

Teachers, Schools, and Pre-K Effect Persistence: An Examination of the Sustaining Environment Hypothesis

Francis A. Pearman, Stanford University
Matthew Springer, University of North Carolina, Chapel Hill
Mark Lipsey, Vanderbilt University
Mark Lachowicz, Vanderbilt University
Walker Swain, University of Georgia
Dale Farran, Vanderbilt University

Short-term boosts in children’s language, literacy, and math skills that result from attending prekindergarten classrooms (PreK) often diminish soon after preschool ends (Yoshikawa, Weiland, & Brooks-Gunn, 2016). This pattern, commonly known as *fadeout*, has been noted in preschool effectiveness literature dating back to the 1960s, and has since been documented in high fidelity studies of preschool effectiveness at the district, state, and national levels (Hill, Gormley, & Adelstein, 2015; Lipsey, Farran, & Durkin, 2018; Puma, Bell, Cook, & Heid, 2010; Puma et al., 2012). For example, a recent meta-analysis of existing preschool effectiveness research, which was based on over 60 evaluations of high-quality early childhood interventions published between 1960 and 2007, found that the average end-of-program-year impact of preschool on cognitive skills dropped by more than 50 percent in the year following the intervention, and again by 50 percent one to two years later (Bailey, Duncan, Odgers, & Yu, 2017).

In light of these findings, conceptual and empirical research has attempted to shed light on the context and processes through which benefits of early childhood education investments are potentially maintained over time. This literature has focused, in part, on the skills and capacities learned during the PreK year and their consequences for later learning (Heckman, 2006). However, an emerging line of research has begun exploring the role subsequent learning environments can play in maintaining PreK effects beyond kindergarten entry—that is, the role of what many scholars have come to call *sustaining environments* (Bailey et al., 2017). Prior research has examined whether PreK effects are maintained if children go on to have high quality teachers during elementary school (Swain, Springer, & Hofer, 2015), or whether the elementary schools they later attend are of high quality themselves (Currie & Thomas, 2006; Lee & Loeb, 2008). Overall, this research has indicated that both teacher quality and school quality may play a role in determining the extent of PreK effect persistence, but as described in the next section, the evidence is mixed and features a variety of measures of school and teacher quality and approaches to estimating PreK effects.

The current study builds on the emerging literature on sustaining environments by combining data from a recently conducted randomized controlled trial of a statewide PreK program, the Tennessee Voluntary PreK (TN-VPK) program, with detailed teacher and school information to examine whether the persistence of PreK effects is influenced by subsequent teacher and school quality. Though economically disadvantaged children who attend public PreK programs like TN-VPK often attend lower quality elementary schools (Currie & Thomas, 2006), there is evidence that some children may nevertheless have exposure to highly effective teachers in such schools (Sass, Hannaway, Xu, Figlio, & Feng, 2012). Likewise, even if children are able to attend higher quality schools after PreK, children may not necessarily have good teachers in these schools, which is especially the case with respect to economically disadvantaged students who have increased odds of being assigned a special education designation and are more likely to be tracked into less rigorous classes (Blair & Scott, 2002; Kalogrides & Loeb, 2013). Therefore, it is relevant to consider the independent effects of high quality schools and teachers separately as well as the combined effects of exposure to both. More specifically, we ask:

- Is the association between PreK participation and 3rd grade achievement conditional on the number of teachers rated as highly effective that children have between PreK and 3rd grade or the timing of their exposure to such teachers?
- Is the association between PreK participation and 3rd grade achievement conditional on the quality of schools that children attend between PreK and 3rd grade?
- Is the association between PreK participation and 3rd grade achievement stronger with exposure to both higher quality schools and highly effective teachers?

Examining these questions about PreK persistence and fadeout in the context of the TN-VPK experiment provides an ideal opportunity given that Lipsey et al. (2018) found large, positive effects of TN-VPK on student achievement at the end of the PreK year that disappeared, or in some instances, turned negative by the time students completed the third grade. In addition, Tennessee has robust teacher evaluation and school accountability systems. We are therefore able to draw on classroom observation scores of teaching and school-level growth data over time to measure the quality of the subsequent learning environments that children encounter.

Overall, we find that neither exposure to highly effective teachers nor attending a high-quality school was sufficient by itself to explain differences in achievement between PreK participants and non-participants in 3rd-grade. However, this study found evidence that having both was associated with a sustained advantage for PreK participants in both math and ELA that lasted through at least 3rd-grade. In other words, the academic advantage of VPK participants versus non-participants at kindergarten entry was most likely to persist until 3rd grade among those students who went on to attend high quality schools with highly effective teachers. These findings were generally robust to a variety of alternative specifications. Notably, however, these findings should be understood within the context of how many children in the analytic sample actually experienced these types of high-quality learning environments. As indicated in Table 2, only 12% of children in the analytic sample (a) attended a high-quality school between kindergarten and 3rd grade, and (b) had one or more highly effective teachers during these years. This contrast with over 40% of children in the analytic sample that either attended a school that did not meet state growth standards or had *zero* highly effective teachers between kindergarten and 3rd grade. These findings suggest that maximizing PreK investments may require attending to the quality of learning environments during PreK and beyond.

References

- Bailey, D., Duncan, G. J., Odgers, C. L., & Yu, W. (2017). Persistence and Fadeout in the Impacts of Child and Adolescent Interventions. *Journal of Research on Educational Effectiveness*, 10(1), 1934–5747. <https://doi.org/10.1080/19345747.2016.1232459>
- Blair, C., & Scott, K. G. (2002). Proportion of LD placements associated with low socioeconomic status: Evidence for a gradient? *Journal of Special Education*, 36(1), 14–22. <https://doi.org/10.1177/00224669020360010201>
- Currie, J., & Thomas, D. (2006). School Quality and the Longer-Term Effects of Head Start. *The Journal of Human Resources*. <https://doi.org/10.2307/146372>
- Heckman, J. J. (2006). Skill formation and the economics of investing in disadvantaged children. *Science*, 312, 1900–1902. <https://doi.org/10.1126/science.1130121>
- Hill, C. J., Gormley, W. T., & Adelstein, S. (2015). Do the short-term effects of a high-quality preschool program persist? *Early Childhood Research Quarterly*, 32, 60–79. <https://doi.org/10.1016/j.ecresq.2014.12.005>
- Kalogrides, D., & Loeb, S. (2013). Different Teachers, Different Peers: The Magnitude of Student Sorting Within Schools. *Educational Researcher*, 42(6), 304–316. <https://doi.org/10.3102/0013189X13495087>
- Lee, V. E., & Loeb, S. (2008). Where Do Head Start Attendees End Up? One Reason Why Preschool Effects Fade Out. *Educational Evaluation and Policy Analysis*. <https://doi.org/10.3102/01623737017001062>
- Lipsey, M. W., Farran, D. C., & Durkin, K. (2018). Effects of the Tennessee Prekindergarten Program on children’s achievement and behavior through third grade. *Early Childhood Research Quarterly*, 45, 155–176. <https://doi.org/10.1016/J.ECRESQ.2018.03.005>
- Puma, M., Bell, S., Cook, R., & Heid, C. (2010). *Head Start impact study final report*. Washington, DC. Retrieved from <http://files.eric.ed.gov/fulltext/ED507845.pdf>
- Puma, M., Bell, S., Cook, R., Heid, C., Broene, P., Jenkins, F., ... Downer, J. (2012). *Third Grade Follow-up to the Head Start Impact Study: Final Report*. Washington, DC. Retrieved from <http://files.eric.ed.gov/fulltext/ED539264.pdf>
- Sass, T. R., Hannaway, J., Xu, Z., Figlio, D. N., & Feng, L. (2012). Value added of teachers in high-poverty schools and lower poverty schools. *Journal of Urban Economics*, 72(2–3), 104–122. <https://doi.org/10.1016/J.JUE.2012.04.004>
- Swain, W. A., Springer, M. G., & Hofer, K. G. (2015). Early Grade Teacher Effectiveness and Pre-K Effect Persistence: Evidence From Tennessee. *AERA Open*. <https://doi.org/10.1177/2332858415612751>
- Yoshikawa, H., Weiland, C., & Brooks-Gunn, J. (2016). When does preschool matter? *Future of Children*.