Rosie's Kids
Exposure to Preschool 1942-46 and Later-Life Outcomes

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The Second World War brought profound changes throughout combatant and non-combatant nations that reverberate to today. But some changes took place far from the battlefield and in settings not usually associated with the mobilization of entire nations, tectonic shifts in global alliances, and the suffering of tens of millions of the world's inhabitants. Some changes were small in scale, entirely on the home front, and often forgotten in the war's aftermath.[1] One such change was the establishment of the first "universal" preschool program in the U.S. – the Lanham Nursery Schools – that was designed to encourage the wartime labor force participation of mothers with young children.[2] We take advantage of this unique episode in the nation's childcare and educational history to assess the impact of these preschools on a variety of outcomes we can observe up to eight decades later.

Evaluations of small, randomized preschool interventions have revealed large effects that persist through young adulthood.[3] The populations examined are both *small* (fewer than 200 children "treated" across all three of the experiments analyzed by Heckman 2006, Heckman and Mosso 2014) and still relatively *young* (they are in their forties today). For example, García *et al.* (2016) examine the Carolina Abecedarian Project (ABC) and the Carolina Approach to Responsive Education (CARE). Because these interventions were directed at children born from 1972 to 1980, the participants could be followed only into their mid-thirties.[4]

The small sample sizes often preclude the estimation of heterogeneous treatment effects. For example, do children from low-SES families benefit disproportionately? The relative youth, even today, of the participants in these experiments precludes a calculation of the lifetime benefits of the interventions. Whether income and cognitive benefits accrue that extend through retirement and older age is not known. We have lacked data to address how early exposure to educational resources impacts individuals throughout their lifetimes. Though the *costs* of such interventions are straightforward to calculate, the *benefits* can be seriously understated if some positive effects are realized only after age 35 or even later, leaving policymakers with insufficient evidence on which to

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[1] One important change related to the topic of this proposal is women's labor force participation, the longer-terms effects of which are often overstated (see Goldin 1991; Goldin and Olivetti 2013).
[2] The program was not entirely universal since the expectation was that the mother was employed, although not necessarily in a war-industry factory. The WPA Nurseries, set up as part of the New Deal, were dependent on the unemployment of at least one of the parents and the need of the family. Admission to the Lanham nurseries were not dependent on the income of the family. Studies have shown the barrier to participation in preschool programs faced by poorer families and the effectiveness of subsidies in overcoming that impediment (Ertas and Shields 2012).
[3] See Heckman (2006).
[4] For a recent survey of the impact of early-life circumstances (including access to preschool) on later-life outcomes, see Currie and Rossin-Slater (2015).

calculate accurate benefit/cost ratios. Though the benefit/cost ratio of 7.3 shown by Garcia *et al.* (2016) could be taken as a lower bound, we can probably come up with better estimates.

The specific intervention we will examine is the funding of pre-schools by the U.S. federal government from 1942 to 1946 under the National Defense Housing Act of 1940, popularly known as the Lanham Act. Beginning in 1942, under a new interpretation of the statute, the Federal Works Agency began providing funds to local school districts to operate nursery schools.[5] These funds went to cities and towns where wartime labor demand could be met only by employing mothers with young children. During the subsequent four years, more than 3,000 preschools were established in about 450 counties, cities, and towns, in every state except New Mexico. At its peak in 1944, the program funded 1,700 nursery schools containing 50,929 children ages 2 to 6 years (Federal Works Agency 1944, 10). As children cycled in and out of the program, about 300,000 may have passed through these nursery schools during the four years the program operated.[6]

By using reports of the schools in local newspapers, we have identified the exact street addresses of 1,003 Lanham nursery schools (LNS) in 285 U.S. cities and towns.[7] In these cities and towns, we have identified all children born 1936 to April 1940 and have calculated the straight-line distance from their residence in the 1940 U.S. Census of Population to the nearest LNS location. We then follow these children over the entire life course to assess the impact of the Lanham nursery schools on: (1) those most directly exposed to Lanham-funded nursery schools (i.e., who were ages 2 to 6 years at any time between 1942 and 1946 and resided in 1940 near an established LNS); and (2) those least likely to have been exposed to Lanham-funded nursery schools (i.e., those who were outside the 2 to 6 years age range throughout the years 1942 and or who resided in 1940 farther from the nearest established LNS).[8]

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[5] Many of these school districts and municipalities also used the funds to open public schools earlier and maintain after-school programs.

[6] Bremner (1974, 3:691) estimates that between 550,000 and 600,000 children were served at some point by all Lanham funding. In addition to nursery schools, though, Lanham funds also went to extended hours care for public-school children ages 6 to 12 years. In 1944, the latter accounted for half of all children enrolled in Lanham-funded schools. Herbst (2017) has also examined the effect of Lanham funding on both mothers and children. That work combines children 2 to 5 and 6 to 12, estimates state-level effects only, and assesses a limited set of outcomes.

[7] We have found only a few listings of the nurseries and schools that received the funds. Instead, we resorted to using newspaper reports. We did locate the initial "cards" in the U.S. National Archives that recorded the funds each municipality received for the program. But they did not contain the location and some funds were transferred to another municipality in the same county.

[8] Technically, we will be examining an "intent to treat" (ITT) rather than an effect of "treatment on the treated" (TOT) when we compare groups (1) and (2). The reason is that we do not know if a specific individual attended a Lanham school. We know only whether their age and location from 1942 to 1946 provided an opportunity to attend. We do know, however, for each school the number of student places from which we can extrapolate from an ITT to a TOT. For a set of three cities, we have the actual school enrollments from which we can refine the extrapolation as well as identify which household-level characteristics were associated with the enrollment decision.

To assess their outcomes over the life course, we will examine individuals in our "treated" and "control" populations in a variety of later-life administrative and survey records that document their educational attainment, income, health, and longevity. These records include the Current Population Survey, the Survey of Income and Program Participation, the 2000 Decennial Census Long Form, the 2001-2020 American Community Survey, IRS Form 1040, and the National Death Index.[9] These linkages will allow us to assess several dimensions of later-life well-being and how they are related to the early-life educational environment. We will observe income, years of schooling, occupational attainment, marital status, self-reported health, longevity, and cause of death. We will also be able to do so in a setting where we can observe additional years of schooling prior to the start of the conventional educational experience, rather than added at later ages, giving us the opportunity to capture the impact of the earlier acquisition of some skills rather than merely an increment to the total years of schooling experienced.[10]

The treatment we observe will actually consist of an entire bundle of treatments in many cases, a bundle in which proximity to an LNS is but one element. Fathers may be absent as a result of either conscription into the armed forces or temporary relocation to a site of war-related employment. We can account for the former by searching for the father seen in the 1940 household in the U.S. Army's enlistment records which record his entry into service in the branch of the military that accounted for most U.S. participants. Mothers may have entered the labor force to compensate for lost spousal income, and may as a result be absent from the home for a significant fraction of the day. We can account for the latter by searching for mothers in the Social Security Administration's Numident file which records the date at which each participant in the program was issued their SSN – as this generally coincided with an individual's entry into paid employment in a sector covered by the Social Security system, we can use this information to determine if and when mothers entered the labor force if they had not already been employed before the war.

A particularly valuable aspect of our approach is that it begins with the entire U.S. population as enumerated in the 1940 census. There were 26.7 million individuals in the 285 cities and towns for which we have exact LNS locations. In this population, 6.3% or 1.7 million were children under age 4 in 1940 and therefore eligible to attend a local LNS. The size of this starting base for our subsequent linkages to other sources will allow us to evaluate more easily heterogeneity in treatment effects than has been possible in more recent studies which although

[9] The U.S. Census Bureau has attached identifiers to both the 1940 Census and the other sources listed here, except for the NDI. The accuracy of the linkages made using these identifiers is high; see Layne et al. (2014).

[10] For example, there is now a vast literature, surveyed by Cutler and Lleras-Muney (2008), that examines how additional years of education contribute to health over the life course. But the focus in these studies has generally been on years added to schooling in the teens rather than years added in the years before kindergarten.

characterized by standard experimental designs have been small in scale and often focused on particularly vulnerable populations.[11]

To assess the plausibility of our approach, we have undertaken a pilot study using US. Census Bureau data and a slightly different identification strategy: we examined all children born in the U.S. 1936-46 and used their exact place of birth recorded in Social Security enrollment records to determine if their birthplace was or was not one of the 485 cities or towns that had a funded and operating LNS. The 2000 U.S. Census of Population and the 2001-2016 American Community Survey (ACS) microdata files have been linked by the Census Bureau to information from the Social Security Administration making it possible to link late life outcomes (income and educational attainment in this case) to exact place of birth, allowing us to examine a set of outcomes observed 2000-16 for individuals exposed and not exposed to nursery schools. We estimate a series of regressions of the form:

$$Y_{ij} = \alpha + \beta_1(Lanham)_j + \beta_2\,(age\ 2-6)_i + \beta_3\left[Lanham_j \times (age\ 2-6)_i\right] + \theta_b + \gamma_t + \varepsilon_{ij} \quad (1)$$

where Y_{ij} = an adult outcome for individual i born in place j;
$(Lanham)_j$ = 1 if birthplace j had a Lanham pre-school;
$(Age\ 2\text{-}6)_i$ = number of years individual i was age 2-6, from 7/43 to 3/46 (e.g., if born 7/41, 2.5 years of potential exposure)
$(Lanham)_j \times (Age\ 2\text{-}6)_i$ = potential exposure in a Lanham place;
θ_b and γ_t are year of birth and current year fixed effects.

[11] Havnes and Mogstad (2011) document substantial differences in the effect of exposure to preschool in Norway, finding that females and children with less-educated mothers derived disproportionate benefits from that program.

Table 1: Pilot Estimates of the Impact of the Lanham Pre-Schools

	Wage & Salary Income[a]		Years of Schooling	
	Female	Male	Female	Male
Years Age 2-6 (1942-46)	-356.45	-451.97	-0.055***	-0.056***
	(192.80)	(456.79)	(0.014)	(0.014)
Lanham Place	-606.36	-860.77	0.134***	0.114**
	(411.94)	(989.02)	(0.047)	(0.061)
(Years Age 2-6) × (Lanham Place)	137.21	550.06***	0.023***	0.028***
	(95.33)	(182.21)	(0.009)	(0.008)
Constant	17613.55***	35151.34***	9.833***	10.431***
	(362.97)	(729.21)	(0.038)	(0.046)
Observations	538,439	625,936	1,242,217	1,143,251
Adjusted R^2	0.008	0.003	0.012	0.009

Sources: 2000 Census & 2001-16 ACS, linked to SSA SS-5 & Lanham Act-funded nursery schools.
Note: Robust standard errors (clustered at the place of birth) in parentheses. All columns include fixed effects for year of birth & Census/ACS year. [a] Employed only *<0.10 **<0.05 ***<0.01

Results are shown in Table 1. For both adult income and lifetime educational attainment, the interaction term for potential exposure in a Lanham place is positive and statistically significant (though the income effect is observed for males but not females). These effects are also large in magnitude. For example, 4 years of Lanham preschool is associated with an additional 0.112 years of schooling across an individual's life. When we extrapolate from this ITT estimate to a TOT estimate (Lanham-enrolled students were from 10 to 50 percent of the eligible population), this amounts to more than a substantial amount of additional schooling attributable to participation in a Lanham-funded nursery. These results hold even when Inverse Propensity Score Weighting is used to ensure that the treated and control populations are balanced across a wide range of place-level characteristics.

This pilot exercise using Census outcomes shows that the effects of exposure to Lanham nursery schools can indeed be detected more than 60 years after exposure. We can now produce more precise estimates of exposure to the Lanham pre-schools by using the addresses for the schools and the residences of the children.

We anticipate that our work will have a substantial impact on population health and health equity outcomes by providing more comprehensive measures of the benefits over the entire life course of exposure to early schooling opportunities. To the extent that our work identifies the impact (hopefully benefits) of later-life health and cognitive functioning associated with these opportunities, it will provide improved guidance to policymakers in allocating resources efficiently across the lives of individuals. The calculations in García et al. (2016) show how much later-life

benefit is missed by focusing only on the immediate (during school years) return to investing in preschool education. Our work can go beyond that.

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