observations at Age 3 Predict Adult Psychiatric Disorders: Longitudinal Evidence from a Birth Cohort." *Archives of General Psychiatry, 53,* 1033–1039.

Dishion, T. J., French, D. C., Patterson, G. R. (1995). "The Development and Ecology of Antisocial Behavior." In D. Cicchetti & D. J. Cohen (Eds.), *Developmental Psychopathology, Vol. 2: Risk, Disorder, and Adaptation.* Oxford, England: John Wiley & Sons, 1995, pp. 421-471.

Duncan, G.J., Dowsett, C.J., Claessens, A., Magnuson, K., Huston, A.C., Klebanov, P., Paganni, L.S., Feinstein, L., Engel, M., Brooks-Gunn, J., Sexton, H., Duckworth, K., & Japel, C. (2007). School readiness and later achievement. *Developmental Psychology,* 43, 1428-1446.

Duncan, G. J., Brooks-Gunn, J., & Klebanov, P. K. (1994). "Economic Deprivation and Early-Childhood Development." *Child Development, 65,* 296-318.

Fryer, Jr., R.G., & Levitt, S. D. (2005). "Understanding the Black-White Test Score Gap in the First Two Years of School." *The Review of Economics and Statistics, 86,* 447-464.

Gomby, D. (2005). *Home visitation in 2005: Outcomes for children and parents*. Working Paper No. 7. Washington, DC: Invest in Kids Working Group, Committee for Economic Development.

Hill, J., Brooks-Gunn, J., & Waldfogel, J. (2003). "Sustained Effects of High Participation in an Early Intervention for Low-Birth-Weight Premature Infants." *Developmental Psychology, 39,* 730-744.

Hill, J., Waldfogel, J., & Brooks-Gunn, J. (2002). "Differential Effects of High-Quality Child Care." *Journal of Policy Analysis and Management, 21,* 601-627.

Kelly, J. F., & Barnard, K. E. (2000). "Assessment of Parent-Child Interaction: Implications for Early Intervention". In J. P. Shonkoff & S. J. Meisels (Eds.), *Handbook of Early Childhood Intervention, Second Edition*. Cambridge, UK: Cambridge University Press, 2000, pp. 258-289.

Liaw, F., Meisels, S. J., & Brooks-Gunn, J. (1995). "The Effects of Experience of Early Intervention on Low Birth Weight, Premature Children: The Infant Health & Development Program." *Early Childhood Research Quarterly, 10,* 405-431.

Liaw, F., & Brooks-Gunn, J. (1994). "Cumulative Familial Risks and Low Birth Weight Children's Cognitive and Behavioral Development." *Journal of Clinical Child Psychology, 23,* 360-372.

Love, J. M., L. Harrison, A. Sagi-Schwartz, M.H. van IJzendoorn, C. Ross, J.A. Ungerer, H. Raikes, C. Brady-Smith, K. Boller, J. Brooks-Gunn, J. Constantine, E.E. Kisker, D. Paulsell, and R. Chazan-Cohen. "Child Care Quality Matters: How Conclusions May Vary with Context." *Child Development,* vol. 74, 2003, pp. 1021-1033.

Love, John M., Ellen Eliason Kisker, Christine Ross, Helen Raikes, Jill Constantine, Kimberly Boller, Jeanne Brooks-Gunn, Rachel Chazan-Cohen, Louisa Banks Tarullo, Christy Brady-Smith, Allison S. Fuligni, Peter Z. Schochet, Diane Paulsell, and Cheri Vogel. "The Effectiveness of Early Head Start for 3-Year-Old Children and Their Parents: Lessons for Policy and Programs." *Developmental Psychology,* vol. 41, 2005, pp. 885-901. http://www.apa.org/journals/releases/dev416885.pdf

Magnuson, K. A., & Waldfogel, J. (2005). "Early Childhood Care and Education: Effects on Ethnic and Racial Gaps in School Readiness." The Future of Children, 15(1), 169-196.

Phillips, M., Brooks-Gunn, J., Duncan, G. J., Klebanov, P. K., & Jencks, C. (1998). "Family Background, Parenting Practices, and the Black-White Test Score Gap." In C. Jencks & M. Phillips. (Eds.), *The Black-White test score gap*. Washington, D.C: Brookings Institute, 1998, pp. 103-145.

Raikes, H., B.L. Green, J. Atwater, E. Kisker, J. Constantine, and R. Chazan-Cohen. "Involvement in Early Head Start Home Visiting Services: Demographic Predictors and Relations to Child and Parent Outcomes." *Early Childhood Research Quarterly,* vol. 21, 2006, p. 2-24.

Ramey, C. T., Bryant, D. M., Wasik, B. H., Sparling, J. J., Fendt, K. H., & La Vange, L. M. (1992). "Infant Health and Development Program for Low Birth Weight, Premature Infants: Program Elements, Family Participation, and Child Intelligence." *Pediatrics, 89,* 454-465.

St. Pierre, Robert G., Jean I. Layzer, Barbara D. Goodson, and Lawrence Bernstein. *National Impact Evaluation of the Comprehensive Child Development Program: Final Report.* Cambridge, MA: Abt Associates Inc., 1997.

Appendix B. Tables and Figures

Not included in page count.

.

Table 1. Outcomes Analyzed

Domain	Outcome	Items	Source	Possible Range	Interpretation
			Child Negative Social-Emotional Development		
	CBCL Aggressive Behavior Problems		Parent Report	0-38	Higher scores: More aggressive behavior
	FACES Aggression		Parent Report	0-8	Higher scores: Greater reported aggression
	FACES Total Problem Behaviors		Parent Report	0-24	Higher scores: More behavior problems
	Child Negativity during Play		Observer Rating/ Parent-Child Play Video	1-7	Higher scores: Higher rates at which the child shows anger, hostility, or dislike toward the parent during play
			Child Positive Approaches Toward Learning		
	FACES Social Skills and Positive Approaches to Learning		Parent Report	0-14	Higher scores: More positive approach to learning
	Leiter-R Attention Sustained		Child Assessment	Raw Scores: -74-74 Scaled Scores: 1-19	Higher scores indicate greater numbers of correct answers with few errors, suggesting greater vigilance and focused attention during a repetitive task Negative raw scores occur when more errors than correct answers are given
	Leiter-R Attention Sustained Total Correct		Child Assessment	Raw Scores: 0-74 Scaled Scores: 1-19	Higher scores: Greater numbers of correct answers
	Leiter-R Attention Sustained Total Errors		Child Assessment	Raw Scores: 0-74 Scaled Scores: 1-19	*Higher* error scaled scores correspond to *lower* raw error scores; therefore, higher error scaled scores indicate *fewer* numbers of incorrect answers
	Emotion Regulation (Leiter-R Examiner Rating Scales)		Interviewer Rating/ Child Assessment	Raw Scores: 0-66 Scaled Scores: 46-113	Higher scores: Greater levels of energy, positive emotion, and lack of anxiety; as well as appropriate levels of self-regulation and indistractibility.
	Cognitive Social (Leiter-R Examiner Rating Scales)		Interviewer Rating/ Child Assessment	Raw Scores: 0-81 Scaled Scores: 54-117	Higher scores: Greater levels of attention, organization/ impulse control, activity restraint, and sociability.

Domain	Outcome	Items	Source	Possible Range	Interpretation
	Leiter Scaled Attention (Leiter-R Examiner Rating Scales)		Interviewer Rating/ Child Assessment	Raw Scores: 0-30 Scaled Scores: 1-10	Higher scores: Greater levels of attention, concentration, focus, and indistractibility while performing challenging tasks
	Child Engagement of Parent during Play		Observer Rating/ Parent-Child Play Video	1-7	Higher scores: Higher rates at which the child shows, initiates, and/or maintains interaction with the parent; and communicates positive regard and/or positive affect to the parent during play.
			Child Pre-Academic Skills		
	English Woodcock-Johnson-Revised Letter-Word Identification		Child Assessment	Raw Scores: 0-57 W Scores: 316-589 Scaled Scores: 40-160 (Extended) Scaled Scores: 0-200	Higher scores: Greater English letter/word knowledge preliteracy skills
	Spanish Woodcock-Muñoz-Revisada Identifcación de Letras y Palabras		Child Assessment	Raw Scores: 0-58 W Scores: 316-566 Scaled Scores: 40-160 (Extended) Scaled Scores: 0-200	Higher scores: Greater Spanish letter/word knowledge preliteracy skills
	English Receptive Vocabulary (Peabody Picture Vocabulary Test III)		Child Assessment	Raw Scores: 0-204 Scaled Scores: 40-160	Higher scores: Greater English receptive vocabulary
	Spanish Receptive Vocabulary (Test de Vocabulario en Imagenes Peabody)		Child Assessment	Raw Scores: 0-125 Scaled Scores: 40-160	Higher scores: Greater Spanish receptive vocabulary
	Woodcock-Johnson-Revised Applied Problems		Child Assessment	Raw Scores: 1-60 W Scores: 332-603 Scaled Scores: 40-160 (Extended) Scaled Scores: 0-200	Higher scores: Greater representation, counting, and simple addition/subtraction emerging numeracy skills
	Woodcock-Muñoz-Revisada Problemas Aplicados		Child Assessment	Raw Scores: 0-59 W Scores: 331-600 Scaled Scores: 40-160 (Extended) Scaled Scores: 0-200	Higher scores: Greater representation, counting, and simple addition/subtraction emerging numeracy skills
	Child Individualized Education Plan		Parent Report	0-1	1 = Child has individualized education plan

Domain	Outcome	Items	Source	Possible Range	Interpretation
			Child Health		
	Parent Rating of Child's Health		Parent Report	1-5	Lower scores: Child more healthy
	Speech Problems		Parent Report	1-3	Lower scores: Child has fewer/less serious speech problems
			Parenting and the Home Environment		
	HOME Total Score		Parent Report + Interviewer Observation	0-42	Higher scores: More enriched home environment
	HOME Learning Environment		Parent Report + Interviewer Observation	0-6	Higher scores: More stimulating home learning environment
	HOME Warmth		Parent Report + Interviewer Observation	0-14	Higher scores: Greater home environment warmth
	Parent Supportiveness during Play		Observer Rating/ Parent-Child Play Video	1-7	Higher scores: Greater degree to which the parent is emotionally available and physically and affectively present to the child during play
	Parent Negative Regard during Play		Observer Rating/ Parent-Child Play Video	1-7	Higher scores: Higher rates of parental expressions of discontent with, anger toward, disapproval of, or rejection of the child during play
	Parent Detachment during Play		Observer Rating/ Parent-Child Play Video	1-7	Higher scores: Greater degree to which the parent was unaware, inattentive, and/or indifferent to the child during play
	8 Teaching Activities		Parent Report	0-16	Higher scores: Greater engagement in more types or more frequent teaching activities with the child
		Told child a story?		0-2	0=zero times, 1=one or two times, 2=three or more
		Taught child letters, words, or numbers?			
		Taught child songs or music?			
		Worked on arts and crafts with child?			
		Played with toys or games indoors?			
		Played a game, sport, or exercised together?			

Domain	Outcome	Items	Source	Possible Range	Interpretation
		Took child along while doing errands? Involved child in household chores?			
	Reads to Child Daily		Parent Report	0-1	1 = Someone at home reads to child daily
	Children's Books (26 or more)		Parent Report	0-1	1 = Has 26 or more children's books
	Child Spanked within Past Week		Parent Report	0-1	1 = Child spanked within last week
	Parent Attended Meetings/Open Houses		Teacher Interview	0-1	1 = Parent attended meetings/open houses this year
			Family Well-Being and Mental Health		
	Someone in household had alcohol/drug problem		Parent Report	0-1	1 = Exposure to household drug or alcohol problems within the past year
	Child Witnessed Violence		Parent Report	0-1	1 = Child exposed to violence
	Parent Health Status		Parent Report	1-5	Lower scores: Better parent health
	Depressive Symptoms (Center for Epidemiologic Studies – Depression scale short form)		Parent Report	0-36	Higher scores: Greater numbers/frequency of depressive symptoms
	Parent Witnessed or Was Victim of Violence		Parent Report	0-1	1 = Parent exposed to/experienced violence
	Parent Abused in Past Year		Parent Report	0-1	1 = Parent abused in past year
			Parent Self-Sufficiency		
	Time Employed in Past 6 Months		Parent Report	1-5	Lower values: Greater fraction of time employed during past 6 months (1 = all, 2 = most of the time, 3 = about half the time, 4 = less than half the time, 5 = never)
	Monthly Household Income (dollars)		Parent Report	0 - 7,000	Higher numbers: Higher income
			Early Care & Education Program Quality		
	Early Childhood Environment Rating Scale-Revised				
	ECERS-R Total Score		Center Observer	1-7	Higher scores: Greater overall early care & education program quality

Domain	Outcome	Items	Source	Possible Range	Interpretation
	ECERS-R Space and Furnishings		Center Observer	1-7	Higher scores: Greater quality of indoor space, furnishings and room arrangements for play
	ECERS-R Personal Care Routines		Center Observer	1-7	Higher scores: Higher quality in areas such as greetings/departures, meals, and health and safety practices
	ECERS-R Language-Reasoning		Center Observer	1-7	Higher scores: Greater quality in availability of books, encouragement of children's communication skills, and use of language
	ECERS-R Activities		Center Observer	1-7	Higher scores: Greater quality manifest in the availability of activities to promote fine motor, art, music, dramatic play, science, and math skills.
	ECERS-R Interaction		Center Observer	1-7	Higher scores: Greater quality in supervision of children, staff to child interactions, and child to child interactions
	ECERS-R Program Structure		Center Observer	1-7	Higher scores: Greater quality in program scheduling, free play activities, and group time
	ECERS-R Parents and Staff		Center Observer	1-7	Higher scores: Greater quality in provisions for parents, staff supervision, and staff cooperation
	Arnett Caregiver Interaction Scale				
	Arnett CIS Total Score		Center Observer	26-104	Higher scores: Greater the degree to which caregiver-children interactions are positive, warm, developmentally appropriate, and not hostile; as well as the degree to which caregivers are actively engaged with children and exercise appropriate control over them.
	Arnett CIS Positive Interactions		Center Observer	10-40	Higher scores: Greater the degree of warmth, enthusiasm, and developmentally appropriate interactions between caregivers and children
	Arnett CIS Punitiveness		Center Observer	9-36	Higher scores: Greater the degree to which caregiver-children interactions are characterized by hostility and harshness.
	Arnett CIS Detachment		Center Observer	4-16	Higher scores: Greater degree of disinterest and lack of caregiver engagement with children

Domain	Outcome	Items	Source	Possible Range	Interpretation
	Arnett CIS Permissiveness		Center Observer	3-12	Higher scores: Greater degree to which caregiver uses appropriate levels of control over children and appropriate levels of discipline (i.e., neither overly permissive nor overly controlling)

Table 2. Response Rates Overall and by Treatment Status for Key Follow-Up Study Data Elements

Data Element	Overall	EHS	Control	Difference[a]
Any Tracking or Prekindergarten Data	2,329 (77.6%)	1,217 (80.4%)	1,112 (74.7%)	<.01
Any Tracking Interview	2,016 (67.2%)	1,047 (69.2%)	969 (65.1%)	<.01
Any Prekindergarten Data	2,142 (71.4%)	1,110 (73.4%)	1,032 (69.4%)	<.02
Prekindergarten Parent Interview	2,063 (68.7%)	1,071 (70.8%)	992 (66.7%)	<.01
Any Direct Child Assessment Data	1,877 (62.6%)	974 (64.4%)	903 (60.7%)	<.03
Any Parent-Child Video Data	1,808 (60.3%)	946 (62.5%)	862 (57.9%)	<.01
Sample Size	3,001	1,513	1,488	

[a] *p*-values refer to likelihood ratio chi-square tests of differential response rates between the EHS and control groups.

Table 3
. Response Biases at Prekindergarten and 3-year Follow-Ups on Selected Baseline Characteristics

Characteristic	PreK Respondents			PreK Nonrespondents				3-year Respondents		
	EHS	Comp	(a)	EHS	Comp	(b)	(c)	EHS	Comp	(d)
Baseline Program and Contextual Characteristics										
Urban Setting	43.60	43.90		34.24	35.96	**	**	43.42	43.81	
Program Approach						***				
Center-Based	22.70	20.74		13.40	20.18			22.74	20.91	
Home-Based	44.95	45.54		51.61	45.61			45.21	44.80	
Mixed	32.34	33.72		34.99	34.21			32.05	34.29	
Implementation Pattern						***	**			
Early	34.41	34.30		34.74	35.96			35.18	35.78	
Late	38.74	37.79		24.57	29.17			37.69	36.08	
Incomplete	26.85	27.91		40.69	34.87			27.13	28.15	
Random Assignment Date (●)						***				
Before 10/1996	34.86	34.98		39.21	39.91			35.36	35.68	
10/1996 to 6/1997	28.65	31.01		34.49	30.48			28.65	31.32	
After 6/1997	36.49	34.01		26.30	29.61			35.99	33.00	

Characteristic	PreK Respondents			PreK Nonrespondents				3-year Respondents		
	EHS	Comp	(a)	EHS	Comp	(b)	(c)	EHS	Comp	(d)
Baseline Sociodemographic Characteristics										
Highest Grade Completed (●)										
< 12	46.55	46.96		50.38	49.43			45.24	45.26	
12 or GED	28.54	29.55		24.55	30.57			29.23	29.48	
12+	24.91	23.48		25.06	20.00			25.53	25.26	
Race / Ethnicity (●)						**				
White	39.19	38.17		31.99	34.70			39.40	39.98	
African American	32.23	34.69		39.55	35.62			32.48	33.77	
Hispanic	24.63	22.86		21.66	24.66			24.02	21.67	
Other	3.94	4.27		6.80	5.02			4.09	4.58	
English Language Ability (●)						*	+			
English is primary language	80.24	79.55		79.39	75.00			80.35	80.10	
Speaks English well	8.53	10.17		12.47	10.38			8.76	10.21	
Does not speak English well	11.22	10.27		8.14	14.62			10.89	9.69	
Primary Occupation (●)										
Employed	23.72	24.47		20.76	22.25			25.35	23.87	
In school or training	22.33	21.55		21.27	21.33			21.92	20.68	
Neither	53.95	53.98		57.97	56.42			52.73	55.45	
Living Arrangements (●)						+	** *			
Living with spouse	25.41	26.29		23.63	23.33			25.96	27.09	
Living with other adults	40.00	41.29		33.58	34.22			38.50	38.75	
Living with no other adults	34.59	32.42		42.79	42.44			35.54	34.16	
Adult Male Present in Household (●)	39.64	41.19		33.83	34.22	+	*	40.02	40.94	

Characteristic	PreK Respondents			PreK Nonrespondents				3-year Respondents		
	EHS	Comp	(a)	EHS	Comp	(b)	(c)	EHS	Comp	(d)
Number of Adults in Household						**	***			
1	35.62	33.30		43.78	44.22			36.74	35.06	
2	51.04	52.39		46.27	47.11			50.18	51.39	
3 or more	13.35	14.31		9.95	8.67			13.08	13.55	
Number of Children 0-5 in Household (●)										
0	63.60	64.95		66.17	65.56			64.82	63.35	
1	27.75	26.39		24.88	27.78			26.68	28.29	
2 or more	8.65	8.67		8.96	6.67			8.50	8.37	
Number of Children 6-17 in Household (●)										
0	63.15	64.85		67.41	69.78			63.12	65.74	
1	23.51	22.01		21.89	19.78			24.26	21.22	
2 or more	13.33	13.15		10.70	10.44			12.62	13.05	
Number of Moves (●)						+	+			
0	51.16	51.86		43.92	44.47			50.76	51.08	
1	27.75	26.86		33.33	30.59			28.29	27.70	
2 or more	21.10	21.27		22.75	24.94			20.95	21.23	
Owns Home	12.88	12.59		5.74	7.71	** *	**	12.37	12.28	

Characteristic	PreK Respondents			PreK Nonrespondents				3-year Respondents		
	EHS	Comp	(a)	EHS	Comp	(b)	(c)	EHS	Comp	(d)
Household Income as a Percentage of Poverty Level (●)										
Less than 33	29.87	30.17		31.02	29.54			29.26	27.91	
33 to 67	31.06	28.15		36.45	31.71			31.30	30.46	
67 to 99	25.32	27.32		20.48	24.66			25.19	27.43	
100 or more	13.74	14.37		12.05	14.09			14.26	14.20	
Prior Enrollment in Head Start or other Child Development Program (●)	12.91	13.37		12.47	13.46			13.02	14.08	
Baseline Entitlement Receipt										
Received AFDC/TANF (●)	33.30	33.50		42.06	37.29	**		32.74	33.33	
Received Food Stamps (●)	45.21	46.40		55.94	50.94	** *		45.79	46.40	
Received Medicaid	75.19	75.63		80.74	72.41	*		75.70	74.66	
Received SSI (●)	7.33	6.80		6.07	7.55			6.82	7.30	
Received WIC (●)	87.50	86.60		87.34	84.43			87.38	86.13	
Received Public Housing	10.34	7.72	*	7.12	11.56	+	*	10.00	8.65	

Characteristic	PreK Respondents			PreK Nonrespondents				3-year Respondents		
	EHS	Comp	(a)	EHS	Comp	(b)	(c)	EHS	Comp	(d)
Baseline Resource Inadequacies										
Food (●)	4.60	6.21		5.82	6.53			4.74	6.83	+
Housing (●)	12.49	12.10		11.61	15.99		+	11.92	12.04	
Money for Necessities (●)	19.58	20.28		24.46	25.00	*	+	19.96	20.31	
Medical Care (●)	14.06	13.70		13.66	17.09			13.43	13.98	
Transportation (●)	20.71	21.65		21.49	24.35			21.01	22.25	
Childcare	33.00	32.43		38.72	39.71	+	*	33.37	34.08	
Money for Supplies	26.45	28.32		29.08	31.87			25.03	30.18	*
Support from Family and Friends	12.84	12.10		13.04	18.37		**	12.23	11.86	
Parenting Information	36.72	37.74		31.37	40.66	+		36.07	38.31	
Baseline High Risk Indices										
Teen Mother (< 20 yo) (●)	37.52	38.76		40.15	37.72			37.05	37.56	
Received Welfare	51.69	51.47		60.69	55.42	**		52.15	51.30	
Not Married/Cohabiting	74.59	73.71		76.37	76.67			74.04	72.91	
Less than HS Diploma or GED	46.55	46.96		50.38	49.43			45.24	45.26	
Not Employed/School/Training	53.95	53.98		57.97	56.42			52.73	55.45	
Maternal Risk Index						*				
0-2 risks	44.07	43.64		35.79	41.12			44.98	44.66	
3 risks	29.68	32.07		36.34	29.68			30.63	30.96	
4-5 risks	26.25	24.29		27.87	29.20			24.39	24.38	
Baseline Child Characteristics										
Focus Child's Age at Randomization (●)										
Unborn	24.50	27.33		23.33	24.78			23.99	25.77	

Characteristic	PreK Respondents			PreK Nonrespondents				3-year Respondents		
	EHS	Comp	(a)	EHS	Comp	(b)	(c)	EHS	Comp	(d)
0-4 months	35.95	34.50		38.96	35.31			35.27	34.99	
5-12 months	40.45	38.18		37.72	39.91			40.73	39.25	
Focus Child is Male (●)	51.31	50.97		52.71	49.07			50.94	50.00	
Focus Child was Firstborn Child (●)	60.73	62.85		66.75	62.70	*		61.87	60.71	
Child Born more than 3 Weeks Early (●)	15.01	11.74	*	14.64	13.01			13.80	11.84	
Birthweight less than 2500 grams (●)	9.19	7.60		10.34	10.34			8.54	7.49	
Stay in Hospital after Birth	17.81	15.94		17.76	16.57			17.14	16.33	
People Concerned about Child's Health	12.45	13.88		14.54	11.84			12.74	14.37	
Child Received Evaluation (●)	5.25	7.08		8.27	6.62	+		5.44	6.36	
Child has Estab/Bio.Med/Environ Risks	42.03	44.88		41.81	45.02			41.16	45.01	
Child has Established Risks (●)	11.29	10.25		12.54	11.29			11.74	10.14	
Child has Biological or Medical Risks (●)	17.31	16.16		20.91	18.39			17.43	16.81	
Child has Environmental Risks (●)	33.38	36.65		29.97	35.69			32.01	36.47	+
Child Covered by Health Insurance	90.86	91.04		88.01	86.47		*	91.02	92.33	

(●) Denotes impact analysis control variable

(a) Significance levels are from tests comparing preK program and control group respondents (preK internal validity)
(b) Significance levels are from tests comparing program group respondents and non-respondents (preK external validity)

Characteristic	PreK Respondents			PreK Nonrespondents				3-year Respondents		
	EHS	Comp	(a)	EHS	Comp	(b)	(c)	EHS	Comp	(d)

(c) Significance levels are from tests comparing control group respondents and non- respondents (preK external validity)
(d) Significance levels are from tests comparing 36-month program and control group respondents (3-year internal validity)

*** Contrast is statistically significant at the .001 level
** Contrast is statistically significant at the .01 level
* Contrast is statistically significant at the .05 level
+ Contrast is statistically significant at the .1 level