



## Race, life course socioeconomic position, racial discrimination, depressive symptoms and self-rated health



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### ARTICLE INFO

#### Article history:

Available online 11 August 2013

#### Keywords:

Race  
Socioeconomic position  
Life course  
Racial discrimination  
Depressive symptoms  
Self-reported health

### ABSTRACT

Greater levels of socioeconomic position (SEP) are generally associated with better health. However results from previous studies vary across race/ethnicity and health outcomes. Further, the majority of previous studies do not account for the effects of life course SEP on health nor the effects of racial discrimination, which could moderate the effects of SEP on health. Using data from the Coronary Artery Risk Development in Young Adults (CARDIA) study, we examined the relationship between a life course SEP measure on depressive symptoms and self-rated health. A life course SEP was constructed for each participant, using a framework that included parental education and occupation along with respondents' highest level of education and occupation. Interaction terms were created between life course SEP and racial discrimination to determine whether the association between SEP and health was moderated by experiences of racial discrimination. Analyses revealed that higher levels of life course SEP were inversely related to depressive symptoms. Greater life course SEP was positively associated with favorable self-rated health. Racial discrimination was associated with more depressive symptoms and poorer self-rated health. Analyses indicated a significant interaction between life course SEP and racial discrimination on depressive symptoms in the full sample. This suggested that for respondents with greater levels of SEP, racial discrimination was associated with reports of more depressive symptoms. Future research efforts should be made to examine whether individuals' perceptions and experiences of racial discrimination at the interpersonal and structural levels limits their ability to acquire human capital as well as their advancement in education and occupational status.

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### Introduction

Socioeconomic position (SEP) is a critical social determinant of both mental and physical health, affecting outcomes through multiple mechanisms (Link & Phelan, 1995). Reducing black–white health disparities is a major public health initiative in the United States and the improvement of the socioeconomic circumstances of blacks is thought to reduce health disparities. Indeed, racial disparities between blacks and whites are often significantly reduced when statistical models adjust for SEP (Kaufman, Long, Liao, Cooper, & McGee, 1998; Liao, McGee, Kaufman, Cao, & Cooper, 1999). However, while black–white health disparities are narrowed when studies adjust for SEP, these differences do not entirely

disappear (Braveman & Barclay, 2009; Geronimus, Hicken, Keene, & Bound, 2006; Williams, 2003; Williams & Mohammed, 2009). The application of a life course SEP framework could more accurately explain the association between SEP and health (Braveman & Barclay, 2009; Hertzman & Power, 2003).

Diseases that develop in adulthood may well have their roots in early life (Braveman & Barclay, 2009; Hertzman & Power, 2003), thus life course SEP is an important factor to consider in the adult health of individuals and populations. A number of mechanisms by which childhood or parental SEP may affect adult health have been examined, with increasing emphasis on early life experiences and cumulative disadvantage over the life course (Barker, 1995; Geronimus et al., 2006; Gilman, Kawachi, Fitzmaurice, & Buka, 2002; Hertzman & Boyce, 2010; Stansfeld, Clark, Rodgers, Caldwell, & Power, 2010; Walsemann, Geronimus, & Gee, 2008; Woolf & Braveman, 2011). Life course SEP could affect health outcomes in a direct manner and could operate through current adult SEP. Understandably, most

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health studies can only collect SEP information from individuals at one time during respondents' adulthood.

#### *Life course SEP & health*

A growing literature has established links between life course SEP and health (Beebe-Dimmer, 2004; Gilman et al., 2002; Halleröd & Gustafsson, 2011; Loucks et al., 2010). But less is known about the effects of childhood exposures on mental and physical health among black Americans (Bowen, 2009; Haas & Rohlfsen, 2010; Walsemann, Gee, & Geronimus, 2009; Walsemann et al., 2008). Black Americans may experience early health deterioration as a result of the cumulative effects of chronic exposure to social or economic adversity (Geronimus et al., 2006; Johnson & Schoeni, 2011; Pearson, 2008). Thus, cumulative risk may be especially important to the mental and physical health of black Americans (Loucks et al., 2009; Schulz et al., 2000; Seeman et al., 2008; Stansfeld et al., 2010). Even blacks who experience upward social mobility may have residual effects of early disadvantage as blacks are more likely than whites to be exposed to adverse experiences in childhood. For instance, over one third of black Americans are estimated to be currently living in poverty, double the rate for whites, (Census, 2011; DeNavis-Walt et al., 2011), and black children are estimated to constitute nearly 90% of the chronically poor children in the United States (Census, 2011; Corcoran, 1997). This, in turn, may limit the opportunities for many blacks to acquire socioeconomic resources as adults. Additionally, childhood poverty is linked to poorer adult health (Gilman et al., 2002; Kessler & Magee, 1993; Muntaner, Eaton, Miech, & O'Campo, 2004; Sadowski, Ugarte, Kolvin, Kaplan, & Barnes, 1999).

Previous studies have established the association between SEP in childhood and adult depression (Gilman et al., 2002; Kessler & Magee, 1993; Sadowski et al., 1999; Strohschein, 2005). For instance, Lynch and colleagues found that chronically low-income respondents were more likely than those who had never experienced poverty to report clinical depression (Lynch, Kaplan, & Shema, 1997), while Gilman and colleagues found that participants from lower SEP backgrounds had nearly a twofold increase in risk for major depression, compared to those from the highest SEP background in their study (Gilman et al., 2002).

The relationship between life course measures of SEP and mental health among black Americans is understudied (Miech, 2008; Muntaner et al., 2004). While a consistent inverse relationship between higher SEP and poor mental health is observed for whites, evidence for blacks is more heterogeneous, as results from previous studies indicate that the magnitude and direction of the association between SEP and mental health for blacks are mixed (Gavin et al., 2009; Lorant et al., 2003; Williams, Takeuchi, & Adair, 1992a,b; Williams et al., 2007). For instance, some studies indicate that SEP is negatively associated with depression and depressive symptoms among black men and women (Banks & Kohn-Wood, 2002; Bromberger, Harlow, Avis, Kravitz, & Cordal, 2004; Roxburgh, 2009) while results from other studies reveal no significant relationship between SEP and mental health among blacks (Ennis, Hobfoll, & Schroder, 2000; Gavin et al., 2009; Williams et al., 2007). Even studies that account for multiple SEP indicators, including measures of wealth, do not lend any additional clarity in understanding the relationship between SEP and depression (Hudson, Neighbors, Geronimus, & Jackson, 2011; Rodriguez, Allen, Frongillo, & Chandra, 1999). One potential limitation is that most previous studies in this area have not included life course SEP indicators such as parental or childhood SEP.

Self-rated global health is a widely used, reliable measure used to predict mortality and various morbidities (Bratter & Gorman, 2011; Idler & Benyamini, 1997). Results from multiple studies

indicate that blacks report poorer self-rated health compared to whites (Borrell & Dallo, 2008; Borrell, Kiefe, Williams, Diez-Roux, & Gordon-Larsen, 2006; Franks, Gold, & Fiscella, 2003). While accounting for socioeconomic resources reduces differences in self-rated health between blacks and whites (Farmer & Ferraro, 2005; Suresh, Sabanayagam, & Shankar, 2011) some gap remains after adjustment for SEP indicators (Cagney, Browning, & Wen, 2005).

#### *Racial discrimination & health*

The experience of racial discrimination is highly stressful, ranking in significance with other major stressful life events such as job loss, divorce, and the death of a loved one (Kessler, Mickelson, & Williams, 1999). Indeed, researchers have found empirical associations between perceived discrimination and impaired psychological well-being, depression, and decreased self-esteem (Karlsen & Nazroo, 2002; Williams et al., 1992a; Williams, Yu, Jackson, & Anderson, 1997). Few studies have examined the role of racial discrimination in explaining the relationship between SEP and self-rated health. Experiences of racial discrimination, either interpersonal or structural, have several consequences. First, it could diminish blacks' returns on human capital investments; discrimination may limit the opportunities available to blacks who achieve a given level of education compared to their white peers (Cole & Omari, 2003; Colen, Geronimus, & Phipps, 2006; Forman, 2003; Williams, 2003). As a result, exposure to discrimination may mediate and/or moderate the association of race/ethnicity and poorer health outcomes (Hudson et al., 2012). Second, experiences of racial discrimination may themselves elicit stress responses that, over time, erode the health of blacks (Cunningham et al., 2012; Kessler et al., 1999; Krieger et al., 2010; USDHHS, 2001; Watkins, Hudson, Howard Caldwell, Siefert, & Jackson, 2010; Williams, Neighbors, & Jackson, 2003; Williams et al., 1997). Reports of exposure to racial discrimination in the workplace and in residential choice are more frequent among black Americans at higher versus lower levels of SEP (Cole & Omari, 2003; Forman, 2003; Hudson et al., 2012). Thus, black Americans who accumulate greater socioeconomic resources may be more at risk of exposure to racial discrimination. It is possible that experiences of racial discrimination could diminish the protective effects of increased levels of SEP among blacks. Racial discrimination has been described as a "costs of upward social mobility," which could diminish the positive health effects of increased SEP (Cole & Omari, 2003; Hudson et al., 2012).

Blacks are more likely than whites to encounter discrimination on the basis of their race/ethnicity and issues of racial discrimination are most salient to black Americans given the history of slavery, segregation and other discriminatory practices and experiences. However, whites have also reported experiences of racial discrimination (Borrell, Kiefe, Diez-Roux, Williams, & Gordon-Larsen, 2012; Bratter & Gorman, 2011; Shavers et al., 2012). Even less is known about how reports of racial discrimination relate to the mental and physical health of whites. In previous studies of racial discrimination among black Americans, only a few have accounted for the effects of racial discrimination on SEP and on health (Bratter & Gorman, 2011; Hudson et al., 2012; Williams et al., 1997). Using data from the 2004 Behavioral Risk Factor Surveillance System, Bratter and Gorman (2011) found that racial discrimination and socioeconomic status together explained black–white gap in self-rated health. However, the authors did not examine whether these were simply independent contributors or also interacted in determining outcomes. Since racial discrimination is associated with impaired psychological well-being, decreased self-esteem, and greater risk of depression (Bhui et al., 2005; Brody et al., 2006; Karlsen & Nazroo, 2002; Kessler et al., 1999; Sellers, Bonham, Neighbors, & Amell, 2006; Williams et al., 1992a,b), it is

possible that experiences of racial discrimination contributes to poorer health status among blacks and whites. To date, there have been few empirical tests of whether experiences of racial discrimination are similarly linked to poorer health in whites.

### *The present study*

The relationship between life course SEP and depressive symptoms and self-rated health is not well understood. The current study examined the effects of a life course measure of SEP on the mental and physical health of blacks and whites and whether the relationship between life course SEP and mental and physical health was moderated by perceptions of racial discrimination. The socioeconomic conditions that individuals experience during childhood and that are accumulated throughout the life course may have an effect on depression that is not adequately captured by examining the current reported income and education. It would also seem that greater childhood socioeconomic resources would protect against depression. However, given evidence from previous studies, it is unclear as to whether these relationships are true across race or primarily among white Americans. Additionally, racial discrimination is a unique stressor that could threaten mental and physical health. It is also possible that racial discrimination could undermine the benefits presumed to accompany improvements in SEP. Previous studies have not examined whether racial discrimination moderates the relationship between life course SEP and health.

The extant literature has focused primarily either on latency effects of stress exposures that occur in utero or during early childhood on adult depression or on stress exposures during adulthood. A full understanding of the determinants of adult health may require inclusion of both. While there is certainly an independent effect of adult SEP on depressive symptoms and self-rated health, we also know that the socioeconomic resources individuals have access to during their childhood, via their parents' education, occupation and earnings have a profound effect on health, both independently and through their own adult SEP. For this paper, we have constructed a life course cumulative risk life course measurement for SEP to account for the effects of both parental SEP and individuals' own education and occupational status. The relationship between SEP and health is more complex for blacks than whites. For instance, African-Americans consistently have poorer physical health status than whites, but findings on depression and other mental health indicators are more mixed (Jackson, Knight, & Rafferty, 2009; Mezuk et al., 2011). Because of this, we examined both depression and at global health status in relation to SEP and discrimination in these two race groups.

The current study examined the joint effects of a life course measure of SEP and perceptions of racial discrimination on both mental and physical health among blacks and whites using data from the Coronary Artery Risk Development in Young Adults study (CARDIA). Specifically, We examined the following research questions: 1) what is the relationship between life course SEP and health, here defined as depressive symptoms and self-rated health, among black and white CARDIA respondents; 2) what is the relationship between racial discrimination and health; 3) does racial discrimination moderate the relationship between life course SEP and health?

## **Methods**

### *Data*

We used data drawn from the Coronary Artery Risk Development in Young Adults (CARDIA) study, which began initial data collection in 1986 with an initial group of 5115 black and white adults aged 18–30 years. Participants were recruited across four

study sites: Birmingham, AL; Chicago, IL; Minneapolis, MN; and Oakland, CA. Study participants were selected so that there would be approximately the same number of people in subgroups of race, gender, education (high school or less and more than high school) and age (18–24 and 25–30) and similarly composed of respondents drawn from the four study sites.

Although CARDIA participants were examined at baseline and years 2, 5, 7, 10, 15, and 20, data for the current analyses are from Year 15. Year 15 was selected because it was the only wave in which all variables of interest, particularly racial discrimination and depressive symptoms were collected. Seventy-two percent ( $N = 3672$ ) of the original sample was reexamined at year 15. Results were limited to Year 15 participants who reported at least one parent's education at baseline, and completed Year 15 outcomes of interest ( $N = 3620$ ).

## **Outcomes variables**

**Depressive Symptomatology** was assessed with the widely used 20-item Center for Epidemiology Studies Depression Scale (CES-D) (Radloff, 1977).

**Self-Rated Health** was measured with the following one item question, "In general would you say your health is..." and participants selected one of the following options: 1 = Excellent, 2 = Very Good, 3 = Good, 4 = Fair, or 5 = Poor. Responses were reverse coded so that a higher score represented favorable self-rated health.

## **Independent variables**

**Childhood SEP** was measured by parent(s) education. Participants were asked to report the highest level of education attained for their mother (or woman who raised them) and for their father (or man who raised them). For respondents who reported both their parents' education level, we used the educational attainment of the highest educated parent.

**Adult SEP** was measured by the participant's own occupation reported in Year 15.

**Life course SEP** was calculated based on the framework developed by Loucks et al., (2009) which accounts for the effects of both parental SEP and adult SEP. The possible range of scores was 0–6, and included each participant's (a) highest educated parent recoded as less than high school diploma = 0, high school education completed = 1, and greater than high school = 2), (b) own education recoded as high school or less = 0, between 13 and 16 years = 1, and greater than 17 years = 2, and (c) own occupation (unemployed/laborer = 0, clerical/sales/housewife = 1, executive/professional/supervisory/technical = 2). Different cut points were employed for parent's and own education to account for trends across generations in educational attainment that were observed in the distribution of the data.

**Racial Discrimination** assessed individuals' perceptions and experiences of discrimination using the Experiences of Discrimination (EOD) index. According to the EOD administered in Year 15, participants were asked whether they had "ever experienced discrimination or been hassled or made to feel inferior...because of their race or color" in seven domains "at school, getting a job, at work, getting housing, getting medical care, on the street or in a public setting, and from the police or in the courts (Cunningham et al., 2012; Krieger & Sidney, 1996). For each domain, participants indicated occurrence (yes/no) and frequency (rarely, sometimes, often) Mean racial discrimination scores were calculated by frequency of experienced discrimination in the seven settings and averaging the recoded responses. The internal consistency reliability of the EOD index for racial/ethnic discrimination was 0.82 for all participants, 0.79 for blacks, and 0.66 for whites (Cunningham et al., 2011).

**Table 1**  
Sociodemographics characteristics of CARDIA Year 15 sample\*.

|   | All (N = 3620) | Blacks (N = 1697) | Whites (N = 1923) |
|---|----------------|-------------------|-------------------|
| Age at entry, mean (SD)                             | 25.08 (3.61)   | 24.49 (3.79)      | 25.59 (3.37)      |
| Male sex, no. (%)                                   | 1602 (44.3)    | 702 (41.4)        | 900 (46.8)        |
| Body mass index, mean (SD)                          | 28.74 (6.84)   | 30.46 (7.35)      | 27.22 (5.95)*     |
| Parental education (years), mean (SD)               | 13.97 (3.18)   | 12.86 (2.92)      | 14.88 (3.09)*     |
| Own education (years), mean (SD)                    | 15.28 (3.18)   | 14.38 (2.16)      | 16.07 (2.55)*     |
| Own occupation                                      |                |                   |                   |
| Laborer, N (%)                                      | 531 (14.7)     | 328 (19.6)        | 203 (10.6)        |
| Clerical/sales/housewife, N (%)                     | 1398 (38.6)    | 803 (47.9)        | 595 (31.2)        |
| Executive/professional/supervisory/technical, N (%) | 1656 (45.7)    | 544 (32.5)        | 1112 (58.2)       |
| Currently working full-time                         | 2716 (74.2)    | 1304 (75.8)       | 1412 (72.8)*      |
| Currently married                                   | 2207 (60.3)    | 853 (49.5)        | 1354 (69.8)**     |
| Life course socioeconomic position, mean (SD)       | 3.87 (1.49)    | 3.31 (1.41)       | 4.36 (1.39)*      |
| Discrimination frequency, sum (SD)                  | 1.29 (1.76)    | 2.33 (1.95)       | 0.38 (0.82)**     |
| CES-D, mean (SD)                                    | 9.16 (7.85)    | 10.52 (8.36)      | 7.96 (7.16)**     |
| Self-rated health, mean (SD)                        | 3.65 (0.89)    | 3.47 (0.90)       | 82.82 (0.86)*     |

\*Significant at the 0.05 level; \*\*Significant at the 0.01 level.

**Covariates**

Age, gender, marital status (married/not married), employment status (currently working full time/not currently working full time), and income (measured continuously) at Year 15 were included as covariates. These sociodemographic factors were included in analyses because of potential confounding with the two dependent variables (Cagney et al., 2005; Dohrenwend et al., 1992; Hudson et al., 2011; Kessler, McGonagle, Swartz, Blazer, & Nelson, 1993; Krieger, Kosheleva, Waterman, Chen, & Koenen, 2011; Link, Lennon, & Dohrenwend, 1993; Nolen-Hoeksema, 2001; Schnittker, 2005; Williams et al., 1992b). Anthropometric and health factors were also included as covariates, including hypertension, heart rate, diabetes, body mass index, and asthma. These additional health factors were included in analysis to adjust for the potential confounding relationship between these factors and the two dependent variables (Carney, Freedland, & Sheps, 2004; Gwynn et al., 2008; Jackson et al., 2009; Johnson & Schoeni, 2011; Katon et al., 2010; Lustman, Freedland, Carney, Hong, & Clouse, 1992; Mezuk, Eaton, Albrecht, & Golden, 2008).

**Data analysis**

Multivariate regression analyses evaluated associations of life course SEP, racial discrimination, depressive symptoms, and self-rated health. Analyses adjusted for potential confounders including age, gender, marital status, employment status, and income as well as factors associated with both health outcomes including hypertension, heart rate, diabetes, body mass index, and asthma. Although the two dependent variables are significantly associated, we did not

include them in the same model because the two outcomes are were so strongly related. Specifically, we did not include depressive symptoms in models of self-rated health and vice versa because of concerns about multicollinearity. Interaction terms were generated between life course SEP and racial discrimination to investigate whether the association between life course SEP and health was moderated by experiences of racial discrimination. We stratified by race in order to determine the effects of life course SEP, racial discrimination, depressive symptoms, self-rated health on black and white respondents.

**Results**

*Descriptive and bivariate statistics*

Table 1 presents descriptive statistics for the sample of participants who completed Year 15 outcome variables of interest and for whom parental education was attained at study entry, stratified by racial group. Bivariate analyses (i.e. *t*-tests, chi square tests) revealed that black participants were statistically different from white participants on most measured variables.

*Life course SEP, racial discrimination, and depressive symptoms*

Tables 2 and 3 present results for models predicting CES-D scores and self-rated health, respectively. In each table, Model A presents the effects of life course SEP on the outcome, adjusting for covariates age, race, and gender for the full sample in the first column labeled “ALL” and by race in the following columns. In Model B, we examined the effect of racial discrimination on the

**Table 2**  
Life course SEP and racial discrimination regressed on depressive symptoms.

|                                  | All <sup>a</sup> |      |        | Blacks |      |        | Whites |      |        |
|----------------------------------|------------------|------|--------|--------|------|--------|--------|------|--------|
|                                  | B                | SE   | p      | B      | SE   | p      | B      | SE   | p      |
| Model A                          |                  |      |        |        |      |        |        |      |        |
| Life course SEP                  | -0.33            | 0.1  | 0.001  | -0.52  | 0.15 | 0.001  | -0.18  | 0.13 | 0.16   |
| Model B                          |                  |      |        |        |      |        |        |      |        |
| Discrimination                   | 0.62             | 0.09 | <0.001 | 0.55   | 0.10 | <0.001 | 1.12   | 0.19 | <0.001 |
| Model C                          |                  |      |        |        |      |        |        |      |        |
| Life course SEP                  | -0.39            | 0.09 | <0.001 | -0.63  | 0.15 | <0.001 | -0.21  | 0.13 | 0.09   |
| Discrimination                   | 0.64             | 0.85 | <0.001 | 0.60   | 0.10 | <0.001 | 1.14   | 0.19 | <0.001 |
| Model D                          |                  |      |        |        |      |        |        |      |        |
| Life course SEP × Discrimination | -0.10            | 0.05 | 0.04   | -0.03  | 0.07 | 0.72   | -0.19  | 0.13 | 0.14   |
| Model E                          |                  |      |        |        |      |        |        |      |        |
| Race × SEP × Disc                | -0.16            | 0.15 | 0.30   |        |      |        |        |      |        |

<sup>a</sup> For analyses with all participants, blacks are the referent group and gender, age, comorbidities, employment status, income, BMI and race were included as covariates. For those within each racial group, gender, age, comorbidities, employment status, income and BMI were included as covariates.

**Table 3**  
Life course SEP and racial discrimination regressed on self-rated health.

|                                  | All <sup>a</sup> |           |          | Blacks   |           |          | Whites   |           |          |
|----------------------------------|------------------|-----------|----------|----------|-----------|----------|----------|-----------|----------|
|                                  | <i>B</i>         | <i>SE</i> | <i>p</i> | <i>B</i> | <i>SE</i> | <i>p</i> | <i>B</i> | <i>SE</i> | <i>p</i> |
| Model A                          |                  |           |          |          |           |          |          |           |          |
| Life course SEP                  | 0.05             | 0.01      | <0.001   | 0.30     | 0.16      | <0.06    | 0.06     | 0.14      | <0.001   |
| Model B                          |                  |           |          |          |           |          |          |           |          |
| Discrimination                   | -0.05            | 0.09      | <0.001   | -0.04    | 0.01      | <0.001   | -0.07    | 0.02      | 0.002    |
| Model C                          |                  |           |          |          |           |          |          |           |          |
| Life course SEP                  | 0.05             | 0.01      | <0.001   | 0.04     | 0.02      | 0.02     | 0.06     | 0.14      | <0.001   |
| Discrimination                   | -0.05            | 0.01      | <0.001   | -0.05    | 0.01      | <0.001   | -0.07    | 0.02      | <0.001   |
| Model D                          |                  |           |          |          |           |          |          |           |          |
| Life course SEP × Discrimination | -0.003           | 0.05      | 0.52     | 0.01     | 0.01      | 0.30     | -0.03    | 0.01      | 0.05     |
| Model E                          |                  |           |          |          |           |          |          |           |          |
| Race × SEP × Disc                | -0.04            | 0.02      | 0.03     |          |           |          |          |           |          |

<sup>a</sup> For analyses with all participants, blacks are the referent group and gender, age, comorbidities, employment status, income, BMI and race were included as covariates. For those within each racial group, gender, age, comorbidities, employment status, income and BMI were included as covariates.

outcome, again first for the entire sample followed by those by racial group. In Model C, we present the independent effects of life course SEP and discrimination together in the same model, and in Model D the interaction between life course SEP and discrimination.

Overall, greater levels of life course SEP were significantly associated with fewer depressive symptoms ( $B = -0.33, p = 0.001$ ) while greater perceptions of racial discrimination were positively associated with depressive symptoms ( $B = 0.62, p < 0.001$ ). When in the same model, both life course SEP and racial discrimination frequency remained statistically significant to the same extent as when in the model alone. In analyses that tested whether racial discrimination moderated the relationship between life course SEP and depressive symptoms, there was a significant interaction between SEP and discrimination (interaction  $B = -0.1, SE = 0.05, p = 0.04$ ). This finding indicated that greater levels of racial discrimination were associated with greater depressive symptoms among respondents with greater levels of life course SEP.

In race-stratified analyses, we examined whether the effects of life course SEP and racial discrimination on depressive symptomatology differed significantly by racial group. As displayed in Table 2 Model A, there was an association between life course SEP and depressive symptoms, but this relationship was only statistically significant in blacks ( $B = -0.52, p = 0.001$ ). There was a significant positive association between racial discrimination and depressive symptoms for both blacks ( $B = 0.55, p < 0.001$ ) and whites ( $B = 1.12, p < 0.001$ ). Within the same model (Table 2, Model C), we found similar relationships between life course SEP, racial discrimination, and depressive symptoms as described above. For blacks, the relationship between life course SEP and depressive symptoms was negative and significant and there was a significant positive association between racial discrimination and depressive symptoms. For whites, life course SEP was negatively associated with depressive symptoms but this association was still not statistically significant (at the 0.05 level) while there was still a positive association between perceptions of discrimination and depressive symptoms. Again, we found no significant interactions between life course SEP and discrimination observed in blacks ( $p = 0.72$ ) or whites ( $p = 0.14$ ).

#### *Life course SEP, racial discrimination, and self-rated health*

Overall, greater levels of life course SEP were positively associated with more favorable self-rated health (see Table 3, Model A) and racial discrimination was related to poorer self-rated health for the overall sample ( $B = -0.05, p < 0.001$ ). Within the same model, the relationship between life course SEP and self-rated health remained statistically significant, with greater levels of SEP

positively associated with favorable self-rated health ( $B = 0.05, p < 0.001$ ). Similarly, there was a significant, negative relationship between greater levels of racial discrimination and favorable self-rated health ( $B = -0.05, p < 0.001$ ).

Next, we tested whether there was an interaction between life course SEP and racial discrimination. Racial discrimination appeared to modify the relationship between life course SEP and self-rated health as this interaction was statistically significant for the overall sample (interaction  $B = -0.01, SE = 0.05, p = 0.04$ ). However, in the three-way interaction used to examine whether the relationship between life course SEP, racial discrimination, and self-rated health varied by race, we found evidence that there was a racial difference. Specifically, whites who had greater levels of life course SEP but perceived greater levels of racial discrimination rated their health poorer than whites with perceived lower levels of racial discrimination (interaction  $B = -0.04, SE = 0.02, p = 0.03$ ).

In the race stratified models shown in Table 3, we found that life course SEP was positively associated with favorable self-rated health for both blacks and whites but was stronger for whites ( $B = 0.06, p < 0.001$ ) and was not statistically significant (at 0.05 level) for blacks. Greater perceptions of discrimination were negatively associated with higher self-rated health for both black and white respondents. Within the same model, life course SEP was positively associated with favorable self-rated health for both blacks ( $p = 0.02$ ) and whites ( $p < 0.001$ ) and discrimination remained negatively related to positive self-rated health for both racial groups ( $p < 0.001$ ). Next, we examined whether racial discrimination moderated the relationship between life course SEP and self-rated health. There were no significant interactions among blacks (interaction  $B = 0.01, SE = 0.01, p = 0.3$ ) but for white respondents, there was a significant interaction with the association between discrimination and poorer self-rated health significantly stronger with increasing life course SEP (interaction  $B = -0.03, SE = 0.01, p = 0.05$ ).

## **Discussion**

It should be acknowledged that this study has several key limitations. First, while we did investigate a measure of life course SEP, this measure was based on respondents' retrospective recall of parents' education and occupation. So while this paper incorporated use of parental education and occupation and CARDIA is a longitudinal dataset, our analyses were limited to a cross-sectional assessment. The use of data from prospective studies that follow respondents over time would be ideal to examine how SEP affects depressive symptoms over the life course. Additionally, it is important to examine the effects of social mobility over the life

course on health. It is possible that the results of this study could be even more pronounced if our study included more recent data. For one, it is possible that current changes in the economic well-being of the population are not represented in this study. Previous studies have indicated the importance of examining social mobility designations and health (e.g. Nicklett & Burgard, 2009). In our analysis of intergenerational social mobility within this sample (results not shown), we found that upward social mobility (moving from low to high) was associated with fewer reports of depressive symptoms and better self-rated health. However, we were unable to make any meaningful comparisons between race, social mobility and health because of such a low sample size in some social mobility categories across race.

Another limitation is that this was a relatively young sample of adults. From a life course perspective, an older sample would likely have a different health profile. For instance, age is negatively associated with depression while physical morbidities increase with age. Additionally, this sample may not have reached peak earning potential. An older sample may be more beneficial to gain a greater understanding of how perceptions of racial discrimination could affect life course SEP. While this study controlled for gender, it is likely that there are important gender-related factors that have not been adequately addressed here. Previous investigations have illustrated that the experiences and effects of discrimination vary across gender and race/ethnicity. For instance, previous investigations have found that the relationship between SEP and depression in blacks varies by gender (Hudson et al., 2011, 2012). Previous investigations have also found that the effects of racial discrimination vary across gender (Hudson et al., 2012; Nuru-Jeter et al., 2008). Future research should investigate whether there are differences in the association between SEP, racial discrimination, and health across race/ethnicity and gender (Cunningham et al., 2011; Hudson et al., 2012).

Although, we were interested in examining the effects of life course SEP and discrimination on depressive symptoms and self-rated health separately, future efforts should be made to examine the effects depressive symptoms on self-rated health as well as the effects of self-rated health on depressive symptoms. The use of longitudinal data could provide an important picture of depressive symptoms and self-rated health.

The findings related to discrimination garnered for white respondents were unexpected and future research efforts must be made to examine precisely what the racial discrimination measure used here is capturing. It is possible that negativity bias among whites could affect perceptions of discrimination and could also drive depressive symptoms. Alternatively, the discrimination measure may not have been sensitive enough to adequately capture the experiences of black respondents in this sample. The discrimination measure used here focuses on experiences and perceptions of racial discrimination at the interpersonal level, which could limit efforts to capture discrimination that occurs at community or institutional levels, such as racial residential segregation and unfair hiring practices. It is also likely that there is some variance in perceptions of discrimination between blacks and whites for different question items. For instance, Cunningham et al., using data drawn from CARDIA, found that items 1 and 3 functioned differently by between blacks and whites (Cunningham et al., 2011). They found that whites reported more racial/ethnic discrimination for the “at school” domain while blacks reported more discrimination for the “getting housing” domain. They linked the endorsements of different racial discrimination experiences to historical factors. For instance, there may be a strong precedent for housing discrimination among blacks because of restrictive residential covenants, residential steering, and discriminatory lending practices. This finding was in contrast to those for whites, who were more likely to

report discrimination at school, which could be a manifestation of attitudes against affirmative action policies. They suggest that whites may believe that affirmative action policies could be a form of institutional racism against whites. Future efforts should also examine whether individuals’ perceptions and experiences of discrimination at the interpersonal and structural levels limits their ability to acquire human capital as well as their advancement in education and occupational status. Thus, it may also be advantageous to examine the effects of racial discrimination on SEP across the life course in a mediation-moderation analysis.

Overall, study results indicated that the higher levels of life course SEP was associated with fewer depressive symptoms and more favorable self-rated health. Strengths of this study included multiple measures of SEP, a life course measure of SEP, and accounting for the effects of racial discrimination. Additionally, while previous studies have examined the relationship between life course SEP and risk of certain clinical diseases and associated biomarkers (Loucks et al., 2009, 2010), a limited number of studies have examined life course SEP and depressive symptoms or self-rated health (Harper et al., 2002).

We observed a significant inverse association between life course SEP and depressive symptoms. Results not only indicated a strong, inverse relationship between life course SEP and depressive symptomatology for blacks and whites. This is an important observation considering that previous studies, which primarily use only cross-sectional SEP measures, have not found consistent, inverse associations between SEP and depression (Gavin et al., 2009; Hudson et al., 2011; Williams et al., 1992a,b, 2007). This finding may indicate that using a life course SEP framework is critical in unpacking the SEP-depression relationship in black Americans.

Racial discrimination was positively associated with greater levels of depressive symptoms and negatively associated with favorable self-rated health. These results are consistent with previous investigations that have indicated that perceptions of racial discrimination are negative to health and here, we found this was true not only for blacks but also for white respondents. We did not find that racial discrimination moderated the relationship between life course SEP and depressive symptoms. Analyses indicated the interactions between experiences of racial discrimination and life course SEP were not significantly related to increased levels of depressive symptoms for blacks or whites. These findings are contrary to previous investigations that have found evidence of a significant interaction between SEP and racial discrimination (Hudson et al., 2011).

We also examined whether the relationship between life course SEP and self-rated health was negatively affected by racial discrimination. There was a significant interaction between life course SEP and racial discrimination. Specifically, respondents who reported greater levels of SEP and perceived racial discrimination were more likely to report poorer self-rated health. However, this interaction was driven by white respondents. Whites with greater levels of life course SEP and higher levels of racial discrimination reported poorer self-rated health.

## Conclusions

The findings presented here are novel. To our knowledge, no previous studies have examined the joint interactive effects of life course SEP and racial discrimination on mental and physical health. The results garnered from this study indicate that greater levels of life course SEP are protective against the development of depressive symptoms and enhance self-rated health. Yet, this study indicates that health benefits presumed to accompany improvements in SEP could be undermined by experiences of racial discrimination, particularly for whites. While unexpected, these findings still

underscore the insidious nature of racial discrimination and its role in disrupting the nature of the relationship between life course SEP, depressive symptoms, and self-rated health.

Because the findings of this study are unique, more investigations of how racial discrimination could alter the relationship between SEP and health over the life course are warranted. Considering the curious findings here, future qualitative efforts may be necessary to examine the precise meaning and experiences of racial discrimination among whites and to determine whether perceptions of discrimination for whites are more tightly linked with implicit or even explicit racial bias. Additionally, the results of this study are timely, considering the current fragility of the American economy, including decreases in wealth and home values along with increased unemployment levels. Downward social mobility could threaten people's health and perceptions of racial discrimination may play an important role in the health status of both blacks and whites. Subsequently, studies conducted across a wide variety of academic disciplines suggest that racial attitudes are affected by the economic climate of the country and scholars have found changes in inter-racial attitudes, particularly in the context of economic downturns (Beck & Tolnay, 1990; Kaufmann, 1998). The combination of high levels of racial residential segregation in the U.S., especially between blacks and whites, (Oliver & Mandelberg, 2000) along with the economic instability could impact perceptions of racial discrimination. Taken together, the results of this study represent a modest first step toward understanding the complex interplay of the relationship between life course SEP, experiences of racial discrimination, and both mental and physical health.

## Acknowledgments

Support for this work was provided by the Kellogg Health Scholars Program, the University of California, San Francisco, Center on Social Disparities in Health, and the University of California, San Francisco Health Disparities Working Group.

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