



The Connecticut Commission on Children

School Readiness: Research and Benchmarks

December 2004

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Brain Development: The Crucial First Years

The first years of life are critical in children's brain development, and this development is very susceptible to adverse influences.

In the past few decades, science has made major advances in understanding child development, including what factors influence the child's development. These findings provide dramatic new information on the child's brain and its growth, but more importantly have demonstrated that the quality of the child's relationships and the degree of cognitive stimulation have a profound impact on the child's cognitive, emotional, and social growth.

The brain develops to 90% of its capacity in the first five years of a child's life. At birth, a child's brain has almost all the brain cells she will ever need. Links between an infant's 100 billion neurons must be hardwired through stimulation and interactions, because the brain will produce few more links after infancy. These crucial links provide the needed power for vision, hearing, language, emotions and movement.¹

Recent brain research has altered assumptions. Now it is known that:

- Experience is critical, beginning before birth. The brain's circuitry is made up of brain cells – neurons – and the connections – synapses – they make with other brain cells. Synapses link to form neural pathways. When a child interacts with the environment – reacting to stimuli, processing information, storing it – new signals activate or create neural pathways. These pathways are critical to healthy development and learning. And the vast majority of synapses are produced during the first three years of life.²

Brain development: the crucial first years

- ◆ At birth, a child's brain has almost all the brain cells she will ever need
- ◆ Critical neurological development occurs in early childhood
- ◆ The brain develops to 90% of its capacity in the first five years of a child's life

- Synapses activated many times by repeated early experience tend to become permanent.
- Synapses not used often enough tend to be eliminated.

These findings, combined with other advances in research, have led to a new and fuller understanding of child development and what influences development during the early years. These findings include:

- Children are born ready to learn. From birth to kindergarten, they are on a fast track making significant linguistic and cognitive gains and rapid progress in emotional, social, and regulatory capacities.
- Children are very vulnerable to harm during these early years.
- Beginning even before birth, the brain is greatly influenced by environmental conditions, including the kind of nourishment, care, surroundings, and stimulation they receive.
- Relationships matter a great deal. Parents and other regular caregivers are critical elements in a child's environment. How they protect, nurture, and stimulate a child influences early development for better or worse.
- Early care can have a lasting impact on how children develop, learn, and behave.

A Carnegie Corporation study noted that “the quality of young children’s environment and social experience has a decisive, long-lasting impact on their well-being and ability to learn.”³

School Readiness in Connecticut: Background

School readiness programs began in Connecticut under a series of laws enacted in the mid-to late-1990s, culminating in *An Act Concerning School Readiness and Child Day Care* (P.A. 97-259). The goal of the programs, as expressed in a 1997 report by the School Readiness Council (established by statute (P.A. 95-226, P.A. 96-213) and convened by the Commissioners of Education and Social Services) is to “ensure that all of our children enter school ready and eager to learn.” The Council identified several key elements of quality programs: that they provide or are linked to programs providing early childhood education, health care, social services, parental involvement and other key components; provide a program of support, training and professional development; be child centered and family focused; and involve broad-based community partnerships with schools, child care programs, family resource centers, employer sponsored programs and local government.⁴

The School Readiness Council recommended that “within five years[, e]very Connecticut child between three and five years of age will have access to quality preschool education that meets child and family needs.”

Although the school readiness program has not yet reached that universal goal, it has resulted in a significant number of preschoolers having the opportunity to benefit from a school readiness program. As of September 27, 2004, there were 47 participating school readiness communities with 7,214 spaces. Of these communities, 18 were priority school districts with 6,727 of the spaces.⁵

School readiness in CT:

◆ Legislation enacted in 1997

◆ In September 2004:

47 participating communities
(7,214 spaces)

Of these communities,

18 are priority school districts
(with 6,727 of the spaces)

(J. Foster, State Department of Education, Sept. 29, 2004)

Educational Gaps Persist

The need for universal school readiness programs to help prepare all children for school success can be seen clearly in the continued racial and income divides in Connecticut students' performance on standardized educational tests.

Nation's Report Card - 2003

The 2003 Nation's Report Card (National Assessment of Educational Progress) shows that overall, Connecticut's schoolchildren ranked among the nation's best readers. At the same time, the overall performance of schoolchildren on this measure indicates that the majority scored below proficiency levels. Less than half (43 percent) of the state's fourth graders scored at the proficient level on a reading test, but that was the highest mark in the nation.⁶

At the same time, the 2003 Nation's Report Card indicates that Connecticut has some of the largest achievement gaps in the nation between:

- ***White students and students from certain minority groups.*** Twelve percent (12%) of the state's Black fourth-graders and 18% of Hispanic fourth-graders met the reading proficiency standard, compared with 54% of White students. Those gaps are significantly larger than for the nation as a whole.
- ***Students from low- and high-income families.*** Overall, less than one in five (18%) of Connecticut's low-income fourth grade students met the reading proficiency standard, compared with 53% of children from higher-income families.

State Mastery Test Scores – 2003

On the 2003 Connecticut Mastery Test, in reading, math and writing, minority and lower-income students (those eligible for free or reduced price lunch) performed at lower levels than non-minority and higher-income students.⁷

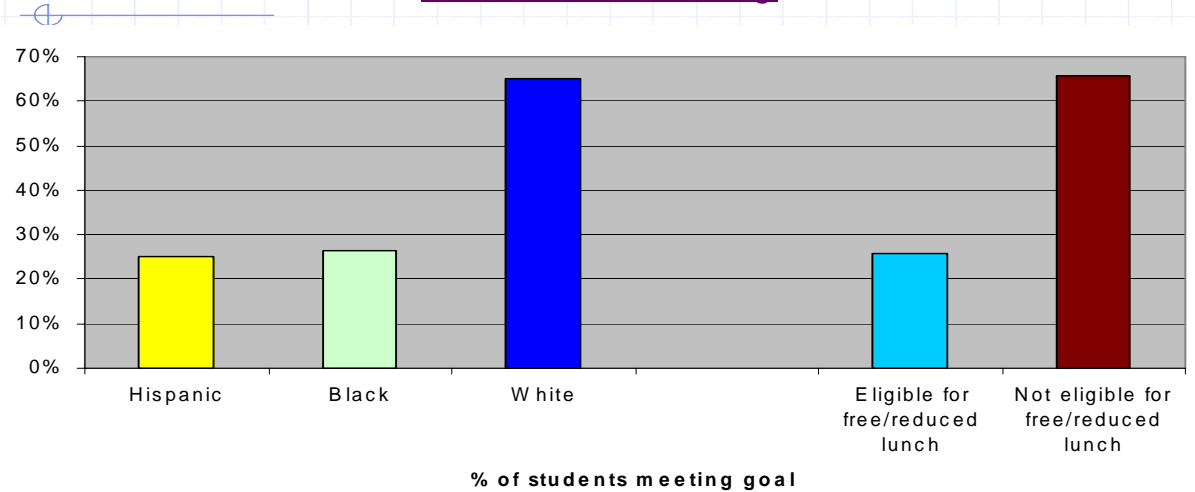
4th Grade Reading

In 4th grade reading, 65% of White students met the goal, compared to 27% of Black students and 25% of Hispanic students.

Connecticut Mastery Test – 2003

(released June 2004)

4th Grade Reading



(State Department of Education, www.cmtreports.com)

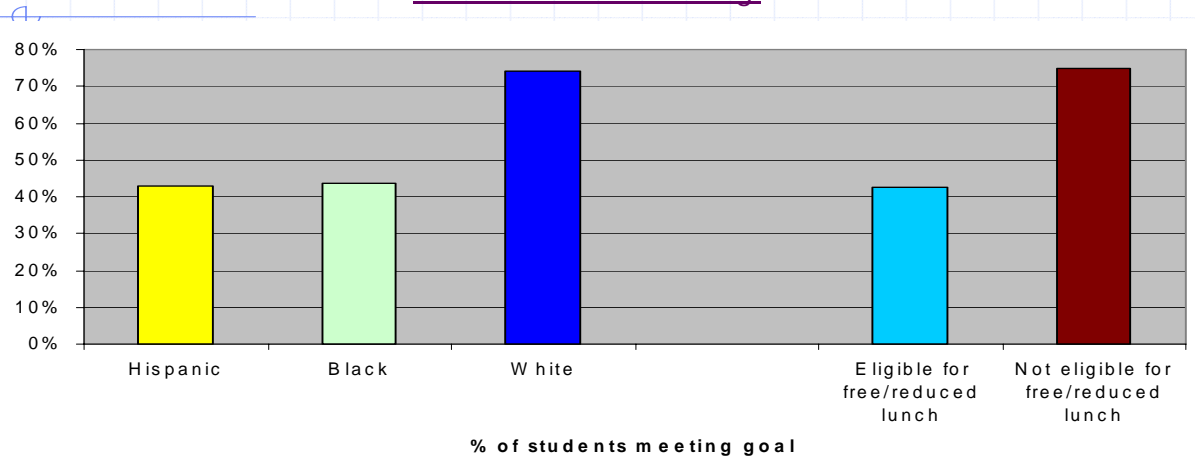
4th Grade Writing

In 4th grade writing, 74% of White students met the goal, compared with 44% of Black students and 43% of Hispanic students.

Connecticut Mastery Test – 2003

(released June 2004)

4th Grade Writing



(State Department of Education, www.cmtreports.com)

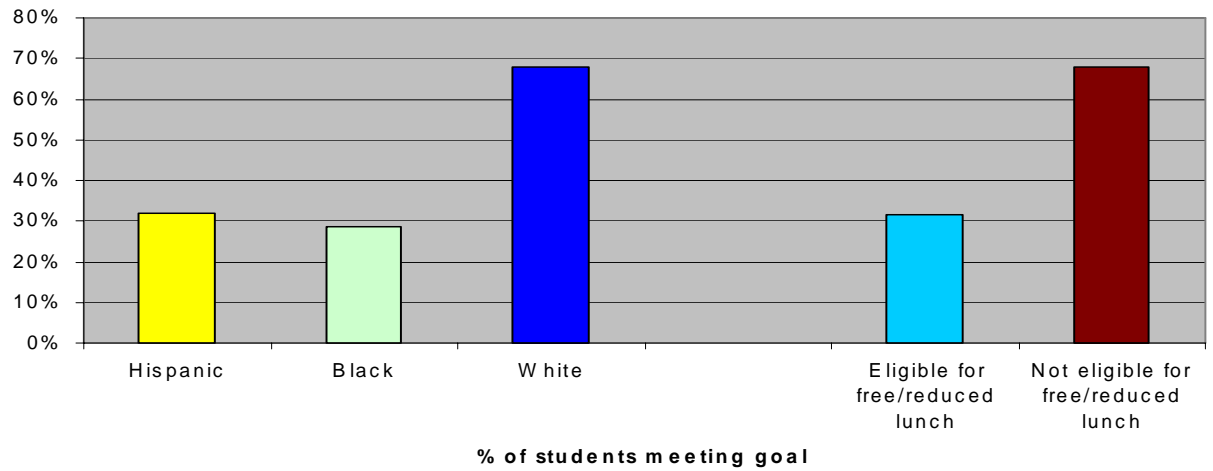
4th Grade Math

In 4th grade math, 68% of White students met the goal, compared with 29% of Black students and 32% of Hispanic students.

Connecticut Mastery Test – 2003

(released June 2004)

4th Grade Math



(State Department of Education, www.cmtreports.com)

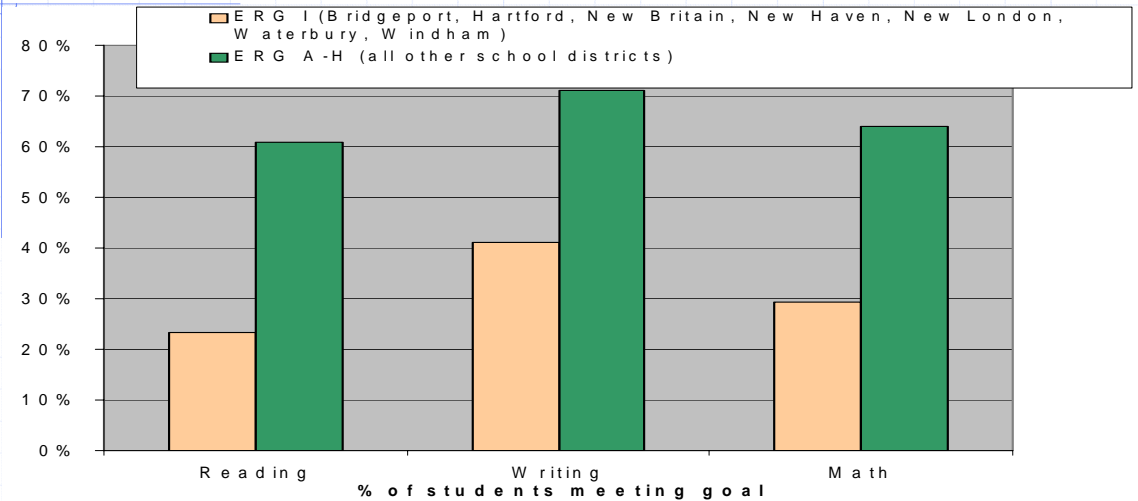
4th Grade Reading, Writing & Math

Fourth grade students in ERG I (Bridgeport, Hartford, New Britain, New Haven, New London, Waterbury & Windham) performed more poorly than students in the other Education Reference Groups (ERGs) on the 2003 mastery tests.⁸

Connecticut Mastery Test – 2003

(released June 2004)

4th Grade Reading, Writing & Math



State Department of Education. (2004, June 25). 2003 CMT results show gaps beginning to close.

School Readiness in Connecticut Shows Significant Gains

Current research in Connecticut unerringly supports an investment in quality preschool:

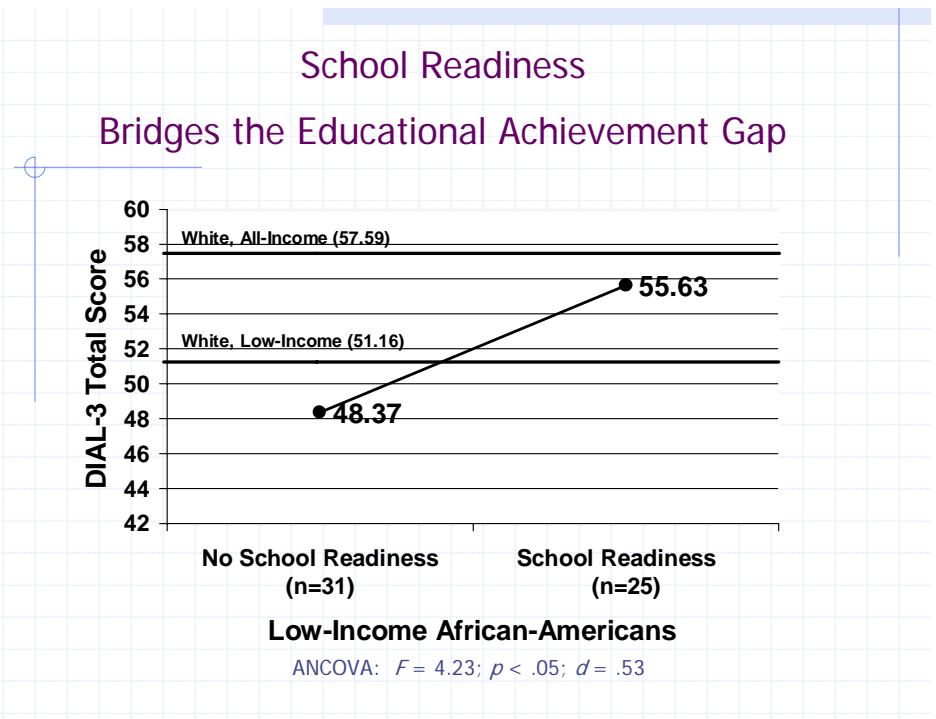
Middletown School Readiness:

The availability of a school readiness program accounted for a significant increase in the number of low-income African-American children “ready” for school – from 87.1 percent (of those who did not attend) to 96.0 percent (of those who did attend). Among White children in general, 96.97 percent were prepared for school.⁹

Low-income African American children who attended a school readiness program attained an average school readiness score (55.63) that was comparable to White children in general (57.59) and surpassed both White low-income children (51.16) and those low-income African American children who did not attend a school readiness program (48.37).

These findings provide strong evidence that school readiness programs can help to close the educational gap at kindergarten entry between White and low-income African American children. The study, conducted in Middletown, used the results of the DIAL-3 developmental screening test to find those at risk of school difficulties in kindergarten.

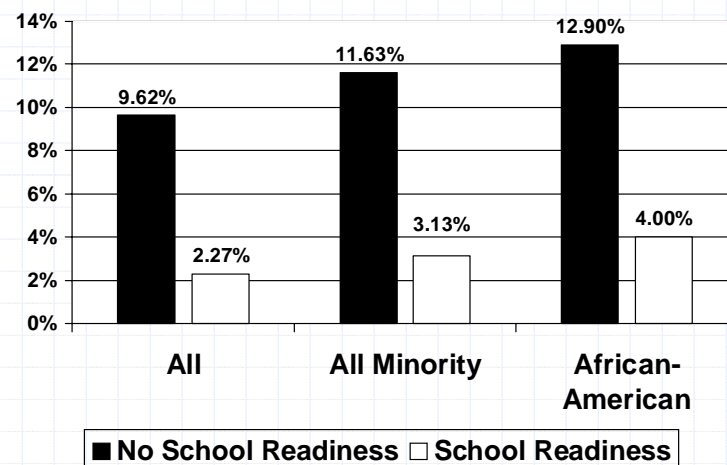
Among Middletown children enrolled in kindergarten, 46 percent of African Americans and 50 percent of Latino children participated in a school readiness program, as opposed to 31 percent of White children. The study also found that children – across racial and economic lines – who attended two years of pre-K, were significantly better prepared for kindergarten than those who attended only one year.



The Middletown findings, conducted by Walter Gilliam of Yale University, are consistent with an earlier analysis of all state-funded school readiness programs. That study, conducted by Edward Zigler and Walter Gilliam, found that pre-K programs had a significant impact in increased competence, reduction in behavior problems by 4th grade, improved attendance and grades in elementary school, and improved state achievement scores. In addition, every state that looked at the impact of their program on grade retention found a significant impact.

School Readiness Reduces Percentage of Children

Scoring Below Threshold on DIAL-3 (-1.5 SD)



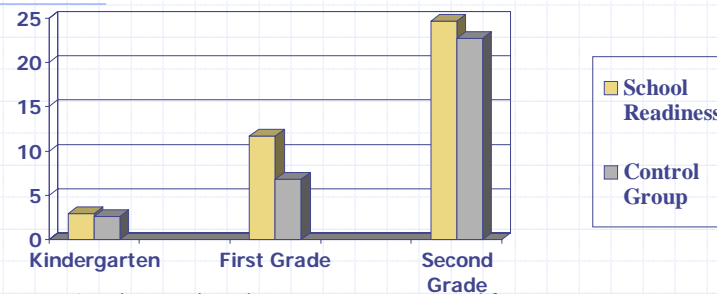
Bridgeport School Readiness:

Bridgeport followed children who had quality early care and education programming and those who did not have such programming. Children who had quality early education had fewer retentions, more frequent attendance, and higher reading scores throughout grades K-2.¹⁰

Those children in the Bridgeport study who had quality early care and education had stronger reading scores than the other children. First-graders who had quality early care and education averaged a score of 11.68 on the Developmental Reading Assessment (DRA), and all of these students exceeded the “substantially deficient” level of 10. In contrast, those children who did not have quality early care and education averaged just 6.84 on the DRA.

The average number of days absent for the Readiness group was significantly lower than for the control group in both kindergarten and first grade. Kindergarten students who had preschool had an average of 9.76 days absent, compared with 15.65 days for those who did not attend preschool.

Developmental Reading Assessment



- *Kindergarten Developmental Reading Assessment* is reported for June, 2001. A score of 10 is the minimum for promotion for first grade. Kindergarten children needed to be at least on level A for promotion. The scoring is A, 1, 2, 3, etc. School Readiness students averaged a level 3, Control Group students averaged a level 2.6.
- In first grade, the School Readiness children had an average score of 11.68. The Control Group's average score was 6.84.
- In second grade, School Readiness students average 24.6, whereas the Control Group's average score was 22.68.
- The School Readiness students met the promotion standard.

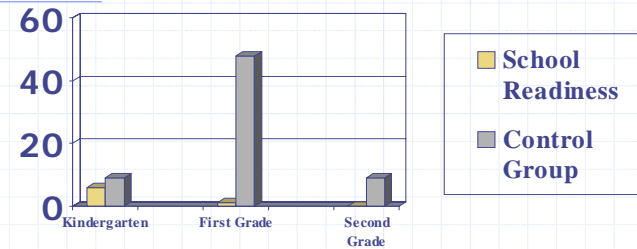
(D. Watson, "Bridgeport School Readiness Longitudinal Study", Bridgeport Public Schools, January 2002)

Attending a school readiness program greatly reduced the likelihood that a child would be retained in grades K-2, which led to significant budgetary savings for Bridgeport.

In the first grade, 47 percent of students (45 out of 96 students) who did not have quality early care and education were retained, compared with only 1 percent of students (1 out of 88 students) who had quality early care and education.

As a result of the significant difference in the number of kindergarten, first grade and second grade retentions among Bridgeport school readiness students and the control group, school readiness was estimated to save over a half million dollars – *just for the students who were part of that study*. Retentions in K-2 cost \$622,644 for the control group and \$113,208 for the school readiness children who were observed. Savings over time and among all students in Bridgeport would likely be much greater.

Retentions - Percentages



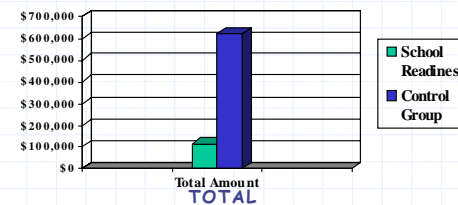
- In Kindergarten, 11/177 School Readiness children were retained (as compared to 15/176).
- In First Grade, 1/88 School Readiness children were retained (as compared to 49/96) [note: the 49/96 rate represents 45 children retained and four multiple retentions].
- In Second Grade, 0/13 School Readiness children were retained where as 2/23 Control Group students were retained.

(D. Watson, "Bridgeport School Readiness Longitudinal Study", Bridgeport Public Schools, January 2002)

The per pupil cost for educating a child in Bridgeport is \$9,434. Costs added to the Bridgeport Public Schools' budget due to retentions for just Grades K and 1:

Kindergarten Retentions				First Grade Retentions			
School Readiness	-- 11	\$103,774	School Readiness	-- 1	\$ 9,434		
Control Group	-- 15	\$141,510	Control Group	-- 49	\$462,226		

Second Grade Retentions			
School Readiness	-- 0	\$ 0	
Control Group	-- 2	\$ 18,868	



School Readiness = \$113,208 VERSUS Control Group = \$622,644

(D. Watson, "Bridgeport School Readiness Longitudinal Study", Bridgeport Public Schools, January 2002)

Milford School Readiness:

Milford found that children who attended a high-quality preschool program were significantly more school ready upon entry to kindergarten and more successful in school than children who did not attend the high-quality program.¹¹ Children in the longitudinal study were from primarily white, middle-income backgrounds and had been previously identified as being at high risk for educational failure or having special education need.

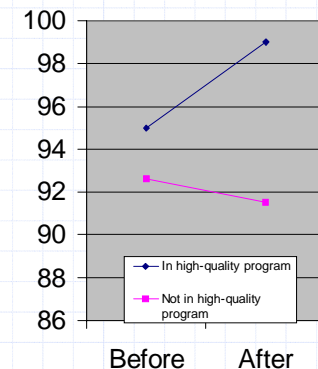
- Children in the high-quality preschool program gained an average of four points (95.0 to 99.0) on age appropriate tests in language, motor skills and concept development over the course of the preschool program. In contrast, children who did not attend a high-quality program (half of whom were in center-based care) lost developmental ground, experiencing a decline in average test scores (92.6 to 91.5) over the same period.
- Preschool participants were three times less likely to require special education during their kindergarten year.
- Children who did not attend the high quality preschool program were over four times more likely to be retained at the end of kindergarten. This is compelling as some argue that gains in early care and education do not hold for middle class children. This showed that they did.

A related study of Milford preschool education found that:¹²

- Two thirds of students who completed the preschool program required no special services in kindergarten or grade one or two.
- Preschool programs saved Milford approximately \$3 million over 5 years in reduced expenditures on outside special education tuition and transportation.

Milford findings

- ◆ Children in a high-quality preschool program gained 4 points on language/concept tests
- ◆ Children not in a high-quality program declined over 1 point



(M. Kramer and C. Wheeler, "Assessing the Benefits of the Milford Public Preschool Program", 1999)

Hartford/West Hartford School Readiness:

Children may benefit especially from school readiness programs that mix children from diverse economic backgrounds. The Hartford/West Hartford study found that low-income children attending preschool with more affluent peers increased their vocabulary skills six times faster than children in classes made up entirely of low-income children.¹³

After six months, the vocabulary gains made by the low-income students in mixed-income classrooms were significantly greater than those of other low-income children, suggesting that low-income children benefited greatly by the language models of their middle-/upper-income peers.

Economically Integrated Programs & Language Growth

◆ After six months, the vocabulary gains made by the low-income students in mixed-income classrooms were significantly greater than those of other low-income children:

	Low-income children in homogeneous classrooms	Low-income children in heterogeneous classrooms	Mid/upper-income peers in heterogeneous classrooms
Mean Standard Score	90.9	93.6	113.7
Mean Monthly Standard Score Gain	.21	1.58	.46
Mean Standard Score After Approx. 6 Months (assessment dates varied)	92.0	102.9	116.8

C. Schechter, "Language Growth in Low-income Children in Economically Integrated Versus Segregated Preschool Programs" (forthcoming)

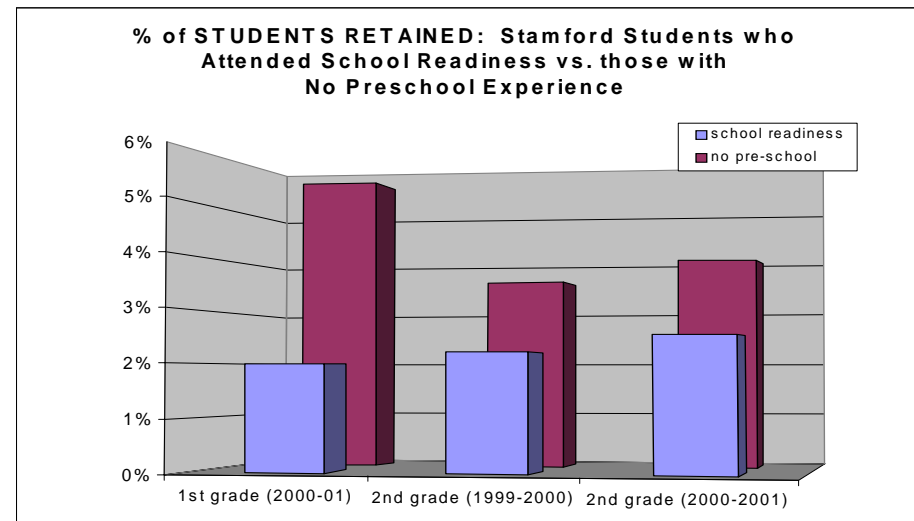
Stamford School Readiness:

A Stamford study demonstrated that school readiness leads to many gains once children from such programs reach school.¹⁴ Children from Stamford school readiness programs, compared to children with no preschool background, had:

- higher reading achievement (in kindergarten, 1st and 2nd grades)
- higher report card marks in many areas (in kindergarten, 1st and 2nd grades)
- fewer retentions
- higher attendance rates (in kindergarten, 1st and 2nd grades)
- fewer ESL and Bilingual placements

In the Stamford study, school readiness students were retained much less often than students with no preschool experience.

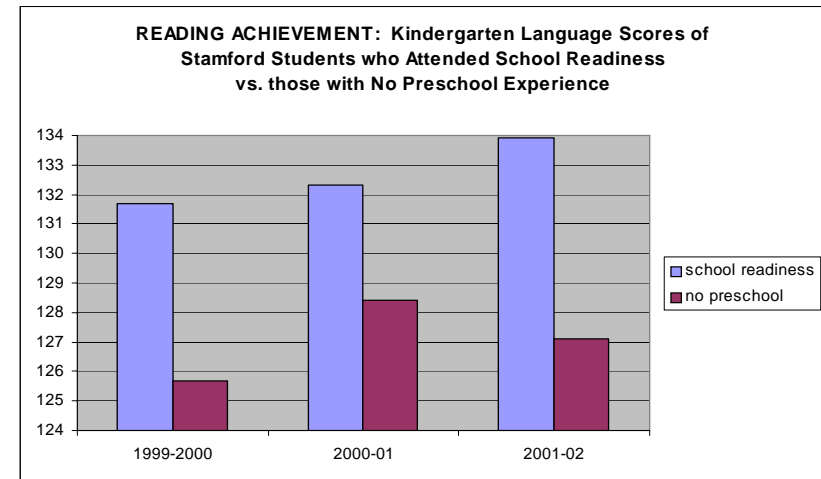
Stamford school readiness



(J. Singer, "The Stamford School Readiness Program: A Longitudinal Study," Stamford Public Schools, October 2002)

In three consecutive years, Stamford school readiness students scored higher than non-preschool students on kindergarten language assessments – and the average scores of the school readiness students in kindergarten rose from 1999-2000 to 2000-01 and again in 2001-02.

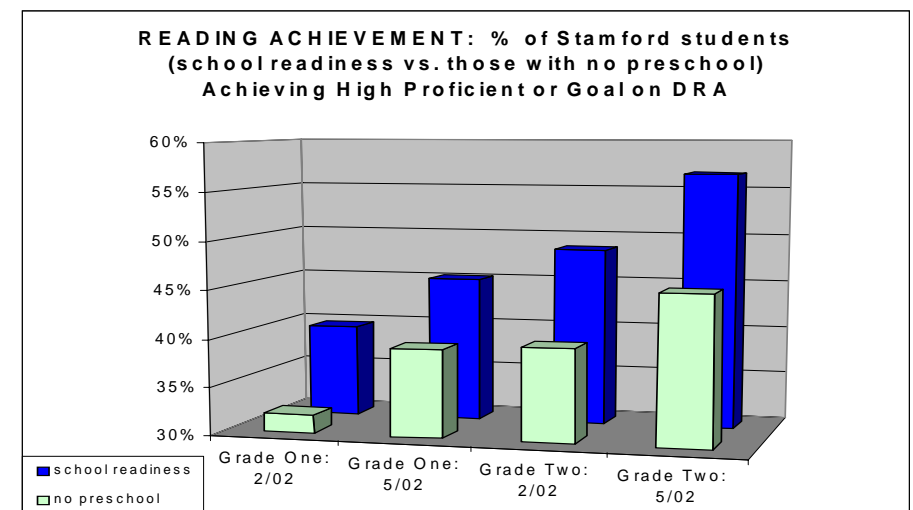
Stamford school readiness



(J. Singer, "The Stamford School Readiness Program: A Longitudinal Study," Stamford Public Schools, October 2002)

The Stamford school readiness students in 1st and 2nd grades scored higher than non-preschool students on the DRA assessment in four different comparisons in 2002.

Stamford school readiness



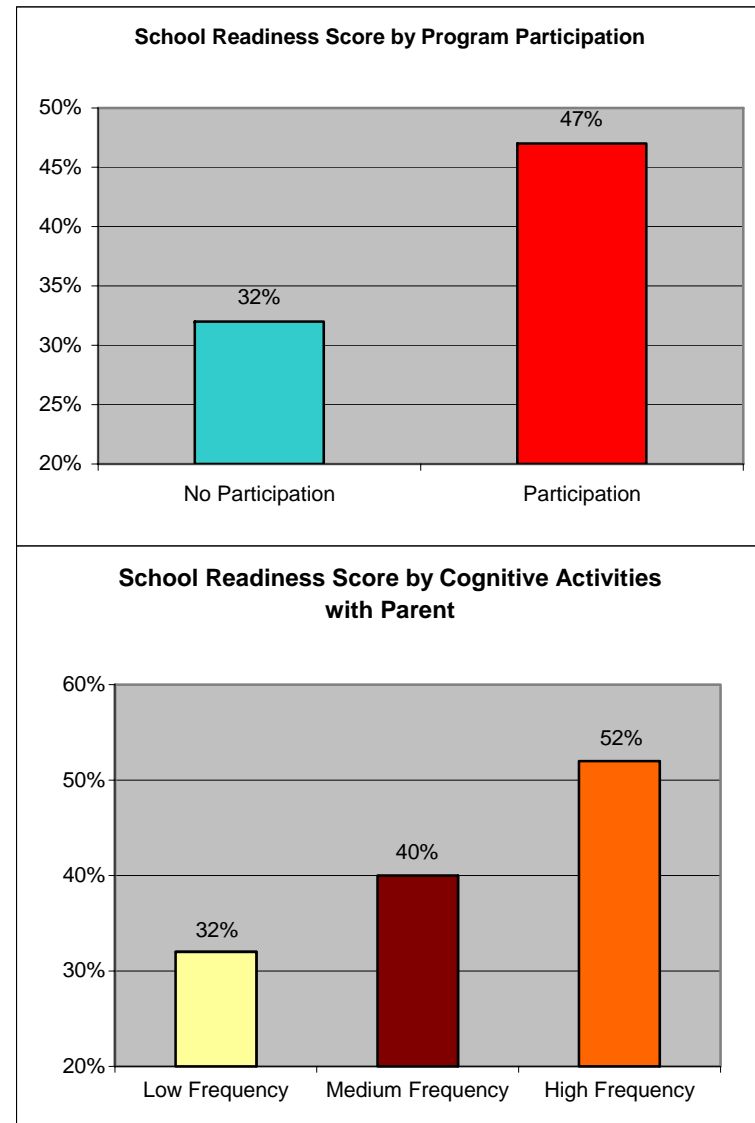
(J. Singer, "The Stamford School Readiness Program: A Longitudinal Study," Stamford Public Schools, October 2002)

Hartford School Readiness:

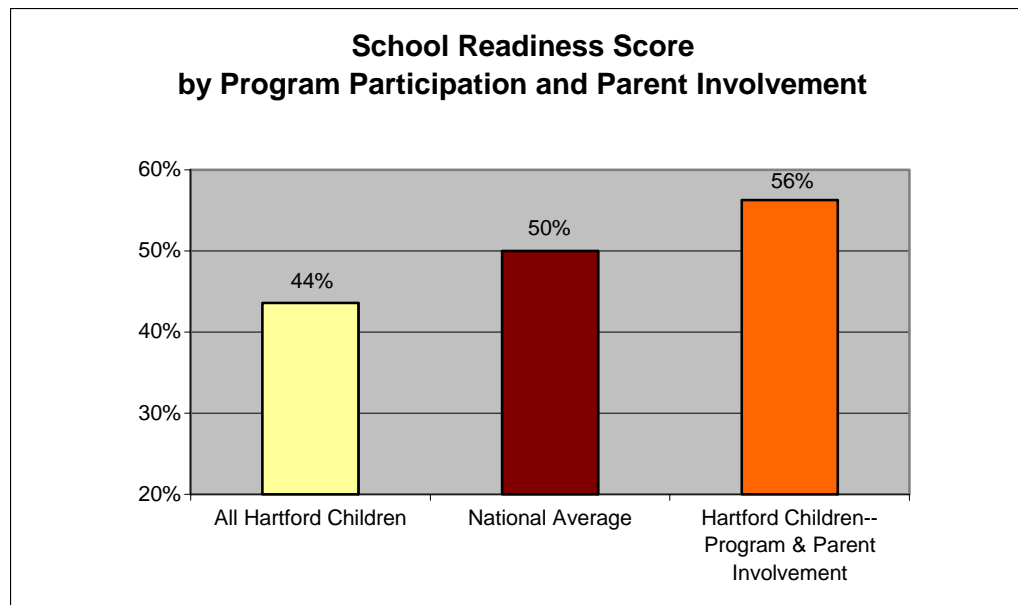
The first study of the school readiness of Hartford’s children found that children who have sustained parental involvement and who participate in organized early childhood experiences score above the national norm and enter school ready to learn.¹⁵ The purposes of the study were to examine children’s readiness and to identify what influences that readiness. The study measured school readiness by using Early Screening Profiles, which are nationally normed assessments based upon data obtained from children and their parents. Forty percent (40%) of all Hartford children surveyed scored above the national norm on school readiness.

Hartford children who participated in organized early childhood programs and experiences scored significantly higher on school readiness skills than children who did not participate.

Hartford children whose parents spent more time with them reading books, practicing numbers or letters, or engaging in other cognitive activities scored higher than other children.



Hartford children who participated in organized early childhood programs *and* whose parents were highly involved with them in stimulating activities scored highest, significantly above the national norm.



Endnotes

- ¹ The Governor's Task Force on Early Childhood Care and Education. (2002, Sept.). *Early care and education: the keystone of Pennsylvania's future -- report*. Commonwealth of Pennsylvania, p. 13.
- ² Shore, R. (1997). *Rethinking the brain: new insights into early development*. New York: Families and Work Institute.
- ³ Carnegie Corporation of New York (1994). *Starting points: meeting the needs of our youngest children*. New York, NY: Carnegie Corporation. Executive Summary.
- ⁴ School Readiness Council. (1997, Jan. 1). *School readiness in Connecticut: a report to the Governor and General Assembly by the School Readiness Council*. Connecticut Department of Social Services.
- ⁵ Foster, J. (2004, Sept. 29). E-mail message to Connecticut Commission on Children staff. Hartford: Connecticut Department of Education.
- ⁶ U.S. Department of Education, National Center for Education Statistics. (2003, Nov.). *The nation's report card: 2003* (nces.ed.gov/nationsreportcard/). Washington, DC: Author. Nation's Report Card (National Assessment of Educational Progress) state assessments in fourth and eighth grade reading, mathematics and science are carried out in odd-numbered years (the schedule is at nces.ed.gov/nationsreportcard/about/assessmentsched.asp).
- ⁷ Connecticut Department of Education. (2004, June 25.). *2003 CMT results show gaps beginning to close*. Hartford: Author; www.cmtreports.com.
- ⁸ To assist in reporting and analyzing school district data, the Connecticut Department of Education developed Education Reference Groups (ERGs), which are designed to compare groups of districts that have similar characteristics. The state's 166 school districts and three academies were divided into nine groups, based on socioeconomic status, indicators of need and enrollment. (Connecticut Department of Education. *State education facts*. As of Dec. 10, 2004, at www.csde.state.ct.us/public/der/edfacts/tables/cm/cm_ergs.htm. Hartford: Author.)
- ⁹ Gilliam, W., & Fahey, C. (2002, Feb. 28). *Middletown school readiness: bridging the educational gap*. Unpublished study results presented by Dr. Walter Gilliam at Education Committee forum, Connecticut General Assembly.
- ¹⁰ Watson, D. (2002, Jan.). *Bridgeport school readiness longitudinal study*. Bridgeport, CT: Bridgeport Public Schools.
- ¹¹ Kramer, M., & Wheeler, C. (1999). *Assessing the benefits of the Milford Public Preschool Program*. Milford, CT: Milford Public Schools.
- ¹² S. Harvey & C. Marcus. (Undated). *The benefits of pre-school education*. Milford, CT: Milford Public Schools.
- ¹³ Schechter, C. (2003, July). *The impact of two types of preschool programs on children's language*. A presentation to the Council of Philanthropy; Schechter, C. (forthcoming). *Language growth in low-income children in economically integrated versus segregated preschool programs*.
- ¹⁴ Singer, J. (2002, Oct.). *The Stamford school readiness program: a longitudinal study*. Stamford, CT: Stamford Public Schools.
- ¹⁵ Hartford Public Schools, City of Hartford, Hartford Foundation for Public Giving & Philliber Research Associates. (Fall 2002). *Preparing Hartford's children for school*.