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Do the benefits fade out or not?

Understanding influences on short and long-term effects of preschool programmes

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Introduction

There is a large body of research on the effectiveness of preschool programmes in preparing children for school and later primary school achievements. The vast majority of this research has been conducted in the United States (US) and, to a lesser extent, the United Kingdom, Europe and South America (Duncan et al., 2022[1]).

Key questions for early childhood development researchers and policymakers are: (1) the extent to which these short-term effects are sustained or decline through primary school and beyond; and (2) what factors make enduring benefits more likely.

Addressing these questions is particularly important in South Africa, where we seek to improve access to quality early education and equip children for lifelong success.

This short research summary considers whether the positive effects of early learning programmes (ELPs) for poor children are associated with better education outcomes in primary school or whether (and why) the benefits may not be sustained (fadeout).

Evidence of Medium and Long-term Impacts

A few oft-cited seminal studies have investigated the long-run impacts of model preschool programmes into adulthood. Examples include the Perry Preschool Programme (Heckman et al., 2010[2]; Schweinhart et al., 2005[3]) and the Abecedarian Programme (Duncan & Magnuson, 2013[4]). Both were intensive and expensive.

Perry provided five days per week of high-quality preschool to poor children aged 36-60 months in small groups of six. Twice-weekly home visits were included. The cost per child in 2023 US dollars was $103,000. Gains in IQ were evident by five years of age, but there was no evidence of a difference between these children and those who did not attend at eight years.

[1] Duncan, G., Kalil, A., Mogstad, M., & Rege, M. (2023). Investing in early childhood development in preschool and at home. Handbook of the Economics of Education, 6, 1-91.
[2] Heckman, J. J., Moon, S. H., Pinto, R., Savelyev, P. A., & Yavitz, A. (2010). The rate of return to the HighScope Perry Preschool Program. Journal of public Economics, 94(1-2), 114-128.
[3] Schweinhart, LJ., Montie, J., Xiang, Z., Barnett, WS., Belfield, CR., Nores, M. (2005). Lifetime effects: The High/Scope Perry Preschool study through age 40. Ypsilanti: MI: High/Scope Press. https://nieer.org/wp-content/uploads/2014/09/specialsummary_rev2011_02_2.pdf
[4] Duncan, G. J., & Magnuson, K. (2013). Investing in preschool programs. Journal of Economic Perspectives, 27(2), 109-132

Despite this, Perry programme participants showed long-term benefits - they were more likely to go to college and less likely to get in trouble with the law than children who had not been exposed to the programme.

Abecedarian children were enrolled from infancy to 60 months in quality full-day childcare and later preschool. Teachers conducted home visits. In 2023, the per-child cost of this programme was $120,000 (USD). Interestingly, participation in this programme benefitted children in preschool and showed positive impacts into adulthood.

Clearly, neither programme is scalable at these costs, not in high-income countries and certainly not feasible in low- and middle-income countries (LMICs). To improve readiness to learn in school and long-term outcomes for poor children in LMICs, scalable, effective programmes are necessary.

A rare example is Mexico's legislated universal (obligatoriedad) preschool programme, introduced in 2002. Mexico has private, community-based and publicly funded preschools of variable quality. Initially, the legislation applied to all children aged 3-5 years. Due to low compliance, the policy was amended in 2008 to require compulsory attendance by five-year-olds in the year before starting school. A recent study of the programme's impact, using both administrative and survey data on children's enrolment and outcomes over many years, is very encouraging, showing benefits throughout school to adulthood (Behrman et al., 2024[5]). Positive medium-term effects were evident for language and mathematics in Grade 6. Over the long term, programme participants were more likely to complete high school, enter tertiary education, or be employed – similar to findings for the high-cost Perry and Abecedarian programmes cited above.

In contrast to the evidence from many high-income-country studies, programme benefits did not diminish over time, showing that universal preschool policies can have sustained effects on cognitive and non-cognitive outcomes when implemented at scale.[6]

No long-term, high-quality impact studies on effects into adulthood have been conducted in Africa.

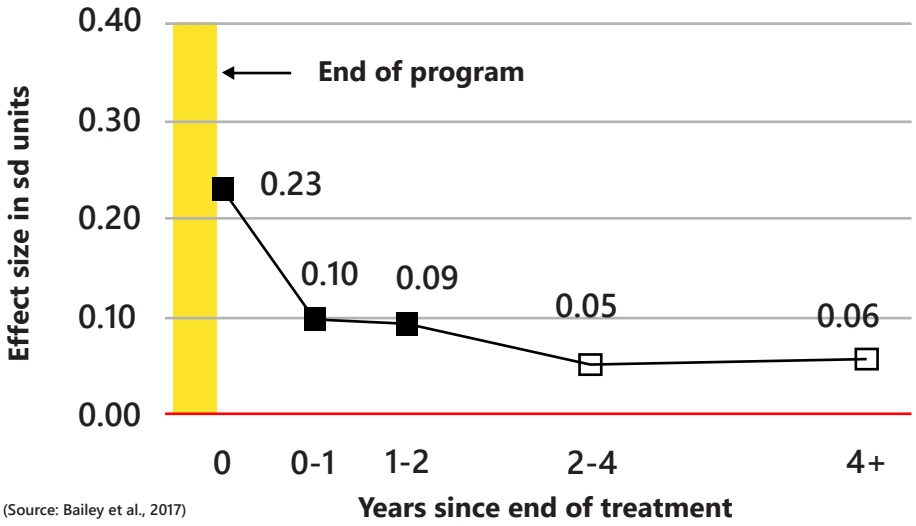
[5] Behrman, J. R., Gomez-Carrera, R., Parker, S. W., Todd, P. E., & Zhang, W. (2024). Starting Strong: Medium-and Longer-run Benefits of Mexico's Universal Preschool Mandate (No. 24-029). Penn Institute for Economic Research, Department of Economics, University of Pennsylvania.
[6] https://voxdev.org/topic/education/mexicos-preschool-mandate-set-children-succeed

Fadeout of Benefits

'Fadeout' refers to the gradual diminishing of cognitive, academic or developmental gains children experience from early childhood education programmes as they progress through school. The benefits seen immediately after preschool often become less pronounced or disappear over time (e.g. Bailey et al., 2020[7]; Duncan and Magnuson, 2013[8]). Recent research at publicly funded preschools in the United States explores whether the effects of preschool programmes remain evident in primary school or fade out.

This is illustrated in a recent meta-analysis[9] of 67 publicly funded programmes in the United States delivered between 1960 and 2007, including publicly funded programmes such as Head Start. The meta-analysis compared studies reporting outcomes for children who attended programmes with those who did not (Bailey et al., 2017[10]). The findings are illustrated in Figure 1, where a drop in effect size from 0.23 at the end of preschool to a statistically non-significant and negligible effect of 0.05 is evident in Grades 2-4.

Figure 1: Fadeout of effects from preschool to Grade 4 in the United States.



(Source: Bailey et al., 2017)

The solid blocks in Figure 1 show statistically significant ($p<0.05$) but declining impact until Grade 2, after which the effect is non-significant. Bailey et al. summarise as follows: "It appears that some well-designed and implemented cognitive, social and emotional interventions produce immediate impacts" (on child outcomes), but reductions in these effects are "typically observed among the regrettably small fraction of interventions where follow-up data are available" (p. 5).

[7] Bailey DH, Duncan GJ, Cunha F, Foorman BR, Yeager DS. (2020). Persistence and fade-out of educational-intervention effects: mechanisms and potential solutions. Psychological Science in the Public Interest, 21(2), 55-97. doi: 10.1177/1529100620915848.
[8] Duncan, G. J., & Magnuson, K. (2013). Investing in preschool programs. Journal of economic perspectives, 27(2), 109-132.
[9] As stated by Bailey et al., 2017: "The meta-analytic database is the product of the National Forum on Early Childhood Policy and Programs (http://developingchild.harvard.edu/initiatives/forum/) based on a comprehensive search of the literature from 1960 to 2007, when the coding project began."
[10] 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), 7–39. https://doi.org/10.1080/19345747.2016.1232459.
See also http://developingchild.harvard.edu/initiatives/forum/

The authors note that much of the observed fadeout of preschool programme effects is due to **skill catch-up** among children who did not attend preschool, as they gain similar advantages through schooling. In this view, skills gained through preschool participation do not fade out; rather, non-preschool attendees catch up. However, this may depend on the quality of the schools they attend later (discussed below).

Sustaining Benefits

There is no doubt that attending good ELPs has benefits for a range of development areas and overall well-being prior to entering school. The short-term gains obtained from exposure are also important for improving school readiness. But what makes the benefits of investing in ELPs more sustainable in the long term?

In their 2017 paper, Bailey and his colleagues discuss three perspectives on interventions likely to produce sustainable long-term impacts.

1: Sustaining Environments

The 'sustaining environments' perspective holds that investments in early childhood programmes are likely to be *"unproductive unless they are accompanied by subsequent investments in sufficiently high-quality schools and other environmental contexts in which development takes place"* (Bailey et al., 2017, p. 18). However, there is limited evidence to support this perspective, partly because designing studies to test this hypothesis is very challenging. One would need to follow specific children from preschool through formal schooling, with sufficient data on children's skills and the quality of their learning environments at key points. This would be expensive and is rarely feasible. Administrative data from preschool and public school systems would be required for analyses.

A recent US study by Johnson & Jackson (2019[11]) on Head Start outcomes through to adulthood is one of the few that used administrative data to investigate this perspective. They found that the long-term impact of investments in preschools was enhanced when disadvantaged children went on to attend well-funded public schools. These children performed better in the long term than children from similar backgrounds who had not benefited from **Head Start.** Their key point is that early learning investments should be followed by investments to improve quality in the school system (what the authors call *dynamic complementarity*) to reduce the threat of fadeout and improve the probability of long-term impact.

[11] Johnson, R. C., & Jackson, C. K. (2019). Reducing inequality through dynamic complementarity: Evidence from Head Start and public-school spending. American Economic Journal: Economic Policy, 11(4), 310–349. https://doi.org/10.1257/pol.20180510

2: Foot-in-the-Door Interventions

Foot-in-the-door interventions are designed to *"equip a child with the right skills or capacities at the right time"* (p. 1) to reduce or avoid potential threats to skill development. The child must be developmentally ready to benefit from the inputs provided, and the learning opportunities provided should align with the child's emerging skills, like scaffolding.[12] The teacher needs to know the child's level of functioning to provide a learning experience that stretches her skills to a more advanced level. There will be no advance if the learning opportunity is below or at the same level as the child's current ability or too far beyond it.

Much of the global and South African emphasis on promoting access to quality ELPs that provide young children with the 'right skills' at the 'right' developmental time prior to school is based on the premise that this will prepare children for school and enable them to benefit from the early grades. The goal is to enhance the likelihood of school achievement and ultimately lead to better employment opportunities. While much evidence supports this view, the question remains whether or not the effects of those early investments are sustained.

3: Skill-Building

The 'skill-building' perspective is underpinned by a cognitive developmental approach to the key skills that enable primary school achievement. It holds that competency in more basic skills in early childhood prepares the child to acquire more complex ones later in development. As Bailey and his colleagues note, "skill-building processes are most easily seen in the case of math and literacy, where early academic skills are the foundations upon which later skills are built" (p. 5). The authors argue that the most sustainable impacts will come from children's exposure to interventions that develop fundamental skills that would not necessarily have developed without ELP participation. Examples include phonological awareness and processing, the oral language decoding skills needed for early reading, and the visual motor integration and fine motor coordination required for writing (O'Carroll and Hickman, 2012[13]; Strickland and Riley-Ayers, 2006[14]). Spatial skills are foundational and highly related to later achievement in both mathematics and science. Counting, number knowledge, estimation and measurement are the strongest predictors of later overall academic achievement (Duncan et al., 2007[15]), and the effect is evident into adolescence (Watts et al., 2014[16]).

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[12] See:https://datadrive2030.co.za/wp-content/uploads/2022/11/Datadrive2030_Policy-Brief_24_Nov_final2.pdf

[13] O'Carroll, S. & Hickman, R. (2012). Narrowing the literacy gap: Strengthening language and literacy development between birth and six years for children in South Africa. Wordworks: Cape Town.

[14] Strickland D, Riley-Ayers S (2006) Early literacy policy and practice preschool years. National Institute for Early Education Research at Rutgers, Policy Brief http://www.readingrockets.org/article/early-literacy-policy-and-practice-preschool-years. O'Carroll, S. & Hickman, R. (2012). Narrowing the literacy gap: Strengthening language and literacy development between birth and six years for children in South Africa. Wordworks: Cape Town.

[15] Duncan, G. J., Dowsett, C. J., Claessens, A., Magnuson, K., Huston, A. C., Klebanov, P., Pagani, L. S., Feinstein, L., Engel, M., Brooks-Gunn, J., Sexton, H., Duckworth, K., & Japel, C. (2007). School readiness and later achievement. Developmental Psychology, 43, 1428-1446.

[16] Watts, T. W., Duncan, G. J., Siegler, R. S., & Davis-Kean, P. E. (2014). What's past is prologue: Relations between early mathematics knowledge and high school achievement. Educational Researcher, 43(7), 352-360

For several years, it has been established that global assessments of programme quality do not necessarily predict early learning outcomes (e.g. Cryer et al., 1999[17]). Examining ELP quality domains - such as those used in the Early Childhood Environment Rating Scales - Revised (ECERS-R) and the Learning Programme Quality Assessment (**LPQA**) developed by DataDrive2030[18] is better. Also, it is necessary to establish ELP quality thresholds that predict positive child development outcomes (Burchinal et al., 2014[19]). Focused measures of programme quality and inputs to promote specific areas are required.

Relevance for South Africa

These perspectives and associated findings have significant implications for South Africa, especially given the considerable appetite to invest in improving ELP quality to achieve better learning outcomes and the recent shift of responsibility for early learning from the Department of Social Development to the Department of Basic Education (DBE).

We know that children's learning outcomes - in preschool and beyond - are profoundly influenced by their socio-economic background. In South Africa, ELOM 4&5 Assessment performance strongly correlates with preschool fees (Henry & Giese, 2023); children's achievement across school grades is strongly associated with their school's quintile, and the gap between wealthier and poorer children widens with the grades (Spaull & Kotze, 2015[20]; Spaul, 2015[21]). If we do not disrupt this pattern, school achievement in poorer children will remain low, employment opportunities will be limited, and South Africa's intergenerational poverty cycle will remain entrenched.

Improved short-term outcomes for South African children are entirely possible (e.g. Dawes et al., 2023[22]). But how do we reduce the likelihood of gains fading as the child proceeds through school? This is not just a child rights and educational well-being issue; it is significant to the investment case for early learning interventions.

A key question for us in South Africa right now is: How are we to understand the determinants of fadeout following short-term gains and those that enhance the likelihood of long-term benefit? Although it is impossible to summarise this very complex research question in this brief, the recent findings by Johnson and Jackson (2019) referred to above and Watts et al., 2023[23] provide some pointers.

[17] Cryer, D., Tietze, W., Burchinal, M., Leal, T., & Palacios, J. (1999). Predicting process quality from structural quality in preschool programs: A cross-country comparison. Early childhood research quarterly, 14(3), 339-361.
[18] https://datadrive2030.co.za/wp-content/uploads/2022/09/ELOM-LPQA-Technical-Report.docx-2-1.pdf
[19] Burchinal, M., Vernon-Feagans, L., Vitiello, V., Greenberg, M., & Family Life Project Key Investigators. (2014). Thresholds in the association between childcare quality and child outcomes in rural preschool children. Early childhood research quarterly, 29(1), 41-51.
[20] Spaull, N., & Kotze, J. (2015). Starting behind and staying behind in South Africa: The case of insurmountable learning deficits in mathematics. International Journal of Educational Development, 41, 13-24. https://doi.org/10.1016/j.ijedudev.2015.01.002
[21] Spaull, N. (2015). Schooling in South Africa: How low-quality education becomes a poverty trap. South African child gauge, 12(1), 34-41.
[22] Dawes, A., Biersteker, L., Snelling, M., Horler, J. & Girdwood, E. (2023). To what extent can community-based playgroup programmes targeting low-income children improve learning outcomes prior to entering the Reception Year in South Africa? A quasi-experimental field study. Early Education and Development, https://doi.org/10.1080/10409289.2021.2005748
[23] Watts, T. W., Jenkins, J. M., Dodge, K. A., Carr, R. C., Sauval, M., Bai,Y., Escueta, M., Duer, J., Ladd, H., Muschkin, C., Peisner-Feinberg, E., & Ananat, E. (2023). Understanding heterogeneity in the impact of public preschool programs. Monographs of the Society for Research in Child Development, 87(4). https://doi.org/10.1111/mono.12463

The next section summarises an important study by Watts and colleagues in North Carolina, USA. Their research presents medium-term findings on variations in child academic achievement in Grade 5, attributable to influences at three points: before, during, and after the Pre-K year[24] when the children were in school. The authors consider factors contributing to the persistence of preschool gains and fadeout of its short-term benefits. While their paper does not follow the perspectives provided by Bailey et al., 2017, it does inform the questions they raise.

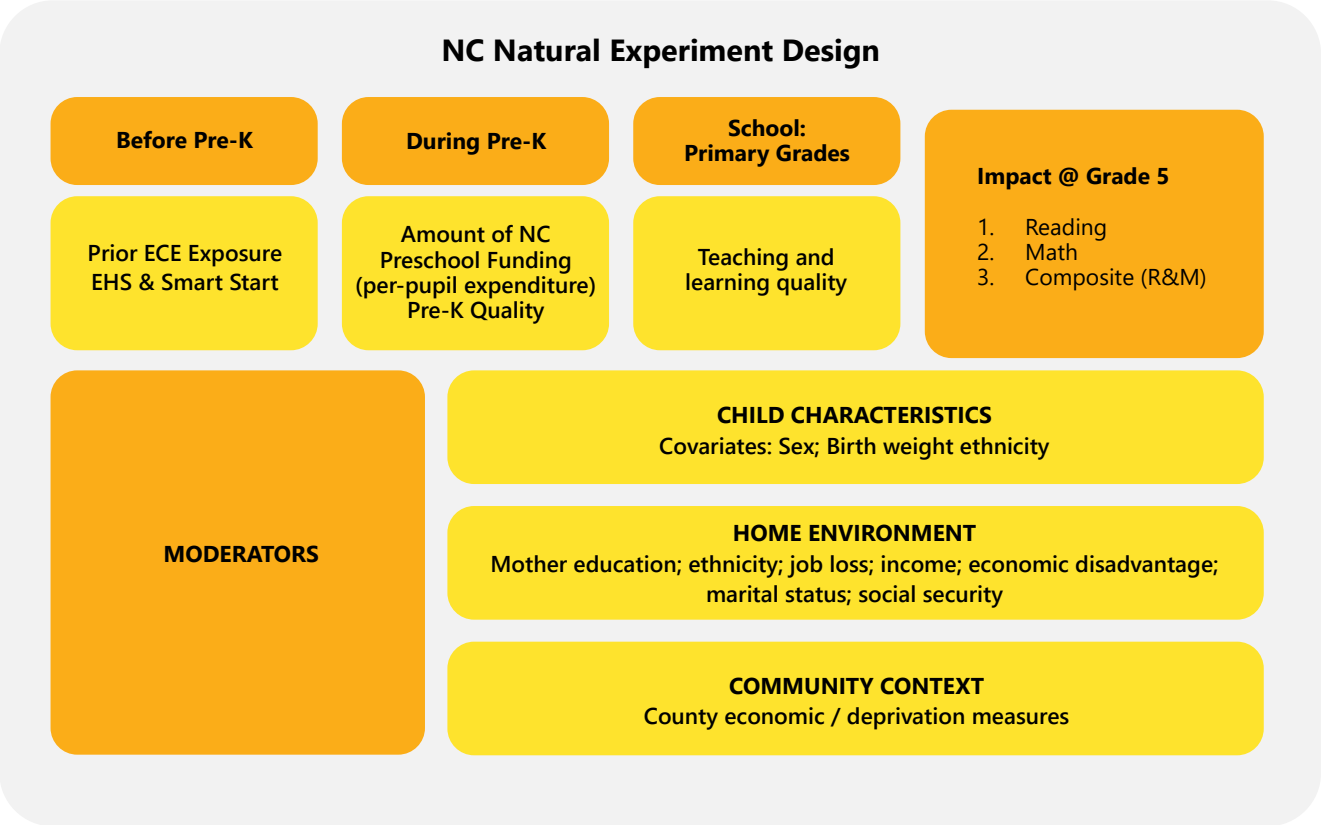
Unpacking The North Carolina Study

North Carolina's Pre-K policy provides funding to an early childhood centre for each child whose family income is below a threshold. Funding is conditional on the centre meeting quality standards for classroom curricula, teacher qualifications and class size, among other aspects (Peisner-Feinberg 2003[25]). This model was designed to incentivise the provision of quality early childhood education in the state system and has led to significant improvement in the quality of teaching and learning over time.

Public funding for Pre-K was introduced in North Carolina (NC) in 2001, with some counties implementing it earlier than others and with variations in the amounts provided (which also changed over the years). These variations created a *'natural experiment'*,[26] allowing researchers to compare the effects of different funding levels on children's learning outcomes by Grade 5.
The differences in funding across counties functioned as distinct treatment groups in experimental research, enabling the study team to examine the extent to which differences in the long-term impacts of preschool participation were attributable to variations in public funding, as well as the contributions of factors beyond the preschool environment, such as household income and other socio-economic indicators. In essence, the study sought to assess factors that might enable or disable the potential benefits that occurred before, during, and after preschool attendance. I illustrate the design in Figure 2.

[24] Pre-K (Pre-Kindergarten) provides early education to children prior to age 5 comparable to pre-Grade R (preschool) services for 3-5 year olds in South Africa.
[25] Peisner-Feinberg, E. S. (2003). Child and program characteristics of the North Carolina more at four pre-kindergarten program: Year 1 (January - June, 2002). Chapel Hill, NC: FPG Child Development Institute. https://fpg.unc.edu/sites/fpg.unc.edu/files/resource-files/MAF_Yr1_full_report_0.pdf
[26] https://www.gov.scot/binaries/content/documents/govscot/publications/advice-and-guidance/2009/12/social-research-methods-guides/documents/natural-experiments/natural-experiments/govscot%3Adocument/Natural%2BExperiments.pdf

Figure 2: Influences of Pre-K funding on early learning outcomes from preschool through primary school.



EHS = Early Head Start,[27] *a free, publicly funded support programme for low-income pregnant women and children under 3 years. Smart Start is a North Carolina programme designed to improve early education quality.*[28]

Watts and his colleagues identified key factors likely to account for differences in preschool impact, including:

1. The ***characteristics of the children***, including their cognitive, socio-emotional functioning and genetic differences. Duncan et al. (2022, p. 10) estimate that "40% of the variance in educational attainment can be attributed to variation between children in genetic components". However, while genetic differences matter, the environment influences a child's outcomes considerably more.

2. *The qualities of the* ***children's home environments***, including their socio-economic status and caregiver education.

[27] https://eclkc.ohs.acf.hhs.gov/programs/article/early-head-start-programs
[28] https://www.smartstart.org/raising-the-quality-of-early-care-and-education/

3. The ***community-level environments***, including access to health and social services and the demographics of their residential area (e.g. wealth distribution, crime, etc).

4. The ***quality of the children's ELPs*** *before* and *during* Grade K (equivalent to Grade R in South Africa).

5. The ***quality of the primary school*** and teaching children experience after they have completed Grade K.

Watts and his colleagues tested three propositions for why the research found variations in preschool impacts once the children were in primary school.

1. **Enriching educational environments** *before, during* and *after* preschool will complement the benefits of preschool. Early interventions could interact with other child environmental experiences in a complementary fashion. Like the ***Sustaining Environments*** and ***Skill-building*** perspectives of Bailey et al., 2017, this approach "*predicts that impacts from early interventions will grow in the presence of later positive educational experiences that catalyse, synergize, and enhance the impact of Pre-K. These later positive experiences help a child build on the skills and capacities gained during the Pre-K intervention*" (Watts et al., 2020, p.30). Children exposed to an enriching educational environment - at home or in an early childhood care and education (ECCE) programme - before the preschool year will have enhanced development and skills before they start. This enables them to benefit more from preschool than those who did not.

2. The ***Compensatory*** position predicts that quality preschool will compensate for the effects of poor early developmental environments, benefitting deprived children more than those from advantaged backgrounds: "*Exposure to Pre-K acts as a 'buffer' by blunting the adverse impact of early negative environmental experiences. If those negative influences occur after the Pre-K year, the Pre-K year serves as prophylactic 'protection'*" (Watts et al., 2022, p. 12).

3. The ***Additive Effects*** position holds that quality preschool exposure has an independent and positive contribution to development alongside other influences, all of which add independently to children's outcomes over the life course.

The Value of Administrative Data

These researchers used the administrative records of more than a million children in the North Carolina (NC) public school system for whom official data was available throughout preschool and primary school. The value of sound administrative data for tracking influences on progress and policy purposes is evident and an important lesson for us in South Africa, where no such data is available.

North Carolina Key Findings

1. *Higher levels of preschool funding* was positively associated with children's academic achievements six years later in Grade 5. All the children gained, regardless of levels of disadvantage.

2. *The positive effects were larger for children exposed to more disadvantaged environments, whether before or after enrolment in Pre-K.*

3. Particularly interesting is that when disadvantaged children attend quality, well-funded preschools, it: *"provides a buffer against the adverse effects of prior negative environmental experiences and protection against the effects of future adverse experiences"* (p. 8). In essence, disadvantaged children who had attended well-funded preschools and then entered *relatively poor-functioning primary schools* did *better* than children from equally disadvantaged backgrounds who attended less funded preschools (of likely poorer quality) and went on to attend the same primary schools. This is what the *buffering effect* of earlier preschool participation means.

4. Strong support was found for the proposition that quality ELPs compensate for adverse home and community environments from early through middle childhood.

More research is needed to investigate this further; South Africa would be an ideal location if the necessary data were available.

Implications for South Africa

It is clear from the North Carolina study that when preschools for disadvantaged children are well funded, and quality is monitored to agreed standards, the benefits are evident in primary school - even buffering children against the negative effects of poorer primary school environments. It provides some of the first evidence from a rigorous natural experiment to show that publicly-funded, quality early learning programmes targeting disadvantaged children compensate for their adverse home and community environments. There are clear lessons for South Africa, which lacks a publicly funded preschool system below Grade R and where most ELPs for poor children rely on small state subsidies and fees. Quality is mixed, and as noted above, evidence from the Thrive By Five 2021 survey indicates that in South Africa, parent fees are strongly associated with preschool quality and child outcomes (assessed by the ELOM 4&5). Children from wealthier backgrounds are doubly advantaged, as their parents can pay more for better-quality preschool.

Studies by Spaull and his colleagues have shown clear social gradients in children's achievement throughout the school grades. The achievement gap between lower school quintiles and those in more advantaged schools and communities persists throughout the school years (Spaull & Kotze, 2015; Spaul, 2015).

Regarding fadeout findings, it is important to recall the point made by Bailey and colleagues (2017) that much of the observed fadeout of preschool effects can be attributed to ***skill catch-up*** in those *who did not attend*, as they benefit from schooling.

Stipek,[29] commenting on Bailey and colleagues' fadeout findings, exhorts us not to use them to downgrade the importance of preschool, particularly for children from low-income backgrounds. We rather need to strengthen the quality of teaching and learning in these settings: ***"If we are serious about reducing the opportunity and achievement gaps, preschool is a significant tool in our toolbox. Preschool is not enough; no reputable researcher would claim it is. The frequent evidence for fadeout shows us that rather than give up on preschool, we need to redouble our efforts to improve the quality of learning that occurs in preschool settings and make sure that elementary schools build on those gains".***

Furthermore, in South Africa, we should not forget that - in addition to the opportunity to enhance cognitive skills – ELPs have the potential to enhance socio-emotional skills and provide safe, nurturing environments for vulnerable, often malnourished children, many of whom are exposed to violence at home and in their communities.

To improve long-term education outcomes and break the poverty cycle, South Africa's disadvantaged children must have access to well-funded and well-resourced ELPs and primary schools where ELP practitioners *and* teachers are supported to maintain the standards necessary to enable skill development.

This will contribute to better school readiness outcomes before Grade R and, following the NC research, could help buffer these children against fadeout when they transition to relatively poor-quality primary schools (a situation likely to persist for many years).

Although South Africa has no sound research evidence to inform policy in this area, findings on medium-term effects will be available from the *Roots and Shoots* programme evaluation,[30] following children from Grades R to 3 to investigate which benefits are sustained or diminished. In this study, children were assessed using ELOM 4&5, and in early Grade 1, mathematics and language skills were measured using the recently developed ELOM-R (v1).

[29] https://dreme.stanford.edu/news/the-value-of-early-education-why-the-fade-out-effect-does-not-mean-we-should-give-up-on-preschool/
[30] https://datadrive2030.co.za/resources/roots-and-shoots-baseline-report/

Finally, as demonstrated in the Mexico and North Carolina studies, good quality, routinely collected administrative data is a valuable, cost-effective research resource. Investing in developing administrative data in South Africa will be well worth it if we wish to have better evidence to inform education policy.

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References

[1] Duncan, G., Kalil, A., Mogstad, M., & Rege, M. (2023). Investing in early childhood development in preschool and at home. Handbook of the Economics of Education, 6, 1-91.

[2] Heckman, J. J., Moon, S. H., Pinto, R., Savelyev, P. A., & Yavitz, A. (2010). The rate of return to the HighScope Perry Preschool Program. Journal of public Economics, 94(1-2), 114-128.

[3] Schweinhart, LJ., Montie, J., Xiang, Z., Barnett, WS., Belfield, CR., Nores, M. (2005). Lifetime effects: The High/Scope Perry Preschool study through age 40. Ypsilanti: MI: High/Scope Press. https://nieer.org/wp-content/uploads/2014/09/specialsummary_rev2011_02_2.pdf

[4] Duncan, G. J., & Magnuson, K. (2013). Investing in preschool programs. Journal of Economic Perspectives, 27(2), 109-132

[5] Behrman, J. R., Gomez-Carrera, R., Parker, S. W., Todd, P. E., & Zhang, W. (2024). Starting Strong: Medium-and Longer-run Benefits of Mexico's Universal Preschool Mandate (No. 24-029). Penn Institute for Economic Research, Department of Economics, University of Pennsylvania.

[6] https://voxdev.org/topic/education/mexicos-preschool-mandate-set-children-succeed

[7] Bailey DH, Duncan GJ, Cunha F, Foorman BR, Yeager DS. (2020). Persistence and fade-out of educational-intervention effects: mechanisms and potential solutions. Psychological Science in the Public Interest, 21(2), 55-97. doi: 10.1177/1529100620915848.

[8] Duncan, G. J., & Magnuson, K. (2013). Investing in preschool programs. Journal of economic perspectives, 27(2), 109-132.

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[10] 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), 7–39. https://doi.org/10.1080/19345747.2016.1232459.
See also http://developingchild.harvard.edu/initiatives/forum/

[11] Johnson, R. C., & Jackson, C. K. (2019). Reducing inequality through dynamic complementarity: Evidence from Head Start and public-school spending. American Economic Journal: Economic Policy, 11(4), 310–349. https://doi.org/10.1257/pol.20180510

[12] See:https://datadrive2030.co.za/wp-content/uploads/2022/11/Datadrive2030_Policy-Brief_24_Nov_final2.pdf

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[14] Strickland D, Riley-Ayers S (2006) Early literacy policy and practice preschool years. National Institute for Early Education Research at Rutgers, Policy Brief http://www.readingrockets.org/article/early-literacy-policy-and-practice-preschool-years. O'Carroll, S. & Hickman, R. (2012). Narrowing the literacy gap: Strengthening language and literacy development between birth and six years for children in South Africa. Wordworks: Cape Town.

[15] Duncan, G. J., Dowsett, C. J., Claessens, A., Magnuson, K., Huston, A. C., Klebanov, P., Pagani, L. S., Feinstein, L., Engel, M., Brooks-Gunn, J., Sexton, H., Duckworth, K., & Japel, C. (2007). School readiness and later achievement. Developmental Psychology, 43, 1428-1446.

[16] Watts, T. W., Duncan, G. J., Siegler, R. S., & Davis-Kean, P. E. (2014). What's past is prologue: Relations between early mathematics knowledge and high school achievement. Educational Researcher, 43(7), 352-360

[17] Cryer, D., Tietze, W., Burchinal, M., Leal, T., & Palacios, J. (1999). Predicting process quality from structural quality in preschool programs: A cross-country comparison. Early childhood research quarterly, 14(3), 339-361.

[18] https://datadrive2030.co.za/wp-content/uploads/2022/09/ELOM-LPQA-Technical-Report.docx-2-1.pdf

[19] Burchinal, M., Vernon-Feagans, L., Vitiello, V., Greenberg, M., & Family Life Project Key Investigators. (2014). Thresholds in the association between childcare quality and child outcomes in rural preschool children. Early childhood research quarterly, 29(1), 41-51.

[20] Spaull, N., & Kotze, J. (2015). Starting behind and staying behind in South Africa: The case of insurmountable learning deficits in mathematics. International Journal of Educational Development, 41, 13-24. https://doi.org/10.1016/j.ijedudev.2015.01.002

[21] Spaull, N. (2015). Schooling in South Africa: How low-quality education becomes a poverty trap. South African child gauge, 12(1), 34-41.

[22] Dawes, A., Biersteker, L., Snelling, M., Horler, J. & Girdwood, E. (2023). To what extent can community-based playgroup programmes targeting low-income children improve learning outcomes prior to entering the Reception Year in South Africa? A quasi-experimental field study. Early Education and Development, https://doi.org/10.1080/10409289.2021.2005748

[23] Watts, T. W., Jenkins, J. M., Dodge, K. A., Carr, R. C., Sauval, M., Bai,Y., Escueta, M., Duer, J., Ladd, H., Muschkin, C., Peisner-Feinberg, E., & Ananat, E. (2023). Understanding heterogeneity in the impact of public preschool programs. Monographs of the Society for Research in Child Development, 87(4). https://doi.org/10.1111/mono.12463

[24] Pre-K (Pre-Kindergarten) provides early education to children prior to age 5 comparable to pre-Grade R (preschool) services for 3-5 year olds in South Africa.

[25] Peisner-Feinberg, E. S. (2003). Child and program characteristics of the North Carolina more at four pre-kindergarten program: Year 1 (January - June, 2002). Chapel Hill, NC: FPG Child Development Institute. https://fpg.unc.edu/sites/fpg.unc.edu/files/resource-files/MAF_Yr1_full_report_0.pdf

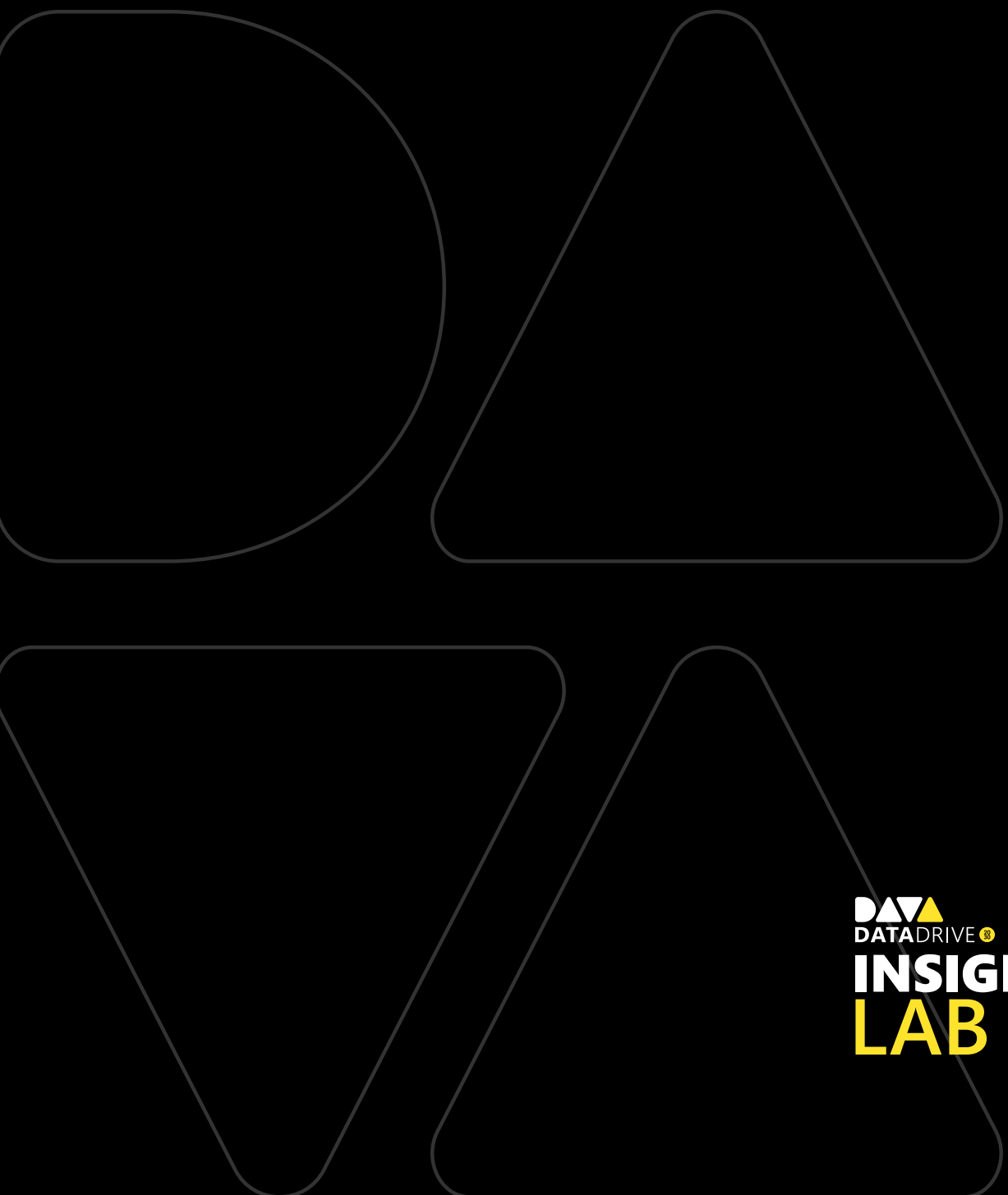
[26] https://www.gov.scot/binaries/content/documents/govscot/publications/advice-and-guidance/2009/12/social-research-methods-guides/documents/natural-experiments/natural-experiments/govscot%3Adocument/Natural%2BExperiments.pdf

[27] https://eclkc.ohs.acf.hhs.gov/programs/article/early-head-start-programs

[28] https://www.smartstart.org/raising-the-quality-of-early-care-and-education/

[29] https://dreme.stanford.edu/news/the-value-of-early-education-why-the-fade-out-effect-does-not-mean-we-should-give-up-on-preschool/

[30] https://datadrive2030.co.za/resources/roots-and-shoots-baseline-report/



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