

Understanding Heterogeneity in the Impact of Public Preschool Programs

Tyler W. Watts, Jade M. Jenkins,
Kenneth A. Dodge et al.



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Understanding Heterogeneity in the Impact of Public Preschool Programs

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Abstract We examine the North Carolina Pre-K (NC Pre-K) program to test the hypothesis that observed variation in effects resulting from exposure to the program can be attributed to interactions with other environmental factors that occur before, during, or after the pre-k year. We examine student outcomes in 5th grade and test interaction effects between NC's level of investment in public pre-k and moderating factors. Our main sample includes the population of children born in North Carolina between 1987 and 2005 who later attended a public school in that state, had valid achievement data in 5th grade, and could be matched by administrative record review ($n = 1,207,576$; 58% White non-Hispanic, 29% Black non-Hispanic, 7% Hispanic, 6% multiracial and Other race/ethnicity). Analyses were based on a natural experiment leveraging variation in county-level funding for NC Pre-K across NC counties during each of the years the state scaled up the program. Exposure to NC Pre-K funding was defined as the per-4-year-old-child state allocation of funds to a county in a year. Regression models included child-level and county-level covariates and county and year fixed effects.

Estimates indicate that a child's exposure to higher NC Pre-K funding was positively associated with that child's academic achievement 6 years later. We found no effect on special education placement or grade retention. NC Pre-K funding effects on achievement were positive for all subgroups tested, and statistically significant for most. However, they were larger for children exposed to more disadvantaged environments either before or after the pre-k experience, consistent with a compensatory model where pre-k provides a

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buffer against the adverse effects of prior negative environmental experiences and protection against the effects of future adverse experiences. In addition, the effect of NC Pre-K funding on achievement remained positive across most environments, supporting an additive effects model. In contrast, few findings supported a dynamic complementarity model. Instrumental variables analyses incorporating a child's NC Pre-K enrollment status indicate that program attendance increased average 5th grade achievement by approximately 20% of a standard deviation, and impacts were largest for children who were Hispanic or whose mothers had less than a high school education. Implications for the future of pre-k scale-up and developmental theory are discussed.

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We test the effects of exposure to North Carolina's Pre-Kindergarten (NC Pre-K) program on academic achievement through grade 5 ($n = 1,207,576$; 58% White Non-Hispanic, 29% Black Non-Hispanic, 7% Hispanic) by leveraging variation in funding for NC Pre-K across 100 NC counties over 18 years. We find living in a county in a year of comparatively high funding is associated with higher academic achievement for the children of that county, and this effect is larger for Hispanic children and children from mothers with lower levels of education. The effect remains positive across most environments and is larger in some environments marked by greater disadvantage, consistent with a compensatory model in which pre-k provides a buffer against adverse influences. Implications for pre-k scale-up and developmental theory are discussed.