Published in final edited form as:

J Racial Ethn Health Disparities. 2017 August ; 4(4): 746–757. doi:10.1007/s40615-016-0278-0.

General Self-Efficacy and Mortality in the USA; Racial Differences

Shervin Assari^{1,2,*}

¹Department of Psychiatry, University of Michigan, 4250 Plymouth Road, SPC 5763, Ann Arbor, MI 48109-2700, USA

²Center for Research on Ethnicity, Culture and Health, School of Public Health, University of Michigan, Ann Arbor, MI, USA

Abstract

Purpose—General self-efficacy has been historically assumed to have universal health implications. However, less is known about population differences in long-term health effects of general self-efficacy across diverse populations. This study compared black and white American adults for (1) the association between psychosocial and health factors and general self-efficacy at baseline, and (2) the association between baseline self-efficacy and long-term risk of all-cause mortality over 25 years.

Methods—The Americans' Changing Lives (ACL) study, 1986–2011, is a nationally representative longitudinal cohort of US adults. The study followed 3361 black ($n = 1156$) and white ($n = 2205$) adults for up to 25 years. General self-efficacy as well as demographics, socioeconomics, stressful life events, health behaviors, obesity, depressive symptoms, and self-rated health were measured at baseline in 1986. The outcome was time to all-cause mortality since 1986. Race was the focal moderator. Logistic regression and proportional hazards models were used for data analysis.

Results—Although blacks had lower general self-efficacy, this association was fully explained by socioeconomic factors (education and income). Our logistic regression suggested interactions between race and education, self-rated health, and stress on general self-efficacy at baseline. Baseline general self-efficacy was associated with risk of mortality in the pooled sample. Race interacted with baseline general self-efficacy on mortality risk, suggesting stronger association for whites than blacks.

*Shervin Assari, assari@umich.edu.

Authors' Contributions

Shervin Assari designed and analyzed this work and drafted and revised the paper. Shervin Assari had full access to all of the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.

Ethics

All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) with the Helsinki Declaration of 1975, as revised in 2000. University of Michigan Institutional review board (IRB) approved the study protocol.

Conflict of Interest

The authors declare that they have no conflict of interest.

Informed Consent

Informed consent was obtained from all participants included in the study.

Conclusion—Black-white differences exist in psychosocial and health factors associated with self-efficacy in the USA. Low general self-efficacy does not increase mortality risk for blacks. Future research should test whether socioeconomic status, race-related attitudes, world views, attributions, and locus of control can potentially explain why low self-efficacy is not associated with higher risk of mortality among American blacks.

Keywords

Ethnic groups; African Americans; Blacks; Mortality; Self-efficacy

Introduction

According to the transactional theory of stress and coping, proposed by Lazarus and Folkman in 1984, coping styles and resources shape individuals' reactions when they face stress [1]. In this view, appraisal of one's own ability to cope is as important as the stressor itself. Individuals who have a better perceived ability to cope also have an enhanced response to stress [1]. Hence, control beliefs such as general self-efficacy, mastery, and internal locus of control have major implications for maintaining health status [2].

General self-efficacy, defined as the subjective expectations regarding one's ability to exert influence over life circumstances and outcomes in the surrounding environment [3], is one of the control beliefs that reflect how people evaluate themselves in coping with stress [3]. General self-efficacy affects how individuals react during times of stress exposure [4]. General self-efficacy is distinct from behavior- and situation-specific self-efficacy, which are defined as the beliefs in one's own ability to accomplish a task and succeed in specific situations [5], or as the beliefs in one's capabilities to organize and execute the course of action required to produce given attainments [6].

In 2014, Turiano and colleagues also showed an interaction between education level and control beliefs on risk of all-cause mortality. Low control beliefs were predictive of an increased risk of mortality only among individuals with low but not high education. Such interaction was not due to confounders such as health behaviors, mood, and health [7]. Race is a very strong proxy of social class in the USA [8]; however, it is still unknown whether or not race alters the protective effect of general self-efficacy on long-term risk of all-cause mortality [7]. In a national sample of older adults, Assari showed that a high level of sense of control over life protects whites but not blacks against mortality over a 3-year follow-up period [9].

Previous studies on the long-term association between baseline general self-efficacy and risk of mortality have mostly enrolled white middle class individuals. In response to the gap in the literature, the current study investigates the central role of race in shaping the complex links between SES, health status, and general self-efficacy on risk of mortality over a 25-year period in the USA. In our study, general self-efficacy is defined as an individual's confidence in ability to cope with stress and control over life [10], which is expected to be a strong protective factor for a wide range of physical and health outcomes across the life course [3, 11, 12]. We particularly compared American blacks and whites for (1)

psychosocial and health factors associated with self-efficacy at baseline, and (2) the association between baseline self-efficacy and long-term risk of all-cause mortality.

Methods

Design and Setting

Data came from the Americans' Changing Lives (ACL), 1986–2011, a nationally representative US study of US adults [13, 14, 15].

Sampling and Participants

The ACL has used a stratified multistage probability sample of US adults. The original study enrolled 3617 adults who were 25 years or older and were living in the continental USA in 1986. All participants were noninstitutionalized respondents (representing 70 % of sampled households and 68 % of sample individuals at baseline). The study oversampled older adults (age > 60) as well as blacks. Current analysis is limited to black ($n = 1156$) and white ($n = 2205$) adults (analytical sample = 3361).

Measures

Demographic factors, socioeconomic status, health, and self-efficacy were collected at baseline in 1986. The outcome was time to mortality over 25 years from 1986 to the end of follow-up in 2011.

Race

In this study, race was black versus whites. Participant's self-reported (self-identified) race and ethnicity were collected using multiple survey items. Respondents were asked an open-ended question, "In addition to being American, what do you think of as your ethnic background or origins?" Respondents were also asked a multiple-choice question "Are you white, black, American Indian, Asian, or another race?" Those who responded with more than one nonwhite group were asked to identify which "best described" their race and ethnicity. The survey also assessed the state or foreign country in which the respondent, respondent's mother, and respondent's father were born. Finally, participants were asked "Are you of Spanish or Hispanic descent, that is, Mexican, Mexican American, Chicano, Puerto Rican, Cuban, or Other Spanish?" Responses from above questions were used to construct race/ethnic categories of "non-Hispanic white," "non-Hispanic black," "non-Hispanic Native American," "non-Hispanic Asian," and "Hispanic." This analysis only included non-Hispanic white [reference category] and non-Hispanic black respondents.

General Self-Efficacy

The study measured general self-efficacy using a six-item measure (Cronbach's $\alpha = 0.67$) [5, 16]. Some of the item examples are as follows: (1) I can do just about anything I really set my mind to do; (2) Sometimes I feel that I am being pushed around in life; and (3) There is really no way I can solve the problems I have. Items were taken from measures by Sherer and colleagues, defining self-efficacy as presented by Bandura [17], Sherer [18], Rosenberg [19], and Pearlin [20]. This measure assesses personal beliefs about the ability to control

one's environment and life circumstances in general [16, 18]. Response items included (1) strongly agree, (2) agree somewhat, (3) disagree somewhat, or (4) strongly disagree. An average score was calculated where the high score was indicative of lower general self-efficacy. As we were particularly interested in the interaction between race and self-efficacy, self-efficacy was operationalized as a dichotomous variable based on mean + SD score (1, low; 0, high). This approach enabled us to have white and black groups with low and high general self-efficacy.

All-Cause Mortality

The outcome was time to mortality due to any cause over 25 years of follow-up. Data on mortality were extracted from death certificates or national death index (NDI). The information derived from the death certificates or NDI included primary cause of death, and underlying causes of death, as well as the date of death. In the USA, a death certificate is filled out by a doctor as soon as possible after a person is deceased [21, 22].

Demographic Factors

Demographic characteristics included gender (a dichotomous variable with male as the referent category) and age (a continuous variable).

Socioeconomic Characteristics

Socioeconomic characteristics included baseline education as a dichotomous variable (<11 years of schooling [reference category] vs. 11 years of schooling) and annual income of the respondent (and spouse if present) (19,000 vs. 20,000 annually).

Stressful Life Events (SLE)

The ACL has collected data on the number of major negative events in the past 3 years (past 3 years from the original date of the survey). Participants were asked about nine stressful life events at wave 1 (1986), using a measure which accords well with current standards of measurement of major/traumatic events [23]. Similar to previous work, and for the sake of clarity and ease of interpretation of the interaction term between SLE and race on general self-efficacy, this variable was treated as a dichotomous variable (any stressful event vs. none) [24, 25].

Chronic Medical Conditions

Self-reported chronic medical conditions were measured at baseline. All participants were asked whether a health care provider had ever told them they had each of seven conditions including hypertension, diabetes, chronic lung disease, heart disease, stroke, cancer, and arthritis. We used a sum score which ranged from 0 to 7 [13, 15].

Obesity

Obesity—treated as a dichotomous variable (body mass index (BMI) ≥ 30 kg/m² vs. others)—was calculated based on self-reported weights and heights. BMI calculated based on self-reported weight and height is known to be in close agreement with measured BMI [26].

Self-Rated Health (SRH)

Respondents were asked to classify their self-rated health as excellent, very good, good, fair, or poor. SRH was operationalized as a dichotomous measure (fair/poor vs. excellent/very good/good), a cutoff point that is common in the literature. This measure has shown high test-retest reliability and validity, when considering its predictive power for mortality and other health outcomes [27, 28].

Health Behaviors

The study also used ACL measures on exercise (physical activity), smoking (i.e., tobacco use), and drinking (i.e., alcohol consumption). The first measure, the physical activity index, asked respondents how often they engaged in the following activities: working in the garden or yard, participating in active sports or exercise, and taking walks. A four-point Likert scale response ranged from “often” to “never.” The index was scored by taking the mean of the three items [18]. A high value indicated a high level of physical activity. To measure smoking behavior, we asked respondents whether they currently smoke. A dummy variable was created where 1 = current smoker and 0 = nonsmoker. A similar dummy measure was used concerning alcohol use, that is, whether or not the respondent currently drinks (1 = current drinker and 0 = nondrinker) [29].

Depressive Symptoms

Depressive symptoms were measured with 11 items from the Center for Epidemiological Studies-Depression scale (CES-D) [29]. CES-D items measure the extent to which respondents felt depressed, happy, lonely, sad, that everything was an effort, that their sleep was restless, that people were unfriendly, that they did not feel like eating, that people dislike them, that they could not get going, and that they enjoyed life. This abbreviated CES-D scale has shown acceptable reliability and a similar factor structure compared to the original version [30, 31, 32]. Item responses were 1 to 3. First, we calculated a z score with a mean of 0 and standard deviation of 1, and then dichotomized our score (mean + SD vs. others).

Data Analysis

The ACL has employed complex sampling design for enrollment. To account for the sampling and nonresponse weights, we used Stata-13 (Stata Corp., College Station, TX, USA) for data analysis. We calculated design-based standard errors. Taylor series linearization was used to estimate standard errors based on sampling and nonresponse weights. Survey logistic and Cox regressions were used for data analysis. Our models passed the tests for proportional hazards. Although we did not include those who were neither white or black, we used sub-pop command in Stata, which maintains the original sampling weights for subpopulation estimation. Before performing modeling, we tested assumptions such as lack of multi-collinearity. To evaluate the proportional hazard assumptions for our Cox proportional hazard models, we used *-estat phtest-* in Stata for Schoenfeld residual analysis.

First, we ran survey logistic regressions in the pooled sample. In our survey logistic regressions, independent variables were gender, age, education, income, stressful life events, chronic medical conditions, self-rated health, and depressive symptoms at baseline. Baseline

self-efficacy was the outcome, and race was the moderator. In the first step, we ran *model 1* with age, gender, and race. In *model 2*, we also included SES (education and income) and stress. In *model 3*, we also included physical and mental health factors (chronic medical conditions, self-rated health, depressive symptoms). In *model 4*, we included five interaction terms between race and education, income, chronic medical conditions, self-rated health, and depressive symptoms. In the next step, we ran survey logistic regressions among whites and blacks. Model 1 included age and gender. Model 2 also included SES (education and income) and stress. Model 3 also included physical and mental health factors (chronic medical conditions, self-rated health, depressive symptoms).

In our proportional hazard models, the independent variable was baseline self-efficacy, measured at 1986, operationalized as a dichotomous variable based on mean + SD (1, low; 0, high). The dependent variable was time (months) to mortality between 1986 and 2011. Baseline demographic factors, socioeconomic characteristics, stress, and health (medical conditions, self-rated health, depressive symptoms, and health behaviors) which are known to be associated with race, personal coping resources, and mortality were confounders. The focal moderator was race (whites as the referent category). In the first step, we ran models in the pooled sample. Models 1 through 3 did not include any interaction term. Model 1 included self-efficacy, age, gender, and race. Model 2 also included SES (education and income) and stress. Model 3 also included physical and mental health factors (chronic medical conditions, self-rated health, depressive symptoms). In models 4 and 5, we entered our interaction term (race $\times$ self-efficacy) with and without health variables as covariates. Finally, we also ran race-specific models (model 1 through model 5). Model 1 included self-efficacy, age, and gender. Model 2 also included SES (education and income). Model 3 also included stress. Model 4 also included physical health factors (chronic medical conditions, self-rated health, obesity). Model 5 also included mental health and health behaviors. Hazard ratios (HR), 95 % CI, and *p* values were reported.

Results

The study followed 1156 black and 2205 white adults for up to 25 years. Table 1 presents descriptive statistics for the analytic sample overall and also based on race. Age and gender were not different across racial groups ($p > 0.05$ for both comparisons). Compared to whites, blacks reported lower education and income, and more stress, medical conditions, obesity, and depressive symptoms ($p < 0.05$ for all comparisons). Compared to whites, blacks reported lower drinking and smoking ($p < 0.05$ for both comparisons). Compared to whites, blacks reported lower self-efficacy as well ($p < 0.05$) (Table 1).

Correlates of Baseline Self-Efficacy

Table 2 shows the results of logistic regressions with low self-efficacy as the outcome in the pooled sample. In model 1 and model 2 of the pooled sample that did not include interaction terms, race was not associated with self-efficacy. In the model with interaction terms, race interacted with baseline education (OR = 0.56, 95 % CI = 0.35–0.89) and stress (OR = 0.55, 95 % CI = 0.31–.99) on baseline self-efficacy, suggesting that the associations between education and stress and self-efficacy were significantly different for whites and blacks.

Race showed a marginally significant interaction with SRH (OR = 0.68, 95 % CI = 0.46–1.02), suggesting that the associations between self-rated health and self-efficacy had a trend toward difference between whites and blacks.

Table 3 shows the results of logistic regressions with low self-efficacy as the outcome among whites and blacks. Among whites, age (OR = 0.99, 95 % CI = 0.98–1.00), income (OR = 0.56, 95 % CI = 0.43–0.72), SRH (OR = 1.80, 95 % CI = 1.27–2.55), and depressive symptoms (OR = 6.08, 95 % CI = 4.25–8.69) and among blacks, age (OR = 0.99, 95 % CI = 0.97–1.00), education (OR = 0.48, 95 % CI = 0.30–0.76), and depressive symptoms (OR = 6.06, 95 % CI = 3.80–9.68) were associated with low self-efficacy.

Baseline Self-Efficacy and Mortality

Table 4 provides a summary of the associations between low self-efficacy and subsequent risk of all-cause mortality in the pooled sample. While race, demographics, socioeconomics, stress, and self-efficacy were in the model (model 1 through model 4), low self-efficacy at baseline was associated with higher risk of mortality during the follow-up. The association between self-efficacy and mortality did not stay significant after all health variables were added to the model (model 5), suggesting that baseline health mediates (or confounds) the association between baseline self-efficacy and mortality. With and without health in the model, there was a significant interaction between race and baseline self-efficacy on mortality, suggesting that the association between baseline self-efficacy and subsequent risk of mortality was significantly different for whites and blacks (Table 4).

Table 5 shows the association between baseline self-efficacy and subsequent risk of mortality among whites and blacks. Among whites, low self-efficacy was associated with higher risk of mortality in the absence of health in the model (model 1 through model 3). Low self-efficacy did not remain as a factor associated with risk of mortality of whites when health was controlled (model 4 and model 5), suggesting that baseline health mediates (or confounds) the association between baseline self-efficacy and risk of mortality among whites. Among Blacks, there was no association between baseline self-efficacy and subsequent risk of mortality over the follow-up. Although the hazard ratio for self-efficacy was smaller than 1, the association between self-efficacy and risk of mortality did not reach a significance level (Table 5).

Table 5 also shows that SES factors (i.e., education and income) explained some but not all of the association between baseline general self-efficacy and risk of mortality for whites, as HR dropped from 1.28 (model 1) to 1.19 (model 2) when we added SES to the model. In addition, adding baseline health (i.e., chronic medical conditions, obesity, and self-rated health) explained the remaining association between baseline general self-efficacy and risk of mortality for whites. Adding SES and health factors to the model did not cause such change in the HR for self-efficacy of blacks. Thus, the mediating effects of SES and health were only present for whites but not blacks.

Discussion

Our study showed two novel primary findings as well as two secondary findings. Regarding our primary findings, first, self-efficacy at baseline was only associated with mortality among whites but not blacks, a difference which was not due to racial differences in baseline SES, stress, and health. Second, baseline education, self-rated health, and stress were differently associated with baseline self-efficacy among whites and blacks. In regard to our secondary findings, first, we found that blacks report lower general self-efficacy, which is explained by socioeconomic factors (education and income). Second, the association between baseline general self-efficacy and subsequent risk of mortality among whites was explained by health but not SES or stress.

In our study, high self-efficacy at baseline was not associated with lower risk of all-cause mortality among blacks. Previous research has shown that high control beliefs may predict poor health outcomes under certain circumstances [33, 34]. When they coexist with constrained opportunities, high control beliefs may do more harm than good [35, 36, 37]. Incongruence between high expectations for control and uncontrollable or difficult to control situations cause the highest levels of cardiovascular reactivity [38, 39, 40, 41] which have a negative influence on neuroendocrine activity and immune function [38, 39, 40, 41]. Individuals with type A personality who have a high need for control [42] exhibit greater physiologic reactivity in uncontrollable situations [43]. Harsh external realities may prevent blacks who endorse high control beliefs from actualizing their high expectation which may result in high physiological reactivity that increases risk for cardiovascular disease [33]. For average blacks who live in poverty and constrained opportunities, high self-efficacy may be unrealistic and may cause constant physiological arousal, which is known to be associated with higher incidence and complications such as hypertension, atherosclerosis, and stroke.

Self-efficacy may have different meanings and reflect different aspects of life for blacks and whites [44, 45]. Low self-efficacy among blacks may reflect a healthy sensitivity to the real world (realistic system-blame). Blacks may report low self-efficacy secondary to the realization of existing social and economic inequality. Thus, among blacks, low self-efficacy may not represent a passive belief in chance or fate (fatalism) [46].

Our first primary finding replicates recent findings reported by Assari among older adults over 3 years [9]. Stronger connection between psychosocial risk factors and long-term health outcomes among whites compared with blacks is not limited to the association between self-efficacy and all-cause mortality [47, 48]. With a similar pattern, depressive symptoms and self-rated health, which are well-established predictors of mortality of whites, have failed to predict long-term health outcomes such as mortality and incident chronic disease for blacks [21, 22, 49, 50, 51, 52]. A similar pattern is found in the general population [52] and patients with a chronic disease [21, 22].

Our finding does not, however, support that of Turiano and colleagues who documented stronger effects among low SES individuals. Authors used a self-deterministic hypothesis to explain their findings on differential protective effects of control beliefs against mortality based on education level. Their explanation implied that lower social class individuals have

the power to mitigate or eliminate the consequences of social disadvantage for mortality risk. In this view, even with difficulties in access to health care as well as limited social and economic resources, individuals from a lower social class may engage in health promotion and disease prevention in the presence of high self-efficacy [7]. We, however, showed that for blacks—whose lives are under multiple disadvantages and experience multiple exposures to a wide range of risk factors in resource-scarce environments—high self-efficacy may have a harmful effect. Our finding does not support that self-efficacy is a particular resilient factor for blacks in poverty, low socioeconomic status, and cumulative disadvantages [7, 53].

Social and developmental psychologists and also sociologists have proposed distinct developmental factors and processes that shape self-perceptions such as self-efficacy among blacks and whites [46, 54, 55]. Social determinants of control beliefs such as self-efficacy and internal locus of control and motivation may vary among whites and blacks [56, 57]. Among blacks, external locus of control, low mastery, and low self-efficacy may reflect higher level attributes, which are influenced by race-related attitudes and identities [58, 59, 60]. Gerald and Patricia Gurin have shown that internal/external control and perceived control and self-efficacy do not reflect similar constructs among blacks and whites [56, 61, 62, 63, 64]. Among those who are poor and marginalized, a high proportion of neighborhood unemployment and public assistance translates into low levels of self-efficacy above and beyond their individual-level SES [60]. Thus, for blacks, lower self-efficacy may reflect their awareness of blocked opportunities due to structural racism that operates as a systematic barrier for blacks who wish to enjoy a life comparable with whites [46, 56, 65, 66].

Appraisal of coping ability is under the influence of a wide range of factors including education, stress, and physical and mental health [10, 12, 67, 68]; however, blacks and whites may differ in psychosocial determinants of self-efficacy [34, 69]. In a study, parent's SES predicted self-efficacy for whites but not blacks [69]. While divine control beliefs were associated with lower mastery for whites, the association was reverse for blacks [34]. Our study showed that self-efficacy is under the influence of stress and self-rated health among whites but reflective of education among blacks. Differential determinants of self-efficacy may result in differential health effects of self-efficacy across groups.

Although socioeconomic status is a major determinant of sense of self-efficacy [70, 71, 72], this association may be more complex for blacks. Education may have a unique implication for self-evaluation of blacks, as blacks with higher education may have higher connection with whites. An increased interracial contact may change the reference group of blacks. Thus, higher educated blacks experience a change in their social composition (more whites) that may be reflected in their appraisal for their own self-efficacy [46, 73]. Thus, increased education may differently enhance sense of self-efficacy of whites and blacks. According to the social comparisons theory by Festinger (1954), attitude about self is the result of individuals' comparing themselves with others [74]. Blacks' low self-efficacy may reflect lower social and economic achievement of blacks in American society [46]. However, depending on the composition of social status and social network and the residential area of a black individual, their reference group may be average Americans, whites, or blacks [46]. Based on the reflected appraisals theory [75, 76], evaluation of self is under influence of

how a person believes others see him, and among blacks, self-efficacy may reflect an internalized negative evaluation of the society about self [46].

Our finding of the stronger effect of education on self-efficacy of blacks is supported by a number of studies. First, in the report on Equality of Educational Opportunity [57], Coleman showed that internal control was unusually important for black students. First, it explained more of the variance in achievement for black than for white students, and it better explained academic success than any other construct in an academic survey [57]. Oyserman et al. have also shown that each additional year of schooling has a stronger influence on self-related motivation and identity among blacks than whites. Years at school influenced how difficulty is interpreted among black but not white students. While education does not increase likelihood of interpretation of difficulty as importance for white kids, it increases the interpretation of difficulty as importance among black children. So, education may have a larger effect on the mind set and cognitive style associated with self-efficacy and motivation [77, 78, 79].

Several [46, 54, 80, 81], but not all [82], studies have found lower self-efficacy among blacks compared to whites. Blacks' lower self-efficacy compared to whites may be explained by lower education and income. In the USA, race is a proxy of socioeconomic status, life circumstances, culture, values, and beliefs—all of which shape the availability of coping skills [83, 84, 85]. The effect of SES factors such as education on self-efficacy, mastery, perceived control, and internal locus of control is well-established. In fact, self-efficacy may partially mediate the effect of SES on health [86, 87, 88, 89].

One of our secondary findings showed that the protective effect of self-efficacy among whites seemed to be due to the confounding role of baseline health. In previous research, self-efficacy was shown to protect health above and beyond baseline health and SES [54, 90, 91, 92]. Individuals with low self-efficacy feel powerless and not efficacious in dealing with stress [93]. High control beliefs predict better physical functioning [94, 95, 96, 97], perceived health and well-being [97], decreased symptoms [97], and metabolic [98] and cardiovascular risks [99]. The mechanism may be mitigation of negative effects of stressors on health [97, 100]. Previous studies on the protective effect of self-efficacy on mortality have mostly enrolled white middle class individuals [54, 90, 91, 92], and very few studies on racial differences in such predictions exist [9].

Our study has a number of limitations. All personal coping resources such as self-efficacy are subject to change over time; however, we did not model their change over the follow-up period. This was because we were particularly interested in the long-term predictive power of self-efficacy across groups. In addition, we did not control for changes in health behaviors as well as socioeconomic status and self-rated health. Furthermore, the study did not control for several baseline factors such as access to care as well as health care utilization. Validity of self-efficacy may not be identical among blacks and whites. Finally, the sample size was lower for blacks compared to whites. Despite these limitations, the study is a unique contribution to the literature, using a nationally representative sample and a long follow-up period. Considering all these limitations, readers should be conservative in interpretations of the findings and conclusions. Particularly, as the outcome was all-cause mortality over 25

years and independent variables were limited to factors at baseline, a wide range of unmeasured and unknown factors as well as changing conditions may have contributed to the observed outcomes.

Readers should have in mind that general self-efficacy in this study was defined as an overall trait not behavior-specific constructs. Thus, the results of this study are not relevant to the health behavior literature in which self-efficacy is often considered determinant of specific behaviors, or a key construct to improve efficacy of behavioral interventions, programs, and policies that help individuals change behaviors. Instead, our study revealed the complex interplay between race, SES, psychosocial factors, and health in altering the effect of general self-efficacy on mortality over a long period of time. Any implication of this study for practice and policy implications should consider the overall definition of self-efficacy in this study.

We believe that the nonsignificant association between general self-efficacy and mortality risk among blacks is a call for policies that are essential to change the life circumstances of blacks, in order for life to become more controllable and to increase opportunities and break down barriers. Self-efficacy of blacks may better reflect their health in a color blind society where access to opportunities are not blocked based on race and color.

To conclude, in the USA, blacks and whites differ in the long-term association between self-efficacy and long-term risk of mortality. As self-efficacy may reflect different aspects of life of blacks and whites, it may have population-specific—rather than universal—health implications. Future research should test how for blacks, low self-efficacy is shaped by racial identity, social class, life experiences, and historical experiences of blocked opportunities as individuals and as a collective group.

Funding

Shervin Assari is supported by the Heinz C. Prechter Bipolar Research Fund and the Richard Tam Foundation at the University of Michigan Depression Center. The Americans' Changing Lives (ACL) study was supported by grant no. AG018418 from the National Institute on Aging (DHHS/NIH), and per the NIH Public Access Policy requires that peer-reviewed research publications generated with NIH support are made available to the public through PubMed Central. NIH is not responsible for the data collection or analyses represented in this article. The ACL study was conducted by the Institute of Social Research, University of Michigan.

References

1. Lazarus RS, Folkman S. Stress, appraisal, and coping. New York: Springer; 1984Google Scholar
2. Lau RR. Origins of health locus of control beliefs. *J Pers Soc Psychol.* 1982;42(2):322–34. [PubMed: 7057357]
3. Lachman ME, Neupert SD, Agrigoroaei S, et al. The relevance of control beliefs for health and aging In: Schaie KW, Willis SL, editors. *Handbook of the psychology of aging*, vol. 7 New York: Elsevier; 2011 p. 175–90.
4. Rabani Bavojdani M, Towhidi A, Rahmati A. The relationship between mental health and general self-efficacy beliefs, coping strategies and locus of control in male drug abusers. *Addict Health.* 2011;3(3–4):111–8. [PubMed: 24494125]
5. Bandura A, Barbaranelli C, Caprara GV, Pastorelli C. Multifaceted impact of self-efficacy beliefs on academic functioning. *Child Dev.* 1996;67:1206–22. [PubMed: 8706518]

6. Maciejewski PK, Prigerson HG, Mazure CM. Self-efficacy as a mediator between stressful life events and depressive symptoms. Differences based on history of prior depression. *Br J Psychiatry*. 2000;176:373–8. [PubMed: 10827887]
7. Turiano NA, Chapman BP, Agrigoroaei S, Infurna FJ, Lachman M. Perceived control reduces mortality risk at low, not high, education levels. *Health Psychol*. 2014;33(8):883–90. [PubMed: 24490646]
8. Drake KA, Galanter JM, Burchard EG. Race, ethnicity and social class and the complex etiologies of asthma. *Pharmacogenomics*. 2008;9(4):453–62. [PubMed: 18384258]
9. Race Assari S., sense of control over life, and short-term risk of mortality among older adults in the United States *Arch Med Sci*. 2016DOI: 10.5114/aoms.2016.59740 In Press.
10. Bandura A, Cioffi D, Taylor CB, Brouillard ME. Perceived self-efficacy in coping with cognitive stressors and opioid activation. *J Pers Soc Psychol*. 1988;55(3):479–88. [PubMed: 3171918]
11. Clark NM, Dodge JA. Exploring self-efficacy as a predictor of disease management. *Health Educ Behav*. 1999;26(1):72–89. [PubMed: 9952053]
12. Tahmassian K, Moghadam JN. Relationship between self-efficacy and symptoms of anxiety, depression, worry and social avoidance in a normal sample of students. *Iran J Psychiatry Behav Sci*. 2011;5:91–8. [PubMed: 24644452]
13. Assari S, Zivin K, Burgard S. Long-term reciprocal associations between depressive symptoms and number of chronic medical conditions: longitudinal support for black-white health paradox. *J Racial Ethnic Health Disparities*. 2015;2(2):1–9.
14. House JS, Lepkowski JM, Kinney AM, Mero RP, Kessler RC, Herzog AR. The social stratification of aging and health. *J Health Soc Behav*. 1994;213–34. Google Scholar [PubMed: 7983335]
15. House JS, Kessler RC, Herzog AR. Age, socioeconomic status, and health. *Milbank Q*. 1990;68(3):383–411. [PubMed: 2266924]
16. Lantz PM, House JS, Mero RP, Williams DR. Stress, life events, and socioeconomic disparities in health: results from the Americans' Changing Lives Study. *J Health Soc Behav*. 2005;46(3):274–88. [PubMed: 16259149]
17. Bandura A Self-efficacy: toward a unified theory of behavioral change. *Psychol Rev*. 1977;84:191–215. [PubMed: 847061]
18. Sherer M, Maddux JE, Mercandante B, Prentice-Dunn S, Jacobs B, Rogers RW. The self-efficacy scale: construction and validation. *Psychol Reports*. 1982;51:663–71.
19. Rosenberg M Society and the adolescent self-image Princeton: Princeton University Press; 1965.
20. Pearlin LI, Schooler C. The structure of coping. *J Health Soc Behav*. 1978;19(1):2–21. [PubMed: 649936]
21. Assari S, Race, self-rated health, and kidney disease deaths in United States; a 25 year cohort with a nationally representative sample *Adv Biomed Res*. 2015 In Press.
22. Assari S, Lankarani MM, Burgard SA. Black white difference in long term predictive power of self-rated health on all-cause mortality in United States. *Ann Epidemiol*. 2016;26(2):106–14. doi: 10.1016/j.annepidem.2015.11.006. [PubMed: 26803458]
23. Turner RJ. Stress: measurement by self-report and interview International Encyclodia of the Social and Behavioral Sciences. London: Elsevier; 2001 Google Scholar
24. Lerebours E, Gower-Rousseau C, Merle V, Brazier F, Debeugny S, Marti R, et al. Stressful life events as a risk factor for inflammatory bowel disease onset: a population-based case-control study. *Am J Gastroenterol*. 2007;102(1):122–31. [PubMed: 17100973]
25. Musliner KL, Seifuddin F, Judy JA, Pirooznia M, Goes FS, Zandi PP. Polygenic risk, stressful life events and depressive symptoms in older adults: a polygenic score analysis. *Psychol Med*. 2015;45(8):1709–20. doi: 10.1017/S0033291714002839. [PubMed: 25488392]
26. Yoong SL, Carey ML, D'Este C, Sanson-Fisher RW. Agreement between self-reported and measured weight and height collected in general practice patients: a prospective study. *BMC Med Res Methodol*. 2013;13:38. doi: 10.1186/1471-2288-13-38. [PubMed: 23510189]
27. Idler EL, Benyamini Y. Self-rated health and mortality: a review of twenty-seven community studies. *J Health Soc Behav*. 1997;38:21–37. [PubMed: 9097506]

28. Lundberg O, Manderbacka K. Assessing reliability of a measure of self-rated health. *Scand J Social Med.* 1996;24(3):218–24.
29. Radloff LS. The CES-D scale: a self-report depression scale for research in the general population. *Appl Psychol Meas.* 1977;1:385–401.
30. Amtmann D, Kim J, Chung H, Bamer AM, Askew RL, Wu S, et al. Comparing CESD-10, PHQ-9, and PROMIS depression instruments in individuals with multiple sclerosis. *Rehabil Psychol.* 2014;59(2):220–9. [PubMed: 24661030]
31. Zhang W, O'Brien N, Forrest JI, Salters KA, Patterson TL, Montaner JS, et al. Validating a shortened depression scale (10 item CES-D) among HIV-positive people in British Columbia Canada. *PLoS One.* 2012;7(7):e40793. [PubMed: 22829885]
32. Andresen EM, Malmgren JA, Carter WB, Patrick DL. Screening for depression in well older adults: evaluation of a short form of the CES-D (center for epidemiologic studies depression scale). *Am J Prev Med.* 1994;10(2):77–84. [PubMed: 8037935]
33. Seeman M et al. Alienation and anomie In: Robinson JR, editor. *Measures of personality and social psychological attitudes*, vol. 1 San Diego: Academic Press; 1991 p. 291–372.
34. Thompson SC et al. The other side of perceived control: disadvantages and negative effects In: Spacapan S, Oshkamp S, editors. *The social psychology of health*. Beverly Hills: Sage; 1988 p. 69–93. Google Scholar
35. Schieman S, Pudrovska T, Milkie MA. The sense of divine control and the self-concept a study of race differences in late life. *Research Aging.* 2005;27(2):165–96.
36. Degood DE. Cognitive control factors in vascular stress responses. *Psychophysiology.* 1975;12:399–401. [PubMed: 1162005]
37. Evans GW, Shapiro DH, Lewis MA. Specifying dysfunctional mismatches between different control dimensions. *Br J Psychol.* 1993;84:255–73.
38. Rothbaum F, Weisz JR, Snyder S. Changing the world and changing the self: a two-process model of perceived control. *J Pers Soc Psych.* 1982;42:5–37.
39. Houston BK. Control over stress, locus of control, and response to stress. *J Pers Soc Psychol.* 1972;21:249–55. [PubMed: 5010407]
40. Manuck SB, Harvey AH, Lechleiter SL, Neal KS. Effects of coping on blood pressure responses to threat of aversive stimulation. *Psychophysiology.* 1978;15:544–9. [PubMed: 715130]
41. Sieber WJ, Rodin J, Larson L, Ortega S, Cummings N, Levy S, et al. Modulation of human natural killer cell activity by exposure to uncontrollable stress. *Brain Behav Immunol.* 1992;6:141–56.
42. Miller SM, Lack ER, Asroff S. Preference for control and the coronary-prone behavior pattern: I'd rather do it myself. *J Pers Soc Psychol.* 1985;49:492–9. [PubMed: 4032228]
43. Krantz DS et al. Helplessness, stress level, and the coronary-prone behavior pattern. *J Exp Soc Psychol.* 1974;10:284–300.
44. Race Hulbary W., deprivation, and adolescent self-image. *Soc Sci Q.* 1975;56:105–14. Google Scholar
45. Crain RL, Weisman CS. *Discrimination, personality, and achievement*. New York: Academic; 1972 Google Scholar
46. Hughes M, Demo DH. Self-perceptions of Black Americans: self-esteem and personal efficacy. *Am J Sociol.* 1989;1:132–59.
47. Assari S Psychosocial correlates of body mass index in the United States: intersection of race, gender and age. *Iran J Psychiatry Behav Sci.* 2016; In Press Google Scholar
48. Assari S, Lankarani MM. Race and gender differences in correlates of death anxiety among elderly in the United States. *Iran J Psychiatry Behav Sci.* 2016; In Press. doi: 10.17795/ijpbs-2024. Google Scholar
49. Assari S, Does baseline stress predict depression 25 years later? Race and gender differences. *J Renal Inj Prev.* 2015 In Press Google Scholar
50. Lankarani MM, Assari S. Association between number of comorbid medical conditions and depression among individuals with diabetes; race and ethnic variations. *J Diabetes Metab Disord.* 2015;7(14):56.

51. Assari S, Lankarani MM. Association between stressful life events and depression; intersection of race and gender. *J Racial Ethnic Health Dispar.* 2015;2(3):1–8. Google Scholar
52. Assari S, Burgard SA. Black-white differences in the effect of baseline depressive symptoms on deaths due to renal diseases: 25 year follow up of a nationally representative community sample. *J Renal Inj Prev.* 2015; In Press Google Scholar
53. King DK. Multiple jeopardy, multiple consciousness: the context of a Black feminist ideology. 1988; 42–72. Google Scholar
54. Hunt JG, Hunt LL. Racial inequality and self-image: identity maintenance and identity diffusion. *Sociology Social Research.* 1977;61:539–59. Google Scholar
55. Hoelter JW. Race differences in selective credulity and self-esteem. *Sociol Q.* 1982;23:527–3.
56. Gurin P, Gurin G, Lao R, Beattie M. Internal/external control and the motivational dynamics of Negro youth. *J Social Issues.* 1969;25:29–53.
57. Coleman JS. The evaluation of equality of educational opportunity. U.S. Department of health, education and welfare. Washington: U.S. Government Printing Office; 1966 Google Scholar
58. Okech AP, Harrington R. The relationships among black consciousness, self-esteem, and academic self-efficacy in African American men. *J Psychol.* 2002;136(2):214–24. [PubMed: 12081095]
59. Pierre MR, Mahalik JR. Examining African self-consciousness and black racial identity as predictors of black men's psychological well-being. *Cultur Divers Ethnic Minor Psychol.* 2005;11(1):28–40. [PubMed: 15727493]
60. Boardman JD, Robert SA. Neighborhood socioeconomic status and perceptions of self-efficacy. *Sociol Perspect.* 2000;43(1):117–36.
61. Gurin P, Epps E. Black consciousness, identity, and achievement: a study of students in historically black colleges. Google Scholar
62. Gurin P, Gurin G, Lao RC, Beattie M. Internal-external control in the motivational dynamics of Negro youth. *J Soc Issues.* 1969;25(3):29–53.
63. Gurin P, Gurin G, Morrison BM. Personal and ideological aspects of internal and external control. *Soc Psychol.* 1978;275–96. Google Scholar
64. Gurin P, Katz D. Motivation and aspiration in the Negro college. Part 2: status and achievement in the U.S. *Am J Sociol.* 1969;75(4):607–31.
65. McCarthy JD, Yancey WL. Uncle Tom and Mr. Charlie: metaphysical pathos in the study of racism and personal disorganization. *American J Sociology.* 1971;7(6):648–72.
66. Porter JR, Washington RE. Black identity and self-esteem: a review of studies of black self-concept, 1968–1978 In: *Annual Review of Sociology*, vol. 5 Palo Alto: Annual Reviews; 1979 p. 53–74. Google Scholar
67. Kvarme LG, Haraldstad K, Helseth S, Sørum R, Natvig GK. Associations between general self-efficacy and health-related quality of life among 12–13-year-old school children: a cross-sectional survey. *Health Qual Life Outcomes.* 2009;23(7):85.
68. Vaezi S, Fallah N. The relationship between self-efficacy and stress among Iranian EFL teachers. *J Language Teaching Res.* 2011;2(5):1168–74. Google Scholar
69. Buchanan T, Selmon N. Race and gender differences in self-efficacy: assessing the role of gender role attitudes and family background. *Sex Roles.* 2008;58(11–12):822–36.
70. Gecas V, Schwalbe ML. Beyond the looking-glass self: social structure and efficacy-based self-esteem. *Soc Psychol Q.* 1983;46:77–88. [PubMed: 6879222]
71. Gecas V The self-concept. *Annu Rev Sociol.* 1982;1–33. Google Scholar
72. Schwalbe ML. Autonomy in work and self-esteem. *Sociological Quarterly.* 1985;26:519–35.
73. Rosenberg M, Pearlin L. Social class and self-esteem among children and adults. *Am J Sociology.* 1978;8(4):53–77.
74. Festinger L A theory of social comparison processes. *Human Relations.* 1954;7:117–40.
75. Cooley CH. Human nature and the social order. New York: Scribner's; 1902 Google Scholar
76. Rosenberg M Conceiving the self. New York: Basic; 1979 Google Scholar
77. Destin M, Oyserman D. Incentivizing education: seeing schoolwork as an investment, not a chore. *J Exp Soc Psychol.* 2010;46(5):846–9. [PubMed: 20824201]

78. Oyserman D, Johnson E, James L. Seeing the destination but not the path: effects of socioeconomic disadvantage on school-focused possible self content and linked behavioral strategies. *Self Identity*. 2011;10(4):474–92. [PubMed: 22053148]
79. Elmore KC, Oyserman D. If 'we' can succeed, 'I' can too: identity-based motivation and gender in the classroom. *Contemp Educ Psychol*. 2012;37(3):176–85. [PubMed: 22711971]
80. Coleman JE, Mcpartland CJ, et al. Equality of educational opportunity. Washington, D.C: Government Printing Office; 1966Google Scholar
81. Gordon C Looking ahead. DC. American Sociological Association: Washington; 1969Google Scholar
82. Stennis D, Seth L. Ethnic Differences in Self-Efficacy at Southern Adventist University 2015 Senior Research Projects Paper 183. http://knowledge.e.southern.edu/senior_research/183.
83. Assari S Chronic medical conditions and major depressive disorder: differential role of positive religious coping among African Americans, Caribbean blacks and non-Hispanic whites. *Int J Prev Med*. 2014;5(4):405–13. [PubMed: 24829727]
84. Assari S Race and ethnicity, religion involvement, church-based social support and subjective health in United States: a case of moderated mediation. *Int J Prev Med*. 2013;4(2):208–17. [PubMed: 23543791]
85. Assari S Ethnic and gender differences in additive effects of socio-economics, psychiatric disorders, and subjective religiosity on suicidal ideation among blacks. *Int J Prev Med*. 2015;6:53. [PubMed: 26180624]
86. Barbareschi G, Sanderman R, Kempen GI, Ranchor AV. The mediating role of perceived control on the relationship between socioeconomic status and functional changes in older patients with coronary heart disease. *J Gerontol B Psychol Sci Soc Sci*. 2008;63(6):353–61.
87. Bailis DS, Segall A, Mahon MJ, Chipperfield JG, Dunn EM. Perceived control in relation to socioeconomic and behavioral resources for health. *Soc Sci Med*. 2001;52(11):1661–76. [PubMed: 11327139]
88. Bobak M, Pikhart H, Hertzman C, Rose R, Marmot M. Socioeconomic factors, perceived control and self-reported health in Russia. A cross-sectional survey. *Soc Sci Med*. 1998;47(2):269–79. [PubMed: 9720645]
89. Grembowski D, Patrick D, Diehr P, Durham M, Beresford S, Kay E, et al. Self-efficacy and health behavior among older adults. *J Health Soc Behav*. 1993;34(2):89–104. [PubMed: 8277130]
90. Wang Y, Yao L, Liu L, Yang X, Wu H, Wang J, et al. The mediating role of self-efficacy in the relationship between Big five personality and depressive symptoms among Chinese unemployed population: a cross-sectional study. *BMC Psychiatry*. 2014;3(14):61.
91. Infurna FJ, Ram N, Gerstorf D. Level and change in perceived control predict 19-year mortality: findings from the Americans' changing lives study. *Dev Psychol*. 2013;49(10):1833–47. [PubMed: 23276128]
92. Penninx BW, van Tilburg T, Kriegsman DM, Deeg DJ, Boeke AJ, van Eijk JT. Effects of social support and personal coping resources on mortality in older age: the Longitudinal Aging Study Amsterdam. *Am J Epidemiol*. 1997;146(6):510–9. [PubMed: 9290512]
93. Seeman M, Lewis S. Powerlessness, health and mortality: a longitudinal study of older men and mature women. *Soc Sci Med*. 1995;41(4):517–25. [PubMed: 7481946]
94. Lachman ME, Agrigoroaei S. Promoting functional health in midlife and old age: long-term protective effects of control beliefs, social support, and physical exercise. *PLoS ONE*. 2010;5:e13297. [PubMed: 20949016]
95. Caplan LJ, Schooler C. The roles of fatalism, self-confidence, and intellectual resources in the disablement process in older adults. *Psychol Aging*. 2003;18:551–61. [PubMed: 14526765]
96. Infurna FJ, Gerstorf D, Zarit SH. Examining dynamic links between perceived control and health: longitudinal evidence for differential effects in midlife and old age. *Dev Psychol*. 2011;47:9–18. [PubMed: 21244147]
97. Lachman ME, Weaver SL. The sense of control as a moderator of social class differences in health and well-being. *J Pers Soc Psychol*. 1998;74:763–73. [PubMed: 9523418]

98. Infurna FJ, Gerstorf D. Perceived control relates to better functional health and lower cardio-metabolic risk: the mediating role of physical activity. *Health Psychol.* 2014;33(1):85–94. [PubMed: 23106110]
99. Surtees PG, Wainwright WJ, Luben R, Wareham NJ, Bingham S, Khaw KT. Mastery is associated with cardiovascular disease mortality in men and women at apparently low risk. *Health Psychol.* 2010;29:412–20. [PubMed: 20658829]
100. Prati G, Pietrantonio L, Cicognani E. Self-efficacy moderates the relationship between stress appraisal and quality of life among rescue workers. *Anxiety Stress Coping.* 2010;23(4):463–70. [PubMed: 19937503]

Table 1

Descriptive statistics for the analytic sample, overall, and stratified by race

Characteristics	All		Whites		Blacks	
	Mean	95 % CI	Mean	95 % CI	Mean	95 % CI
Age	47.77	46.69–48.84	47.96	46.75–49.17	46.33	44.89–47.78
Education *	12.53	12.34–12.73	12.69	12.48–12.90	11.37	10.90–11.84
Income *	5.41	5.22–5.60	5.57	5.36–5.77	4.25	3.88–4.62
Depressive symptoms *	−0.03	−0.08–0.02	−0.07	−0.13–0.02	0.28	0.18–0.38
Chronic medical conditions *	0.79	0.74–0.85	0.78	0.71–0.84	0.91	0.81–1.02
Self-rated health *	2.30	2.25–2.35	2.28	2.23–2.33	2.43	2.32–2.54
Stress *	0.88	0.84–0.92	0.88	0.84–0.92	0.88	0.82–0.95
Physical activity *	0.02	−0.03–0.07	0.05	0.00–0.11	−0.22	−0.33–0.12
Self-efficacy (low) *	−0.03	−0.08–0.02	−0.06	−0.11–0.00	0.13	0.03–0.24
	%	95 % CI	%	95 % CI	%	95 % CI
Gender						
Male	47.26	44.86–49.68	47.82	45.12–50.52	43.18	38.79–47.69
Female	52.74	50.32–55.14	52.18	49.48–54.88	56.82	52.31–61.21
Self-rated health *						
Good-excellent	85.06	83.33–86.64	85.97	84.15–87.60	78.38	74.68–81.68
Poor-fair	14.94	13.36–16.67	14.03	12.40–15.85	21.62	18.32–25.32
Self-efficacy (Low) *						
No	63.85	61.09–66.52	64.39	61.36–67.31	59.87	54.91–64.62
Yes	36.15	33.48–38.91	35.61	32.69–38.64	40.13	35.38–45.09
Education *						
Low	23.93	21.37–26.70	21.71	18.87–24.85	40.25	34.55–46.24
High	76.07	73.30–78.63	78.29	75.15–81.13	59.75	53.76–65.45
Income *						
Low	38.46	35.24–41.78	35.90	32.41–39.55	57.26	50.31–63.93
High	61.54	58.22–64.76	64.10	60.45–67.59	42.74	36.07–49.69
Stressful life events (any) *						
No	38.61	36.60–40.65	38.49	36.34–40.69	39.45	35.45–43.60
Yes	61.39	59.35–63.40	61.51	59.31–63.66	60.55	56.40–64.55
Obesity *						
No	85.54	83.76–87.14	86.48	84.47–88.27	78.56	74.50–82.13
Yes	14.46	12.86–16.24	13.52	11.73–15.53	21.44	17.87–25.50
High depressive symptoms *						
No	87.25	85.32–88.95	88.43	86.36–90.22	78.57	74.89–81.85
Yes	12.75	11.05–14.68	11.57	9.78–13.64	21.43	18.15–25.11
Smoking *						

Characteristics	All		Whites		Blacks	
	Mean	95 % CI	Mean	95 % CI	Mean	95 % CI
No	69.59	66.83–72.23	70.35	67.34–73.19	64.05	58.54–69.21
Yes	30.41	27.77–33.17	29.65	26.81–32.66	35.95	30.79–41.46
Drinking *						
No	39.98	36.73–43.33	38.49	35.15–41.95	50.93	45.37–56.47
Yes	60.02	56.67–63.27	61.51	58.05–64.85	49.07	43.53–54.63

*
 $p < 0.05$ for all comparisons between blacks and whites

Table 2

The association between psychosocial factors and low self-efficacy at baseline (1986) using logistic regression in the pooled sample ($n = 3361$)

	HR	95 % CI	HR	95 % CI	HR	95 % CI	HR	95 % CI
	Model 1		Model 2		Model 3		Model4	
Blacks	1.20	0.95–1.51	0.95	0.76–1.18	0.82 [#]	0.65–1.03	1.53 [*]	1.06–2.22
Gender (women)	1.27 [*]	1.05–1.54	1.19 [#]	0.97–1.46	1.08	0.87–1.33	1.08	0.87–1.34
Age	1.00	0.99–1.00	0.99 ^{***}	0.98–1.00	0.99 ^{**}	0.99–1.00	0.99 [*]	0.99–1.00
Education			0.65 ^{***}	0.53–0.80	0.77	0.63–0.94	0.84 [#]	0.68–1.03
Income			0.50 ^{***}	0.41–0.62	0.57 ^{***}	0.45–0.72	0.56 ^{***}	0.44–0.72
Stressful life events (any)			1.16	0.93–1.44	1.10	0.88–1.37	1.15	0.91–1.47
Chronic medical conditions					1.00	0.92–1.09	1.00	0.92–1.09
Self-rated health (poor)					1.60 ^{**}	1.19–2.15	1.77 ^{**}	1.24–2.51
Depressive symptoms					6.02 ^{***}	4.45–8.14	6.04 ^{***}	4.23–8.63
Black × education							0.56 [*]	0.35–0.89
Black × income							1.18	0.65–2.16
Black × stressful life events							0.55 [*]	0.31–0.99
Black × self-rated health (poor)							0.68 [#]	0.46–1.02
Black × depressive symptoms							1.02	0.57–1.82

[#]
 $p < 0.1$;

^{*}
 $p < 0.05$,

^{**}
 $p < 0.01$;

^{***}
 $p < 0.001$

Table 3

The association between psychosocial factors and low self-efficacy at baseline (1986) using logistic regression in the pooled sample ($n = 3361$) and based on race

	HR	95 % CI	HR	95 % CI	HR	95 % CI	HR	95 % CI	HR	95 % CI	HR	95 % CI
	Whites				Blacks							
	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6	
Gender (women)	1.24 [*]	1.00–1.53	1.17	0.94–1.46	1.06	0.84–1.34	1.53 ^{**}	1.14–2.05	1.40 [*]	1.03–1.91	1.32 [#]	0.96–1.81
Age	1.00	0.99–1.01	0.99 ^{**}	0.98–1.00	0.99 [*]	0.98–1.00	1.00	0.99–1.01	0.99 ^{**}	0.97–1.00	0.99 [*]	0.97–1.00
Education			0.69 ^{**}	0.56–0.86	0.84 [#]	0.68–1.03			0.45 ^{***}	0.30–0.66	0.48 ^{**}	0.30–0.76
Income			0.49 ^{***}	0.39–0.61	0.56 ^{***}	0.43–0.72			0.56 [*]	0.33–0.95	0.71	0.42–1.22
Stressful life events (any)					1.16	0.91–1.47					0.77	0.53–1.12
Chronic medical conditions					0.98	0.89–1.08					1.15	0.93–1.44
Self-rated health (poor)					1.80 ^{***}	1.27–2.55					0.85	0.55–1.31
Depressive symptoms					6.08 ^{***}	4.25–8.69					6.06 ^{***}	3.80–9.68

[#] $p < 0.1$;

^{*} $p < 0.05$,

^{**} $p < 0.01$;

^{***} $p < 0.001$

Table 4

The association between baseline self-efficacy (1986) and subsequent all-cause mortality using proportional hazards models in the pooled sample ($n = 3361$)

	HR	95 % CI	HR	95 % CI	HR	95 % CI	HR	95 % CI	HR	95 % CI
	Model 1		Model 2		Model 3		Model 4		Model 5	
Self-efficacy (low)	1.23***	1.10–1.38	1.14*	1.02–1.28	1.14*	1.02–1.27	1.18**	1.04–1.34	1.10	0.96–1.26
Blacks	1.40***	1.23–1.60	1.22**	1.05–1.42	1.22**	1.05–1.42	1.37**	1.14–1.65	1.24*	1.03–1.48
Gender (women)	0.60***	0.53–0.69	0.58***	0.51–0.65	0.57***	0.51–0.65	0.58***	0.51–0.65	0.54***	0.47–0.62
Age	1.09***	1.09–1.10	1.09***	1.08–1.09	1.09***	1.08–1.09	1.09***	1.08–1.09	1.09***	1.08–1.10
Education			0.77***	0.68–0.87	0.76***	0.67–0.87	0.76***	0.67–0.86	0.86*	0.76–0.98
Income			0.74***	0.64–0.86	0.74***	0.64–0.86	0.74***	0.64–0.86	0.82*	0.69–0.97
Stressful life events (any)					1.09	0.95–1.24	1.09	0.95–1.24	1.03	0.90–1.19
Chronic medical conditions									1.16***	1.10–1.21
Obesity									1.04	0.89–1.22
Self-rated health (poor)									1.41***	1.20–1.65
Exercise									0.88***	0.83–0.94
Smoking									1.83***	1.56–2.14
Drinking									1.01	0.88–1.14
Depressive symptoms									1.08	0.87–1.33
Self-efficacy (low) × black							0.76*	0.59–0.98	0.71*	0.55–0.92

* $p < 0.05$;

** $p < 0.01$,

*** $p < 0.001$

Table 5

The association between baseline self-efficacy (1986) and subsequent all-cause mortality using proportional hazards models among whites ($n = 2205$) and blacks ($n = 1156$)

	HR	95 % CI	HR	95 % CI	HR	95 % CI	HR	95 % CI	HR	95 % CI
	Model 1		Model 2		Model 3		Model 4		Model 5	
Whites										
Self-efficacy (low)	1.28***	1.12–1.46	1.19**	1.05–1.36	1.18*	1.04–1.35	1.09	0.95–1.26	1.09	0.94–1.25
Gender	0.58***	0.51–0.67	0.56***	0.49–0.65	0.56***	0.49–0.64	0.54***	0.47–0.63	0.51***	0.44–0.60
Age	1.10***	1.09–1.10	1.09***	1.08–1.10	1.09***	1.08–1.10	1.09***	1.08–1.09	1.09***	1.08–1.10
Education			0.75***	0.65–0.87	0.74***	0.64–0.86	0.82*	0.71–0.96	0.86*	0.74–1.00
Income			0.76***	0.64–0.89	0.76***	0.64–0.89	0.82*	0.68–0.97	0.85 [#]	0.71–1.02
Stressful life events					1.11	0.95–1.31	1.09	0.93–1.28	1.06	0.90–1.25
Chronic medical conditions							1.16***	1.10–1.22	1.17***	1.11–1.23
Obesity							0.98	0.80–1.21	1.03	0.85–1.24
Self-rated health							1.63***	1.39–1.92	1.47***	1.23–1.76
Exercise									0.88***	0.82–0.94
Smoking									1.88***	1.56–2.27
Drinking									1.01	0.87–1.17
Depressive symptoms									1.13	0.87–1.45
Blacks										
Self-efficacy (low)	0.96	0.79–1.17	0.88	0.73–1.06	0.88	0.73–1.06	0.84	0.69–1.02	0.86	0.68–1.08
Gender	0.75**	0.61–0.93	0.69***	0.56–0.86	0.69***	0.56–0.86	0.66***	0.52–0.84	0.71**	0.56–0.89
Age	1.08***	1.07–1.09	1.07***	1.06–1.08	1.07***	1.06–1.08	1.07***	1.05–1.08	1.07***	1.06–1.08
Education			0.83	0.64–1.09	0.83	0.64–1.09	0.89	0.67–1.17	0.90	0.70–1.15
Income			0.66*	0.48–0.91	0.66*	0.48–0.91	0.69*	0.50–0.94	0.68*	0.50–0.92
Stressful life events					0.98	0.82–1.17	0.94	0.78–1.14	0.94	0.78–1.13
Chronic medical conditions							1.12*	1.03–1.22	1.13*	1.03–1.24
Obesity							1.12	0.88–1.41	1.08	0.84–1.40
Self-rated health							1.15	0.95–1.38	1.12	0.94–1.33
Exercise									0.89 [#]	0.80–1.01
Smoking									1.59***	1.31–1.93
Drinking									0.99	0.75–1.32
Depressive symptoms									0.81	0.60–1.10

[#] $p < 0.1$;

^{*} $p < 0.05$;

^{**} $p < 0.01$;

^{***} $p < 0.001$