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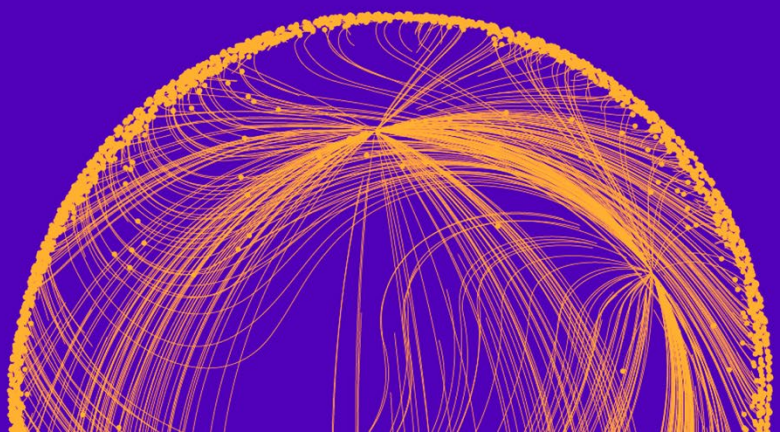

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Education and Mortality: Evidence for the Silent Generation from Linked Census and Administrative Data

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Abstract

We quantify the effect of education on mortality using a linkage of the full count 1940, 2000, and 2010 US census files and the Numident death records file. Our sample is composed of children aged 0-18 in 1940, observed living with at least one parent, for whom we can construct a rich set of parental and neighborhood characteristics. We estimate effects of educational attainment in 1940 on survival to 2000, as well as the effects of completed education, observed in 2000, on 10-year survival to 2010. The educational gradients in longevity that we estimate are robust to the inclusion of detailed individual, parental, household, neighborhood and county covariates. Given our full population census sample, we also explore rich patterns of heterogeneity and examine the effect of mediators of the education-mortality relationship. The mediators we consider in this study explain more than half of the relationship between education and mortality. We further show that the mechanisms underlying the education-mortality gradient might be different at different margins of educational attainment.

Keywords: education, health, mortality
JEL Codes: I1, I2, J1

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1 Introduction

Many papers have documented the strong correlation between education and mortality (Kitagawa and Hauser, 1968; Elo and Preston, 1996; Balaj et al., 2024). Evidence shows that the education-mortality gradient in the United States is getting steeper (Meara et al., 2008; Case and Deaton, 2021). Although the correlation is well established, there is no consensus on causality and mechanisms. Education could impact behaviors such as as drinking and smoking (Cutler and Lleras-Muney, 2010b; Conti et al., 2014), income (Mincer, 1974), disability (Cutler and Lleras-Muney, 2010a), neighborhood, marriage, social networks, and access to healthcare.

In this paper, we exploit a linkage between the 1940 US census, 2000 US census, 2010 US census, and the NUMIDENT file to study the relationship between completed years of schooling and older age mortality. We have four main contributions.

First, we document the relationship between education and mortality in the United States using a large administrative data set. We find a strong relationship that is highly non-linear, with the largest decline in mortality at 11 to 12 years of schooling.[1]

Second, we find that controlling for detailed parental and neighborhood characteristics of the household where a child grew up has almost no effect on the strength of the relationship. While this does not prove that the impact of education on mortality is causal, it is consistent with a causal relationship. Although we cannot account for differences in childhood health that could impact education and later life mortality, we definitively show that the correlation between education and later life health is *not* driven by differences in childhood socioeconomic status as measured by a rich set of parental, neighborhood, and county characteristics, including local teacher characteristics, that we observe in the 1940 census.

Third, we show detailed patterns of heterogeneity in the relationship. The impact of ed-

[1] In the United States, this is completed High School. This is consistent with evidence found by Montez et al. (2012) and Lleras-Muney et al. (2022), among others.

ucation is stronger among non-Hispanic Whites and people born with higher socioeconomic status, both in terms of their parents' education and in terms of their childhood neighborhood. The parents-children linkage in the 1940 census allows us to look at far more types of heterogeneity than previous studies. We believe that this is the first paper to show that the mortality-education gradient is stronger for children born to highly educated parents, and the first to show that it is steeper for children who grew up in richer neighborhoods.[2] The relationship is also stronger for people who grew up in urban areas and stronger for those who did not grow up on farms. We provide evidence that the education-mortality gradients are less steep for White Hispanics and American Indians. Although the sample sizes are small, we found no relationship between education and mortality for Asians.

Lastly, we used a link to the 2000 census to show how adult income, neighborhood, home ownership, living alone, and disability mediate the relationship between educational attainment and mortality. We find that these mediators account for more than half of the impact of education on mortality. Physical and mental difficulties are the most important mediator, explaining nearly one-third of the relationship. They are especially important for explaining the education gradient at lower levels of education. Income explains about one-sixth of the gradient, and plays a more important role at higher levels of education. Neighborhood and homeownership combined explain only about one-tenth, and living alone plays a very small role. We believe this is the first paper to use detailed neighborhood information and health-related difficulties measures from the U.S. census as mediators. We show that the relationship between education and mortality may be caused by different pathways at different margins of education.

[2] Lleras-Muney et al. (2022) show that the gradient is steeper in richer states. Halpern-Manners et al. (2020) show that the gradient is steeper for children whose fathers had higher occupational scores.

2 Literature Review

The most closely related study is Lleras-Muney et al. (2022), which links siblings and uses education data from the 1940 census, death records and family tree data from familysearch.org. They find that each additional year of schooling is associated with a 0.4 higher life expectancy at age 35. They also find that the relationship between education and mortality is unchanged when comparing siblings or twins, but is stronger for men in high-income places. While their paper focuses on earlier cohorts (main focus is 1906-1915 though they have some data on earlier cohorts), this paper analyzes the experiences of later cohorts (1922-1940). Educational attainment was increasing rapidly during this period of time, so our paper studies cohorts with substantially higher average education.[3] Second, this paper uses a linkage to the 2000 census to see how the relationship between education and mortality is mediated through income, home ownership and disability. Finally, their paper only studied Whites because non-Whites are less likely to be linked through familysearch.org, whereas this paper studies both Whites and non-Whites. Finally, because we observe children in the 1940 census, we have more detailed information about childhood socio-economic status, which allows us to conduct heterogeneity analyses at a household level and a geographic level.

Another closely related study is Halpern-Manners et al. (2020), which utilizes linkages of 1920 and 1940 census with the SSA NUMIDENT and Social Security Master Death File. Their main finding is that the relationship between years of education and age of death is modestly attenuated (roughly 15%) among twins[4] and non-twin siblings. Our paper differs from that study in several ways. First, because they rely on linkages based on names for the 1920 and 1940 censuses, they limit their study to men only, while we include women in our study. This study also studies earlier cohorts, 1910-1920, than our study. Lastly, we use a linkage to the 2000 census to quantify the impact of mediators such as income, neighborhood

[3] About 1/3rd of the 1906-1915 birth cohort graduated from high school compared to around 2/3rd for the 1924-1940 birth cohort.

[4] There are only around 2,000 twins with discordant levels of education in their sample, and so the twins results are very noisy

and disability in adulthood to explore the potential mechanisms mediating the relationship between education and mortality.

Montez and Hayward (2011) shows that controlling for early life characteristics such as mother's and father's education and childhood socioeconomic status has little impact on the correlation between education and mortality. However, their paper used a much smaller sample (around 20,000) in the Health and Retirement Study and retrospective measures of childhood socioeconomic status and childhood health.

Our paper also contributes to the literature on the mediators between education and mortality. Cutler et al. (2011) show that the increasing education-mortality gradient is not due to changes in behavioral risk factors over time. Increasing gradients are explained by increasing returns to education conditional on risk factors and increasing returns to healthier behaviors. Rogers et al. (2013) use the NHANES linked mortality file to show that 40% of the education-mortality association is mediated by including income. They find another 36% is mediated through health behaviors such as smoking, drinking, and exercise. The 2000 long-form census does not contain any information on health behaviors, but we add to the literature by using disability measures, which have not been used previously. Disability is a key predictor of mortality. Landes (2024) finds mortality rates are nearly double for people with a disability versus those without after controlling for demographic characteristics. Rates are more than double for those with more than one disability. Using data from the 2002 Health and Retirement Study, Cutler and Lleras-Muney (2010a) find that disability rates for people 65 and older are double for high school graduates versus those with a college degree. One third of the relationship can be explained by differences in health behaviors (smoking, drinking, and BMI) and another third can be explained by differences in lifetime occupations.

Other studies have used instruments such as compulsory schooling laws (Lleras-Muney, 2005; Meghir and Palme, 2005; Clark and Royer, 2013; van Kippersluis et al., 2011), Vietnam draft lottery (Buckles et al., 2016) or college expansion (Fletcher and Noghanibehambari,

2024) to identify effects of education on mortality. These studies have found mixed results. This could be because they study different countries, different time periods, or different margins of education. A meta-analysis by Xue et al. (2021) finds that average causal effects are close to zero, after accounting for publication bias. The papers in the meta-analysis study a range of different countries (the majority in Europe), where the health setting may be very different than the United States. For another comprehensive review see Galama et al. (2018).

Finally, several papers have studied twins to compare children with identical family upbringing and genetics. Behrman et al. (2011) study twins in Denmark and find that twins with different levels of education have similar mortality and health. Lundborg et al. (2016) use Swedish data with a larger sample size (about 50,000) and find that the relationship between education and mortality is almost unchanged when including a twin fixed-effect. Their paper also controls for early life health differences between twins such as height and birth weight. In the United States, both Lleras-Muney et al. (2022) and Halpern-Manners et al. (2020) find that controlling for twin fixed-effects does not substantially reduce the association between education and mortality. The limitations of twin studies are discussed in Bound and Solon (1999).

3 Data

We use a linkage of the 1940 full-count US census to the 2000 and 2010 census files and the Social Security Administration NUMIDENT file. Our primary sample, described in Table 1, is composed of US-born children under the age of 16, observed in the 1940 census living with at least one parent in the contiguous US. This sample is merged with the 2000 and 2010 census and NUMIDENT using Protected Identification Keys (PIKs). Among the individuals assigned a PIK, we further limit the sample to observations with a unique PIK match. We observe a unique PIK for about 21,270,000 observations, or 64.22 per cent of the baseline

sample. Observations with a PIK are slightly younger and more male,[5] come from families with more educated parents, and are more likely to be White Non-Hispanic.

Our main mortality measure is survival to 2010 conditional on survival to 2000. Survival to 2010 is an indicator variable created as the intersection of 1) observing a unique link for individuals in the 2010 census *or*, absent the census link, 2) observing a recorded date of death in NUMIDENT after 2010. Conditioning on survival in 2000 is necessary in our study because our main independent variable of interest is educational attainment observed in the 2000 census. Thus, our main results study mortality at ages 60-85. In one alternative model the main independent variable of interest is educational attainment in 1940 for 15-18 year-olds, and we use survival to 2000 as the outcome variable. We use this model to study mortality at younger ages (15-78). Survival to 2000 is imputed as 1) observing a unique link for individuals in the 2000 census *or* 2) absent a unique census 2000 link, observing a recorded date of death in NUMIDENT after 2000, or a unique match to the 2010 census.

The main independent variable of interest is educational attainment recorded in 2000, measured in completed years of education. In the 2000 census long form, respondents were asked to choose a level of attainment from: 'No schooling completed', which is our reference category, 'Nursery school to 4th grade', which we label as '4 years of schooling', '5th grade or 6th grade', which we label '6 years of schooling', and '7th grade or 8th grade', recorded as '8 years of schooling'. We kept distinct categories for 9th, 10th and 11th grade attainment, as in the original 2000 long form questionnaire. For data privacy protection reasons[6] we found it necessary to combine several categories. '12th grade, no diploma' and 'High school graduate' are recorded as '12 years of schooling', 'Some college credit, but less than 1 year' is recorded as '13 years of schooling', 'One or more years of college, no degree' and 'Associates degree' are combined into '14 years of schooling', 'Bachelor's degree' is assigned 16 years, while all higher

[5]PIK rates are generally higher for younger cohorts and men. The PIK-ing procedure and match rates for various demographics are detailed in Massey et al. (2018).

[6]We faced a trade-off between providing comparisons across different races, genders, ethnicities, and geographical areas, and having enough meaningful observations to abide by cell count restrictions imposed by the Census Bureau and necessary for disclosure of results. We opted for combining educational categories.

degrees are bundled into '17 years of schooling'. In all of our analyses, we use fixed effects to measure education rather than a continuous measure. Appendix Figures A1 and A2 show the distribution of educational attainment in the 2000 census. For our cohorts of interest, 1922-1940, college completion or higher levels of attainment are more common among men than among women. Large attainment gaps can also be noticed between the White Non-Hispanic, Black and White Hispanic populations, with minorities underepresented at higher levels of educational attainment. A nontrivial share of Black and White Hispanic individuals attained less than eight years of schooling.

Five sets of control variables were constructed for the individuals in the main sample based on their personal, parental, household, neighborhood, and county characteristics (including teacher covariates at the enumeration district level) observed in 1940. *Personal* control variables include information on race, ethnicity, sex, age, and state of birth. *Parental* controls include information on mother's education in years of schooling and mother's age in five-year intervals (these are replaced with father's characteristics if the mother is absent from the household), whether at least one of the parents is foreign born, whether only the mother or only the father are present in the household, and dad's occupation fixed effects. *Household* controls include information on the number of siblings, whether an individual lives on a farm, whether an individual's family moved in the past five years within the county, state, or from abroad, whether the household was located in a metropolitan area, and the population size of the place of residence.

We construct *neighborhood* characteristics using a feature of the 1940 census records: the fact that the data was collected by enumerators who traveled in small contiguous geographic areas called enumeration districts and recorded information about households on numbered sheets. This enables us, for each child in our sample, to construct neighborhood measures based on proximity in the census records.[7] The neighborhood controls include information

[7]In practice, we use the information on the nearest 50 neighbors to define the 'neighborhood', by aggregating information on the closest 25 neighboring households up and 25 neighboring households down the census roster line for each individual.

on the average schooling and income of nearby fathers, average schooling and employment status of nearby mothers, fraction of neighbors living on farms, fraction of nearby fathers on Emergency Employment, which we use as a proxy for the level of severity of the Great Depression in the individual's neighborhood, as well as average years of schooling, wage, age, and fraction female of teachers in the enumeration district.[8,9]

Finally, *county* controls include the average occupational scores separately for men and women aged 35-54, the fraction of births delivered in hospitals, doctor to population ratio for Whites, infant mortality rate for Whites, average percent of workers employed in agriculture, average density (persons per sq. mile), average percent of dwelling units with a private bathtub or shower, average percent of rural farm dwelling units with running water, average percent of rural farm dwelling units with electric lighting, total major war supply contracts and projects in millions of dollars, the minimal distance to a 4-year college, the minimal distance to a normal school, average number of children born to women aged 21-30, and an indicator variable for whether the county has a city with a population of at least 25,000. Sources for the county controls are listed in Appendix Table A1.

4 Empirical Strategy

We start with a series of linear probability regression models in which S_i^{2010}, an indicator for survival until 2010, is regressed on educational attainment fixed effects in 2000, $\gamma_j ED_j$. The omitted category is zero years of education in 2000. In the basic specification, we include a vector X_i of controls for *individual* characteristics that include age in 1940, ethnicity, race, and state of birth. All controls are fully interacted with female indicators F. We augment

[8]Emergency Employment was a subsidized form of employment under the New Deal, recorded in the 1940 sample as 'At Work, public emergency'.

[9]We computed average teacher characteristics at the enumeration district level separately for White, Black, and all teachers combined and matched teacher covariates with individual level data by race, i.e., White children were matched with the characteristics of White teachers in the enumeration district, Black children were matched with the characteristics of Black teachers, and Other race children were matched with average characteristics of teachers of all races combined. If teacher covariates were missing at the enumeration district level, they were replaced by teacher covariates at the county level.

the basic model by gradually adding covariates and reporting how our estimates of the effect of educational attainment change. To the baseline set of individual characteristics X_i we add parental and household controls. Next, we add neighborhood and county-level controls interacted with a female indicator. Finally, we include county-by-gender fixed effects and re-estimate the previous models. Our preferred model (1) includes the full set of covariates and county $\times$ gender fixed effects, $\theta_{c\times F}$. We cluster standard errors in all models in this study at the county level in 1940. Additionally, we use survey-provided person weights in all regressions that involve covariates from the 2000 census long form.

$$S_i^{2010} = \sum_j (\gamma_j ED_j) + \beta_1 X_i + \beta_2 X_i \times F + \theta_{c\times F} + u_i \tag{1}$$

We also estimate a version of equation (1) that includes household fixed effects in 1940, comparing the effect of education between siblings, accounting for additional unobserved parental/household/neighborhood characteristics shared by the siblings.

We conduct an extensive set of heterogeneity analyses using the fully saturated specification in equation 1. We estimate the model separately by gender, race and ethnicity, and by levels of parental educational attainment. Leveraging the neighborhood variables, we also run our model separately by state-level terciles of house values, father's income, parental education, and local farm status.

One of the mechanisms through which education may lead to higher rates of survival is its association with higher lifetime income. We estimate models in which we control for the log of total income in 2000 and separately also for social security income in 2000.[10] To further explore the income mechanism, we additionally estimate models in which the log of total income and the log of social security income are the outcome variables.

To explore the role of additional mediators in the relationship between educational at-

[10]If total or social security income is reported to be zero or negative, we replace the missing values in the log of total or social security income respectively with a zero and include in our regressions a control variable for whether total or social security income was zero or negative.

tainment and mortality, we further estimate regressions with educational attainment in 2000 as the main independent variable of interest as before but where the outcome variables are home ownership status in 2000, log of block group level household income in 2000, log of block group level home values in 2000, an indicator variable for whether an individual lived alone in 2000, and indicators for whether an individual reported having any difficulty, any physical difficulty, any difficulty with performing mental tasks (learning, remembering, or concentrating), or difficulty working at a job or business.[11] Then, we re-estimate the effect of education on survival with these mediators as additional controls.

While our main analysis relies on completed education observed for individuals surviving to 2000, we also present evidence on the impact of educational attainment in 1940 on the probability of survival to 2000. For this purpose, we use a sample of US born 15-18 year olds, observed living with their parents in the 1940 census and having a unique PIK match in 2000 census. We estimate a specification similar to equation (1), regressing survival to 2000 on the grade attainment in 1940. The equation includes the same set of controls X_i and is estimated by gradually adding the same set of 1940 controls and county $\times$ gender fixed effects as for the subsample of individuals surviving to 2000. Many of these 15-18 year olds continued their education, and as such we treat this evidence indicative of the effect of grade progression by ages 15-18 on early-life mortality.

$$S_i^{2000} = \sum_j (\gamma_j E_j^{1940}) + \beta_1 X_i + \beta_2 X_i \times F + \theta_{c \times F} + v_i \tag{2}$$

[11] In the census 2000 Long Form questionnaire, respondents were asked whether they had (1) "blindness, deafness, or a severe vision or hearing impairment"; (2) "a condition that substantially limits one or more basic physical activities such as walking, climbing stairs, reaching, lifting, or carrying"; (3) difficulty with "learning, remembering, or concentrating"; (4) difficulty with "dressing, bathing, or getting around inside the home"; (5) difficulty with "going outside the home alone to shop or visit a doctor's office"; and (6) difficulty with "working at a job or business". We define the "any difficulties" indicator taking the value of one if the individual reports having any of these six conditions. The physical difficulty indicator equals one if the respondent reports having conditions (1), (2), (4), or (5). The mental difficulties indicator equals one if the respondent reports having condition (3) and the work related difficulties indicator equals one if the respondent reports having condition (6).

5 Results

Survival to 2010 conditional on survival to 2000. Table 2 shows our estimates of the effect of education completed by 2000 on the 10-year survival probability for individuals aged 0-15 in 1940, who were aged 60-75 in 2000. The mean of the 10-year survival rate is 0.727. The shape of the education gradient in longevity estimated for this population is shown in Figure 1 for the model in Table 2 that includes county-by-gender fixed effects. One striking result is that the mortality gradient in education is largely unaffected by the addition of detailed household, neighborhood and county controls. The stability of the coefficients is an indication that omitted variable bias may be relatively small (Oster (2019)). The gradient is fairly linear up to 10 years of schooling, exhibits a flattening at 11 years of schooling, and a jump at 12 years of schooling for high school completers. This pattern is consistent with the labor market effects of high school dropout and degree attainment, which have been observed to lead to nonlinear jumps in income (see, for example, our estimates in Table 5 on the effect of high school completion on income). The mortality-education gradient rises further for individuals with some college or an associates degree compared to high school graduates and continues to increase for bachelor's degree and professional degree holders.

The gradient in Table 2 is estimated for all races, and our various specifications control for many parental, household, neighborhood and local teacher characteristics. In Table A3 we show additional coefficients for our preferred specification, which includes all covariates and county by gender fixed effects.[12] The race-by-gender fixed effects indicate the lower overall survival rates of the Black and American Indian population, and the higher survival of ethnic Hispanics. Higher chances of survival to 2010 are also experienced by individuals who were living on a farm in 1940, and by those with a foreign-born parent. Interestingly, after the inclusion of a rich set of controls, we do not find statistically significant effects of having only the mother or only the father present in the 1940 household on later-life

[12]While all our models include a rich set of controls, we do not report coefficients for every single control variable in this paper in order to minimize deanonymization risks and the administrative burden associated with having the Census Bureau conduct a disclosure review of a large number of coefficients.

mortality.

Overall, these results indicate that the effects of educational attainment on survival to 2010, conditional on survival to 2000, are significant and robust. In terms of magnitude, we find that, for example, moving from 8 years of schooling to 16 years of schooling leads to a 17.8 percentage point increase in the ten-year survival rate.

When we include household fixed effects in Table A2, we find the education-mortality gradient to be very similar to our main estimates in Table 2, with the same nonlinearities at high school and bachelor's degree completion. The magnitudes in the household fixed effects models become slightly attenuated for higher levels of educational attainment. For example, college completion is associated with a 21.5 percentage point higher survival probability (relative to no schooling) in our main estimates, and a 18.4 percentage point higher survival rate in the household model.

Survival to 2000. We show the effects of grade attainment achieved by teenagers aged 15-18 for the entire population in Table 3 and display the education-mortality gradient in Figure 2. The gradient is fairly linear past five years of schooling, with modest flattening for higher levels of attainment (10th, 11th grade).[13] Attaining ninth grade by age 16 in 1940, relative to attaining sixth grade, is associated with a 8.4 percentage point increase in the probability of survival to 2000, a large effect, relative to the average survival probability of 55.6% in our sample. These results indicate that the effects of education on early-life mortality are robust to the inclusion of a rich set of controls, but are affected by censoring, as many 15-18 year-olds continued their education.

[13]We observe a nonlinear effect, higher survival rates for individuals with one grade of schooling. As shown in Appendix Figures A3 and A4, very few individuals report attaining only a few years of schooling. This was more common among Black and White Hispanic populations. Many of these individuals would have attended one room schools where children of various ages were educated in the same room, and grade progression would have been less precisely estimated. As such, the nonlinear mortality effects for very low levels of educational attainment may be due to the misclassification of individuals into educational attainment categories.

5.1 Heterogeneity analysis

Survival to 2010 conditional on survival to 2000. In Table 4, we contrast the education-mortality gradient for 10-year survival from 2000 to 2010 across genders, races, ethnicities, and levels of parental education in 1940. The different gradients by gender are illustrated in Figure 3. The education gradient is steeper for women than for men for 11 and 12 years of schooling as well as for some college attainment, but becomes flatter for women attaining a bachelor's degree or higher. Montez et al. (2009) discuss potential mechanisms behind the flatter gradient for highly educated women, pointing to gender differences in smoking patterns, given a strong education-by-gender interaction with mortality rates in lung cancer and chronic respiratory diseases.

Differences by race and ethnicity in the education gradient for 10-year survival are illustrated in Figure 4 for the White Non-Hispanic, Black, and White Hispanic populations. The gradient is generally higher for White Non-Hispanics, except at lower levels of education, where confidence intervals overlap. There is a significant flattening of the Hispanic education mortality gradient for individuals with some college or more. Notwithstanding other ecological factors, this result may be an artifact of the way census enumerators recorded race and ethnicity. Duncan and Trejo (2023) point out that in the 1930 census (like in our sample, the 1940 census), enumerators were instructed to assign the race and ethnicity of respondents. Interestingly, Hispanic individuals who were more educated were more likely to be assigned as White, and these patterns varied across communities, leading to under-reporting of educational attainment for Hispanics.

We also explore heterogeneity by parental education (mother's education, or father's if mother not present) in Table 4. Looking at the means of our dependent variable, survival to 2010 conditional on survival to 2000, children born into households with higher educated parents also had higher survival rates. The education-mortality gradient varies little for families with parents with some high school education or more, but tends to be lower for parents with eight years of schooling or fewer, although confidence intervals overlap across

parental education levels.

While our results are very similar across the six models that gradually expand the set of controls, it is still possible that unobservable environmental and socio-economic factors might bias our estimates. To explore this further, we estimate the education-mortality gradient across different areas. In Table A4 we split our sample into state-level terciles of house values at the enumeration district level, father's income at the neighborhood level, and parent's education at the neighborhood level. Results are similar across these groups, with overlapping confidence intervals indicating that the education-mortality gradient is not fundamentally shaped by the neighborhoods in which children grew up. In Table A5 we also compare the shape of the gradient for children growing up on farms and those from non-farm households, in rural vs. urban areas, and across terciles of the fraction of households in the 1940 neighborhood that were farms. Here again, the confidence intervals overlap across areas, with some differences in the lower tail of the educational distribution, where lower levels of educational attainment appear to have larger impacts on the survival rate in rural areas than in urban areas. This pattern is likely driven by selection, as very few individuals in urban areas acquired fewer than eight years of schooling, whereas such levels of attainment were more common in rural areas.[14]

Survival to 2000. Results from our preferred specification are summarized in Figure 5, which plots estimates from Tables A6 and A7. The gradient for Whites appears U-shaped, however very few individuals in our sample have less than five years of schooling completed, so those are likely exceptional cases.[15] The slope past five years of potential schooling is linear and the magnitudes are considerable. For example, attaining 11 years of schooling in 1940 when aged 15-18 compared to attaining only eighth grade is associated with a 7.7 percentage point increase in survival to 2000. The gradient is noticeably flatter for Black teenagers, plausibly because—amid segregation, systemic discrimination, and con-

[14]Using data from the public IPUMS 1940 100% sample, we find that among White 15–18-year-olds, only 17 percent had completed eighth grade or less in urban areas, compared to 42.3 percent in rural areas.

[15]In the IPUMS public use sample, less than 3.7% of White individuals aged 15-18 have attained less than five years of schooling by age 15.

strained family resources—comparable educational achievement by age 18 translated into post-secondary credentials and higher-quality employment less consistently than it did for their White counterparts.

For Black teenagers, the gradient is linear and upward sloping even at lower levels of educational attainment. While having less than five years of schooling was an exception for White children, likely related to medical conditions or other exemptions from compulsory schooling laws, about 23 percent of Black 15- to 18-year-olds in the public IPUMS 100% sample had attained at most fourth grade. It therefore appears that for Black children, most of whom were educated in underfunded segregated schooling systems (Card and Krueger (1992)), attaining even low levels of schooling led to gains in the probability of surviving to 2000. The second pattern that stands out for Black teenagers is that the magnitudes of the effects of educational attainment are in general lower. For example, having completed nine years of schooling relative to six years of schooling leads to a 8.4 percentage point increase in the probability of survival to 2000 for Whites, but only a 4 percentage point increase for Black teenagers. As mentioned above, the lower magnitude may reflect the fact that in the labor market, because of systemic discrimination, access to occupations with lower health risk or occupational stress was not equally distributed between White and Black graduates with the same levels of educational attainment. As such, Black and White workers with similar levels of educational attainment were likely exposed to different work conditions and occupational hazards. Higher measurement error in the number of years of schooling for Black children (Margo (1986)) may also depress magnitudes of the education-mortality gradient.

5.2 Mediators

We use the link to the 2000 long form census to assess the role of mediators in the education-mortality relationship. Income is an important possible mediator of the education-mortality relationship, as it can facilitate access to higher-quality care or goods and services that

promote health.[16] Indeed, as shown in Table 5, there is a clear association between higher levels of education and total income as well as social security income. For social security income, the relationship is weaker, as not all individuals in our sample are collecting social security yet. Individuals with high levels of education are more likely to still be working and are less likely to receive social security.[17] Thus, we prefer to use the log of total income as our measure of income. Compared to the relationship without mediators, income reduces coefficients on education by roughly 10-15%. An increase of income by 10% is associated with a 0.3 percentage point increase in 10-year survival rates. For comparison, an increase of 1 year of schooling increases survival rates by roughly 2 percentage points. One caveat is that our measure of income is at only one point in time and is a combination of both labor income and income from retirement and other sources.

Beyond income, we consider a series of other mediators that can be observed in the 2000 long-form census. We examine the impact of educational attainment on median household income and median housing values at the block group level of the individual's neighborhood in 2000, homeownership status, whether the person lives alone, and whether they reported having physical, mental, or work related difficulties. In all regressions, we include the full set of controls from the 1940 census and county-by-gender fixed effects as before.

Table 6 shows that higher educational attainment is positively correlated with homeownership and living in block groups with higher median household income and house values. Education is negatively correlated with living alone or experiencing mental or physical difficulties. Many of the outcomes also display non-linear relations. Physical and work-related difficulties have large declines from 11 to 12 years. One potential explanation is life-time differences in occupations.

In Table 7, we estimate the education-mortality gradient including these mediators as controls. Homeowership is associated with a 6 percentage point higher probability of survival

[16] On the other hand, income may also allow for purchases of unhealthy goods such as alcohol and cigarettes. For more on the effect of income on health see Lleras-Muney (2022).

[17] Individuals in our sample are 60-75 in 1940. In 2000, social security could start to be drawn at ages 62-70, with the monthly benefit increasing if benefits were started at a later age.

to 2010, roughly equivalent to the difference between 12 and 16 years of schooling. It is possible that homeownership provides more financial and social stability, higher quality housing, and psychological benefits.[18] Or healthier people might be more likely to stay in their owned home rather than move to a long term care facility or other short term housing. Living in a census block group where neighborhood income or house values are 10 percentage points higher is associated with a 0.16 and 0.13 percentage point higher survival rates, respectively. This pattern could be related to the quality of local public amenities and public health resources. Living alone reduces survival rates by about 4 percentage points. Physical and mental difficulties have substantial impacts on mortality, the largest of any of the mediators. A physical difficulty reduces survival rates by about 13 percentage points[19], and a mental difficulty reduces survival by 10 percentage points.

We decompose the relationship between education and mortality in Table 8. Each row in the table shows the increase in survival associated with different margins of education. For example, moving from 8 years of schooling to 11 years of schooling increases survival rates by 3 percentage points.[20] Ten percent of this can be explained by the increase in income in moving from 8 years of schooling to 11 years of schooling,[21] 9% is explained by neighborhood income level and homeownership status, and 57% is explained by decreases in physical, mental, and work related difficulties.

Across the education distribution, our mediators explain more than half of the relationship between education and mortality. Physical, mental, and work related difficulties explain nearly a third of the relationship, and they appear to play an especially large role at lower

[18]Using a sibling-design and linked census records, Breen (2024) finds that owning a home as a young adult increases life expectancy by roughly 4 months.

[19]This is the coefficient on "physical difficulty" plus the coefficient on "any difficulty". The positive coefficient on any difficulty reflects the fact that having multiple difficulties is worse than the linear impacts of each difficulty combined. A single physical difficulty reduces survival by 12.8 percentage points. A lone mental difficulty reduces survival by 10 percentage points. A person with physical and mental difficulties has survival reduced by 25.2 percentage points.

[20]In Table 2, Column 6 the coefficient on 11 years of schooling is 0.090 and the coefficient on 8 years of schooling is 0.060.

[21]0.003 = 0.019 * (0.569 - 0.408). 0.019 is the impact of log total income on survival (Table 7, Column 1) and 0.569 and 0.408 are the fixed-effects on 11 years and 8 years of schooling, respectively, in the regression on log total income (Table 5, Column 5).

levels of education. Conversely, the role of income is more important at the highest levels of education.

6 Conclusion

We examine the education-mortality gradient in the 10-year survival rate (2000-2010) for cohorts born 1922-1940, commonly referred to as "The Silent Generation." Advances in linkages between US census files (Massey et al. (2018)) allow us to observe the old age survival patterns of children recorded living with at least one parent in the 1940 full census sample, for whom we can observe a rich set of characteristics related to parental, household, and neighborhood background in young age. We find the relationship between educational attainment and mortality to be remarkably stable to a rich set of controls for the characteristics of individuals' parents and childhood environmental circumstances. This shows definitively that the relationship between education and mortality is not driven by differences in observable childhood characteristics, such as socioeconomic status. Our household fixed effect models show that unobservable childhood factors that are constant within family appear to play a small role in the relationship (e.g. perhaps parents that encourage more education also encourage better health behaviors in adulthood), on the order of 20%. Thus, at least in the United States, the vast majority of the relationship must be explained by either unobservable differences among siblings born into the *same family* (e.g. healthier siblings within a household are likely to obtain more schooling), or the *causal effect* of education on mortality. Due to data limitations, very few studies are able to control for factors such as early childhood health that might both impact education and old-age mortality.[22] Twin studies looking at monozygotic twins, such as Lundborg et al. (2016), can study people with identical DNA, but cannot account for health differences that occur after birth. Causal methodologies have so far not been conclusive in either direction. One potential area of study is more research

[22] Montez and Hayward (2011) finds no change in the health-education association after controlling for self-reported health status in childhood.

on why siblings in the same household receive different levels of education in the first place.

We document evidence consistent with the idea that children from more advantaged backgrounds have steeper education-mortality gradients as adults. One advantage of our study is access to the full 1940 census, so we are able to study heterogeneity across many dimensions that have not previously been studied, such as parent's education, neighborhood at a detailed level, and farm status. We also find that children who grew up in urban areas and children who did not grow up on farms have steeper education gradients as adults. The education-mortality gradients are less steep for White Hispanics and American Indians, and non-existent for Asians.

Using a linkage to the 2000 long-form census, we present evidence on the mediators of the education-mortality relationship at different margins of education. Overall, more than half of the relationship is mediated by physical and mental difficulties, income, and neighborhood characteristics in adulthood. We show that physical and mental difficulties explain almost one-third of the relationship and are especially important for explaining the education gradient at *lower* levels of education. Adult income explains about one-sixth of the gradient, playing a bigger role at *higher* levels of education. Neighborhood characteristics and homeownership status in adulthood combined explain only about one-tenth of the gradient. Thus, we show that the mechanisms through which education may affect adult mortality vary across different stages of educational attainment.

In future work, likely facilitated by further advances in census file linkages, we hope to explore the role of other mediators of the education-mortality relationship, such as occupational choice, marriage, divorce, and fertility. Previous research has shown that income and health behaviors, especially smoking, are important mediators of the relationship between education and mortality. This paper shows the importance of physical and mental difficulties, especially at lower levels of education. Policies aimed at reducing disparities in disabilities by education and income level could potentially be an effective strategy for reducing the education-mortality gradient.

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7 Figures and Tables

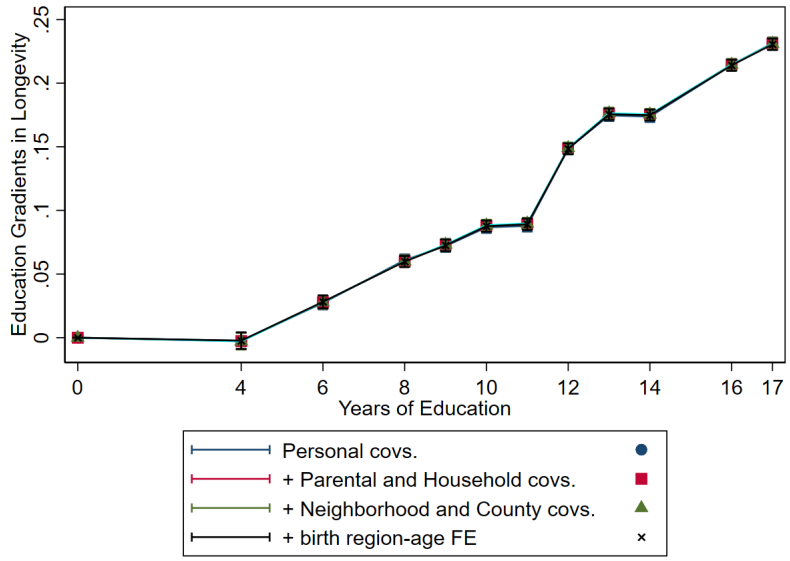

Figure 1: Education Gradients in Longevity (Survival to 2010)
Notes: This figure plots estimates from Table 2, columns 4,5,6 (models with county × gender fixed effects) and the results of an additional specification including birth region × age fixed effects.

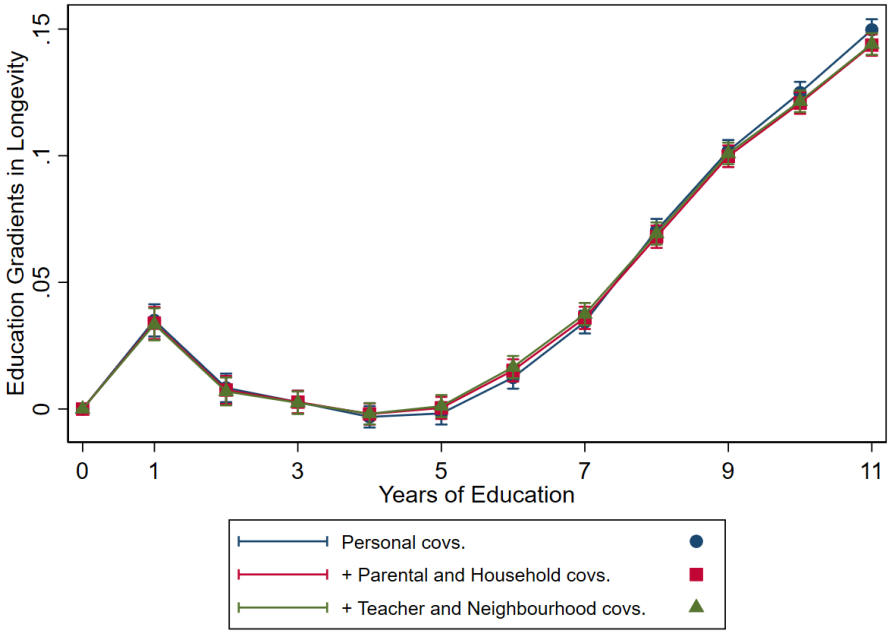

Figure 2: Education Gradients in Longevity (Survival to 2000)
Notes: Estimates from Table 3, columns 4,5,6 (models with county × gender fixed effects).

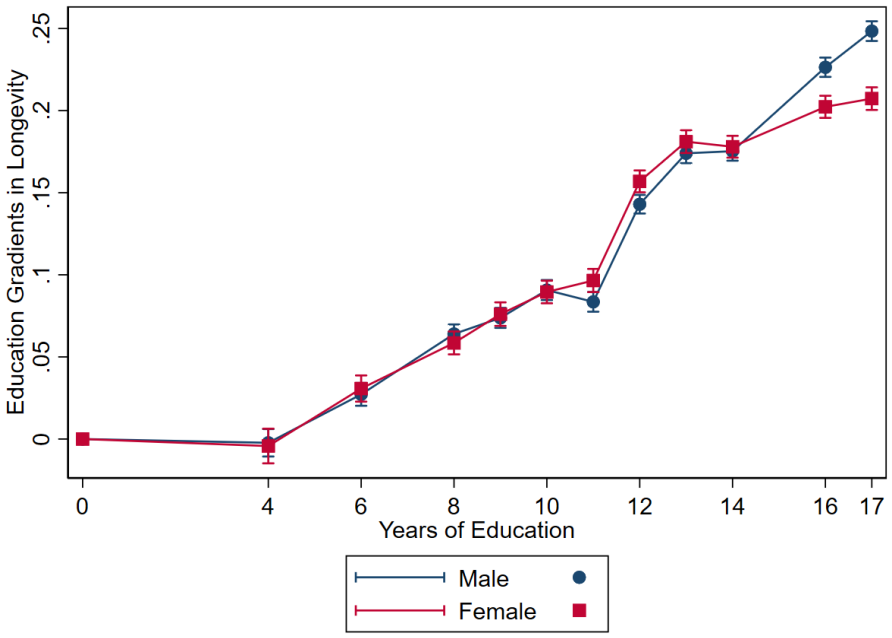

Figure 3: Education Gradients in Longevity (Survival to 2010)
Notes: Estimates from Table 4

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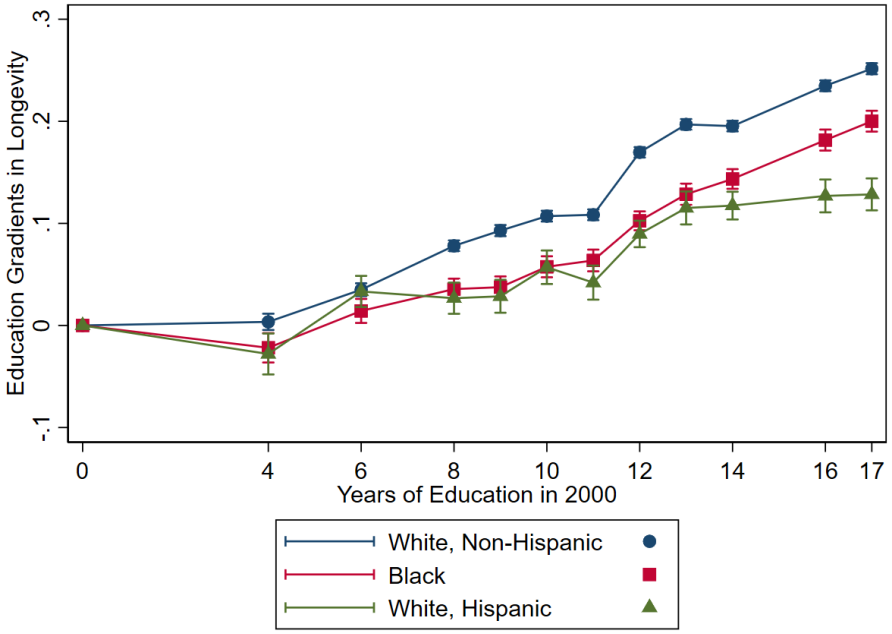

Figure 4: Education Gradients in Longevity (Survival to 2010)
Notes: Estimates from Table 4

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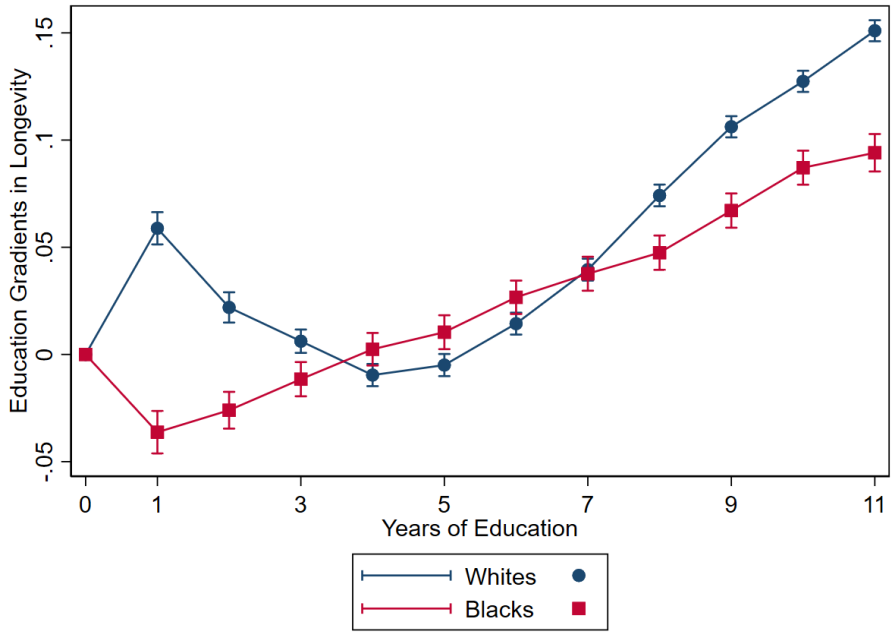

Figure 5: Education Gradients in Longevity (Survival to 2000)

Notes: Estimates from Tables A6 and A7. In the IPUMS 1940 Census %100 sample, 0.54% of White and 1.85% of Black teenagers report no schooling completed, while 0.28 % of the White sample and 1.47% of the Black sample report one grade of schooling.

Table 1: Summary Statistics

	US-born children under 16, living with at least one parent in 1940			
		Assigned a unique protected identification key (PIK)		
			Subsample surviving to 2000	
				Surviving to 2010
Age	7.67	7.52	7.04	6.49
American Indian (%)	0.34	0.24	0.19	0.17
Asian (%)	0.19	0.16	0.17	0.18
Black (%)	10.59	7.53	6.15	5.64
White Hispanic (%)	2.25	1.86	1.84	1.88
White Non-Hispanic (%)	86.62	90.21	91.65	92.12
Female (%)	49.29	48.11	51.86	54.44
Only father in household (%)	2.18	1.64	1.45	1.30
Only mother in household (%)	8.39	6.34	5.67	5.21
Foreign-born parent (%)	14.57	15.63	15.79	15.86
Father's years of schooling	7.88	8.19	8.36	8.51
Mother's years of schooling	8.28	8.57	8.74	8.88
Mother employed (%)	10.67	9.51	8.98	8.59
Father employed (%)	90.82	91.21	91.68	92.05
Average schooling. nearby fathers	7.74	7.97	8.05	8.09
Average schooling. nearby mothers	8.14	8.34	8.41	8.44
Average income. nearby fathers	1,079	1,140	1,156	1,168
Average employment rate. nearby mothers (%)	11.23	10.89	10.71	10.63
Fraction of neighbors living on farms (%)	28.84	26.15	26.08	26.01
Fraction fathers on emergency employment (%)	6.81	6.72	6.63	6.54
Average teacher age	35.06	35.24	35.25	35.25
Average teacher wage	1,221	1,270	1,280	1,286
Average teacher years of schooling	14.6	14.65	14.66	14.66
Fraction female teachers (%)	72.68	72.61	72.53	72.5
Observations	33 120 000	21 270 000	15 710 000	11 660 000[a]

Notes: Number of observations rounded in accordance with the Census Bureau rules for disclosure. a. For variables relating to parental educational attainment or employment, the sample sizes are slightly smaller because of missing values. In the subsample surviving to 2010, we observe father's years of schooling for 10 990 000 observations, mother's years of schooling for 11 470 000, mother's employment for 11 510 000, and father's employment for 11 060 000 observations.

Table 2: Effect of Education on Survival to 2010, Conditional on Survival to 2000

	Dependent variable: Survival to 2010[a]					
	without county FEs			**with county x female FEs**		
	Model:			**Model:**		
	person covs	**pers, parent, HH covs**	**pers, parent, HH, teacher, neigh. and county covs**	**person covs**	**pers, parent, HH covs**	**pers, parent, HH, teacher and neigh. covs**
	1	**2**	**3**	**4**	**5**	**6**
4 yrs. of schooling	−0.002	−0.003	−0.003	−0.002	−0.003	−0.003
	(0.006)	(0.006)	(0.006)	(0.007)	(0.006)	(0.006)
6 yrs. of schooling	0.028***	0.028***	0.028***	0.027***	0.028***	0.028***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
8 yrs. of schooling	0.063***	0.061***	0.061***	0.061***	0.060***	0.060***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
9 yrs. of schooling	0.072***	0.073***	0.073***	0.072***	0.073***	0.073***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
10 yrs. of schooling	0.086***	0.088***	0.088***	0.087***	0.088***	0.088***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
11 yrs. of schooling	0.087***	0.089***	0.089***	0.088***	0.089***	0.090***
	(0.005)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
12 yrs. of schooling	0.148***	0.149***	0.149***	0.148***	0.149***	0.149***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
13 yrs. of schooling	0.173***	0.176***	0.176***	0.175***	0.176***	0.176***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
14 yrs. of schooling	0.172***	0.175***	0.175***	0.174***	0.175***	0.176***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
16 yrs. of schooling	0.212***	0.215***	0.215***	0.214***	0.215***	0.215***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
17 yrs. of schooling	0.230***	0.231***	0.231***	0.231***	0.231***	0.231***
	(0.004)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Observations	2,665,000	2,665,000	2,665,000	2,665,000	2,665,000	2,665,000
Adjusted R-squared	0.060	0.061	0.061	0.061	0.062	0.062
Y-mean	0.7273	0.7273	0.7273	0.727	0.727	0.727

Notes: Sample is composed of US-born individuals who were under 16 and living with at least one parent in 1940, who were assigned a unique PIK, and who were administered the long form questionnaire in the 2000 Census (1/6 sample). Number of observations was rounded in accordance with Census Bureau disclosure rules. Not all the coefficients of control variables are shown. Standard errors clustered at the 1940 county level. * p<0.05 ** p<0.01 *** p<0.001.

Table 3: Effect of Education on Survival to 2000, Individuals Aged 15-18 in 1940

	Dependent variable: Survival to 2000[a]					
	without county FEs			**with county x female FEs**		
	Model:			**Model:**		
	person covs	**pers, parent HH covs**	**pers, parent, HH, teacher, neigh and county covs**	**person covs**	**pers, parent, HH covs**	**pers, parent, HH, teacher and neigh covs**
	1	**2**	**3**	**4**	**5**	**6**
1 year of schooling	0.035***	0.033***	0.033***	0.035***	0.034***	0.033***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
2 yrs. of schooling	0.008	0.006	0.006	0.008	0.008	0.007
	(0.006)	(0.006)	(0.005)	(0.006)	(0.006)	(0.005)
3 yrs. of schooling	0.002	0.001	0.001	0.003	0.003	0.002
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
4 yrs. of schooling	−0.004	−0.004	−0.003	−0.003	−0.002	−0.002
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
5 yrs. of schooling	−0.003	−0.001	0.000	−0.002	0.000	0.001
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
6 yrs. of schooling	0.011*	0.015***	0.016***	0.012**	0.015***	0.017***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
7 yrs. of schooling	0.033***	0.036***	0.037***	0.034***	0.036***	0.037***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
8 yrs. of schooling	0.070***	0.069***	0.070***	0.071***	0.068***	0.069***
	(0.005)	(0.004)	(0.004)	(0.005)	(0.004)	(0.004)
9 yrs. of schooling	0.100***	0.100***	0.100***	0.102***	0.100***	0.101***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
10 yrs. of schooling	0.122***	0.121***	0.120***	0.125***	0.121***	0.122***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
11 yrs. of schooling	0.147***	0.143***	0.143***	0.150***	0.144***	0.144***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
12+ yrs. of schooling	0.166***	0.160***	0.159***	0.169***	0.161***	0.161***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Observations	5,120,000	5,120,000	5,120,000	5,120,000	5,120,000	5,120,000
Adjusted R-squared	0.055	0.059	0.060	0.056	0.060	0.060
Y-mean	0.556	0.556	0.556	0.556	0.556	0.556

Notes: Sample is composed of US-born individuals aged 15-18, living with at least one parent in 1940, who were assigned a unique PIK. Number of observations was rounded in accordance with the Census Bureau rules for disclosure. Standard errors were clustered at the 1940 county level. * p<0.05 ** p<0.01 *** p<0.001.

Table 4: Effect of Education on Survival to 2010, conditional on Survival to 2000, by Select Characteristics

								Parental education:				
	Male	Female	American Indian	Asian	Black	White Hispanic	White Non-Hispanic	13–17 yrs. schooling	12 yrs. schooling	9–11 yrs. schooling	8 yrs. schooling	Less than 8 yrs.
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)
4 yrs. of schooling	−0.002	−0.004	0.109	−0.271	−0.022	−0.028	0.004	−0.005	0.053	0.049*	−0.027	−0.014
	(0.008)	(0.011)	(0.072)	(0.214)	(0.014)	(0.020)	(0.008)	(0.047)	(0.033)	(0.022)	(0.016)	(0.008)
6 yrs. of schooling	0.027***	0.031***	0.084	−0.168	0.014	0.033*	0.035***	0.013	0.072**	0.035*	0.016	0.024***
	(0.007)	(0.008)	(0.069)	(0.191)	(0.012)	(0.015)	(0.006)	(0.034)	(0.026)	(0.016)	(0.012)	(0.007)
8 yrs. of schooling	0.064***	0.059***	0.012	−0.323**	0.036***	0.027	0.078***	0.089**	0.093***	0.079***	0.072***	0.048***
	(0.006)	(0.007)	(0.062)	(0.112)	(0.010)	(0.015)	(0.005)	(0.028)	(0.018)	(0.013)	(0.010)	(0.006)
9 yrs. of schooling	0.074***	0.076***	0.050	−0.202	0.037***	0.029	0.093***	0.084**	0.104***	0.092***	0.086***	0.064***
	(0.006)	(0.007)	(0.065)	(0.140)	(0.011)	(0.016)	(0.005)	(0.026)	(0.020)	(0.012)	(0.010)	(0.006)
10 yrs. of schooling	0.091***	0.090***	0.058	−0.079	0.057***	0.057***	0.107***	0.114***	0.127***	0.116***	0.094***	0.080***
	(0.006)	(0.007)	(0.068)	(0.119)	(0.010)	(0.016)	(0.005)	(0.026)	(0.018)	(0.012)	(0.010)	(0.006)
11 yrs. of schooling	0.084***	0.097***	0.009	−0.075	0.064***	0.042*	0.108***	0.117***	0.135***	0.119***	0.094***	0.080***
	(0.006)	(0.007)	(0.066)	(0.118)	(0.011)	(0.017)	(0.005)	(0.025)	(0.018)	(0.012)	(0.010)	(0.006)
12 yrs. of schooling	0.143***	0.157***	0.112	−0.047	0.103***	0.090***	0.170***	0.186***	0.203***	0.182***	0.158***	0.129***
	(0.006)	(0.007)	(0.059)	(0.102)	(0.009)	(0.013)	(0.005)	(0.024)	(0.017)	(0.012)	(0.012)	(0.006)
13 yrs. of schooling	0.174***	0.181***	0.123	−0.038	0.129***	0.115***	0.197***	0.217***	0.225***	0.206***	0.187***	0.160***
	(0.006)	(0.007)	(0.065)	(0.107)	(0.010)	(0.016)	(0.005)	(0.024)	(0.017)	(0.012)	(0.010)	(0.006)
14 yrs. of schooling	0.175***	0.178***	0.188**	−0.033	0.144***	0.117***	0.195***	0.220***	0.228***	0.210***	0.182***	0.150***
	(0.006)	(0.007)	(0.059)	(0.101)	(0.010)	(0.014)	(0.005)	(0.024)	(0.017)	(0.012)	(0.009)	(0.006)
16 yrs. of schooling	0.226***	0.202***	0.168**	−0.015	0.182***	0.127***	0.235***	0.263***	0.263***	0.248***	0.222***	0.185***
	(0.006)	(0.007)	(0.064)	(0.103)	(0.010)	(0.016)	(0.005)	(0.024)	(0.017)	(0.012)	(0.010)	(0.006)
17 yrs. of schooling	0.248***	0.207***	0.166*	−0.026	0.200***	0.128***	0.252***	0.284***	0.283***	0.261***	0.231***	0.196***
	(0.006)	(0.007)	(0.081)	(0.101)	(0.010)	(0.016)	(0.005)	(0.024)	(0.018)	(0.012)	(0.010)	(0.007)
Observations	1,290,000	1,375,000	6,600	3,800	139,000	43,000	2,473,000	328,000	479,000	588,000	701,000	568,000
Adjusted R-squared	0.066	0.045	0.091	0.091	0.060	0.051	0.062	0.060	0.054	0.058	0.061	0.061
Y-mean	0.689	0.763	0.639	0.780	0.669	0.744	0.731	0.774	0.766	0.731	0.712	0.682

Notes: Sample is composed of US-born individuals under the age of 16 in 1940, living with at least one parent, who were assigned a unique PIK and linked to the 2000 Census or observed in Numident with a death record after 2000. Regressions include the full set of controls in the county-gender fixed effects specification. Number of observations was rounded in accordance with Census Bureau disclosure rules. Standard errors (in parentheses) are clustered at the 1940 county level. * p<0.05 ** p<0.01 *** p<0.001.

Table 5: Effect of Education on survival to 2010, Conditional on Surviving to 2000, Controlling for Measures of Income Observed in 2000 Census

	Dep. Var.: Survival to 2010				Dep. Var.:	Dep. Var.:
	Specification:				Log total income	Log SS income
	Non-missing income	Controlling for log total income	Non-missing social security income	Controlling for log SS income		
4 yrs. of schooling	-0.004	-0.003	-0.004	-0.003	0.123***	0.202***
	(0.007)	(0.007)	(0.007)	(0.007)	(0.036)	(0.055)
6 yrs. of schooling	0.028***	0.025***	0.028***	0.028***	0.256***	0.336***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.030)	(0.043)
8 yrs. of schooling	0.060***	0.054***	0.060***	0.060***	0.408***	0.494***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.026)	(0.038)
9 yrs. of schooling	D[a]	0.065***	D	0.073***	0.468***	0.567***
	D	(0.005)	D	(0.005)	(0.027)	(0.039)
10 yrs. of schooling	0.088***	0.079***	0.088***	0.088***	0.523***	0.639***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.027)	(0.038)
11 yrs. of schooling	D	0.080***	D	0.090***	0.569***	0.611***
	D	(0.005)	D	(0.005)	(0.028)	(0.038)
12 yrs. of schooling	0.149***	0.133***	0.149***	0.149***	0.792***	0.587***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.026)	(0.037)
13 yrs. of schooling	0.176***	0.154***	0.176***	0.176***	1.153***	0.551***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.027)	(0.040)
14 yrs. of schooling	0.176***	0.152***	0.176***	0.175***	1.168***	0.431***
	(0.004)	(0.004)	(0.004)	(0.004)	(0.026)	(0.038)
16 yrs. of schooling	0.215***	0.181***	0.215***	0.213***	1.481***	0.110**
	(0.004)	(0.004)	(0.004)	(0.004)	(0.026)	(0.041)
17 yrs. of schooling	0.231***	0.189***	0.231***	0.229***	1.892***	-0.251***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.028)	(0.047)
Log total income		0.032***				
		(0.000)				
Log SS income				0.007***		
				(0.001)		
Observations	2,664,000	2,664,000	2,664,000	2,664,000	2,664,000	2,664,000
Adjusted R-squared	0.062	0.066	0.062	0.062	0.132	0.385
Y-mean	0.727	0.727	0.727	0.727	9.348	5.988

Notes: a. D indicates coefficients that were not disclosed given small sample sizes in the respective cell. Sample is composed of US-born individuals aged 0–15 in 1940, with at least one parent present, who were assigned a unique PIK and observed in the 2000 Census or in the 2010 Census or in NUMIDENT with death date later than 2000. Model 6 from Table 1 is used in all regressions. We assign to individuals with zero or negative total income or social security income the `loginctot` value of zero and the `logssinc` value of zero, respectively. Thus, `loginctot` and `logssinc` will only contain missing values if total income or social security income information is missing, respectively. Standard errors were clustered at the 1940 county level. Number of observations was rounded in accordance with the Census Bureau rules for disclosure. ** $p<0.01$; *** $p<0.001$

Table 6: Effect of Education on Mediators of Mortality Observed in 2000 Census

	Dependent variable:							
	Homeowner status	Log of block group median household income	Log of block median housing value	Any mental or physical difficulties?	Physical difficulties?	Mental difficulties?	Work related difficulties?	Lives alone
Sample	10a	10b	10c	10d	10e	10f	10g	10h
4 yrs. of schooling	0.011	-0.000	-0.012	-0.029***	-0.036***	-0.041***	0.014*	0.014*
	(0.006)	(0.006)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
6 yrs. of schooling	0.043***	0.020***	0.017**	-0.068***	-0.069***	-0.110***	-0.045***	-0.012*
	(0.005)	(0.005)	(0.006)	(0.005)	(0.005)	(0.005)	(0.006)	(0.005)
8 yrs. of schooling	0.084***	0.064***	0.052***	-0.131***	-0.130***	-0.180***	-0.085***	-0.033***
	(0.004)	(0.004)	(0.006)	(0.005)	(0.005)	(0.005)	(0.005)	(0.004)
9 yrs. of schooling	0.094***	0.070***	0.067***	-0.156***	-0.153***	-0.208***	-0.104***	-0.036***
	(0.005)	(0.005)	(0.007)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
10 yrs. of schooling	0.105***	0.091***	0.085***	-0.185***	-0.182***	-0.224***	-0.112***	-0.047***
	(0.005)	(0.005)	(0.007)	(0.005)	(0.005)	(0.006)	(0.005)	(0.004)
11 yrs. of schooling	0.114***	0.096***	0.089***	-0.200***	-0.197***	-0.233***	-0.119***	-0.054***
	(0.005)	(0.005)	(0.007)	(0.005)	(0.005)	(0.006)	(0.005)	(0.005)
12 yrs. of schooling	0.164***	0.164***	0.167***	-0.288***	-0.281***	-0.255***	-0.152***	-0.081***
	(0.005)	(0.004)	(0.006)	(0.005)	(0.005)	(0.005)	(0.005)	(0.004)
13 yrs. of schooling	0.175***	0.210***	0.232***	-0.300***	-0.291***	-0.262***	-0.159***	-0.059***
	(0.005)	(0.005)	(0.007)	(0.005)	(0.005)	(0.006)	(0.005)	(0.004)
14 yrs. of schooling	0.172***	0.245***	0.295***	-0.316***	-0.305***	-0.263***	-0.162***	-0.064***
	(0.005)	(0.004)	(0.007)	(0.005)	(0.005)	(0.005)	(0.005)	(0.004)
16 yrs. of schooling	0.193***	0.355***	0.455***	-0.394***	-0.377***	-0.274***	-0.197***	-0.081***
	(0.005)	(0.005)	(0.007)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
17+ yrs. of schooling	0.194***	0.369***	0.492***	-0.405***	-0.385***	-0.276***	-0.203***	-0.053***
	(0.005)	(0.005)	(0.007)	(0.005)	(0.005)	(0.005)	(0.005)	(0.004)
Observations	2,637,000	2,541,000	2,538,000	2,665,000	2,665,000	2,665,000	2,664,000	2,637,000
Adjusted R-squared	0.033	0.221	0.296	0.062	0.060	0.035	0.020	0.039
Y-mean	0.874	10.680	11.610	0.322	0.277	0.055	0.139	0.233

Notes: Sample is composed of US-born individuals aged 0-15 in 1940, with at least one parent present, who are assigned a unique PIK and observed in the 2000 Census or in the 2010 Census or in NUMIDENT with death date later than 2000. Model 6 from Table 1 is used in all regressions. Standard errors were clustered at the 1940 county level. Number of observations was rounded in accordance with the Census Bureau rules for disclosure. ** p<0.01; *** p<0.001

Table 7: Effect of Education on Survival to 2010, Conditional on Survival to 2000, Controlling for Mediators Observed in the 2000 Census

	Dependent variable: Survival to 2010		
Log total income	0.019***		
	(0.000)		
Log household income		0.014***	
		(0.000)	
Log social security income			0.005***
			(0.001)
Homeowner	0.059***	0.059***	0.062***
	(0.001)	(0.001)	(0.001)
Log of median hh. inc. at block group lvl	0.016***	0.016***	0.020***
	(0.001)	(0.001)	(0.001)
Log of median house values at block group lvl	0.013***	0.013***	0.015***
	(0.001)	(0.001)	(0.001)
Lives alone	-0.041***	-0.025***	-0.035***
	(0.001)	(0.001)	(0.001)
Any difficulty	0.024***	0.025***	0.025***
	(0.002)	(0.002)	(0.002)
Physical difficulty	-0.152***	-0.155***	-0.156***
	(0.002)	(0.002)	(0.002)
Difficulty in Ability to Perform Mental Tasks	-0.124***	-0.126***	-0.127***
	(0.002)	(0.002)	(0.002)
Difficulty in Ability to Work At a Job or Business	-0.055***	-0.056***	-0.055***
	(0.001)	(0.001)	(0.001)
4 yrs. of schooling	-0.010	-0.010	-0.010
	(0.007)	(0.007)	(0.007)
6 yrs. of schooling	-0.002	-0.001	-0.001
	(0.006)	(0.006)	(0.006)
8 yrs. of schooling	0.006	0.008	0.008
	(0.005)	(0.005)	(0.005)
9 yrs. of schooling	0.007	0.009	0.010*
	(0.005)	(0.005)	(0.005)
10 yrs. of schooling	0.013***	0.015***	0.016***
	(0.005)	(0.005)	(0.005)
11 yrs. of schooling	0.010*	0.012**	0.014**
	(0.005)	(0.005)	(0.005)
12 yrs. of schooling	0.043***	0.047***	0.050***
	(0.005)	(0.005)	(0.005)
13 yrs. of schooling	0.061***	0.067***	0.071***
	(0.005)	(0.005)	(0.005)
14 yrs. of schooling	0.057***	0.062***	0.067***
	(0.005)	(0.005)	(0.005)
16 yrs. of schooling	0.073***	0.080***	0.088***
	(0.005)	(0.005)	(0.005)
17 yrs. of schooling	0.083***	0.094***	0.103***
	(0.005)	(0.005)	(0.005)
Observations	2,537,000	2,537,000	2,537,000
Adjusted R-squared	0.101	0.100	0.099
Y-mean	0.734	0.734	0.734

Notes: Model 6 from Table 1 is used in all regressions. Standard errors clustered at the 1940 county level. Number of observations was rounded in accordance with the Census Bureau rules for disclosure. ** p<0.01; *** p<0.001 . We assign to individuals with zero or negative total income or social security income the `loginctot` value of zero and the `logssinc` value of zero, respectively.

Table 8: Decomposition of Survival Increases by Education

	Survival Diff	Income	Neigh + Home	Difficulties	Alone	All Mediators
8 to 11	0.030	0.003	0.003	0.017	0.001	0.024
		10.2%	9.2%	56.6%	2.9%	78.8%
11 to 12	0.059	0.004	0.005	0.015	0.001	0.026
		7.2%	8.6%	25.8%	1.9%	43.4%
12 to 14	0.027	0.007	0.003	0.005	-0.001	0.014
		26.5%	12.7%	16.7%	-2.6%	53.3%
14 to 16	0.039	0.006	0.005	0.012	0.001	0.024
		15.2%	13.0%	31.7%	1.8%	61.8%
16 to 17	0.016	0.008	0.001	0.002	-0.001	0.009
		48.8%	4.8%	9.6%	-7.2%	56.0%
8 to 17	0.171	0.028	0.017	0.051	0.001	0.097
		16.5%	10.0%	29.6%	0.5%	56.5%

Notes: The first column shows the increase in 10-year survival rates from Table, Column 6. Other columns show the percentage of change explained by each mediator. For example, the 0.003 increase in survival from income for 8 years to 11 years comes from 0.003 = 0.019 * (0.569 - 0.408). 0.019 is the impact of log total income on survival (Table 7, Column 1) and 0.569 and 0.408 are the fixed-effects on 11 years and 8 years of schooling, respectively, in the regression on log total income (Table 5, Column 5). In other words, moving from 8 to 11 years of schooling increasing log total income by 0.161, and each point of log total income increases survival by 0.019. "Income" is log total income. "Neigh + Home" contains log of median household income at the census block group level, log of median housing value at the census block group level, and whether the individual is a homeowner or not. "Difficulties" contains Any difficulty, Physical difficulty, Difficulty in Ability to Perform Mental Tasks, Difficulty in Ability to Work At a Job or Business. "Alone" is whether the individual lives alone or not.

Appendix A. Additional tables and figures

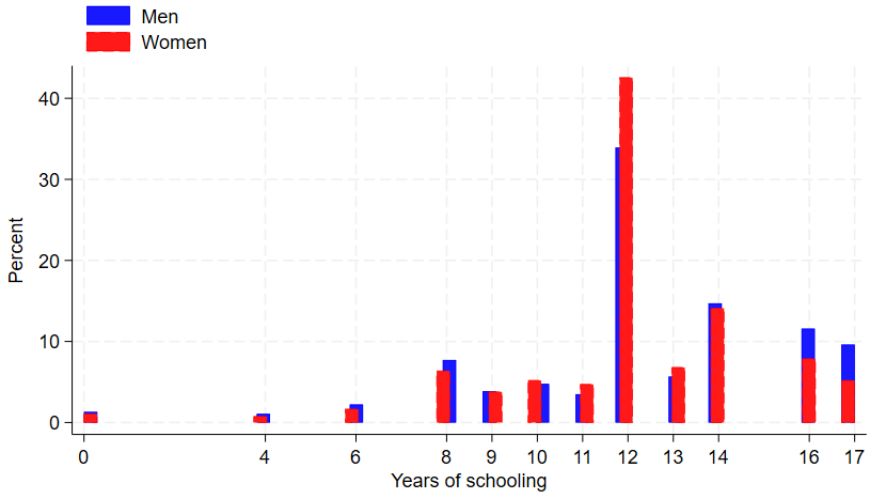

Figure A1: Educational Attainment in 2000 by Gender, Birth Cohorts 1922-1940

Source: IPUMS USA 2000 5% sample, U.S.-born individuals.

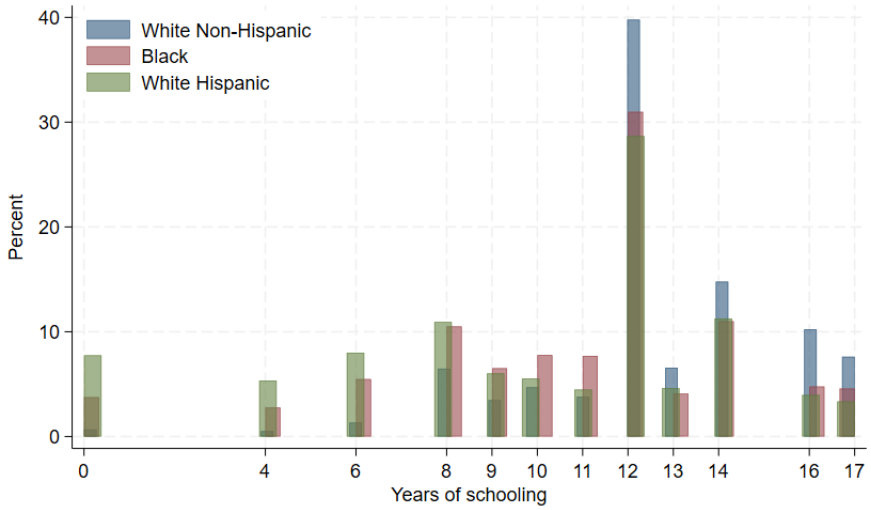

Figure A2: Educational Attainment in 2000 by Race/Ethnicity, Birth Cohorts 1922-1940

Source: IPUMS USA 2000 5% sample, U.S.-born individuals.

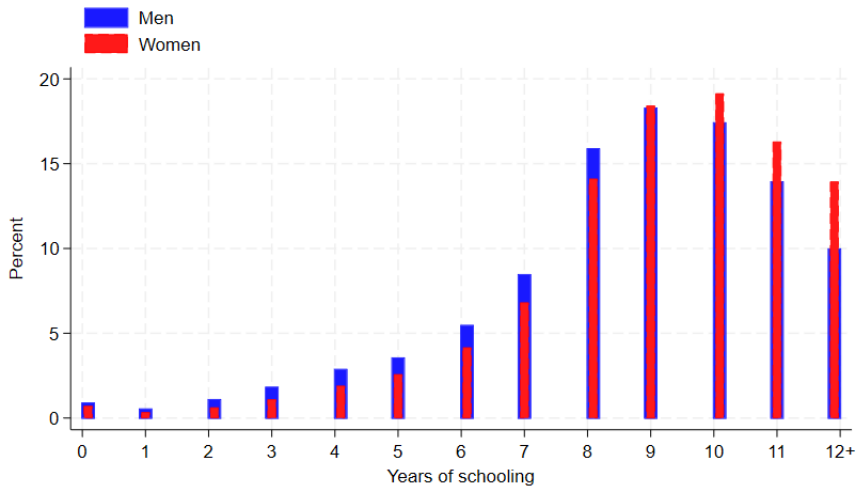

Figure A3: Educational Attainment in 1940 by Gender, Individuals Aged 15-18

Source: IPUMS USA 1940 100% sample, U.S.-born individuals.

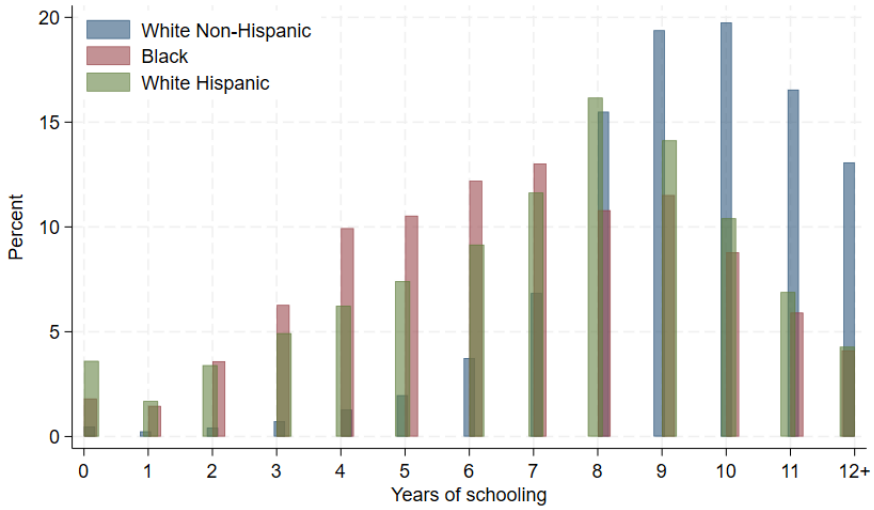

Figure A4: Educational Attainment in 1940 by Race/Ethnicity, Individuals Aged 15-18

Source: IPUMS USA 1940 100% sample, U.S.-born individuals.

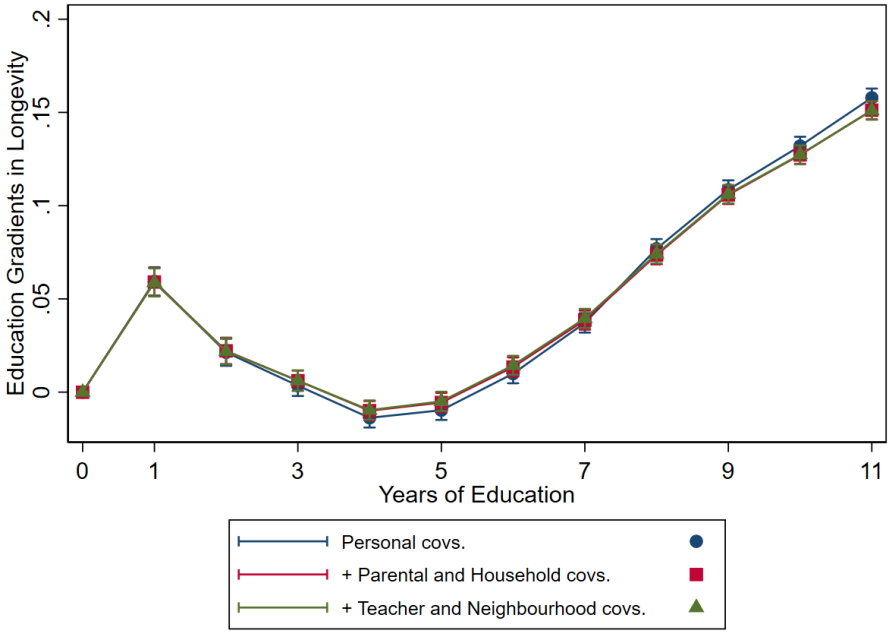

Figure A5: Education Gradients in Longevity (Survival to 2000), White individuals
Notes: Estimates from Table A6

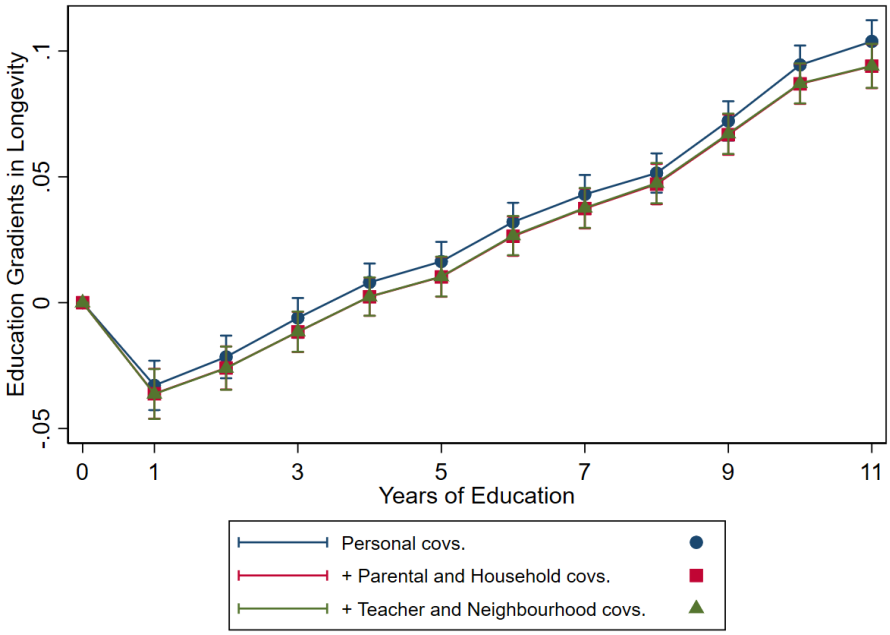

Figure A6: Education Gradients in Longevity (Survival to 2000), Black individuals
Notes: Estimates from Table A7

Table A1: County-Level Variables, with Sources

County-level variable	Source
Average occupational score, men aged 35–54 Average occupational score, women aged 35–54 Average number of children, women aged 21–30 Indicator, city with population 25,000+ in county Doctor/population ratio for Whites	1940 IPUMS, 100 percent sample
Minimal distance to a normal school	Author's calculations, using locations listed in The Factors Operating in the Location of State Normal Schools by Harry C. Humphreys (Columbia University, 1923)
Minimal distance to a 4-year college	Author's calculations, using data for institutions founded before 1940, College Scorecard, US Department of Education
Fraction of White births delivered in hospital Infant mortality for Whites, 1941	Data provided by Michael Haines
Population density (persons per square mile), 1940 % of rural farm dwelling units with electric lighting, 1940 % of rural farm dwelling units with running water, 1940 % of workers employed in agriculture, 1940 % of dwelling units with private bathtub or shower, 1940 Sum of major war supply contracts and projects ($)	County and City Data Book[a]

[a]US Bureau of the Census, County and City Data Book, Consolidated File: County Data, 1947–1977. Distributed by Inter-University Consortium for Political and Social Research, 2012-09-18. https://doi.org/10.3886/ICPSR07736.v2

Table A2: Effect of Education on Survival to 2010, Conditional on Survival to 2000, Models with Household Fixed Effects

	Dependent variable: merged2010ordiedafter					
	Without county FEs			With county by female FEs		
	Person Covs	**Pers, Parent and HH covs**	**Pers, Parent, HH, teacher, neigh and county covs**	**Person Covs**	**Pers, Parent and HH covs**	**Pers, Parent, HH, teacher and neigh covs**
	(1)	(2)	(3)	(4)	(5)	(6)
4 yrs. of schooling	0.011	0.010	0.011	0.008	0.007	0.008
	(0.019)	(0.019)	(0.019)	(0.019)	(0.019)	(0.019)
6 yrs. of schooling	0.047**	0.047**	0.047**	0.046**	0.046**	0.046**
	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)	(0.015)
8 yrs. of schooling	0.074***	0.073***	0.074***	0.073***	0.073***	0.074***
	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)
9 yrs. of schooling	0.081***	0.081***	0.081***	0.080***	0.080***	0.081***
	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)
10 yrs. of schooling	0.091***	0.090***	0.090***	0.089***	0.089***	0.089***
	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)
11 yrs. of schooling	0.094***	0.093***	0.093***	0.092***	0.092***	0.092***
	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)
12 yrs. of schooling	0.134***	0.133***	0.133***	0.133***	0.133***	0.133***
	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)
13 yrs. of schooling	0.161***	0.161***	0.161***	0.161***	0.161***	0.161***
	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)
14 yrs. of schooling	0.152***	0.152***	0.152***	0.151***	0.152***	0.152***
	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)
16 yrs. of schooling	0.184***	0.184***	0.184***	0.184***	0.184***	0.184***
	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)
17 yrs. of schooling	0.190***	0.189***	0.189***	0.188***	0.187***	0.187***
	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)	(0.013)
Am. Indian x Female	0.007	0.006	0.008	0.029	0.028	0.026
	(0.037)	(0.037)	(0.037)	(0.038)	(0.038)	(0.038)
Am. Indian	-0.285	-0.285	-0.286	-0.294	-0.299	-0.294
	(0.175)	(0.178)	(0.177)	(0.193)	(0.193)	(0.193)
Asian x Female	0.008	0.009	0.013	0.014	0.016	0.010
	(0.049)	(0.048)	(0.049)	(0.047)	(0.047)	(0.047)
Asian	0.155	0.159	0.165	0.104	0.111	0.117
	(0.374)	(0.376)	(0.381)	(0.340)	(0.346)	(0.347)
Black x Female	0.023*	0.019	0.009	0.016	0.014	0.008
	(0.009)	(0.010)	(0.011)	(0.011)	(0.011)	(0.012)
Black	-0.285*	-0.279*	-0.132	-0.285*	-0.281*	-0.122
	(0.114)	(0.115)	(0.129)	(0.114)	(0.116)	(0.129)

Continued on next page

	Dependent variable: Survival to 2010					
	Without county FEs			With county by female FEs		
	Person Covs	**Pers, Parent and HH covs**	**Pers, Parent, HH, teacher, neigh and county covs**	**Person Covs**	**Pers, Parent and HH covs**	**Pers, Parent, HH, teacher and neigh covs**
	(1)	(2)	(3)	(4)	(5)	(6)
Hispanic x Female	0.020	0.018	0.015	0.024	0.024	0.021
	(0.016)	(0.016)	(0.016)	(0.017)	(0.017)	(0.017)
Hispanic	0.009	-0.008	-0.033	0.024	0.003	-0.018
	(0.132)	(0.133)	(0.127)	(0.138)	(0.139)	(0.135)
Female	0.045***	0.135	0.183*			
	(0.008)	(0.071)	(0.092)			
Only mother present				-0.038	-0.038	-0.038
				(0.057)	(0.057)	(0.057)
Only mother present x Female				-0.023	-0.023	-0.023
				(0.016)	(0.016)	(0.016)
Only father present				-0.044	-0.044	-0.044
				(0.039)	(0.039)	(0.039)
Only father present x Female				-0.000	-0.000	-0.000
				(0.021)	(0.021)	(0.021)
Foreign-born parent				-0.002	-0.002	-0.002
				(0.025)	(0.025)	(0.025)
Foreign-born parent x Female				-0.009	-0.009	-0.009
				(0.006)	(0.006)	(0.006)
Observations	2 603 000	2 603 000	2 603 000	2 603 000	2 603 000	2 603 000
Adjusted R-squared	0.920	0.920	0.920	0.921	0.921	0.921
Y-mean	0.727	0.727	0.727	0.727	0.727	0.727

Notes: All models include household fixed effects. Sample is composed of US-born individuals who were under 16 and living with at least one parent *and a sibling* in 1940, who were assigned a unique PIK, and who were administered the long form questionnaire in the 2000 Census (1/6 sample). Number of observations was rounded in accordance with Census Bureau disclosure rules. Not all the coefficients of control variables are shown. Standard errors clustered at the 1940 county level. * p<0.05 ** p<0.01 *** p<0.001.

Table A3: Effect of Education on Survival to 2010, Conditional on Survival to 2000, Additional Covariates (Table 2, specification 6)

Variable	Coefficient (SE)	Variable	Coefficient (SE)
4 yrs. of schooling	-0.003	Only mother present	-0.006
	(0.006)		(0.003)
6 yrs. of schooling	0.028***	Only mother present × Female	0.001
	(0.005)		(0.005)
8 yrs. of schooling	0.060***	Only father present	-0.007
	(0.004)		(0.004)
9 yrs. of schooling	0.073***	Only father present × Female	-0.004
	(0.005)		(0.005)
10 yrs. of schooling	0.088***	Foreign-born parent	0.026***
	(0.004)		(0.002)
11 yrs. of schooling	0.090***	Foreign-born parent × Female	-0.003
	(0.004)		(0.002)
12 yrs. of schooling	0.149***	Living on farm	0.011***
	(0.004)		(0.002)
13 yrs. of schooling	0.176***	Living on farm × Female	-0.000
	(0.004)		(0.003)
14 yrs. of schooling	0.176***	Metro area	-0.001
	(0.004)		(0.003)
16 yrs. of schooling	0.215***	Metro area × Female	0.003
	(0.004)		(0.005)
17 yrs. of schooling	0.231***		
	(0.005)		
Am. Indian	-0.083***		
	(0.013)		
Am. Indian × Female	0.003		
	(0.016)		
Asian	0.023*		
	(0.011)		
Asian × Female	0.020		
	(0.017)		
Black	-0.036***		
	(0.003)		
Black × Female	0.002	Observations	2665000
	(0.003)		
	(0.004)		
Hispanic × Female	0.005	Y-mean	0.727
	(0.005)		

Notes: This table shows additional coefficients for the specification shown in Table 2, column 6. Sample is composed of US-born individuals who were under 16 and living with at least one parent in 1940, who were assigned a unique PIK, and who were administered the long form questionnaire in the 2000 Census (1/6 sample). Number of observations was rounded in accordance with Census Bureau disclosure rules. Not all the coefficients of control variables are shown. Standard errors clustered at the 1940 county level. * $p<0.05$ ** $p<0.01$ *** $p<0.001$.

Table A4: Effect of education on survival to 2010, conditional on survival to 2000, by place of residence in 1940 (part I)

	Dep. Var.: Survival to 2010, conditional on survival to 2000								
	Model: with county by gender fixed effects								
	Terciles of 1940 house values at enumeration district level			Terciles of fathers' income (1940) at neighborhood level			Terciles of parents' years of educ. (1940) at neighborhood level		
	1	2	3	1	2	3	1	2	3
Sample	8a	8b	8c	8d	8e	8f	8h	8i	8j
4 yrs. of schooling	−0.020*	0.006	0.023	−0.012	−0.006	0.032	−0.017*	0.011	0.027
	(0.010)	(0.011)	(0.015)	(0.009)	(0.011)	(0.018)	(0.008)	(0.013)	(0.018)
6 yrs. of schooling	0.026**	0.025**	0.033**	0.028***	0.021*	0.041***	0.021**	0.038***	0.032*
	(0.008)	(0.009)	(0.011)	(0.007)	(0.009)	(0.012)	(0.007)	(0.010)	(0.013)
8 yrs. of schooling	0.055***	0.063***	0.063***	0.065***	0.052***	0.059***	0.050***	0.077***	0.059***
	(0.007)	(0.008)	(0.009)	(0.006)	(0.008)	(0.010)	(0.006)	(0.008)	(0.011)
9 yrs. of schooling	0.066***	0.076***	0.081***	0.075***	0.074***	0.072***	0.063***	0.089***	0.081***
	(0.007)	(0.008)	(0.010)	(0.007)	(0.008)	(0.011)	(0.006)	(0.009)	(0.011)
10 yrs. of schooling	0.080***	0.091***	0.096***	0.089***	0.087***	0.095***	0.078***	0.105***	0.097***
	(0.007)	(0.007)	(0.009)	(0.007)	(0.008)	(0.010)	(0.006)	(0.008)	(0.011)
11 yrs. of schooling	0.078***	0.097***	0.099***	0.089***	0.084***	0.108***	0.080***	0.104***	0.103***
	(0.007)	(0.008)	(0.009)	(0.007)	(0.008)	(0.010)	(0.006)	(0.008)	(0.011)
12 yrs. of schooling	0.138***	0.153***	0.161***	0.145***	0.146***	0.166***	0.134***	0.167***	0.167***
	(0.006)	(0.007)	(0.009)	(0.006)	(0.007)	(0.010)	(0.006)	(0.008)	(0.010)
13 yrs. of schooling	0.164***	0.182***	0.188***	0.170***	0.175***	0.194***	0.160***	0.194***	0.196***
	(0.007)	(0.007)	(0.009)	(0.006)	(0.008)	(0.010)	(0.006)	(0.008)	(0.010)
14 yrs. of schooling	0.164***	0.179***	0.189***	0.170***	0.171***	0.196***	0.158***	0.192***	0.197***
	(0.007)	(0.007)	(0.009)	(0.006)	(0.008)	(0.010)	(0.006)	(0.008)	(0.010)
16 yrs. of schooling	0.197***	0.217***	0.231***	0.201***	0.212***	0.237***	0.191***	0.232***	0.238***
	(0.007)	(0.007)	(0.009)	(0.006)	(0.008)	(0.010)	(0.006)	(0.008)	(0.010)
17 yrs. of schooling	0.212***	0.232***	0.250***	0.213***	0.226***	0.257***	0.207***	0.243***	0.258***
	(0.007)	(0.007)	(0.009)	(0.007)	(0.008)	(0.010)	(0.007)	(0.008)	(0.011)
Observations	878,000	877,000	876,000	888,000	888,000	888,000	888,000	888,000	888,000
Adjusted R-squared	0.064	0.064	0.062	0.064	0.063	0.062	0.062	0.063	0.063
Y-mean	0.721	0.724	0.735	0.721	0.722	0.738	0.717	0.725	0.740

Notes: Sample is composed of US-born individuals aged 0–15 in 1940, with at least one parent present, who were assigned a unique PIK and observed in the 2000 Census, or in the 2010 Census, or in NUMIDENT with a death date later than 2000. Model 6 from Table 1 is used in all regressions. Standard errors (in parentheses) are clustered at the 1940 county level. Number of observations was rounded in accordance with the Census Bureau rules for disclosure.*Significance levels*: * p<0.05; ** p<0.01; *** p<0.001.

Table A5: Effect of Education on Survival to 2010, Conditional on Survival to 2000, by Place of Residence in 1940 (part II)

	Own farm status (1940)		Rural/urban (1940)		Terciles of farm status (1940 NBHD)			Region of Birth	
	non-farm	farm	rural	urban	1	2	3	South	North
Sample	8k	8l	8m	8n	8o	8p	8q	8r	8s
4 yrs. of schooling	0.002	−0.008	−0.005	0.005	0.005	−0.022	0.002	−0.007	−0.006
	(0.009)	(0.009)	(0.007)	(0.013)	(0.011)	(0.013)	(0.010)	(0.008)	(0.012)
6 yrs. of schooling	0.021**	0.032***	0.029***	0.022*	0.026***	0.014	0.036***	0.027***	0.019*
	(0.007)	(0.008)	(0.006)	(0.009)	(0.008)	(0.011)	(0.009)	(0.006)	(0.008)
8 yrs. of schooling	0.044***	0.072***	0.067***	0.035***	0.043***	0.054***	0.074***	0.050***	0.073***
	(0.006)	(0.006)	(0.005)	(0.007)	(0.006)	(0.009)	(0.007)	(0.006)	(0.007)
9 yrs. of schooling	0.072***	0.072***	0.073***	0.071***	0.074***	0.054***	0.082***	0.060***	0.088***
	(0.006)	(0.007)	(0.006)	(0.008)	(0.007)	(0.010)	(0.008)	(0.006)	(0.007)
10 yrs. of schooling	0.089***	0.086***	0.087***	0.090***	0.093***	0.074***	0.092***	0.079***	0.101***
	(0.006)	(0.007)	(0.005)	(0.007)	(0.006)	(0.010)	(0.008)	(0.006)	(0.006)
11 yrs. of schooling	0.093***	0.083***	0.088***	0.092***	0.096***	0.070***	0.092***	0.083***	0.101***
	(0.006)	(0.007)	(0.006)	(0.007)	(0.006)	(0.010)	(0.008)	(0.006)	(0.007)
12 yrs. of schooling	0.153***	0.140***	0.144***	0.154***	0.157***	0.128***	0.150***	0.132***	0.165***
	(0.006)	(0.006)	(0.005)	(0.007)	(0.006)	(0.009)	(0.007)	(0.005)	(0.006)
13 yrs. of schooling	0.181***	0.164***	0.170***	0.183***	0.185***	0.154***	0.175***	0.162***	0.192***
	(0.006)	(0.007)	(0.005)	(0.007)	(0.007)	(0.010)	(0.007)	(0.006)	(0.007)
14 yrs. of schooling	0.182***	0.157***	0.168***	0.183***	0.186***	0.153***	0.170***	0.158***	0.192***
	(0.006)	(0.006)	(0.005)	(0.007)	(0.006)	(0.009)	(0.007)	(0.006)	(0.006)
16 yrs. of schooling	0.221***	0.193***	0.205***	0.223***	0.226***	0.189***	0.205***	0.199***	0.230***
	(0.006)	(0.007)	(0.005)	(0.007)	(0.006)	(0.009)	(0.007)	(0.006)	(0.006)
17 yrs. of schooling	0.239***	0.205***	0.217***	0.242***	0.244***	0.205***	0.214***	0.215***	0.247***
	(0.006)	(0.007)	(0.005)	(0.007)	(0.010)	(0.008)	(0.006)	(0.006)	(0.007)
Observations	1,876,000	789,000	1,461,000	1,204,000	1,514,000	399,000	752,000	757,000	1,908,000
Adjusted R-squared	0.062	0.067	0.065	0.061	0.061	0.071	0.065	0.067	0.059
Y-mean	0.728	0.726	0.727	0.728	0.728	0.721	0.729	0.705	0.737

Notes: Sample is composed of US-born individuals aged 0–15 in 1940, with at least one parent present, who were assigned a unique PIK and observed in the 2000 Census, or in the 2010 Census, or in NUMIDENT with a death date later than 2000. Model 6 from Table 1 is used in all regressions. Standard errors (in parentheses) are clustered at the 1940 county level. Number of observations was rounded in accordance with the Census Bureau rules for disclosure. *Significance levels*: * p<0.05; ** p<0.01; *** p<0.001.

Table A6: Effect of Education on Survival to 2000, Whites Aged 15-18 in 1940

	Dependent variable: Merged2000ordiedafter					
	without county FEs			with county x female FEs		
	Model:			Model:		
	person covs	pers, parent HH covs	pers, parent, HH, teacher, neigh and county covs	person covs	pers, parent, HH covs	pers, parent, HH, teacher and neigh covs
	1	2	3	4	5	6
1 year of schooling	0.058***	0.059***	0.058***	0.059***	0.059***	0.059***
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
2 yrs. of schooling	0.020**	0.021**	0.022**	0.021**	0.022**	0.022**
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
3 yrs. of schooling	0.002	0.005	0.006	0.003	0.006	0.006
	(0.006)	(0.005)	(0.005)	(0.006)	(0.005)	(0.005)
4 yrs. of schooling	−0.016**	−0.012*	−0.010*	−0.014**	−0.010	−0.010
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
5 yrs. of schooling	−0.011*	−0.007	−0.006	−0.010	−0.006	−0.005
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
6 yrs. of schooling	0.009	0.013**	0.014**	0.010	0.013**	0.014**
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
7 yrs. of schooling	0.037***	0.039***	0.039***	0.037***	0.039***	0.040***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
8 yrs. of schooling	0.078***	0.075***	0.075***	0.077***	0.074***	0.074***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
9 yrs. of schooling	0.108***	0.106***	0.106***	0.109***	0.106***	0.106***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
10 yrs. of schooling	0.131***	0.127***	0.127***	0.132***	0.127***	0.127***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
11 yrs. of schooling	0.156***	0.151***	0.150***	0.158***	0.151***	0.151***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
12+ yrs. of schooling	0.176***	0.169***	0.167***	0.178***	0.169***	0.168***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Observations	4,767,000	4,767,000	4,767,000	4,767,000	4,767,000	4,767,000
Adjusted R-squared	0.049	0.053	0.053	0.050	0.054	0.054
Y-mean	0.567	0.567	0.567	0.567	0.567	0.567

Notes: Sample is composed of US-born White individuals aged 15-18, living with at least one parent in 1940, who were assigned a unique PIK. See Table 1 for details on the sets of covariates across specifications. Standard errors were clustered at the 1940 county level. Number of observations was rounded in accordance with the Census Bureau rules for disclosure. ** p<0.01; *** p<0.001.

Table A7: Effect of Education on Survival to 2000, Black individuals Aged 15-18 in 1940

	Dependent variable: Merged2000ordiedafter					
	without county FEs			**with county x female FEs**		
	Model:			**Model:**		
	person covs	**pers, parent HH covs**	**pers, parent, HH, teacher, neigh and county covs**	**person covs**	**pers, parent, HH covs**	**pers, parent, HH, teacher and neigh covs**
	1	**2**	**3**	**4**	**5**	**6**
1 year of schooling	−0.031**	−0.036***	−0.036***	−0.033***	−0.036***	−0.036***
	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)	(0.010)
2 yrs. of schooling	−0.021*	−0.027**	−0.027**	−0.022*	−0.026**	−0.026**
	(0.008)	(0.008)	(0.008)	(0.008)	(0.009)	(0.009)
3 yrs. of schooling	−0.006	−0.013	−0.012	−0.006	−0.012	−0.012
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
4 yrs. of schooling	0.007	0.001	0.001	0.008	0.002	0.002
	(0.007)	(0.007)	(0.007)	(0.007)	(0.008)	(0.008)
5 yrs. of schooling	0.014	0.009	0.009	0.016*	0.010	0.010
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
6 yrs. of schooling	0.027***	0.025**	0.025**	0.032***	0.026***	0.027***
	(0.007)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
7 yrs. of schooling	0.036***	0.035***	0.036***	0.043***	0.037***	0.038***
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
8 yrs. of schooling	0.040***	0.046***	0.047***	0.052***	0.047***	0.047***
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
9 yrs. of schooling	0.059***	0.065***	0.066***	0.072***	0.067***	0.067***
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
10 yrs. of schooling	0.078***	0.084***	0.085***	0.094***	0.087***	0.087***
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
11 yrs. of schooling	0.087***	0.092***	0.092***	0.104***	0.094***	0.094***
	(0.008)	(0.009)	(0.009)	(0.008)	(0.009)	(0.009)
12+ yrs. of schooling	0.100***	0.101***	0.101***	0.117***	0.102***	0.102***
	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)	(0.008)
Observations	335,000	335,000	335,000	335,000	335,000	335,000
Adjusted R-squared	0.039	0.044	0.044	0.042	0.045	0.045
Y-mean	0.397	0.397	0.397	0.397	0.397	0.397

Sample is composed of US-born Black individuals aged 15-18, living with at least one parent in 1940, who were assigned a unique PIK. See Table 1 for details on the sets of covariates across specifications. Standard errors were clustered at the 1940 county level. Number of observations was rounded in accordance with the Census Bureau rules for disclosure.** p<0.01; *** p<0.001.