

Article

Health returns to education by family socioeconomic origins, 1980–2008: Testing the importance of gender, cohort, and age



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ARTICLE INFO

Article history:

Received 29 March 2016

Received in revised form

23 July 2016

Accepted 8 August 2016

Keywords:

Self-rated health

Mortality

Education

Gender

Cohort

Age

ABSTRACT

Recent studies find that health returns to education are elevated among those who come from disadvantaged families. These findings suggest that education may be a health resource that compensates or “substitutes” for lower parental socioeconomic status. Alternatively, some studies find support for a cumulative (dis)advantage perspective, such that educational health returns are higher among those who already were advantaged, widening initial health (dis)advantages across the life course. However, it remains unclear whether these findings are dependent on gender or cohort, and this is a fundamental oversight given marked differences between men and women in educational and health inequalities across the twentieth century. Drawing on national US data (1980–2002 General Social Survey with 2008 National Death Index Link), I indeed find that the presence or strength of resource substitution or cumulative (dis)advantage depends upon health measure as well as gender and cohort. For self-rated health, cumulative (dis)advantage explains educational health disparities, but among men only. Cumulative (dis)advantage in avoiding fair or poor health is partly explained by cohort and age variation in health returns to education, and cumulative (dis)advantage in excellent health is more robust in earlier cohorts and at older ages. For mortality, resource substitution is instead supported, but for women only. Among those from disadvantaged families, educational mortality buffering increases with cohort but diminishes with age. Taken together, these findings confirm prior research showing that adult health inequalities linked to education depend on family background, and extend this work by demonstrating that the nature and extent of these dynamics differ considerably depending on the health outcome being assessed and on an individual's historical context, life course stage, and gender.

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1. Introduction and background

Individuals who obtain higher education show greater adult physical health than those who do not (Conti & Heckman, 2010; Schafer, Wilkinson, & Ferraro, 2013). However, recent studies have also shown that associations between education and health vary substantially by family or parental socioeconomic origins. Taken as a whole, these studies are inconclusive. Do parental socioeconomic status (SES) and attained education show a resource substitution pattern, where advantaged familial SES makes education less predictive of adult health and eventual mortality (e.g., Bauldry, 2015; Ross & Mirowsky, 2011; Schaan, 2014; Schafer et al., 2013)? Or, do family origins and educational attainment instead reveal cumulative (dis)advantage, where early SES widens or strengthens educational health inequalities (e.g., Bauldry, 2014; Conti & Heckman, 2010; Schaan, 2014)?

While these studies differ somewhat in terms of their health

measures and population samples, they all overlook a more fundamental backdrop: the changing nature of educational and health inequalities across the twentieth century. In the United States, high school and college education changed greatly in curricular content and economic value during this time, and postsecondary education became more common in later decades (Hout, 2012). Meanwhile, patterns of health, disease and longevity became more unequal by educational attainment (Lynch 2003; Masters, Hummer, & Powers, 2012). Finally, the gender gap in obtaining a college education closed by the 1980s, and across the twentieth century men and women have shown distinct resources for and returns to educational attainment (DiPrete & Buchmann, 2013; Hout 2012; Masters et al., 2012). Despite these fundamental historical shifts, it remains unclear whether the presence or strength of resource substitution or cumulative (dis)advantage depends upon gender or cohort. Here, I draw on national US data to analyze these further contingencies in health returns to education.

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1.1. Family socioeconomic origins and health returns to education

Family or parental SES during one's childhood defines a life-style niche with lasting consequences for one's health across the remaining life course (Haas, 2008; Johnson & Schoeni, 2011). For instance, SES defines a young and vulnerable person's exposure and access to food, safety, parental and peer role modeling of health behaviors, and emotional, social and cognitive resources and stimulation, all of which may carry durable health consequences (Dannefer 2003; Hayward & Gorman, 2004; Hertzman & Boyce, 2010). At the same time, however, the ultimate health outcomes of childhood SES may pivot fundamentally on later life transitions involving education (Schafer et al., 2013).

Existing work generally supports the perspective that health disadvantages linked to childhood SES may be reversed or "leveled" by attaining higher education, which is consistent with a resource substitution perspective. However, some support also exists for a cumulative (dis)advantage perspective, which instead posits that initial health disadvantages linked to family origins may be widened or reinforced – rather than reversed or "leveled" – by educational experiences. Here, I briefly overview these two competing perspectives on adult health inequality. Then, I argue for the importance of examining further heterogeneity by gender, cohort, and age, as these dimensions not only are basic population health parameters but also may shape the nature or extent of any health dynamics relevant to the resource substitution or cumulative (dis)advantage perspectives.

1.1.1. Resource substitution

A resource substitution perspective views educational attainment and family or parental SES as two interacting health resources that may functionally substitute for each other in the production of health during adulthood. This substitution may occur given that childhood SES and educational attainment functionally provide the same basic kinds of cognitive, noncognitive, psychosocial, or material resources known to be correlated with physical health (Bauldry, 2015; Ross & Mirowsky, 2011; Schaan, 2014; Schafer et al., 2013). Because educational attainment and early socioeconomic advantage both contribute to a common pool of resources for maintaining good physical health, education may be less decisive for health outcomes when early socioeconomic advantage is present. However, if one is socioeconomically disadvantaged, education may be relatively important to health due to otherwise limited resources for personal well-being (Bauldry, 2014; Schafer et al., 2013).

1.1.2. Cumulative (dis)advantage

In contrast, a cumulative (dis)advantage perspective emphasizes that socioeconomic health inequality begins early in life, during childhood, and from then on tends to perpetuate and widen as individuals obtain education. Cumulative (dis)advantage in health may occur for three distinct reasons (Bauldry, 2014; Schafer et al., 2013). First, advantaged individuals not only are more likely to enroll in higher education than their disadvantaged counterparts, but they also potentially are more likely to derive cognitive, noncognitive, psychosocial or material profits from academic degrees or experiences due to a pervasive middle-class orientation or bias of Western educational institutions (e.g., Lareau & Weininger, 2008). Second, individuals who come from advantaged childhood backgrounds tend to already have tastes or preferences for healthy lifestyles, and higher education would then serve to support and strengthen these initial preferences (Pudrovska & Aniskin, 2013). Finally, childhood socioeconomic inequality may create deep or even permanent health disadvantages that cannot be surmounted or "erased" by educational attainment (Hertzman & Boyce, 2010).

1.2. Additional heterogeneity in educational health returns: gender, cohort, and age

Although gender, cohort and age are widely recognized as basic sources of health variation, these additional contingencies have yet to be reconciled with existing work on resource substitution and cumulative (dis)advantage. In this study, I begin to address this gap by extending previous work that has examined variation in educational health gradients (e.g., Conti & Heckman, 2010; Lynch, 2003; Ross & Mirowsky, 2011; Schaan, 2014). While this work has recognized the importance of gender, cohort, and/or age to educational health inequalities, it has analyzed these demographic dimensions separately rather than jointly, which overlooks the interrelated nature of fundamental shifts in educational inequality across the twentieth century (DiPrete & Buchmann, 2013; Hout, 2012; Lynch, 2003). Moreover, this work has yet to address well-established variation in educational health returns by family socioeconomic origins.

1.2.1. Gender

Gender differences in diverse health returns to education have already been demonstrated (e.g., Ross, Masters, & Hummer, 2012; Masters et al., 2012; Pudrovska & Aniskin, 2013). Men and women show differing mechanisms of biological and physiological development and aging, and they also diverge notably in their health exposures and behaviors and psychosocial resources, both within and across socioeconomic groups (Denney, Rogers, Hummer, & Pampel, 2010; Hayward & Gorman, 2004; Liu & Hummer, 2008; Masters et al., 2012; Pudrovska & Aniskin, 2013; Ross et al., 2012).

However, it remains unclear whether there are gender differences in health returns to education by parental socioeconomic status. Ross and Mirowsky (2006) build a theoretical perspective on gender differences in health returns to education, stipulating that gender may either serve as a source of resource substitution or cumulative (dis)advantage. For instance, women may show greater health returns to education than men if they otherwise carry limited socioeconomic resources, perhaps due to institutionalized gender inequality in society (resource substitution). Alternatively, men may show greater health returns than women if they are more readily able to translate their education into favorable jobs or occupations due to biased labor market processes (cumulative (dis)advantage).

While valuable, this perspective does not specifically address gender differences in educational health returns by family origins. While financial returns to education by propensity to attain a college degree do not seem to differ by gender (Brand & Xie, 2010), income is only one of several factors linking education to health, making it plausible that gender heterogeneity in socioeconomic health gradients may be based in non-income processes (Ross & Mirowsky, 2011). Indeed, for overall health returns, Conti and Heckman (2010) show using national data that the observed distributions of educational treatment effects on a variety of health outcomes and behaviors across levels of childhood cognitive, noncognitive, and health endowments do often differ by gender. Because childhood endowments are shaped fundamentally by parental socioeconomic status, this strongly suggests parental SES and educational attainment may combine differently across genders in the production of adult health disparities. However, because Conti and Heckman (2010) restricted their study to a specific British cohort, it is unclear whether and to what extent gender heterogeneity in educational health gradients applies to the US population across the course of the twentieth century.

1.2.2. Age and the overlooked role of cohort variation

Studies focusing on age variation in health returns to education by family socioeconomic origins find support for resource

substitution. For example, Ross and Mirowsky (2011) find that age widens gaps in physical limitations between the less and more educated especially among those with low levels of parental education. Likewise, Schaan (2014) found support for resource substitution in a European sample, though resource substitution appeared to diminish rather than amplify with age.

However, neither study has disentangled the role of cohort in heterogeneous health returns. Cohort and age effects are important to estimate simultaneously when evaluating resource substitution arguments, due to mutual confounding. Indeed, main and interactive effects involving education can shift in magnitude, significance or both when either age or cohort is omitted from the health equation (Lynch, 2003). Socioeconomic health disparities are cohort-dependent. For instance, educational disparities in mortality shifted with changes in institutions, culture, technology, or demography across the twentieth century in the United States (Masters et al., 2012; Warren & Hernandez, 2007), while cohorts showed changing childhood health exposures due to landmark improvements in public health, such as vastly improved nutrition and buffering from infectious diseases, and also due to changes in compulsory schooling and declining fertility as well (Finch & Crimmins, 2004; Masters et al., 2012).

Recent studies that either focus on or oversample particular age groups leave unclear whether observed socioeconomic health inequalities may age- or cohort-dependent. Bauldry (2014) drew on a national sample of young adults, finding cumulative (dis)advantage in educational inequalities in self-rated health. Ross and Mirowsky (2011) and Schafer et al. (2013) analyzed national data that oversampled older adults, finding resource substitution for morbidity, mortality, and physical limitations.

2. Data and methods

2.1. Data

To examine socioeconomic health inequalities across the life course by gender, cohort, and age, the current study draws on the 2008 GSS-NDI (publically available at norc.org), a dataset that merges repeated cross-sectional data from the General Social Survey (1980–2002 GSS) with mortality data from the National Death Index (NDI). Conducted by the National Opinion Research Center (NORC) at the University of Chicago, the GSS is a nationally representative sample of the noninstitutionalized, English-speaking US population aged 18 or older. Begun in the 1970s, the GSS has been administered at least every other year with response rates of 70 to 82% (Muennig et al., 2011).

In the GSS-NDI, health items are administered to respondents in survey years ranging from 1980 to 2002, and mortality is ascertained via NDI in 2008. GSS observations are matched to NDI death certificate data using a probabilistic algorithm. This algorithm principally uses respondent social security numbers to evaluate matches, and also takes into account other respondent identifiers such as date of birth and given names (Muennig et al., 2011). $N=23,420$ individuals received self-rated health question in the GSS-NDI. Of these, $N=21,769$ (93%) had valid responses on self-rated health and all other variables in the study. All findings are based on listwise analysis; multiple imputation or full-information maximum likelihood (FIML) estimation (Allison, 2002) did not produce differing findings.

2.1.1. Dependent variables: self-rated health and mortality

Self-rated health is measured using a four-category format (“Would you say your own health, in general, is excellent, good, fair, or poor?”) and is queried in fifteen GSS administrations in the GSS-NDI. While self-rated health questions with five response

categories often are treated as ordinal outcomes, the GSS four-category question is more suitably modeled as logistic or binary outcomes (similar to Idler & Benyamini, 1997; Jylhä, 2009; Warren & Hernandez, 2007).

Here, I model self-rated health in two ways: as fair or poor health and as excellent health. These two sets of analyses differ in terms of how the modal response (“good” health) is treated; “good” is the most common health self-assessment for all years (41.7–49.1% each year, from 1980 to 2002). Meanwhile, “excellent” health is the highest possible self-assessment on the GSS scale (29.9–33.5% each year) and often shows qualitatively different associations with objective health indicators relative to lower levels of self-rated health (Idler & Benyamini, 1997; Jylhä, Volpato, & Guralnik, 2006; Jylhä, 2009). Some researchers have argued that excellent subjective health indicates positive health or vitality, above and beyond a lack of major morbidity (Jylhä, 2009). For mortality, all participants in the GSS-NDI are assigned a vital status based on 2008 NDI records (i.e. dead or alive in 2008). Year of death is reported.

2.1.2. Parental or familial socioeconomic status (SES)

To assess parental SES, I made use of both parents’ levels of education (measured as 0–20 years) and occupational prestige (SEI; socioeconomic index). Each measure was standardized and converted to a cumulative normal probability for ease of interpretation (range=0–1, noninclusive). The parental SES score was obtained as the average of normalized education and occupational SEI. Other measurement approaches incorporating both parents did not produce differing results, nor did standardization of parental SES within cohort groupings rather than across the entire GSS-NDI sample. While not strictly measured during childhood, parental SES tends to be quite stable across the duration of childhood and into adulthood, making parental SES at the time of the GSS survey a reasonably accurate proxy for parental SES during the respondent’s childhood years (Wagmiller, Lennon, Kuang, Alberti, & Aber, 2006; Ziolo-Guest, Duncan, Kalil, & Boyce, 2012).

2.1.3. Educational attainment

Respondents reported how many years of formal education they had completed, ranging from 0 to 20. At survey, some respondents were still students or may have intended to return to school. I reran all analyses excluding individuals in school at survey ($N=746$, 3.4%) or aged 18–24. Substantive findings were unchanged.

2.1.4. Demographic variables

Sex is a binary indicator (male or female) and race is two binary indicators, for black or African-American and other non-white race. Respondent age at survey is recorded (18–89 years).

2.2. Analytic strategy

First, I conduct a series of logistic regressions of self-rated health. I estimate these separately for men and women, as preliminary analyses demonstrated significant gender differences in resource substitution or cumulative (dis)advantage. Therefore, by gender, I estimate a set of regressions for fair or poor health and then a set for excellent health. In these sets, the initial models specify main effects of parental or childhood SES (standardized score from 0 to 1; Model 1) and then educational attainment (in years; Model 2). Model 3 then provides an overall adjudication between the resource substitution and cumulative (dis)advantage perspectives, by specifying a two-way interaction between education and parental SES. Additional models then reveal further complexity in the overall resource substitution or cumulative (dis)advantage pattern. They do so by sequentially specifying

interactions among cohort, age, education, and parental SES.

Models of mortality are Cox proportional hazards regressions where duration of observation is 2008 (or the year of death) minus survey year (e.g., Ross et al., 2012). Here again, mortality analyses are run separately by gender, in line with prior work that documents gender-specific socioeconomic mortality gradients and stratifies regressions accordingly (Denney et al., 2010; Masters et al., 2012). Initial models showed that education and parental SES do not have proportional hazards; therefore analyses are also stratified on parental SES (e.g., Denney et al., 2010; Harrell, 2015). The parental SES groupings (low versus high) are defined by a median cut and they roughly correspond to whether parents have at least a high school degree (e.g., Bauldry, 2014; Conti & Heckman, 2010; Ross & Mirowsky, 2011). Interactions of covariates with exposure time ($\ln t$) are retained whenever significant within these regressions. Ties are handled by the Efron method. 4% of respondents ($n=82$) had total exposure exceeding 100 years, with some cases likely due to data error. The presented mortality results exclude these cases but including them does not yield differing conclusions.

All regressions control for cohort (year of birth), age and race and are estimated with robust standard errors.

3. Results

3.1. Descriptive statistics

The most common causes of death in the GSS-NDI were vascular or heart disease, cancer, injury, diabetes, or pneumonia (not shown; compare to Minino, Arias, Kochanek, Murphy, and Smith (2002)). Table 1 shows descriptive statistics by gender and birth cohort. Probabilities of death by 2008 and reporting fair/poor health decrease across cohorts while probabilities of reporting

excellent health increase; this trend is similar across genders though women report worse health overall relative to men (e.g., Ross et al., 2012). Meanwhile, parental SES and educational attainment increase robustly across cohorts. Parental SES and years of education are moderately correlated ($r=0.48$). Women show slightly lower levels of education in the middle cohorts, but not in the oldest or younger cohort, likely in part due to selective mortality on education and the diminishing gender gap in education. Finally, racial diversity of respondents increases across cohorts.

3.2. Fair/poor self-rated health

Tables 2 and 3 report logistic regressions of fair or poor self-rated health, stratified by gender (men in Table 2, women in Table 3). Models 1-2 report main effects of childhood/parental SES and educational attainment on fair/poor health. These models reveal highly significant negative associations, as expected (unstandardized logit coefficients shown; all $ps < .001$). In Model 3, a two-way interaction between education and parental SES is specified (Education \times Parental SES), yielding a significant negative coefficient for men ($p=.01$). For women, this interaction term is nonsignificant ($p > .5$).

Depicted in Fig. 1, the two-way interaction for men supports a cumulative (dis)advantage perspective, in that the presence of either socioeconomic resource (education or parental SES) fortifies or strengthens the association between the other resource and reporting fair/poor health. Health predictions across levels of parental SES are shown, by level of education (high school graduate, some college, four-year college graduate). Point predictions (delta method; Long & Freese, 2006) are connected and are bounded by 95% confidence intervals (I-beams). In this figure, predicted probabilities of fair or poor health robustly decrease as parental SES increases. However, this decrease is sharper at higher levels of education. Meanwhile, health returns to obtaining

Table 1
Descriptive Statistics, by gender and birth cohort groupings (1980–2002 General Social Survey with 2008 National Death Index Link).

| Birth Cohort Men | 1891–1914 N=415 | | | 1915–1938 N=2190 | | | 1939–1962 N=4783 | | | 1963–1984 N=2132 | | |
|--------------------------|--------------------|--------|--------|---------------------|--------|--------|---------------------|--------|--------|---------------------|--------|--------|
| | Mean | 95% CI | | Mean | 95% CI | | Mean | 95% CI | | Mean | 95% CI | |
| Fair/Poor Health | 0.419 | 0.372 | 0.467 | 0.338 | 0.318 | 0.358 | 0.157 | 0.146 | 0.167 | 0.137 | 0.123 | 0.152 |
| Excellent Health | 0.219 | 0.179 | 0.259 | 0.247 | 0.229 | 0.265 | 0.361 | 0.347 | 0.374 | 0.388 | 0.368 | 0.409 |
| Died by 2008 | 0.822 | 0.785 | 0.859 | 0.530 | 0.509 | 0.551 | 0.190 | 0.179 | 0.201 | 0.070 | 0.059 | 0.081 |
| Parental SES (0 to 1) | 0.296 | 0.273 | 0.318 | 0.366 | 0.356 | 0.375 | 0.525 | 0.518 | 0.531 | 0.608 | 0.599 | 0.617 |
| Parental Education (Yrs) | 7.336 | 6.912 | 7.759 | 8.809 | 8.653 | 8.965 | 11.197 | 11.100 | 11.293 | 12.671 | 12.540 | 12.802 |
| Parental Occup. SEI | 39.884 | 37.749 | 42.019 | 41.131 | 40.290 | 41.973 | 45.786 | 45.158 | 46.415 | 49.650 | 48.834 | 50.467 |
| Education (Yrs) | 10.330 | 9.948 | 10.713 | 12.300 | 12.148 | 12.453 | 13.718 | 13.635 | 13.801 | 13.332 | 13.231 | 13.432 |
| Race: Black | 0.108 | 0.078 | 0.138 | 0.118 | 0.104 | 0.131 | 0.120 | 0.111 | 0.130 | 0.119 | 0.105 | 0.133 |
| Race: Other | 0.010 | 0.000 | 0.019 | 0.021 | 0.015 | 0.026 | 0.042 | 0.037 | 0.048 | 0.086 | 0.074 | 0.098 |
| Age at Survey | 78.345 | 77.714 | 78.975 | 62.897 | 62.523 | 63.271 | 39.789 | 39.534 | 40.044 | 26.460 | 26.240 | 26.680 |
| Women | N=776 | | | N=3051 | | | N=5926 | | | N=2496 | | |
| | Mean | 95% CI | | Mean | 95% CI | | Mean | 95% CI | | Mean | 95% CI | |
| Fair/Poor Health | 0.451 | 0.416 | 0.486 | 0.346 | 0.330 | 0.363 | 0.173 | 0.164 | 0.183 | 0.135 | 0.122 | 0.149 |
| Excellent Health | 0.151 | 0.126 | 0.176 | 0.226 | 0.211 | 0.241 | 0.349 | 0.337 | 0.361 | 0.366 | 0.347 | 0.385 |
| Died by 2008 | 0.811 | 0.783 | 0.838 | 0.448 | 0.430 | 0.466 | 0.139 | 0.130 | 0.148 | 0.050 | 0.041 | 0.058 |
| Parental SES (0 to 1) | 0.295 | 0.280 | 0.310 | 0.366 | 0.357 | 0.374 | 0.511 | 0.505 | 0.517 | 0.579 | 0.571 | 0.588 |
| Parental Education (Yrs) | 7.410 | 7.131 | 7.688 | 8.755 | 8.620 | 8.890 | 11.040 | 10.953 | 11.126 | 12.443 | 12.324 | 12.562 |
| Parental Occup. SEI | 41.005 | 39.516 | 42.495 | 41.404 | 40.706 | 42.103 | 45.415 | 44.839 | 45.991 | 46.735 | 45.982 | 47.489 |
| Education (Yrs) | 10.607 | 10.374 | 10.840 | 11.904 | 11.795 | 12.012 | 13.494 | 13.428 | 13.560 | 13.300 | 13.208 | 13.392 |
| Race: Black | 0.107 | 0.085 | 0.129 | 0.131 | 0.119 | 0.143 | 0.168 | 0.159 | 0.178 | 0.201 | 0.185 | 0.217 |
| Race: Other | 0.008 | 0.002 | 0.014 | 0.020 | 0.015 | 0.025 | 0.041 | 0.036 | 0.046 | 0.082 | 0.071 | 0.093 |
| Age at Survey | 79.222 | 78.779 | 79.664 | 63.911 | 63.590 | 64.232 | 39.580 | 39.346 | 39.814 | 26.634 | 26.433 | 26.835 |

Table 2
Logistic regressions of fair or poor self-rated health (men; 1980–2002 General Social Survey).

| Men | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|
| Parental SES (0 to 1) | –1.4349** [–1.676, –1.194] | –0.6094** [–0.883, –0.336] | –0.5923** [–0.864, –0.321] | –0.6046** [–0.877, –0.332] | –0.5672** [–0.840, –0.295] | –0.5988** [–0.870, –0.327] | –0.5630** [–0.836, –0.290] |
| Education (Years) | | –0.1395** [–0.160, –0.119] | –0.1496** [–0.171, –0.128] | –0.1504** [–0.172, –0.129] | –0.1586** [–0.182, –0.135] | –0.1503** [–0.172, –0.128] | –0.1599** [–0.183, –0.136] |
| Education × Parental SES | | | –0.0937** [–0.167, –0.021] | –0.0875* [–0.161, –0.014] | –0.0608 [–0.139, 0.017] | –0.0908* [–0.164, –0.017] | –0.0656 [–0.142, 0.010] |
| Cohort × Parental SES | | | | –0.0063 [–0.019, 0.007] | | | |
| Cohort × Education | | | | | –0.0012* [–0.002, –0.0001] | | |
| Age × Parental SES | | | | | | 0.0049 [–0.009, 0.019] | |
| Age × Education | | | | | | | 0.0013* [0.0002, 0.0024] |
| Cohort | 0.0024 [–0.006, 0.011] | 0.0072+ [–0.001, 0.015] | 0.0065 [–0.002, 0.015] | 0.0060 [–0.002, 0.014] | 0.0056 [–0.003, 0.014] | 0.0064 [–0.002, 0.015] | 0.0063 [–0.002, 0.015] |
| Age | 0.0292** [0.021, 0.038] | 0.0328** [0.024, 0.041] | 0.0326** [0.024, 0.041] | 0.0325** [0.024, 0.041] | 0.0328** [0.024, 0.041] | 0.0328** [0.024, 0.041] | 0.0335** [0.025, 0.042] |
| Black | 0.4456** [0.299, 0.592] | 0.3769** [0.227, 0.527] | 0.3767** [0.228, 0.525] | 0.3749** [0.226, 0.524] | 0.3800** [0.231, 0.529] | 0.3759** [0.227, 0.525] | 0.3802** [0.232, 0.529] |
| Other | 0.2578* [0.006, 0.510] | 0.2512+ [–0.014, 0.517] | 0.2778* [0.014, 0.541] | 0.2691* [0.004, 0.534] | 0.2674* [–0.001, 0.536] | 0.2728* [0.008, 0.537] | 0.2673* [–0.0004, 0.535] |

Note. N = 9520 men. Unstandardized logit coefficients and 95% CIs shown.

+ p < .10.

* p < .05.

** p ≤ .01 (two-tailed).

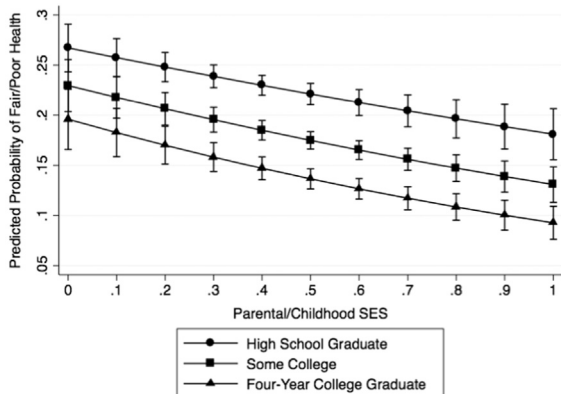


Fig. 1. Predicted fair/poor self-rated health across levels of parental SES, by level of education (men: 1980–2002 General Social Survey).

education are strongest among those from relatively advantaged families.

The remaining equations in Table 2 (Models 3–7) specify additional two-way interactions, between cohort or age and education or parental SES. For men and women, cohort (in years)

strengthens health protection linked to education, in line with prior work documenting the increasing importance of education for health across the twentieth century (Model 5; Masters et al., 2012). In Model 5, the two-way interaction of education and parental SES is not statistically significant for men ($p > 0.1$). Additional analyses for men (not shown) utilizing rescaled comparisons of nested logistic models (knb package in Stata; Karlson, Holm, & Breen, 2012) showed the cumulative (dis)advantage pattern is partly explained by the increasing health protection provided by education across cohorts (rescaled coefficient difference for Education × Parental SES across Models 3 and 5 = –0.0368, test of difference $p = 0.03$).

Meanwhile, age diminishes (for men; $p < 0.05$) or tends to diminish (for women; $p < 0.10$) the observed health protection of education (Model 7). Rescaled model comparisons demonstrated that the diminished importance of education to health in older age is partly responsible for the observed cumulative (dis)advantage pattern for men (rescaled coefficient difference for Education × Parental SES across Models 3 and 7 = –0.0342, $p = 0.02$). Interactions of cohort or age with parental SES are nonsignificant ($ps > 0.2$; Models 4 and 6).

Figs. 2 and 3 illustrate how the cohort and age modifications of health returns to education modify the overall cumulative (dis)advantage pattern for men. In Fig. 2, based on Model 5, the

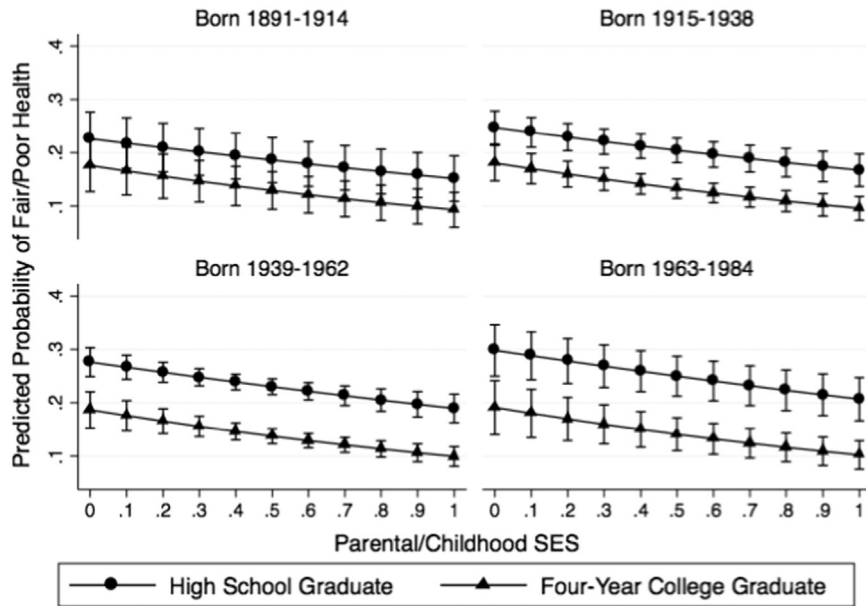


Fig. 2. Predicted probabilities of fair/poor self-rated health across levels of parental SES, by birth cohort and level of education (men: 1980–2002 General Social Survey).

cumulative (dis)advantage pattern is visualized by cohort groupings. For the earliest cohort group (born 1891–1914), health differences by level of education (high school graduate or four-year college graduate) are notable but are nonsignificant (as shown by overlapping I-beams). For all other cohorts, significant health differences by education are present; these vary in terms of magnitudes. Fig. 3, based on Model 7, focuses instead on age groupings. Cumulative (dis)advantage arguably is most robust among men aged 55–72, where educational health differences are both significant and sizable in magnitude. Additional models (not shown) revealed statistically nonsignificant three-way and four-way interactions among cohort, age, education, and parental SES across both genders.

While on average cumulative (dis)advantage holds for men across age ranges and cohorts, the analyses and figures reveal that educational attainment and parental SES in their own right are far stronger predictors of health variation. For both men and women, life-course

fluctuations in the health utility of education and historical fluctuations linked to cohort timing matter relatively little compared to socioeconomic standing for explaining health disparities.

3.3. Excellent self-rated health

Tables 4 and 5 document results for excellent self-rated health (men in Table 4, women in Table 5). As for the previous set of regressions, education and parental SES show strong associations with health across both genders, promoting excellent health in this case (Models 1–2; $p < 0.001$). In Model 3, a two-way interaction of education and parental SES is significant for men ($p < 0.01$) but not for women ($p > 0.5$). Here again, cumulative (dis)advantage is supported, with socioeconomic resources across the life course mutually reinforcing each other in the production of excellent health for men.

Models 4–8 report further results from two- and three-way

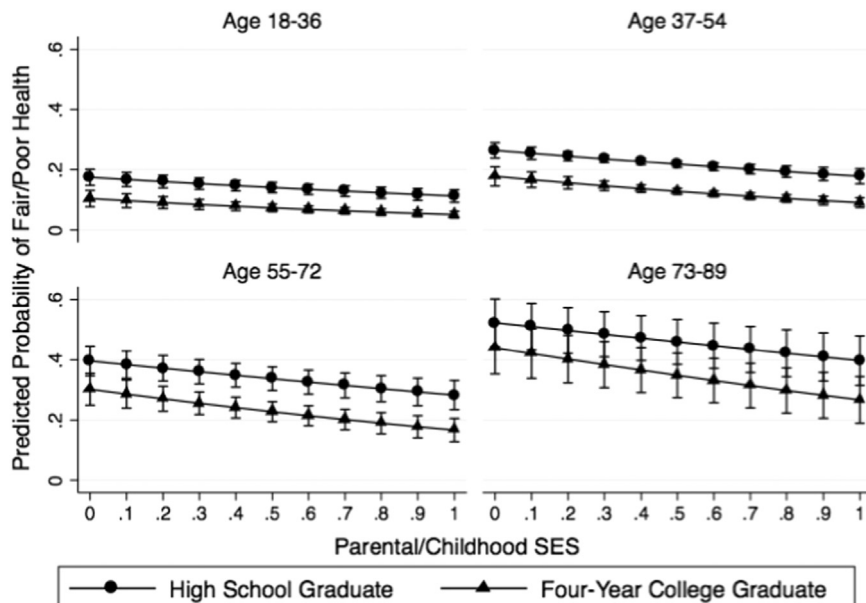


Fig. 3. Predicted probabilities of fair/poor self-rated health across levels of parental SES, by age at survey and level of education (men: 1980–2002 General Social Survey).

Table 3
Logistic regressions of fair or poor self-rated health (women; 1980–2002 General Social Survey).

| Women | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---------------------------------|--|-------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|--|
| Parental SES (0–1) | –1.3093** [–1.51, –1.10] | –0.4993** [–0.727, –0.272] | –0.4983** [–0.726, –0.271] | –0.5238** [–0.755, –0.292] | –0.4791** [–0.707, –0.251] | –0.5162** [–0.746, –0.286] | –0.4755** [–0.704, –0.247] |
| Education (Years) | | –0.1655** [–0.185, –0.146] | –0.1636** [–0.185, –0.142] | –0.1638** [–0.185, –0.142] | –0.1712** [–0.194, –0.148] | –0.1640** [–0.186, –0.143] | –0.1714** [–0.194, –0.148] |
| Education × Parental SES | | | 0.0180 [–0.051, 0.087] | 0.0299 [–0.042, 0.101] | 0.0506 [–0.025, 0.126] | 0.0253 [–0.045, 0.096] | 0.0432 [–0.030, 0.117] |
| Cohort × Parental SES | | | | –0.0073 [–0.018, 0.004] | | | |
| Cohort × Education | | | | | –0.0011* [–0.002, –0.00004] | | |
| Age × Parental SES | | | | | | 0.0063 [–0.005, 0.018] | |
| Age × Education | | | | | | | 0.0010 ⁺ [0.000, 0.0021] |
| Cohort | –0.0065 ⁺ [–.013, .0004] | 0.0011 [–0.006, 0.008] | 0.0013 [–0.006, 0.008] | 0.0006 [–0.007, 0.008] | 0.0006 [–0.007, 0.008] | 0.0012 [–0.006, 0.008] | 0.0014 [–0.006, 0.009] |
| Age | 0.0213** [.014, .028] | 0.0256** [0.018, 0.033] | 0.0256** [0.018, 0.033] | 0.0255** [0.018, 0.033] | 0.0260** [0.019, 0.033] | 0.0259** [0.019, 0.033] | 0.0267** [0.019, 0.034] |
| Black | 0.5131** [0.396, 0.630] | 0.4573** [0.338, 0.577] | 0.4575** [0.338, 0.577] | 0.4563** [0.337, 0.576] | 0.4617** [0.342, 0.581] | 0.4569** [0.338, 0.576] | 0.4622** [0.343, 0.582] |
| Other | 0.5359** [.322, .750] | 0.4901** [0.270, 0.710] | 0.4877** [0.267, 0.708] | 0.4793** [0.258, 0.700] | 0.4848** [0.263, 0.707] | 0.4812** [0.260, 0.702] | 0.4840** [0.262, 0.706] |

Note. N = 12249 women. Unstandardized logit coefficients and 95% CIs shown.

⁺ p < 0.10.

* p < 0.05.

** p ≤ 0.01 (two-tailed).

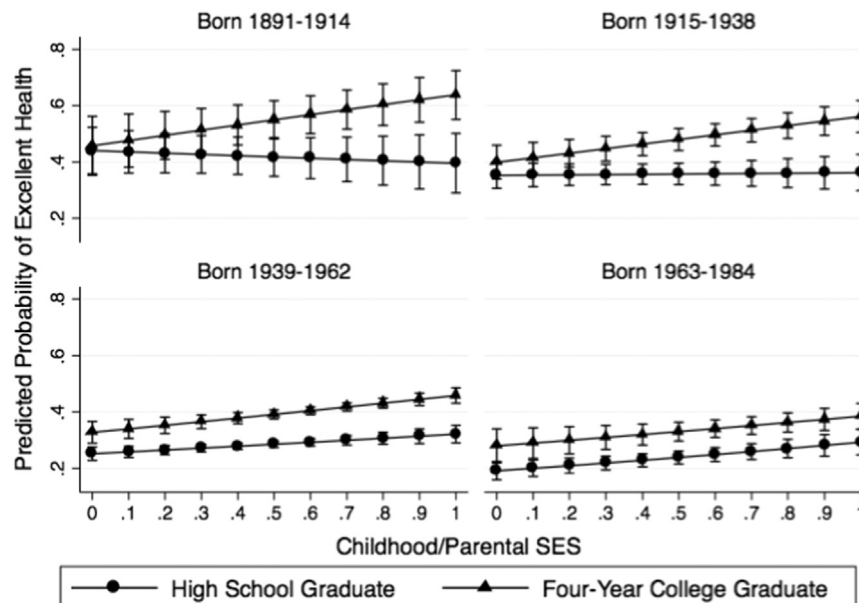


Fig. 4. Predicted probabilities of excellent self-rated health across levels of parental SES, by birth cohort and level of education (men: 1980–2002 General Social Survey).

interactions of cohort or age with parental SES and/or education. For men, a negative three-way interaction involving cohort emerges (Cohort \times Education \times Parental SES; $p < 0.01$); this result signifies that the cumulative (dis)advantage pattern is lessened for recent cohorts. A marginal three-way interaction involving age (Age \times Education \times Parental SES; $p = 0.06$) supports further cumulative (dis)advantage, such that age fortifies or widens cumulative socioeconomic (dis)advantages.

Fig. 4 depicts the changing nature of the cumulative (dis)advantage across cohorts (based on Model 5). Cumulative (dis)advantage arguably is strongest in the two earliest cohorts (born 1891–1938), where health returns to parental SES are positive for college graduates but null among high school graduates. The third cohort (1939–1962) appears to represent an interesting transition phase, where positive health returns to parental SES are present across both levels of education but still notably stronger among college graduates. In the final cohort (1963–1984), cumulative (dis)advantage has vanished, as health gains to parental SES are practically equivalent across levels of education.

Further models testing additional three- and four-way interactions yielded statistically nonsignificant results (not shown).

As for the fair/poor self-rated health analyses, patterns of cumulative (dis)advantage exhibited by men across age and cohort are relatively unimportant to explaining health variation relative to the importance of educational attainment and parental SES for both genders.

3.4. Mortality

Kaplan-Meier survival curves, shown in Fig. 5, depict

differential mortality by level of education. Curves are stratified by parental SES (bottom 50%, “disadvantaged families”; top 50%, “advantaged families”) and gender (men and women). Overall, these curves visually suggest that women from advantaged families may exhibit the weakest mortality protection from education.

Table 6 presents results from multivariate Cox hazard regressions. The table is stratified horizontally by parental SES and vertically by gender, so that four separate multivariate regressions are reported. Education buffers mortality equivalently for men and women from relatively disadvantaged families (Men: HR=.944, 95% CI=0.906, 0.984, $p = 0.007$; Women: HR=0.944, 95% CI=0.903, 0.985, $p = .009$). However, in relatively advantaged families, educational mortality buffering is present for men only (HR=.965, 95% CI=0.943, 0.988, $p = 0.004$). For women from advantaged families, education does not significantly buffer mortality (HR=0.987, 95% CI=0.963, 1.013, $p = 0.321$). In all models, cohort mitigates the link between aging and mortality, which is consistent with major improvements in public health and life expectancy across the twentieth century (Masters et al., 2012).

Additional models tested statistical interactions between education and cohort or age within stratified regressions. Table 7 features results for disadvantaged family origins only (bottom 50% of parental SES). For men and women alike, cohort strengthens the buffering capacity of education (Cohort \times Education HR=0.999, $ps < 0.05$), whereas age weakens educational mortality buffering (Age \times Education HR=1.001, $ps < 0.05$). For advantaged families, neither cohort nor age modifies educational mortality buffering (not shown; all $ps > 0.3$).

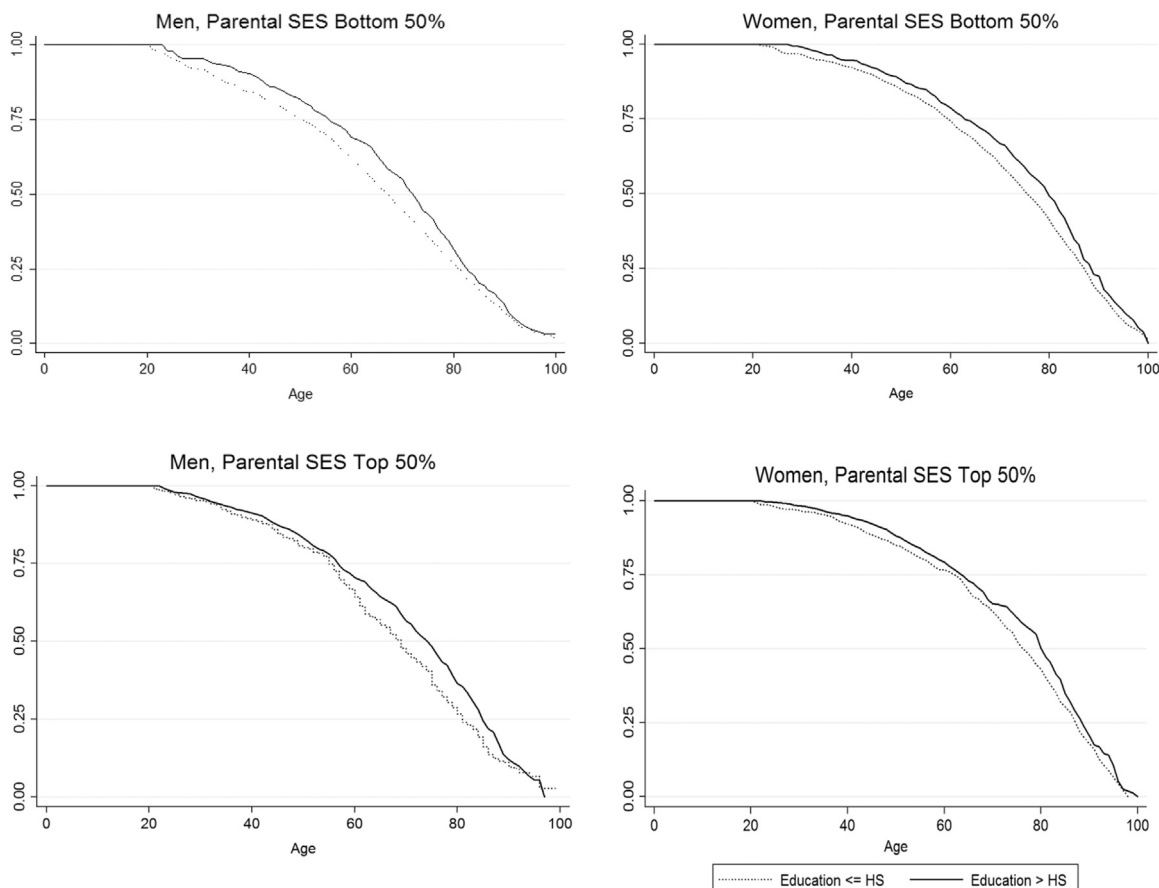


Fig. 5. Kaplan-Meier Survival curves, by gender and parental SES (1980–2002 General Social Survey with 2008 National Death Index Link).

Table 4
Logistic regressions of excellent self-rated health (men; 1980–2002 General Social Survey).

| Men | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---------------------------------|-------------------------------|-------------------------------|---|-----------------------------------|----------------------------------|---|---|
| Parental SES (0–1) | 1.1186** [0.923, 1.314] | 0.4755** [0.259, 0.692] | 0.3747** [0.146, 0.603] | 0.3583** [0.127, 0.589] | 0.3582** [0.124, 0.592] | 0.3600** [0.127, 0.593] | 0.3488** [0.113, 0.585] |
| Education (Years) | | 0.1139** [0.097, 0.131] | 0.1147** [0.098, 0.132] | 0.1162** [0.099, 0.133] | 0.1251** [0.106, 0.144] | 0.1158** [0.099, 0.133] | 0.1223** [0.104, 0.141] |
| Education × Parental SES | | | 0.0921** [0.032, 0.152] | 0.0885** [0.024, 0.153] | 0.0762* [0.010, 0.143] | 0.0902** [0.026, 0.155] | 0.0835** [0.018, 0.149] |
| Cohort × Parental SES | | | | 0.0074 [−0.005, 0.019] | 0.0094 [−0.003, 0.022] | | |
| Cohort × Education | | | | −0.0001 [−0.001, 0.001] | −0.0003 [−0.001, 0.001] | | |
| Cohort × Educ × Par. SES | | | | | −0.0044** [−0.008, −0.001] | | |
| Age × Parental SES | | | | | | −0.0048 [−0.018, 0.008] | −0.0064 [−0.020, 0.007] |
| Age × Education | | | | | | 0.0000 [−0.001, 0.001] | 0.0001 [−0.001, 0.001] |
| Age × Educ × Par. SES | | | | | | | 0.0036 ⁺ [−0.0001, 0.007] |
| Cohort | −0.0143** [−0.021, −0.008] | −0.0170** [−0.024, −0.010] | −0.0165** [−0.023, −0.010] | −0.0166** [−0.023, −0.010] | −0.0148** [−0.022, −0.008] | −0.0164** [−0.023, −0.010] | −0.0162** [−0.023, −0.010] |
| Age | −0.0268** [−0.034, −0.020] | −0.0309** [−0.038, −0.024] | −0.0313** [−0.038, −0.024] | −0.0314** [−0.039, −0.024] | −0.0313** [−0.038, −0.024] | −0.0312** [−0.038, −0.024] | −0.0323** [−0.040, −0.025] |
| Black | −0.1659* [−0.304, −0.028] | −0.1049 [−0.244, 0.035] | −0.1033 [−0.242, 0.036] | −0.1013 [−0.241, 0.038] | −0.1086 [−0.248, 0.031] | −0.1022 [−0.241, 0.037] | −0.1083 [−0.247, 0.031] |
| Other | −0.1333 [−0.352, 0.086] | −0.1675 [−0.391, 0.056] | −0.1893 ⁺ [−0.413, 0.035] | −0.1836 [−0.408, 0.041] | −0.1822 [−0.406, 0.042] | −0.1863 ⁺ [−0.411, 0.038] | −0.1868 ⁺ [−0.411, 0.037] |

Note. *N* = 9520 men. Unstandardized logit coefficients and 95% CIs shown.

⁺ *p* < 0.10.

* *p* < 0.05.

** *p* ≤ 0.01 (two-tailed).

4. Discussion

Parental SES lays a foundation for life-course health (Johnson & Schoeni, 2011). While most existing studies find that health returns to education are strongest among those who come from disadvantaged families (consistent with resource substitution), other studies instead find health returns to be highest among individuals from privileged or advantaged families (consistent with cumulative (dis)advantage). While these mixed findings may be due in part to the differing samples or health outcomes across studies, they overlook fundamental historical shifts in education and health. The economic value of obtaining education varied widely across the twentieth century, while educational attainment and returns to education differed markedly by gender as well (DiPrete & Buchmann, 2013; Hout, 2012). In this study, I tested the importance of gender and cohort to life-course health disparities.

Taken together, the current findings confirm prior research showing that adult health inequalities linked to education depend

on family background, and extend this work by demonstrating that the nature and extent of these dynamics differ considerably depending on the health outcome being assessed and on an individual's historical context, life course stage, and gender. While I found support for cumulative (dis)advantage in educational health disparities, this existed only for men, such that men from advantaged families showed the greatest gains in self-rated health from education. For men, cumulative (dis)advantage in avoiding fair or poor health appears most robust around retirement age, and cumulative (dis)advantage in experiencing excellent health is more robust in earlier cohorts and at older ages.

These findings suggest that Bauldry's (2014) findings may be gender- or life-course-dependent. They may also reflect the use of a propensity scoring methodology, which examines effect heterogeneity across a vector of pre-educational factors rather than parental SES in particular, and focuses on returns to a four-year college degree specifically. Increasingly researchers are examining the measurement properties of self-rated health. Population

Table 5
Logistic regressions of excellent self-rated health (women; 1980–2002 General Social Survey).

| Women | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---------------------------------|-------------------------------|-------------------------------|-----------------------------------|----------------------------------|-----------------------------------|---|---|
| Parental SES (0–1) | 1.2708** [1.095, 1.446] | 0.6354** [0.441, 0.830] | 0.6376** [0.438, 0.838] | 0.6281** [0.427, 0.829] | 0.6371** [0.434, 0.840] | 0.6212** [0.420, 0.823] | 0.6226** [0.420, 0.825] |
| Education (Years) | | 0.1319** [0.114, 0.149] | 0.1319** [0.114, 0.149] | 0.1316** [0.114, 0.149] | 0.1353** [0.117, 0.154] | 0.1305** [0.113, 0.148] | 0.1336** [0.115, 0.152] |
| Education × Parental SES | | | –0.0029 [–0.064, 0.058] | 0.0026 [–0.064, 0.069] | –0.0019 [–0.069, 0.065] | 0.0169 [–0.049, 0.082] | 0.0143 [–0.051, 0.080] |
| Cohort × Parental SES | | | | 0.0062 [–0.005, 0.017] | 0.0071 [–0.004, 0.018] | | |
| Cohort × Education | | | | –0.0005 [–0.002, 0.001] | –0.0006 [–0.002, 0.0005] | | |
| Cohort × Educ × Par. SES | | | | | –0.0023 [–0.006, 0.001] | | |
| Age × Parental SES | | | | | | –0.0047 [–0.016, 0.007] | –0.0053 [–0.017, 0.007] |
| Age × Education | | | | | | 0.0010 ⁺ [–0.0001, 0.002] | 0.0011 ⁺ [–0.0001, 0.002] |
| Age × Educ × Par. SES | | | | | | | 0.0020 [–0.002, 0.006] |
| Cohort | –0.0024 [–0.008, 0.004] | –0.0082** [–0.014, –0.002] | –0.0082** [–0.014, –0.002] | –0.0080** [–0.014, –0.002] | –0.0073* [–0.013, –0.001] | –0.0081** [–0.014, –0.002] | –0.0081** [–0.014, –0.002] |
| Age | –0.0144** [–0.021, –0.008] | –0.0212** [–0.028, –0.015] | –0.0212** [–0.028, –0.015] | –0.0209** [–0.027, –0.014] | –0.0208** [–0.027, –0.014] | –0.0212** [–0.028, –0.015] | –0.0217** [–0.028, –0.015] |
| Cohort × Age | 0.0004** [0.0002, 0.0005] | 0.0002* [0.00003, 0.0003] | 0.0002* [0.00003, 0.0003] | 0.0002** [0.00004, 0.0003] | 0.0002** [0.00005, 0.0003] | 0.0002* [0.00003, 0.0003] | 0.0002* [0.00003, 0.0003] |
| Black | –0.3954** [–0.511, –0.280] | –0.3626** [–0.480, –0.245] | –0.3626** [–0.480, –0.245] | –0.3612** [–0.479, –0.244] | –0.3649** [–0.483, –0.247] | –0.3605** [–0.478, –0.243] | –0.3635** [–0.481, –0.246] |
| Other | –0.2602** [–0.467, –0.053] | –0.2585* [–0.468, –0.049] | –0.2581* [–0.468, –0.048] | –0.2536* [–0.463, –0.044] | –0.2523* [–0.462, –0.043] | –0.2580* [–0.467, –0.049] | –0.2569* [–0.466, –0.048] |

Note. $N = 12249$ women. Unstandardized logit coefficients and 95% CIs shown.

⁺ $p < 0.10$.

* $p < 0.05$.

** $p \leq .01$ (two-tailed).

subgroups defined by gender or race may differ systematically in terms of the cognitive thresholds they carry for thinking about and self-assigning subjective health (Grol-Prokopczyk, Freese, & Hauser, 2011).

In contrast, the results for mortality supported resource substitution, for women only. Education did not significantly buffer mortality among women from relatively advantaged families, whereas men showed educational mortality buffering regardless of family origins. Prior work similarly finds that educational mortality buffering is strongest among those who are least likely to complete college (Schafer et al., 2013). However, this work had not tested for heterogeneity by gender. Further models also examined the roles of cohort and age, demonstrating that relatively disadvantaged families show increasing educational disparities in mortality in more recent cohorts and decreased mortality protection with age. This

importantly adds to prior work documenting the roles of cohort and age in educational mortality buffering (e.g., Masters et al., 2012; Ross et al., 2012), by showing that cohort and age variation in educational returns may be concentrated among those from disadvantaged families. Overall, health measures in this study reveal differing socioeconomic interaction patterns, and, from a policy standpoint, suggest that education may help reduce the deleterious effects of early childhood deprivation when it comes to preventing premature death specifically.

It is common to assume away period effects in order to identify and estimate cohort and age variation in educational gradients in self-rated health or mortality (e.g., Lynch, 2003; Ross et al., 2012). Moving forward, an explicit APC analysis would be useful for testing whether any period-based fluctuations in health dynamics are in part responsible for patterns of resource substitution or

Table 6
Mortality results (multivariate cox regressions; 1980–2002 General Social Survey with 2008 National Death Index Link).

| Parental SES: Bottom 50% | | | | | | |
|--------------------------|----------|--------|--------|----------|--------|--------|
| | Men | | | Women | | |
| | HR | 95% CI | | HR | 95% CI | |
| Education (Years) | 0.944** | 0.906 | 0.984 | 0.944** | 0.903 | 0.985 |
| Cohort | 0.997 | 0.987 | 1.006 | 1.018** | 1.008 | 1.027 |
| Age | 1.041** | 1.030 | 1.051 | 1.065** | 1.056 | 1.075 |
| Cohort × Age | 0.9996** | 0.9994 | 0.9997 | 0.9995** | 0.9993 | 0.9996 |
| Race: Black | 1.343** | 1.155 | 1.561 | 1.853** | 1.336 | 2.569 |
| Race: Other | 2.105* | 1.156 | 3.832 | 0.874 | 0.639 | 1.196 |
| N | 4475 | | | 6252 | | |

| Parental SES: Top 50% | | | | | | |
|-----------------------|----------|--------|--------|----------|--------|--------|
| | Men | | | Women | | |
| | HR | 95% CI | | HR | 95% CI | |
| Education (Years) | 0.965** | 0.943 | 0.988 | 0.987 | 0.963 | 1.013 |
| Cohort | 0.990 | 0.978 | 1.003 | 1.007 | 0.994 | 1.020 |
| Age | 1.040** | 1.026 | 1.054 | 1.062** | 1.048 | 1.077 |
| Cohort × Age | 0.9996** | 0.9994 | 0.9999 | 0.9995** | 0.9993 | 0.9997 |
| Race: Black | 1.838* | 1.109 | 3.046 | 3.657** | 2.196 | 6.090 |
| Race: Other | 1.217 | 0.837 | 1.769 | 0.778 | 0.459 | 1.320 |
| N | 4925 | | | 5857 | | |

Note. Hazard ratios (HRs) are reported.

* $p < 0.05$.

** $p \leq 0.01$ (two-tailed).

Table 7
Cohort and age modification for disadvantaged family origins (parental ses: bottom 50%; Multivariate Cox Regressions).

| Cohort modification of educational mortality buffering | | | | | | |
|--|----------|--------|--------|----------|--------|--------|
| | Men | | | Women | | |
| | HR | 95% CI | | HR | 95% CI | |
| Education (Years) | 0.921** | 0.877 | 0.967 | 0.913** | 0.866 | 0.962 |
| Cohort × Education | 0.999* | 0.998 | 1.000 | 0.999* | 0.998 | 1.000 |
| Cohort | 0.995 | 0.986 | 1.005 | 1.016** | 1.007 | 1.025 |
| Age | 1.040** | 1.029 | 1.051 | 1.065** | 1.055 | 1.074 |
| Cohort × Age | 0.9996** | 0.9994 | 0.9998 | 0.9994** | 0.9993 | 0.9996 |
| Race: Black | 1.354** | 1.166 | 1.571 | 1.883** | 1.359 | 2.610 |
| Race: Other | 2.066* | 1.129 | 3.781 | 0.872 | 0.639 | 1.190 |
| N | 4475 | | | 6252 | | |

| Age modification of educational mortality buffering | | | | | | |
|---|----------|--------|--------|----------|--------|--------|
| | Men | | | Women | | |
| | HR | 95% CI | | HR | 95% CI | |
| Education (Years) | 0.917** | 0.871 | 0.965 | 0.909** | 0.859 | 0.961 |
| Age × Education | 1.001* | 1.000 | 1.002 | 1.001* | 1.000 | 1.002 |
| Cohort | 0.997 | 0.987 | 1.007 | 1.018** | 1.009 | 1.028 |
| Age | 1.042** | 1.031 | 1.052 | 1.067** | 1.057 | 1.077 |
| Cohort × Age | 0.9996** | 0.9994 | 0.9998 | 0.9994** | 0.9993 | 0.9996 |
| Race: Black | 1.354** | 1.166 | 1.572 | 1.879** | 1.356 | 2.602 |
| Race: Other | 2.049* | 1.116 | 3.762 | 0.873 | 0.640 | 1.191 |
| N | 4475 | | | 6252 | | |

Note. Hazard ratios (HRs) are reported.

* $p < 0.05$.

** $p \leq 0.01$ (two-tailed).

cumulative (dis)advantage. For instance, economic recessions or downturns may induce shocks in education and health both within and across cohorts.

Measures of parental SES offered in the General Social Survey are administered during adulthood and are static. Specifically, these measures ask about the highest year of education obtained by one's mother or father as well as their current or most recent occupational statuses. While the extent of retrospection presumably increases with respondent age it is reassuring to note that retrospective parental socioeconomic measures generally are quite accurate (Haas, 2008). Severe economic disadvantage, such as childhood poverty, has been shown to induce unique life-course health disparities (Ziol-Guest et al., 2012). Unfortunately the GSS does not offer a direct measure of severe childhood disadvantage for the pooled sample. Because fluctuation and timing of childhood parental SES both have demonstrated links to later adult economic well-being and health (Wagmiller et al., 2006; Ziol-Guest et al., 2012), future work should use nuanced childhood socioeconomic measures.

Important dialog exists among competing interpretations of socioeconomic health gradients. Such gradients may reflect absolute differences in material or socioeconomic holdings, and they may reflect the relative status that such material or socioeconomic holdings confer upon an individual within societies or social contexts (Schnittker & McLeod, 2005). Indeed, although individuals within a society may differ on health as a function of childhood SES or personal education, societies showing lower levels of resource inequality overall tend to be healthier overall compared to societies in which levels of resource or income inequality are high (Wilkinson & Pickett, 2006). A cross-national study would extend our knowledge of whether and to what extent resource substitution or cumulative (dis)advantage is based in cultural or societal factors.

Meanwhile, ample debate exists regarding the extent to which socioeconomic health gradients truly reflect influences of SES on health rather than vice-versa. Thus, parsing out educational selection processes continues to be an important focus of inquiry (e.g., Bauldry, 2014; Conti & Heckman, 2010). Similarly, life-course health gradients linked to childhood SES may be partly based in parental or childhood health or genetic variation rather than strictly in differences in material or economic resources (Conti & Heckman, 2010). Therefore, rich life-course data would help to more closely illuminate pathways that jointly link parental SES and educational attainment to adult health inequalities.

While gender variation provided a valuable focus for the present study, racial or ethnic effect variation is left to future research with more suitable data, as the GSS does not query race or ethnicity in any rigorous sense until the introduction of a series of Census-based self-identification questions in the year 2000. Moreover, it is well-known that causes of death such as diabetes, accidental injury, or cardiovascular disease are unevenly distributed by race, gender, and age. Large-scale data would afford the opportunity to examine how complex socioeconomic health gradients differ across causes of death.

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