

NIEER Working Paper**Preschool Program Effects on Hispanic Children's Cognitive Development**

Is Pre-K preparing Hispanic children to succeed in school?

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Research shows that high-quality preschool programs have a positive effect on children's cognitive development, which in turn increases children's chances to succeed in school. Given the changing demographic profile of the nation, a question being asked with increasing frequency is whether the cognitive benefits of preschool education generalize to children from specific ethnolinguistic groups, including children from the rapidly growing Hispanic population.

The most recent U.S. decennial Census showed that Hispanics have become the largest U.S. minority group. This has occurred several years before forecast that it would happen. Hispanics number 35 million or 12.5% of the U.S. population, very close to the size of the African American population. The U.S. Census Bureau has projected that by 2025 the Hispanic population will grow from 35 million to 61 million, at which point it will constitute 18% of the U.S. population (Pew Hispanic Center, 2002b, January). As a group, Hispanics are the least well-educated segment of the American population. Many of the achievement problems among Hispanics in high school and college are rooted in academic difficulties in the early grades—difficulties that are in turn rooted in a lack of school readiness in early childhood.

It is important to understand how the effects of preschool education may vary among children from different demographic and ethno-linguistic groups. Research findings on variation in effects on these groups can provide valuable insights that can inform development of programs that better target needs. To understand these issues, it is necessary to assess the impact of preschool programs on the individual groups themselves. The research evidence reviewed in this brief indicates that Hispanic children can benefit from preschool education at least as much as children from other major U.S. racial/ethnic groups.

Two relatively recent evaluations and an analysis of a national longitudinal sample of children provide evidence of the effects of preschool education on Hispanic children's cognitive development. Georgetown University's study of Oklahoma's universal pre-K program and the U.S. Department of Health and Human Services' Head Start Impact Study measured effects of well-established preschool programs on the development of children who attended them, breaking down their analyses by ethnic background. The third study analyzed data from the Early Childhood Longitudinal Study (ECLS-K) to examine the effects of exposure to a preschool center in the years before kindergarten.

Oklahoma's Universal Pre-K Program

The number of states that administer publicly funded pre-K programs has soared in the past two decades: from 10 in 1980 to 38 in 2002-03 (Barnett, Hustedt, Robin, & Schulman, 2004; Gormley, Gayer, Phillips, & Dawson, 2004). The aim of these programs is to promote children's acquisition of skills, knowledge, and behaviors that are associated with success in elementary school. The proportion of 4-year olds in the United States enrolled in state pre-K programs was 17% in 2004-05 and the proportion of 3-year olds was 3% (Barnett, Hustedt, et al., 2004). The number of children served by state pre-K programs ranges widely from state to state. In 2004-05, Delaware, Hawaii, and New Mexico each served fewer than 1,000 children, while Texas served more than 175,000 children. Twelve states funded no pre-K programs in 2004-05, though Florida began providing prekindergarten in 2005-06. Ten states accounted for more than three quarters of the children participating in state pre-K programs in 2002-03 (Barnett, Hustedt, et al., 2004).

Most states target their programs to low-income children and children with other characteristics that put them at risk for starting school behind their peers. Nine states, however, did not set eligibility criteria for their pre-K initiatives in 2002-03. Having no eligibility criteria does not mean, however, that all children are actually able to participate. Georgia and Oklahoma are the only two states that made pre-K universally available to 4-year olds whose families wanted them to participate in 2002-03. In the other states, access was limited by the availability of state funds to support pre-K and districts' willingness to offer it (Barnett, Hustedt, et al., 2004).

Emerging evidence indicates that pre-K programs, like child care, are characterized by extensive variation. For example, in 2004-05, some states required that all pre-K teachers have a college degree and a certification in early childhood education, while others required only a Child Development Associate (CDA) certificate.

Although a number of attempts have been made to evaluate the impact of state pre-K programs, most of these evaluations suffer from serious methodological limitations or flaws, making it difficult or impossible to draw unambiguous conclusions. An evaluation of the Oklahoma pre-K initiative by Gormley, Gayer, Phillips, and Dawson (2004), described below, represents an effort to overcome many of these methodological problems. This study is significant in that it scrutinized the effects of the program separately by racial/ethnic group, allowing an analysis of the program effects on Hispanic children.

Specifically, Gormley et al. (2004) evaluated the school readiness of children who attended the universal pre-K program in Tulsa, Oklahoma, during the 2002-03 school year. In Oklahoma, all 4-year olds are eligible to participate in pre-K if their public school district offers it. The participating districts receive state funding for each 4-year old served, just as they would for any K-12 student. This state's pre-K initiative has expanded rapidly since 1998 when it was opened to all 4-year olds. The program was

available in more than 90 percent of school districts in 2002-03. These districts served 59 percent of all 4-year olds in the state—a higher percentage served than by any other state (Barnett, Hustedt, et al., 2004). (The initiative does not serve 3-year olds.) The program requires all teachers to have a bachelor's degree with certification in early childhood education and pays them salaries equivalent to those of other public school teachers. The program met eight of 10 quality benchmarks cited in *The State of Preschool: 2004 State Preschool Yearbook*. However, it lacks statewide requirements for health screenings and referrals (Barnett, Hustedt, et al., 2004).

The Gormley et al. (2004) study examined the effects of pre-K on children of varied racial, ethnic, and income groups, and on children in full-day and half-day programs. To reduce sample selection bias that results when control group children likely differ in background and other factors from those in the treatment group, this study employed a "regression discontinuity" research design, comparing two groups of children. The 'preschool group' was made up of children attending kindergarten who attended the state-funded preschool program the previous year. The 'no preschool' group was made up of comparable children attending the state-funded preschool program and who were assessed at the beginning of the year before the program benefits had a chance to accrue. The sample consisted of more than 3,000 children, approximately equally divided between those who had just completed the pre-K program and those just beginning pre-K.

Testing

To assess the impact of the program, the children were administered three subtests of the Woodcock-Johnson Achievement Test, which is a standardized, nationally normed achievement test that has been widely used in studies of early education and its consequences:

- The Letter-Word Identification subtest measures pre-reading and reading skills. It requires children to identify letters that appear in large type and to pronounce words correctly (the child is not required to know the meaning of any particular word).
- The Spelling subtest measures pre-writing and spelling skills (such as drawing lines and tracing letters); it requires the child to produce uppercase and lowercase letters and to spell words correctly.
- The Applied Problem Solving subtest measures early mathematical reasoning and problem-solving skills. It requires the child to analyze and solve math problems, performing relatively simple calculations.

The tests were administered by teachers in the Tulsa Public School (TPS) kindergarten and pre-K programs. It is important to note that the teachers were instructed to administer the test exclusively in English even though TPS classrooms include a substantial number of Hispanic children, some of whom come from Spanish-speaking households. Teachers were also instructed to administer the test to all children, unless it proved impossible to get any meaningful response. (The fact that all children were tested in English regardless of their home language has implications for interpreting the study results with regard to ethnolinguistic minority children.)

Impacts

The data analyses showed statistically significant impacts of the pre-K program for each subtest. These impacts were found for both full-day and half-day programs, for each of four racial/ethnic groups (Hispanic, Black, Native American, and White children), and for both subsidized-lunch eligible and non-eligible children. The results show sizable improvements in test scores for each racial/ethnic group as follows:

- For Hispanic children, the letter-word identification scores increased by 4.15 (1.50 of the standard deviation for the control group), the spelling scores increased by 2.66 points (0.98 of the standard deviation for the control group), and the applied problems scores increased by 4.97 points (0.99 of the standard deviation for the control group).
- For Black children, the letter-word identification scores increased by 2.91 (0.74 of the standard deviation for the control group), the spelling scores increased by 1.47 points (0.52 of the standard deviation for the control group), and the applied problems scores increased by 1.68 points (0.38 of the standard deviation for the control group).
- For Native American children, the letter-word identification scores increased by 3.56 (0.89 of the standard deviation for the control group), the spelling scores increased by 2.24 points (0.72 of the standard deviation for the control group), and the applied problems scores increased by 3.08 points (0.60 of the standard deviation for the control group).
- For White children, the letter-word identification scores increased by 3.02 (0.76 of the standard deviation for the control group), the spelling scores increased by 2.07 points (0.72 of the standard deviation for the control group), and the applied problems scores do not have a statistically significant increase.

For race/ethnicity by full day versus half-day program, the analyses found positive point estimates for almost all of the test impacts. With the exception of the Native American children in a full-day program, which is a very small sample and therefore standard errors are so high that statistically significant findings are unlikely, the analyses found strong test impacts for all racial and ethnic groups for full-day as well as half-day programs.

On the basis of the Gormley et al. (2004) study, it can be concluded that Oklahoma's universal pre-K program succeeded in enhancing the school readiness of a diverse group of children, including Hispanic children.

Although the research design and scientific rigor of the Gormley et al. (2004) study represents an improvement over previous studies of state pre-K programs, it did not test for the impact of no program or of other types of programs. That is, it did not

compare the children who attended the state pre-K program to either those whose parents chose not to send their children to any pre-K program or those who attended a private pre-K, a day care, or a Head Start program. The study answered only this question: Did the children who attended the Tulsa, OK program obtain higher test scores than children who did not attend the program? The study did not test for the impact of making the Tulsa pre-K program available to every age-eligible child in the state.

It is also important to note that one cannot compare the study's estimated test impacts across sub-groups. For example, the greater estimated test impacts for Hispanic children relative to Black children does not necessarily imply that a representative Hispanic child will gain more from the program than a representative Black child. The Hispanic results measure the test impacts for Hispanic children who chose to select into the program. Likewise, the results for Black children measure the test impacts for Black children who chose to select into the program. Because the Oklahoma pre-K program is voluntary, comparing test scores of kindergarten children who completed the program to kindergarten children who did not is likely to suffer from selection bias. Certain families are more likely to select into the pre-K program; these families will have unobservable characteristics that influence test scores. Thus, a traditional comparison of kindergarten children exposed to pre-K to kindergarten children not exposed to pre-K, even using controls for selection bias, could lead to spurious results. These two groups differ in many observable ways. For example, children who attended Tulsa pre-K are less likely to be Hispanic than are Tulsa children not exposed to pre-K, which is evidence of underutilization of preschool education by Hispanic families.

Nevertheless, the results of the Gormley et al. (2004) study support the proposition that a universal pre-K program financed by state government and implemented by the public schools can improve pre-reading, pre-writing, and pre-numeracy skills as measured by standardized tests administered in English for a diverse cross-section of young children, including specifically Hispanic children.

Head Start

Begun in 1965 as part of the War on Poverty, Head Start has as its goal to boost the school readiness of low-income children. The premise underlying the program is that low-income children do not receive the same level of intellectual stimulation at home as middle-class children. Based on a “whole child” model, the program provides comprehensive services that include preschool education; medical, dental, and mental health care; nutrition; and parental involvement. Head Start services are designed to be responsive to each child’s and family’s ethnic, cultural, and linguistic heritage.

The congressionally mandated Head Start Impact Study is being conducted on a nationally representative sample of Head Start grantee/delegate agencies. A recent report (U.S. Department of Health and Human Services, May 2005) presents preliminary findings on impacts after one year in Head Start (fall 2002 to spring 2003). (A final report will present results of analyses following children through the end of first grade.) Approximately 5,000 newly entering 3- and 4-year old children applying for Head Start

entry in fall 2002 were randomly assigned to either a Head Start group that had access to Head Start program services or to a non-Head Start group that could enroll in available community non-Head Start services, selected by their parents. The study quantifies the impact of Head Start across child cognitive, social-emotional, and health domains as well as on parenting practices. The total sample, spread over 23 different states, consists of 84 randomly selected Head Start grantees/delegate agencies, 383 randomly selected Head Start centers, and a total of 4,667 newly entering children, including 2,559 in the 3-year-old group and 2,108 in the 4-year-old group. (Grantees are organizations that have fiscal and administrative responsibility for programs in their jurisdiction; they can subcontract with agencies to handle administrative oversight over some or all of these programs. The term grantee/delegate agency is used to refer to both types of agencies.)

The study examines the impact of access to Head Start, bearing in mind that the control group had some access to other early childhood services. Impact was estimated for the total population and by language and ethnic background, allowing analyses of the impact of Head Start on Hispanic children. To avoid problems of selection bias, the study randomly assigned a sample of 3- and 4-year-old Head Start applicants not previously served by the program, either to a treatment group (in which children and families received Head Start services) or to a control group (in which children were not granted access to Head Start but may have received a range of other services chosen by their parents). The study focuses on newly entering children to ensure that the estimated impacts are unaffected by previous program participation. (Consequently, children who were returning to Head Start, as well as those previously enrolled in Early Head Start, were excluded from the study sample.) Under this randomized design, a simple comparison of outcomes for the two groups yields an unbiased estimate of the impact of Head Start on children's school readiness. The advantage of this research design is that if random assignment is properly implemented with a sufficient sample size, program participants should not differ in any systematic or unmeasured way from non-participants except through their access to Head Start services. The fact that both Head Start programs (i.e., grantee/delegate agencies) and children were randomly selected makes results able to be generalized to the entire Head Start program, not just the selected study sample.

Of particular relevance to the focus of the present paper, the report (U.S. Department of Health and Human Services, May 2005) presents data on the impact of Head Start on children's cognitive development in five constructs based on direct child assessments (1-5) and one construct (6) based on parent reports; each construct comprises one or more measures. The constructs are:

- (1) pre-reading skills focusing primarily on letter recognition;
- (2) prewriting skills that address the ability to draw shapes and write letters;
- (3) vocabulary knowledge, which is indicative of receptive language development;

- (4) oral comprehension and phonological awareness, which assess the ability to understand spoken language, including the knowledge that spoken sentences are made of component words that, in turn, comprise syllables and sounds (phonemes);
- (5) early math skills that are essential for the development of more advanced quantitative capabilities;
- (6) parent's perceptions of their child's early language and literacy skills--parents were asked to provide their perceptions of their child's emerging literacy and language skills.

The baseline data, collected in fall 2002, included in-person interviews with the parent/primary caregiver of each child and direct one-on-one child assessments conducted by the local interviewers/assessors. The interviews were conducted in the child's home with a parent or primary caregiver living with and responsible for raising the child. Parent interviews were available in both English and Spanish versions, and bilingual English/Spanish speakers were hired for areas with Spanish-speaking families. For other languages, either interviewers/assessors fluent in these languages were hired or other local resources were asked to identify interpreters to aid in completing the parent interviews.

At the time of the assessment, the interviewer/assessor asked the main care provider a series of questions to determine the appropriate language for the assessment. For children requiring assessment in Spanish, a bilingual interviewer/assessor administered the assessment battery in Spanish and also administered two subtests in English, i.e., the Peabody Picture Vocabulary Test (adapted) (PPVT) and the Woodcock-Johnson III Letter-Word Identification. For children who could not be assessed in English or Spanish, a bilingual interviewer/assessor or an interpreter for the child's language were used. The interviewer/assessor (or interpreter) used the English assessment booklet, translated the instructions into the child's language, and administered four subtests: McCarthy Draw-A-Design, Color Names and Counting, Leiter-R-Adapted, and Story and Print Concepts. For the spring assessments, these children were all tested in English.

In spring 2003, the interviewers/assessors again conducted in-person parent interviews and child assessments. Once again, the parent interviews were conducted in the child's home with a parent or primary caregiver living with and responsible for raising the child. The interviews were conducted in the parent's language with English and Spanish versions available. Parents speaking other languages were interviewed with the aid of an interpreter. The same fall battery of direct child assessments was again administered in spring 2003 with the addition of a Letter Naming Task. In spring 2003, the children assessed in Spanish in fall 2002 were assessed primarily in English, along with the continued administration of two Spanish language measures: the Test de

Vocabulario en Imágenes Peabody (TVIP) and the Batería Woodcock- Muñoz Identificación de Letras y Palabras. One exception is Puerto Rico where, because instruction is in Spanish, all children were assessed only with the complete Spanish battery in spring 2003.

The overall average analyses, which combined all the children in the sample regardless of demographic characteristics, showed the following:

- There are small to moderate statistically significant positive impacts for both 3- and 4-year-old children on several measures across four of the six cognitive constructs, including pre-reading, pre-writing, vocabulary, and parent reports of children's literacy skills.
- No significant impacts were found for the constructs oral comprehension and phonological awareness or early mathematics skills for either age group.

The report presents the results of analyses conducted separately by race/ethnicity: Like the analyses for the combined sample, the results of analyses for race/ethnicity show small to moderate effect sizes. The most important and consistent of these findings regarding ethnolinguistic minority children are discussed below:

- For Hispanic 3-year-old children, positive impacts occurred in pre-reading (both Woodcock-Johnson III Letter Word Identification and Letter Naming), vocabulary (PPVT-III, adapted), and pre-writing (Woodcock-Johnson III Spelling). No impacts were found for Hispanic 4-year olds.
- For African American 3-year olds, positive impacts were found in pre-reading (Woodcock-Johnson III Letter Word Identification), phonological awareness (CTOPPP Elision), and pre-writing (Draw-a-Design); for African American 4-year olds, positive impacts occurred in pre-reading skills (Woodcock-Johnson III Letter-Word Identification), and early writing (Woodcock-Johnson III Spelling).
- For White 3-year-old children, positive impacts occurred in oral comprehension (Woodcock-Johnson III Oral Comprehension); for White 4-year olds, positive impacts were found in pre-reading skills (Letter Naming Task).

Head Start also had an impact on parent perceptions of children's emerging literacy (the PELS measure), for African American, Hispanic, and White children in the 3-year-old group. For the 4-year-old group an impact on this measure was only found for African-American children.

Analyses of the ECLS-K Data

A study by Loeb, Bridges, Bassok, Fuller, and Rumberger (2005) used data from the Early Childhood Longitudinal Study, Kindergarten Class of 1998-99 (ECLS-K), collected by the National Center for Educational Statistics (NCES). The data are based on a nationally representative sample of children who showed at least minimal levels of English-language proficiency (on the pre-reading assessment). The data were drawn

from interviews with the children's parents, along with direct assessments of their five year-olds and interviews with kindergarten teachers.

Loeb et al. (2005) analyzed data for 14,162 children who entered kindergarten for the first time in 1998. In the fall of the kindergarten year, parents were asked a series of questions regarding their child's care arrangements since birth, including the main kind of care or early education utilized in the year immediately prior to kindergarten. Based on their responses, Loeb et al. separated children into four mutually exclusive child-care types: (non-Head Start) center program, Head Start program, parental care, and nonparental care. (The nonparental care group includes care by non-parent relatives and non-relatives such as a babysitter.)

The data analyses examined, separately by child's racial/ethnic group (White, Black, Hispanic), the statistical effects of these types of child-care experiences on the children's performance on the following measures of cognitive development. In the fall of kindergarten, NCES staff conducted one-on-one child assessments to measure the child's reading and mathematics ability. The reading assessment measures a variety of skills including print familiarity, letter and word recognition, beginning and ending sounds, rhyming sounds, vocabulary, and comprehension. The math test evaluates each child's knowledge of numbers as well as their spatial sense and problem solving abilities.

The analyses show variation in the effects for children of different ethnic groups. Hispanic children appear to benefit more in terms of cognitive development from center attendance than White or Black children with similar characteristics. More specifically, the magnitude of test-score gains are dramatically larger for Hispanic students than for the other racial/ethnic groups. For instance, center care is associated with a 0.23 SD increase in the reading scores of Hispanic students, almost three times the effect size for White children. In addition, Hispanic children who attend Head Start do better in reading than those who receive maternal care, though the Head Start effect is smaller than the center effect.

As Loeb et al. (2005) point out, it is important to remember that these results for Hispanic youngsters are generalizable to those children with minimal proficiency in English. Further research would be useful in assessing whether these effects also hold for Hispanic children with more limited English.

It is important to note that the Loeb et al. study may be more susceptible to selection bias in its estimates than either the Oklahoma study or the National Head Start Impact Study which are explicitly designed to avoid selection bias. Direct information on the extent to which this is a problem in the Loeb et al. study is provided by a comparison to the results of the Head Start Impact study, the Loeb study, finds no significant impacts of Head Start for the overall sample and even estimates negative "effects" on reading for most children (though not for Hispanic children). This suggests that the Loeb et al. study systematically under-estimates the effects of Head Start and, perhaps, other targeted programs as well.

Discussion and Recommendations

Despite the research evidence demonstrating the cognitive benefits of preschool education for Hispanic children, the rates of participation in preschool programs are low for this ethnolinguistic group. Even in Oklahoma's universal pre-K program, the participation of Hispanic families appears to be lower than that of other groups. There is a need for (a) research to ascertain the reasons that Hispanic families may have for such low rates of participation in preschool education and the conditions or obstacles that may be limiting their access and (b) efforts to increase this population's access to and participation in high-quality preschool education programs that meet this group's needs and preferences.