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2003 through 2005, to carry out this part. Such funds shall remain available until expended.”.

TITLE VIII—EARLY LEARNING OPPORTUNITIES

SEC. 801. SHORT TITLE; FINDINGS.

(a) **SHORT TITLE.**—This title may be cited as the “Early Learning Opportunities Act”.

(b) **FINDINGS.**—Congress finds that—

(1) medical research demonstrates that adequate stimulation of a young child’s brain between birth and age 5 is critical to the physical development of the young child’s brain;

(2) parents are the most significant and effective teachers of their children, and they alone are responsible for choosing the best early learning opportunities for their child;

(3) parent education and parent involvement are critical to the success of any early learning program or activity;

(4) the more intensively parents are involved in their child’s early learning, the greater the cognitive and noncognitive benefits to their children;

(5) many parents have difficulty finding the information and support the parents seek to help their children grow to their full potential;

(6) each day approximately 13,000,000 young children, including 6,000,000 infants or toddlers, spend some or all of their day being cared for by someone other than their parents;

(7) quality early learning programs, including those designed to promote effective parenting, can increase the literacy rate, the secondary school graduation rate, the employment rate, and the college enrollment rate for children who have participated in voluntary early learning programs and activities;

(8) early childhood interventions can yield substantial advantages to participants in terms of emotional and cognitive development, education, economic well-being, and health, with the latter 2 advantages applying to the children's families as well;

(9) participation in quality early learning programs, including those designed to promote effective parenting, can decrease the future incidence of teenage pregnancy, welfare dependency, at-risk behaviors, and juvenile delinquency for children;

(10) several cost-benefit analysis studies indicate that for each \$1 invested in quality early learning programs, the Federal Government can save over \$5 by reducing the number of children and families

who participate in Federal Government programs like special education and welfare;

(11) for children placed in the care of others during the workday, the low salaries paid to the child care staff, the lack of career progression for the staff, and the lack of child development specialists involved in early learning and child care programs, make it difficult to attract and retain the quality of staff necessary for a positive early learning experience;

(12) Federal Government support for early learning has primarily focused on out-of-home care programs like those established under the Head Start Act, the Child Care and Development Block Grant of 1990, and part C of the Individuals with Disabilities Education Act, and these programs—

(A) serve far fewer than half of all eligible children;

(B) are not primarily designed to provide support for parents who care for their young children in the home; and

(C) lack a means of coordinating early learning opportunities in each community; and

(13) by helping communities increase, expand, and better coordinate early learning opportunities

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for children and their families, the productivity and creativity of future generations will be improved, and the Nation will be prepared for continued leadership in the 21st century.

SEC. 802. PURPOSES.

The purposes of this title are—

(1) to increase the availability of voluntary programs, services, and activities that support early childhood development, increase parent effectiveness, and promote the learning readiness of young children so that young children enter school ready to learn;

(2) to support parents, child care providers, and caregivers who want to incorporate early learning activities into the daily lives of young children;

(3) to remove barriers to the provision of an accessible system of early childhood learning programs in communities throughout the United States;

(4) to increase the availability and affordability of professional development activities and compensation for caregivers and child care providers; and

(5) to facilitate the development of community-based systems of collaborative service delivery models characterized by resource sharing, linkages be-

tween appropriate supports, and local planning for services.

SEC. 803. DEFINITIONS.

In this title:

(1) CAREGIVER.—The term “caregiver” means an individual, including a relative, neighbor, or family friend, who regularly or frequently provides care, with or without compensation, for a child for whom the individual is not the parent.

(2) CHILD CARE PROVIDER.—The term “child care provider” means a provider of non-residential child care services (including center-based, family-based, and in-home child care services) for compensation who or that is legally operating under State law, and complies with applicable State and local requirements for the provision of child care services.

(3) EARLY LEARNING.—The term “early learning”, used with respect to a program or activity, means learning designed to facilitate the development of cognitive, language, motor, and social-emotional skills for, and to promote learning readiness in, young children.

(4) EARLY LEARNING PROGRAM.—The term “early learning program” means—

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(A) a program of services or activities that helps parents, caregivers, and child care providers incorporate early learning into the daily lives of young children; or

(B) a program that directly provides early learning to young children.

(5) INDIAN TRIBE.—The term “Indian tribe” has the meaning given the term in section 4 of the Indian Self-Determination and Education Assistance Act (25 U.S.C. 450b).

(6) LOCAL COUNCIL.—The term “Local Council” means a Local Council established or designated under section 814(a) that serves one or more localities.

(7) LOCALITY.—The term “locality” means a city, county, borough, township, or area served by another general purpose unit of local government, an Indian tribe, a Regional Corporation, or a Native Hawaiian entity.

1 (8) PARENT.—The term “parent” means a bio-
2 logical parent, an adoptive parent, a stepparent, a
3 foster parent, or a legal guardian of, or a person
4 standing in loco parentis to, a child.

5 (9) POVERTY LINE.—The term “poverty line”
6 means the poverty line (as defined by the Office of

1 Management and Budget, and revised annually in
2 accordance with section 673(2) of the Community
3 Services Block Grant Act (42 U.S.C. 9902(2))) ap-
4 plicable to a family of the size involved.

5 (10) REGIONAL CORPORATION.—The term “Re-
6 gional Corporation” means an entity listed in section
7 419(4)(B) of the Social Security Act (42 U.S.C.
8 619(4)(B)).

9 (11) SECRETARY.—The term “Secretary”
10 means the Secretary of Health and Human Services.

11 (12) STATE.—The term “State” means each of
12 the several States of the United States, the District
13 of Columbia, and the Commonwealth of Puerto Rico.

14 (13) TRAINING.—The term “training” means
15 instruction in early learning that—

16 (A) is required for certification under
17 State and local laws, regulations, and policies;

18 (B) is required to receive a nationally or
19 State recognized credential or its equivalent;

20 (C) is received in a postsecondary edu-
21 cation program focused on early learning or
22 early childhood development in which the indi-
23 vidual is enrolled; or

24 (D) is provided, certified, or sponsored by
25 an organization that is recognized for its exper-

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1 tise in promoting early learning or early child-
2 hood development.

3 (14) YOUNG CHILD.—The term “young child”
4 means any child from birth to the age of mandatory
5 school attendance in the State where the child re-
6 sides.

7 **SEC. 804. PROHIBITIONS.**

8 (a) PARTICIPATION NOT REQUIRED.—No person, in-
9 cluding a parent, shall be required to participate in any
10 program of early childhood education, early learning, par-
11 ent education, or developmental screening pursuant to the
12 provisions of this title.

13 (b) RIGHTS OF PARENTS.—Nothing in this title shall
14 be construed to affect the rights of parents otherwise es-
15 tablished in Federal, State, or local law.

16 (c) PARTICULAR METHODS OR SETTINGS.—No entity
17 that receives funds under this title shall be required to
18 provide services under this title through a particular in-
19 structional method or in a particular instructional setting
20 to comply with this title.

21 (d) NONDUPLICATION.—No funds provided under
22 this title shall be used to carry out an activity funded
23 under another provision of law providing for Federal child
24 care or early learning programs, unless an expansion of

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1 such activity is identified in the local needs assessment
2 and performance goals under this title.

3 **SEC. 805. AUTHORIZATION AND APPROPRIATION OF**
4 **FUNDS.**

5 There are authorized to be appropriated to the De-
6 partment of Health and Human Services to carry out this
7 title—

8 (1) \$750,000,000 for fiscal year 2001;

9 (2) \$1,000,000,000 for fiscal year 2002;

10 (3) \$1,500,000,000 for fiscal year 2003; and

11 (4) such sums as may be necessary for each of
12 the fiscal years 2004 and 2005.

13 **SEC. 806. COORDINATION OF FEDERAL PROGRAMS.**

14 (a) **COORDINATION.**—The Secretary and the Sec-
15 retary of Education shall develop mechanisms to resolve
16 administrative and programmatic conflicts between Fed-
17 eral programs that would be a barrier to parents, care-
18 givers, service providers, or children related to the coordi-
19 nation of services and funding for early learning pro-
20 grams.

21 (b) **USE OF EQUIPMENT AND SUPPLIES.**—In the case
22 of a collaborative activity funded under this title and an-
23 other provision of law providing for Federal child care or
24 early learning programs, the use of equipment and
25 nonconsumable supplies purchased with funds made avail-

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1 able under this title or such provision shall not be re-
2 stricted to children enrolled or otherwise participating in
3 the program carried out under this title or such provision,
4 during a period in which the activity is predominately
5 funded under this title or such provision.

6 **SEC. 807. PROGRAM AUTHORIZED.**

7 (a) **GRANTS.**—From amounts appropriated under
8 section 805 the Secretary shall award grants to States to
9 enable the States to award grants to Local Councils to
10 pay the Federal share of the cost of carrying out early
11 learning programs in the locality served by the Local
12 Council.

13 (b) **FEDERAL SHARE.**—

14 (1) **IN GENERAL.**—The Federal share of the
15 cost described in subsections (a) and (e) shall be 85
16 percent for the first and second years of the grant,
17 80 percent for the third and fourth years of the
18 grant, and 75 percent for the fifth and subsequent
19 years of the grant.

20 (2) **NON-FEDERAL SHARE.**—The non-Federal
21 share of the cost described in subsections (a) and (e)
22 may be contributed in cash or in kind, fairly evalu-
23 ated, including facilities, equipment, or services,
24 which may be provided from State or local public
25 sources, or through donations from private entities.

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1 For the purposes of this paragraph the term "facili-
2 ties" includes the use of facilities, but the term
3 "equipment" means donated equipment and not the
4 use of equipment.

5 (c) MAINTENANCE OF EFFORT.—The Secretary shall
6 not award a grant under this title to any State unless the
7 Secretary first determines that the total expenditures by
8 the State and its political subdivisions to support early
9 learning programs (other than funds used to pay the non-
10 Federal share under subsection (b)(2)) for the fiscal year
11 for which the determination is made is equal to or greater
12 than such expenditures for the preceding fiscal year.

13 (d) SUPPLEMENT NOT SUPPLANT.—Amounts re-
14 ceived under this title shall be used to supplement and
15 not supplant other Federal, State, and local public funds
16 expended to promote early learning.

17 (e) SPECIAL RULE.—If funds appropriated to carry
18 out this title are less than \$150,000,000 for any fiscal
19 year, the Secretary shall award grants for the fiscal year
20 directly to Local Councils, on a competitive basis, to pay
21 the Federal share of the cost of carrying out early learning
22 programs in the locality served by the Local Council. In
23 carrying out the preceding sentence—

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1 (1) subsection (c), subsections (b) and (c) of
2 section 810, and paragraphs (1), (2), and (3) of sec-
3 tion 811(a) shall not apply;

4 (2) State responsibilities described in section
5 811(d) shall be carried out by the Local Council
6 with regard to the locality;

7 (3) the Secretary shall provide such technical
8 assistance and monitoring as necessary to ensure
9 that the use of the funds by Local Councils and the
10 distribution of the funds to Local Councils are con-
11 sistent with this title; and

12 (4) subject to paragraph (1), the Secretary
13 shall assume the responsibilities of the Lead State
14 Agency under this title, as appropriate.

15 **SEC. 808. USES OF FUNDS.**

16 (a) **IN GENERAL.**—Subject to section 810, grant
17 funds under this title shall be used to pay for developing,
18 operating, or enhancing voluntary early learning programs
19 that are likely to produce sustained gains in early learn-
20 ing.

21 (b) **LIMITED USES.**—Subject to section 810, Lead
22 State Agencies and Local Councils shall ensure that funds
23 made available under this title to the agencies and Local
24 Councils are used for 3 or more of the following activities:

1 (1) Helping parents, caregivers, child care pro-
2 viders, and educators increase their capacity to fa-
3 cilitate the development of cognitive, language com-
4 prehension, expressive language, social-emotional,
5 and motor skills, and promote learning readiness.

6 (2) Promoting effective parenting.

7 (3) Enhancing early childhood literacy.

8 (4) Developing linkages among early learning
9 programs within a community and between early
10 learning programs and health care services for
11 young children.

12 (5) Increasing access to early learning opportu-
13 nities for young children with special needs, includ-
14 ing developmental delays, by facilitating coordination
15 with other programs serving such young children.

16 (6) Increasing access to existing early learning
17 programs by expanding the days or times that the
18 young children are served, by expanding the number
19 of young children served, or by improving the afford-
20 ability of the programs for low-income families.

21 (7) Improving the quality of early learning pro-
22 grams through professional development and train-
23 ing activities, increased compensation, and recruit-
24 ment and retention incentives, for early learning
25 providers.

1 (8) Removing ancillary barriers to early learn-
2 ing, including transportation difficulties and absence
3 of programs during nontraditional work times.

4 (c) REQUIREMENTS.—Each Lead State Agency des-
5 ignated under section 810(c) and Local Councils receiving
6 a grant under this title shall ensure—

7 (1) that Local Councils described in section 814
8 work with local educational agencies to identify cog-
9 nitive, social, emotional, and motor developmental
10 abilities which are necessary to support children's
11 readiness for school;

12 (2) that the programs, services, and activities
13 assisted under this title will represent develop-
14 mentally appropriate steps toward the acquisition of
15 those abilities; and

16 (3) that the programs, services, and activities
17 assisted under this title collectively provide benefits
18 for children cared for in their own homes as well as
19 children placed in the care of others.

20 (d) SLIDING SCALE PAYMENTS.—States and Local
21 Councils receiving assistance under this title shall ensure
22 that programs, services, and activities assisted under this
23 title which customarily require a payment for such pro-
24 grams, services, or activities, adjust the cost of such pro-
25 grams, services, and activities provided to the individual

1 or the individual's child based on the individual's ability
2 to pay.

3 **SEC. 809. RESERVATIONS AND ALLOTMENTS.**

4 (a) **RESERVATION FOR INDIAN TRIBES, ALASKA NA-**
5 **TIVES, AND NATIVE HAWAIIANS.**—The Secretary shall re-
6 serve 1 percent of the total amount appropriated under
7 section 805 for each fiscal year, to be allotted to Indian
8 tribes, Regional Corporations, and Native Hawaiian enti-
9 ties, of which—

10 (1) 0.5 percent shall be available to Indian
11 tribes; and

12 (2) 0.5 percent shall be available to Regional
13 Corporations and Native Hawaiian entities.

14 (b) **ALLOTMENTS.**—From the funds appropriated
15 under this title for each fiscal year that are not reserved
16 under subsection (a), the Secretary shall allot to each
17 State the sum of—

18 (1) an amount that bears the same ratio to 50
19 percent of such funds as the number of children 4
20 years of age and younger in the State bears to the
21 number of such children in all States; and

22 (2) an amount that bears the same ratio to 50
23 percent of such funds as the number of children 4
24 years of age and younger living in families with in-

19 (a) FEDERAL ADMINISTRATIVE COSTS.—The Sec-
20 retary may use not more than 3 percent of the amount
21 appropriated under section 805 for a fiscal year to pay
22 for the administrative costs of carrying out this title, in-
23 cluding the monitoring and evaluation of State and local
24 efforts.

1 (b) STATE ADMINISTRATIVE COSTS.—A State that
2 receives a grant under this title may use—

3 (1) not more than 2 percent of the funds made
4 available through the grant to carry out activities
5 designed to coordinate early learning programs on
6 the State level, including programs funded or oper-
7 ated by the State educational agency, health, chil-
8 dren and family, and human service agencies, and
9 any State-level collaboration or coordination council
10 involving early learning and education, such as the
11 entities funded under section 640(a)(5) of the Head
12 Start Act (42 U.S.C. 9835 (a)(5));

13 (2) not more than 2 percent of the funds made
14 available through the grant for the administrative
15 costs of carrying out the grant program and the
16 costs of reporting State and local efforts to the Sec-
17 retary; and

18 (3) not more than 3 percent of the funds made
19 available through the grant for training, technical
20 assistance, and wage incentives provided by the
21 State to Local Councils.

22 (c) LEAD STATE AGENCY.—

23 (1) IN GENERAL.—To be eligible to receive an
24 allotment under this title, the Governor of a State
25 shall appoint, after consultation with the leadership

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1 of the State legislature, a Lead State Agency to
2 carry out the functions described in paragraph (2).

3 (2) LEAD STATE AGENCY.—

4 (A) ALLOCATION OF FUNDS.—The Lead
5 State Agency described in paragraph (1) shall
6 allocate funds to Local Councils as described in
7 section 812.

8 (B) FUNCTIONS OF AGENCY.—In addition
9 to allocating funds pursuant to subparagraph
10 (A), the Lead State Agency shall—

11 (i) advise and assist Local Councils in
12 the performance of their duties under this
13 title;

14 (ii) develop and submit the State ap-
15 plication;

16 (iii) evaluate and approve applications
17 submitted by Local Councils under section
18 813;

19 (iv) ensure collaboration with respect
20 to assistance provided under this title be-
21 tween the State agency responsible for
22 education and the State agency responsible
23 for children and family services;

24 (v) prepare and submit to the Sec-
25 retary, an annual report on the activities

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1 carried out in the State under this title,
2 which shall include a statement describing
3 how all funds received under this title are
4 expended and documentation of the effects
5 that resources under this title have had
6 on—

7 (I) parental capacity to improve
8 learning readiness in their young chil-
9 dren;

10 (II) early childhood literacy;
11 (III) linkages among early learn-
12 ing programs;

13 (IV) linkages between early
14 learning programs and health care
15 services for young children;

16 (V) access to early learning ac-
17 tivities for young children with special
18 needs;

19 (VI) access to existing early
20 learning programs through expansion
21 of the days or times that children are
22 served;

23 (VII) access to existing early
24 learning programs through expansion

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1 of the number of young children
2 served;

3 (VIII) access to and affordability
4 of existing early learning programs for
5 low-income families;

6 (IX) the quality of early learning
7 programs resulting from professional
8 development, and recruitment and re-
9 tention incentives for caregivers; and

10 (X) removal of ancillary barriers
11 to early learning, including transpor-
12 tation difficulties and absence of pro-
13 grams during nontraditional work
14 times; and

15 (vi) ensure that training and research
16 is made available to Local Councils and
17 that such training and research reflects the
18 latest available brain development and
19 early childhood development research re-
20 lated to early learning.

21 SEC. 811. STATE REQUIREMENTS.

22 (a) ELIGIBILITY.—To be eligible for a grant under
23 this title, a State shall—

24 (1) ensure that funds received by the State
25 under this title shall be subject to appropriation by

1 the State legislature, consistent with the terms and
2 conditions required under State law;

3 (2) designate a Lead State Agency under sec-
4 tion 810(c) to administer and monitor the grant and
5 ensure State-level coordination of early learning pro-
6 grams;

7 (3) submit to the Secretary an application at
8 such time, in such manner, and accompanied by
9 such information as the Secretary may require;

10 (4) ensure that funds made available under this
11 title are distributed on a competitive basis through-
12 out the State to Local Councils serving rural, urban,
13 and suburban areas of the State; and

14 (5) assist the Secretary in developing mecha-
15 nisms to ensure that Local Councils receiving funds
16 under this title comply with the requirements of this
17 title.

18 (b) STATE PREFERENCE.—In awarding grants to
19 Local Councils under this title, the State, to the maximum
20 extent possible, shall ensure that a broad variety of early
21 learning programs that provide a continuity of services
22 across the age spectrum assisted under this title are fund-
23 ed under this title, and shall give preference to
24 supporting—

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1 (1) a Local Council that meets criteria, that are
2 specified by the State and approved by the Sec-
3 retary, for qualifying as serving an area of greatest
4 need for early learning programs; and

5 (2) a Local Council that demonstrates, in the
6 application submitted under section 813, the Local
7 Council's potential to increase collaboration as a
8 means of maximizing use of resources provided
9 under this title with other resources available for
10 early learning programs.

11 (c) LOCAL PREFERENCE.—In awarding grants under
12 this title, Local Councils shall give preference to
13 supporting—

14 (1) projects that demonstrate their potential to
15 collaborate as a means of maximizing use of re-
16 sources provided under this title with other resources
17 available for early learning programs;

18 (2) programs that provide a continuity of serv-
19 ices for young children across the age spectrum, in-
20 dividually, or through community-based networks or
21 cooperative agreements; and

22 (3) programs that help parents and other care-
23 givers promote early learning with their young chil-
24 dren.

25 (d) PERFORMANCE GOALS.—

1 (1) ASSESSMENTS.—Based on information and
2 data received from Local Councils, and information
3 and data available through State resources, the
4 State shall biennially assess the needs and available
5 resources related to the provision of early learning
6 programs within the State.

7 (2) PERFORMANCE GOALS.—Based on the anal-
8 ysis of information described in paragraph (1), the
9 State shall establish measurable performance goals
10 to be achieved through activities assisted under this
11 title.

12 (3) REQUIREMENT.—The State shall award
13 grants to Local Councils only for purposes that are
14 consistent with the performance goals established
15 under paragraph (2).

16 (4) REPORT.—The State shall report to the
17 Secretary annually regarding the State's progress to-
18 ward achieving the performance goals established in
19 paragraph (2) and any necessary modifications to
20 those goals, including the rationale for the modifica-
21 tions.

22 (5) IMPROVEMENT PLANS.—If the Secretary de-
23 termines, based on the State report submitted under
24 paragraph (4), that the State is not making progress
25 toward achieving the performance goals described in

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1 paragraph (2), then the State shall submit a per-
2 formance improvement plan to the Secretary, and
3 demonstrate reasonable progress in implementing
4 such plan, in order to remain eligible for funding
5 under this title.

6 SEC. 812. LOCAL ALLOCATIONS.

7 (a) IN GENERAL.—The Lead State Agency shall allo-
8 cate to Local Councils in the State not less than 93 per-
9 cent of the funds provided to the State under this title
10 for a fiscal year.

11 (b) LIMITATION.—The Lead State Agency shall allo-
12 cate funds provided under this title on the basis of the
13 population of the locality served by the Local Council.

14 SEC. 813. LOCAL APPLICATIONS.

15 (a) IN GENERAL.—To be eligible to receive assistance
16 under this title, the Local Council shall submit an applica-
17 tion to the Lead State Agency at such time, in such man-
18 ner, and containing such information as the Lead State
19 Agency may require.

20 (b) CONTENTS.—Each application submitted pursu-
21 ant to subsection (a) shall include a statement ensuring
22 that the local government entity, Indian tribe, Regional
23 Corporation, or Native Hawaiian entity has established or
24 designated a Local Council under section 814, and the

1 Local Council has developed a local plan for carrying out
2 early learning programs under this title that includes—

3 (1) a needs and resources assessment con-
4 cerning early learning services and a statement de-
5 scribing how early learning programs will be funded
6 consistent with the assessment;

7 (2) a statement of how the Local Council will
8 ensure that early learning programs will meet the
9 performance goals reported by the Lead State Agen-
10 cy under this title; and

11 (3) a description of how the Local Council will
12 form collaboratives among local youth, social service,
13 and educational providers to maximize resources and
14 concentrate efforts on areas of greatest need.

15 **SEC. 814. LOCAL ADMINISTRATION.**

16 (a) **LOCAL COUNCIL.—**

17 (1) **IN GENERAL.—**To be eligible to receive
18 funds under this title, a local government entity, In-
19 dian tribe, Regional Corporation, or Native Hawai-
20 ian entity, as appropriate, shall establish or des-
21 ignate a Local Council, which shall be composed
22 of—

23 (A) representatives of local agencies di-
24 rectly affected by early learning programs as-
25 sisted under this title;

1 (B) parents;

2 (C) other individuals concerned with early
3 learning issues in the locality, such as rep-
4 resentative entities providing elementary edu-
5 cation, child care resource and referral services,
6 early learning opportunities, child care, and
7 health services; and

8 (D) other key community leaders.

9 (2) DESIGNATING EXISTING ENTITY.—If a local
10 government entity, Indian tribe, Regional Corpora-
11 tion, or Native Hawaiian entity has, before the date
12 of enactment of the Early Learning Opportunities
13 Act, a Local Council or a regional entity that is
14 comparable to the Local Council described in para-
15 graph (1), the entity, tribe or corporation may des-
16 ignate the council or entity as a Local Council under
17 this title, and shall be considered to have established
18 a Local Council in compliance with this subsection.

19 (3) FUNCTIONS.—The Local Council shall be
20 responsible for preparing and submitting the appli-
21 cation described in section 813.

22 (b) ADMINISTRATION.—

23 (1) ADMINISTRATIVE COSTS.—Not more than 3
24 percent of the funds received by a Local Council
25 under this title shall be used to pay for the adminis-

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1 trative costs of the Local Council in carrying out
2 this title.

3 (2) FISCAL AGENT.—A Local Council may des-
4 ignate any entity, with a demonstrated capacity for
5 administering grants, that is affected by, or con-
6 cerned with, early learning issues, including the
7 State, to serve as fiscal agent for the administration
8 of grant funds received by the Local Council under
9 this title.

10 TITLE IX—RURAL EDUCATION ACHIEVEMENT
11 PROGRAM

12 SEC. 901. RURAL EDUCATION INITIATIVE.

13 Subpart 2 of part J of title X of the Elementary and
14 Secondary Education Act of 1965 (20 U.S.C. 8291 et
15 seq.) is amended to read as follows:

16 “Subpart 2—Rural Education Initiative

17 “SEC. 10971. SHORT TITLE.

18 “This subpart may be cited as the ‘Rural Education
19 Achievement Program’.

20 “SEC. 10972. PURPOSE.

21 “It is the purpose of this subpart to address the
22 unique needs of rural school districts that frequently—

23 “(1) lack the personnel and resources needed to
24 compete for Federal competitive grants; and

EARLY LEARNING OPPORTUNITIES ACT LANGUAGE

Accountability provisions

Replace Section 11(d)(2) with the following:

“Performance goals. The Secretary, in collaboration with the Secretary of Education and in consultation with the States, who in turn shall consult with local councils, shall develop performance goals and indicators for quality factors associated with improved **developmental outcomes for young children**, including parent education, enhanced child care provider training (particularly in language and literacy development), increased ratios of child care staff to children, retention of child care providers, and other quality indicators in Section 2, Purposes.”

Add a Section 11(d)(5):

“Improvement Plans. If the Secretary determines, based on the State report, that the State is not making progress toward achieving the performance goals, the State must submit a performance improvement plan to the Secretary in order to remain eligible for funding.”

Add the following sentence at the end of Section (7)(e):

or

“Responsibilities designated in Section 11(d) as State responsibilities shall be assumed by the Local Council with regard to the locality.”

EARLY LEARNING OPPORTUNITIES ACT LANGUAGE

Funding rule

Add a subparagraph to Section 5 so that it states:

“SEC. 5. AUTHORIZATION AND APPROPRIATION OF FUNDS

(a) There are authorized to be appropriated to the Department of Health and Human Services to carry out this Act__

- (1) \$750,000,000 for fiscal year 2001;
- (2) \$1,000,000,000 for fiscal year 2002;
- (3) \$1,500,000,000 for fiscal year 2003; and
- (4) such sums as may be necessary for each of the fiscal years 2004 and 2005.

(b) Special Funding Rule Section (a) shall only apply in years in which appropriations under section 639 of the Head Start Act meet or exceed the adjusted prior year appropriation and appropriations for section 658B of the Child Care and Development Block Grant Act meet or exceed the adjusted prior year appropriation. The term “adjusted prior year appropriation” means with respect to a fiscal year, the amount appropriated for the preceding fiscal year pursuant to section 639 of the Head Start Act for the preceding fiscal year or pursuant to section 658B of the Child Care and Development Block Grant Act, adjusted to reflect the percentage change in the Consumer Price Index for All Urban Consumers (issued by the Bureau of Labor Statistics) during such preceding fiscal year.”

file:early learning

FAX COVER



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Office of Management and Budget
Executive Office of the President
Washington, D.C. 20503



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Ann O'Leary

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6884

Senator Jeffords is requesting that the following "supplement, not supplant" language be added to the Labor-HHS Appropriations bill. The State of Vermont has for many years spent substantial amounts of state general revenue funds to provide child care assistance to low-income families. In 1996, state general revenue funds for child care totaled \$8.6 million. With the onset of welfare reform and increased federal funds for child care, the state general revenue funds decreased to \$5.9 million (FY 97) and last year the amount decreased to \$5.4 million. Vermont's state child care funding is over the maintenance of effort and match fund requirements of welfare reform. The authorizing language for the Child Care and Development Block Grant does not include basic "supplement, not supplant" language to prevent states from decreasing state funding for child care as federal child care funding is increased. The language below would prevent states from using federal funds to supplant state expenditures for child care.

Amendment to S. 2553

On page 39, line 24, after "\$817,328,000" add: *"such funds shall be used to supplement, not supplant state general revenue funds for child care assistance for low-income families:"*

Amendment to H.R. 4577

On page 37, line 21; after "\$2,000,000,000" add: *"such funds shall be used to supplement, not supplant state general revenue funds for child care assistance for low-income families:"*

If you have any questions, or need further information, please call Kimberly Barnes-O'Connor at 4-6770.



File: early learning

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Frank Porter Graham Child Development Center

October 11, 2000

Dear Colleagues,

Thank you very much for your interest in the Abecedarian Study. Thank you also for your patience concerning dissemination of the findings concerning the most recent Age-21 Follow-up Study. As many of you know, we had planned on releasing a final report soon after the Executive Summary was released. However, as we discovered that the release of such a report could have interfered with the study's long tradition of publishing in the peer-reviewed literature, we decided to forgo such a release and provide pre-prints of articles to interested parties when the works were "in press." We are pleased to announce that the first article presenting the findings is now in press in the journal *Developmental Psychology*. This article examines the longitudinal trajectories of the participants' cognitive and academic development. We are currently working on another article that will detail the age-21 descriptive findings concerning cognitive functioning and achievement as well as some of the life success findings such as educational attainments and childbearing. When this article is in press, we will be happy to provide pre-prints to interested parties as well.

Thank you again for your interest in our work.

Sincerely,

Frances A. Campbell, Ph.D.

Senior Scientist, Frank Porter Graham Child Development Center

Principal Investigator, the Age-21 Follow-up Study of the Abecedarian Project

Ann-
My interest too
- Ruby

PRE-PRINT OF ARTICLE TO APPEAR IN THE JOURNAL DEVELOPMENTAL PSYCHOLOGY

Running Head: DEVELOPMENT OF ABILITIES

The Development of Cognitive and Academic Abilities: Growth Curves from an Early Childhood Educational Experiment

Frances A. Campbell
Elizabeth P. Pungello
Shari Miller-Johnson
Margaret Burchinal
University of North Carolina at Chapel Hill
Craig T. Ramey
University of Alabama at Birmingham

Abstract

The extent to which early, high quality child care can change cognitive and academic developmental patterns from infancy through early adulthood was examined in this follow-up study of the Abecedarian Project, a prospective randomized trial of early childhood educational intervention for children of low-income families. Early treatment consisted of full-time educational child care from infancy to age five. Study participants were 111 infants from 109 low-income families randomly assigned to preschool treatment or control groups. Cognitive and test scores collected between the ages of 3 and 21 years and academic test scores from 8 to 21 years were included in this study. The primary question addressed was whether treatment showed long-term effects on cognitive and academic skills. A second question involved testing whether cognitive gains accounted for the long-term treatment effects on academic skills. The results showed that treated children, on average, attained higher scores on both cognitive and academic tests, with moderate to large treatment effect sizes observed through age 21. The preschool cognitive gains accounted for a substantial portion of the treatment differences in the development of reading and math skills. This study indicates that intensive early childhood education can have long lasting effects on cognitive and academic development.

The Development of Cognitive and Academic Abilities: Growth Curves from an Early Childhood Educational Experiment

Whether the cognitive and academic gains from early educational intervention can be maintained into adulthood was examined in this follow-up study of the Abecedarian Project, a program of full-time educational child care for children from low-income families. This work is important for two reasons: First, a longitudinal study of the developmental trajectories of individuals with and without intensive early intervention affords an opportunity to examine how infant and preschool environments influence development in a context where many parameters of the daily environment can be specified and controlled across individual children. Such studies are rare, especially those in which data on participants are available from infancy through young adulthood. Second, it is important that we identify as precisely as possible how intervention programs produce their effects. Poor children are at risk for cognitive delays and school failure (Patterson, Kupersmidt, & Vaden, 1990; Smith, Brooks-Gunn, & Klebanov, 1997). Understanding how early childhood experiences might change the long-term odds for success in these vulnerable individuals is vital if scientists are to advise policymakers on how best to intervene in potentially negative situations. Therefore, a second focus of this paper is to identify possible mechanisms through which early intervention might have an impact on adult academic skills.

By and large, early intervention programs have been successful in enhancing poor children's initial school success (e.g., Bryant & Maxwell, 1997; Johnson & Walker, 1991; Lazar, Darlington, Murray, Royce, & Snipper, 1982; Reynolds, 1994; Sheehan, Cryan, Wiechel, & Bandy, 1991). Although the kinds of test score gains possible in early childhood are hard to maintain in later childhood (Reynolds, 1994), Barnett (1995) summarized findings from 15 "model" early childhood studies and demonstrated that most could point to positive gains well past the point that treatment ended. Cognitive test score gains were maintained through age 14 in the Milwaukee Project (Garber, 1988) and through age 15 in the Abecedarian study (Campbell & Ramey, 1995). Better academic performance was seen into middle childhood in the Houston Parent Child Development Center (Johnson & Walker, 1991), the Florida Parent Education Project (Jester & Guinagh, 1983), and the Syracuse University Family Development Program (girls only) (Lally, Mangione, & Honig, 1988), and through mid-adolescence in the High/Scope Perry Preschool Program (Berrueta-Clement, Schweinhart, Barnett, Epstein, & Weikart, 1984) and the Abecedarian study (Campbell & Ramey, 1995). The Syracuse Program (Lally et al., 1988) and the Yale Child Welfare Research Program (Seitz, Rosenbaum, & Apfel, 1985) found that treated children showed fewer behavior problems in school. In short, although the specific benefits varied across programs, treatment effects persisted into middle childhood or adolescence.

Very few early interventionists have conducted post-high school studies of their samples. Two exceptions are the Early Training Project (Gray, Ramsey, & Klaus, 1982) and the High/Scope Perry Preschool Project (Berrueta-Clement et al., 1984). When participants in the Early Training Project were followed up, the investigators found that, while in school, treated individuals were significantly less likely to be placed into special education classes. However, the researchers found no intellectual test differences (a 2-point, non-statistically significant treatment/control gap measured at age 17), no treatment-related differences on achievement test scores, no reduction in grade retention, and no difference in rates of high school graduation (except for the fact that treated females who had children prior to high school graduation were significantly more likely to finish school afterwards) (Gray, Ramsey, & Klaus, 1983).

The High/Scope Perry Preschool Project investigators found treatment/control IQ differences of less than 1 point by age 10 (Weikart, Bond, & McNeil, 1978), but subsequently, members of their preschool treatment group earned significantly higher scores on achievement tests in 8th grade, spent less time in special education, and were more likely to graduate from high school. At age 19, the treatment group scored significantly higher than controls on a test of general literacy. Most striking was the finding that lawbreaking was significantly reduced among those with preschool treatment (Berrueta-Clement et al., 1984). At age 27, significant treatment/control differences included a lower likelihood of lawbreaking, better rates of employment and less use of welfare, but no treatment differences in general literacy scores (Schweinhart, Barnes, & Weikart, 1993). The Perry Preschool Program has been widely publicized, and, not surprisingly, has "taken much of the limelight when it comes to arguing the policy implications of early intervention research" (Woodhead, 1988, p. 445).

In addition to examining whether early childhood programs can have a long-term impact, specifying the mechanisms whereby they do so is of great importance. A number of theoretical models imply that altering the early environment would powerfully change the course of development. General Systems Theory (von Bertalanffy, 1975), Bronfenbrenner's bioecological models of development (e.g., Bronfenbrenner & Morris, 1998), and Sameroff's transactional model (Sameroff, Seifer, Baldwin, & Baldwin, 1993) all suggest that the characteristics of children, caregivers, and the environment mutually influence one another, and the processes whereby these elements interact change over time as a function of intervening events. Bronfenbrenner and Morris (1998) specify proximal

processes (e.g., adult-child social interactions and verbal exchanges) as the "primary mechanisms producing human development" (p. 994). Surroundings enriched with a variety of playthings and learning equipment should also foster more engagement with the environment, one basis for predicting later intellectual levels (Bornstein & Sigman, 1986; DiLalla et al., 1990; Fagin & McGrath, 1981). Hart and Risley (1995) have noted that "experiences in infancy establish habits of seeking, noticing, and incorporating new and more complex experiences, as well as schemas for categorizing and thinking about experiences" (p. 193). Children are not passive recipients of stimuli but rather bring personal, temperamental characteristics into their learning environments which partly determine their reactions to the experiences they encounter (Slomkowski, Nelson, Dunn, & Plomin, 1992).

Logically, a child care program that, in addition to good physical care, also provided optimal infant stimulation in the form of adult-child interactions, a variety of playthings and opportunities to explore them, followed by a developmentally appropriate preschool learning environment would be expected to contribute positively and significantly to children's cognitive development. An enhancement of preschool cognitive skills should, in turn, facilitate the transition to school and lead to better initial academic success because "personal" characteristics of children, such as their cognitive skills upon school entry, are "immediately relevant to the school agenda" (Alexander & Entwisle, 1988, p. 6).

One hypothesis is that early childhood programs change a child's cognitive abilities per se, enabling the child better to meet the challenges of school, a "direct effects" model. Barnett, Young, and Schweinhart (1998) used structural equation modeling to examine four explanatory models linking early intervention to the educational attainment of the individuals in the Perry Preschool study. The model specifying direct program effects on child cognitive development was most strongly supported by the data in comparison with models looking at other possible mechanisms (i.e., changes in child motivation, changes in how parents perceived children and supported them, or no change). This work is similar to the analysis conducted by the Consortium for Longitudinal Studies (Lazar et al., 1982) to explain the Consortium's most robust finding, namely, that early childhood education reduced the likelihood of placement into special education. The Consortium data best fit a model in which significant paths were found between early treatment, mother's education, children's intellectual test score (developed abilities) at age 6, and eventual placement.

The Abecedarian study provides a unique opportunity to test hypotheses about longitudinal development. It was a true experiment with random assignment of infants to treatment and control groups. Treatment for the participants began in early infancy. The data have now been extended to young adulthood, age 21 years. This program provides new information on the extent and duration of the effects of a very intensive (all-day, year round), long lasting (5 years), early childhood program on later cognitive development and academic performance among high risk children. No other program reporting post-high school results to date provided treatment of this magnitude.

The goals of the present study were to test three hypotheses: (1) early childhood treatment led to higher cognitive/intellectual test scores over time, (2) early childhood treatment led to higher achievement test scores over time; and (3) the effects of treatment on academic achievement over time were mediated by cognitive development at the end of treatment.

Method

Participants

A total of 111 infants born to 109 families (one set of twins and one sibling pair) began the study in one of four cohorts between 1972 and 1977. All were healthy newborns believed to be free of biological conditions associated with mental retardation. In addition, all were found to be "high risk" based on scores on a High-Risk Index that included such factors as family income and maternal education level (Ramey & Smith, 1977). Fifty-nine of the 111 infants were female, 52 were male. All were born into low-income families, 25% lived with both parents at birth, maternal education averaged tenth grade, and maternal age averaged 20 years. Although ethnicity was not a selection criterion, 98% were African American reflecting the confounding of ethnicity and poverty in the local area.

Early Childhood Program

A detailed description of the early childhood program is provided in Ramey and Campbell (1984). Briefly, of the 111 infants in the original sample, 57 were randomly assigned to the treatment group, and 54 were randomly assigned to the control group. The treatment consisted of an early education program provided in a child care center that was open 8 hours per day, 5 days per week, 50 weeks per year. Infant age averaged 4.4 months when center attendance began. Transportation was provided if needed. The center was very high quality with low teacher:child ratios (ranging from 1:3 for infants to 1:6 for children aged 5 years old), extensive in-service training for teachers, and very low teacher turnover. An infant curriculum designed to promote cognitive, language, perceptual-motor, and social development was developed for this project (Sparling & Lewis, 1979). As children aged into the later

preschool years, the curriculum focused more on language development and preliteracy skills (Ramey, McGinness, Cross, Collier, & Barrie-Blackley, 1982; Sparling & Lewis, 1984).

Since infants in the treated group received much of their nutrition at the center, infants in the control group received iron-fortified formula for the first 15 months. This was done in an effort to reduce the likelihood that cognitive differences between the groups were due to better early nutrition in treated children. In addition, families of control children received disposable diapers until the child was toilet trained as an incentive for participation. Social work services were made available to both groups as needed. Many children in the control group attended child care centers, some beginning in infancy and others beginning in the preschool years. Thus, the comparison presented here is between children who received consistent, high quality early educational intervention and children who experienced a variety of early care environments, including parental care and/or other child care facilities, typically used by low-income families in the community.

Procedures

Details concerning the procedures for the early childhood program, and the assessments of the participants conducted when they were preschoolers and at 6.5, 8, 12, and 15 years of age are available in earlier publications (see Ramey & Campbell, 1984, 1991; Campbell & Ramey, 1994, 1995). Briefly, during the early childhood treatment period (at ages 3, 4, and 5 years), during the primary grades (at ages 6.5 and 8 years), and during adolescence (at ages 12 and 15 years), standardized intellectual tests were administered. At ages 8, 12, and 15 years, standardized achievement tests were administered as well. All assessments were individually administered by research assistants. From age 8 years forward, testers were blind to the participant's early treatment history. Other constructs not relevant to this report were assessed at each of the time points, and participants were assessed at other time points not included in the analyses presented here as well.¹

For the age-21 follow-up study, participants were located by the project's Family Coordinator and sent a letter inviting them to become involved. Of the 104 who agreed to participate, 68 were assessed within one month of their 21st birthday, 32 within nine months of their 21st birthday, and 4 more than a year after their 21st birthday. The assessments included the administration of standardized tests of intellectual level and achievement by research assistants blind to the participant's early treatment history. Most were tested at the child development center because funds had been secured to pay for participants living away from the local area to travel to the center. A few were unable to travel, and the assessor traveled to them to complete the testing. Other constructs were also assessed that are not included in this report.

Measures

Intellectual level. At each time point where intellectual level was assessed, a standardized, age-appropriate measure was utilized that demonstrated high levels of validity and reliability with norms based on samples that included African Americans. At ages 3 and 4 years, participants were assessed using the Stanford Binet Intelligence Scale, Form L-M (Terman & Merrill, 1972). When participants were 5 years old, the Wechsler Preschool and Primary Scale of Intelligence was used (WPPSI; Wechsler, 1967). At ages 6.5, 8, 12, and 15 years, the Wechsler Intelligence Scale for Children-Revised was used (WISC-R; Wechsler, 1974). Finally, at age 21 years, the Wechsler Adult Intelligence Scale – Revised (WAIS-R; Wechsler, 1981) was administered.

Academic achievement. Achievement was also assessed using standardized measures with established reliability and validity and norms based on samples that included African Americans. When participants were aged 8, 12, and 15 years, reading and math achievement were assessed using the Woodcock-Johnson Psychoeducational Battery, Part 2: Tests of Achievement (Woodcock & Johnson, 1977). At age 21, reading and math achievement were assessed using the more recent version of the same instrument (Woodcock & Johnson, 1989).

Sample Attrition

Table 1 provides the number of participants that contributed data at each time point by treatment group and test administered. Of the 111 participants in the original sample (57 in the treatment group and 54 in the control group), 98 were still in the study at age 3 years (50 in the treatment group and 48 in the control group). Attrition was due to the following reasons: three participants died before the age of 2 years (one child in the treatment group and two in the control group), one was found to have a biological condition associated with moderate retardation and was thus ineligible for the study (a child in the treatment group), two children were withdrawn (one in the treatment group and one in the control group), and seven moved away from the local area (four in the treatment group and three in the control group). An additional child in the control group moved out of the local area between the 3-year and 4-year assessment points, bringing the sample size at age 4 to 97 (50 in the treatment group and 47 in the control group).

By the age 5 years assessment point, an additional child in the treatment group had died, another child in the control group was withdrawn from the study, and two other children in the control group had moved out of the local area. However, another child in the control group that had moved out of the area earlier in the study moved

back into the local area and was tested. Thus, the sample size at age 5 was 94 (49 in the treatment group and 45 in the control group). By the age 6.5 years assessment point, three other children had moved out of the local area (two in the treatment group and one in the control group), bringing the sample size to 91 (47 in the treatment group and 44 in the control group).

Between the age 6.5 and age 8 assessment points, two children had moved out of the local area (one in the treatment group and one in the control group), and one withdrew from the study (a child in the control group). However, two children in the treated group had moved back into the local area, and one child in the control group who had moved was located and the WISC-R was administered. Thus, the total number of children who completed the WISC-R at age 8 was 91 (48 in the treatment group and 43 in the control group). At the age 8 years assessment point, the Woodcock-Johnson Achievement test and the WISC-R were administered several months apart, and due to the differences in timing, two children in the control group who were administered the WISC-R did not complete the Woodcock-Johnson. Finally, at age 8, one treated child that completed the Woodcock-Johnson achievement tests had a score for math but not reading because the reading raw score was too low to be transformed into a standardized score (however, this child's raw reading scores were high enough to be transformed in subsequent years and were included in the analyses).

Between the age 8 and age 12 assessment points, two children in the treated group moved overseas, and one family in the control group declined to participate at age 12. However, all living participants who had either withdrawn or moved away earlier in the study were contacted and asked to participate in the age 12 follow-up. A total of 13 such participants (six in the treated group and seven in the control group) were located and agreed to participate bringing the total to 101 participants (52 in the treatment group and 49 in the control group).

At the age 15 follow-up, one additional child in the treatment group declined to participate. However, the two treated children who were living overseas at the age 12 follow-up had returned and were assessed at age 15, and two children in the control group who had declined to participate earlier decided to participate at age 15. Thus, the sample size at age 15 was 104 (53 in the treatment group and 51 in the control group). The same participants assessed at the age 15 follow-up agreed to take part at age 21, resulting in the same sample size.

All subjects, regardless of attrition, were included in the data analyses with the group assignment they had received upon entry into the study. Thus, even participants who had only a few of the many possible data points to contribute to the analyses were retained in the analysis data set. This strategy was possible because random assignment was used to assign participants to the treatment and control groups, systematic attrition from one or the other group was not present (e.g., participants were not more likely to be withdrawn from one group than another, see description of attrition above), and the analytic strategy chosen (described next) allowed for participants with incomplete data to be analyzed. This method had the added benefit of providing greater power in the detection of group differences due to the larger sample sizes.

Data Analyses

Hierarchical Linear Models (HLM) were used to test the longitudinal hypotheses in this study, using the MIXED procedure in SAS (Singer, 1998). This analytic method estimates individual and group growth curves to describe patterns of change over time and factors associated with those patterns (see Byrk & Raudenbush, 1987, 1992; Laird & Ware, 1982). That is, this method permits examination of regression relationships among dependent and predictor variables and the ways in which these relationships vary over time. This approach accommodates randomly missing data points and inconsistent timing in data collection (i.e., unequal time intervals between data points) and allows for flexible specification of the within- and between-subject variance.

Effects of treatment on IQ scores. The HLM for the longitudinal IQ analysis involved estimating individual growth curves with separate intercepts and slopes for each child. Population growth curves were estimated from the individual curves, estimating population curves for treatment and control children. A piecewise regression approach was used that allowed the rate of change over time to differ between the time period in which children received treatment and the time period after the treatment ended. Separate linear and quadratic slopes for each time period were estimated for each group.

The full polynomial regression model included a term for treatment as a between-subject predictor variable to test for treatment effects. A term representing which childhood cognitive test was administered (i.e., the Stanford Binet administered when the children were 3 and 4 years of age or the Wechsler scales administered thereafter) was included in the full-model as a time-varying covariate to control for test differences. Other within-subject factors included the linear and quadratic age terms to examine patterns and rates of change over time. A term that represented time of assessment (i.e., younger than age 6 versus older than age 6) was entered as a time-varying covariate in the model, and this term's interactions with linear and quadratic age allowed for the rate of change to differ between the time period in which children received early intervention and the period after treatment ended. The full analysis model included all main effects and all two- and three-way interactions among treatment group,

timing of assessment, and the linear and quadratic age terms. The model was simplified when higher order interactions were nonsignificant.

Effects of treatment on achievement scores. HLM analyses were also utilized to examine growth curves for academic achievement scores. A total of four assessment points were available for these analyses - at the end of the third year of formal schooling (age 8), the end of the seventh year in school (age 12), the end of the tenth school year (age 15), and at age 21. Thus, these polynomial models examined whether treatment and control groups differed in achievement outcomes after treatment had ended. Separate analyses were conducted for math and reading achievement.

The full models in these analyses included treatment group as a between-subject predictor variable and both linear and quadratic age as within-subject factors. All main effects and two-way interactions among treatment group and the trends for age were included in the analysis models. Nonsignificant higher-order interactions were dropped to enhance interpretation of results.

Mediation analyses. Mediation analyses were conducted to examine if the enhanced cognitive skills of the treated children at the completion of the preschool intervention was a factor by which the treatment led to higher academic achievement. The strategy used to test this mediation hypothesis was similar to the approach described by Baron and Kenny (1986), which involves testing for an association between the predictor and mediation variables, demonstrating that the predictor variable affects the dependent variable, and testing a model that includes both the predictor and mediation variables. In this study, the longitudinal IQ analysis first tested the association between the predictor variable (i.e., early treatment) and the hypothesized mediator (IQ). The associations between the predictor variable (early treatment) and the dependent variables (reading and math achievement) were next tested in the longitudinal achievement scores analyses. The mediation hypothesis was tested by entering full-scale IQ scores at age 5 into the reduced models predicting to achievement scores, and examining the reduction in the treatment effect sizes for achievement when IQ was also considered.

Results

Effects of Treatment

IQ scores. Table 1 provides unadjusted means and standard deviations for the treatment and control groups on the cognitive instruments administered from ages 3 to 21 years. Results from the longitudinal analysis of the test scores are reported in Table 2 and illustrated in Figure 1. Table 2 lists the unstandardized regression coefficients, standard errors, and test statistics for the reduced model predicting to cognitive test scores. A significant main effect was found for treatment group. Children who received the early educational treatment achieved higher overall IQ scores than children in the control group. A main effect was also found for change over time, indicating that IQ scores across all subjects were characterized by a linear decline. In addition, a significant main effect was found for the test administered, indicating that participants tended to score higher on the Stanford Binet than on the Wechsler scales.

These main effects were qualified by significant higher-order interactions. The magnitude of the difference between the treatment and control groups varied as a function of time of assessment, as indicated by a significant two-way interaction of treatment group by time of assessment (i.e., during treatment versus after treatment). Although the magnitude of the treatment difference was greater while treated children were still receiving the intervention, treatment differences were significant both during the preschool period and in the follow-up period (see the coefficients listed for the intercepts for the two time periods in Table 2). A significant two-way interaction was also found for time of assessment and quadratic age, indicating that across all subjects, significantly more curvature existed during the preschool period than in the post-preschool period (see the coefficients listed for the quadratic slope for the two time periods). Finally, these two-way interactions were qualified by a significant three-way interaction found for treatment group by time of assessment by linear age (see the coefficients listed for linear slopes for the two groups in the two time periods). The difference between treated and control groups in linear decline was greater during the preschool period than during the follow-up period. These results are graphically displayed in Figure 1. As the figure depicts, a larger difference existed between the treatment and control groups during the treatment period compared to the period after the early childhood treatment. The figure also shows that the pattern of change over time differed between the groups during treatment, but that the groups demonstrated a parallel linear decline in standardized test scores over time during the period after treatment.

Adjusted means and treatment/control effect sizes for cognitive test scores are provided in Table 3. Since the HLM analyses found differences between the preschool intervention phase and the period after treatment, separate statistics are provided for each time period. The adjusted means at age 4 were chosen to represent the preschool period given that this age was the mid-point of that phase. The statistics at age 15 were selected to represent the follow-up period because it was the time point assessed closest to the mid-point of that phase. The adjusted means decline significantly during the follow-up period (see Figure 1). However, during this phase, the

groups demonstrated parallel linear decline. Thus, the differences between the adjusted means and therefore the effect sizes were the same at each age point after treatment ended. Two effect sizes were calculated. The first used the pooled sample standard deviation ($SD = 6.30$), given the truncated nature of the sample (compared to the population on which the Wechsler scales were standardized). A more conservative estimate of the effect size was also calculated using the standard deviation of the Wechsler IQ tests ($SD = 15$). Educators consider effect sizes of .25 or greater to have practical significance (Cohen, 1977). As Table 3 shows, even the more conservative estimates are in the range considered educationally meaningful, and both estimates for the period of time during treatment are considered large.

Achievement scores. Concerning reading achievement, individuals who received the early educational treatment achieved higher reading scores than those in the control group, $F(1, 187) = 8.34, p = .004$. Neither the linear nor quadratic age terms were significant indicating that overall reading scores across all subjects from age 8 to 21 years were characterized by generally flat levels of change over time. No significant interactions were found between treatment group and linear or quadratic age indicating that the patterns of change over time did not vary as a function of treatment. As seen in Figure 2, initial reading scores were higher for the treatment group than the control group, and both groups displayed fairly level and parallel rates of change over time. In other words, the treatment and control groups maintained their positions relative to national norms across time, making progress at roughly the same rate. Regression coefficients and standard errors for the reduced model predicting to reading achievement are reported in Table 4.

Concerning math achievement, a significant main effect was found for treatment group, $F(1, 187) = 6.02, p = .015$, indicating that children who received the early educational treatment achieved higher math scores than those in the control group. In addition, significant linear ($F(1, 104) = 79.15, p = .0001$) and quadratic ($F(1, 187) = 9.39, p = .0025$) main effects were found indicating that overall, math scores across all subjects from age 8 to age 21 were characterized by linear and quadratic change over time. No significant interactions between treatment group and linear or quadratic age over time were found, indicating that the rate of change over time was equivalent for both groups. As seen in Figure 3, initial math scores were higher for the treatment group than the control group, and both groups experienced a relatively steeper decline in standardized math scores from age 8 to age 12 as compared to a more gradual decline in standardized math scores from age 12 to age 21. Regression coefficients and standard errors for the reduced model predicting to math achievement are reported in Table 4.

Adjusted means and effect sizes for reading and math achievement are presented in Table 5. The adjusted means for age 15 are given because that was the time point assessed closest to the mid-point of the curves. For reading, no significant effects for age or for treatment by age were found. Thus, the adjusted means, their differences, and therefore the effect sizes were the same at each age. For math, a significant age effect was found, thus the adjusted means differed across the ages (see Figure 3). However, the treatment by age interaction was not significant, thus the differences between the means and therefore the effect sizes were the same at each age. Again two effect sizes were calculated, one using the pooled sample standard deviation (reading $SD = 4.85$; math $SD = 6.41$), and a more conservative estimate calculated using the standard deviation of the Woodcock-Johnson (reading and math $SD = 15$). As seen in the table, the more conservative estimates are in the range considered educationally meaningful, and the estimates based on the pooled sample standard deviation are in the range considered large.

Mediation analyses. Evidence that IQ scores mediated the effects of treatment on achievement was found for both reading and math. First, when full scale IQ at age 5 was entered into the reduced model predicting to reading achievement scores, the term for IQ was significant ($F(1, 185) = 61.26, p = .0001$), and the significance of the treatment term was reduced ($F(1, 185) = 3.89, p = .0501$). The extent of mediation was determined by calculating the percent reduction in the effect size for treatment. As seen in Table 6, adding full scale IQ into the model reduced the effect size for treatment by 44% when the pooled sample standard deviation was used, and by 42% when the Woodcock-Johnson's standard deviation was used.

Similarly, when full scale IQ at age 5 was entered into the reduced model predicting to math achievement scores, the term for IQ was significant ($F(1, 287) = 88.03, p = .0001$). In the case of math, when IQ was entered in the model, the term for treatment became nonsignificant ($F(1, 287) = 2.33, p = .1277$). Again, the extent of mediation was calculated by determining the percent reduction in the effect size for treatment. As seen in Table 6, adding full scale IQ into the model reduced the effect size for treatment by 53% when the pooled sample standard deviation was used, and by 54% when the Woodcock-Johnson's standard deviation was used. Thus, the results of all three sets of HLMs (IQ, achievement, and mediation analyses) provide evidence for the mediation hypothesis by demonstrating that treated children, on average, scored higher on both IQ and achievement tests over time, and that the treatment effect size for achievement was substantially reduced when IQ was also considered.

Discussion

This study indicates that intensive early childhood education can have long lasting effects on cognitive and academic development. Analysis of cognitive growth curves between the ages of 3 and 21 years showed that patterns of change in cognitive test performance differed during the early childhood treatment phase with treated children having steeper rates of increase. After the early childhood years, however, change in cognitive growth was parallel in the treatment and control groups. Although a decline relative to national norms was seen in both groups after middle childhood, it is important to note that the trajectories did not converge by young adulthood.

The persistence into adulthood of the Abecedarian treatment effects on cognitive development is in contrast to the erosion of treatment/control test score differences in the Early Training Project (Gray et al., 1982) and the High/Scope Perry Preschool Project (Berrueta-Clement et al., 1984; Schweinhart et al., 1993), the only other randomized trials of early childhood intervention to have reported post-high school findings. Why might the treatment/control difference in cognitive test scores endure to this point in this study but not in others? A number of factors could have contributed to this difference in the persistence of effects.

One important difference between the Abecedarian study and the Early Training and Perry Preschool Projects was that the Abecedarian treatment began in early infancy whereas the other two projects admitted children aged either 3 or 4 years. This suggests that starting intervention for poor children before the age of 3 years may have made the difference in the persistence of effect on cognitive development. However, while the Abecedarian findings support the assertion by Bornstein and Sigman (1986) that there is "a significant role for infancy in cognitive development" (p. 269), they do not provide conclusive evidence that starting educational intervention in the first year is critical. Bruer (1999) contended that far too much emphasis has been placed on the importance of learning in the first three years of life, and he notes that although "the (Abecedarian) results do provide some evidence that the treatment had an effect, they do not prove that the intervention had these effects because (emphasis his) the program occurred during the birth-to-3 or birth-to 5-year period" (p. 170). By the same token, however, neither do the cognitive test score findings rule out the importance of starting intervention in infancy. Given that age of entry was confounded with other factors such as duration of treatment (discussed next) in this study, firm conclusions concerning the importance of beginning intervention in infancy cannot be drawn, but the results strongly support the further investigation of this factor in early intervention studies.

Other factors that varied among the programs included duration of treatment, program intensity, service delivery model, and the characteristics of the children served. Concerning duration, the Abecedarian project provided treatment for five years before kindergarten whereas the Early Training and Perry Preschool projects provided treatment for one to two years. Some data suggest that less than four years of treatment may be below the threshold required for long-term effectiveness (e.g., Fuerst & Fuerst, 1993). In addition, the Abecedarian program operated 8 hours a day, year-round, thus it was more intensive than the others which were half-day programs (with weekly family visits) that operated for only part of the year. The Perry Preschool operated for 8 months a year, and the Early Training Project treated children only during the summers. In a review of long-term (at least into middle childhood) outcomes of programs for disadvantaged children, Bryant and Maxwell (1997) suggested that program intensity possibly distinguished programs where benefits persisted from those where they were less enduring.

Another difference between the Abecedarian study, the Perry Preschool and the Early Training Project involved their service delivery models. Whereas the Abecedarian study was primarily child-focused, the Perry Preschool and Early Training Project had both child-centered and parent visit components. Although service delivery models and other factors (especially intensity of treatment) are often confounded, research does suggest that child-centered treatment models may have more enduring effects on children's cognitive outcomes than family visit models (Bryant & Maxwell, 1997). A final point of difference among the three programs concerns the characteristics of the children enrolled. Children in the Perry Preschool were selected partly on the basis of their age-3 mental test scores (which averaged in the high 70s in both the treated and control groups at program entry). Although not used as part of the selection process, test scores in the treated and control groups in the Early Training project were in the mid to high 80s at the start of the program. The Abecedarian enrollees entered the program in early infancy; at 3 months of age scores on the Mental Development Index of the Bayley Scales of Infant Development (Bayley, 1969) were in the average range for both the treated, $M = 95$, $SD = 11.5$, and control, $M = 96.2$, $SD = 18.2$, groups. It is therefore likely that the latter program had a somewhat more heterogeneous group of participants than the earlier studies. Future research on early intervention must examine each of these factors to determine their roles in program effectiveness.

Data to allow a direct comparison in academic test scores among program participants were available only for the Abecedarian and Perry Preschool studies. Of the two, the Abecedarian study participants showed greater treatment/control differences in academic scores. The individuals treated in the Perry Preschool scored at the 13th percentile on standardized academic tests at age 14, the last year that such figures are available. At the age most

comparable (15 years), the Abecedarian preschool treatment group's average reading score was at the 31st percentile. In neither study was the average academic performance of treated individuals "average" when compared with national norms. However, to conclude that either the Abecedarian study or any other rigorously controlled early childhood educational program failed to attain its objectives because the treated individuals scored below the national norm (Bruer, 1999) is to miss the essential point that, with groups of children at high risk for school failure, those treated in early childhood outscored their own controls either on indices of academic progress or on actual tests. Moreover, in both the Abecedarian and Perry Preschool studies, the chances that the treated students would stay in school were greatly improved (Campbell, Ramey, Pungello, Sparling, & Miller-Johnson, 2000; Schweinhart et al., 1993), and in the case of the Abecedarian study, the likelihood of their attending a 4-year college was significantly greater (34.5% of the treated group compared to 13.7% of the control group) (Campbell et al., 2000).

The present findings indicated that enhancements in cognitive development mediated school performance in the Abecedarian participants. This would argue for a "direct effects" model in that positive changes in the children themselves led to better academic outcomes. It is recognized that cognitive functioning is not the only important factor underlying academic achievement, which like any complex outcome is multideterminate. In addition to early treatment, family factors, the characteristics of the schools attended by the children, and the influence of their peers would all affect student performance. In the Abecedarian study, in addition to the children having a high quality, stable early child care environment in which cognitive, language, motor, and socioemotional development were stressed, all the children lived in a town where officials were committed to providing adequate housing, low-cost medical care, and public transportation. The local public school system attended by most of the study sample was generally good. The majority of students in this school system came from academically oriented families who placed high value on achievement. Extra learning supports for reading and math were provided by the schools on the basis of teacher nominations in addition to the mandated Special Services for children identified as eligible. The long-term academic gains might have been different in a less supportive school system.

The results of the present study indicated that cognitive functioning accounted for approximately half of the intervention effect on academic achievement, thus leaving about half yet to be explained. In addition, the results do not explain why cognitive performance served as a mediator for future academic performance. One could argue that early intervention "inoculated" high risk children by causing a permanent change which then led to increased school success (cf. Barnett et al., 1998). However, a more probable model is that the higher cognitive functioning at the end of the early intervention program allowed the treated children to enter school with a greater degree of school readiness which led to an increased likelihood of early school success, which increased the likelihood of later success, and so on (Campbell & Ramey, 1994). In this causal chain model, the probability of later academic success is increased, but it is not guaranteed. For example, children treated in the Milwaukee Project (Garber, 1988) exhibited a 10-point IQ difference at age 14, but no academic test score differences at that point (Garber, personal communication, 1992). In contrast, the Perry Preschool Project investigators found positive academic outcomes well past the point of finding cognitive test differences.

Future research on early intervention needs to move beyond outcome measure follow-up designs and examine more closely the intervening process variables that mediate the effects of early intervention and enable effects to be maintained over time. Earlier analyses of the Abecedarian longitudinal data along with cases from a related subsequent study, Project CARE (Wasik, Ramey, Bryant, & Sparling, 1990) suggested that children who experienced the full-time child care treatment exhibited greater interest in persons and objects and showed more task persistence in the very early years than did control children. Hierarchical linear models indicated that the measure of task orientation mediated the effects of the early childhood educational experience on children's cognitive development through age 8 (Burchinal, Campbell, Bryant, Wasik, & Ramey, 1997).

More research is also needed to elucidate the importance of beginning intervention in early infancy. Well-controlled studies in which child age at entry and termination of treatment are staggered need to be carried out to disentangle the questions surrounding the effects of age at entry from duration of treatment. Another question raised by these findings concerns how to maintain the cognitive test performance within high-risk populations. The Abecedarian data show that early childhood education can lead to an enhancement of cognitive test performance that endures into early adulthood. On the other hand, the "progressive decline" in mental test performance among the poor previously reported, based on cross sectional data (Heber, Dever, & Conry, 1968), was seen here in a longitudinal study. A sizeable boost in test performance seems relatively easy to accomplish in early childhood, but difficult to sustain at the same level thereafter. Although rates of change after early childhood were parallel in the treatment and control groups, the trend was downward in both. Mental test performance is important only insofar as it predicts academic functioning, however, and there were clear indications that the early childhood program significantly contributed in lasting ways to academic skills, especially in reading, but also in mathematics. Growth curves showed that reading skills were maintained at a fairly even level, relative to national norms, from early

childhood into adulthood, indicating steady growth in this skill. Mathematics skills, however, declined relative to national norms over the years. The reason for this differential pattern of change in the two subject areas is unclear. More research is needed to understand this phenomenon.

These long-term findings from the Abecedarian Project are important because the study was a scientifically rigorous, prospective randomized trial. The design allows for more confidence in attributing the findings to early childhood intervention itself rather than to uncontrolled differences in the treated and control groups. Low attrition also increases confidence in the findings. A limitation in the data is the small sample size, but this is offset by the extent of available longitudinal data which allowed the investigators to examine change over many years in the same well-defined sample of participants. The results generalize to African Americans from low-income families. They are encouraging in that they show long-term, significant benefits from an early childhood program, but at the same time they raise questions about why cognitive scores declined and why academic skills did not grow equally in reading and mathematics.

Nevertheless, the positive young adult benefits seen in the treated individuals in this study imply that money invested in improving the educational value of early child care environments was well spent. The Abecedarian child care program was of high quality in terms of low child:staff ratios, the provision of a systematic early childhood curriculum that was individualized for each child, on-site pediatric care, and low staff turnover. While this University-based program had aspects that might be difficult to duplicate in other settings, such as its extensive emphasis on research, in most ways it could feasibly be replicated. For example, the early child care staff was diverse. Some members had advanced degrees in early childhood education, but others, while they were experienced caregivers, were not college graduates and came from families similar to those of the children.

The early educational experience provided in the Abecedarian program had lasting benefits for children from economically disadvantaged families. Related research has shown that the more limited the family resources in terms of parental education, the greater benefit children derive from early intervention (Ramey, Campbell, & Ramey, 1999). While the long-term enhancement of cognitive test performance in the Abecedarian study sample was modest, it was related to significant benefits in terms of academic skills. Society has a stake in the future of poor children. To increase the likelihood that they might achieve higher academic skills implies a greater likelihood of life success. All children deserve that chance.

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Footnote

¹In addition to the early childhood treatment, a school-age treatment phase was conducted. Details of this phase of treatment are provided in Ramey and Campbell (1991). Briefly, at the end of the early childhood phase (at age 5), half of the treatment group and half of the control group were randomly assigned to receive the school-age intervention which consisted of visits to the home by a home-school resource teacher during the first 3 years of formal schooling. This report does not analyze the data by the four-group comparison because the focus of this work is the long-term impact of early childhood educational intervention.

Table 1

Unadjusted Means for Each Group at Each Time Point for Each Test Administered

Age Test	Treatment group			Control group		
	<u>n</u>	Mean	<u>SD</u>	<u>n</u>	Mean	<u>SD</u>
3 Years						
Stanford Binet	50	100.70	13.97	48	84.27	13.45
4 Years						
Stanford Binet	50	101.70	11.82	47	89.19	13.40
5 Years						
WPPSI	49	101.43	10.96	45	93.98	13.68
6.5 Years						
WISC-R	47	98.45	12.25	44	92.55	11.78
8 Years						
WISC-R	48	97.83	11.76	43	93.77	12.60
WJ-Reading	47	94.00	13.26	41	85.17	12.30
WJ-Math	48	97.73	12.34	41	92.46	14.42
12 Years						
WISC-R	52	94.69	9.53	49	88.65	11.58
WJ-Reading	52	91.27	14.13	49	85.12	11.07
WJ-Math	52	91.92	12.24	49	86.55	14.43
15 Years						
WISC-R	53	95.83	11.08	51	90.06	12.56
WJ-Reading	53	94.30	12.93	51	88.51	10.40
WJ-Math	53	93.62	13.72	51	86.84	12.67
21 Years						
WAIS-R	53	89.66	10.09	51	85.24	8.61
WJ-Reading	53	93.30	16.83	51	87.57	13.16
WJ-Math	53	89.15	11.54	51	84.45	11.16

Note. WPPSI = Wechsler Preschool and Primary Scale of Intelligence; WISC-R = Wechsler Intelligence Scale for Children-Revised; WJ-Reading = Woodcock-Johnson Achievement Test for Reading; WJ-Math = Woodcock-Johnson Achievement Test for Math; WAIS-R = Wechsler Adult Intelligence Scale – Revised.

Table 2

Cognitive Test Scores Over Time as a Function of Treatment and Age: Regression Coefficients, Standard Errors, and Test Statistics for the Reduced Model

Factor	Control group		Treatment group		Overall F(1,751)	Difference ^b F(1,751)
	β	SE	β	SE		
Treatment phase						
Intercept (age 3 years)	88.47	1.82	96.17	1.36		42.08***
Linear slope	-10.03	5.88	-13.50*	5.88	4.02*	17.82***
Quadratic slope	-1.43*	0.69	-1.43*	0.69	4.37*	--
Test ^b	-2.73***	0.72	-2.73***	0.72	14.62***	--
Follow-up phase						
Intercept (age 6.5 years)	92.46	1.64	95.72	1.18		8.75**
Linear slope	-0.35	0.18	-0.47**	0.17	6.71**	0.64
Quadratic slope	-0.01	0.01	-0.01	0.01	0.99	--
Test ^b	-2.73***	0.72	-2.73***	0.72	14.62***	--

^aDifference refers to Control-Treatment Group difference.^bTest refers to a dummy variable indicating which test was administered (Stanford Binet = 1; Wechsler scales = 0).* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 3

Cognitive Test Scores Over Time as a Function of Treatment and Age: Adjusted Means and Estimated Effect Sizes

Phase	Adjusted means			Effect size	
	Treated	Control	Difference ^a	Pooled sample $\underline{d}$ ^b	Test $\underline{d}$ ^c
Treatment	103.0	92.0	11.0	1.75	.74
Follow-up	94.1	88.6	5.71	.87	.37

Note. The adjusted means given for the treatment phase are those at age 4 (the mid-point of that phase), and the adjusted means given for the follow-up phase are those at age 15 (close to the mid-point of that phase).

^aDifference refers to the difference between the treatment and control group.

^bPooled sample $\underline{d}$ = the effect sizes calculated using the pooled standard deviation ($\underline{SD}$ = 6.30).

^cTest $\underline{d}$ = the effect sizes calculated using the standard deviation of the Wechsler IQ test ($\underline{SD}$ = 15).

Table 4

Academic Achievement Over Time as a Function of Treatment and Age: Regression Coefficients and Standard Errors for the Reduced Models

Factor	β	SE
Reading achievement		
Intercepts		
Treatment group	93.44***	1.65
Control group	86.64***	1.70
Slope		
Linear trend	0.09	0.08
Math achievement		
Intercepts		
Treatment group	93.25***	1.58
Control group	87.73***	1.62
Slopes		
Linear trend	-0.70***	0.08
Quadratic trend	0.05**	0.02

* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 5

Achievement Scores Over Time as a Function of Treatment and Age: Adjusted Means and Estimated Effect Sizes

Subject	Adjusted means			Effect size	
	Treated	Control	Difference ^a	Pooled sample $\underline{d}$ ^b	Test $\underline{d}$ ^c
Reading	93.5	86.7	6.8	1.40	.45
Math	91.6	86.1	5.5	.86	.37

Note. The adjusted means given are those at age 15.

^aDifference refers to the difference between the treatment and control group.

^bPooled Sample $\underline{d}$ = the effect sizes calculated using the pooled standard deviation (reading $\underline{SD}$ = 4.85; math $\underline{SD}$ = 6.41).

^cTest $\underline{d}$ = the effect sizes calculated using the standard deviation of the Woodcock-Johnson Achievement tests (reading and math $\underline{SD}$ = 15).

Table 6
Evidence of Mediation

Model	Adjusted mean			Effect size	
	Treated	Control	Difference ^a	Pooled sample $\underline{d}$ ^b	Test $\underline{d}$ ^c
Reading					
Model without IQ	93.5	86.7	6.8	1.40	.45
Model with IQ	91.9	88.1	3.8	.79	.26
% Reduction				44	42
Math					
Model without IQ	91.6	86.1	5.5	.86	.37
Model with IQ	91.7	89.1	2.6	.40	.17
% Reduction				53	54

^aDifference refers to the difference between the treatment and control group.

^bPooled Sample $\underline{d}$ = the effect sizes calculated using the pooled standard deviation (reading model without IQ $\underline{SD}$ = 4.85; reading model with IQ $\underline{SD}$ = 4.92; math model without IQ $\underline{SD}$ = 6.41; math model with IQ $\underline{SD}$ = 6.42).

^cTest $\underline{d}$ = the effect sizes calculated using the standard deviation of the Woodcock-Johnson ($\underline{SD}$ = 15).

Figure Captions

Figure 1. Cognitive growth curves as a function of preschool treatment.

Figure 2. Reading achievement growth curves as a function of preschool treatment.

Figure 3. Mathematics achievement growth curves as a function of preschool treatment.

Figure 1

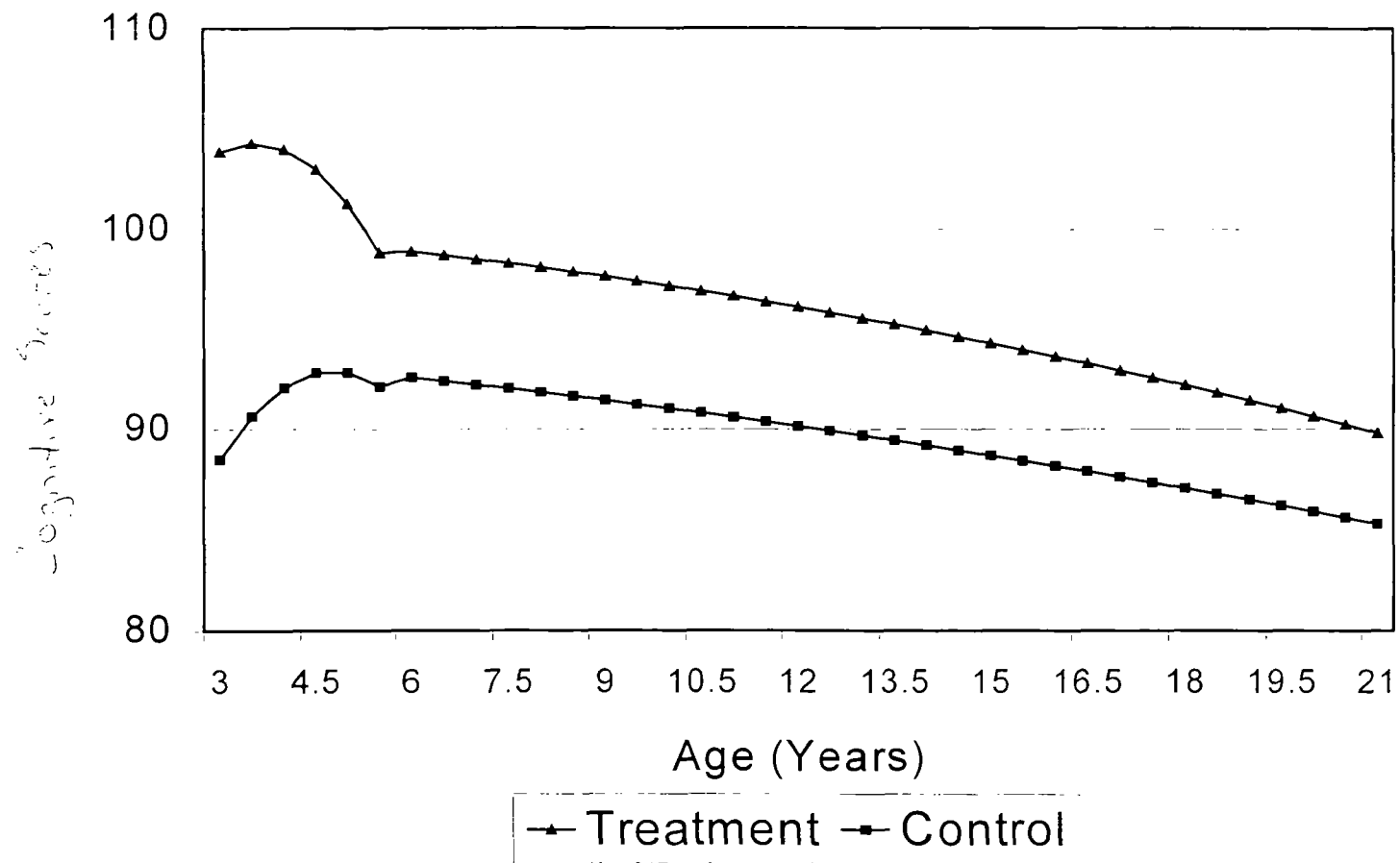


Figure 2

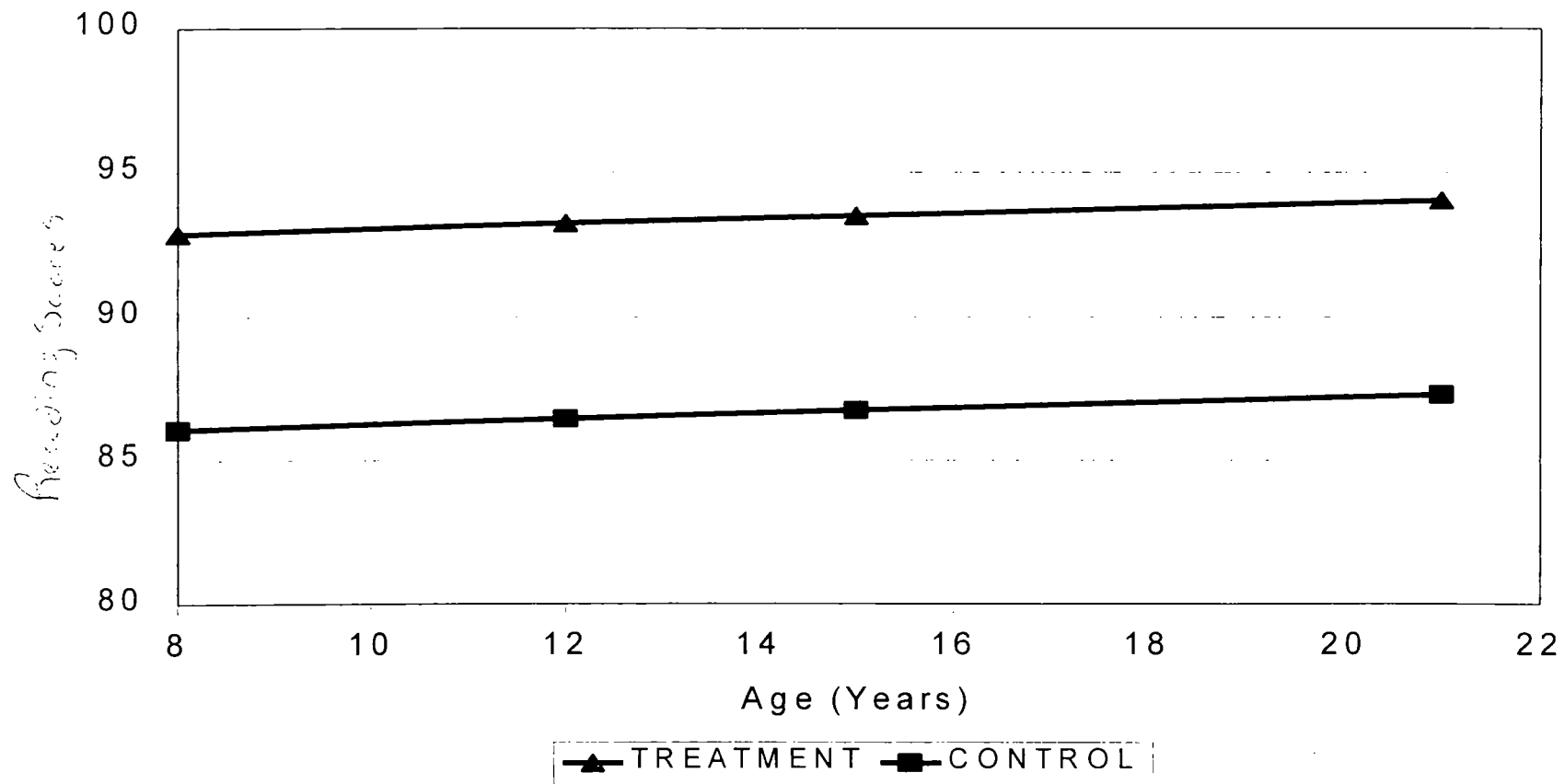


Figure 3

