Where Do PreK Programs Operate Best?
Exploring Variation in PreK Access and Quality in Mixed-Delivery Systems

Over the past 15 years, investments in preschool programs have expanded dramatically. For example, the federal Race to the Top - Early Learning Challenge provided $1 billion to states to align, coordinate, and improve the quality of their early learning and development programs across multiple funding streams. In addition, more than $200 million in Preschool Development Grants have been awarded to expand high-quality preschool programs, enabling an estimated 33,000 additional children to enroll during the first year of funding.[1] At the same time, Head Start programs continue to operate on a large scale throughout the country. As PreK has become a more widespread and normative part of children's educational trajectory, there have been a number of debates about the best program settings – or auspices – to implement PreK programs. Some programs implemented primarily in public school settings – such as Boston's PreK program – have shown moderate to large impacts on children's early learning and have substantially reduced early achievement gaps. Yet, in cities currently expanding PreK availability, programs are likely to be located across a variety of program settings – community-based organizations, faith-based organizations, and public schools among them. Given this complexity, the field has been confronted with discourse about how program auspice may affect the quality of the preschool programming children receive, and which settings can benefit most from interventions and efforts to strengthen the early childhood education infrastructure.

The proposed panel aims to fill important gaps in current knowledge about preschool program auspice by considering: 1) the key factors that are associated with parents' decision making about which program setting to choose for their child; 2) differences in observed quality between programs operating in community-based setting versus public schools; and 3) variation in the effects of preschool programming and curricular interventions by program auspice. The first study leverages school choice data from the New York City Universal PreK program to determine which types of program auspices parents are most likely to apply to. Findings indicate that parents overwhelmingly prefer public school programs, but there is variation in demand by geographic location. The second study uses observational and experimental data from a large-scale test of a preschool math intervention implemented across both public schools and community-based organizations to compare observed quality between program auspices and to test whether impacts of the intervention varied by auspice. Quality in general did not vary substantially between contexts, but public schools appeared to have better quality of math instruction. Intervention effects on quality of math instruction were larger in community-based organizations. The final paper tests whether the impacts of the New Mexico preschool program varied by program auspice. Findings demonstrated that there were impacts on children's school readiness skills overall, and that impacts were largest for children attending nonpublic programs. Following these three presentations, Dr. Maia Connors from the Ounce of Prevention Fund – an expert in early childhood education policy and practice – will discuss finding from these three studies, and the implications of this work for future expansion of preschool programming in mixed-auspice systems.

[1] See http://www2.ed.gov/programs/preschooldevelopmentgrants/pdgfactsheet81115.pdf.

Choice in a Mixed-Delivery System:
The Role of Program Setting in Families' Decisions about PreK

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Background. As districts and states expand access to pre-K, many rely on mixed-delivery systems to meet demand (Schumacher et al., 2005). In New York City, for example, the Department of Education grew from a system serving about 20,000 children in 2014 to a system serving nearly 70,000 children two years later. To do this, the city created pre-K classrooms in existing elementary schools, opened new pre-K centers, *and* awarded contracts with community-based organizations to offer Pre-K for All seats.

At the same time, districts increasingly have experimented with enrollment policies that allow for greater flexibility and choice in where children can attend school. Proponents of school choice policies argue that greater choice will lead to more competition among schools, higher-quality programming, and better learning outcomes. The success of such initiatives depends on the ways in which families navigate this complex decision-making process, and yet we know relatively little about how families make choices among multiple pre-K program options in a free, universal system, or how choice may vary across subgroups.

This study examines the extent to which program setting (e.g., public school or community-based organization) matters to parents as they navigate a free, universal, mixed-delivery system, and whether this differs across subgroups of the population. This work sheds light on how children sort into pre-K programs, which is important context for other work that examines how program setting may influence children's early learning experiences and, ultimately, their outcomes.

Purpose. The purpose of this study is to examine the ways in which pre-K program setting (e.g., public school, community-based organization) and other site characteristics contribute to decisions parents make about where to apply and enroll their children for pre-K in a large urban district using a centralized application process. We do this using two complementary approaches. First, we examine how program setting and other site characteristics predict demand at the site

level. Second, we examine how program setting predicts individuals' pre-K choices after accounting for other site characteristics (e.g., program quality) and convenience factors (e.g., distance).

Setting. We examine the role of program setting in pre-K application preferences within New York City's universal pre-kindergarten system, Pre-K for All. As of 2016 (the year these data were drawn), Pre-K for All served nearly 70,000 children in over 1800 pre-K sites. The majority of programs are run by community-based organizations, called NYC Early Childhood Education Centers (NYCEECs), that offer Pre-K for All through contracts with the Department of Education (DOE; 43%) or the Administration for Children's Services (ACS; 19%). About 34% of pre-K programs are in public school settings with other grade levels (e.g., elementary schools that extended down to pre-K). Another 3% of programs are Pre-K Centers; these are also run by the NYC DOE, but they only serve pre-K children.

Participants. Participants in the current study were 55,379 children who applied to and subsequently enrolled in Pre-K for All in 2016-2017. The sample, like NYC, was diverse: 37% of participants were Hispanic, 21% were Black, 20% were White, 19% were Asian, and 3% were another race/ethnicity; 51% were flagged as low-income, 34% spoke a first language other than English, and 5% of children were born outside the U.S.

Intervention/Program/Practice. Not applicable.

Research Design. This paper describes a descriptive study that leverages families' choices on their pre-K applications, family demographic data, and site-level data. By examining choices and their characteristics, we obtain parents' "revealed" preference; the rank-ordered choices reveal which factors parents weight more strongly than others when choosing where to apply. This reduces potential bias due to social desirability that might influence responses if, for example, parents were asked to report the key factors they considered when choosing which pre-K programs to apply to.

Data Collection and Analysis. All children residing in NYC and born in 2012 were eligible to apply to up to 12 pre-K programs through a unified application process in the spring prior to pre-K. Although pre-K programs may prioritize different subgroups of children for enrollment (e.g., children with a sibling already at the site, children who live in the site's catchment area), children are free to apply to pre-K programs located anywhere in the city, regardless of their home borough or zoned district. A deidentified dataset containing these rank-ordered choices was obtained from the NYC Department of Education.

Using these data and other administrative data on sites and children, we first conduct linear regression models, with sites as the unit of analysis, to examine which site characteristics predict site demand (applications received). Then, following Glazerman and Dotter (2016), we use rank-ordered logit models to examine how program-level characteristics (e.g., program setting, quality, student composition) and convenience factors (e.g., distance from home) contribute to choices across the sample overall and for different subgroups.

Findings/Results. Participants listed a total of 186,295 ranked preferences (M_{child}=3.36, *SD* = 2.84, *Range* = 1-12) to 1779 unique pre-K programs in the first application round. Preliminary findings regarding site demand indicate that public schools were more popular than other program settings. See Figure 1 for a visual depiction of demand across the city, color-coded by program setting. Furthermore, program setting appeared to be more strongly associated with demand than other characteristics of sites, including student composition and site quality.

Analyses examining how program setting contributes to individual families' choices, relative to other factors, are underway and will also be presented in this paper.

At SREE, we will discuss how findings contribute to our understanding of family choice and provide context for other research that examines the effect of program setting on program quality and children's outcomes.

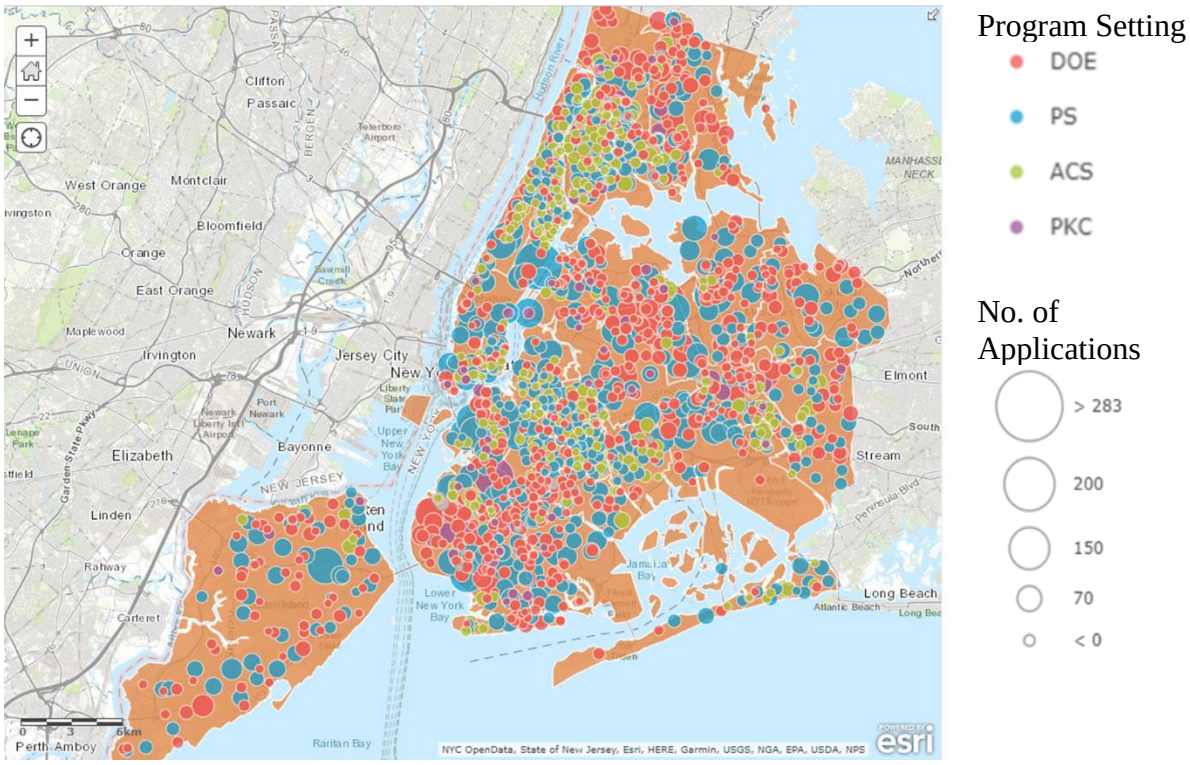

Figure 1. Pre-K for All applications, spring 2016. Circles represent pre-K sites sized by number of applications received in Round 1 and color coded by the program setting: public school (PS), district-run pre-K centers (PKC), and community-based organizations with contracts through the DOE (DOE) or ACS (ACS).

Classroom and Instructional Quality in Community-based and Public School PreK Programs: Evidence from New York City

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Background. Access to PreK has expanded rapidly over the past 15 years with several states and school districts allocating funding to increase the number of children who are able to participate in a publicly-funded, center-based early learning program prior to the start of kindergarten. In order to find a sufficient number of programs to meet current demand, PreK programming has been offered across a host of different educational settings, with public elementary schools and community-based organizations (CBOs) serving as the most frequent locations for center-based PreK. This mixed-delivery system is a reflection of the fact that most localities do not have the capacity – due to space and teacher availability limitations – to implement programs solely in public school settings. As attention in recent years has turned from concern over lack of access to PreK to a focus on improving the quality of existing PreK programming, debates have emerged about the most appropriate settings to implement PreK programming. Yet, there is limited work comparing PreK programs implemented in CBOs and public school setings to examine differences in observed instructional quality. Moreover, there is limited information – perhaps due to power constrainsts – about whether interventions that aim to improve program quality have differential effects in public schools vs. CBOs.

Objective. The current study addresses this limitation by leveraging data from a large-scale cluster-based randomized trial of a preschool math intervention called Building Blocks to compare observed measures of instructional quality in PreK programs operating in public schools versus CBOs. Specifically, we compare levels of observed global quality, quality of math instruction, and time spent on different content areas/in different instructional formats within the study control group. Second, we use data from the full sample to test whether the effects of the intervention on quality of instruction varied by program auspice.

Setting, participants, and research design. Sixty-nine preschool programs in New York City agreed to participate in the study.[1] Participating schools were randomly assigned to a treatment group and received training and coaching on how to implement Building Blocks, or randomly assigned to a control group in which they implemented PreK as usual. One hundred and seventy three classrooms (N = 86 enrolled in the treatment group; N = 87 enrolled in the control group) participated in the study. Data were collected by trained and reliable observers in the spring of the academic year. In the larger randomized trial for the study, Morris, Mattera, and Maier (2016) found an impact of assignment to Building Blocks on the amount of time spent in math instruction, and the quality of math instruction in the PreK year. Given this finding, and the study's initial goal to describe normative practices outside the context of an intervention, descriptive analyses included in this study comparing public school and CBO programs will be conducted within the control group only. This control group sample includes 61 public school classrooms and 25 CBO classrooms. Subgroup analyses comparing intervention effects for public school and CBO classrooms include the full study sample.

Measures and procedures. Three indicators of classroom quality were collected in all participating classrooms prior to study implementation, in the spring of a first implementation year, and in the spring of a second implementation year. Specifically, the team collected the Classroom Assessment Scoring System (CLASS; Pianta, LaParo, & Hamre, 2008) as a measure of global quality, the Narrative Record (Farran & Billbrey, 2004) to describe the amount of time spent on content and mode of instruction in each classroom, and the COEMET (Clements et al., 2011) to measure the quality of math instruction. Observational data from the spring of the second implementation year are used in the current study. Teacher surveys were used to collect demographic information on teachers' background characteristics, such as years teaching and education.

Analysis. We first used descriptive statistics and independent samples t-tests to compare the public school and CBO classrooms on the CLASS domains (emotional support, classroom organization, and instructional support), select Narrative Record constructs and the COEMET scores (looking specifically at time spent on math and quality of math instruction). Next, we ran a series of multi-level models with school random effects to test whether auspice-based differences were robust to a series of teacher-level control variables. Finally, we examined effects of Building Blocks on these indicators of instructional quality within subgroups of public school and CBO programs to test for evidence that one auspice appeared to benefit more from the intervention.

Results. Findings revealed that CBO classrooms had greater levels of emotional support than public school classrooms (Table 1), but there was no statistically significant difference by program type in classroom organization and instructional support. Narrative Record results demonstrated that public school classrooms spent more time on whole group and literacy instruction than CBOs. CBO classrooms had more time with no content observed. The differences in quality of math instruction were most stark. Public school classrooms spent more time on math instruction, and the quality of observed math instruction was higher. Regression analyses showed that the difference by auspice on emotional support was not robust to teacher

[1] Data for this study owere collected while the city was rolling out its universal PreK initiative.

and classroom-level controls. However, differences in the Narrative Record and the COEMET measures were robust to controls. Subgroup analysis discussed in Morris et al. (2016) showed that impacts of Building Blocks on time spent on math in CBOs were larger than impacts in public schools, but that the impacts within these subgroups were not statistically significant different from one another.

Conclusions. Differences in observed quality were not as great between public school and CBO programs as originally hypothesized. However, there were clearer differences in the quality of math instruction between preschool and CBO programs. Effects of a targeted intervention might be most effective for CBOs, as these are the contexts that appear to have been implementing math for less time prior to intervention. Supports to strengthen program quality in CBOs may be an effective strategy for districts looking to operate PreK programs in mixed-auspices.

Table 1

Comparison of Indicators of Classroom Quality, by Program Auspice

Measure of classroom quality	Public schools Mean	Public schools SD	CBOs Mean	CBOs SD	Difference	Standardized difference	Significant difference
CLASS domain scores							
Emotional support (1 - 7)	5.77	0.82	6.09	0.76	-0.32	-0.42	*
Classroom organization (1 - 7)	5.62	0.76	5.77	0.69	-0.16	-0.23	
Instructional support (1 - 7)	2.52	0.80	2.44	0.77	0.07	0.09	
Narrative record scores							
Total duration of observation in minutes	179.75	7.54	178.25	8.54	1.51	0.18	
Proportion of observation spent in small group of small group center	0.07	0.10	0.09	0.11	-0.02	-0.17	
Proportion of observation spend on literacy or mix with teacher focus on literacy	0.14	0.11	0.08	0.08	0.06	0.71	
Proportion of observation spent on math or mix with teacher focus on math	0.14	0.12	0.19	0.13	-0.05	-0.39	**
Proportion of observation in whole group instruction	0.34	0.17	0.26	0.14	0.08	0.58	**
Proportion of observation in small group instruction	0.01	0.05	0.02	0.05	-0.01	-0.12	
Proportion of observation in small group center	0.06	0.10	0.08	0.11	-0.01	-0.13	
Proportion of observation in centers	0.11	0.12	0.10	0.13	0.01	0.09	
Proportion of observation in nap, outside, or special class	0.12	0.12	0.16	0.14	-0.04	-0.31	*
Proportion of observation spent on math or mix of literacy/math	0.12	0.11	0.15	0.10	-0.02	-0.22	*
Proportion of observation spent on literacy	0.13	0.10	0.07	0.08	0.06	0.66	**
Proportion of observation spent on science	0.03	0.06	0.02	0.06	0.00	0.08	
Proportion of observation sepnt on gross motor	0.07	0.09	0.07	0.09	0.00	-0.02	
Proportion of observation spent on mixed content	0.26	0.14	0.27	0.17	-0.01	-0.04	
Proportion of observation spent on no content	0.30	0.13	0.35	0.14	-0.06	-0.41	*
COEMET scores							
Minutes of math instruction delivered by a teacher during observation	37.89	21.16	30.44	25.52	7.45	0.29	*
Minutes an average child was participating in a math activity or lesson during observation	29.56	17.37	17.60	12.05	11.96	0.99	**
Count of full Small Math Activities (SMAs) and instructor-led mini SMAs	4.69	2.34	4.16	2.59	0.53	0.20	*
Average SMA quality (1 - 5; only coded when an SMA was observed)	1.84	0.44	1.60	0.43	0.24	0.57	**

Note: N = 61 public school classrooms and N = 25 CBO classrooms, includes on control group classrooms from larger RCT; ** $p < .01$; * $p < .05$

Does Auspice Matter? Impacts of New Mexico PreK in Public and Nonpublic Settings

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Background/Context: One-third of 4-year-olds in the U.S. attend state-funded preschool, and these initiatives are now offered by 43 states and D.C. Both child enrollment and state financial investments in preschool have increased dramatically over the past two decades (Friedman-Krauss et al., 2018). Although state-funded preschool programs are administered and funded by public, state agencies, many states, including New Mexico, use mixed-delivery systems to serve children in both public (i.e., public schools) and nonpublic (i.e., private child care) settings.

Research finds significant, positive impacts of attending state-funded preschool on children's cognitive skills at kindergarten entry (e.g., Barnett et al., 2018; Gormley, Phillips, & Gayer, 2008). However, little research has explored how impacts differ across the auspice in which children attend publicly-funded preschool. The New Mexico PreK program provides a unique opportunity to do so as children are served in in both public and nonpublic settings.

Purpose/Objective/Research Question: The goal of this research is to estimate how cognitive impacts of attending NM PreK during the year before kindergarten differ by auspice. A regression discontinuity (RD) approach is used.

Setting: The research occurred in state-funded NM PreK programs and public kindergarten classrooms throughout NM between 2006 and 2010. Direct assessments of children's language, literacy, and math skills occurred at children's schools.

Population/Participants/Subjects: Data are pooled across five years of RD evaluations of NM PreK (2005-2006 through 2009-2010; n=5,491). Children were randomly selected from NM PreK sites to participate in the study as the "comparison" group in the RD analysis. A

corresponding number of kindergarten children who had attended each NM PreK site the prior year were randomly selected to form the "PreK" group. The sample was 51% female, 60% Hispanic, 19% White, 16% Native American, 2% Black, and 3% other races; 78% of children spoke English as their home language. A total of 57% attended NM PreK in public schools and 43% in nonpublic settings.

Intervention/Program/Practice: NM PreK began in 2005 and provides center-based preschool to 4-year-olds for at least 2.5 hours per day. All children in NM are eligible to attend but priority is given to children living in the attendance zone of a Title I school. NM PreK has high standards including requiring early childhood training for teachers, low class sizes and student-to-teacher ratios, and a continuous quality improvement system. NM PreK is jointly administered by two state agencies: The New Mexico Public Education Department (PED) which oversees NM PreK programs in public schools and the Children, Youth, and Families Department (CYFD) which oversees NM PreK programs operating in nonpublic settings.

Research Design: We use an age-cutoff RD approach (e.g., Gormley et al., 2005) to estimate the effects of attending one year of NM PreK on children's cognitive skills, and then compare impacts for PED and CYFD. The RD approach takes advantage of NM's strict program eligibility determination based on a child's birthdate. This approach reduces selection bias as the assignment rule is unlikely related to child or family characteristics also related to children's cognitive skills (e.g., Barnett et al., 2018). Children who are 4 by August 31 are eligible to attend NM PreK, while children who are 5 by August 31 attend kindergarten. The "comparison" group is assessed at the beginning of PreK and the "PreK" group is assessed at the beginning of kindergarten to estimate PreK impacts after they attended NM PreK. We use instrumental variable (IV) analysis to further reduce bias from children violating the assignment rule, though this was not a substantial problem.

We pool data from the first five years of NM PreK between 2005-2006 and 2009-2010 to increase the sample size and precision of the estimates. Similar procedures were used during each year of the study. RD assumptions (Lipsey et al., 2015) were checked and will be discussed.

Data collection and analysis: Measures of children's cognitive skills include language (Peabody Picture Vocabulary Test (PPVT-III), early math (Applied Problems subtest from the Woodcock-Johnson Tests of Achievement (WJAP;), and early literacy (Print Awareness subtest of the Test of Preschool Early Literacy (TOPEL) in the first three years of the study and the Early Literacy Skills Assessment (ELSA) in the last two years. Spanish-speaking children were also assessed using Spanish versions of these measures. Children were assessed at the beginning of PreK ("comparison" group) or the beginning of kindergarten ("PreK" group).

Data were analyzed using an age cutoff RD approach to estimate the effects of attending NM PreK for one year on children's cognitive development. The preferred model specification uses a 6-month bandwidth but results are robust across 3- and 12-month bandwidths. All models control for child and family characteristics and school district fixed effects. To aggregate and examine NM PreK effects across the five cohorts, we used random-effects meta-analysis. Subgroup analyses will be completed to compare the effects of NM PreK for children in public and nonpublic programs. Methods to reduce selection bias in this comparison will be explored.

Findings/Results: In the full sample, NM PreK participants demonstrated statistically significant language (Effect size = 0.29 SD), literacy (0.88 SD), and math (0.45 SD) gains (See Table 2). Impacts were significantly larger for language and early literacy in CYFD than PED. There were no differences across auspice for early math.

Conclusions: NM PreK produced significant gains on children's language, early math, and early literacy skills at kindergarten entry. Gains in language and early literacy were larger when children attended publicly-funded preschool in nonpublic settings such as private child care or Head Start than in school districts. Results are consistent with prior research finding larger cognitive gains for children attending private than public preschool (Coley et al., 2016). Math impacts did not vary by auspice, perhaps due to little experience of teachers in supporting math learning across all settings. Future analysis will (1) use quality data to contextualize findings, (2) deal with selection into CYFD or PED, and (3) explore if impact differences by auspice change over five years as programs scaled up (given that CYFD started with more experience providing preschool but PED had stronger teacher qualifications requirements).

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Table 1

New Mexico PreK Sample Descriptive Statistics

	Full sample (n=5,491)		Comparison group (n=2,912)		PreK group (n=2,579)	
	N	%	N	%	N	%
Female	2,807	51	1,544	53	1,263	49
Hispanic	3,265	60	1,701	58	1,564	61
White	1,057	19	574	20	483	19
Native American	895	16	469	16	426	17
Black	109	2	61	2	48	2
Other race	165	3	107	4	58	2
Non-English home language	1,205	22	613	21	592	22
PED	3,109	57	1,493	51	1,616	63
CYFD	2,382	43	1,419	49	963	37

Note: PED = New Mexico Public Education Department; CYFD =Children, Youth, and Families Department. The percentage of the sample in PED and CYFD across the comparison and PreK groups is expected to be equal. Differences are due to challenges in locating the "PreK" group as they were more dispersed in schools throughout the state.

Table 2

Estimated Impacts of NM PreK

	Language		Early Math		Early Literacy	
	b	SE	b	SE	b	SE
NM PreK	6.31 ***	(1.54)	1.95 ***	(0.35)	7.54 ***	(1.13)
PED	-1.91 *	(0.97)	-0.15	(0.25)	-2.60 **	(0.87)
White	6.90 ***	(0.95)	1.83 ***	(0.23)	3.94 ***	(0.73)
Native American	-3.78 **	(1.44)	-0.97 **	(0.36)	1.54	(1.16)
Black	1.83	(2.29)	0.81	(0.48)	0.00	(2.32)
Other Race	1.84	(3.22)	0.95	(0.75)	1.08	(2.91)
Female	0.48	(0.68)	0.37 *	(0.16)	1.97 ***	(0.48)
IEP	-3.13	(1.85)	-0.79	(0.49)	0.21	(1.73)
Home language: English only	7.78 ***	(1.28)	1.36 ***	(0.23)	-0.26	(0.79)

Note: * $p<.05$, ** $p<.01$, *** $p<.001$. Results reflect IV analysis using a 6-month bandwidth around the birthdate cutoff. Hispanic is the reference group for race. PED = New Mexico Public Education Department (CYFD (Children, Youth, and Families Department) is the reference group)). Language is measured using the Peabody Picture Vocabulary Test (PPVT; Dunn & Dunn, 1997), Early Math is measured with the Applied Problems Subtest of the Woodcock Johnson Test of Achievement (Woodcock, McGrew, & Mather, 2001), Early Literacy is measured with the Print Awareness subscale of the Test of Preschool Early Literacy (Lonigan, Wagner, Torgesen, & Rashotte, 2007) during the first three years of the study. Results for years four and five using the Early Literacy Skills Assessment (DeBruin-Parecki, 2005) will be incorporated for the presentation.