Early Childhood Education by MOOC: Lessons from *Sesame Street*

Melissa S. Kearney and Phillip B. Levine

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Executive Summary

There has been much focus in recent years on the importance of early childhood education to improve the academic readiness and more broadly, the life chances, of children from lower-income and lower-educated households. For all of this attention, it is surprising that perhaps the largest, and least costly, early childhood intervention in this country has gone largely undiscussed: *Sesame Street*. *Sesame Street* was first broadcast in the United States in 1969 with the explicit goal of helping young children, especially those from economically disadvantaged homes, to prepare for school. Our research examines how exposure to *Sesame Street* affected the educational performance of the first generation of preschool-age children to have access to the show. These are children who entered first grade just after the show's 1969 introduction. We find that *Sesame Street* accomplished its goal of improving school readiness for these children.

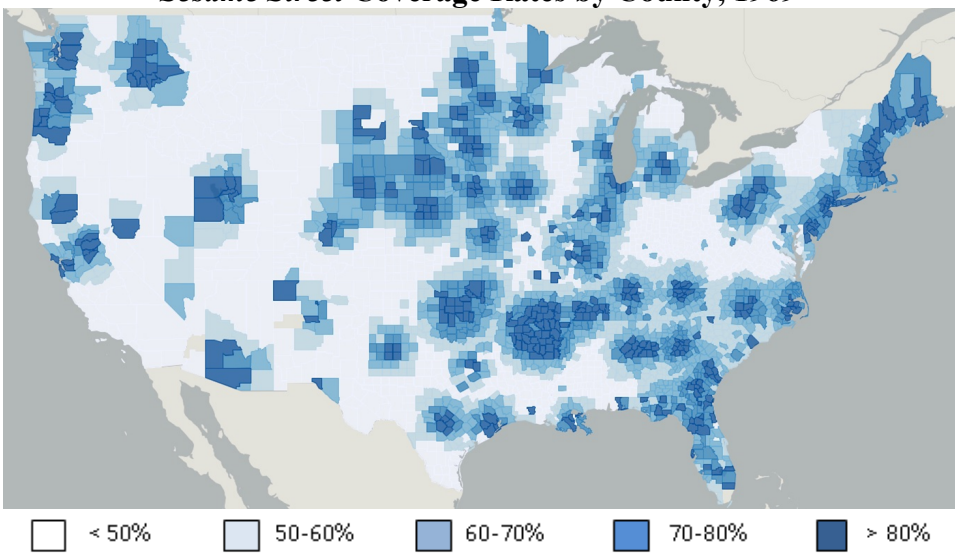
Sesame Street immediately became a huge success. Estimates suggest that by January of 1970, over five million households tuned in to a typical episode and roughly one-third of children between the ages of 2 and 5 regularly watched the show. Well-designed research studies conducted at the time of *Sesame Street*'s creation indicate that low-income children who were randomly assigned to have access to the show experienced a substantial and immediate increase in measures of literacy and numeracy at ages 3 and 4. We build on this early targeted evidence by looking broadly at the cohort of U.S. children who were potentially exposed to the show during their preschool years and to consider longer-term outcomes, starting with a measure of elementary school performance.

When the show began, only around two-thirds of the U.S. population lived in locations where *Sesame Street* could be received on their televisions. Of the 192 stations airing the show when it was introduced, 101 broadcast on UHF channels and the rest on VHF channels. UHF signals were inferior and many households did not own a TV that could even receive those signals. This created a technological divide in who could watch the show. Our empirical approach makes use of this divide to investigate whether children living in places with better access to the show saw relative increases in their educational performance, as compared to children living in places where access to the show was limited by technology. More specifically, we exploit county-level variation in distance to the TV tower transmitting the show and, and, crucially, whether that tower broadcast on a UHF (ultra-high frequency) channel or VHF (very high frequency) channels. In locations where the nearest tower was not close or where that tower broadcast over UHF, reception was weaker.

Figure 1 displays the geographic variation in broadcast exposure. For example, Southern California, Ohio, and the District of Columbia have very limited *Sesame Street* coverage; this is driven by the fact that for these areas, the nearest tower broadcasting the show did so via a UHF

signal. Distance from the tower also clearly matters. Rural locations are not included in our analysis, so our comparisons are only among those living in metropolitan areas. For simplicity, we can think about strong and weak reception locations as being above or below average reception rates. Using this dichotomy, we note that on average, 85 percent of households in strong reception counties had the ability to view Sesame Street as compared to only 55 percent of households in weak location counties.

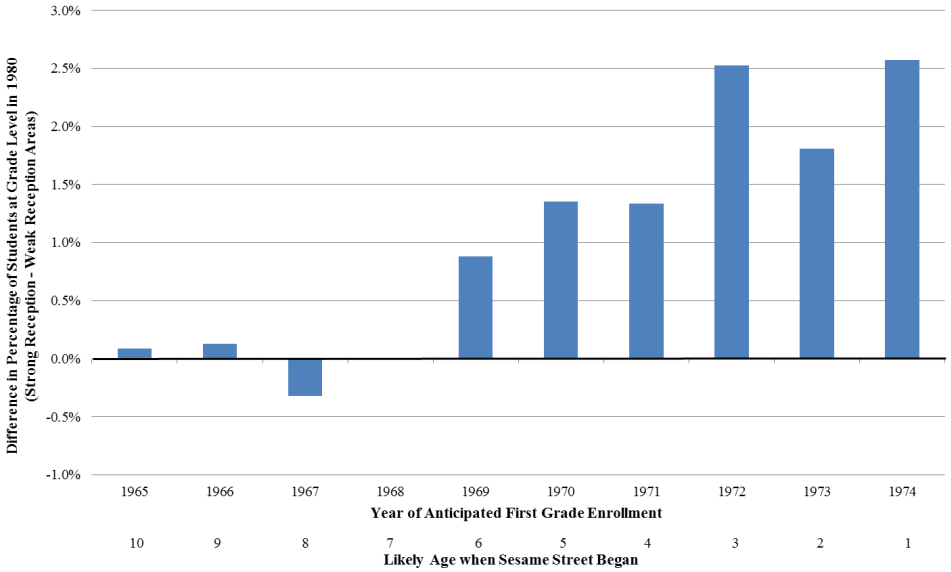
***Sesame Street* Coverage Rates by County, 1969**



We combine this geographic variation in broadcast exposure –with differences across birth cohorts in terms of their age at the time of the show's introduction. *Sesame Street*'s content focused on first-grade readiness; those children who had advanced beyond that point would not have been exposed during early childhood and hence would generally not have been affected by its introduction. The essence of our research strategy is to investigate whether children in the birth cohorts under age six in 1969 living in locations with high *Sesame Street* broadcast coverage saw improved outcomes as compared to the cohort born just before them, and to compare this improvement to the relative change for the same cohorts living in locations with more limited Sesame Street coverage. This approach controls for fixed differences across counties and focuses on relative changes happening exactly at the time of the show's introduction. We implement this approach using data from the 1980, 1990, and 2000 Censuses.

The results of our analysis provide evidence that *Sesame Street*'s introduction generated a positive impact on educational outcomes through the early school years. In particular, exposed cohorts of students with better reception capabilities were more likely to be attending a grade that is appropriate for their age. This can be seen in Figure 2 below. Among birth cohorts that were older than preschool age when Sesame Street began, we observe little difference in grade for age status between children in locations where reception was strong versus weak. But, among children who were preschool age when the show began, the data show a noticeable gap: children in strong reception locations increased their likelihood of remaining at the appropriate grade level by 1.5 to 2 percentage points. Overall, moving from a weak to strong reception county reduces the likelihood of falling behind appropriate grade level by approximately 14 percent.

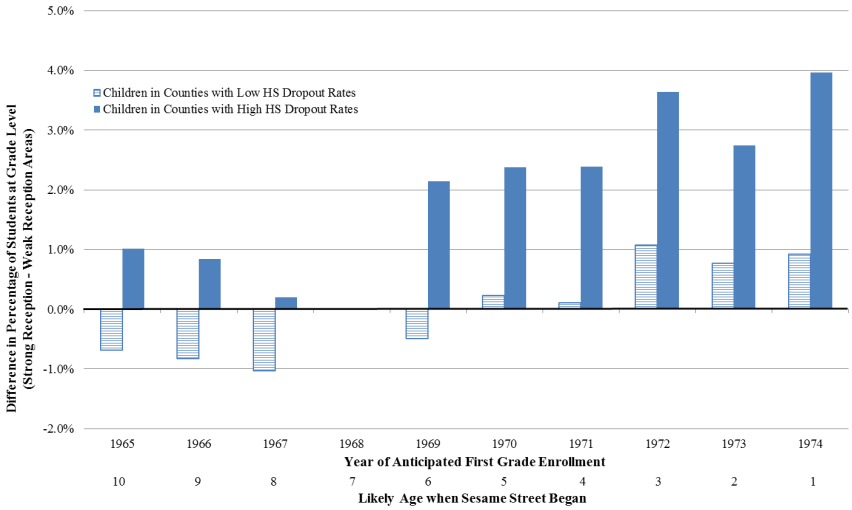
Impact of the Introduction of *Sesame Street* on Grade-for-Age Status in 1980



note: Strong reception areas are defined as those where the closest TV tower broadcasting Sesame Street is VHF and within a 60 mile radius. Poor reception areas are all others. Differences are normalized to equal zero when the year of anticipated first grade enrollment is 1968.
source: Authors' calculations based on analysis of 1980 Census Data.

The positive effect on grade-for-age status is particularly pronounced for boys and black, non-Hispanic children and those living in economically disadvantaged areas. Figure 3 shows that using similar comparisons between children in strong and weak reception areas who were preschool age before and after the Sesame Street began, the impact of the show's introduction was greater among children from economically disadvantages areas (defined here as places with large high school dropout rates). The impact for these children rises to approximately 3 percentage points.

Impact of the Introduction of *Sesame Street* on Grade-for-Age Status in 1980, by Level of Economic Disadvantage in County



note: See notes to Figure 5.
source: Authors' calculations based on analysis of 1980 Census Data.

We also use data from the 1990 and 2000 Censuses to examine longer run outcomes for this late 1960s preschool cohort. In particular, we examine ultimate educational attainment and earnings. The evidence is weaker here, suggesting only small effects. However, the small estimated impact on wages in adulthood is consistent with forecasts based on the estimated improvements in test scores and grade-for-age status brought about by the show's introduction.

In summary, our research finds that *Sesame Street* had a sizable effect on that rate at which students stayed on track through elementary school. This is impressive, but perhaps even more so since the per-child costs of airing this program are extremely small -- by one estimate, $5 per year per child. In light of all the emphasis on the importance of early childhood interventions, the fact that a television show can have this type of an effect should be taken as very good news.