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Racial/Ethnic Disparities in Midlife Depressive Symptoms: The Role of Cumulative Disadvantage Across the Life Course

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Abstract

This study examines the role of cumulative disadvantage mechanisms across the life course in the production of racial and ethnic disparities in depressive symptoms at midlife, including the early life exposure to health risk factors, the persistent exposure to health risk factors, and varying mental health returns to health risk factors across racial and ethnic groups. Using data from the over-40 health module of the National Longitudinal Study of Youth (NLSY) 1979 cohort, this study uses regression decomposition techniques to attend to differences in the *composition* of health risk factors across racial and ethnic groups, differences by race and ethnicity in the *association* between depressive symptoms and health risk factors, and how these differences combine within racial and ethnic groups to produce group-specific levels of—and disparities in—depressive symptoms at midlife. While the results vary depending on the groups being compared across race/ethnicity and gender, the study documents how racial and ethnic mental health disparities at midlife stem from life course processes of cumulative disadvantage through both unequal distribution and unequal associations across racial and ethnic groups.

Keywords

Cumulative disadvantage; life course; health disparities; depressive symptoms; race; ethnicity; gender

Introduction

A health disparity is by definition a group-level phenomenon, describing differences in health outcomes across important social groups, with a particular focus on differences among socially advantaged and disadvantaged groups. In the United States, racial and ethnic minority groups bear the disproportionate burden of poor health outcomes. There has been increasing interest in examining inequalities in the risk and protective factors that give rise to racial and ethnic disparities in health outcomes, given the persistence and rise of various

racial and ethnic health disparities despite efforts to reduce them (National Center for Health Statistics 2012).

Research documenting racial and ethnic health disparities in the United States demonstrates that at all ages and relative to non-Hispanic whites, blacks are at an increased risk for morbidity, the onset and progression of disease, mortality, and lower life expectancy (see, e.g., Keppel, Pearcy, and Wagener 2002; Olshansky et al. 2012; Williams and Collins 1995; Williams 2012). Hispanics or Latinos have similar or better health and all-cause mortality outcomes compared to non-Hispanic whites on some dimensions of health (often referred to as the Hispanic or Latino health paradox given their comparably lower socioeconomic status), but worse outcomes on other dimensions of health such as rates of infectious diseases and mortality from certain health conditions (Keppel, Pearcy, and Wagener 2002; Palloni and Arias 2004; Riosmena, Wong, and Palloni 2013: Sorlie et al. 1993, Vega and Amaro 1994, Williams and Collins 1995).

Racial and ethnic disparities in mental health, however, do not necessarily follow the patterns of physical health disparities. Research on racial and ethnic disparities in mental health shows that some racial and ethnic minority group are at an increased risk for some mental health outcomes such as depressive symptoms compared to non-Hispanic whites, but not other psychopathological outcomes such as major depressive episodes and anxiety disorders (see, e.g., Breslau et al. 2006; Kessler et al. 2005; Keyes 2009; Keyes, Barnes, and Bates 2011; Luo and Waite 2005; Mezuk et al. 2010, 2013; Turner and Avison 2003; Walsemann, Gee, and Geronimus 2009; Williams et al. 2007). While some explanations for the latter pattern (sampling bias, measurement error, differences in positive coping) show limited empirical support (see, e.g., Mezuk et al. 2013), it is plausible that the “reversed” direction of the disparity reflects, in part, differences across groups in who has access to medical treatment, who seeks treatment, and the types of treatment received (Burgard and Chen 2014; Williams et al. 2007). Using survey-based on measures of mental health circumvents this issue in that the questions are asked of everyone regardless of access to medical care, thus putting all respondents on the same plane for making between-group comparisons (to the extent that the meaning of the question or response options does not differ across groups). This study focuses on depressive symptoms reported as part of the Center for Epidemiologic Study Depression scale, a measure for which previous research documents increased depressive symptoms for blacks compared to non-Hispanic whites (e.g., Luo and Waite 2005; Turner and Avison 2003; Walsemann, Gee, and Geronimus 2009).

For both physical and mental health outcomes, the overall direction and size of racial and ethnic health disparities is modified when certain social and psychological *health risk factors* are controlled. However, race and ethnicity often have statistical associations with health above and beyond adjustment for health risk factors, or what Williams (2012: 283) calls “the added burden of race.” One potential added burden of race that has not been systematically examined with respect to racial and ethnic health disparities is the *accumulation* of health risk factors across the life course. Previous research has shown that certain health risk factors accumulate across the life course in various ways to influence physical and mental health outcomes, yet much of this research has not systematically

accounted for racial and ethnic differences in these life course processes of accumulation, and the studies that do often focus on racial and ethnic disparities in physical health as opposed to mental health. Scholars studying mental health "have only scratched the surface of the temporal dynamics upon which mental health and illness rest" (George 2014: 251); this is particularly true with respect to the temporal dynamics of health risk factors that give rise to racial and ethnic disparities in mental health.

This study links various operationalizations of cumulative disadvantage to the study of racial and ethnic disparities in depressive symptoms, focusing on the accumulation of certain health risk factors over the life course and examining how these cumulative disadvantage factors combine within racial and ethnic groups to produce group-level racial and ethnic disparities in depressive symptoms at a particular point in the life course, midlife. In particular, this study attends to three different cumulative disadvantage mechanisms and how they underlie racial and ethnic disparities in depressive symptoms at midlife: through differences across racial and ethnic groups in the composition of *early life* and *persistent* exposure to health risk factors, as well as *status-resource interactions* in which there are varying mental health returns to health risk factors across racial and ethnic groups.

Review of the Literature

Health at any one point in time is the product of a series of decisions, contexts, and experiences across the life course. While concurrent health risk factors may contribute in part to racial and ethnic disparities in depressive symptoms at midlife, the composition of health risk factors from across the life course is likely to contribute to these disparities as well (see, e.g., Pearlin et al. 2005). Cumulative (dis)advantage is broadly defined as "a general mechanism for inequality across any temporal process (e.g., life course, family generations) in which a favorable relative position becomes a resource that produces further relative gains," or an unfavorable relative position becomes a resource for further relative losses (DiPrete and Eirich 2006: 271; see also Dannefer [2003] and O'Rand [1996]). Focusing in particular on the accumulation of potential health risks, this study uses the cumulative disadvantage perspective to identify the various temporal mechanisms through which health risk factors accumulate across the life course given the myriad operationalizations of these temporal cumulative processes within the perspective (DiPrete and Eirich 2006).[1]

Previous research documents that the *early life* exposure to certain health risk factors leads to racial and ethnic disparities in adult health outcomes through what is often referred to as a path-dependent cumulative disadvantage mechanism (DiPrete and Eirich 2006; Willson, Shuey, and Elder 2007) in which early life health and socioeconomic conditions have direct effects on later physical and mental health, as well as indirect effects through the intervening health and socioeconomic conditions they engender (Blackwell, Hayward, and Crimmins 2001; Goosby 2013; Haas 2008; Hayward and Gorman 2004; Kuh et al. 2002; Miech and

[1]Other perspectives integral to—and often overlapping with—the study of such temporal mechanisms include the life course perspective more broadly as well as the stress process, cumulative adversity, and cumulative inequality perspectives (see, e.g., Colen 2011; Ferraro, Shippee, and Schaefer 2009; Kuh et al 2003; Pearlin et al 2005; Turner and Lloyd 1995; Turner, Wheaton, and Lloyd 1995).

Shanahan 2000; Pais 2014; Pudrovska and Anikputa 2014; Walsemann, Geronimus, and Gee 2008; Willson, Shuey and Elder 2007). Thus, racial and ethnic disparities in midlife depressive symptoms may be attributable to differences between groups in the composition or level of early life health risk factors, such as socioeconomic background. Consistent with this mechanism, previous research has found evidence that early life socioeconomic factors account in part for racial and ethnic disparities in subsequent depressive symptoms (Luo and Waite 2005; Walsemann, Gee, and Geronimus 2009).

Another sort of path-dependent cumulative disadvantage that may contribute to racial and ethnic health disparities in midlife depressive symptoms is differences in the levels of early life psychological resources. Referred to as psychological, personal, and psychosocial resources, the stress process perspective highlights that components of self-concept, individual feelings about one's self such as self-esteem, mastery, and sense of personal control, are important determinants of subsequent mental health outcomes as well as resources that mediate and moderate the effects of stressors on mental health outcomes (see, e.g., Miller, Rote, and Keith 2013; Pearlin and Bierman 2013; Pearlin et al. 1981; Pearlin and Schooler 1978; Pudrovska et al. 2005; Ross and Mirowsky 2013; Schnittker and McLeod 2005; Turner and Lloyd 1999; Turner, Taylor, Van Gundy 2004; Turner and Turner 2013; Thoits 2006; 2010; 2013). With respect to a critical period when psychological resources may influence adult depressive symptoms, previous research highlights psychological factors during the transition to adulthood, such as self-esteem and sense of personal control, that are associated with subsequent depressive symptoms (Mossakowski 2013; Trzesniewski et al. 2006). Given differences in the level of psychological resources during the transition to adulthood across racial and ethnic groups (see, e.g., Erol and Orth 2011; Mossakowski 2012; Thoits 2006; but see Turner, Taylor, and Van Gundy 2004), it is plausible that these compositional differences may contribute to racial and ethnic disparities in depressive symptoms at midlife. However, there is a dearth of research linking racial and ethnic differences in levels of psychological resources from the transition to adulthood and later racial and ethnic disparities in depressive symptoms.

A second cumulative disadvantage mechanism involves the repeated or *persistent* exposure to risk factors as mechanisms for inequality (Blau and Duncan 1967; DiPrete and Eirich 2006; Ferraro and Kelley-Moore 2003; Ferraro, Shippee, and Schafer 2009; Luo and Waite 2005; Willson, Shuey, and Elder 2007). In the stress process framework, myriad measures of chronic stressors are associated with symptoms of depression, often beyond the impact of acute or recent stressors, highlighting the unique contribution of repeated stressors to the stress process (see, e.g., Avison and Turner 1988; McLeod and Shanahan 1996; Mossakowski 2013; Pearlin et al. 1981; Turner, Wheaton, and Lloyd 1995; Turner and Avison 2003). To the extent that the persistent exposure to certain health risk factors is unequally distributed across racial and ethnic groups, this may contribute in part to racial and ethnic disparities in midlife depressive symptoms (see, e.g., Luo and Waite 2005; Turner and Avison 2003), yet more work is need to link specific types of persistent health risk factors—such as physical health and socioeconomic factors—to racial and ethnic disparities in depressive symptoms.

In addition to the differences in the levels of early life and persistent exposure to health risk factors across racial and ethnic groups, the effects of early life, persistent, and concurrent health risk factors on depressive symptoms may vary across racial and ethnic groups. Rather than accumulating across time as with the early life and persistent exposure to health risk factors, accumulation here refers to synergistic effects across multiple independent variables: race/ethnicity and a particular health risk factor of interest. In the cumulative disadvantage framework, Blau and Duncan's (1967) *status-resource interaction* model examines the interaction between a status variable (e.g., race/ethnicity) and resources of interest (e.g., socioeconomic factors) that generates heterogeneity across groups in the outcome of interest (e.g., health). A few studies have shown no significant interactions (or very few which could be attributed to chance) between race and health risk factors in their effects on physical and mental health outcomes or trajectories (see, e.g., Haas and Rohlfsen 2010; Hayward et al. 2000; Luo and Waite 2005; Seeman et al. 2008; Turner, Taylor, and Van Gundy 2004), while a few studies do find race by health risk factor interactions in their effects on physical and mental health (Farmer and Ferraro 2005; Shuey and Willson 2008; Turner and Avison 2003). While empirical support is mixed, scholars often invoke varying health returns to health risk factors across racial and ethnic groups as integral to the production of health disparities (see, e.g., Colen 2011; Mezuk et al. 2013; Pearson 2008; Williams 2012). Indeed, the ability or opportunity to translate a given health resource into health gains might not be captured in empirical studies that are either under-powered or are not able to control for covariates relevant to racial and ethnic health disparities, requiring continued focus on status-resource interactions in the production of racial and ethnic health disparities in general and disparities in depressive symptoms in particular.

Examining the life course cumulative disadvantage factors that engender racial and ethnic disparities in midlife depressive symptoms must account for gender. Women experience higher levels of depressive symptoms compared to men, and the distribution of types of stressors across the life course varies by gender (see, e.g., Rosenfeld and Mouzon 2013; Thoits 2006, 2010; Turner and Avison 2003), as do the social meanings and practices associated with gender that influence health with respect to, among other things, differences in health-promoting or -inhibiting behavior, labeling and reporting of symptoms, and diagnoses (Barsky, Peekna, and Borus 2001; Rosenfeld and Mouzon 2013; Springer and Mouzon 2011). Previous studies have shown that the accumulation of health risk factors across the life course varies across women and men with respect to some physical health outcomes (see, e.g., Hamil-Luker and O'Rand 2007; Montez 2013, Pudrovska 2014; Pudrovska et al. 2014), yet more research is needed to examine whether this is the case for mental health outcomes like depressive symptoms.

In its most basic formulation, the intersectionality perspective highlights that social statuses such as race/ethnicity,[2] class, and gender (among others) constitute intersecting systems of privilege and oppression that are inextricably linked with respect to individuals' lives (see, e.g., Bauer 2014; Choo and Ferree 2010; Crenshaw 1989; McCall 2005). Thus, the push to examine one axis of inequality—race/ethnicity—with respect to health disparities in the U.S.

[2]Because this study focuses on black non-Hispanics, Hispanics/Latinos, and white non-Hispanics, race/ethnicity are grouped together for descriptive purposes, although they are distinct social statuses.

must account for how race/ethnicity is defined and feeds back into contexts such as gender and class. By examining the factors associated with racial and ethnic disparities in depressive symptoms within groups defined by gender, this study examines how the accumulation of health risk factors across the life course is embedded and inextricably linked with the nexus of race/ethnicity and gender, shaping unique rather than additive disadvantages with respect to depressive symptoms at midlife (Bauer 2014; Bowleg 2008; Choo and Ferree 2010; Grollman 2014; McCall 2005).

Current Study

There are at least two ways in which health risk factors may combine within groups to produce between-group racial and ethnic disparities in midlife depressive symptoms: through the unequal composition or levels of health risk factors across racial and ethnic groups, and through the varying associations between depressive symptoms and health risk factors across racial and ethnic groups. While many studies have examined depressive symptoms with respect to cumulative disadvantage or racial and ethnic health disparities, few studies integrate the two, particularly in terms of focusing on accumulation in exposure to risk factors as opposed to trajectories of depressive symptoms. This study examines how three cumulative disadvantage factors—early life exposure to health risk factors, persistent exposure to health risk factors, and status-resource interactions—underlie levels of and racial and ethnic disparities in depressive symptoms at midlife, focusing on differences in the *composition* of early life and persistent exposure to health risk factors across racial and ethnic groups, as well as the varying *association* between depressive symptoms and health risk factors across racial and ethnic groups.

Focusing on depressive symptoms at midlife has both theoretical and methodological underpinnings. While it is well-documented that, across the life course, depressive symptoms are lowest at middle age (see Ferraro and Wilkinson [2013] for a review), there may still be disparities in depressive symptoms across racial and ethnic groups, as well as differences across groups in the cumulative disadvantage mechanisms that produce levels of depressive symptoms. Furthermore, focusing on disparities in depressive symptoms at the same point in the life course—roughly age 40—ensures that enough time has passed to see the effects of early life and persistent exposure to health risk factors that are hypothesized to influence subsequent depressive symptoms, and that the length of exposure time is comparable across respondents.

Methods

Data

Data come from the National Longitudinal Study of Youth 1979 (NLSY), a nationally representative sample (and oversample of blacks and Hispanics) of 12,686 men and women who were between the ages of 14 and 22 when first surveyed in 1979 (http://www.bls.gov/nls/nlsy79.htm). Data were collected yearly from 1979 to 1994, and biennially from 1996 to the present, initially to chronicle the labor force experience of this cohort. However, other sets of questions have been added over the years that broadened the scope of the survey. Sample members were interviewed about their health in one of five waves: 1998,

2000, 2002, 2004, or 2006. The interview most often occurred in the wave after the respondent's fortieth birthday, although the actual ages at time of interview range from 38 to 49. The analytic sample is restricted to those who participated in the over-40 health module. Racial and ethnic disparities in depressive symptoms are examined within gender and across three racial and ethnic groups: non-black non-Hispanics (the majority of whom are white and will henceforth be called white), black non-Hispanics, and Hispanics or Latinos.

While the NLSY 1979 does not contain detailed information on certain factors expected to contribute to racial and ethnic health disparities, such as perceived discrimination, two important benefits of using the NLSY 1979 data to examine racial and ethnic disparities in depressive symptoms should be noted. First, because of the oversampling of black and Hispanic/Latino populations, there are large enough samples of these particular racial/ethnic minority groups to examine status-resource interactions, which may have been underpowered in prior studies. In addition, the repeated measures design allows for the measurement of early life and persistent exposure to health risk factors for the most part as they occur, rather than relying on retrospective reports which could underestimate inequalities in the exposures of interest.

Measures

Dependent variables—The *depressive symptoms* index is constructed as the sum of seven items from the Center for Epidemiologic Studies Depression scale (Radloff 1977) about how often the respondent experienced various depressive symptoms over the past week, with answers ranging from not at all (0) to most days (3). Scores ranged from 0 to 21 in which 0 indicates no depressive symptoms and a higher score generally indicates more depressive symptoms (although this conflates the number and frequency of depressive symptoms). Cronbach's alpha for the depressive symptoms index was .83 for the entire sample. The types of depressive symptoms included questions about appetite, distraction, feeling depressed, feeling sad, effort required to complete tasks, effort required to get going, and sleep.

Independent variables—Early life health risk factors included whether the respondent was *born in the United States* and measures of early life socioeconomic status, such as whether the respondent was *living with two parents at age 14* and the respondent's *mother's* and *father's educational attainment*. In addition, two psychological resources from the transition to adulthood were included: *self-esteem*, a psychological disposition that involves one's approval or disapproval of themselves (Rosenberg 1989), and *locus of control*, a sense of personal control over life that can be internal (determined by self) or external (determined by forces outside of self) (Rotter 1966). Locus of control (in which a higher score indicates higher external locus of control) was measured with four items in 1979 (when respondents were ages 14 to 22) and self-esteem (a higher score indicates higher self-esteem) was measured with ten items in 1980. Cronbach's alpha is rather low for the locus of control measure in the entire sample (.36), although this is common for scales with few items (see, e.g., Mossakowski 2013). Cronbach's alpha for self-esteem is much higher (.87) for the entire sample.

Measures of persistent health risk factors were constructed as proportional measures ranging from 0 to 1, for example, as the proportion of waves in which the respondent reported having a limitation in work due to health out of the total number of waves in which the respondent reported about their limitations in work due to health from the beginning of the study period until the wave before their participation in the over-40 health module. In addition to persistent health limitations, measures of persistent socioeconomic factors were constructed for poverty status, lowest quintile of net worth, self-reported debt, and time spent unemployed (defined below).

Several concurrent health risk factors were measured in the same wave as when the respondent participated in the over-40 health module (unless otherwise noted). These were included in the analysis to examine the contribution of the early life and persistent health relevant factors above and beyond concurrent health risk factors. In addition, these concurrent health relevant factors are of interest with respect to the status-resource interactions, e.g., to examine whether the mental health returns to concurrent health risk factors depend on race/ethnicity. *Educational attainment* is categorized as less than high school, high school, three years of college or less, and four or more years of college. *Family poverty status* is defined as the total family income being below the poverty level for the last year as issued by the U.S. Department of Health and Human Services and based on Census Bureau poverty guidelines for that year. Two measures of employment status used in this analysis are *weeks spent out of the labor force*, defined as any time spent unemployed and unavailable for work at least one week in the last year, and *weeks spent unemployed*, defined as any time spent unemployed and available for work at least one week in the last year. "Unavailable" means that the person was not looking for work, for example, because they were engaged in housework, in school, unable to work because of long-term physical or mental illness, retired, or voluntarily idle. *Household net worth* is a categorical variable of net worth (in 2008 constant dollars) divided into six categories: negative or zero, $1-9,999, $10,000-49,999, $50,000-149,999, $150,000-299,999, and $300,000 or more. *Self-reported debt* is a dichotomous variable of whether the respondent would be in debt or not if they turned their assets into cash and paid off their debts (Sweet et al. 2013). Respondent *body mass index* (BMI) is a categorical variable using the cut points denoted by the Centers for Disease Control (BMI under 25 is normal weight [very few sample members were underweight], 25-29 is overweight, 30-34 is obese I, and 35 and over is obese II). The measure of *poor health-related quality of life* is derived from the physical component summary of the 12-item Short Form (SF-12) included in the over-40 health module, a brief inventory of twelve physical and mental health questions that captures functional health and well-being from the respondent's point of view (Ware, Kosinski, and Keller 1996). The physical component score from the SF-12 weights the physical health measures more heavily than the mental health measures. The NLSY data contains the summary scores that were calibrated with regression weights so that they range from 0 to 100 in the population, respondents with a score above 50 have better health than the typical person in the general U.S. population (age is not held constant), and each one-point difference above or below 50 corresponds to one-tenth of a standard deviation (the NLSY sample has a slightly higher mean score and slightly lower standard deviation compared to general U.S. population) (Ware, Kosinski, and Keller 1995). *Health plan coverage* captures whether the respondent

had any health or hospital plan coverage for their health care. *Smoker*, measured in 1998, captures whether the respondent was a daily smoker at that time. *Marital status* measures whether the respondent was currently married or not. *Children ever born* captures the number of children the respondent had up until the over-40 health module. *Age assessed* is constructed by subtracting the respondent's year of birth from the year in which they participated in the over-40 health module.

Analytic strategy

A regression decomposition is used to delineate the contribution of the *composition* of a broad range of early life, persistent, and concurrent health risk factors and the contribution of the *association* between these factors and depressive symptoms to racial and ethnic disparities in depressive symptoms at midlife. Regression decompositions are most commonly used in economics to explore the factors associated with gender wage gaps and have also been used to describe disparities in a range of outcomes such as wealth accumulation and sexual frequency decline (see, e.g., Addo and Lichter 2013; Karraker, DeLamater, and Schwarz 2001), although previous research has not decomposed racial and ethnic health disparities. This study uses the Oaxaca-Blinder technique, which takes advantage of the additive separability of ordinary least squares (OLS) regression to decompose the difference in average outcomes between two groups (Blinder 1973; Oaxaca 1973; Jann 2008; Winsborough and Dickinson 1971).

For example, OLS regression models predicting depressive symptoms for each group (e.g., white and black women) are estimated, where X is a vector of independent variables and the constant:

$$Y_w = X_w' \beta_w + \varepsilon_w$$

$$Y_b = X_b' \beta_b + \varepsilon_b$$

The difference in mean depressive symptoms across the two models is:

$$D = \bar{Y}_w - \bar{Y}_b = \bar{X}_w' \hat{\beta}_w - \bar{X}_b' \hat{\beta}_b$$

which if the terms are expanded and rearranged becomes:

$$D = \left(\bar{X}_w - \bar{X}_b\right)' \hat{\beta}_b + \bar{X}_b' \left(\hat{\beta}_w - \hat{\beta}_b\right) + \left(\bar{X}_w - \bar{X}_b\right)' \left(\hat{\beta}_w - \hat{\beta}_b\right)$$

The first component represents how much of the difference between white and black women's depressive symptoms is due to group differences in the composition of health risk factors. The second component represents how much of the difference between white and black women's depressive symptoms is due to group differences in the associations between

health risk factors and depressive symptoms. The third component represents the interaction between the composition and association terms, accounting for the fact that differences in composition and association exist simultaneously between the two groups being compared. This term is difficult to interpret but is retained in the analysis to provide more conservative estimates of the contribution of the compositional and association components (see, e.g., Karraker, DeLamater, and Schwartz [2011]). The results from this last term are not presented in the tables but are available upon request.

A regression decomposition sets up a classic counterfactual with which to interpret the results, showing what would happen to the depressive symptoms of the second group if the second group took on the compositional and associational characteristics of the first group. In the example above, each term expresses the expected change in black women's depressive symptoms if they had the same level of health risk factors or associations between health risk factors and depressive symptoms as white women.

Parameter estimates and standard errors for each term are estimated using the *oaxaca* command in Stata 12.1 following the procedure outlined by Jann (2008). Decomposition using categorical independent variables is conducted using transformations of deviations from the grand mean so that the results are the same irrespective of the base category chosen (Jann 2008; Suits 1984; Yun 2005). Values for item-missing data were derived using multivariate imputation by chained equations in Stata. The coefficients are averaged across ten imputed datasets and the standard errors are adjusted using Rubin's (1987) formula that combines the estimated variability within and across replications with a small correction factor to the variance. The natural log of the depressive symptoms index was used for analysis because the raw score was positively skewed, thus a constant (1) was added to the depressive symptoms index to retain the cases with no reported depressive symptoms. The standard errors for the decomposition provide an estimate of the precision with which the compositional and associational effects of health risk factors explain the percent change delineated in the decomposition; these are used to denote the statistical significance of the results reported in Tables 1 and 2.[3],[4]

Results

Table A.1 in Appendix A gives the unweighted descriptive statistics for the analytic variables, showing the compositional differences across racial and ethnic groups in levels of the health risk factors of interest. Table 1 shows the results of the decompositions of

[3]Of all the statistically significant effects reported in the decomposition results, most would not be statistically significant with an adjustment made to the p-values to account for the multiple comparisons in the decompositions (e.g., with alpha=.05 and 306 comparisons made in Tables 1 and 2, this corresponds to a Bonferroni-adjusted p-value of .05/306=.00016). Indeed, published studies decomposing disparities in outcomes of interest often fail to account for the precision with which the parameters are estimated (Jann 2008), and those that do often do not account for the increased probability of Type I errors when performing multiple comparisons simultaneously. The results reported here should be interpreted in light of the multiple comparisons being made within one decomposition, perhaps as somewhat exploratory evidence of particular early life exposures, persistent exposures, and status-resource interactions.

[4]Data loss in longitudinal panels due to death and attrition winnows the sample so that those who remain are increasingly the healthiest and wealthiest people, potentially leading to underestimated inequalities in depressive symptoms as well as the early life, persistent, and concurrent health risk factors associated with depressive symptoms. However, the results of this study remained relatively unchanged in terms of statistical significance and size of coefficients when controlling for the propensity to remain in the study long enough to be included in the analytic sample (results available upon request).

differences in mean (natural log transformed) depressive symptoms across racial and ethnic groups for women, and Table 2 shows the same sets of analyses for men. The first set of results in Tables 1 and 2 show the estimated difference in depressive symptoms across racial and ethnic groups given the mean level of depressive symptoms predicted from the group-specific regression models. The difference in means is always calculated as Group 1 - Group 2 (such that a positive difference means that Group 1 has increased depressive symptoms, and negative differences means that Group 2 has increased depressive symptoms). Table 1 shows that white women have slightly higher levels of depressive symptoms than Hispanic/Latina (although the difference in means is not statistically significant), while black women have increased depressive symptoms compared to white women and Hispanic or Latina women.[5] Table 2 shows that Hispanic/Latino men have increased depressive symptoms compared to white men (although the difference is not statistically significant), and black men have increased depressive symptoms compared to both white and Hispanic/Latino men (although the difference in means is only significant with respect to white and black men).

While some differences in mean depressive symptoms at midlife may appear minimal, the results of the decompositions in Tables 1 and 2 highlight the offsetting forces that produce the overall levels of depressive symptoms for each group. The expected effects on depressive symptoms for Group 2 may either increase (coefficient is positive) or decrease (coefficient is negative) if Group 2 were to take on the same composition or association of each health risk factor as Group 1, holding constant the contribution of all other health risk factors. This has implications for whether the disparities in depressive symptoms among the groups being compared would increase or decrease, depending on which group has higher observed depressive symptoms. Overall, Tables 1 and 2 demonstrate that for women and men, racial and ethnic disparities in depressive symptoms at midlife are driven by both compositional differences in health risk factors as well as status-resource interactions in which the mental health returns to health risk factors vary across racial and ethnic groups. However, which health risk factors matter and how depends on gender as well as the racial and ethnic groups being compared. The presentation of the results will focus on the health risk factors for which the standard errors of the decomposition signal a more precise estimate of the coefficient using standard significance levels ($p<.05$).

Composition of early life exposure to health risk factors

There is evidence that differences across racial and ethnic groups in the composition of early life socioeconomic and psychological factors contribute to racial and ethnic disparities in depressive symptoms at midlife. Hispanic women's depressive symptoms would decrease (negative coefficient in Table 1) if they had the same levels of living in a two-parent household at age 14 as white women; white women had higher levels of living in a two-parent household (Appendix A Table A.1). This scenario would serve to increase the observed disparity in white and Hispanic women's depressive symptoms given that white women have slightly higher depressive symptoms than Hispanic or Latina women at midlife. Black women's depressive symptoms would increase (positive coefficient in Table 1) if they

[5]When dependent variables are natural log transformed, the coefficients can be interpreted in terms of percent change as 100*[exp(β)-1] percent (Wooldridge 2009). Thus, the differences in mean depressive symptoms for white and black women is 12.6% and 14.6% for Hispanic/Latina and black women.

had the same lower levels of self-esteem during the transition to adulthood as Hispanic women (Table A.1), which would thus increase the disparity in black and Hispanic women's depressive symptoms. Table 2 shows that black men's depressive symptoms would decrease if they had the same slightly higher levels of self-esteem and lower levels of external locus of control during the transition to adulthood as white men (Table A.1), which would thus decrease the observed disparity in white and black men's depressive symptoms. Black men's depressive symptoms would increase if they had the same lower levels of self-esteem during the transition to adulthood as Hispanic/Latino men (Table A.1), which would then increase the overall disparity in Hispanic and black men's depressive symptoms at midlife.

Composition of persistent exposure to health risk factors

There is evidence that differences across racial and ethnic groups in the composition of persistent health limitations contributes to the racial and ethnic disparities in depressive symptoms at midlife (Tables 1 and 2). Black women's depressive symptoms would decrease if they had the same slightly lower levels of persistent health limitations as white and Hispanic women, and black men's depressive symptoms would decrease if they had the same slightly lower levels of persistent health limitations as white men (Table A.1). These scenarios would thus decrease the observed disparities in depressive symptoms for black women with white and Hispanic women, and black men with white men.

Composition of concurrent exposure to health risk factors

While this study focuses on differences across racial and ethnic groups in the composition of early life and persistent health risk factors net of concurrent health risk factors, it is interesting to note the compositional differences in concurrent health risk factors that contribute to the racial and ethnic disparities in depressive symptoms at midlife (Tables 1 and 2). The summary measure of poor physical health at midlife contributed to several disparities in midlife depressive symptoms, suggesting that the link between mental and physical health contributes to racial and ethnic disparities in mental health. In addition, differences across racial and ethnic groups in the composition of marital status, self-reported debt, health plan coverage, and weeks unemployed each contributed in part to various racial and ethnic disparities in depressive symptoms for women and men.

Status-resource interactions with early life, persistent, and concurrent health risk factors

Table 1 shows that among women, there were differences by racial and ethnic groups in the association between depressive symptoms and particular health risk factors of interest that contributed to the disparities in depressive symptoms at midlife. Hispanic women's depressive symptoms would decrease if the associations of depressive symptoms with persistent health limitations, persistent poverty status, and educational attainment were the same for Hispanic women as for white women. Table B.1 in Appendix B, which displays the regression of depressive symptoms on the host of covariates for each racial/ethnic group of women and men, shows positive associations between depressive symptoms and persistent health limitations, persistent poverty, and education (vs. 4 years of college or more) for Hispanic women, and smaller positive, negative, and null associations observed for white women (a fully-interacted regression model indicates that these differences are significant at $p<.05$ for each of these associations except for less than high school). This analysis

highlights a particular nuance of the Hispanic/Latina health paradox: not only are levels of depressive symptoms similar for Hispanic/Latina and white women net of the composition of health risk factors, they are also similar even with the comparably unfavorable associations for Hispanic/Latina women of depressive symptoms with education, persistent health limitations, and persistent poverty status.

Table 1 shows that black women's depressive symptoms would decrease if the association between depressive symptoms and persistent health limitations were the same for black women as for white women. The positive association between depressive symptoms and persistent health limitations is larger for black women compared to white women (tests of the interaction indicate the difference is statistically significant at $p < .05$). As seen in Table 1, however, black women's depressive symptoms would increase if the associations of depressive symptoms with daily smoking in 1998 and age when surveyed were the same for black women as for white women. The positive association between smoking and depressive symptoms for white women is significantly different from the null association observed for black women (test of interaction significant at $p<.05$), while the negative association between age when surveyed and depressive symptoms for black women is significantly different from the null association observed for white women (test of interaction significant at $p<.05$) (Table B.1).[6] Table 1 shows that black women's depressive symptoms would decrease if the association between midlife depressive symptoms and living in a two-parent household at age 14 were the same for black women as for Hispanic women. Table B.1 shows that living in a two-parent household at age 14 decreases depressive symptoms at age 40 for Hispanic women, which is significantly different ($p < .05$) from the null association for black women. In the scenario in which black women had the same association between depressive symptoms and household structure at age 14 as Hispanic women, black women's depressive symptoms would decrease, thus decreasing the overall disparity in depressive symptoms at midlife among Hispanic and black women.

Table 2 shows that if Hispanic/Latino and black men took on the total associational characteristics of white men, this would increase depressive symptoms for Hispanic/Latino and black men and thus increase the observed disparities, although estimates of the contribution of individual health risk factors were not precise enough to reach statistical significance. None of the men's coefficients in Table B.1 was significantly different ($p<.05$) from another in fully-interacted models (not shown).

Discussion

This study highlights the role of various cumulative disadvantage mechanisms in the production of racial and ethnic disparities in depressive symptoms at midlife, expanding previous research to examine the early life experience of certain psychological resources, the persistent exposure to health limitations, and the persistent exposure to certain socioeconomic factors that combine to produce racial and ethnic disparities in depressive

[6]The findings with respect to age when surveyed, and thus when depressive symptoms are reported, is consistent with findings from Walsemann and colleagues that the rate of decline in depressive symptoms from early adulthood to midlife may be faster for blacks Hispanics compared to whites, although the 10 year age range in which depressive symptoms are reported for the current study does not replicate the longer length of time examined in prior work (Walsemann, Gee, and Geronimus 2009).

symptoms at midlife. This study uses regression decomposition techniques to attend to differences in the *composition* of health risk factors across racial and ethnic groups and differences by race and ethnicity in the *association* between health risk factors and depressive symptoms, delineating the contribution of these components to the production of racial and ethnic disparities in midlife depressive symptoms. Importantly, this study examines the factors associated with racial and ethnic disparities in depressive symptoms within gender, and makes explicit comparisons between Hispanics/Latinos and non-Hispanic blacks, thus documenting more fully the scope of the health risk factors that combine to produce level of—and racial and ethnic disparities in—midlife depressive symptoms.

With respect to the early life health risk factors that influence midlife depressive symptoms, one measure of the early life environment, household structure at age 14, contributed to racial and ethnic disparities in women's midlife depressive symptoms in terms of both compositional differences as well as through a status-resource interaction. Furthermore, differences across racial and ethnic groups in the composition of early life psychological resources is an important direct pathway through which racial and ethnic disparities in midlife depressive symptoms are produced: the gap in white and black men's depressive symptoms would decrease if black men had the same higher levels of self-esteem and lower levels of external locus of control during the transition to adulthood as white men, yet Hispanic-black disparities in depressive symptoms could actually increase if black women and men had the same lower levels of self-esteem during the transition to adulthood as Hispanic women and men. This contrast highlights one benefit of using a decomposition for the study of health disparities, in identifying the offsetting forces that produce the overall levels of depressive symptoms observed—those that would both increase and decrease health disparities depending on the groups being compared.

The link between mental and physical health contributes to racial and ethnic disparities in depressive symptoms at midlife. The disproportionate burden of persistent health limitations for blacks contributes to racial and ethnic disparities in midlife depressive symptoms, as does the disproportionate burden of poor physical health at midlife for Hispanic men, black men, and black women. In addition, the association between persistent health limitations and midlife depressive symptoms is stronger for black and Hispanic women compared to white women.

Policy is often proposed and enacted at the population level with a focus on reducing disparities between groups, particularly those health disparities which are an economic burden to families and the health care system (Smedley, Stith, and Nelson 2009), and, increasingly, those health disparities which can be characterized as health inequities that are avoidable in that they are not due neither to biology nor free choice (Braveman 2014). While the decomposition derives from ordinary least squares regressions, it explicates the forces that lead to disparities in outcomes between two particular groups being compared. As such, it is an alternative representation of the data that corresponds to the way in which health is often conceptualized at the academic and policy levels, in terms of differences between groups. Distinguishing between the compositional and associational components and their relative strengths has important implications for policy concerned with reducing health

disparities. Mitigating the compositional differences across racial and ethnic groups in certain early life and persistent health risk factors, or mitigating the impact of the compositional differences (Phelan, Link, and Tehranifar 2010), would serve to decrease racial and ethnic disparities in midlife depressive symptoms, although not eliminate the disparities in depressive symptoms since the association of depressive symptoms with certain health risk factors depends on race and ethnicity. Yet, it is less clear how to mitigate the impact of the associational differences across groups: the status-resource interactions found for women.

The fact that the status-resource interactions are found only for women highlights the relevance of incorporating the intersection of multiple social statuses in the study of health disparities (Bowleg 2012), and highlights areas for future research on the pathways through which certain health risk factors lead to particular racial and ethnic disparities in women's depressive symptoms. The status-resource interaction in which the positive association between smoking and depressive symptoms for white women is mitigated for black women highlights that the process may be gendered, extending previous research findings that found no interaction between race and nicotine dependence in predicting depression for women and men together (Keyes, Barnes, and Bates 2011). In addition, the large and significant association between depressive symptoms and persistent health limitations for black and Hispanic women, and the status-resource interactions when compared to white women, raises important questions as to whether racial and ethnic minority women in particular are not able to access resources that facilitate coping with persistent health limitations compared to their more advantaged counterparts. Finally, the effect of living in a two-parent household on depressive symptoms varies across black and Hispanic women, which may highlight differences across groups in the types of family structures, resources, and relationships that underlie the dichotomous variable and have implications for the mental health of family members—particularly women (see, e.g., Mouzon 2014; Piontak 2014; Sarkisian Gerena and Gerstel 2007; Sarkisian and Gerstel 2004).

One way in which health risk factors may translate to different health effects for women across racial and ethnic groups in part through micro- and meso-level processes that vary by race or ethnicity in ways that are not accounted for in the current analysis. Previous research has shown varying health returns to perceived discrimination across race, ethnicity, and socioeconomic status (see, e.g., Bratter and Gorman 2011; Colen 2011; Fuller-Rowell, Doan, and Eccles 2012; Hudson et al. 2013; Grollman 2014; Kessler, Mickelson, and Williams 1999; Lee and Turney 2013; Krieger 1990; Krieger and Sidney 1996; Major, Quinton, and McCoy 2002; Williams and Mohammed 2009). In addition, there are several other candidate psychological and interpersonal processes that may contribute to varying health returns to health risk factors by race and ethnicity, such as subjective status comparisons to others, kin network demands, concepts of self or identity, meaning construction and negotiation, social interactions, patient-provider interactions, and interviewer-respondent interactions during the survey interview (Colen 2011; Garbarski, Schaeffer, and Dykema 2011; Hagiwara et al. 2013; Heflin and Chiteji 2012; McLeod 2012; Schnittker and McLeod 2005; Thoits 2013; Williams 2012). Future research should link life course models of inequality with quantitative and qualitative analyses of micro- and meso-level psychological and interpersonal processes to continue to shed light on why certain

health risk and protective factors do not translate to the same health gains for women across groups racial and ethnic groups.

One limitation of the current study is that associations can be documented but the causal ordering of relationships cannot be parsed. For example, concurrent weeks unemployed, which plays a role in racial and ethnic disparities in men's depressive symptoms, could be a consequence rather than a cause of depressive symptoms. An additional analytic limitation is that this study accounts for the contribution of early life and persistent health risk factors to overall racial and ethnic disparities in depressive symptoms net of concurrent health risk factors, without examining the total effect of early life and persistent health risk factors—the indirect effects via the association with concurrent health risk factors in addition to the direct effects on depressive symptoms reported here. Future research should examine how this type of path-dependency contributes to group-level health disparities, linking individual-level path models to models that decompose group differences in outcomes.

The participants in the NLSY 1979 are from a particular cohort that experienced early adulthood in the 1980s and the beginning of the 1990s: the late baby boomers. Even in the presence of economic recessions in the 1980s and 1990s, the baby boom cohort can be characterized as experiencing relative economic prosperity during their working years compared to prior cohorts, particularly for women given increases in women's labor force participation and reduced fertility, and particularly for the early boomers compared to the later boomers (Keister and Deeb-Sossa 2001). Of course, such trends vary across racial and ethnic groups, with blacks, and particularly black men, experiencing greater decline in labor market opportunities during that time (Wilson 1987). Thus, the study summarizes the life course processes of cumulative disadvantage that lead to racial and ethnic disparities in midlife depressive symptoms for this particular cohort, and future research should continue to examine the life course processes of cumulative disadvantage that lead to racial and ethnic health disparities among later cohorts, other economic climates, and other geographic contexts. Furthermore, while one of the benefits of using repeated measures data from the NLSY is to examine how certain operationalization of cumulative disadvantage contribute to disparities in depressive symptoms, this data set is missing many other health risk factors that have implications for racial and ethnic health disparities, such as vigilance, perceived discrimination, perceived stress, institutional racism, segregation, neighborhood characteristics, and environmental impacts (see, e.g., Colen 2011; Hicken et al. 2013; Williams 2012; Williams and Mohammed 2009).

This study also highlights an interesting methodological balance in documenting health disparities and the mechanisms producing them. An issue in any disparities research is the aggregation of subgroups within racial and ethnic groups. Such aggregation (non-black non-Hispanics as whites, Hispanics, and blacks) corresponds to much of the previous research and thus allows for comparisons with prior studies. However, doing so sacrifices some validity because it misses the within-group cultural variations that have implications for health disparities, as well as the potential changes in racial classification (Saperstein and Penner 2012), with implications for measuring racial and ethnic health disparities.

Despite the potential limitations, this study delineates a set of socioeconomic, psychological, and other health risk factors that shape racial and ethnic disparities in midlife depressive symptoms, drawing particular attention to the early life and persistent health risk factors that produce group-level disparities in midlife depressive symptoms. Taken together, the results of this study highlight the need to tackle inequalities across the life course in the socioeconomic, psychological, and other health risk factors that set the stage for midlife depressive symptoms in general and racial and ethnic disparities in midlife depressive symptoms in particular. Future research should continue to attend to differences in both the composition of health risk factors of interest and the varying health returns to health risk factors by race and ethnicity in the production of racial and ethnic health disparities across the life course.

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Appendix A

Table A.1

Descriptive Statistics of Analytic Sample by Race, Ethnicity, and Gender, NLSY 1979 Cohort

	White Women			Hispanic Women			Black Women		
	Mean or Proportion	**S.D.**	**N**	**Mean or Proportion**	**S.D.**	**N**	**Mean or Proportion**	**S.D.**	**N**
Depressive symptoms (0-21)	3.61	4.26	2129 *d*	3.71	4.56	824 *e*	4.36	4.77	1302
Early life									
Self-esteem 1980 (0-30)	22.31	4.12	2050 *a*	21.32	3.96	784 *d*	22.26	3.99	1248
Locus of control 1979 (0-12)	4.51	2.39	2117 *a,d*	5.07	2.47	814	5.12	2.32	1289
Lived with two parents at age 14 (1=yes)	0.78		2129 *a,d*	0.66		823 *d*	0.50		1297
Born outside US (1=yes)	0.03		2129 *a*	0.25		824 *d*	0.03		1302
Mother's highest grade completed			*a,d*			*d*			
Less than high school	0.29		2045	0.74		771	0.56		1196
High school	0.49		2045	0.19		771	0.33		1196
Some college	0.11		2045	0.05		771	0.08		1196
4 years or more of college	0.11		2045	0.02		771	0.04		1196
Father's highest grade completed			*a,d*			*d*			
Less than high school	0.31		1980	0.67		672	0.53		963
High school	0.39		1980	0.21		672	0.33		963
Some college	0.11		1980	0.05		672	0.08		963
4 years or more of college	0.19		1980	0.06		672	0.06		963
Persistent									
Persistent health limitation	0.07	0.15	2128 *d*	0.07	0.14	824 *e*	0.09	0.16	1299
Persistently low net worth	0.13	0.22	2117 *a,d*	0.23	0.28	819 *d*	0.35	0.33	1291
Persistent poverty status	0.11	0.20	2123 *a,d*	0.26	0.31	822 *d*	0.38	0.35	1298
Persistent self-reported debt	0.09	0.22	2098 *a,d*	0.14	0.25	813 *d*	0.18	0.27	1281
Persistent time unemployed	0.17	0.16	2128 *b,d*	0.19	0.17	824 *d*	0.29	0.22	1299
Concurrent									
Poor health-related quality of life (0-57.15)	17.47	8.69	2124 *d*	17.75	8.02	817 *e*	18.82	8.98	1298
BMI			*a,d*			*d*			
Normal weight	0.51		1994	0.33		752	0.26		1193
Overweight	0.26		1994	0.32		752	0.30		1193

	White Women			Hispanic Women			Black Women		
	Mean or Proportion	**S.D.**	**N**	**Mean or Proportion**	**S.D.**	**N**	**Mean or Proportion**	**S.D.**	**N**
Obese I	0.14		1994	0.21		752	0.22		1193
Obese II	0.09		1994	0.13		752	0.21		1193
Smoker[g] (1= yes)	0.27	*a*	2037	0.16	*d*	763	0.26		1235
Health plan coverage (1= yes)	0.88	*a,d*	2129	0.79		822	0.80		1300
Married (1= yes)	0.70	*a,d*	2129	0.60	*d*	824	0.37		1301
Children ever born (0-10)	1.87	1.27 *a,d*	2129	2.35	1.52 *e*	824	2.14	1.51	1302
Education		*a,d*			*d*				
Less than high school	0.06		2129	0.18		824	0.11		1302
High school	0.42		2129	0.40		824	0.41		1302
Some college	0.24		2129	0.29		824	0.32		1302
4 years or more of college	0.28		2129	0.14		824	0.16		1302
Net worth		*a,d*			*d*				
Negative or zero	0.09		1932	0.18		738	0.26		1183
$1-9,999	0.09		1932	0.16		738	0.23		1183
$10,000-49,999	0.14		1932	0.20		738	0.23		1183
$50,000-149,999	0.26		1932	0.21		738	0.17		1183
$150,000-299,999	0.18		1932	0.12		738	0.07		1183
$300,000 or more	0.23		1932	0.12		738	0.04		1183
Poverty status (1= yes)	0.10	*a,d*	1841	0.21	*e*	696	0.28		1036
Self-reported debt (1=yes)	0.07	*a,d*	2032	0.13	*f*	766	0.16		1228
Weeks unemployed (0-52)	1.44	6.85 *d*	2096	2.01	8.00	797	2.71	9.72	1270
Weeks out of labor force (0-52)	10.22	19.06 *b*	2096	12.45	20.79 *e*	797	9.90	18.85	1270
Age at assessment (39-49)	41.11	0.97	2129	41.18	1.10 *f*	824	41.07	0.95	1302

	White Men			Hispanic Men			Black Men		
	Mean or Proportion	**S.D.**	**N**	**Mean or Proportion**	**S.D.**	**N**	**Mean or Proportion**	**S.D.**	**N**
Depressive symptoms (0-21)	2.58	3.60 *c,d*	2044	2.98	4.04	812	3.25	4.11	1253
Early life									
Self-esteem 1980 (0-30)	22.75	4.02 *a,e*	1961	21.71	4.05 *d*	748	22.36	4.08	1196
Locus of control 1979 (0-12)	4.38	2.42 *a,d*	2026	5.14	2.46 *e*	801	4.84	2.35	1233
Lived with two parents at age 14 (1=yes)	0.80	*a,d*	2040	0.66	*d*	811	0.51		1251

	White Men			Hispanic Men			Black Men		
	Mean or Proportion	**S.D.**	**N**	**Mean or Proportion**	**S.D.**	**N**	**Mean or Proportion**	**S.D.**	**N**
Born outside US (1=yes)	0.03	*a*	2043	0.26	*d*	812	0.02		1253
Mother's highest grade completed		*a,d*			*d*				
Less than high school	0.25		1955	0.70		728	0.51		1120
High school	0.52		1955	0.21		728	0.36		1120
Some college	0.12		1955	0.05		728	0.07		1120
4 years or more of college	0.11		1955	0.04		728	0.06		1120
Father's highest grade completed		*a,d*			*d*				
Less than high school	0.29		1914	0.65		665	0.51		922
High school	0.37		1914	0.22		665	0.37		922
Some college	0.13		1914	0.05		665	0.06		922
4 years or more of college	0.21		1914	0.07		665	0.06		922
Persistent									
Persistent health limitation	0.04	0.12	*b,d* 2043	0.06	0.15	811	0.06	0.14	1252
Persistently low net worth	0.12	0.21	*a,d* 2033	0.22	0.28	*d* 805	0.33	0.33	1245
Persistent poverty status	0.08	0.16	*a,d* 2041	0.19	0.26	*d* 811	0.25	0.29	1251
Persistent self-reported debt	0.10	0.22	*a,d* 2015	0.15	0.27	789	0.17	0.26	1223
Persistent time unemployed	0.19	0.19	*a,d* 2043	0.25	0.22	*d* 811	0.30	0.23	1252
Concurrent									
Poor health-related quality of life (0-57.15)	16.26	6.71	*a,d* 2033	17.33	7.84	805	17.17	7.62	1247
BMI			*a,e*			*f*			
Normal weight	0.26		1971	0.17		767	0.22		1199
Overweight	0.47		1971	0.48		767	0.46		1199
Obese I	0.20		1971	0.22		767	0.22		1199
Obese II	0.07		1971	0.13		767	0.10		1199
Smoker[g] (1= yes)	0.27	*b*	1915	0.21	*d*	736	0.30		1128
Health plan coverage (1= yes)	0.85	*a,d*	2042	0.72		810	0.71		1250
Married (1= yes)	0.69	*a,d*	2042	0.57	*d*	812	0.41		1253
Children ever born (0-10)	1.64	1.30	*a,d* 2044	2.06	1.58	812	1.96	1.62	1253
Education		*a,d*			*d*				
Less than high school	0.09		2044	0.22		812	0.13		1253
High school	0.43		2044	0.44		812	0.53		1253

	White Men			Hispanic Men			Black Men		
	Mean or Proportion	**S.D.**	**N**	**Mean or Proportion**	**S.D.**	**N**	**Mean or Proportion**	**S.D.**	**N**
Some college	0.20		2044	0.23		812	0.21		1253
4 years or more of college	0.28		2044	0.11		812	0.12		1253
Net worth			*a,d*			*d*			
Negative or zero	0.08		1910	0.17		709	0.26		1097
$1-9,999	0.08		1910	0.17		709	0.21		1097
$10,000-49,999	0.15		1910	0.22		709	0.21		1097
$50,000-149,999	0.25		1910	0.21		709	0.19		1097
$150,000-299,999	0.19		1910	0.12		709	0.08		1097
$300,000 or more	0.23		1910	0.11		709	0.05		1097
Poverty status (1= yes)	0.06		*a,d* 1830	0.16		*d* 677	0.24		988
Self-reported debt (1=yes)	0.07		*a,d* 1945	0.12		735	0.15		1133
Weeks unemployed (0-52)	1.39	6.63	*c,d* 1987	2.07	8.63	*d* 785	3.69	11.51	1214
Weeks out of labor force (0-52)	3.28	11.48	*a,d* 1987	6.17	15.54	*e* 785	8.47	18.02	1214
Age at assessment (38-49) 41.16		1.06	*a* 2044	41.26	1.17	812	41.22	1.18	1253

Notes

Significance tests are two-tailed and test for differences across racial and ethnic groups in means for continuous variables, in proportions for binary variables, and chi-square differences tests for categorical variables with more than two categories.

The “persistent” factors are the proportion of waves in which the respondent was at a particular status (e.g., had a health limitation), and the descriptive statistics are means of these proportions.

a significantly different from Hispanic (same gender) at p < .001

b significantly different from Hispanic (same gender) at p < .01

c significantly different from Hispanic (same gender) at p < .05

d significantly different from black (same gender) at p < .001

e significantly different from black (same gender) at p < .01

f significantly different from black (same gender) at p < .05

g measured in 1998

Appendix B

Table B.1

Regressions of Women's and Men's Depressive Symptoms on Health-Relevant Covariates by Race and Ethnicity, NLSY 1979 Cohort Over-40 Health Module[a,b,c]

	White Women		Hispanic Women		Black Women	
	Coef.	s.e.	Coef.	s.e.	Coef.	s.e.
Early life						
Self-esteem 1980 (0-30)	−0.023	0.005***	−0.013	0.009	−0.024	0.007***
Locus of control 1979 (0-12)	0.010	0.008	0.016	0.013	0.010	0.011
Lived with parents at age 14 (1=yes)	−0.028	0.045	−0.156	0.066*	0.052	0.050
Born outside US (1=yes)	0.063	0.115	−0.072	0.073	0.046	0.143
Mother's education						
Less than high school	0.023	0.080	−0.338	0.214	0.107	0.142
High school	−0.013	0.070	−0.223	0.216	0.087	0.139
Some college	0.056	0.082	−0.270	0.248	0.220	0.156
Four years college or more	Reference		Reference		Reference	
Father's education						
Less than high school	−0.085	0.068	−0.167	0.157	0.105	0.138
High school	−0.035	0.061	−0.033	0.158	0.070	0.138
Some college	−0.017	0.074	−0.115	0.203	0.215	0.154
Four years college or more	Reference		Reference		Reference	
Persistent						
Persistent health limitations	0.319	0.133*	1.085	0.252***	0.891	0.177***
Persistently low net worth	0.276	0.118*	−0.022	0.157	0.177	0.110
Persistent poverty status	−0.251	0.124*	0.162	0.161	−0.184	0.117
Persistent self-reported debt	0.128	0.111	0.058	0.161	0.180	0.112
Persistent time unemployed	0.155	0.124	0.303	0.193	0.226	0.129
Concurrent						
Poor health-related quality of life (0-57.15)	0.019	0.002***	0.020	0.004***	0.014	0.003***
BMI						
Normal weight	Reference		Reference		Reference	
Overweight	−0.012	0.045	−0.040	0.078	−0.016	0.069

	White Women		Hispanic Women		Black Women	
	Coef.	**s.e.**	**Coef.**	**s.e.**	**Coef.**	**s.e.**
Obese I	0.031	0.056	−0.076	0.091	−0.023	0.077
Obese II	0.064	0.070	0.076	0.108	−0.034	0.077
Daily smoker 1998 (1=yes)	0.227	0.046 ***	0.095	0.090	0.054	0.062
Health plan coverage (1=yes)	0.011	0.059	−0.001	0.080	0.003	0.066
Married (1=yes)	−0.045	0.046	−0.044	0.071	−0.151	0.058 **
Children ever born (0-10)	0.003	0.015	−0.008	0.023	0.004	0.018
Education						
Less than high school	−0.024	0.097	0.178	0.137	0.122	0.117
High school	−0.036	0.054	0.280	0.107 **	0.124	0.084
Some college	−0.051	0.054	0.233	0.103 *	0.031	0.078
Four years college or more	Reference		Reference		Reference	
Net worth						
Negative-$0	Reference		Reference		Reference	
$1-9,999	0.099	0.100	0.146	0.153	0.106	0.156
$10,000-49,999	0.159	0.089	0.015	0.134	0.094	0.152
$50,000-149,999	0.075	0.066	0.046	0.121	0.137	0.144
$150,000-299,999	0.064	0.055	0.098	0.114	0.144	0.144
$300,000 or more	−0.001	0.059	0.162	0.131	0.116	0.162
Poverty status (1=yes)	0.111	0.074	0.238	0.118 *	0.129	0.085
Self-reported debt (1=yes)	0.265	0.088 **	0.083	0.117	0.199	0.080 *
Weeks unemployed (0-52)	0.006	0.003 *	0.000	0.004	0.000	0.003
Weeks out of the labor force (0-52)	0.001	0.001	−0.002	0.002	0.000	0.002
Age at assessment (39-49)	0.013	0.019	−0.008	0.028	−0.062	0.026 *
Constant	0.601	0.790	1.416	1.215	3.464	1.096 **

	White Men		Hispanic Men		Black Men	
	Coef.	**s.e.**	**Coef.**	**s.e.**	**Coef.**	**s.e.**
Early life						
Self-esteem 1980 (0-30)	−0.020	0.005 ***	−0.014	0.008	−0.025	0.007 ***
Locus of control 1979 (0-12)	0.009	0.008	0.018	0.013	0.024	0.011 *
Lived with parents at age 14 (1=yes)	−0.023	0.044	0.001	0.062	0.055	0.049

	White Men		Hispanic Men		Black Men	
	Coef.	**s.e.**	**Coef.**	**s.e.**	**Coef.**	**s.e.**
Born outside US (1=yes)	0.158	0.105	−0.040	0.069	0.005	0.174
Mother's education						
Less than high school	−0.095	0.079	0.000	0.193	0.035	0.132
High school	−0.146	0.068 *	0.080	0.193	0.036	0.127
Some college	−0.114	0.075	0.063	0.218	0.051	0.144
Four years college or more	Reference		Reference		Reference	
Father's education						
Less than high school	−0.027	0.065	−0.088	0.161	0.031	0.138
High school	−0.018	0.057	0.003	0.171	−0.090	0.137
Some college	0.004	0.065	0.007	0.198	0.016	0.158
Four years college or more	Reference		Reference		Reference	
Persistent						
Persistent health limitations	0.240	0.163	0.314	0.249	0.527	0.200 **
Persistently low net worth	0.145	0.117	0.056	0.146	−0.032	0.114
Persistent poverty status	−0.025	0.145	0.064	0.161	−0.052	0.124
Persistent self-reported debt	0.246	0.104 *	0.213	0.150	0.057	0.112
Persistent time unemployed	0.009	0.103	0.099	0.163	0.133	0.130
Concurrent						
Poor health-related quality of life (0-57.15)	0.029	0.003 ***	0.027	0.005 ***	0.024	0.004 ***
BMI						
Normal weight	Reference		Reference		Reference	
Overweight	−0.033	0.043	−0.021	0.094	−0.085	0.064
Obese I	−0.001	0.054	−0.071	0.106	0.009	0.076
Obese II	−0.017	0.076	0.044	0.119	0.003	0.100
Daily smoker 1998 (1=yes)	0.009	0.045	0.017	0.078	0.047	0.058
Health plan coverage (1=yes)	−0.150	0.055 **	−0.060	0.075	−0.156	0.059 **
Married (1=yes)	−0.073	0.044	−0.135	0.072	−0.046	0.057
Children ever born (0-10)	0.014	0.014	0.015	0.020	−0.016	0.015
Education						
Less than high school	0.172	0.083 *	0.157	0.128	0.045	0.113
High school	0.133	0.052 *	0.165	0.111	0.026	0.089

	White Men		Hispanic Men		Black Men	
	Coef.	**s.e.**	**Coef.**	**s.e.**	**Coef.**	**s.e.**
Some college	0.043	0.053	0.015	0.113	0.072	0.092
Four years college or more	Reference		Reference		Reference	
Net worth						
Negative-$0	Reference		Reference		Reference	
$1-9,999	0.125	0.098	−0.111	0.153	0.191	0.142
$10,000-49,999	0.002	0.083	−0.059	0.143	0.119	0.141
$50,000-149,999	−0.040	0.064	−0.039	0.121	0.217	0.130
$150,000-299,999	−0.008	0.053	−0.071	0.122	0.084	0.133
$300,000 or more	0.014	0.055	−0.028	0.130	0.007	0.146
Poverty status (1=yes)	0.051	0.097	0.200	0.108	0.088	0.085
Self-reported debt (1=yes)	0.070	0.092	0.213	0.120	0.113	0.082
Weeks unemployed (0-52)	0.007	0.003 **	0.002	0.004	0.006	0.002 *
Weeks out of the labor force (0-52)	0.003	0.002	0.003	0.003	0.002	0.002
Age at assessment (38-49)	0.017	0.016	0.005	0.025	0.005	0.020
Constant	0.299	0.702	0.423	1.099	0.695	0.880

Coef.=coefficient, s.e.=standard error

*** p<.001

** p<.01

* p<.05, two-tailed

[a] N= 2129 white women, 824 Hispanic women, 1302 black women. 2044 white men, 812 Hispanic men, 1253 black men

[b] Measures from same wave as over-40 health reported except where otherwise noted. Measures of persistence computed over the study period until the wave prior to the over-40 health module.

[c] Depressive symptoms are natural log-transformed.

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Highlights

- Study links cumulative disadvantage to racial/ethnic disparities in midlife depressive symptoms
- Group differences in the composition of early life and persistent exposure to health risk factors
- Varying mental health returns to health risk factors across race/ethnicity

Table 1

Decomposition of Mean Difference in Women's Depressive Symptoms by Race and Ethnicity, NLSY 1979 Cohort Over-40 Health Module[a,b,c]

	White (1) and Hispanic (2) Women		White (1) and Black (2) Women		Hispanic (1) and Black (2) Women	
Group 1 mean[d]	1.137	0.020	1.137	0.020	1.114	0.033
Group 2 mean	1.114	0.033	1.272	0.026	1.272	0.026
Difference	0.023	0.039	−0.135	0.033***	−0.158	0.043***
	Coef.	**s.e.**	**Coef.**	**s.e.**	**Coef.**	**s.e.**
Composition						
Early life						
Self-esteem 1980	−0.013	0.009	−0.001	0.003	0.023	0.008**
Locus of control 1979	−0.009	0.008	−0.006	0.007	0.000	0.001
Lived with parents at age 14	−0.019	0.008*	0.015	0.014	0.008	0.008
Born outside US	0.016	0.016	0.000	0.001	0.010	0.031
Mother highest grade completed	0.066	0.038	−0.006	0.018	0.001	0.011
Father highest grade completed	0.047	0.031	−0.012	0.022	0.001	0.008
Persistent						
Persistent health limitations	0.004	0.006	−0.015	0.006*	−0.018	0.007**
Persistently low net worth	0.002	0.015	−0.037	0.023	−0.020	0.013
Persistent poverty status	−0.024	0.024	0.048	0.031	0.021	0.014
Persistent self-reported debt	−0.003	0.008	−0.016	0.010	−0.008	0.005
Persistent time unemployed	−0.007	0.005	−0.027	0.016	−0.022	0.013
Concurrent						
Poor health-related quality of life	−0.007	0.007	−0.019	0.006**	−0.014	0.006*
BMI	0.005	0.012	0.007	0.015	0.003	0.006
Daily smoker 1998	0.010	0.010	0.001	0.001	−0.005	0.006
Health plan coverage	0.000	0.007	0.000	0.005	0.000	0.001
Married	−0.005	0.007	−0.050	0.019**	−0.034	0.014*
Children ever born	0.004	0.011	−0.001	0.005	0.001	0.004
Education	−0.026	0.018	−0.008	0.010	0.006	0.007
Net worth	−0.002	0.022	−0.017	0.036	−0.007	0.016
Poverty status	−0.029	0.015	−0.024	0.016	−0.008	0.006
Self-reported debt	−0.005	0.007	−0.019	0.008*	−0.006	0.004
Weeks unemployed	0.000	0.002	0.000	0.004	0.000	0.002
Weeks out of the labor force	0.004	0.004	0.000	0.001	−0.001	0.004
Age at assessment	0.001	0.002	−0.003	0.002	−0.007	0.004
Total	0.011	0.048	−0.190	0.043***	−0.079	0.042
Association						
Early life						

	Coef.	s.e.	Coef.	s.e.	Coef.	s.e.
Self-esteem 1980	−0.204	0.216	0.025	0.185	0.238	0.249
Locus of control 1979	−0.031	0.079	−0.003	0.069	0.027	0.088
Lived with parents at age 14	0.085	0.053	−0.040	0.034	−0.103	0.041 *
Born outside US	0.034	0.034	0.001	0.006	−0.004	0.005
Mother highest grade completed	0.097	0.070	−0.005	0.044	−0.076	0.066
Father highest grade completed	0.015	0.051	−0.023	0.044	−0.031	0.056
Persistent						
Persistent health limitations	−0.051	0.019 **	−0.050	0.019 *	0.017	0.027
Persistently low net worth	0.068	0.045	0.034	0.056	−0.068	0.066
Persistent poverty status	−0.108	0.054 *	−0.025	0.064	0.130	0.075
Persistent self-reported debt	0.010	0.028	−0.010	0.029	−0.022	0.036
Persistent time unemployed	−0.029	0.044	−0.021	0.052	0.022	0.068
Concurrent						
Poor health-related quality of life	−0.016	0.083	0.096	0.072	0.113	0.095
BMI	−0.001	0.015	−0.005	0.006	−0.005	0.007
Daily smoker 1998	0.022	0.017	0.045	0.020 *	0.010	0.028
Health plan coverage	0.010	0.078	0.007	0.071	−0.003	0.083
Married	−0.001	0.051	0.040	0.027	0.040	0.034
Children ever born	0.026	0.065	−0.003	0.051	−0.026	0.063
Education	−0.042	0.016 **	−0.011	0.019	0.031	0.021
Net worth	0.006	0.010	0.009	0.027	−0.011	0.033
Poverty status	−0.028	0.031	−0.005	0.033	0.031	0.042
Self-reported debt	0.024	0.019	0.011	0.019	−0.019	0.023
Weeks unemployed	0.012	0.010	0.016	0.011	0.000	0.014
Weeks out of the labor force	0.038	0.026	0.015	0.020	−0.016	0.025
Age at assessment	0.889	1.381	3.106	1.310 *	2.219	1.567
Constant	−0.727	1.422	−3.173	1.341 *	−2.446	1.606
Total	0.098	0.051	0.031	0.045	0.050	0.053

Coef.=coefficient, s.e.=standard error

*** p<.001

** p<.01

* p<.05, two-tailed

[a] N= 2129 white women, 824 Hispanic women, 1302 black women

[b] Decomposition of categorical variables is conducted using transformations of deviations from the grand mean so that the results are the same irrespective of the base category chosen (Jann 2008; Suits 1984; Yun 2005).

[c] Measures from same wave as over-40 health reported except where otherwise noted. Measures of persistence computed over the study period until the wave prior to the over-40 health module.

[d] Means are natural log transformed and model-implied, deriving from group-specific regressions of natural log-transformed depressive symptoms on covariates.

Table 2

Decomposition of Mean Difference in Men's Depressive Symptoms by Race and Ethnicity, NLSY 1979 Cohort Over-40 Health Module[a,b,c]

	White (1) and Hispanic (2) Men		White (1) and Black (2) Men		Hispanic (1) and Black (2) Men	
Group 1 mean[d]	0.892	0.019 **	0.892	0.019 **	0.955	0.032 **
Group 2 mean	0.955	0.032 **	1.025	0.026 **	1.025	0.026 **
Difference	−0.063	0.037	−0.133	0.032 **	−0.070	0.042

	Coef.	s.e.	Coef.	s.e.	Coef.	s.e.
Composition						
Early life						
Self-esteem 1980	−0.015	0.009	−0.009	0.005 *	0.018	0.007 **
Locus of control 1979	−0.014	0.010	−0.011	0.006 *	0.007	0.004
Lived with parents at age 14	0.000	0.009	0.015	0.014	0.008	0.007
Born outside US	0.009	0.016	0.000	0.001	0.001	0.042
Mother highest grade completed	0.028	0.035	−0.001	0.017	0.000	0.010
Father highest grade completed	0.032	0.031	−0.007	0.026	0.015	0.009
Persistent						
Persistent health limitations	−0.005	0.004	−0.009	0.004 *	−0.001	0.003
Persistently low net worth	−0.006	0.016	0.007	0.024	0.003	0.012
Persistent poverty status	−0.007	0.017	0.009	0.022	0.003	0.008
Persistent self-reported debt	−0.011	0.008	−0.004	0.008	−0.001	0.002
Persistent time unemployed	−0.005	0.009	−0.015	0.014	−0.007	0.007
Concurrent						
Poor health-related quality of life	−0.028	0.010 **	−0.021	0.007 **	0.004	0.008
BMI	−0.001	0.009	−0.001	0.004	−0.001	0.004
Daily smoker 1998	0.001	0.004	−0.001	0.002	−0.004	0.005
Health plan coverage	−0.008	0.010	−0.022	0.009 *	−0.002	0.003
Married	−0.016	0.009	−0.013	0.016	−0.007	0.009
Children ever born	−0.006	0.008	0.005	0.005	−0.002	0.002
Education	−0.022	0.020	−0.005	0.014	0.003	0.007
Net worth	0.013	0.024	−0.055	0.032	−0.016	0.011
Poverty status	−0.021	0.012	−0.016	0.016	−0.007	0.007
Self-reported debt	−0.012	0.007	−0.009	0.007	−0.003	0.003
Weeks unemployed	−0.001	0.003	−0.013	0.006 *	−0.009	0.005 *
Weeks out of the labor force	−0.007	0.008	−0.010	0.009	−0.004	0.004
Age at assessment	−0.001	0.003	0.000	0.001	0.000	0.001
Total	−0.105	0.042 *	−0.189	0.038 **	−0.003	0.050
Association						

	Coef.	s.e.	Coef.	s.e.	Coef.	s.e.
Early life						
Self-esteem 1980	−0.123	0.206	0.128	0.181	0.255	0.239
Locus of control 1979	−0.045	0.076	−0.072	0.064	−0.029	0.082
Lived with parents at age 14	−0.016	0.050	−0.040	0.034	−0.027	0.041
Born outside US	0.052	0.033	0.003	0.004	−0.001	0.004
Mother highest grade completed	0.000	0.065	−0.025	0.041	−0.007	0.063
Father highest grade completed	0.026	0.052	−0.007	0.045	−0.023	0.060
Persistent						
Persistent health limitations	−0.004	0.018	−0.018	0.016	−0.013	0.020
Persistently low net worth	0.020	0.042	0.057	0.053	0.029	0.060
Persistent poverty status	−0.017	0.041	0.007	0.048	0.029	0.052
Persistent self-reported debt	0.005	0.027	0.032	0.026	0.026	0.032
Persistent time unemployed	−0.022	0.048	−0.038	0.050	−0.010	0.063
Concurrent						
Poor health-related quality of life	0.044	0.089	0.090	0.077	0.046	0.095
BMI	0.003	0.020	0.014	0.018	0.009	0.023
Daily smoker 1998	−0.002	0.019	−0.012	0.022	−0.009	0.030
Health plan coverage	−0.064	0.067	0.004	0.057	0.067	0.067
Married	0.035	0.048	−0.011	0.030	−0.037	0.038
Children ever born	−0.003	0.051	0.059	0.041	0.062	0.050
Education	−0.007	0.018	0.016	0.020	0.028	0.025
Net worth	0.005	0.012	−0.026	0.023	−0.049	0.029
Poverty status	−0.025	0.024	−0.009	0.030	0.028	0.035
Self-reported debt	−0.019	0.020	−0.007	0.020	0.016	0.022
Weeks unemployed	0.011	0.010	0.005	0.013	−0.014	0.017
Weeks out of the labor force	0.002	0.021	0.007	0.022	0.005	0.027
Age at assessment	0.476	1.249	0.477	1.083	0.001	1.343
Constant	−0.171	1.287	−0.545	1.114	−0.375	1.384
Total	0.160	0.048 **	0.091	0.041 *	0.006	0.047

Coef.=coefficient, s.e.=standard error

** p<.001

** p<.01

* p<.05, two-tailed

[a] N = 2044 white men, 812 Hispanic men, 1253 black men

[b] Decomposition of categorical variables is conducted using transformations of deviations from the grand mean so that the results are the same irrespective of the base category chosen (Jann 2008; Suits 1984; Yun 2005).

[c] Measures from same wave as over-40 health reported except where otherwise noted. Measures of persistence computed over the study period until the wave prior to the over-40 health module.

[d] Means are natural log transformed and model-implied, deriving from group-specific regressions of natural log-transformed depressive symptoms on covariates.