

PRESCHOOL PARTICIPATION AND THE COGNITIVE AND SOCIAL DEVELOPMENT OF LANGUAGE MINORITY STUDENTS

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Executive Summary

This study examined participation in preschool and its relationship with the cognitive and social development of language minority students. Although there is a large body of research that demonstrates the cognitive and social benefits of attending preschool (Barnett, 1995; Gorey, 2001; National Research Council, Committee on Early Childhood Pedagogy, 2000; Vandell, 2004), very little of this research has included language minority students, or at least those who do not speak English. Either non-English speaking families are not included in the design of the study, such as with the widely cited National Institute for Child Health and Development (NICHD) Early Child Care Study, or the studies are based on cognitive and social assessments that are only conducted in English (e.g., Magnuson, Meyers, Ruhm, & Waldfogel, 2004). Consequently, little is known about participation in and outcomes of preschool for the growing population of language minority students.

The present study was able to overcome many of the limitations of previous studies. The data used in this study came from the Early Childhood Longitudinal Study of the Kindergarten Class of 1998-99 (ECLS-K) and included a representative sample of students and parents who did not speak English. Parent interviews were conducted primarily via telephone with bilingual staff, so only one percent of the parent interviews could not be conducted because of language problems (U.S. Department of Education, National Center for Education Statistics, 2000, p. 5-14). The direct math assessment was conducted in both English and Spanish, which thereby included the majority of non-English speaking language minority students. And teachers were asked to assess students' cognitive skills irrespective of language.

However, the ECLS-K data still have limitations for conducting studies of preschool. The study relied on retrospective parent interviews for information on their child's preschool experiences. As such, it is subject to recall error. It also meant there was little information on the quality of the preschools that the child attended, which previous studies have shown impacts student outcomes (NICHD Early Child Care Research Network, 2003). Finally, it meant that it was difficult to control for all of the characteristics of families that could have influenced their decision to send their child to preschool, making it hard to assess the causal impacts of preschool on cognitive and social development. Nonetheless, the study was able to generate considerable and valuable information on preschool participation and its relationship with school outcomes.

Research Questions

The study addressed three research questions:

1. How widespread is participation in preschool the year before kindergarten and does participation vary by language background?
2. What is the relationship between preschool participation and cognitive and social development at entry to kindergarten and does this relationship vary by language background?
3. What is the relationship between preschool participation and cognitive and social development at the end of third grade and does this relationship vary by language background?

In this study the term *preschool* refers to an array of center-based child care programs, including day care centers, nursery schools, pre-kindergarten programs, preschools, and Head Start¹ programs. In most of the analyses we compare students who attended Head Start preschool programs and other non-Head Start, center-based preschool programs with students who did not attend any preschool programs the year before kindergarten.

To better understand the role of language background, we identified three sub-groups of language minorities: students from households where English was the primary language spoken (English dominant), students from Spanish-speaking households where English was NOT the

¹ *Head Start* refers to the federally-funded program for low-income children (see Currie & Duncan, 1995).

primary language (Spanish dominant), and students from non-Spanish-speaking households where English was NOT the primary language (Other language dominant).

Participation

Consistent with previous studies, we found that the majority of students who entered kindergarten in the fall of 1998 had attended some form of preschool the year before entering kindergarten. Specifically, we found that 68 percent of kindergarteners had attended preschool, which is consistent with national estimates from other datasets (see Table 4). But participation among language minority children (58 percent) was lower than among non-language minority children (72 percent), with children from Spanish-dominant households having even lower participation rates (48 percent). Moreover, language minority children were more likely to attend Head Start programs rather than non-Head Start programs.

Our statistical models confirmed these results. After controlling for other factors that predicted preschool participation, such as socioeconomic status (SES) and mother's employment, language minority students were still 30 percent less likely to attend non-Head Start programs than non-language minority students (Figure 1). However, they were just as likely to attend Head Start programs as non-language minority students.

We also examined the amount and timing of preschool that students received. The majority of students attended preschool part-time (20 hours or less per week) and for more than nine months in the year before kindergarten (Tables 7 and 8). These rates did not vary widely by language background, but there were differences in the age students first attended non-Head Start preschool programs. The majority of students who attended Head Start programs first attended those programs at age 4 and those rates did not vary widely by language background. In contrast, more than two-thirds of students who attended non-Head Start programs first attended prior to age 4, and more than one-third first attended prior to age 3 (Table 9). These rates did vary widely by language background: whereas 37 percent of non-language minority students first attended non-Head Start programs prior to age 3, only 25 percent of all language minority students and only 12 percent of students from Spanish-dominant households first attended before age 3.

The most important finding from this part of the study is that not only are language minority students less likely than non-language minority students to attend non-Head Start

programs the year before kindergarten, they are also less likely to attend such programs for more than one year. These disparities are most pronounced for language minority students from Spanish-dominant households.

School Readiness

We found widespread differences in several cognitive and non-cognitive measures of school readiness that were assessed by teachers and ECLS-K field staff in the fall of kindergarten.

Our analysis revealed that only about half of all students identified as language minority based on the parent questionnaire were identified as a language minority by their schools. As a result, only half of all language minorities were given an English proficiency test (Table 10). The results of these tests showed that about half of all language minority students given the test were classified as English proficient and were subsequently given all of the direct assessments in English. Students who were not proficient in English, but who spoke Spanish, were given the direct math assessment in Spanish. Students who were not proficient in Spanish, but who spoke a language other than Spanish, were not given any of the direct cognitive assessments. As a result, analyses of the direct cognitive assessments conducted by ELCS-K field staff provide an inaccurate picture of the cognitive abilities of language minority students, especially for non-Spanish, largely Asian students (Table 2). In contrast, teachers were instructed to assess students' cognitive skills in their native language if they could not demonstrate them in English.

These different procedures led to observed differences in cognitive development by language background. For example, whereas the average difference between language minority students and non-language minority students is only .19 standard deviations (SD) on the direct reading assessment (Table 11), which excluded all non-English proficient students, the difference was .39 SD on the direct assessment of math, which included Spanish-speaking students (Table 12) and the difference was .43 SD on the teacher assessment of literacy skills, which included all students (Table 13).

The results also revealed widespread differences by preschool participation. Students who attended non-Head Start programs had reading and math scores about half a standard deviation higher than students who did not attend preschool, whereas students who attended Head Start programs had reading and math scores about one-quarter of a standard deviation

lower than students who did not attend preschool. At least some of these differences can be attributed to differences in the characteristics of students and their families that may be related both to participation in preschool and to cognitive development in kindergarten. After controlling for the effects of a number of these characteristics in our statistical models, we estimated that students who attended non-Head start programs had literacy scores (the most inclusive measure of cognitive development) that were .25 SD higher than students who did not attend preschool, whereas students who attended Head Start programs had literacy scores similar to students who did not attend preschool (Figure 3).² These findings are consistent with other studies of preschool, which have found effect sizes between .2 and .4 (Vandell, 2004). The results are also consistent with a recent study based on ECLS-K, which found an effect size of non-Head Start, center-based care of about .17 SD in fall kindergarten direct-assessed reading and math scores (which excluded non-English proficient language minority students) after controlling for a similar, but somewhat larger set of student and family demographic variables (Magnuson et al., 2004, Table 2).³ We also found that the effects of attending non-Head Start programs did not differ by language background. That is, all students benefited equally from attending non-Head Start programs.

We found that the amount of time children spent in preschool and the age first enrolled were associated with cognitive outcomes, although the associations were not large. In general, students who attended non-Head Start programs more than half time the year before kindergarten and first attended prior to age 4 had larger cognitive benefits than students who first attended at age 4 and attended less than half time. For example, students who attended non-Head Start programs the year before kindergarten more than 20 hours per week and who first attended at age 2 or earlier had literacy scores .28 SD higher than students who did not attend any preschool, whereas students who attended non-Head Start programs beginning at age 4 and less than 50

² Throughout this report, we use the terms *effect* and *effect sizes* to represent the predicted relationship between an independent variable and a dependent variable in a statistical model that controls for the effects of other predictor variables. These terms do not prove that the predicted relationship is causal. Effect sizes for achievement outcomes were computed by dividing the estimated parameters from the statistical models by the student-level standard deviation from the corresponding unconditional models.

³ As we explain in the report, the direct-assessed scores excluded about half of the language minority students. Because language minority students were also less likely to attend preschool, as we show in the report, excluding them from the analysis biases the estimated effects of preschool downward. In estimating a model of direct-assessed reading scores identical to the one we estimated for teacher-assessed literacy, the effect size for attending a center was about .06 SD lower for direct-assessed reading scores than for teacher-assessed literacy scores, which accounts for much of the difference between our estimates and those of Magnuson, et al.

percent time had literacy scores no higher than students who did not attend preschool at all (Figure 4).

Our analysis also revealed that preschool participation had relatively little association with a range of social skills, such as learning behaviors and relationships with peers. However, students who attended preschool, both Head Start and non-Head Start programs, were also more likely to exhibit externalizing problem behaviors in the fall of kindergarten. These behaviors were fairly consistent across language groups (Figure 5). For example, students who attended Head Start programs (except Spanish-dominant students) were 71 percent more likely to exhibit externalizing problem behaviors and students who attended non-Head Start programs (except English-dominant students) were 86 percent more likely to exhibit problem behaviors than students who did not attend any preschool the year before kindergarten. We also found that the more and the earlier students attended non-Head Start programs, the more likely they were to exhibit problem behaviors (Figure 6). Students who first attended a non-Head Start program at age 4 and attended 20 hours per week or less, in fact, did not exhibit problem behaviors at a higher rate than students who did not attend preschool at all (Figure 6). This finding is also consistent with results from other studies, including the NICHD Study of Early Child Care (Vandell, 2004).

Students who attended preschool were also less likely to repeat kindergarten. Students who attended Head Start programs were 26 percent less likely to repeat kindergarten, and students who attended non-Head Start programs were 34 percent less likely to repeat kindergarten than students who did not attend preschool at all (Figure 7). Controlling for other factors, students from English-dominant and other-language-dominant households were no more likely than non-language minority students to repeat kindergarten, but students from Spanish-dominant households were 34 percent more likely to repeat kindergarten. We consider these to be small effects, similar to those for cognitive outcomes.⁴

Students who attended preschool were also less likely to be identified as having a disability and requiring special education services. Students who attended non-Head Start

⁴ We selected this threshold to correspond to one (Cohen, 1988) used to establish .2 SD as the threshold for a “small” effect size. Cohen argues that .2 SD corresponds to moving someone from the 50th to the 58th percentile (p. 25). The corresponding change in probability from 50 percent to 58 percent corresponds to an odds ratio of 1.38 percent $(.58/.42)/(.50/.50)$. The change in probability from 50 percent to 42 percent corresponds to an odds ratio of 0.72 $(.42/.58)/(.50/.50)$.

programs were 24 percent less likely to be identified as having a disability during kindergarten as non-language minority students, whereas students who attended Head Start programs were just as likely to be identified (Figure 7). Controlling for other factors, English-dominant students were no more likely to be identified as having a disability as non-language minority students; but students from Spanish-dominant households were 34 percent less likely to be identified and students from other-language-dominant households were 61 percent less likely to be identified.

Overall, our results corroborated what other studies have found: students who attended preschool, especially non-Head Start programs, had higher levels of school readiness (as evidenced by more advanced cognitive development, reduced likelihood of repeating kindergarten, and reduced likelihood of being identified as having a disability). But preschool participation was also associated with an increased likelihood of exhibiting external behavior problems. These positive and negative associations apply to all students no matter what their language background with only a few exceptions.

Third Grade Outcomes

Differences in cognitive and social development by language background and preschool participation were still observed four years after starting kindergarten, when most students were finishing third grade. Overall, differences by language background in the direct-assessed cognitive measures were much larger than differences in the teacher-assessed measures. For example, language minority students scored .34 SD lower than non-language minority students on the direct-assessed reading test (Table 17) and .49 SD lower than non-language minority students on the directed-assessed science test, and .21 SD lower than non-language minority students on the direct-assessed math test (Table 18). In contrast, language minority students only scored about .1 SD lower than non-language minority students in four content areas assessed by their classroom teachers (Table 19). Some of these differences could be due to differences in the types of skills measured by the two assessments.⁵

Differences in cognitive development by preschool participation remained modest and were similar to those observed in the fall of kindergarten. For example, students who attended non-Head Start preschool programs the year before kindergarten had direct-assessed math scores

⁵ Part of this difference is due to the fact that about 25 percent of the students in the five wave of the study did not have teacher assessments and those that did had scores on the direct-assessments that were about .06 SD higher than the full sample of students.

in the fall of kindergarten that were .37 SD higher, and students who attended Head-Start programs had math scores that were .24 SD lower, than students who did not attend preschool (Table 12). In third grade, those differences were .36 SD and .43 SD, respectively (Table 18). But when we estimated a statistical model that controlled for the same set of predictors as we did for fall kindergarten scores, the estimated effects of preschool became inconsequential, although still statistically significant. The estimated effects of attending a non-Head Start program were .1 SD on reading (Figure 9), .13 SD on math (Figure 10), and .06 SD on science (Figure 10). However, the estimated effects of attending a Head Start center remained negative and small, albeit larger than the effects of non-Head Start programs. The effects of Head Start and non-Head start programs did not vary among language groups, except that Spanish-dominant students who attended Head Start programs had significantly higher achievement than Spanish-dominant students who did not attend any preschool.

Although the average effect of preschool on cognitive development was inconsequential, we did find that the effects varied among schools, especially for students who attended Head Start programs. In some schools, students who attended preschool programs were doing up to .33 SD better than students who didn't attend any preschool, while in other schools they were doing as much as .56 SD worse (see Figure 11).

We found statistically significant, but inconsequential, effects of Head Start on problematic behaviors (relative odds equal to 1.29) and no statistically significant effects of non-Head Start preschool programs (see Figure 12). We also found that the effects did not vary by language group, but students who attended non-Head Start programs more than part-time had somewhat higher odds of problematic behavior than students who attended less than part-time.

The estimated retention and special education effects of preschool also declined from kindergarten to third grade, but remained larger than the cognitive effects. Students who attended non-Head Start programs were 28 percent less likely to be below grade level than students who did not attend preschool, and 22 percent less likely to be identified as a special education student; however, there were no significant differences for students who attended Head Start programs (Figure 12). Both of these positive effects appear due to the effects of non-Head Start programs on kindergarten literacy. There were some differences in these effects among language groups and by the intensity and duration of preschool participation.

Overall, the cognitive effects of non-Head Start preschool programs were reduced by about half. The effects on retention and special education, however, are more likely to be sustained, which could explain the long-term effects of preschool on high school graduation (Barnet, 1995; Karoly & Bigelow, 2005). These results are consistent with an earlier study using ECLS-K that found the estimated cognitive effects of attending non-Head Start preschool were reduced by 60 percent between the fall of kindergarten and the spring of first grade (Magnuson et al., 2004, p. 135). The lack of sustainability is also consistent with reviews of a range of experimental preschool interventions that found the cognitive effects of most interventions had become insignificant two to four years after the intervention ended (Caldwell, 1987). The exceptions are long-term, high quality interventions, such as the Carolina Abecedarian Project, where students received full-day care for five years prior to entering kindergarten (Campbell & Ramey, 1994; Gorey, 2001)..

The modest effects of preschool compare to large disparities in achievement by language background. Entering school, the achievement levels of language minorities were about .4 SD below non-language minority students. The disparities were somewhat smaller by the end of third grade, about .3 SD; but there were also large differences among language groups. In particular, students from Spanish-dominant households entered kindergarten almost .8 SD behind non-language-minority students in literacy skills, and were still .7 SD behind at the end of third grade.

Conclusions

The findings from this study suggest that attending preschool can improve the school readiness of language minority students. Currently, however, language minority students are less likely to enroll in preschool, particularly non-Head Start programs that appear to make the biggest educational impact. As a result, preschool attendance fails to reduce the large achievement gap between language minority and non-language-minority students that exists at kindergarten entry. Improving access to preschool programs and improving the quality of the programs could help address existing disparities in school readiness (Magnuson & Waldfogel, 2005). Yet because the achievement impact of preschool appears to diminish during the first four years of school, while the achievement gap—especially for Spanish-dominant language minority students—increases, preschool alone may have limited use as a long-term strategy for

improving the achievement gap without strengthening the schools these students attend or without providing additional support during the school years.⁶ In other words, preschool should be viewed as part of a more comprehensive and sustained effort to improve the educational outcomes of language minority students.

⁶ In a study of the Chicago Child Center Program, low-income Black students who received two or three years of support in grades 1-3 had significantly higher achievement than students who had preschool alone (Reynolds, 1994).

