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Do rising tides lift all boats? Racial disparities in health across the lifecourse among middle-class African-Americans and Whites

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ABSTRACT

Although racial inequalities in health are well documented, much less is known about the underlying mechanisms that create and sustain these population patterns, especially among nonpoor subgroups. Using 20 waves of data from the Panel Study of Income Dynamics (PSID), we estimate the magnitude of the Black/White gap in self-rated health among middle-income, working-age (18–65) adults and explore potential sources of this disparity. Findings from multilevel regression models suggest that intragenerational gains in family income result in significantly smaller improvements in self-rated health for middle-class African-Americans than similarly situated Whites. We also note that childhood disadvantage predicts subsequent health trajectories in adulthood, but does little to explain the Black/White gap in the association between family income and self-rated health. We conclude that middle-class status provides restricted health returns to upward mobility for African-Americans and this differential relationship cannot be accounted for by greater exposure to early life disadvantage.

Introduction

In the United States, the health of African-Americans lags well behind most other racial/ethnic groups. Compared to Whites, Black men and women face higher risks of chronic illnesses, infectious diseases, and injuries – all of which to serve to shorten their average life expectancy by as much as 6 years (Murphy, Xu, & Kockanek, 2013). However, Black/White disparities in wellbeing do not simply take root at advanced ages. Rather, they emerge at birth and fluctuate according to predictable patterns across the lifecourse (Williams, Mohammed, Leavell, & Collins, 2010). These divergent health trajectories translate into distinctly different life experiences for African-Americans and Whites.

Although the existence of stark racial disparities in health is well documented, much less is known about the underlying mechanisms that create and sustain these divergent trajectories. Socioeconomic status (SES) is known to be one of the most powerful predictors of subsequent morbidity and mortality (Pavalko, & Caputo, 2013), so much so that it is known as a fundamental cause of population health disparities (Phelan, Link, & Tehranifar, 2010). Individuals who occupy higher positions on the socioeconomic gradient can expect to live healthier and longer lives than those who occupy positions below (Adler et al., 1994; Elo & Preston, 1996; Adler and Rehkopf, 2008). However, the evidence regarding the extent to which the Black/White gap in physical well-being is due to racial differences in SES has been mixed, with a majority of studies reporting that disparate levels of SES explain only a portion of racial inequalities in health (Franks, Gold, & Fiscella, 2003; Braveman, Cubbin, Egerter, Williams, & Pamuk, 2010).

Moreover, the extent to which the health of African-Americans lags behind that of Whites is not consistent across levels of SES. Black/White disparities in morbidity and mortality tend to be more pronounced at higher levels of SES (Williams & Sternthal, 2010). For example, among adults with incomes below 100% of the federal poverty threshold, 11% more nonHispanic Blacks than Whites rate their health as fair/poor. Among adults whose family incomes are at or above 400% of poverty, 41% more non-Hispanic Blacks than Whites describe their overall health as being fair/poor (Centers for Disease Control and Prevention, 2012). This represents more than a two-fold increase in the Black/White gap in self-rated health at the upper versus lower end of the income distribution. These findings suggest that the ways in which race and SES interact to produce disparate health outcomes across the lifecourse are complex and deserve further study.

To this end, we examine the patterning of racial disparities in physical wellbeing among a subpopulation that has been vastly

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understudied – middle-class African-Americans (Jackson & Stewart, 2003; Jackson, 2005; Landry & Marsh, 2011). Specifically, we seek to determine the extent to which the Black/White gap in self-rated health among middle-class Americans can be explained by two lifecourse mechanisms – early exposure to childhood disadvantage or the nonequivalence of socioeconomic status across race. The first suggests that middle-class Whites exhibit better health outcomes than their African-American counterparts because they are less likely to have spent their formative years with limited socioeconomic resources. Given what we know concerning the latent and long-lasting effects of childhood poverty (Duncan, Ziol-Guest, & Kalil, 2010; Case, Lubotsky, & Paxson, 2002) as well as the cumulative impact of negative social exposures on health throughout the lifecourse (Hayward, & Gorman 2004; Geronimus, Hicken, Keene, & Bound, 2006; Walsemann, Geronimus, & Gee, 2008), the consequences of this early life adversity might not be fully expressed until midlife or beyond. The second mechanism proposes a different pathway, whereby the impact of SES over the lifecourse (i.e. upward socioeconomic mobility) will have a muted impact on the health of middle-class African-Americans compared to middle-class Whites. For the purpose of this paper, we will be using the terms, health and wellbeing, interchangeably to capture the same underlying construct.

Background

Lifecourse SES and health: Theoretical perspectives

Researchers who examine the population patterning of health across the lifecourse typically invoke one of two explanatory mechanisms. The first emphasizes the role that early life exposures play in the production of wellbeing later in life, while the second highlights the cumulative impact of these health eroding insults over time. Existing lifecourse frameworks have emerged simultaneously from different disciplinary perspectives; however, there is much theoretical overlap. We will draw conceptual connections between subfields by discussing similar models in tandem.

Early origin frameworks

Early origin frameworks (EOFs) suggest that encountering socioeconomic hardship early in life, especially during developmentally sensitive (i.e. critical) periods, negatively impacts an individual's health as he/she ages. These critical periods might occur during fetal development, early childhood, or adolescence. What distinguishes early origins frameworks from other lifecourse approaches is their emphasis on specific, time-bound periods of maturation during early life in which exposures to disadvantage have outsized effects on subsequent health trajectories. Moreover, these approaches allow for the possibility that a substantial amount of time may pass between these exposures and the expression of adult disease or disability. This latency period is likely to be clinically unremarkable and offer few, if any, clues to the health deterioration that is about to occur.

Barker's Fetal Origins Hypothesis is the most well known EOH. Barker (2003) posits that individuals exposed to unfavorable intrauterine environments during specific stages of fetal development will undergo metabolic dysregulation and face increased rates of chronic illness, particularly cardiovascular disease, in adulthood. The most convincing evidence in support of the fetal origins hypothesis comes from natural experiments during which maternal nutritional intake during pregnancy was highly restricted (Almond, & Mazumder, 2011; Chen, & Zhou, 2007; Susser, & Stein, 1994; Stein, Zybert, van der Pal-de Bruin, & Lumey, 2006, 2007). These studies suggest that children exposed to limited caloric intake during gestation are significantly more likely to be obese, exhibit unhealthy fat distribution, have high blood pressure, and face a greater risk of schizophrenia as adults (Hoek, Brown, & Susser, 1998; St Clair et al., 2005; Stein et al., 2006, 2007; Chen, & Zhou, 2007).

Theoretical conceptualizations that emphasize the role of early life exposures, particularly those occurring after the perinatal period, in the subsequent development of health later in life are not without proponents in other fields. Researchers have noted that the years between birth and age 6 when most children begin formal schooling are particularly important for long-term outcomes, health and otherwise (Hayward, & Gorman, 2004; Case, Fertig, & Paxson, 2005; Palloni, 2006; Case, & Paxson, 2008, 2010; Currie, 2009; Conti, Heckman, & Urzua, 2010; Duncan et al., 2010; Heckman, Pinto, & Savelyev, 2013).

Critiques of EOFs are not without merit. One of the most striking shortcomings of these approaches is the tendency to downplay important changes in health that occur after the initial critical period. For example, subsequent studies have found that infants who experience an early adiposity rebound during childhood (2–6 years) have the highest risk of developing cardiovascular disease in adulthood (Koyama et al., 2014). Additionally, and perhaps more importantly, racial/ethnic disparities in health often become apparent well before midlife, with race-specific rates of several chronic diseases, such as diabetes, obesity, asthma, and even hypertension, diverging during childhood (Akinbami, Moorman, Simon, & Schoendorf, 2014; Akinbami, Simon, & Rossen, 2016; Caprio et al., 2012; Goren, 2008; Hardy et al., 2017; Ogden et al., 2016; Weiss, 2004). These empirical realities call for theoretical approaches that can capture exposure to disadvantage across the entirety of the lifecourse as well as the cumulative way these exposures erode health over time. It is to these frameworks that we now turn.

Cumulative disadvantage/advantage

The concept of cumulative (dis)advantage has a long tradition in sociology and can be traced back to the work of Merton (1968) and Blau and Duncan (1967). More recently, the concept of cumulative (dis)advantage has gained theoretical traction in the field of social epidemiology and led to the development of two distinct frameworks, each of which describes specific, time-dependent pathways through which health is produced over time. The first, the accumulation of risk model, predicts that the longer an individual is exposed to socioeconomic hardship, the worse her health will be. Thus, the relationship between SES and physical wellbeing across the lifecourse is thought to be relatively straightforward, with increases in SES over time resulting in concomitant improvements in health. The second framework, the chains of risk model, more directly draws upon the Mertonian concept of cumulative (dis)advantage in that it emphasizes the ways in which exposures to hardships earlier in the lifecourse can place an individual on a specific trajectory resulting in the expression of suboptimal health outcomes over time (Hertzman & Power, 2003; Pavalko & Caputo, 2013).

Both these cumulative (dis)advantage approaches have been criticized for not adequately incorporating the experiences of African-Americans (Schwartz & Meyer, 2010; Geronimus, 2013). Proponents of these frameworks often fail to consider how occupying another disadvantaged social status, such as being a member of a racial minority, might impact the seemingly straightforward association between SES and health (Schwartz & Meyer, 2010). Therefore, these approaches may have limited applicability when investigating why Black/White disparities in health are more pronounced among non-poor as opposed to poor subgroups.

Instead, we highlight the critical interplay between race and class to more fully explain (1) why the health returns to upward mobility might be muted among African-Americans compared to Whites and (2) how exposure to childhood disadvantage might influence the disparate association between lifetime SES and health across race. To this end, we rely upon the restricted returns hypothesis (RRH) put forth by Colen (2011). It suggests that the health returns to middle-class status are likely to be limited for African Americans compared to Whites due to racial barriers that operate at the structural (macro), interpersonal (mezzo), and intrapersonal (micro) level. Although it is beyond the scope of this paper to explain, in detail, all the possible pathways

through which higher SES might not confer similar health benefits across race, we will highlight those that are likely to play an outsized role in creating and maintaining Black/White health disparities.

First, despite having better than average levels of educational attainment, occupational prestige, and family incomes, middle-class African Americans tend to live in neighborhoods that are less well off than similarly situated Whites (Adelman, 2004; Pattillo, 2013; Reardon, Fox, & Townsend, 2015). Reardon et al. (2015) note that Black middle-class households are situated in neighborhoods with median incomes that resemble those in poor White neighborhoods (approximately $12,000). Similarly, Sharkey (2014) finds that households within the "core middle-class" reside in neighborhoods with levels of disadvantage that are almost 0.5 standard deviations *above* the national average while similarly situated Whites reside in neighborhoods that are almost 0.5 standard deviations *below* the national average.

Second, although middle-class African Americans have been catching up to or even approaching parity with Whites along several dimensions of SES, a notable exception is wealth (Killewald et al., 2017). In 2013, the average net worth of White and Black families was $141,900 and $11,000, respectively; furthermore, this sizeable racial disparity has only grown over time (Shapiro, 2017), particularly in the wake of the Great Recession when housing values recovered faster in predominantly White neighborhoods than predominantly nonWhite neighborhoods (Kochhar and Fry, 2014; Pfeffer, Danziger, & Schoeni, 2013). More importantly given the focus of the current study, racial disparities in wealth tend to increase rather than decrease across the income spectrum (Maroto, 2016). Wealth, net of the effects of other key dimensions of SES, has been shown be a powerful predictor of health disparities across as well as within race (Bond Huie, Krueger, Rogers, & Hummer, 2003; Pollack et al., 2013).

Finally, middle-class status does not shield African Americans from encounters with interpersonal discrimination (Feagin & Sikes, 1994; Landry & Marsh, 2011). Notably, Colen, Ramey, Cooksey, and Williams (2018) find that upwardly mobile Blacks and Hispanics were significantly more likely to experience acute as well as chronic discrimination compared to their socioeconomically stable counterparts and that these differential exposures to unfair treatment accounted for a sizeable proportion of the Black/White gap in self-rated health. Although not an exhaustive list, taken together these powerful sources of racial inequality (residential segregation, wealth accumulation, and exposure to discrimination) are likely to work in tandem to prevent middle-class African Americans from reaping the full range of health benefits typically associated with occupying an advantaged social standing.

Although both early origins and cumulative disadvantage frameworks can be used to explain racial disparities in the association between lifecourse SES and health, each suggests a different mechanism through which the health of middle-class African Americans remains suboptimal relative to Whites. EOFs highlight the importance of childhood disadvantage. Thus, we would expect the association between lifetime SES and adult health to be similar for Blacks and Whites once differential exposures to early life adversity are taken into account. Alternatively, the RRH predicts that African-Americans will experience fewer health benefits following gains in SES over time, regardless of exposure to childhood disadvantage. Thus, we would expect the association between lifetime SES and adult health to be more pronounced for Whites than Blacks after accounting for differential early life exposures. To be clear, the RRH does not suggest that childhood factors are unimportant; rather, it follows that they are not *sufficient* to explain why upward mobility would be less health protective for African-Americans than Whites.

Race, lifecourse SES, and health

Previous research examining racial disparities in the relationship between SES and health across the lifecourse has produced mixed results, with some studies providing evidence that early life exposures to socioeconomic disadvantage shape subsequent health trajectories and contribute to the emergence of Black/White inequalities in adult health (Hayward, Miles, Crimmins, & Yang, 2000; Warner & Hayward, 2006; Haas & Rohlfsen, 2010) while others lend credence to the restricted returns hypothesis (Farmer & Ferraro 2005; Kahn & Fazio, 2005; Hudson, Puterman, Bibbins-Domingo, Matthews, & Adler, 2013).

Haas and Rohlfsen (2010) find that childhood socioeconomic deprivation significantly predicts the timing of the subsequent onset of functional disability, largely through health-related mechanisms, but cannot explain Black/White disparities in this critical indicator of physical wellbeing. On the other hand, Farmer and Ferraro (2005) provide the most convincing empirical support for the notion that African-Americans may be less likely to benefit, with respect to their health, from gains in SES across the lifecourse by demonstrating that increases in educational attainment resulted in better self-rated health for White but not Black adults aged 25–74. Kahn and Fazio's work (2005) echoes these findings using household income instead of education and expands the choice of health outcome measures to include chronic diseases and functional impairment.

However, the generalizability of these findings is limited by two important shortcomings. First, many studies rely on samples of older adults, often in conjunction with retrospective data, to examine how the expression of health and wellbeing across the lifecourse differs by race. This is especially problematic when comparing health outcomes among African-Americans as opposed to Whites, since selection pressures at older ages (Willson, Shuey, & Elder, 2007; Masters, 2012) in conjunction with substantially different average life expectancies (Geronimus, Bound, Waidmann, Colen, & Steffick, 2001; Harper, Lynch, Burris, & Smith, 2007) may produce patterns of population health that are unique to older individuals and do not adequately capture trends among younger cohorts.

Second, much of the research examining racial disparities in health using a lifecourse perspective fails to consider how these overarching patterns and the mechanisms that drive them may not be consistent across other key social statuses, such as socioeconomic status. Most notably, the experiences of middle-class African-Americans are assumed to be similar to those of their poorer counterparts. There have been a few recent exceptions (Colen, Geronimus, Bound, & James, 2006; Hudson et al., 2013) but their limited numbers fail to provide a deep or thorough understanding of the complex, intersecting processes associated with both race and SES that are likely to produce health disparities over time. Using data from the Coronary Artery Risk Development in Young Adults (CARDIA) Study, Hudson et al. (2013) report that a measure of lifecourse socioeconomic position (SEP) was positively and significantly associated with self-rated health scores for Whites but failed to reach statistical significance ($p < 0.05$) for Blacks. Colen et al. (2006) find similar results combining nationally representative data from the National Longitudinal Survey of Youth (NLSY, 1979) for three generations of women to examine the association between lifecourse trajectories of family income on the risk of giving birth to a low birthweight baby.

This study seeks to directly address these shortcomings by using 20 waves of nationally representative prospective data from the Panel Study of Income Dynamics (PSID) from 1985 to 2011 to explore how early life disadvantage and intragenerational gains in SES interact to produce racial disparities in health across the lifecourse. We seek to investigate the following research questions:

1. Do middle-class African-Americans experience significantly fewer health returns to intragenerational upward mobility compared to middle-class Whites?
2. What is the magnitude of the Black/White gap in the association between fluctuations in SES across the lifecourse and health?
3. How much of the differential impact of intragenerational mobility on health can be explained by racial disparities in exposure to

childhood social and economic disadvantage?

Data and methods

Description of the data

The PSID is a nationally representative, panel survey of American families begun in 1968. Face-to-face interviews were conducted annually from 1968 to 1997 and then biennially after that. The original PSID sample contained detailed information on approximately 5000 families. By 2011, the number of families participating in this study was 8907 and included 24,661 individuals. Information is collected on every person in the household during a given survey year with a majority of questions being directed to the head and his/her spouse (PSID, 2013). We restrict our study sample to middle-class, working-age (18–64 years old), nonHispanic White and nonHispanic Black PSID heads and wives (including cohabiting partners).

Conceptualizing middle-class status

We classified PSID respondents as middle-class if their family income for the preceding year fell into the middle three quintiles of the income distribution for African-Americans and Whites, combined. In sensitivity analyses, we operationalized middle-class status according to two different sets of criteria: (1) if the respondent's main occupation was white- as opposed to blue-collar or (2) if the respondent attended at least some college. Regression results were similar across classification approaches.

We chose to conceptualize middle-class status in this manner for a number of reasons. First, a measure of SES based on income can easily capture year-to-year fluctuations in economic resources, which is particularly helpful for the current study since we are examining changes in SES over time. Second, educational attainment and occupational prestige tend to be well established by early adulthood and do not change as frequently over the lifecourse. Thus, their treatment as a time-varying variable would be suspect. Third, compared to other SES indicators, income can more accurately capture the effects of short-term economic shocks, such as those created by recessions, as well as differential returns to SES across race. Finally, relying on a measure of SES at the household, as opposed to the individual, level allows us to describe the financial resources available to respondents who either work part-time or are out of the labor force entirely.

Our strategy to define middle-class according to income mirrors approaches taken by other investigators whose work also focuses on how racial inequalities prevent the economic advancement of African Americans. For example, Sharkey (2014) and Lacy (2007) rely on specific income ranges to distinguish between different segments of the Black middle-class. Since our study captures an elongated period spanning more than 30 years and compares middle-class individuals across race, we chose to rely on arbitrary cut points based on income quintiles as opposed to absolute dollar amounts to identify middle-class respondents. Our approach is similar to that taken by studies that seek to examine racial disparities in wealth accumulation (Conley, 2010; Oliver & Shapiro, 2013) as well as growing trends in income inequality (Chetty, Hendren, Jones, & Porter, 2018, 2017), and thus is not without precedent.

Description of the measures

For the purpose of this study, physical wellbeing is assessed using self-rated health. Respondents were asked to rate their health as being excellent, very good, good, fair, or poor. This measure has been shown to be a powerful indicator of physical wellbeing and predicts subsequent mortality more accurately than physician diagnosis (DeSalvo, Bloser, Reynolds, He, & Muntaner, 2006; Jylhä, 2009). Furthermore, the biological basis that undergirds this indicator of general health status is becoming clearer as researchers now note consistent associations between self-rated health and several important biomarkers such as albumin, white blood cell count, hemoglobin, HDL cholesterol, and creatinine (Jylhä, 2006). This measure is one of the most common ways to operationalize general health status (Ferraro, & Farmer 1999); thus, its utilization facilitates cross-study comparisons.

We collapsed the original response categories to create a dichotomous indicator in which 0 represents good, very good, or excellent health and 1 represents poor or fair health. We adhered to this strategy to avoid problems of small cell sizes among the most extreme response categories, facilitate ease of interpretation of empirical findings, and promote comparability across other existing studies that also rely on a dichotomous indicator of self-rated health. Moreover, this approach has been shown to be conceptually robust since being in fair/poor health has been found to predict a number of important subsequent health outcomes, including death (Jylhä, 2009). A thorough examination of the ways in which the income/health gradient differs across race is beyond the scope of the current study, but due to its importance should be explored by future research endeavors. Sensitivity analyses revealed similar results when using either the 5- or 2-category measures.

The main independent variable, lifetime SES, is captured using a continuous measure of family income that combines earnings and income transfers from each adult member of the current household obtained during the year *prior* to the current survey year. We adjust this variable for inflation using the CPI-U index and report all values in 2010 dollars. Thus, our measure of family income is lagged by one-year. Due to the skewed nature of its distribution, we transform this variable by taking the natural log of its value for all regression analyses.

The decision to use family income to depict fluctuations in SES across the lifecourse was intentional and guided by previous research (Duncan, Daly, McDonough, & Williams, 2002). By relying on family income to capture changes in SES over time, we are able to accomplish two objectives. First, we avoid issues associated with changes in how upward mobility is characterized over time. For example, during the 1970s and 1980s, when PSID data was first being collected, having a college degree meant something different than it does today, largely because it is more common and comes with fewer social and economic rewards (Goldin & Katz, 1999; Aaronson, & Mazumder, 2008; Moretti, 2008). Second, a measure of income that is captured at the household level reflects socioeconomic resources available to an individual regardless of their employment or marital status.

Respondent's race was based on self-report coded as 0 or 1 if he/she was nonHispanic White or nonHispanic Black. All individuals who identified as Hispanic were excluded from the analyses that form the basis of the current study. The analytic sample contains 83 individuals (0.3% of the analytic sample) whose race changes across waves, some of whom are biracial. We use the most recent report from the survey in which race was re-asked and carried it backwards to create a time invariant measure. In comparison to those without any changes in racial identity, these individuals are more likely to be female, be in poor health, and less likely to have lived with both parents as a child and have parents who were well-off. The relationship between family income, race, and self-rated health among these 83 cases does not substantively differ from the rest of the sample.

Childhood disadvantage was measured using four variables designed to capture early life socioeconomic adversity that have been shown to exert a long-lasting effect on subsequent health. PSID respondents were retrospectively asked about their parents' socioeconomic status (poor, average, or well-off); family composition (lived with both parents or not); father's educational attainment (less than high school, some high school, high school graduate, some college, or college graduate); and mother's educational attainment (less than high school, some high school, high school graduate, some college, or college graduate).

We incorporate additional covariates in all regression models to adjust for potential confounders such as respondent's age (in years), sex (male vs. female), number of people in the family, relation to household

head (self vs. spouse or cohabiting partner), marital status (married/cohabiting, never married, widowed, or divorced/separated), employment status (working, unemployed/temporarily laid-off, or otherwise not working), and educational attainment (years of completed schooling).

Analytic strategy

Since the PSID contains repeated measures on the same individuals as they move through successive lifecourse stages, we are able to capture changes in family income as well as self-rated health within respondents over time. We limit the analytic sample to household head and their spouses who had nonmissing values for family income and self-rated health for at least 2 time points, yielding information on 17,059 individuals over an average time span of 13.8 years.

Our data have a hierarchical structure wherein observations collected at time t are nested within each individual i. Therefore, we use a multilevel logistic regression model to estimate the association between family income and self-rated health across the lifecourse and determine the extent to which this relationship differs by race (Skrondal and Rabe-Hesketh, 2004; Snijders and Bosker, 2012). The composite statistical model can be written as follows:

$$ln\left[\frac{Pr(y_{it}=1)}{Pr(y_{it}=0)}\right] = [\beta_1 + \beta_2 inc_{it} + \beta_3 age_{it} + \beta_4 black_i + \beta_5 x_{5it} + \ldots + \beta_n x_{nit}] + [\zeta_{1i} + \zeta_{2i} inc_{it} + \zeta_{3i} age_{it}]$$

where y_{it} indicates whether individual i is in poor or fair health at time t. The first set of square brackets on the right-hand side of the model shows the structural part of the model, where β_1 represents the average intercept, β_2 is the slope for family income, β_3 is the slope for age, β_4 is the slope for race, and β_5 - β_n are regression coefficients for individual i at time t, and $x_2 - x_n$ are the values of each predictor for individual i at time t. Subsequent models allow for cross-level interactions between race and family income. Family income was measured for the last calendar year in each wave, thus, our models examine the association between self-rated health and family income from the prior year.

The model allows for multiple error terms. The second set of square brackets on the right-hand side shows the composite residual. The composite residual allows for individual-specific deviations from the average intercept (ζ_{1i}) as well as individual-specific variability around the average slopes for family income (ζ_{2i}) and age (ζ_{3i}). The error terms for the slopes allow for heteroscedasticity and autocorrelation—those residuals explicitly vary across values of family income and age. We assume that the three residuals are approximately normally distributed with means equal to zero and variances and covariances that are estimated from the data:

$$\begin{bmatrix}\zeta_{1i}\\ \zeta_{2i}\\ \zeta_{3i}\end{bmatrix} \sim N\left(\begin{bmatrix}0\\0\\0\end{bmatrix}, \begin{bmatrix}\sigma_1^2 & 0 & \sigma_{13}\\ \sigma_{12} & \sigma_2^2 & \sigma_{12}\\ \sigma_{13} & 0 & \sigma_3^2\end{bmatrix}\right)$$

where σ_1^2, σ_2^2, and σ_3^2 are the variances associated with the residuals ζ_{1i}, ζ_{2i}, and ζ_{3i} respectively, and σ_{12} and σ_{13} are the covariances between the random intercept and each of the random slopes. We constrain the covariance between the residuals for the slopes (ζ_{2i} and ζ_{3i}) to be zero because allowing that covariance to differ from zero did not improve model fit. We used Mplus 8.0 software for all analyses, used maximum likelihood estimation with adaptive quadrature, and include robust standard errors that were clustered at the highest level of aggregation (i.e. the family).

To handle issues of missing data, we rely on multiple imputation techniques to generate values for all covariates included in descriptive and multivariate analyses. Evidence from the relationships of missing data with individual time varying and time invariant characteristics suggests the data are not missing completely at random which makes typical approaches such as listwise deletion inappropriate (Allison, 2001). In the imputation phase, the procedures use a diverse set of predictors to estimate five sets of responses for each missing value. These imputed values include a random component based on draws from the posterior predictive distribution of the missing data under a posited Bayesian model which, under the missing-at-random, provide unbiased estimates of variance (Allison, 2001).

Table 1A
Descriptive statistics for adult demographic and socioeconomic characteristics among middle-class, working-age PSID respndents (1985–2011).
Source: Panel Study of Income Dynamics, 1985–2011

	Combined Sample	White	Black	*p* Value for Black/White Difference
Self Rated Health				
Excellent	21.82	24.35	17.24	***
Very Good	34.83	37.97	29.14	
Good	30.89	27.87	36.36	
Fair	9.88	7.54	14.11	
Poor	2.58	2.27	3.15	
Race				
White	64.40			
Black	35.60			
Mean Family Income (2010 $)	53,972	57,076	48,356	***
	(20,472)	(20,110)	(19,918)	
Mean Age	38.53	38.54	38.52	
	(11.40)	(11.76)	(10.71)	
Sex				
Men	46.03	48.08	42.34	Ref
Women	53.97	51.92	57.66	***
Mean Family Size	3.07	2.95	3.30	***
	(1.46)	(1.34)	(1.62)	
Relation to Head				
Head	63.45	60.33	69.08	Ref
Wife/Husband/ Cohabitor	36.55	39.67	30.92	***
Marital Status				
Married/Cohabiting	67.75	75.02	54.59	Ref
Single	10.92	7.43	17.23	***
Widowed	3.28	2.67	4.39	***
Divorced/Separated	18.05	14.88	23.79	***
Employment Status				
Working	77.70	77.82	77.50	Ref
Unemployed/Laid Off	5.21	4.11	7.20	***
Otherwise Not Working	17.09	18.08	15.30	***
Mean Years Completed Education	12.72	12.91	12.36	***
	(2.11)	(2.09)	(2.09)	
N (Person-Years)	112,209	72,257	39,946	
N (Individuals)	17,059	10,861	6280	

[a]Tests for racial differences are based on two-tailed t-tests generated from bivariate OLS, logit, ordered, or multinomial logit regression models. All models were estimated using robust standard errors clustered at the family level.
**p < 0.01; * p < 0.05; + p < 0.10
*** p < 0.001.

Results

Descriptive findings

Table 1A presents descriptive statistics for middle-class PSID respondents between the ages of 18 and 64. Although only 12.5% of respondents characterize their health as being fair or poor, Black/White disparities in self-rated health are clearly evident. Seventeen percent of African-Americans but only 10% of Whites described their health as being fair or poor. At the opposite end of the spectrum, 62% of Whites but only 46% of African-Americans state their health is either very good

or excellent.

Mean family income across all respondents is $53,972. Despite falling within the middle quintiles of the income distribution, White middle-class PSID participants report significantly higher family incomes ($57,076) than their Black counterparts ($48,356). Furthermore, Black middle-class PSID respondents tend to have slightly larger families than White middle-class PSID respondents, with an average of 3.30 and 2.95 individuals, respectively. This suggests that absolute levels of family incomes have to stretch further and support more people in Black, as opposed to White, families.

The average age of respondents in our total sample is 39. We do not find significant differences in the age of respondents across race. This is not the case when considering if and how the proportion of men and women varies according to race. Whites maintain a more even sex distribution (48% men vs. 52% women), while women are overrepresented among Blacks (42% men vs. 58% women). More than a third of the total sample is either married or cohabiting (68%); however, Black/White disparities emerge when we examine these trends by race. Seventy-five percent of White middle-class PSID respondents but only 55% of Black middle-class PSID respondents are married or cohabiting. Similarly, 7% and 17% of White and African-American respondents, respectively, report being single. Racial disparities in employment are evident but only for those who are unemployed (4% of Whites vs. 7% of Blacks) or otherwise not working (18% of Whites vs. 15% of Blacks). The proportion who are currently working is remarkably consistent across race. We report significant racial differences in educational attainment, with White and Black participants completing, on average, 13 and 12 years of schooling, respectively.

Descriptive findings concerning the childhood socioeconomic characteristics of working age, middle-class PSID respondents are delineated in Table 1B. Even among a sample of individuals whose incomes are neither extremely low or high, the racial patterning of early life disadvantage is quite clear. Forty-seven percent of middle-class Blacks but only 31% of middle-class Whites describe their parents as having been poor when they were growing up. Eighty percent of White PSID respondents but only 62% of Black PSID respondents lived with both parents during childhood. Moreover, 24% and 21% of Whites in our sample but only 10% and 13% of African-Americans had fathers and mothers, respectively, who attended or graduated from college. This suggests that compared to middle-class Whites, middle-class Blacks are more likely to have experienced upward socioeconomic mobility to achieve their current social status as adults.

Table 1B
Descriptive statistics for childhood socioeconomic characteristics among middle-class, working-age PSID respndents (1985–2011).
Source: Panel Study of Income Dynamics, 1985–2011

	Combined Sample	White	Black	*p* Value for Difference
Parents Poor				
Poor	36.92	31.21	47.26	***
Average	44.69	50.77	33.68	
Well Off	18.39	18.02	19.06	
Lived with Both Parents	73.86	80.16	62.48	***
Father's Education				
Less Than High School	33.61	27.53	44.60	***
Some High School	12.89	11.98	14.53	
High School Graduate	34.61	36.76	30.71	
Some College	7.66	9.22	4.82	
College Graduate	11.25	14.51	5.34	
Mother's Education				
Less Than High School	22.35	18.04	30.16	***
Some High School	16.35	13.38	21.72	
High School Graduate	43.56	47.94	35.62	
Some College	9.35	10.44	7.39	
College Graduate	8.39	10.20	5.11	
N (Person-Years)	112,209	72,257	39,946	
N (Individuals)	17,059	10,861	6280	

[a]Tests for difference are based on two-tailed t-tests generated from bivariate OLS, logit, ordered, or multinomial logit regression models. All models were estimated using robust standard errors clustered at the family level.
**p < 0.01; *p < 0.05; +p < 0.10
*** p < 0.001.

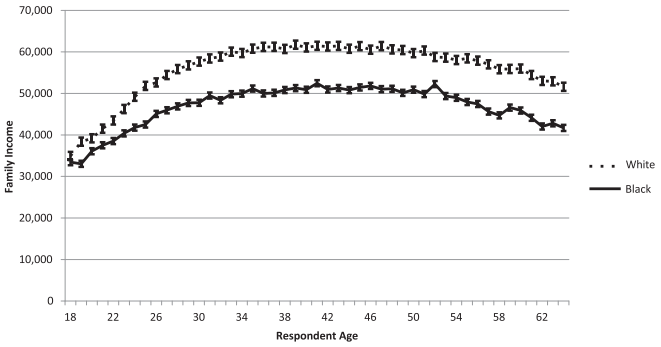

Fig. 1. Mean adjusted family income over time, with 95% confidence intervals.

We present additional descriptive results in Figs. 1 and 2 to adequately reflect how key predictors fluctuate over time. As Fig. 1 makes clear, average family incomes increase among middle-class PSID participants of both races as they age, with peak earning power being reached slightly earlier, at age 39, for Whites than at age 41 for African-Americans. Racial disparities in income are relatively modest during emerging adulthood (18–30 years of age), but grow rapidly so that the Black/White gap becomes pronounced by age 30 and continues unabated throughout midlife until retirement. Given that a sizeable proportion of young people being raised in middle-class families attend college during their late teens and early 20s, the smaller Black/White income gap during emerging adulthood could reflect the postponement of full-time employment. Regardless of the reason(s) driving trends delineated in Fig. 1, it is apparent that racial disparities in income among middle-class Americans emerge early and accumulate over time.

Not surprisingly, more middle-class Black than White PSID respondents rate their health as fair or poor health over the lifecourse (Fig. 2). Furthermore, racial disparities in self-rated health increase over time, emerging early on rather than becoming apparent at later ages. By age 25, more than twice as many Blacks than Whites rate their health as being fair or poor (8.32% vs. 3.35%). By ages 45 and 65, this gap in self-rated health is 7.4 (19.80% vs. 12.44%) and 18.7 (41.91% vs. 23.16%) percentage points, respectively. Thus, during the peak working ages when most middle-class individuals expect to maintain their health and maximize their earning power (i.e. mid 40s), almost one in five African-Americans can expect to be in ill health. This is

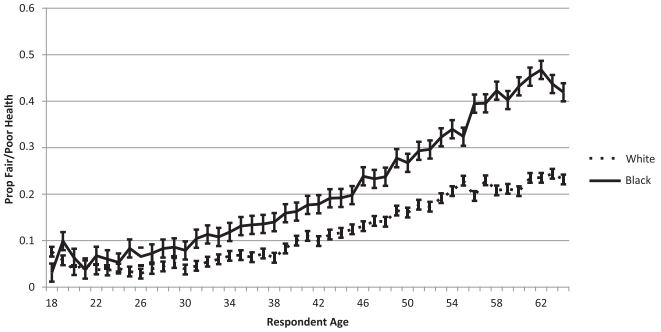

Fig. 2. Proportion in fair or poor health over time, with 95% confidence intervals.

Table 2
Results from multilevel logistic regression models predicting fair or poor health for middle-class, working aged PSID respondents (1985–2011).
Source: Panel Study of Income Dynamics, 1985–2011

	Model 1[b]			Model 2[b]			Model 3[b]		
	b		SE[a]	b		SE[a]	b		SE[a]
Age	0.069	***	0.004	0.069	***	0.004	0.065	***	0.004
Ln Family Income	−0.804	***	0.094	−0.969	***	0.104	−0.926	***	0.099
Race									
NH White	Ref			Ref			Ref		
NH Black	0.790	***	0.088	0.849	***	0.091	0.700	***	0.089
Income*NH Black				0.273	*	0.117	0.237	*	0.116
Parents Poor									
Poor							Ref		
Average							−0.424	***	0.073
Well Off							−0.202	*	0.088
Lived with Both Parents							−0.161	*	0.066
Father's Education									
Less Than High School							Ref		
Some High School							−0.194	*	0.095
High School Graduate							−0.207	**	0.065
Some College							−0.260	*	0.119
College Graduate							−0.223	*	0.103
Mother's Education									
Less Than High School							Ref		
Some High School							−0.134		0.083
High School Graduate							−0.262	**	0.079
Some College							−0.190	f	0.106
College Graduate							−0.186	f	0.111
Intercept	1.980	***	1.980	2.002	***	0.252	1.528	***	0.247
Random Effects									
Variance for Intercept	5.537	***	0.244	5.580	***	0.237	5.498	***	0.234
Variance for Income	1.023	***	0.171	1.132	***	0.139	1.229	***	0.170
Variance for Age	0.010	***	0.001	0.010	***	0.001	0.010	***	0.001
Cov(Health & Income)	0.469	f	0.246	0.607	**	0.210	0.652	**	0.194
Cov(Health & Age)	0.094	***	0.009	0.094	***	0.009	0.095	***	0.009
N (Person-Years)		112,209			112,209			112,209	
N (Individuals)		17,059			17,059			17,059	

Notes : All multilevel regression models are estimated with random intercepts for each PSID respondent. Variables are mean centered.
[a] Robust standard errors are calculated with the Huber/White correction method and clustered at the family level.
[b] Additional control variables include: age, sex, family size, relation to head, marital status, employment status, and years completed education.
*** $p < 0.001$
** $p < 0.01$.
* $p < 0.05$.
[f] $p < 0.10$

compared to only one in ten Whites. By retirement age, almost half of middle-class African-Americans but only a quarter of similarly situated Whites describe their health as being fair or poor.

Multilevel regression results

Results from regression models are presented in Table 2. Model 1, our baseline model, characterizes the relationship between family income and self-rated health. Since our sample is restricted to respondents who fall within the three middle income quintiles, regression coefficients for family income capture how much, on average, the odds of fair or poor health change following a 1% increase in this SES measure. Thus, our findings capture those within the middle-class whose incomes fluctuate over time as well as those whose incomes remain relatively stable. In Model 2, we incorporate an interaction term (income*race) to test whether the association between family income and self-rated health is significantly different for Blacks compared to Whites. By integrating additional indicators of childhood disadvantage in Model 3, we test how much of the disparate relationship between family income and self-rated health across race (i.e. the interaction term) can be explained by African-Americans greater propensity to experience early life socioeconomic adversity. We statistically control for a number of covariates including respondent's age, sex, family size, relationship to household head, marital status, employment status, and years of completed schooling in all regression models.

Do middle-class African-Americans experience significantly fewer health returns to intragenerational upward mobility compared to middle-class Whites?

Results from Model 1 indicate that among middle-class respondents, after controlling for race, each additional 10% increase in family income decreases the odds of being in fair/poor health by 8.0% [−0.804*10]. To reiterate, this association is net of the effect of a number of important covariates, including employment and educational attainment – two additional key determinants of socioeconomic status. Additionally, we find that compared to Whites, African-Americans in this sample are 2.2 times more likely to be in fair or poor health [exp(0.790)], despite falling within the middle three quintiles of the income distribution.

What is the magnitude of the Black/White gap in the association between fluctuations in SES across the lifecourse and health?

The coefficient for the interaction term we add to Model 2 (0.273) is of a moderate magnitude ($p < 0.05$), suggesting that middle-class African-Americans experience differential health returns to intragenerational upward mobility, at least that which is captured by fluctuations in family income across the lifecourse. For middle-class White PSID respondents, every 10% increase in family income over time is associated with a subsequent 9.7% [−0.969*10] reduction in

the odds of fair or poor health. For their Black counterparts, the regression coefficient for family income is reduced by 0.273, indicating that middle-class African-Americans can only expect to lessen the likelihood of suboptimal health by 6.9% [−0.696*10] with each additional 10% increase in family income.

How much of the differential impact of intragenerational mobility on health can be explained by racial disparities in exposure to childhood social and economic disadvantage?

Once we control for differential exposure to childhood socioeconomic disadvantage across race (Model 3), the magnitude of the coefficient for the interaction term decreases by 13% from 0.273 to 0.237 but remains sizeable and continues to be statistically significant ($p < 0.05$). These findings suggest that early life socioeconomic disadvantage explains a small proportion of racial disparities in the health returns to upward mobility. For Whites, a 10% increase in family income over time is associated with an 9.3% [−0.926*10] reduction in the odds of fair or poor health. For Blacks, however, a 10% increase in family income results in the odds of fair/poor health decreasing by 6.9% [−0.689*10].

Results from Model 3 also reveal some interesting associations between specific aspects of childhood socioeconomic disadvantage and self-rated health in adulthood. Having parents who were average as opposed to poor significantly reduces the chance of being in fair or poor health by 35% [(1 − exp(−0.424))*100]. Growing up with parents who were well off compared to poor, however, only lessens the odds of fair or poor health by only 18% [(1 − exp (−0.202))*100]. This finding suggests that the relationship between childhood SES and adult health might be curvilinear, with diminishing returns as one moves farther up the income distribution.

We also note that both father's and mother's educational attainment appears to matter when determining subsequent health status over time. This is remarkable since gender differences in school completion, with women at a distinct disadvantage, were pronounced among the parents of PSID respondents. The education/health gradient for father's schooling increases until the some college category, while the corresponding gradient for mother's schooling reaches the greatest magnitude at the high school graduate category, suggesting that having a college educated father rather than mother could be more health protective later in life. This result could be driven by gender differences in the returns to education and deserves further study in future research.

Discussion

Taken as a whole, our findings lend credence to the restricted returns hypothesis (RRH) to explain the patterning of racial inequalities in self-rated health among middle-class, working-age adults in the United States. Net of the effects of potential confounders, intragenerational increases in family income over time were associated with significantly larger reductions in fair or poor health for Whites than Blacks. These results stand in contrast to those presented elsewhere (Hayward et al., 2000; Shuey & Willson, 2008; Haas & Rohlfsen, 2010) which do not report sizeable Black/White differences in the relationship between lifetime SES and health. Instead, they bolster those from of a small but growing body of literature that suggests returns, health and otherwise, to upward socioeconomic mobility might not be similar across race (Colen et al., 2006; Fuller-Rowell, Doan, & Eccles, 2012; Hudson et al., 2012, 2013).

We cannot say, with certainty, why our findings regarding racial disparities in the association between SES and health differ from prior research, but these divergent results could stem from the fact that many earlier studies relied on older analytic samples. Black/White differences in health tend to be less pronounced at later ages because of selection pressures that exert themselves over the lifecourse to produce a robust group of African-Americans in their 70s and 80s. Furthermore, older cohorts of Americans came of age during a historical epoch characterized by very different social conditions than the ones experienced by younger cohorts. For example, the Great Depression exposed large numbers of White and well as Black children to childhood deprivation, which could have blunted racial disparities in the effect of early life SES on subsequent health outcomes. Moreover, deeply entrenched patterns of racial residential segregation during the first half of the 20th century, which were held in place by restrictive covenants, redlining, and mob violence (Massey & Denton, 1993; Rothstein, 2017), helped to create vibrant Black inner-city neighborhoods with thriving middle-classes (Wilson 2012). Rather than leaving African American enclaves to find better housing, schools, and job prospects, as is more common today, most middle-class Blacks did not relocate to predominantly White neighborhoods as their socioeconomic circumstances improved.

Results presented here also suggest that while childhood conditions are important predictors of adult health, they are not sufficient to explain why the health of middle-class African-Americans lags behind that of similarly situated Whites. On the contrary, it appears that even after accounting for several key indicators of childhood disadvantage, middle-class Blacks reap fewer health benefits as they ascend the socioeconomic hierarchy. This finding is in line with other lifecourse research on racial inequalities in health – namely that both childhood and adult exposures work in tandem to produce disparate trends in morbidity and mortality (Kahn, & Fazio, 2005; Wilson, 2007; Haas, Krueger, & Rohlfsen, 2012). Our study takes this exploration one step further to show that restricted health returns to upward mobility for middle-class African-Americans are not simply a result of differential exposures to childhood disadvantage. Thus, the beneficial effects of pursuing the American Dream, even successfully so, might not extend equally across race.

Why would the health of middle-class, working-age Whites benefit more from similar gains in SES over time than similarly situated African-Americans? One of the most frequently suggested answers to this question concerns the differential exposure to childhood socioeconomic disadvantage across race – namely that middle-class African-Americans are more likely than their White counterparts to have spent their early years in or near poverty. This explanation, coupled with our ever expanding knowledge regarding the long-term deleterious effects of childhood stress on health and wellbeing (Lee, Tsenkova, & Carr, 2014; Montez & Hayward, 2014; Umberson, Williams, Thomas, Liu, & Thomeer, 2014), provides a theoretically justified and sociologically plausible pathway through which restricted health returns to upward mobility could be substantiated. However, our empirical findings indicate otherwise since racial differences in the association between family income and self-rated health remained sizable even after accounting for four critical aspects of early life disadvantage, and echo those reported by Haas and Rohlfsen (2010) who note that social and economic hardship in childhood accounts for only a small proportion of the impact of SES on health across the lifecourse.

Unlike much of the research that investigates racial disparities in health, our study focuses solely on the experiences of non-poor populations, thus filling a critical gap in the literature. Although interest in the Black middle-class, along with its numbers (Marsh, Darity, Cohen, Casper, & Salters, 2007; Hunt & Ray, 2012), has been increasing over time, it remains a vastly understudied and often misunderstood segment of society (Jackson & Stewart, 2003; Landry, & Marsh, 2011). Given that (1) the Black/White gap in morbidity and mortality tends to be *more* pronounced at higher levels of SES and (2) the underlying social and economic conditions that give rise to racial disparities in health vary greatly across the SES spectrum, it is imperative that we gain a deeper understanding of the unique challenges faced by the Black middle-class – most notably how race-related stressors work to erode the health of its members despite their largely successful efforts to maintain or improve their socioeconomic standing.

Although the results presented here shed light on influential lifecourse pathways, through which the health of middle-class African

Americans lags behind that of their White counterparts, additional questions remain. A particularly notable one concerns the role of gender in shaping the association between lifetime SES and health across race. For example, in recent decades women's rates of school completion have surpassed men's, many male dominated occupations now boast substantially more female workers, and the gender wage gap has narrowed, particularly at labor market entry (Blau, Brummund, & Yung-Hsu Liu, 2013; DiPrete & Buchmann, 2013; Mandel & Semyonov, 2014). At the same time, the United States has witnessed declines in life expectancy among working-class Whites that have been more pronounced among women than men (Kindig & Cheng, 2013; Montez & Zajacova, 2014). These demographic trends, in conjunction with prior research that suggests African American women, even among those who are not poor, may bear the brunt of accelerated aging (i.e. weathering) (Geronimus, 2015), makes future empirical efforts that approach these research questions from a decidedly intersectional perspective necessary.

Policy implications

First and foremost, our findings provide evidence that racial disparities in health are not simply a reflection of differential access to socioeconomic resources. Instead, they suggest a more nuanced and complicated relationship between SES and health that is likely to vary substantially across different racial/ethnic groups (Kaufman, Cooper, and McGee, 1997; Williams & Sternthal, 2010). If, as a society, we want to work toward eliminating health racial disparities in health, it is imperative to recognize that anti-poverty programs are important but not sufficient to achieve this lofty goal. To do so, we will need to address at least some of the fundamental causes (Phelan & Link, 2015), such as residential segregation (Williams & Collins, 2001), differential wealth accumulation (Oliver & Shapiro, 2013), and continued exposure to interpersonal racial discrimination (Williams, & Mohammed, 2009), that undergird suboptimal health outcomes among African-Americans of all class backgrounds.

Second, over the previous decade, lifecourse researchers have presented convincing evidence that exposures in childhood are key drivers of health and wellbeing in adulthood (Hayward & Gorman, 2004; Haas, 2008; Campbell et al., 2014; Pudrovska, 2014) and policy recommendations have begun to follow suit (Forrest & Riley, 2004; Barnett & Belfield, 2006; Irwin, Siddiqi, & Hertzman, 2007; Hertzman et al., 2010). While our results do not contradict these findings, they suggest that early life factors cannot fully, or even predominantly, account for racial disparities in subsequent health outcomes, even among those segments of society that have achieved middle-class standing. In order to reduce the Black/White gap in health, we will need to design and implement social policies that help working-age adults *in addition* to their children. It will not be enough to focus on the youngest segments of society to improve population health outcomes and reduce racial disparities in morbidity and mortality. Health programs and policies that target children and adolescents could be designed to provide "boosters" to high-risk subgroups as they move through the lifecourse. This is likely to be an especially unpopular policy recommendation in an era that has witnessed continual efforts to shrink the role and size of government, but is a critical aspect of any well informed plan to improve the health of minority populations and reduce racial disparities in morbidity and mortality.

Finally, our findings suggest that small improvements in early life conditions, such as growing up in a moderately well off as opposed to poor family or having a parent who graduated from high school, have long lasting health implications for children as they move through successive lifecourse stages – even up until retirement age. Thus, it is not necessary for parents to reach the highest rungs of the socioeconomic hierarchy, which are often characterized by advanced degrees, prestigious jobs, or six figure salaries, to pass the positive health effects of these SES gains onto their children. In an era characterized by an astonishing amount of income inequality (Piketty & Saez, 2014), this is an important point to underscore. The long arm of childhood exposures on adult health appears to be rather sensitive to the intergenerational effects of social and economic disadvantage, such that a little bit of upward mobility is likely to produce larger than expected improvements in health within and across generations. Thus, policy efforts that enable a larger swathe of individuals to experience upward mobility, even at the lower rungs of the income distribution, such as raising the minimum wage or a establishing a guaranteed income, have a greater probability of improving population health outcomes and reducing health disparities across multiple generations than efforts that allow a small number of people to accrue excessive levels of wealth.

Even in an era of improving social and economic standing among African-Americans, racial disparities in health remain entrenched. In order to reduce, and eventually eliminate, Black/White differentials in morbidity and mortality, we need to gain a deeper understanding of the complex ways that race and SES interact to produce health and well-being and how these processes fluctuate across the lifecourse. This is not likely to be simple relationship – one in which the health of African-Americans improves steadily as they ascend the socioeconomic hierarchy. Instead, it will take careful empirical inquiry to demonstrate how structural level racial inequalities as well as continued exposure to racial discrimination erode the health returns to upward mobility we have come to expect as an integral part of the American Dream.

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References

Aaronson, Daniel, & Mazumder, Bhashkar (2008). Intergenerational Economic Mobility in the United States, 1940 to 2000. *Journal of Human Resources, 43*, 139–172.
Adelman, Robert M. (2004). Neighborhood opportunities, race, and class: The Black middle class and residential segregation. *City and Community, 3*, 43–63.
Adler, Nancy E., et al. (1994). Socioeconomic status and health: The challenge of the gradient. *American Psychologist, 49*, 15–24.
Adler, Nancy E., & Rehkopf, David H. (2008). U.S. disparities in health: Descriptions, causes, and mechanisms. *Annual Review of Public Health, 29*, 235–252.
Akinbami, Lara J., Moorman, Jeanne E., Simon, Alan E., & Schoendorf, Kenneth C. (2014). Trends in racial disparities for asthma outcomes among children 0 to 17 years, 2001–2010. *Journal of Allergy and Clinical Immunology, 134*, 547–553.
Akinbami, Lara J., Simon, Alan E., & Rossen, Lauren M. (2016). Changing trends in asthma prevalence among children. *Pediatrics, 137*, 1–7.
Allison, Paul D. (2001). *Missing data.* Thousand Oaks, CA: Sage Publications, Inc.
Almond, Douglas, & Mazumder, Bhashkar (2011). Health capital and the prenatal environment: The effect of ramadan observance during pregnancy. *American Economic Journal: Applied Economics, 3*, 56–85.
Barker, David J. P. (2003). The developmental origins of adult disease. *European Journal of Epidemiology, 18*, 733–736.
Barnett, W. Steven, & Belfield, C. R. (2006). Early childhood development and social mobility. *The Future of Children, 16*, 73–98.
Blau, Francine D., Brummund, Peter, & Yung-Hsu Liu, Albert (2013). Trends in occupational segregation by gender 1970–2009: Adjusting for the impact of changes in the occupational coding system. *Demography, 50*, 471–492.
Blau, Peter M., & Duncan, Otis Dudley (1967). *American occupational structure.* Hoboken, NJ: John Wiley & Sons.
Bond Huie, Stephanie A., Krueger, Patrick M., Rogers, Richard G., & Hummer, Robert A. (2003). Wealth, race, and mortality. *Social Science Quarterly, 84*, 667–684.
Braveman, Paula A., Cubbin, Catherine, Egerter, Susan, Williams, David R., & Pamuk, Elsie (2010). Socioeconomic disparities in health in the United States: what the patterns tell us. *American Journal of Public Health, 100*(S1), S186–S196 (April 1).
Campbell, Frances, et al. (2014). Early childhood investments substantially boost adult health. *Science, 343*, 1478–1485.
Caprio, Sonia, et al. (2012). Influence of race, ethnicity, and culture on childhood obesity: Implications for prevention and treatment. *Obesity, 16*, 2566–2577.
Case, Anne, Fertig, Angela, & Paxson, Christina (2005). The lasting impact of childhood

health and circumstance. *Journal of Health Economics, 24*, 365–389.
Case, Anne, Lubotsky, Darren, & Paxson, Christina (2002). Economic status and health in childhood: The origins of the gradient. *The American Economic Review, 92*, 1308–1334.
Case, Anne, & Paxson, Christina (2008). Height, health, and cognitive function at older ages. *The American Economic Review, 98*, 463–467.
Case, Anne, & Paxson, Christina (2010). Causes and consequences of early-life health. *Demography, 47*, S65–S85.
Centers for Disease Control and Prevention. 2012. National Center for Health Statistics. Health Data Interactive.〈www.cdc.gov/nchs/hdi.htm〉.
Chen, Yuyu, & Zhou, Li-An (2007). The long-term health and economic consequences of the 1959–1961 famine in China. *Journal of Health Economics, 26*, 659–681.
Chetty, Raj, et al. (2017). The fading American dream: Trends in absolute income mobility since 1940. *Science, 356*, 398–406.
Chetty, Raj, Hendren, Nathaniel, Jones, Maggie R., & Porter, Sonya R. (2018). *Race and economic opportunity in the United States: An intergenerational perspective.* National Bureau of Economic Research (Working Paper No. 24441).
Colen, Cynthia G. (2011). Addressing racial disparities in health using life course perspectives: toward a constructive criticism. *DuBois Review, 8*(1), 79–94.
Colen, Cynthia G., Geronimus, Arline T., Bound, John, & James, Sherman A. (2006). Maternal upward socioeconomic mobility and Black-White disparities in infant birthweight. *American Journal of Public Health, 96*, 2032–2039.
Colen, Cynthia G., Ramey, David M., Cooksey, Elizabeth C., & Williams, David R. (2018). Racial disparities in health among nonpoor african americans and hispanics: The role of acute and chronic discrimination. *Social Science Medicine, 199*, 167–180.
Conti, Gabriella, Heckman, James, & Urzua, Sergio (2010). The education-health gradient. *American Economic Review, 100*, 234–238.
Conley, Dalton (2010). *Being black, living in the red* (Second Edition). Berkeley, CA: University of California Press.
Currie, Janet (2009). Healthy, wealthy, and wise: Socioeconomic status, poor health in childhood, and human capital development. *Journal of Economic Literature, 47*, 87–122.
DeSalvo, Karen B., Bloser, Nicole, Reynolds, Kristi, He, Jiang, & Muntaner, Paul (2006). Mortality prediction with a single general self-rated health question. *Journal of General Internal Medicine, 21*, 267–275.
DiPrete, Thomas A., & Buchmann, Claudia (2013). *The rise of women: The growing gender gap in education and what it means for American schools.* New York: Russell Sage Foundation.
Duncan, Greg J., Daly, Mary C., McDonough, Peggy, & Williams, David R. (2002). Optimal indicators of socioeconomic status for health research. *American Journal of Public Health, 92*, 1151–1157.
Duncan, Greg J., Ziol-Guest, Kathleen M., & Kalil, Ariel (2010). Early-childhood poverty and adult attainment, behavior, and health. *Child Development, 81*, 306–325.
Elo, Irma T., & Preston, Samuel H. (1996). Educational differentials in mortality: United States, 1979–1985. *Social Science Medicine, 42*, 47–57.
Farmer, Melissa M., & Ferraro, Kenneth F. (2005). Are racial disparities in health conditional on socioeconomic status? *Social Science Medicine, 60*, 191–204.
Feagin, Joe R., & Sikes, Melvin P. (1994). *Living with racism: The Black middle-class experience.* Boston: Beacon Press.
Ferraro, Kenneth F., & Farmer, Melissa M. (1999). Utility of health data from social surveys: Is there a gold standard for measuring morbidity? *American Sociological Review, 64*, 303–315.
Forrest, Christopher B., & Riley, Anne W. (2004). Childhood origins of adult health: A basis for life-course health policy. *Health Affairs, 23*, 155–164.
Franks, Peter, Gold, Marthe R., & Fiscella, Kevin (2003). Sociodemographics, self-rated health, and mortality in the US. *Social Science Medicine, 56*, 2505–2514.
Fuller-Rowell, Thomas E., Doan, Stacey N., & Eccles, Jacquelynne S. (2012). Differential effects of perceived discrimination on the diurnal cortisol rhythm of African Americans and Whites. *Psychoneuroendocrinology, 37*(1), 107–118.
Geronimus, Arline T. (2013). Deep integration: Letting the epigenome out of the bottle without losing sight of the structural origins of population health. *American Journal of Public Health, 103*, S56–S63.
Geronimus, Arline T. (2015). Race-ethnicity, poverty, urban stressors, and telomere length in a detroit community-based sample. *Journal of Health and Social Behavior, 56*, 199–224.
Geronimus, Arline T., Bound, John, Waidmann, Timothy A., Colen, Cynthia G., & Steffick, Dianne (2001). Inequality in life expectancy, functional status, and active life expectancy across selected black and white populations in the United States. *Demography, 38*, 227–251.
Geronimus, Arline T., Hicken, Margaret, Keene, Danya, & Bound, John (2006). Weathering and age patterns of allostatic load scores among Blacks and Whites in the United States. *American Journal of Public Health, 96*, 826–833.
Goldin, Claudia, & Katz, Lawrence F. (1999). *The returns to skill in the united states across the twentieth century.* National Bureau of Economic Research.
Goren, Michael I. (2008). Ethnic-specific pathways to obesity related disease: The hispanic vs. African American paradox. *Obesity, 16*, 2561–2565.
Haas, Steven (2008). Trajectories of functional health: The 'long arm' of childhood health and socioeconomic factors. *Social Science Medicine, 66*, 849–861.
Haas, Steven A., Krueger, Patrick M., & Rohlfsen, Leah (2012). Race/ethnic and nativity disparities in later life physical performance: The role of health and socioeconomic status over the life course. *Journals of Gerontology Series B-Psychological Sciences and Social Sciences, 67*, 238–248.
Haas, Steven, & Rohlfsen, Leah (2010). Life course determinants of racial and ethnic disparities in functional health trajectories. *Social Science Medicine, 70*, 240–250.
Hardy, Shakia T., et al. (2017). Heterogeneity in blood pressure transitions over the life course: Age-specific emergence of racial/ethnic and sex disparities in the United States. *JAMA Cardiology, 2*, 653–661.
Harper, Sam, Lynch, John, Burris, Scott, & Smith, George Davey (2007). Trends in the Black-White life expectancy gap in the United States, 1983–2003. *JAMA: The Journal of the American Medical Association, 297*, 1224–1232.
Hayward, Mark D., & Gorman, Bridget K. (2004). The long arm of childhood: The influence of early-life social conditions on men's mortality. *Demography, 41*, 87–107.
Hayward, Mark D., Miles, Toni P., Crimmins, Eileen M., & Yang, Yu (2000). The significance of socioeconomic status in explaining the racial gap in chronic health conditions. *American Sociological Review, 65*, 910–930.
Heckman, James, Pinto, Rodrigo, & Savelyev, Peter (2013). Understanding the mechanisms through which an influential early childhood program boosted adult outcomes. *The American Economic Review, 103*, 2052–2086.
Hertzman, Clyde, et al. (2010). Tackling inequality: Get them while they're young. *BMJ, 340*, 346–348.
Hertzman, Clyde, & Power, Chris (2003). Health and human development: Understandings from life-course research. *Developmental Neuropsychology, 24*, 719–744.
Hoek, Hans W., Brown, Alan, & Susser, Ezra (1998). The Dutch famine and schizophrenia spectrum disorders. *Social Psychiatry and Psychiatric Epidemiology, 33*, 373–379.
Hudson, Darrell L., et al. (2012). Are benefits conferred with greater socioeconomic position undermined by racial discrimination among African-American men? *Journal of Men'States Health, 9*, 127–136.
Hudson, Darrell L., Puterman, Eli, Bibbins-Domingo, Kirsten, Matthews, Karen A., & Adler, Nancy E. (2013). Race, life course socioeconomic position, racial discrimination, depressive symptoms and self-rated health. *Social Science Medicine, 97*, 7–14.
Hunt, Matthew O., & Ray, Rashawn (2012). Social class identification among Black Americans: Trends and determinants, 1974–2010. *American Behavioral Scientist, 56*, 1462–1480.
Irwin, Lori G., Siddiqi, Arjumad, & Hertzman, Clyde (2007). *Early child development: A powerful equalizerFinal report to the WHO Commission on Social Determinants of Health, Geneva.*
Jackson, Pamela Braboy, & Stewart, Quincy Thomas (2003). A research agenda for the Black middle class: Work stress, survival strategies, and mental health. *Journal of Health and Social Behavior, 44*, 442–455.
Jackson, Paula Braboy (2005). Health inequalities among minority populations. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences, 60*, S63–S67.
Jylhä, Marja (2006). Self-rated health showed a graded association with frequently used biomarkers in a large population sample. *Journal of Clinical Epidemiology, 59*, 465–471.
Jylhä, Marja (2009). What is self-rated health and why does it predict mortality? Towards a unified conceptual model. *Social Science Medicine, 69*, 307–316.
Kahn, Joan R., & Fazio, Elena M. (2005). Economic status over the life course and racial disparities in health. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences, 60*, S76–S84.
Kaufman, Jay S., Cooper, Richard S., & McGee, Daniel L. (1997). Socioeconomic status and health in blacks and whites: the problem of residual confounding and the resiliency of race. *Epidemiology, 8*(6), 621–628.
Killewald, Alexandra (2013). Return to being Black, living in the red: A race gap in wealth that goes beyond social origins. *Demography, 50*, 1177–1195.
Kindig, David A., & Cheng, Erika R. (2013). Even as mortality fell in most US counties, female mortality nonetheless rose in 42.8 percent of counties from 1992 to 2006. *Health Affairs, 32*, 451–458.
Kochhar, R. and Fry R. (2014). Wealth Inequality Has Widened Along Racial, Ethnic Lines Since End of Great Recession. Pew Research Center Report. Washington DC.
Koyama, et al. (2014). Adiposity rebound and the development of metabolic syndrome. *Pediatrics, 133*, 114–119.
Lacy, Karen (2007). *Blue Chip Black: Race, class, and status in the new Black middle class.* Berkeley, CA: University of California Press.
Landry, Bart, & Marsh, Kris (2011). The evolution of the new Black middle class. *Annual Review of Sociology, 37*, 373–394.
Lee, Chioun, Tsenkova, Vera, & Carr, Deborah (2014). Childhood trauma and metabolic syndrome in men and women. *Social Science Medicine, 105*, 122–130.
Mandel, Hadas, & Semyonov, Moshe (2016). Going back in time? Gender differences in trends and sources of the racial pay gap. *American Sociological Review, 81*, 1039–1068.
Maroto, Michelle (2016). Growing farther apart: Racial and ethnic inequality in household wealth across the distribution. *Sociological Science, 3*, 801–824.
Marsh, Kris, Darity, William A., Cohen, Philip N., Casper, Lynne M., & Salters, Danielle (2007). The emerging Black middle class: Single and living alone. *Social Forces, 86*, 735–762.
Massey, D. S., & Denton, N. A. (1993). *American apartheid: segregation and the making of the underclass.* Cambridge, MA: Harvard University Press.
Masters, Ryan K. (2012). Uncrossing the U.S. Black-White mortality crossover: The role of cohort forces in life course mortality risk. *Demography, 49*, 773–796.
Merton, Robert K. (1968). The Matthew Effect in science: The reward and communication systems of science are considered. *Science, 159*, 56–63.
Montez, Jennifer Karas, & Hayward, Mark D. (2014). Cumulative childhood adversity, educational attainment, and active life expectancy among U.S. adults. *Demography, 51*, 413–435.
Montez, Jennifer Karas, & Zajacova, Anna (2013). Explaining the widening gap in mortality among U.S. White women. *Journal of Health and Social Behavior, 54*, 166–182.
Moretti, Enrico (2008). *Real wage inequality.* National Bureau of Economic Research.
Murphy, Sherry L., Xu, Jiaquan, & Kockanek, Kenneth D. (2013). Deaths: Final data for 2010. *National Vital Statistics Reports, 61*.
Ogden, Cynthia L., et al. (2016). Trends in obesity prevalence among children and adolescents in the United States, 1988–1994 through 2013–2014. *JAMA, 315*,

2292–2299.
Oliver, Melvin L., & Shapiro, Thomas M. (2013). *Black Wealth, White Wealth: A New Perspective on Racial Inequality* (Second Edition). Taylor & Francis.
Palloni, Alberto (2006). Reproducing inequalities: Luck, wallets, and the enduring effects of childhood health. *Demography, 43*, 587–615.
Pattillo, Mary (2013). *Black picket fences: Privilege and peril among the Black middle class* (2nd Edition). Chicago, IL: University of Chicago Press.
Pavalko, Eliza K., & Caputo, Jennifer (2013). Social inequality and health across the life course. *American Behavioral Scientist, 57*, 1040–1056.
Pfeffer, Fabian T., Danziger, Sheldon, & Schoeni, Robert F. (2013). Wealth disparities before and after the great recession. *Annals of the American Academy of Political and Social Science, 650*, 98–122.
Phelan, Jo. C., & Link, Bruce G. (2015). Is racism a fundamental cause of inequalities in health? *Annual Review of Sociology, 41*, 311–330.
Phelan, Jo. C., Link, Bruce G., & Tehranifar, Parisa (2010). Social conditions as fundamental causes of health inequalities: Theory, evidence, and policy implications. *Journal of Health and Social Behavior, 51*, S28–S40.
Piketty, Thomas, & Saez, Emmanuel (2014). Inequality in the long run. *Science, 344*, 838–843.
Pollack, Craig Evan, et al. (2013). Do wealth disparities contribute to health disparities within racial/ethnic groups? *Journal of Epidemiology and Community Health, 67*, 439–445.
PSID (2013). Main Interview User Manual: Release 2012.1. Institute for Social Research University of Michigan.
Pudrovska, Tetyana (2014). Early-life socioeconomic status and mortality at three life course stages: An increasing within-cohort inequality. *Journal of Health and Social Behavior, 55*, 181–195.
Reardon, Sean F., Fox, Lindsay, & Townsend, Joseph (2015). Neighborhood income composition by household race and income, 1990–2009. *Annals of the American Academy of Political and Social Science, 660*, 78–97.
Rothstein, Richard (2017). *The Color of Law: A forgotten history of how our government segregated America.* New York, NY: Norton.
Schwartz, Sharon, & Meyer, Ilan H. (2010). Mental health disparities research: The impact of within and between group analyses on tests of social stress hypotheses. *Social Science Medicine, 70*, 1111–1118.
Shapiro, Thomas M. (2017). *Toxic inequality: How America's wealth gap destroys mobility, deepens the racial divide, and threatens our future.* New York: Basic Books.
Sharkey, Patrick (2014). Spatial segmentation and the Black middle class. *American Journal of Sociology, 119*, 903–954.
Shuey, Kim M., & Willson, Andrea E. (2008). Cumulative disadvantage and Black-White disparities in life-course health trajectories. *Research on Aging, 30*, 200–225.
Skrondal, A., & Rabe-Hesketh, S. (2004). *Generalized latent variable modeling.* New York: Chapman and Hall/CRC.
Snijders, T. A. B., & Bosker, R. J. (2012). *Multilevel analysis: An introduction to basic and advanced multilevel modeling* (2nd ed.). California: Sage.
St Clair, David, et al. (2005). Rates of adult schizophrenia following prenatal exposure to the chinese famine of 1959–1961. *JAMA: the journal of the American Medical Association, 294*, 557–562.
Stein, Aryeh D., et al. (2007). Anthropometric measures in middle age after exposure to famine during gestation: Evidence from the Dutch famine. *The American Journal of Clinical Nutrition, 85*, 869–876.
Stein, Aryeh D., Zybert, Patricia A., van der Pal-de Bruin, Karin, & Lumey, L. H. (2006). Exposure to famine during gestation, size at birth, and blood pressure at age 59 Y: Evidence from the Dutch famine. *European Journal of Epidemiology, 21*, 759–765.
Susser, Mervyn, & Stein, Zena (1994). Timing in prenatal nutrition: A reprise of the Dutch famine study. *Nutrition Reviews, 52*, 84–94.
Umberson, Debra, Williams, Kristi, Thomas, Patricia A., Liu, Hui, & Thomeer, Mieke Beth (2014). Race, gender, and chains of disadvantage: Childhood adversity, social relationships, and health. *Journal of Health and Social Behavior, 55*, 20–38.
Walsemann, Katrina M., Geronimus, Arline T., & Gee, Gilbert C. (2008). Accumulating disadvantage over the life course: Evidence from a longitudinal study investigating the relationship between educational advantage in youth and health in middle age. *Research on Aging, 30*, 169–199.
Warner, David F., & Hayward, Mark D. (2006). Early-life origins of the race gap in men's mortality. *Journal of Health and Social Behavior, 47*, 209–226.
Weiss, Ram (2004). Obesity and the metabolic syndrome in children and adolescents. *New England Journal of Medicine, 350*, 2362–2374.
Williams, David R., & Collins, Chiquita (2001). Racial residential segregation: A fundamental cause of racial disparities in health. *Public Health Reports, 116*, 404–416.
Williams, David R., & Mohammed, Selina (2009). Discrimination and racial disparities in health: Evidence and needed research. *Journal of Behavioral Medicine, 32*, 20–47.
Williams, David R., Mohammed, Selina A., Leavell, Jacinta, & Collins, Chiquita (2010). Race, socioeconomic status, and health: Complexities, ongoing challenges, and research opportunities. *Annals of the New York Academy of Sciences, 1186*, 69–101.
Williams, David R., & Sternthal, Michelle (2010). Understanding racial-ethnic disparities in health. *Journal of Health and Social Behavior, 51*, S15–S27.
Willson, Andrea E., Shuey, Kim M., & Elder, Glen H., Jr. (2007). Cumulative advantage processes as mechanisms of inequality in life course health. *American Journal of Sociology, 112*, 1886–1924.
Wilson, George (2007). Racialized life-chance opportunities across the class structure: The case of African-Americans. *The Annals of the American Academy of Political and Social Science, 609*, 215–232.
Wilson, William Julius (2012). *The truly disadvantaged: The inner city, the underclass, and public policy* (Second ed.). Chicago, IL: University of Chicago Press.