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Unequal hopes and lives in the USA: optimism, race, place, and premature mortality

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Abstract The 2016 election highlighted deep divisions in the USA, and exposed unhappiness and frustration among poor and uneducated whites. The starkest marker of this unhappiness is the rise in preventable deaths and suicides among the middle aged of this cohort. In contrast, minorities have much higher levels of optimism, and their life expectancies continue to rise. Low-income respondents display the largest differences, with poor blacks by far the most optimistic, and poor rural whites the least. African Americans and Hispanics also have higher life satisfaction and lower stress incidence than poor whites. The gaps across racial groups peak in middle age, at the nadir of the U-curve of age and life satisfaction. We explored the association between our subjective well-being data and the Centers for Disease Control and Prevention (CDC) mortality data. We find that the absence of hope among less than college-educated whites matches the trends in premature mortality among 35–64-year-olds. Reported pain, reliance on disability insurance, low labor force participation, and differential levels of resilience across races all have mediating effects in the desperation-mortality associations. We also explore the role of place, and map the states associated with higher/lower indicators of well-being for these different cohorts. The matches between indicators of well-being and of mortality suggest that the former could serve as warning indicators of ill-being in the future, rather than waiting for rising mortality to sound the alarms.

Keywords Well-being · Optimism · Stress · Premature mortality · Resilience

JEL classifications D6 · I3 · I14 · I19

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1 Introduction

Over the past several years, stark disparities in well-being have emerged across the US population, revealing pockets of desperation and despair. Most notably, minorities, who have traditionally faced discrimination, are more optimistic and less frustrated than are poor and uneducated whites, who live primarily in suburban and rural areas in the heartland. Rising mortality among uneducated whites—driven by preventable deaths such as suicides and opioid poisoning—is the starkest marker of this desperation.

These trends reflect a social crisis with multiple and complex causes, not all of which we fully understand. An important first step is to seek better understanding of its reach and causes. We hope that the results of our research, based on metrics of well-being, such as life satisfaction and optimism about the future on the one hand, and stress, worry, and anger on the other, contribute to that effort.

We found marked differences in life satisfaction, optimism, and stress across poor blacks, Hispanics, and whites. The latter cohort demonstrates signs of deep desperation and the former two are happier, more optimistic, and less stressed (our measure of optimism is a question that asks respondents where on a 0–10 scale ladder they think their life satisfaction will be in 5 years). The gaps between African Americans and whites peak in the middle age years. We also find that individuals who exercise more and smoke less are happier and less stressed. Poor rural whites, meanwhile, are the least hopeful among the poor groups. Additionally, we find important differences across *places* after controlling for respondents' traits and map the states associated with higher and lower indicators of well-being. Finally, we explore the associations between the patterns in premature mortality and in well-being by matching our individual well-being data with CDC mortality statistics.

Our metrics highlight the high costs of being poor in the USA and uncover costs that are less in the form of the material deprivation more typical of poverty in poor countries, and more in the form of stress, insecurity, poor health, and lack of hope.[1] These costs manifest themselves differently across race and place, and show up among poor and uneducated whites in the form of deep desperation.

1.1 Existing studies

What explains these surprising trends, which are, at least among wealthy countries, unique to the USA? A number of studies have focused on differential trends in mobility (and fear of downward mobility, Cherlin 2016); differential health behaviors (Chetty et al. 2016); inequality of opportunity (Chetty et al. 2014); and structural economic trends. The latter include the bottoming out of manufacturing in many regions and a related increase in dropouts from the labor market (Krueger 2017).

Numerous studies, including several published in this journal, provide evidence of particular policies or shocks that result in changes in the happiness and/or hope

[1] For example, the high material costs of being poor in Latin America in the 1970s, which included paying as much as 18 times more per unit of water and electricity, with inferior health outcomes (Adrianzen and Graham 1973).

of particular cohorts (Herbst 2013; Durson et al. 2016; Krekel et al. 2015; Angelini et al. 2013). In the USA in recent decades, it is likely that employment trends in manufacturing regions, followed by the 2008–2009 financial crisis, had a strong negative effect in the same places. At the same time, the causality likely runs in the other direction as well, and the unhappiness and lack of hope related to these trends has broader implications for health and longevity. Happier people tend to be healthier and more productive (Graham 2008; Graham et al. 2004; De Neve 2013). And individuals with a greater sense of purpose—described as eudemonic well-being by some economists and psychologists, and as "flourishing" by others—also tend to live longer (Steptoe et al. 2015; Keyes and Simoes 2012).

In November 2015, Case and Deaton (2015a) published a study showing a marked increase in the all-cause mortality of high school (and below) educated white middle-aged non-Hispanic men and women between 1999 and 2013.[2] The change reversed decades of progress in mortality and is most prevalent among uneducated non-Hispanic whites. Drug and alcohol poisoning, suicide, chronic liver diseases, and cirrhosis were the major factors in the mortality rate increase. Self-reported health, mental health, and ability to conduct activities of daily living in this group also saw a marked decrease.

The authors' follow-up (Case and Deaton 2017) suggests that the trends in mortality encompass a broader range of ages and that these cohorts experienced a stalling of progress against other major conditions (e.g., heart disease and cancer), with obesity and smoking as possible contributors. They also found that the trends pertained not only to rural areas but also to smaller cities and suburban areas, with the exception of the largest coastal cities.

Dwyer-Lindgren et al. (2016) found that cardiovascular disease mortality tended to be highest along the Mississippi River, while self-harm and interpersonal violence were elevated in southwestern counties, and chronic respiratory disease was highest in Kentucky and West Virginia. Deaths from self-harm declined in the past decade in California, Texas, and other coastal areas, but increased in the Midwest and in parts of New England. Our primary focus was on the increase in premature deaths due to these so-called deaths of despair and the extent to which reflect the patterns in desperation that we found in our data.

Neither blacks nor Hispanics experienced an increase in death rates during the same period. Assari and Lankarani (2016) found that while black Americans have worse health indicators than white Americans on average, they are better off in terms of mental health: depression, anxiety, and suicide are all more common among whites.

Shiels et al. (2017) show the preventable death increases occurring at an earlier age (25–30) for white men and women, as well as for Native Indian men and women, in addition to the increases in the 30–49 age group for these same cohorts. The increase in suicides and accidental deaths underlying these increases stand in sharp contrast to the flat or decreasing trends for these kinds of deaths for the same age groups of blacks and Hispanics.

[2] Gelman and Auerbach (2016) posit that these trends are driven in part by aggregation bias at the older ages of the 45–54 cohort.

Pierce and Schott (2016) found that US counties with more exposure to exogenous trade liberalization had an increase in suicide deaths. Despite the geographic variation, these were concentrated among whites, a group with disproportionately high employment in manufacturing.

2 Data and empirical specification

The main data source of our paper is the Gallup Healthways (GH) survey, collected daily for adult individuals all across the USA. It covers a wide range of demographic details and economic and self-reported health conditions of the respondents, as well as a series of subjective well-being questions. In some specifications, we complement the GH with data from the American Community Survey (ACS), the Centers for Disease Control and Prevention (CDC), and the Survey of Epidemiology and End Results (SEER).[3] These three data sources allow us to compute several variables at the Metropolitan Statistical Area (MSA) level: household income, income inequality, mortality rates, and population race shares.

In our main specification, we use only GH data and we focus on the 2010–2015 period. While our interest is the entire US adult population, data availability imposes some constraints. Firstly, we only consider those living in MSAs. As of 2015, according to United States Census Bureau (USCB) estimates,[4] the 381 MSAs in US territory accounted for 85.6% of the population.[5] Secondly, GH only computes MSA-level sampling weights for MSAs with more 300 respondents.[6] As a result, between 188 and 190 of the 381 MSAs can be used for 2010–2012 (representing about 89% of the population living in MSAs), and between 105 and 108 can be used for the 2013–2015 period (approximately 79% of the population living in MSAs). Because the number and definition of MSAs changed in 2013, a total of 196 MSAs appear in at least 1 year, and 103 are present in every year between 2010 and 2015 (approximately 78% percent of the population living in MSA). In broad terms, the 196 MSAs tend to correspond to those above 300,000 people and the more restricted group of 103 to those above 500,000 people.[7]

For the 2010–2015 period, GH provides us with a repeated cross section of approximately 1.6 million US adults, of which 1.3 million live in MSAs, with the remaining in micropolitan statistical areas or even smaller counties. Over 1 million have MSA-level survey weights. From these, approximately 0.8 million have data for both the dependent variables under analysis and the controls. This group will be the focus of our analysis, although we also have some analyses that include the smaller areas.

In some instances, we had to make additional adjustments to the individual level data. The income variable collected in GH assigns respondents to a 0–10 scale for the household's pretax income, with 0 being the lowest value (below $720/year) and 10 the

[3] Obtained through NBER at http://www.nber.org/data/seer_u.s._county_population_data.html.
[4] Source: http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=PEP_2015_PEPANNRES
[5] This proportion has increased very slightly over time: from 85 to 85.5% from 2010 to 2014.
[6] In additional specifications (Section 3 and Appendix 2), we use national-level weights (doubling the number of MSAs), with no meaningful changes.
[7] GH halved the number of daily interviews to 500 in 2013, decreasing the number of weighted MSAs.

highest (above $120,000/year). That prevents us from directly applying the Census bureau poverty thresholds based on exact values.[8] We divided respondents into three categories: poor, middle-income, and rich. Respondents in the top income bracket defined by GH, those with a pretax household income of over $120,000/year identified as "rich" (roughly 18% of total respondents). We assigned those in the bottom five categories, whose pretax income is below $22,000 per household to the "poor" category (approximately 17% of the respondents).[9] We classified those in the remaining five income categories as middle income. For race, GH assigns respondents to one of five categories (Asian, Black, Hispanic, Other Race, and White).

Equation (1) below describes the empirical specification for our race-income exploration:

$$\begin{aligned} WB_{ijt} = {} & \beta_0 + \beta_1{}^{*}\left(poorhh_{ijt}\right) + \beta_2{}^{*}\left(richhh_{ijt}\right) + \beta_3{}^{*}\left(black_{ijt}\right) + \beta_4{}^{*}\left(hispanic_{ijt}\right) + \beta_5{}^{*}\left(asian_{ijt}\right) \\ & + \beta_6{}^{*}\left(other\ race_{ijt}\right) + \beta_7{}^{*}\left(poorhh_{ijt}\right)*\left(black_{ijt}\right) + \beta_8{}^{*}\left(poorhh_{ijt}\right)*\left(hispanic_{ijt}\right) \\ & + \beta_9{}^{*}\left(poorhh_{ijt}\right)*\left(asian_{ijt}\right) + \beta_{10}{}^{*}\left(poorhh_{ijt}\right)*\left(other\ race_{ijt}\right) + \beta_{11}{}^{*}\left(richhh_{ijt}\right)*\left(black_{ijt}\right) \\ & + \beta_{12}{}^{*}\left(richhh_{ijt}\right)*\left(hispanic_{ijt}\right) + \beta_{13}{}^{*}\left(richhh_{ijt}\right)*\left(asian_{ijt}\right) + \beta_{14}{}^{*}\left(richhh_{ijt}\right)*\left(other\ race_{ijt}\right) \\ & + \beta_{15}{}^{*}\left(Z_{ijt}\right) + \varnothing_j + \gamma_t + \varepsilon_{ijt} \end{aligned} \quad (1)$$

WB represents one of the well- or ill-being markers under consideration for individual *i*, in MSA *j*, for time *t*. We consider: (i) reported life satisfaction today, (ii) expected life satisfaction in 5 years (i.e., optimism), (iii) experienced stress yesterday, (iv) worry yesterday, (v) satisfied with place of residence, (vi) experienced anger yesterday, and (vii) has a social support network that can be relied on in times of need. The first two questions are on a 0–10 scale, while the remaining ones are binary (0–1 scale). We estimate all specifications using linear OLS models for ease of interpretation (we also provide the estimation results under ordered logistic and logistic regression models—see Section 3 and Appendix 3 for additional details).

Poorhh and *richhh* are dummy variables identifying if the respondent belongs to a poor or a rich household, respectively. *Black, Asian, Hispanic,* and *Other race* are dummy variables identifying the respondent's race. They are interacted with those for income level (*poorhh* and *richhh*) to explore race-income heterogeneities. The omitted category for income corresponds to middle-income respondents, while that for race corresponds to whites.

Z is a vector of individual socio-demographic controls. These include the following dummy variables:

a) age groups[10] (18–24, 25–34, 35–44, 45–54, 55–64, 65+);

[8] In Appendix 2, we employ alternative definitions for poor, middle-income, and rich individuals, including that from the Census Bureau. The results we obtain are quantitatively similar to those in our main specification.

[9] This percentage and the previous one do not use Gallup's survey weights. The corresponding shares of weighted respondents are 15 and 24%.

[10] The age dummies have ranges that contain a similar number of observations and generally match the age brackets present in the other databases that we used, such as the CDC's Compressed Mortality File.

b) gender (male and female);
c) marital status (single, married or in a domestic partnership, divorced or separated, and widowed);
d) educational level (high school dropout, high school graduate, technical/vocational school, college dropout, college graduate, post-graduate);
e) employment status (employed full-time, employed part-time, self-employed, employed part-time but wanting full-time, unemployed, and not in the workforce);
f) religious preference (preference, no preference, or atheist);

We also included binary variables for several health-related characteristics: experiencing pain the previous day; having (self-reported) health problems that prevent "normal" activities for someone of the respondent's age; body mass index (BMI)-based categories (underweight, normal range, overweight, obese); smoking; and having exercised at least once over the previous week. We controlled for reporting lack of money for food or for healthcare over the previous 12 months. $\varnothing_j$ represents MSA dummies and γ_t represents year dummies. All regressions use MSA-level survey weights unless otherwise specified.[11]

As an additional control within our baseline framework, we use two specifications where the dependent variable is the expected future life satisfaction. In the first, we follow Eq. (1) precisely, while in the second one we include current life satisfaction as an additional control. The reason is that individuals may anchor their beliefs about future life satisfaction on their own answer about their current life satisfaction. As a result, if a certain group (e.g., low-income respondents) reports low life satisfaction, they may also report low future expected life satisfaction, although that might only be a reflex of their low starting point, rather than an indication of unusually low optimism.

We estimate all specifications using linear OLS models for ease of interpretation. The use of nonlinear models makes direct interpretations of the estimated coefficients difficult, as they express log odds rather than linear effects. Additionally, our main parameters of interest include the coefficients for race and income variables, as well as the corresponding interactions. The latter type of variables makes the computation of odds ratios more complex, as they depend on the value of the components of the interaction term. The results we obtain under OLS are fairly similar to those under ordered logit (for current and expected life satisfaction) and logit (for the remaining dependent variables) specifications and our findings are robust to the choice of model.[12] In addition, with either specification, as all the independent variables are binary, the coefficients reflect relative magnitudes that we can compare to the omitted category.

[11] The inclusion of (MSA)*(Year) interactions, month of interview dummies, other types of survey weights, and no survey weights at all, does not meaningfully change in the coefficients. See Appendix 2.

[12] While the logit and ordered logit models are technically the appropriate specification, it has become accepted practice to use OLS in happiness regressions, for ease of interpretation, as long as the results are very close. In our case, the OLS specifications yield slightly more significant coefficients for some variables of interest, but the patterns are otherwise identical and the choice of model does not affect our conclusions. We report the logit and ordered logit results in Appendix 3.

3 Baseline results and interpretation

3.1 Results

We first used a simple specification exploring the race-income interactions without other individual sociodemographic controls (Table 1).[13] Yet our results here are remarkably similar to the specification including the full battery of controls (Table 2). The main result (in both specifications) is that poor blacks are significantly more optimistic about their future life satisfaction and both less stressed and less worried than poor whites (Tables 1 and 2). The black-white optimism difference holds across income levels, although it diminishes as incomes increase. Hispanics demonstrate a similar trend, with poor Hispanics also more optimistic than poor whites, but the gap is less stark than between blacks and whites, and there is no trend across income categories. Heterogeneities across races are also visible in life satisfaction and in incidence of stress and worry, in particular among the poor, where whites fare clearly worse than other race groups.[14]

When we control for socio-demographic factors, blacks are again *by far* the most optimistic cohort. This is particularly so *within* poor respondents, where they are almost an entire point (.90) higher on the 0–10 scale than are poor whites (Table 2; Fig. 1).[15] Again, the gap decreased as one moves from lower to higher income classes. Among rich individuals, African Americans are only half a point (.43) higher than whites on the optimism scale.[16] There are modest differences in the results based on the specification that controls for current life satisfaction, but they do not alter our main findings.

The inclusion of individual socio-economic controls accentuates the heterogeneities across race groups for life satisfaction, worry, and stress, particularly between black and white respondents. Nevertheless, blacks in general reported lower levels of satisfaction with their place of residence and lower levels of social support.[17] This discrepancy suggests that the findings are not simply a "polyanna" effect, but rather that blacks are distinguishing between their circumstances and challenges today and where their future is going. Along these same lines, our results on anger are noteworthy. Poor blacks and poor Hispanics are more likely to experience anger the previous day than are poor whites, even though they are

[13] However, we include both year and MSA dummies in every specification.

[14] We also explored reported depression and found that it was also highest among low-income whites. A more comprehensive account, however, would require a separate study. Depression and happiness are distinct emotional states. While positive emotional states, such as happiness and smiling, tend to track closely, negative states—stress, anger, and depression—track differently, with depression the most distinct. See Stone and Mackie (2013).

[15] We computed Figure 1 using the coefficients from column (2), the BPLA regression without BPL as a control. When we use current BPL as a control (column (3)), we get slightly lower gaps between poor blacks and poor whites and they decrease less as income increases.

[16] These race-income heterogeneities are also very strong when generating separate regressions by year (Table 7, Appendix 1).

[17] The social support and anger questions were asked in 2008–2012 and 2010–2013, respectively. Therefore, the time period under consideration differs for those two cases.

Table 1 Race-income heterogeneities, no individual-level controls (2010–2015)

	(1) OLS: bpl	(2) OLS: bpla	(3) OLS: bpla	(4) OLS: worry	(5) OLS: stress	(6) OLS: citysat	(7) OLS: anger	(8) OLS: social support
Variables	No individual-level controls (196 MSAs)	No individual-level controls (196 MSAs)	Bpl control, no other individual-level controls (196 MSAs)	No individual-level controls (196 MSAs)	No individual-level controls (196 MSAs)	No individual-level controls (196 MSAs)	No individual-level controls (196 MSAs)	No individual-level controls (200 MSAs)
Reported life satisfaction today (0–10)			0.541*** (0.0037)					
Poor household	−0.868*** (0.0157)	−0.583*** (0.0143)	−0.113*** (0.0135)	0.135*** (0.0037)	0.094*** (0.0037)	−0.069*** (0.0024)	0.052*** (0.0026)	−0.084*** (0.0033)
Rich household	0.620*** (0.0084)	0.485*** (0.0106)	0.149*** (0.0097)	−0.035*** (0.0022)	0.002 (0.0032)	0.038*** (0.0019)	−0.016*** (0.0018)	0.030*** (0.0018)
Black	0.015 (0.0152)	0.855*** (0.0135)	0.847*** (0.0123)	−0.059*** (0.0040)	−0.086*** (0.0050)	−0.074*** (0.0073)	0.009*** (0.0029)	−0.036*** (0.0042)
Hispanic	0.130*** (0.0168)	0.612*** (0.0204)	0.541*** (0.0232)	0.001 (0.0045)	−0.031*** (0.0048)	−0.022*** (0.0048)	0.020*** (0.0035)	−0.030*** (0.0053)
Asian	0.021 (0.0232)	0.371*** (0.0234)	0.360*** (0.0169)	−0.002 (0.0060)	−0.007 (0.0050)	0.002 (0.0040)	−0.001 (0.0043)	0.000 (0.0074)
Other race	−0.081*** (0.0260)	0.396*** (0.0331)	0.440*** (0.0314)	0.017*** (0.0060)	0.003 (0.0065)	−0.054*** (0.0061)	0.035*** (0.0052)	−0.050*** (0.0066)
(Rich household)*(Black)	−0.188*** (0.0264)	−0.323*** (0.0259)	−0.221*** (0.0225)	0.002 (0.0076)	−0.015** (0.0073)	0.024*** (0.0046)	−0.003 (0.0056)	−0.007 (0.0098)
(Rich household)* (Hispanic)	−0.154*** (0.0306)	−0.246*** (0.0266)	−0.162*** (0.0241)	0.023*** (0.0083)	0.030*** (0.0067)	0.008 (0.0057)	0.013 (0.0080)	0.018** (0.0076)
(Rich household)*(Asian)	−0.152*** (0.0337)	−0.219*** (0.0345)	−0.137*** (0.0274)	0.008 (0.0086)	0.007 (0.0099)	0.003 (0.0052)	0.006 (0.0069)	−0.034*** (0.0092)

Table 1 (continued)

Variables	(1) OLS: bpl No individual-level controls (196 MSAs)	(2) OLS: bpla No individual-level controls (196 MSAs)	(3) OLS: bpla Bpl control, no other individual-level controls (196 MSAs)	(4) OLS: worry No individual-level controls (196 MSAs)	(5) OLS: stress No individual-level controls (196 MSAs)	(6) OLS: citysat No individual-level controls (196 MSAs)	(7) OLS: anger No individual-level controls (196 MSAs)	(8) OLS: social support No individual-level controls (200 MSAs)
(Rich household)* (Other race)	−0.052	−0.291***	−0.263***	0.001	−0.006	0.005	0.009	−0.011
	(0.0488)	(0.0594)	(0.0551)	(0.0147)	(0.0152)	(0.0110)	(0.0110)	(0.0144)
(Poor household)*(Black)	0.388***	0.271***	0.061**	−0.017***	−0.013***	−0.024***	0.009*	−0.027***
	(0.0229)	(0.0244)	(0.0253)	(0.0050)	(0.0045)	(0.0053)	(0.0047)	(0.0079)
(Poor household)* (Hispanic)	0.440***	−0.101**	−0.339***	−0.023***	−0.046***	0.035***	0.014***	−0.042***
	(0.0260)	(0.0394)	(0.0363)	(0.0060)	(0.0069)	(0.0049)	(0.0050)	(0.0089)
(Poor household)*(Asian)	0.465***	0.405***	0.153***	−0.048***	−0.026**	0.004	−0.015	0.034**
	(0.0431)	(0.0428)	(0.0368)	(0.0125)	(0.0131)	(0.0095)	(0.0104)	(0.0164)
(Poor household)* (Other race)	0.215***	0.142**	0.025	−0.008	0.001	−0.017	0.021*	−0.041***
	(0.0586)	(0.0602)	(0.0502)	(0.0127)	(0.0128)	(0.0112)	(0.0110)	(0.0146)
Constant	6.975***	7.744***	3.969***	0.293***	0.421***	0.871***	0.168***	0.900***
	(0.0070)	(0.0063)	(0.0258)	(0.0018)	(0.0019)	(0.0017)	(0.0011)	(0.0017)
Observations	770,899	770,899	770,899	770,899	770,899	770,899	608,787	347,080
R-squared	0.049	0.039	0.260	0.017	0.009	0.028	0.008	0.027
MSA dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Clustered standard errors (at the MSA level) in parentheses

***$p < 0.01$; **$p < 0.05$; *$p < 0.1$

Note: These regressions include the 196 MSAs for which sampling weights were available at least in 1 year, except for social support, where 200 MSAs were available. All specifications use the 2010–2015 period, except for anger (2010–2013) and social support (2008–2012)

Table 2 Race-income heterogeneities, with individual-level controls (2010–2015)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	OLS: bpl	OLS: bpla	OLS: bpla	OLS: worry	OLS: stress	OLS: citysat	OLS: anger	OLS: social support
Variables	Full set of controls (196 MSAs)	Full set of controls (196 MSAs)	Full set of controls + bpl control (196 MSAs)	Full set of controls (196 MSAs)	Full set of controls (196 MSAs)	Full set of controls (196 MSAs)	Full set of controls (196 MSAs)	Full set of controls (200 MSAs)
Reported life satisfaction today (0–10)			0.556***					
			(0.0042)					
Poor household	−0.334***	−0.225***	−0.040***	0.029***	0.016***	−0.019***	−0.001	−0.025***
	(0.0107)	(0.0113)	(0.0100)	(0.0025)	(0.0026)	(0.0023)	(0.0023)	(0.0028)
Rich household	0.398***	0.275***	0.054***	−0.007***	0.015***	0.017***	0.002	0.008***
	(0.0072)	(0.0079)	(0.0069)	(0.0020)	(0.0024)	(0.0018)	(0.0017)	(0.0019)
Black	0.171***	0.643***	0.548***	−0.083***	−0.131***	−0.053***	−0.006**	−0.029***
	(0.0133)	(0.0146)	(0.0127)	(0.0035)	(0.0040)	(0.0069)	(0.0029)	(0.0040)
Hispanic	0.244***	0.279***	0.143***	−0.021***	−0.085***	0.004	−0.005	−0.019***
	(0.0139)	(0.0169)	(0.0166)	(0.0048)	(0.0044)	(0.0040)	(0.0029)	(0.0044)
Asian	−0.079***	−0.166***	−0.122***	−0.002	−0.056***	0.013***	−0.007	−0.042***
	(0.0204)	(0.0277)	(0.0204)	(0.0063)	(0.0055)	(0.0043)	(0.0045)	(0.0071)
Other race	0.094***	0.163***	0.111***	−0.020***	−0.060***	−0.026***	0.008	−0.038***
	(0.0232)	(0.0238)	(0.0232)	(0.0053)	(0.0063)	(0.0050)	(0.0057)	(0.0064)
(Rich household)*(Black)	−0.216***	−0.216***	−0.096***	0.006	−0.002	0.019***	−0.001	−0.007
	(0.0258)	(0.0236)	(0.0222)	(0.0067)	(0.0066)	(0.0045)	(0.0055)	(0.0088)
(Rich household)*(Hispanic)	−0.175***	−0.149***	−0.051**	0.026***	0.043***	0.003	0.018**	0.006
	(0.0258)	(0.0282)	(0.0236)	(0.0077)	(0.0073)	(0.0052)	(0.0073)	(0.0072)
(Rich household)* (Asian)	−0.112***	−0.036	0.026	−0.003	0.010	0.003	0.003	−0.018**
	(0.0326)	(0.0350)	(0.0258)	(0.0089)	(0.0102)	(0.0049)	(0.0069)	(0.0091)

Table 2 (continued)

Variables	(1) OLS: bpl Full set of controls (196 MSAs)	(2) OLS: bpla Full set of controls (196 MSAs)	(3) OLS: bpla Full set of controls + bpl control (196 MSAs)	(4) OLS: worry Full set of controls (196 MSAs)	(5) OLS: stress Full set of controls (196 MSAs)	(6) OLS: citysat Full set of controls (196 MSAs)	(7) OLS: anger Full set of controls (196 MSAs)	(8) OLS: social support Full set of controls (200 MSAs)
(Rich household)* (Other race)	−0.075* (0.0445)	−0.181*** (0.0505)	−0.139*** (0.0474)	0.009 (0.0136)	0.011 (0.0140)	−0.001 (0.0109)	0.012 (0.0106)	−0.015 (0.0138)
(Poor household)*(Black)	0.381*** (0.0227)	0.261*** (0.0214)	0.049** (0.0219)	−0.014*** (0.0051)	−0.007* (0.0040)	−0.023*** (0.0051)	0.008* (0.0045)	−0.015** (0.0067)
(Poor household)*(Hispanic)	0.285*** (0.0184)	−0.137*** (0.0281)	−0.296*** (0.0266)	0.000 (0.0049)	−0.020*** (0.0056)	0.019*** (0.0045)	0.025*** (0.0049)	−0.035*** (0.0079)
(Poor household)*(Asian)	0.212*** (0.0389)	0.149*** (0.0413)	0.031 (0.0363)	0.008 (0.0120)	0.017 (0.0127)	−0.014 (0.0092)	0.008 (0.0103)	0.001 (0.0130)
(Poor household)*(Other race)	0.154*** (0.0501)	0.100* (0.0541)	0.014 (0.0460)	−0.000 (0.0105)	0.009 (0.0110)	−0.022** (0.0106)	0.025** (0.0102)	−0.031** (0.0132)
Lacked money for food (past 12 m)	−0.715*** (0.0126)	−0.255*** (0.0120)	0.142*** (0.0096)	0.152*** (0.0029)	0.136*** (0.0026)	−0.074*** (0.0024)	0.073*** (0.0026)	−0.122*** (0.0032)
Lacked money for healthcare (past 12 m)	−0.534*** (0.0097)	−0.309*** (0.0100)	−0.012 (0.0096)	0.125*** (0.0028)	0.111*** (0.0022)	−0.050*** (0.0018)	0.050*** (0.0021)	−0.118*** (0.0028)
Age 25–34	−0.204*** (0.0132)	−0.190*** (0.0111)	−0.076*** (0.0117)	0.009*** (0.0032)	−0.029*** (0.0035)	−0.012*** (0.0026)	−0.005* (0.0027)	−0.036*** (0.0033)
Age 35–44	−0.305*** (0.0146)	−0.542*** (0.0134)	−0.373*** (0.0133)	0.021*** (0.0036)	−0.056*** (0.0033)	0.005 (0.0033)	−0.005* (0.0028)	−0.076*** (0.0038)
Age 45–54	−0.362*** (0.0154)	−0.852*** (0.0142)	−0.651*** (0.0138)	0.018*** (0.0039)	−0.099*** (0.0035)	0.022*** (0.0031)	−0.027*** (0.0030)	−0.111*** (0.0039)

Table 2 (continued)

Variables	(1) OLS: bpl Full set of controls (196 MSAs)	(2) OLS: bpla Full set of controls (196 MSAs)	(3) OLS: bpla Full set of controls + bpl control (196 MSAs)	(4) OLS: worry Full set of controls (196 MSAs)	(5) OLS: stress Full set of controls (196 MSAs)	(6) OLS: citysat Full set of controls (196 MSAs)	(7) OLS: anger Full set of controls (196 MSAs)	(8) OLS: social support Full set of controls (200 MSAs)
Age 55–64	−0.295*** (0.0150)	−1.276*** (0.0165)	−1.112*** (0.0171)	−0.021*** (0.0034)	−0.166*** (0.0036)	0.036*** (0.0034)	−0.050*** (0.0031)	−0.117*** (0.0036)
Age 65+	−0.030** (0.0146)	−1.745*** (0.0203)	−1.728*** (0.0184)	−0.100*** (0.0037)	−0.273*** (0.0042)	0.063*** (0.0031)	−0.073*** (0.0034)	−0.080*** (0.0037)
Male	−0.286*** (0.0084)	−0.339*** (0.0083)	−0.180*** (0.0052)	−0.028*** (0.0018)	−0.047*** (0.0016)	−0.008*** (0.0017)	0.013*** (0.0011)	−0.011*** (0.0016)
Single	−0.215*** (0.0085)	−0.050*** (0.0078)	0.069*** (0.0066)	−0.001 (0.0021)	−0.003* (0.0019)	−0.011*** (0.0018)	0.001 (0.0018)	0.026*** (0.0023)
Divorced/separated	−0.314*** (0.0083)	−0.016 (0.0126)	0.159*** (0.0117)	0.021*** (0.0020)	0.019*** (0.0020)	−0.018*** (0.0020)	0.004** (0.0020)	0.012*** (0.0024)
Widowed	−0.185*** (0.0129)	−0.236*** (0.0156)	−0.133*** (0.0134)	−0.006* (0.0031)	−0.017*** (0.0025)	0.017*** (0.0023)	−0.021*** (0.0022)	0.057*** (0.0033)
Underweight	−0.137*** (0.0267)	−0.146*** (0.0242)	−0.070*** (0.0211)	0.018*** (0.0050)	0.003 (0.0052)	−0.011** (0.0046)	−0.003 (0.0051)	−0.010* (0.0059)
Overweight	−0.057*** (0.0062)	−0.005 (0.0062)	0.027*** (0.0054)	−0.009*** (0.0015)	−0.001 (0.0016)	−0.004*** (0.0013)	0.002 (0.0013)	−0.007*** (0.0017)
Obese	−0.139*** (0.0075)	−0.038*** (0.0074)	0.039*** (0.0065)	−0.021*** (0.0016)	−0.005*** (0.0018)	−0.005*** (0.0019)	0.003* (0.0017)	−0.016*** (0.0023)
Health problems	−0.375*** (0.0095)	−0.414*** (0.0096)	−0.205*** (0.0087)	0.079*** (0.0019)	0.083*** (0.0021)	−0.027*** (0.0017)	0.018*** (0.0017)	−0.030*** (0.0024)

Table 2 (continued)

Variables	(1) OLS: bpl Full set of controls (196 MSAs)	(2) OLS: bpla Full set of controls (196 MSAs)	(3) OLS: bpla Full set of controls + bpl control (196 MSAs)	(4) OLS: worry Full set of controls (196 MSAs)	(5) OLS: stress Full set of controls (196 MSAs)	(6) OLS: citysat Full set of controls (196 MSAs)	(7) OLS: anger Full set of controls (196 MSAs)	(8) OLS: social support Full set of controls (200 MSAs)
Experienced physical pain	−0.350*** (0.0082)	−0.327*** (0.0089)	−0.132*** (0.0065)	0.181*** (0.0026)	0.183*** (0.0019)	−0.040*** (0.0016)	0.113*** (0.0022)	−0.044*** (0.0024)
Smokes	−0.283*** (0.0078)	−0.010 (0.0089)	0.147*** (0.0075)	0.030*** (0.0018)	0.043*** (0.0019)	−0.040*** (0.0018)	0.036*** (0.0019)	−0.026*** (0.0024)
Exercises at least once over last 7 days	0.245*** (0.0057)	0.246*** (0.0092)	0.110*** (0.0079)	−0.037*** (0.0015)	−0.035*** (0.0015)	0.008*** (0.0012)	−0.015*** (0.0015)	0.007*** (0.0016)
Religious preference (vs. atheist)	0.101*** (0.0066)	0.117*** (0.0074)	0.061*** (0.0071)	0.001 (0.0018)	−0.004** (0.0018)	0.016*** (0.0020)	−0.006*** (0.0018)	0.019*** (0.0022)
Less than HS	−0.028 (0.0174)	−0.359*** (0.0245)	−0.344*** (0.0216)	−0.035*** (0.0036)	−0.070*** (0.0046)	−0.006** (0.0029)	0.014*** (0.0031)	−0.062*** (0.0048)
HS graduate	−0.068*** (0.0080)	−0.158*** (0.0087)	−0.120*** (0.0077)	−0.045*** (0.0025)	−0.076*** (0.0026)	−0.006*** (0.0021)	−0.000 (0.0016)	−0.020*** (0.0024)
Technical/vocational school	−0.154*** (0.0116)	−0.108*** (0.0136)	−0.023** (0.0109)	−0.030*** (0.0030)	−0.051*** (0.0032)	−0.018*** (0.0026)	0.003 (0.0025)	−0.025*** (0.0032)
Some college	−0.111*** (0.0062)	−0.053*** (0.0062)	0.009* (0.0050)	−0.018*** (0.0025)	−0.026*** (0.0021)	−0.017*** (0.0016)	0.001 (0.0014)	−0.015*** (0.0020)
Post-graduate	0.135*** (0.0062)	0.113*** (0.0066)	0.038*** (0.0054)	0.011*** (0.0019)	0.023*** (0.0019)	0.001 (0.0012)	−0.001 (0.0016)	0.004** (0.0018)
Self-employed	0.007 (0.0122)	0.220*** (0.0126)	0.216*** (0.0117)	0.049*** (0.0038)	0.026*** (0.0037)	−0.008*** (0.0027)	0.015*** (0.0030)	

Table 2 (continued)

Variables	(1) OLS: bpl Full set of controls (196 MSAs)	(2) OLS: bpla Full set of controls (196 MSAs)	(3) OLS: bpla Full set of controls + bpl control (196 MSAs)	(4) OLS: worry Full set of controls (196 MSAs)	(5) OLS: stress Full set of controls (196 MSAs)	(6) OLS: citysat Full set of controls (196 MSAs)	(7) OLS: anger Full set of controls (196 MSAs)	(8) OLS: social support Full set of controls (200 MSAs)
Employed PT	0.238*** (0.0101)	0.122*** (0.0108)	−0.011 (0.0089)	−0.014*** (0.0039)	−0.057*** (0.0035)	0.008*** (0.0025)	−0.008*** (0.0024)	
Underemployed	−0.280*** (0.0123)	−0.017* (0.0100)	0.139*** (0.0100)	0.056*** (0.0031)	0.007** (0.0033)	−0.025*** (0.0027)	0.016*** (0.0028)	
Unemployed	−0.513*** (0.0150)	0.052*** (0.0150)	0.337*** (0.0151)	0.095*** (0.0034)	0.024*** (0.0040)	−0.039*** (0.0033)	0.026*** (0.0028)	
Not in workforce	0.112*** (0.0071)	−0.076*** (0.0080)	−0.138*** (0.0071)	0.000 (0.0018)	−0.056*** (0.0021)	−0.001 (0.0014)	0.001 (0.0018)	
Constant	7.668*** (0.0185)	8.838*** (0.0162)	4.577*** (0.0338)	0.264*** (0.0051)	0.536*** (0.0042)	0.891*** (0.0043)	0.148*** (0.0035)	1.026*** (0.0049)
Observations	770,899	770,899	770,899	770,899	770,899	770,899	608,787	347,080
R-squared	0.175	0.165	0.367	0.129	0.130	0.064	0.062	0.109
MSA dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Clustered standard errors (at the MSA level) in parentheses

***$p < 0.01$; **$p < 0.05$; *$p < 0.1$

Note: These regressions include the 196 MSAs for which sampling weights were available at least in 1 year, except for Social support, where 200 MSAs were available. All specifications use the 2010–2015 period, except for anger (2010–2013) and social support (2008–2012)

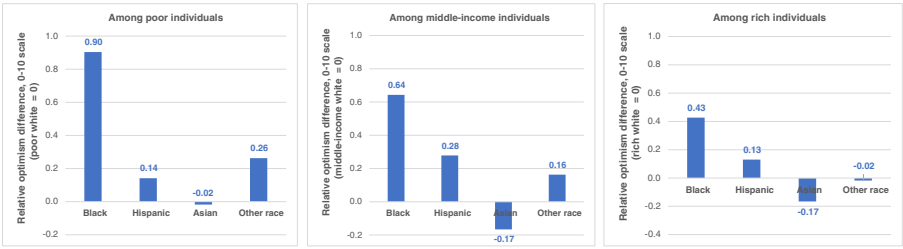

Fig. 1 Differential optimism associated with different race groups (relative to white), within each income group

more optimistic about the future at the same time. Reported pain, meanwhile, had a higher positive correlation with stress, worry, and anger than any other control variable, and a negative (although not the most negative) correlation with current and future life satisfaction.

Stress is an important marker of ill-being and the differences between poor blacks and their white counterparts are large, even after accounting for all the controls in Table 2. Poor blacks are 14 percentage points less likely than are poor whites to report experiencing stress in the previous day. Unlike optimism, these differences between blacks and whites remain constant across income groups (Fig. 2).

For an alternative and perhaps simpler interpretation of these baseline results, we also standardized the dependent variables of interest, so that we can measure each coefficient in terms of standard deviations. For example, when controlling for socio-demographic factors as in Table 2, among the poor and holding everything else constant, being black is associated with an optimism increase of 0.43 standard deviations (the standard deviation for the optimism variable is approximately 2.122). Regarding worry and stress (with standard deviations of 0.467 and 0.494, respectively), among the poor being black decreases stress by 0.21 and 0.28 standard deviations.

Table 2 also displays the coefficients for the socio-economic controls. After controlling for other individual-level factors, males have lower levels of life satisfaction and optimism, lower likelihood of being satisfied with the place of

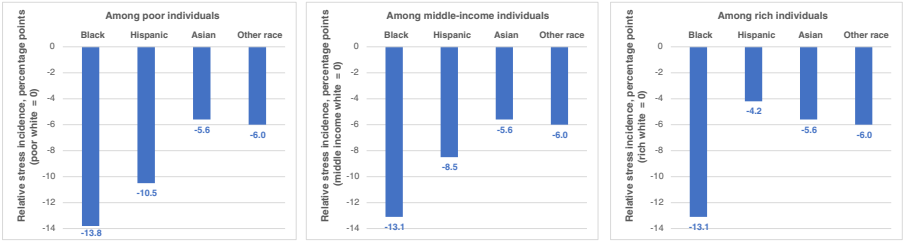

Fig. 2 Differential stress incidence, by race group (relative to white), within each income group

living and of having social support, and higher likelihood of reporting anger. They also report lower incidence of stress and worry. Reporting pain or health problems is associated with lower life satisfaction and more stress, worry, and anger. Exercising the previous week has the opposite associations. Smoking is associated with lower life satisfaction and likelihood of stress, worry, and anger, but also with higher optimism. Unemployment has the usual large negative association with life satisfaction and increases worry.

Additionally, we attempted to address some potential concerns regarding the robustness of our race-income heterogeneity results. We re-estimated Eq. (1) using several household size adjustments to the income variable. We built on these and incorporated the Census Bureau poverty measure. We checked the possibility that MSAs with a small number of African American respondents drove the results. We also assessed the robustness of our results to the inclusion of both month and (MSA) x (Year) dummies. Finally, we checked the sensitivity of our estimates to the inclusion and type of survey weights used. The results are in our Appendix 2, and are robust to all these measures. Finally, as referenced in the previous section, there may be a concern regarding the use of OLS in the estimation of potentially nonlinear relationships. In Appendix 3 we replicate Tables 1 through 6, using ordered logit and logit models instead of OLS, and those estimates show that our conclusions are robust to the choice of estimation framework.

The coefficients for the age categories are of particular interest. Column (1) displays the previously established age-life satisfaction U curve (Graham and Ruiz-Pozuelo 2017; Blanchflower and Oswald 2008). Social support (Column (8)) seems to display a similar, though less pronounced, trend. Optimism (columns (2)–(3)) displays a different pattern, however, as it decreases with age, with particularly large negative effects in middle and old age. Stress and anger (columns (5) and (7), respectively) also decrease with age, worry tends to display an inverted U shape, peaking in middle age, and satisfaction with place of living (column (6)) increases with age.

We assessed if the heterogeneities across races change with age. We estimated an analogous specification to that outlined in Eq. (1), but interacting race with age groups, instead of income (Table 3). Because we find the largest optimism gap between African Americans and whites and due to space considerations, we display only the coefficients for black, age groups, and black-age interactions.

The black-white gaps in life satisfaction and optimism are larger for those between 45 and 64. The gap in worry incidence is also highest for that group. Younger blacks are more likely to report anger and less likely to have social support (relative to young whites). This trend reverses for anger after age 35, as older whites are increasingly more likely to report feelings of anger than their black counterparts. The gap on social support also decreases with age up to the 55–64 group, as whites become less likely to report social support.[18]

[18] We also collapsed the data at the MSA level, using MSA fixed effects to control for non time-varying MSA-specific unobservables. This reduces the significance of some variables, but the main ones hold.

Table 3 Race-age heterogeneities (2010–2015)

Variables	(1) OLS: bpl Full set of controls (196 MSAs)	(2) OLS: bpla Full set of controls (196 MSAs)	(3) OLS: bpla Full set of controls + bpl control (196 MSAs)	(4) OLS: worry Full set of controls (196 MSAs)	(5) OLS: stress Full set of controls (196 MSAs)	(6) OLS: citysat Full set of controls (196 MSAs)	(7) OLS: anger Full set of controls (196 MSAs)	(8) OLS: social support Full set of controls (200 MSAs)
Black	−0.023	0.440***	0.452***	−0.067***	−0.149***	−0.080***	0.037***	−0.045***
	(0.0268)	(0.0197)	(0.0206)	(0.0058)	(0.0071)	(0.0075)	(0.0060)	(0.0072)
Age 25–34	−0.260***	−0.211***	−0.066***	0.011***	−0.023***	−0.016***	0.001	−0.027***
	(0.0126)	(0.0140)	(0.0139)	(0.0041)	(0.0046)	(0.0031)	(0.0031)	(0.0032)
Age 35–44	−0.392***	−0.585***	−0.367***	0.026***	−0.050***	0.001	0.005	−0.068***
	(0.0128)	(0.0157)	(0.0154)	(0.0043)	(0.0040)	(0.0037)	(0.0030)	(0.0038)
Age 45–54	−0.474***	−0.912***	−0.649***	0.026***	−0.098***	0.012***	−0.016***	−0.108***
	(0.0151)	(0.0155)	(0.0163)	(0.0045)	(0.0043)	(0.0036)	(0.0031)	(0.0040)
Age 55–64	−0.390***	−1.330***	−1.114***	−0.015***	−0.172***	0.025***	−0.040***	−0.118***
	(0.0147)	(0.0194)	(0.0201)	(0.0040)	(0.0041)	(0.0039)	(0.0033)	(0.0037)
Age 65+	−0.106***	−1.794***	−1.735***	−0.100***	−0.283***	0.054***	−0.062***	−0.077***
	(0.0149)	(0.0221)	(0.0207)	(0.0042)	(0.0043)	(0.0036)	(0.0032)	(0.0041)
(Black)*(Age 25–34)	0.117***	0.095***	0.030	0.005	−0.000	−0.004	−0.026***	−0.015
	(0.0302)	(0.0263)	(0.0249)	(0.0073)	(0.0075)	(0.0067)	(0.0068)	(0.0102)
(Black)*(Age 35–44)	0.236***	0.270***	0.140***	−0.015**	0.009	0.007	−0.044***	0.000
	(0.0344)	(0.0300)	(0.0265)	(0.0072)	(0.0072)	(0.0073)	(0.0070)	(0.0095)
(Black)*(Age 45–54)	0.520***	0.446***	0.158***	−0.051***	0.006	0.035***	−0.057***	0.026***
	(0.0313)	(0.0310)	(0.0292)	(0.0068)	(0.0071)	(0.0075)	(0.0070)	(0.0092)
(Black)*(Age 55–64)	0.478***	0.467***	0.201***	−0.044***	0.031***	0.054***	−0.061***	0.053***
	(0.0335)	(0.0313)	(0.0310)	(0.0068)	(0.0075)	(0.0071)	(0.0075)	(0.0104)
(Black)*(Age 65+)	0.376***	0.350***	0.142***	−0.014*	0.074***	0.056***	−0.065***	0.009
	(0.0392)	(0.0355)	(0.0343)	(0.0070)	(0.0081)	(0.0074)	(0.0072)	(0.0112)

Table 3 (continued)

Variables	(1) OLS: bpl Full set of controls (196 MSAs)	(2) OLS: bpla Full set of controls (196 MSAs)	(3) OLS: bpla Full set of controls + bpl control (196 MSAs)	(4) OLS: worry Full set of controls (196 MSAs)	(5) OLS: stress Full set of controls (196 MSAs)	(6) OLS: citysat Full set of controls (196 MSAs)	(7) OLS: anger Full set of controls (196 MSAs)	(8) OLS: social support Full set of controls (200 MSAs)
Observations	70,899	770,899	770,899	770,899	770,899	770,899	608,787	347,080
R-squared	0.175	0.165	0.367	0.129	0.130	0.064	0.062	0.109
MSA dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Clustered standard errors (at the MSA level) in parentheses

***$p < 0.01$; **$p < 0.05$; *$p < 0.1$

Note: These regressions include the 196 MSAs for which sampling weights were available at least in 1 year, except for Social support, where 200 MSAs were available. All specifications use the 2010–2015 period, except for anger (2010–2013) and social support (2008–2012). The remaining race-age interactions, as well as the individual-level controls from Table 2 with the exception of race-income interactions, were included but are not displayed

3.2 Discussion

There are many potential explanations for these findings. Poor whites have fallen in status in relative terms, as competition for low-skilled jobs has intensified. In contrast, minorities have made gradual, hard-fought progress, although many challenges remain. Black-white wage and education gaps have narrowed. Black males earned 69% of the median wage for white males in 1970 and 75% by 2013. While the gaps in educational achievement and proficiency have widened across *income* groups, they have narrowed between blacks (and Hispanics) and whites, with the former becoming larger than the latter (Porter 2015; Reardon and Portilla 2015).

Gaps in life expectancy between blacks and whites have also narrowed, from 7.0 years in 1990 to 3.4 in 2014 (Tavernise 2016; Case and Deaton 2017). Blanchflower and Oswald (2004) showed a closing in the historical black-white happiness gap. Oswald and Wu (2011) use mid-2000s data and find that blacks reported fewer bad mental health days than whites.

Assari and Lankarani (2016, cited above) highlight higher levels of resilience among blacks and other minorities. Resilience—defined as maintaining health in spite of a range of psychosocial risk factors——may be higher among blacks and minorities as they have had more experience with adversity. Community and religious factors may also be at play; in our data, blacks are the most likely group to report that religion is important in their lives. Other accounts of the role of religion and community in African Americans' lives (Jackson 2015; Ryff 2015) corroborate this. While we control for religion in our analysis, it is plausible that it also affects optimism in ways that we cannot observe.

Another sign of differential resilience is the higher level of optimism of older blacks, among older respondents (cited above). In general, older respondents are less optimistic about their future life satisfaction, which makes objective sense if respondents are predicting health and other troubles to increase with age (Graham 2017). Schwandt (2016) found that younger respondents tend to overestimate their future life satisfaction, while older ones underestimate it, but in our data that is less the case for older blacks.

There are two other plausible explanations for the higher levels of black optimism compared to whites, neither of which appear to be supported by the data. One is that black optimism levels are a result of the raised hope associated with the election and two-term tenure of the first African American president. Yet the time trends—including from other data sets—do not support this. Black life satisfaction began to increase steadily in the 1970s, decades before President Obama's time. In addition, black life satisfaction *and* optimism for the future remained steady throughout his tenure, including through ups and downs, and the conclusion of his tenure.[19]

Another potential explanation is that poor black optimism is simply a "polyanna" or "happy peasant and frustrated achiever" effect, associated with low expectations and/or

[19] While we find a sharp drop in the life satisfaction and optimism of Democrats and Independents in weeks following the 2016 election, a partial recovery seems to be underway by the end of the year (https://www.brookings.edu/blog/up-front/2017/02/02/the-trump-unhappiness-effect-nears-the-great-recession-for-many/). We do not yet have the data to test if there is a longer-term negative effect of trends since then—and plan to do so going forward. The evidence above, though, suggests that this is not a finding that is explained by short-term events.

adaptation to adversity.[20] Yet the available evidence—including the psychological and sociological studies cited above and recent historical work (Isenberg 2016)—suggests otherwise, highlighting resilience and determination rather than low expectations. A review of our work by Blanchflower and Oswald (2018), meanwhile, contrasts rising black happiness levels with a flat trend in blacks' financial satisfaction. Similarly, in the regressions reported above, we find that the same poor optimistic black respondents are far less satisfied with their place of living than are poor whites. These results do not support the "polyanna" interpretation nor suggest that poor blacks have a different conception of happiness than do their Hispanic or white counterparts.

These trends contrast sharply with the experiences of working class whites. Krugman (2015) noted that the economic setbacks of this group have been particularly bad because they expected better: "We're looking at people who were raised to believe in the American Dream, and are coping badly with its failure to come true." A recent study by Cherlin (2016) found that poor and middle-class blacks are more likely to compare themselves to parents who were worse off than they are, while blue-collar whites have more precarious lives and employment than their parents did. Not coincidentally, this latter group formed the base of support for Donald Trump's populist, anti-establishment electoral campaign.

Chetty et al. (2016) found that, beyond income, there are also strong geographic markers associated with these trends. Mortality rates and the associated behaviors are particularly prevalent in rural areas in the Midwest and much less in cities. This could be due to healthier behaviors associated with living in cities (e.g., more walking) and to the combination of social isolation and economic stagnation in rural areas. Krugman (2015) also noted the regional dimension to these trends: life expectancy is high and rising in the Northeast and California, where social benefits are highest and traditional values weakest, while low and stagnant life expectancy is concentrated in the Bible belt.

3.3 Alternative specifications across race and rural areas

We explored whether there were differences in our race and optimism findings among poor individuals in rural versus urban areas. To do this, we used only poor respondents but no longer restricted our sample to respondents living in MSAs, instead including both those living in counties belonging to micropolitan areas and those living in smaller counties.[21] We again modify Eq. (1) and now use race by urban/rural status interactions. Table 4 shows that poor rural blacks are modestly less optimistic than their urban counterparts. Similarly, poor rural whites are also less optimistic than their poor urban counterparts.

We then focused only on whites and explored income by urban/rural status. Table 5 shows the income gradient that might be expected, with richer individuals generally being more likely to report higher life satisfaction, optimism, satisfaction with place of living (only in urban areas), and social support, and less likely to report worry and anger. However, rural respondents across income groups report higher life satisfaction

[20] Graham and Pettinato (2002) coined the term "happy peasants and frustrated achievers" to describe such optimistic poor individuals in many poor countries over a decade ago.
[21] These use national-level, rather than MSA-level, survey weights.

Table 4 Race and urban-rural heterogeneities (2010–2015)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	OLS: bpl	OLS: bpla	OLS: bpla	OLS: worry	OLS: stress	OLS: citysat	OLS: anger	OLS: social support
Variables	Full set of controls	Full set of controls	Full set of controls + bpl control	Full set of controls	Full set of controls	Full set of controls	Full set of controls	Full set of controls
Rural	−0.008	−0.146***	−0.142***	−0.010***	−0.017***	−0.012***	−0.011***	0.009**
	(0.0166)	(0.0158)	(0.0146)	(0.0034)	(0.0040)	(0.0043)	(0.0025)	(0.0042)
Black	0.458***	0.801***	0.569***	−0.088***	−0.129***	−0.078***	0.007*	−0.046***
	(0.0254)	(0.0239)	(0.0228)	(0.0054)	(0.0046)	(0.0065)	(0.0034)	(0.0064)
Hispanic	0.478***	0.054	−0.188***	−0.001	−0.084***	0.018***	0.019***	−0.059***
	(0.0173)	(0.0368)	(0.0370)	(0.0058)	(0.0040)	(0.0053)	(0.0046)	(0.0090)
Asian	0.133***	−0.128***	−0.195***	0.014	−0.022**	0.005	−0.006	−0.039***
	(0.0328)	(0.0441)	(0.0401)	(0.0122)	(0.0097)	(0.0081)	(0.0081)	(0.0103)
Other race	0.240***	0.157***	0.036	−0.013	−0.054***	−0.039***	0.020**	−0.070***
	(0.0449)	(0.0374)	(0.0346)	(0.0077)	(0.0065)	(0.0127)	(0.0080)	(0.0129)
(Rural)*(Black)	0.132***	0.000	−0.067*	0.000	0.011	−0.006	−0.001	−0.002
	(0.0401)	(0.0435)	(0.0381)	(0.0092)	(0.0110)	(0.0071)	(0.0092)	(0.0125)
(Rural)*(Hispanic)	−0.101*	0.134***	0.186***	−0.004	0.004	0.007	0.001	0.026
	(0.0584)	(0.0459)	(0.0581)	(0.0100)	(0.0113)	(0.0089)	(0.0081)	(0.0163)
(Rural)*(Asian)	0.246	0.439***	0.315***	−0.045	−0.010	−0.026	0.030	0.002
	(0.1848)	(0.1530)	(0.1149)	(0.0368)	(0.0328)	(0.0361)	(0.0348)	(0.0455)
(Rural)*(Other race)	−0.087	0.030	0.073	0.001	0.002	−0.017	0.002	0.045**
	(0.0941)	(0.0749)	(0.0576)	(0.0197)	(0.0152)	(0.0143)	(0.0130)	(0.0194)
Constant	7.219***	8.665***	5.017***	0.271***	0.494***	0.888***	0.121***	1.026***
	(0.0436)	(0.0388)	(0.0465)	(0.0067)	(0.0077)	(0.0083)	(0.0068)	(0.0091)

Table 4 (continued)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	OLS: bpl	OLS: bpla	OLS: bpla	OLS: worry	OLS: stress	OLS: citysat	OLS: anger	OLS: social support
Variables	Full set of controls	Full set of controls	Full set of controls + bpl control	Full set of controls	Full set of controls	Full set of controls	Full set of controls	Full set of controls
Observations	225,576	225,576	225,576	225,576	225,576	225,576	177,294	104,326
R-squared	0.155	0.194	0.363	0.186	0.200	0.076	0.085	0.128
State dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Clustered standard errors (at the state level) in parentheses

***$p < 0.01$; **$p < 0.05$; *$p < 0.1$

Note: These regressions include only poor individuals. The remaining individual-level controls that were used for Table 2 were also used, but are not displayed

and lower incidence of worry, stress, and anger than urban ones (although they are still less optimistic about the future and exhibit lower satisfaction with their place of living).

4 Do desperation and premature mortality go together? An initial exploration

The mortality data and our well-being metrics highlight a paradox of higher well-being and improving health among minorities juxtaposed against the opposite trend among uneducated whites. Here we explore the extent to which our markers of well and ill-being have a statistically robust association with the trends in mortality. We matched our metrics of well-being from the GH—using the same individual level data as in Table 2—with MSA-level mortality data from the CDC, along with some other MSA-level controls.

For mortality rates, we rely on 2010–2015 data from the CDC Compressed Mortality File.[22] We compute a MSA-level composite mortality measure using the causes of death that Case and Deaton (2015a) identified as being key drivers of the change. We use the classifications as defined by the International Statistical Classification of Diseases and Related Health Problems 10th Revision codes (ICD 10):

a) intentional self-harm (ICD10 codes X60-X84) and sequelae of intentional self-harm, assault and events of undetermined intent (Y87);
b) alcoholic liver disease (K70), chronic hepatitis, not elsewhere classified (K73), and fibrosis and cirrhosis of liver (K74);
c) multiple types of accidental poisoning (X40–45);
d) multiple types of poisoning with undetermined intent (Y10–15);
e) analgesics, antipyretics and anti-inflammatory drugs (Y45), sedatives, hypnotics and antianxiety drugs (Y47), and psychotropic drugs, not elsewhere classified (Y49).

We take into account all individuals aged 35–64 years old, and subsequent references to mortality rates in this section refer to this measure.[23] The mortality rate varies across MSAs from 27 to 151 deaths per 100,000 people (with a mean of 56) and tends to decrease with MSA size.

We use the ACS to obtain MSA-level measures for mean household income and inequality (as measured by the Gini coefficient). These variables allow us to account for possible correlations between income, inequality, and mortality. For instance, if higher mortality MSAs are also those with lowest average incomes and/or higher inequality levels, then our mortality variable might simply be picking up the effects of low income or high inequality. Finally, we use the SEER for MSA-level population statistics, broken down by race groups, and use the share of white non-Hispanics as a proxy for (lack of) racial diversity.

[22] National Center for Health Statistics. Compressed Mortality File, 2008–2015 (CD-ROM Series 20, No. 2 U) Vital Statistics Cooperative Program. Hyattsville, Maryland. 2016.
[23] The three decades considered (35–44, 45–54, 55–64) all had similar "composite" mortality rates.

Table 5 Income and rural-urban heterogeneities (2010–2015)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	OLS: bpl	OLS: bpla	OLS: bpla	OLS: worry	OLS: stress	OLS: citysat	OLS: anger	OLS: social support
Variables	Full set of controls	Full set of controls	Full set of controls + bpl control	Full set of controls	Full set of controls	Full set of controls	Full set of controls	Full set of controls
Rural	0.046***	−0.056***	−0.084***	−0.015***	−0.020***	−0.010***	−0.011***	0.005***
	(0.0071)	(0.0087)	(0.0085)	(0.0021)	(0.0022)	(0.0024)	(0.0015)	(0.0016)
Poor household	−0.287***	−0.192***	−0.016	0.028***	0.020***	−0.019***	0.006***	−0.022***
	(0.0131)	(0.0112)	(0.0103)	(0.0022)	(0.0022)	(0.0018)	(0.0018)	(0.0027)
Rich household	0.368***	0.257***	0.031***	−0.003*	0.016***	0.022***	0.001	0.007***
	(0.0056)	(0.0069)	(0.0070)	(0.0015)	(0.0022)	(0.0018)	(0.0016)	(0.0014)
(Rural)*(Poor household)	−0.034**	−0.095***	−0.074***	0.006	0.005	0.001	0.002	0.003
	(0.0168)	(0.0152)	(0.0152)	(0.0039)	(0.0046)	(0.0028)	(0.0029)	(0.0045)
(Rural)*(Rich household)	−0.017	0.038*	0.048**	−0.000	−0.014**	−0.020***	0.007*	−0.011**
	(0.0175)	(0.0214)	(0.0196)	(0.0041)	(0.0054)	(0.0033)	(0.0041)	(0.0041)
Constant	7.896***	9.009***	4.154***	0.258***	0.511***	0.907***	0.107***	1.044***
	(0.0171)	(0.0240)	(0.0333)	(0.0041)	(0.0034)	(0.0053)	(0.0029)	(0.0046)
Observations	926,901	926,901	926,901	926,901	926,901	926,901	721,240	408,110
R-squared	0.202	0.168	0.390	0.133	0.138	0.053	0.059	0.099
State dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Clustered standard errors (at the state level) in parentheses

***$p < 0.01$; **$p < 0.05$; *$p < 0.1$

Note: These regressions include only white non-hispanic individuals. The remaining individual-level controls that were used for Table 2 were also used, but are not displayed

We found that MSA-level mortality rates for 35–64-year-olds are significantly and negatively associated with current and future expected life satisfaction, and positively associated with feelings of worry (Table 6). For instance, holding all else constant, a 50% increase in a MSA's composite mortality rate—a relatively small change for the range of rates indicated in earlier paragraphs—would be associated with a .04 point decrease in expected future life satisfaction, a 0.45% decrease relative to its mean.[24] A similar increase would be associated with a 1 percentage point increase in the incidence of worry, a 3.14% increase relative to its mean.

We also ran the same regression as that of Table 6, but omitting all health-related variables, and the coefficient estimates increased their magnitude.[25] This is precisely what we would expect if the mortality level is negatively associated with both subjective well-being and self-reported health.

Individuals who live in more racially homogeneous MSAs are more likely to have lower life satisfaction and lower satisfaction with the place of living.[26] This complements the general pattern of premature mortality rates being higher—and subjective well-being markers being lower—among whites compared to minorities.

These are associations, of course, and we cannot assume causality. Indeed, one can imagine dual directions. Having less hope about the future could increase one's likelihood of premature death (e.g., via under-investment in one's health and/or via simply giving up); at the same time, living with more premature death in one's locale could dampen hope and increase worry and other markers of ill-being. Even without causality, the association between our metrics of ill-being and these "deaths of despair" suggests that they could play a leading role in highlighting desperation among certain cohorts or in certain places rather than waiting for rising death rates to sound the alarm bells.

5 Interrelated trends and explanations

There are several other trends in the data that suggest a pattern of interrelated explanations. Our baseline regressions include a variable measuring reported pain, which Case and Deaton (2015b) found to correlate with suicide rates. Pain, not surprisingly, positively correlates with stress and worry and is highest in middle-aged years, precisely when life satisfaction is lowest (and when the mortality rate increases among uneducated whites are highest). Individuals who experience pain have a decrease in expected future life satisfaction of .33 points (Table 2) or .15 standard deviations. The magnitudes on stress, worry, and anger are larger: individuals that experience pain are 18 percentage points more likely to report both worry and stress and 11 percentage points more likely to report anger. Reported pain for poor whites is also higher in rural areas than in MSAs (Fig. 3).

[24] The calculation is: $\exp(-0.087 * log(1.50))$. The log represents a 50% increase and $(log(1.50) = 0.40547)$; the product equals approximately − 0.04. The mean optimism or expected future life satisfaction is 7.86, so the change above corresponds to approximately 0.5% of this mean value.

[25] Regression results available from the authors.

[26] This is not the case in Table 6, but is indeed the case when using a logit estimation framework (see Appendix 3).

Table 6 Race-income heterogeneities, with MSA-level variables (2010–2015)

Variables	(1) OLS: bpl Full set of controls (194 MSAs)	(2) OLS: bpla Full set of controls (194 MSAs)	(3) OLS: bpla Full set of controls + bpl control (194 MSAs)	(4) OLS: worry Full set of controls (194 MSAs)	(5) OLS: stress Full set of controls (194 MSAs)	(6) OLS: citysat Full set of controls (194 MSAs)	(7) OLS: anger Full set of controls (194 MSAs)	(8) OLS: social support Full set of controls (198 MSAs)
Reported life satisfaction today (0–10)			0.555*** (0.0042)					
Log(Gini Index)	−0.159 (0.2248)	0.152 (0.2710)	0.241 (0.2301)	0.027 (0.0592)	−0.038 (0.0590)	−0.101** (0.0484)	−0.050 (0.0587)	0.113* (0.0591)
Log(mean MSA household income)	0.030 (0.1688)	0.248 (0.1643)	0.231 (0.1442)	0.085** (0.0411)	0.038 (0.0389)	−0.020 (0.0386)	−0.003 (0.0439)	−0.021 (0.0414)
Log(MSA composite death rate per 100,000 people, all races, 35–64)	−0.078* (0.0404)	−0.087** (0.0396)	−0.044 (0.0353)	0.025*** (0.0094)	0.007 (0.0090)	−0.006 (0.0097)	−0.001 (0.0101)	−0.013 (0.0102)
Log(White non-Hispanic share of population (%), MSA-level)	−0.808** (0.3793)	−0.176 (0.2530)	0.272 (0.2889)	0.010 (0.0966)	0.056 (0.0898)	−0.126 (0.0793)	0.139 (0.1351)	0.095 (0.1456)
Poor household	−0.334*** (0.0107)	−0.225*** (0.0113)	−0.040*** (0.0100)	0.029*** (0.0025)	0.017*** (0.0026)	−0.018*** (0.0023)	−0.001 (0.0023)	−0.025*** (0.0028)
Rich household	0.398*** (0.0073)	0.275*** (0.0079)	0.054*** (0.0069)	−0.007*** (0.0020)	0.015*** (0.0024)	0.017*** (0.0018)	0.002 (0.0017)	0.008*** (0.0019)
Black	0.171*** (0.0133)	0.643*** (0.0146)	0.548*** (0.0127)	−0.083*** (0.0035)	−0.131*** (0.0040)	−0.052*** (0.0069)	−0.006** (0.0029)	−0.029*** (0.0040)
Hispanic	0.244*** (0.0141)	0.278*** (0.0170)	0.142*** (0.0167)	−0.021*** (0.0048)	−0.085*** (0.0045)	0.004 (0.0040)	−0.005* (0.0028)	−0.019*** (0.0044)

Table 6 (continued)

Variables	(1) OLS: bpl Full set of controls (194 MSAs)	(2) OLS: bpla Full set of controls (194 MSAs)	(3) OLS: bpla Full set of controls + bpl control (194 MSAs)	(4) OLS: worry Full set of controls (194 MSAs)	(5) OLS: stress Full set of controls (194 MSAs)	(6) OLS: citysat Full set of controls (194 MSAs)	(7) OLS: anger Full set of controls (194 MSAs)	(8) OLS: social support Full set of controls (198 MSAs)
Asian	−0.078*** (0.0204)	−0.167*** (0.0277)	−0.123*** (0.0205)	−0.002 (0.0063)	−0.056*** (0.0055)	0.013*** (0.0043)	−0.007 (0.0045)	−0.042*** (0.0071)
Other race	0.094*** (0.0233)	0.163*** (0.0238)	0.111*** (0.0232)	−0.020*** (0.0053)	−0.060*** (0.0063)	−0.025*** (0.0057)	0.008 (0.0050)	−0.038*** (0.0064)
(Rich household)*(Black)	−0.217*** (0.0257)	−0.217*** (0.0237)	−0.096*** (0.0222)	0.006 (0.0067)	−0.002 (0.0066)	0.019*** (0.0045)	−0.001 (0.0055)	−0.007 (0.0088)
(Rich household)*(Hispanic)	−0.174*** (0.0258)	−0.149*** (0.0282)	−0.052** (0.0236)	0.026*** (0.0078)	0.042*** (0.0052)	0.002 (0.0073)	0.018** (0.0073)	0.007
(Rich household)*(Asian)	−0.113*** (0.0326)	−0.035 (0.0350)	0.028 (0.0258)	−0.003 (0.0089)	0.010 (0.0102)	0.003 (0.0049)	0.004 (0.0069)	−0.018** (0.0091)
(Rich household)*(Other race)	−0.077* (0.0445)	−0.177*** (0.0506)	−0.134*** (0.0475)	0.010 (0.0136)	0.011 (0.0141)	−0.002 (0.0109)	0.013 (0.0106)	−0.014 (0.0139)
(Poor household)*(Black)	0.382*** (0.0227)	0.260*** (0.0214)	0.048** (0.0220)	−0.014*** (0.0051)	−0.007* (0.0040)	−0.023*** (0.0051)	0.008* (0.0045)	−0.015** (0.0067)
(Poor household)*(Hispanic)	0.284*** (0.0184)	−0.136*** (0.0282)	−0.294*** (0.0267)	−0.000 (0.0049)	−0.020*** (0.0056)	0.019*** (0.0046)	0.026*** (0.0049)	−0.035*** (0.0079)
(Poor household)*(Asian)	0.214*** (0.0390)	0.150*** (0.0413)	0.031 (0.0363)	0.008 (0.0120)	0.017 (0.0127)	−0.014 (0.0092)	0.007 (0.0103)	0.001 (0.0130)
(Poor household)*(Other race)	0.155*** (0.0502)	0.102* (0.0541)	0.016 (0.0461)	−0.001 (0.0105)	0.009 (0.0110)	−0.022** (0.0106)	0.024** (0.0102)	−0.031** (0.0133)

Table 6 (continued)

Variables	(1) OLS: bpl Full set of controls (194 MSAs)	(2) OLS: bpla Full set of controls (194 MSAs)	(3) OLS: bpla Full set of controls + bpl control (194 MSAs)	(4) OLS: worry Full set of controls (194 MSAs)	(5) OLS: stress Full set of controls (194 MSAs)	(6) OLS: citysat Full set of controls (194 MSAs)	(7) OLS: anger Full set of controls (194 MSAs)	(8) OLS: social support Full set of controls (198 MSAs)
Observations	768,810	768,810	768,810	768,810	768,810	768,810	606,699	345,631
R-squared	0.175	0.165	0.367	0.129	0.130	0.064	0.062	0.109
MSA dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Clustered standard errors (at MSA-level) in parentheses

***$p < 0.01$; **$p < 0.05$; *$p < 0.1$

These regressions include all the MSAs for which sampling weights and death rates were available at least in 1 year. The individual-level controls from Table 2 are not displayed (except those related to race and income) but were included

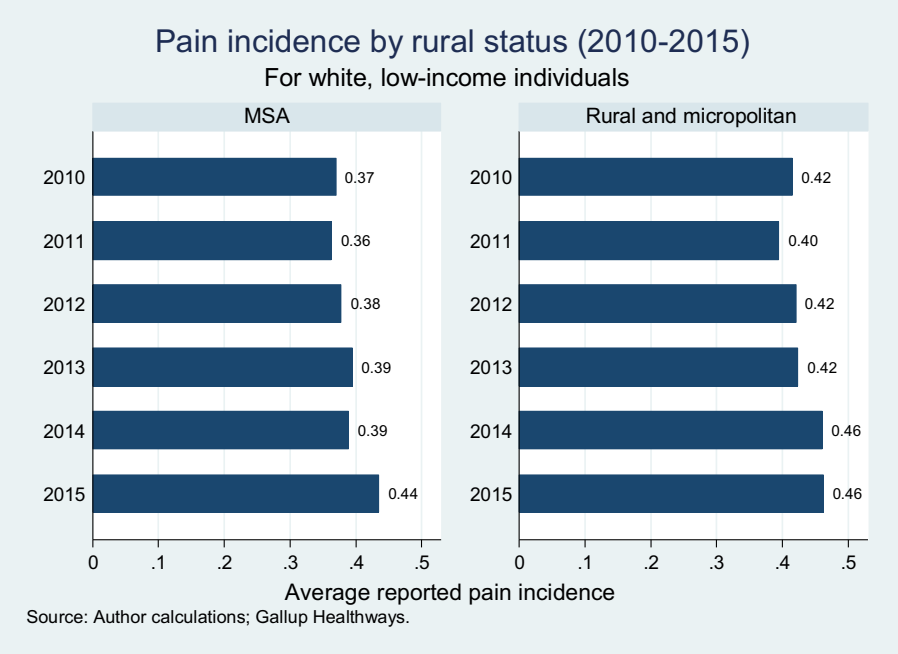

Fig. 3 Pain incidence by rural status, for low income, white individuals

In addition to pain—and possibly related to it—, the reliance on disability insurance increased over the past two decades, from under 3% of the working age population to almost 5% for men, and from 1.3 to 4.5% for women.[27] While it is concentrated in former coal mining regions, it extends beyond them and roughly patterns the reported pain data in GH. While disability insurance provides an important and often lifelong safety net for many, it also introduces additional barriers to labor force participation. Potential recipients cannot participate in the labor force during the wait time for approval for disability, a period that can last up to 2 years.[28] Long-term unemployment is strongly associated with unhappiness and is a condition that most individuals do not adapt back from (Clark and Oswald 1994; Clark 2006).

Another trend which may help explain the lack of optimism we find is that of prime age (25–54 year old) males dropping out of the labor force, with projections from 15% today to 25% in 2050 (Eberstadt 2016). Krueger (2017) finds that between 25 and 35% of prime age males out of the labor force are on SSDI and that another 30% applied in the past and may be awaiting a decision. Yet the rise in SSDI is concentrated among 55–64-year-olds, while the post-2000 decrease in participation rates is highest among younger cohorts (Ruffing 2017). Demand-driven factors (e.g., declining labor market opportunities, lack of active job search and training assistance, high incarceration rates) are also important (Black et al. 2016).

Another issue is the difficulty of moving to new places to seek jobs. Moving rates declined in the years surrounding the financial crisis, and a common explanation was

[27] Social Security Advisory Board: http://www.ssab.gov/Disability-Chart-Book. These are not age-adjusted numbers.

[28] We thank Henry Aaron for raising this.

the decline in the housing market. Demyank et al. (2017) found that those that are unemployed *and* that have negative equity are more likely to move. Yet, this hinges on their ability to foreclose on their mortgages and on being in a position to find jobs elsewhere. The common traits of prime age blue-collar workers who have dropped out of the labor force are not associated with a strong possibility of finding employment in another location (Krueger 2017).

A potentially reinforcing factor in this cycle is that these same cohorts, who are disproportionately in remote rural areas, are less likely to have a range of social connections outside their locales or broadband internet. A recent study found that the majority of rural youth live in "Civic Deserts"—places characterized by a dearth of opportunities for civic and political engagement. The limited access to broadband internet limits both social connections and information about jobs outside their immediate area (Kei-Kawashima-Ginsberg and Sullivan 2017).[29]

5.1 The role of place

In addition to the trends discussed above, there are unobservable differences across places that make it more (or less) likely that particular demographic cohorts are happy, optimistic, and healthy. In the maps below (Fig. 4), we show patterns across states in life satisfaction, optimism, and worry—the three variables that are most closely associated with premature mortality in our regressions above—for non-Hispanic whites and for minorities,[30] respectively (patterns in stress and reported pain are in Appendix 4).

To explore the place-specific patterns, we ran a standard regression with the well-being variable of interest as the dependent variable, and again for simplicity of interpretation we use OLS. We control for socio-demographic variables such as age, gender, race, marital status, education, employment status, religiosity, and use month and year of interview dummies.[31] We also include state-specific identifiers. We then rank the states by the estimated coefficients on these identifiers; these values represent the left over differences specific to states that different levels of education, employment status, and so forth, *do not account for*.

For each map, the comparison is relative to the state with the lowest coefficient. For life satisfaction and optimism, we kept the original 0–10 scale. For worry, we rescaled the state coefficients into a 0–100 scale, so that state-level variations can be comparable to percentage point increases. For life satisfaction and optimism, higher values are better, while for worry lower values are better. The colors on the maps reflect what range of values specific states are in for each race group, with dark green being a higher score and light green a lower one, so that dark green states are better for life satisfaction and optimism, but worse for worry. States that are coded gray do not have sufficient observations to allow an estimate for the race group and variable of interest.[32] The

[29] For the distribution of broadband, see: https://www.broadbandmap.gov/technology.
[30] In this case, minorities comprise only African Americans and Hispanics.
[31] We omitted income variables as otherwise state dummies would disproportionately pick up the disadvantageous state-level aspects, such as higher costs of living (Oswald and Wu 2011).
[32] We excluded states with less than 50 observations/year for the group in question.

boxplots in Appendix 4 display the dispersion in state coefficients, for each variable, across whites and minorities.

Our geographic analysis yields many patterns that are consistent with those reported in other kinds of data—and in our earlier work. As the maps show, the best places in terms of optimism for minorities, except for the District of Columbia, are the Southern states, where there are proportionately more minorities and a well-established African American culture (although at the same time worse objective health and poverty conditions). The patterns are quite different for non-Hispanic whites. The most optimistic states for this group are Hawaii, Alaska, California, Delaware, Texas, Florida, and Arizona. The most desperate states are in Appalachia and the Midwest, mirroring the patterns in poor health and lack of employment for these same cohorts.

The subtle differences across place are difficult to quantify. There are factors, such as historical levels of segregation, which tend to vary at more disaggregated levels such as counties (Andrews et al. 2017), which we have not explored here, but hope to in future research, as there is much more to understand about these trends—including the specifics of place.

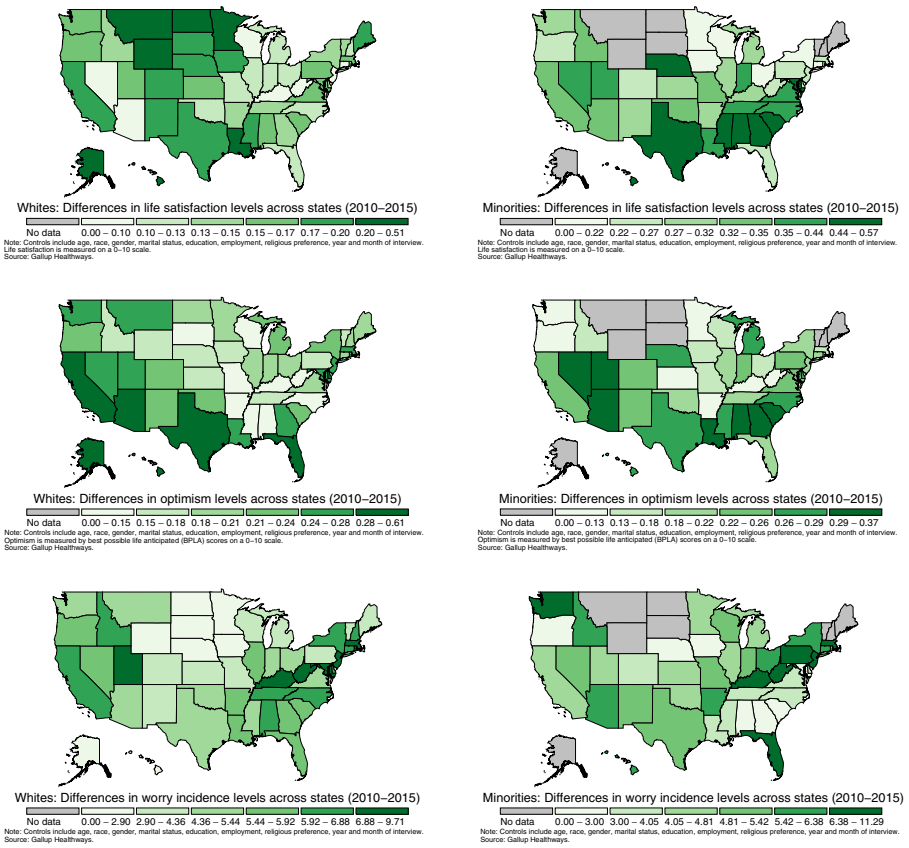

Fig. 4 The geography of life satisfaction, optimism, and worry

6 Conclusions and potential policies

Our findings identified linkages between markers of reported ill-being, such as lack of hope, high levels of stress, and reported pain, and the rising rates of mortality among uneducated whites. These markers stand in sharp contrast to much higher levels of life satisfaction and hope for the future and lower levels of stress among poor blacks and Hispanics, who are continuing to make gradual progress in narrowing gaps in life expectancy with whites. Our findings are strong associations, but we cannot claim causality.

Our findings also suggest a role for place. MSAs that are more racially homogeneous (white) and rural, and have more social isolation are more likely to have higher mortality rates. They also tend to have worse health behaviors, such as smoking prevalence and a lack of physical activity. Respondents in these areas are also more likely to report pain, which is a channel to suicide. The combination of fear of downward mobility, weak safety nets, and eroding social cohesion likely contributes to the high levels of desperation that we have found. In contrast, places with more diversity and higher concentrations of minorities—and likely their shared cultures and extensive informal safety nets as well—tend to be the most optimistic.

While our results suggest a need to restore hope and sense of purpose to places characterized by desperation and premature death, it is not obvious how to do so. One component (of many) should include a major effort to introduce healthier behaviors. One part of this will entail taking on the role of prescription practices in generating the excess supply of opioids.[33]

Our safety nets, meanwhile, are notoriously weak compared to other rich countries, and their reach is uneven across states. With the exception of disability insurance, they are also very weak for those out of the labor force (Trisi 2016a, b). While the Earned Income Tax Credit (EITC) is an effective program for working families, it is far less so for those unable to find work or out of the labor force. A related challenge is the strong anti-government sentiment among uneducated whites, which makes designing effective policies difficult. Much of the US political dialog stigmatizes recipients of welfare assistance and the bureaucracies are particularly difficult to navigate. Not by coincidence, the efficient bureaucracies that administer universal programs like social security and Medicare are distinctly different, and many recipients are not aware they are on government programs.[34]

The same places with hollowed out labor forces and high deaths of despair tend to have low rates of internet access and are more likely to be "civic deserts", at a time that the internet is an increasingly important means for access to safety net programs and other community outreach efforts. Building up communities, meanwhile, is a related challenge. There are many relevant lessons in the rich literature on well-being, which highlight the benefits of volunteering and participating in other community level activities, particularly for those out of the labor force.[35]

There are, no doubt, other possible solutions, many of which are long-term in nature, including improvements in public education, vocational training, and relocation incentives. Importantly, while the starkest trends in terms of lack of hope and mortality

[33] The U.S. has the world's highest per capita consumption of opioids: http://www.painpolicy.wisc.edu/country/profile/united-states-america.

[34] 40% of Medicare recipients are unaware of being on a government program (Kuziemko et al. 2015).

[35] See, e.g., https://www.whatworkswellbeing.org/ .

incidence are among poor whites, policies directed at improving opportunities and well-being must also focus on poor minorities, who despite higher levels of resilience, continue to face real disadvantages are real.

A first step is to get a better handle on the causes of the problem. This must entail listening to what desperate people themselves have to say, as well as learning from those who have shown more resilience when coping with crisis. Well-being metrics can play a role, for example by undertaking regular polling to gauge life satisfaction, optimism, pain, stress, and worry across people and places. Countries such as the UK are already collecting these metrics. Reporting on the patterns and trends regularly in public and policy discussions would be a simple and inexpensive way to monitor the well-being and ill-being of our society. It certainly seems a better path than waiting for mortality rates to sound the alarm bells.

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Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

Appendix 1 Race-income heterogeneities by year

Table 7 Base specification, but with yearly regressions (2010–2015)

	(1) OLS: bpl	(2) OLS: bpla	(3) OLS: bpla w/ bpl control	(4) OLS: worry	(15) OLS: stress	(6) OLS: citysat	(7) OLS: anger
Panel A: 2010							
Black	0.191***	0.671***	0.569***	− 0.093***	− 0.139***	− 0.050***	− 0.011
	(0.030)	(0.028)	(0.023)	(0.007)	(0.008)	(0.008)	(0.007)
(Rich household)*(Black)	− 0.093	− 0.091	− 0.041	0.021	0.007	0.044***	− 0.019
	(0.057)	(0.057)	(0.050)	(0.017)	(0.021)	(0.014)	(0.013)
(Poor household)*(Black)	0.443***	0.266***	0.029	− 0.008	− 0.003	− 0.019*	0.002
	(0.059)	(0.050)	(0.053)	(0.011)	(0.011)	(0.010)	(0.010)
Panel B: 2011							
Black	0.170***	0.638***	0.543***	− 0.075***	− 0.125***	− 0.051***	− 0.009**
	(0.025)	(0.025)	(0.023)	(0.006)	(0.006)	(0.009)	(0.004)
(Rich household)*(Black)	− 0217***	− 0.193***	− 0.072	− 0.006	− 0.002	− 0.006	− 0.001
	(0.061)	(0.046)	(0.046)	(0.018)	(0.020)	(0.011)	(0.012)
(Poor household)*(Black)	0.318***	0.262***	0.084*	− 0.036***	− 0.019**	− 0.025***	0.012
	(0.043)	(0.048)	(0.047)	(0.011)	(0.009)	(0.010)	(0.008)
Panel C: 2012							
Black	0.309***	0.728***	0.556***	− 0.093***	− 0.144***	− 0.047***	− 0.005
	(0.022)	(0.022)	(0.022)	(0.005)	(0.007)	(0.008)	(0.004)
(Rich household)*(Black)	− 0.257***	− 0248***	− 0.105**	− 0.012	− 0.014	0.009	0.009
	(0.059)	(0.052)	(0.046)	(0.011)	(0.013)	(0.009)	(0.011)
(Poor household)*(Black)	0.290***	0.185***	0.024	0.009	0.006	− 0.025***	0.013*
	(0.042)	(0.052)	(0.048)	(0.009)	(0.009)	(0.009)	(0.008)
Panel D: 2013							
Black	0.089***	0.639***	0.588***	− 0.087***	− 0.115***	− 0.055***	0.006
	(0.032)	(0.040)	(0.034)	(0.006)	(0.008)	(0.011)	(0.007)
(Rich household)*(Black)	− 0329***	− 0403***	− 0.216***	0.040**	− 0.008	0.023	− 0.001
	(0.081)	(0.071)	(0.065)	(0.017)	(0.025)	(0.017)	(0.012)
(Poor household)*(Black)	0.38***	0.310***	0.094	− 0.013	− 0.019	− 0.043***	0101
	(0.070)	(0.076)	(0.082)	(0.014)	(0.015)	(0.013)	(0.012)
Panel E: 2014							
Black	0.062	0.590***	0.555***	− 0.063***	− 0.123***	− 0.055***	
	(0.040)	(0.028)	(0.024)	(0.007)	(0.009)	(0.010)	
(Rich household)*(Black)	− 0.256***	− 0300***	− 0.150**	− 0.011	0.025	0.012	
	(0.082)	(0.066)	(0.059)	(0.021)	(0.020)	(0.018)	
(Poor household)*(Black)	0.605***	0.313***	− 0.027	− 0.031**	− 0.009	− 0.002	
	(0.073)	(0.069)	(0.063)	(0.013)	(0.014)	(0.013)	
Panel R: 2015							
Black	0.051	0.514***	0.485***	− 0.080***	− 0.127***	− 0.063***	
	(0.038)	(0.038)	(0.030)	(0.008)	(0.009)	(0.008)	
(Rich household)*(Black)	− 0.138**	− 0.128**	− 0.050	0.025	− 0.005	0.048***	
	(0.057)	(0.055)	(0.049)	(0.017)	(0.016)	(0.015)	
(Poor household)*(Black)	0.399***	0.343***	0.118**	− 0.018	0.000	− 0.019	
	(0.062)	(0.066)	(0.059)	(0.013)	(0.013)	(0.013)	

Clustered standard errors (at the MSA level) in parentheses

***$p < 0.01$;**$p < 0.05$;*$p < 0.1$

Note: This table displays only the coefficients for Black (Black)*(Poor household) and (Black)*(Rich household). MSA dummies and all individual-level controls from Table 2 were included in the regressions but are not displayed

Appendix 2 Robustness checks

a) Household size adjustments

One potential concern regarding the results in Table 2 is that we assign respondents to income groups based on total household income. In the GH data, household size correlates positively to household income,[36] which would introduce a bias in the estimated coefficients for the income and interaction terms. In our baseline specification, we did not adjust for household size, for two main reasons. One is the high share of missing values for this variable (25% of the observations in our baseline specifications). A second reason is that, as mentioned in Section 3, the income variable in GH is not continuous and instead assigns respondents to 1 of 11 income brackets. Adjusting the reported household income to the household size would therefore require assigning respondents an income value, based on the bracket they report. This problem is further compounded by the fact that, with a categorical income variable, incomes are inevitably top-coded, which demands further assumptions regarding how to assign income to the households in the top bracket.

We address this concern with three different strategies. In the first case, we consider only the cases of one-person households, where no adjustment is necessary. In the second alternative, we exclude those in the top income bracket (i.e., respondents reporting pretax household income above $120,000/year), assign every other respondent the midpoint of the income bracket they reported, and adjust reported income by household size, on a per capita basis. In the final alternative, we do not exclude any respondent. For those not in the top income bracket, we applied the adjustment described in the previous alternative. We assigned those in the top income bracket a value based on data from the American Community Survey, obtained through IPUMS (Ruggles et al. 2015).[37]

Table 8 displays the results when following the first alternative. The magnitude of the indicator variables for income groups among poor white respondents increases slightly (see rows for "Poor household"). Nevertheless, the racial heterogeneities remained very stark. For instance, among the poor and holding everything else constant, African Americans score nearly 1.1 points higher on the 0–10 optimism scale than whites and are 13 percentage points less likely to have experienced stress the previous day (see rows for "Black" and "(Poor household)*(Black)").

As mentioned above, the second and third alternatives adjust the reported pretax income for household size. This required additional assumptions. We assigned those in income brackets below the top to the midpoint. We assigned those in the top income bracket the average of households whose total pretax income exceeds $120,000/year, based on estimates using data from Ruggles et al. (2015). For every year in the 2008–2015 period, we identified households reporting pretax income above the $120,000/year threshold, computed the corresponding average income, and assigned this yearly amount to the respondents in the top bracket. We then converted all incomes into per

[36] When regressing the household size variable on income group (recall that Gallup's income variable assigns respondents to income brackets, coded from 0 to 10), a coefficient of 0.080 is obtained. This would mean that, on average and imposing a linear progression, an increase of 1 in the income group is associated with an increase of 0.08 in the household size.

[37] Steven Ruggles, Katie Genadek, Ronald Goeken, Josiah Grover, and Matthew Sobek. *Integrated Public Use Microdata Series: Version 6.0* [dataset]. Minneapolis, MN: University of Minnesota, 2015.

capita amounts, by dividing the total household income by the household size.[38] Finally, we reassigned the three income categories to reflect this new per capita income variable. We specified thresholds such that we would again obtain approximately 20% of observation in the rich group, another 20% in the poor, and the remaining in the middle-income group.[39] This resulted in a maximum threshold of $12,499 per person for the poor group and in a minimum of $54,000 per person for the rich group.

The second alternative differs from the third only in the choice to exclude those assigned to the top income bracket in the GH data, which substantially reduces the number of respondents in the rich group. Table 9 displays the estimates obtained when using this alternative. As before, the race-income heterogeneities remain quantitatively large despite a slight decrease in the optimism gap: poor African Americans are now 0.83 points higher than poor whites in the optimism scale.

Table 10 displays the estimates obtained when using the third alternative, which includes the respondents in the top income bracket. As in the previous cases, this approach generates large race-income heterogeneities between African Americans and whites.

b) Alternative measure of poverty following US Census Bureau

Two possible objections to the robustness checks conducted in the previous subsection are that the thresholds chosen are relatively arbitrarily and that the definition of poverty used implicitly ignores any type of equivalence scale. Regarding the latter aspect, it means that the income needed for a household to be above the poverty threshold is always linearly proportional to the household size, ignoring any aspect related to its composition or the age of its members. An alternative to address both issues, then, is to use the poverty thresholds that the US Census defines every year[40] and correspondingly classify respondents as poor.[41] Table 11 displays the results for this specification. As before, there are no meaningful differences in the race-income heterogeneities.

c) Exclude MSAs with smaller numbers of poor African American respondents

Another concern about the base specification results is that the results could be driven by the within-MSA variation in MSAs with very few African Americans, particularly poor ones. Table 12 displays the results obtained when running the base specification under different thresholds for the minimum number of low-income African Americans per MSA, per year. As panel A to panel C illustrate, there are again no meaningful differences in magnitude and significance levels across the different thresholds.

[38] Respondents whose reported household size is larger than 10 are dropped from the analysis (951 observations).

[39] More precisely, 19 and 20% of the (unweighted) observations corresponded to the poor and to the rich groups, respectively. Upon application of the sampling weights, these percentages changed to 27 and 14%, respectively.

[40] See, for example: https://www.census.gov/data/tables/time-series/demo/income-poverty/historical-poverty-thresholds.html.

[41] Under this specification, rich respondents are defined in the same way as in third alternative of Section a). The results do not meaningfully change if the rich are classified under the criterion used for the base specification (i.e., the rich group corresponds to the respondents whose reported household income is above $120,000/year; these results are not displayed but are available from the authors, upon request).

Table 8 Base specification, only one-person households (2010–2015)

Variables	(1) OLS: bpl Full set of controls	(2) OLS: bpla Full set of controls	(3) OLS: bpla Full set of controls + bpl control	(4) OLS: worry Full set of controls	(5) OLS: stress Full set of controls	(6) OLS: citysat Full set of controls	(7) OLS: anger Full set of controls	(8) OLS: social support Full set of controls
Reported life satisfaction today (0–10)			0.610***					
			(0.0048)					
Poor household	− 0.409***	− 0.353***	− 0.104***	0.037***	0.022***	− 0.014***	− 0.001	− 0.022***
	(0.0182)	(0.0238)	(0.0198)	(0.0043)	(0.0042)	(0.0033)	(0.0036)	(0.0048)
Rich household	0.304***	0.251***	0.065***	0.007	0.024***	0.013***	0.005	0.001
	(0.0260)	(0.0294)	(0.0231)	(0.0060)	(0.0062)	(0.0049)	(0.0050)	(0.0074)
Black	0.244***	0.660***	0.511***	− 0.076***	− 0.121***	− 0.041***	− 0.021***	− 0.029***
	(0.0291)	(0.0326)	(0.0263)	(0.0067)	(0.0065)	(0.0078)	(0.0057)	(0.0087)
Hispanic	0.184***	0.370***	0.258***	0.002	− 0.044***	− 0.007	0.013	0.015
	(0.0485)	(0.0426)	(0.0369)	(0.0121)	(0.0133)	(0.0086)	(0.0118)	(0.0129)
Asian	0.026	− 0.097	− 0.113**	− 0.003	− 0.036**	0.017	− 0.043***	0.032**
	(0.0478)	(0.0644)	(0.0532)	(0.0137)	(0.0181)	(0.0119)	(0.0104)	(0.0149)
Other race	0.041	0.218***	0.193**	− 0.046***	− 0.015	− 0.055***	0.024	− 0.047**
	(0.0751)	(0.0832)	(0.0752)	(0.0167)	(0.0217)	(0.0173)	(0.0184)	(0.0203)
(Rich household)*(Black)	− 0.118	− 0.204**	− 0.132	− 0.026	− 0.015	0.045***	− 0.019	0.004
	(0.0825)	(0.0998)	(0.0815)	(0.0181)	(0.0216)	(0.0145)	(0.0167)	(0.0388)
(Rich household)*(Hispanic)	0.179	− 0.089	− 0.198**	0.007	0.028	0.009	0.045	− 0.022
	(0.1099)	(0.1281)	(0.0961)	(0.0298)	(0.0389)	(0.0213)	(0.0383)	(0.0434)
(Rich household)*(Asian)	− 0.007	− 0.166	− 0.162	− 0.018	− 0.021	− 0.020	0.021	− 0.088*
	(0.1054)	(0.1300)	(0.1070)	(0.0245)	(0.0418)	(0.0170)	(0.0381)	(0.0485)
(Rich household)*(Other race)	− 0.060	− 0.337	− 0.300	− 0.019	− 0.073	− 0.016	− 0.020	0.012
	(0.1729)	(0.2217)	(0.2348)	(0.0413)	(0.0488)	(0.0457)	(0.0425)	(0.0493)
(Poor household)*(Black)	0.481***	0.429***	0.136***	− 0.027***	0.005	− 0.008	0.008	− 0.006
	(0.0549)	(0.0524)	(0.0435)	(0.0089)	(0.0090)	(0.0092)	(0.0103)	(0.0161)

Table 8 (continued)

Variables	(1) OLS: bpl Full set of controls	(2) OLS: bpla Full set of controls	(3) OLS: bpla Full set of controls + bpl control	(4) OLS: worry Full set of controls	(5) OLS: stress Full set of controls	(6) OLS: citysat Full set of controls	(7) OLS: anger Full set of controls	(8) OLS: social support Full set of controls
(Poor household)*(Hispanic)	0.318***	− 0.131	− 0.326***	0.019	0.016	0.009	− 0.014	− 0.056***
	(0.0605)	(0.1098)	(0.0989)	(0.0159)	(0.0193)	(0.0116)	(0.0141)	(0.0193)
(Poor household)*(Asian)	0.160	0.373***	0.276***	0.020	0.035	− 0.031	0.011	− 0.049
	(0.1113)	(0.1182)	(0.1019)	(0.0320)	(0.0318)	(0.0257)	(0.0344)	(0.0409)
(Poor household)*(Other race)	0.184	0.114	0.002	0.022	− 0.012	− 0.008	− 0.012	0.008
	(0.1482)	(0.1544)	(0.1308)	(0.0253)	(0.0293)	(0.0263)	(0.0221)	(0.0339)
Constant	7.368***	8.862***	4.368***	0.275***	0.505***	0.936***	0.132***	1.015***
	(0.0548)	(0.0707)	(0.0704)	(0.0126)	(0.0136)	(0.0123)	(0.0156)	(0.0206)
Observations	145,631	145,631	145,631	145,631	145,631	145,631	109,285	50,639
R-squared	0.169	0.166	0.377	0.166	0.176	0.070	0.073	0.116
MSA dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Clustered standard errors (at MSA-level) in parentheses

***$p < 0.01$; **$p < 0.05$; *$p < 0.1$

Note: These regressions include only the respondents who reported living in a one-person household. They also include the 196 MSAs for which sampling weights were available at least in 1 year, except for social support, where 200 MSAs were available. All specifications use the 2010–2015 period, except for anger (2010–2013) and social support (2008–2012). The individual-level controls from Table 2 were included but are not displayed, except those related to race and income

Table 9 Base specification, income adjusted by household size (excludes respondents in the top income bracket)

Variables	(1) OLS: bpl Full set of controls	(2) OLS: bpla Full set of controls	(3) OLS: bpla Full set of controls + bpl control	(4) OLS: worry Full set of controls	(5) OLS: stress Full set of controls	(6) OLS: citysat Full set of controls	(7) OLS: anger Full set of controls	(8) OLS: social support Full set of controls
Reported life satisfaction today (0–10)			0.572*** (0.0050)					
Poor household	− 0.292*** (0.0112)	− 0.101*** (0.0120)	0.066*** (0.0099)	0.029*** (0.0023)	0.029*** (0.0026)	− 0.016*** (0.0022)	0.007*** (0.0025)	− 0.023*** (0.0038)
Rich household	0.258*** (0.0135)	0.190*** (0.0152)	0.043*** (0.0124)	− 0.028*** (0.0034)	− 0.024*** (0.0044)	0.008*** (0.0027)	0.004 (0.0031)	0.001 (0.0044)
Black	0.201*** (0.0185)	0.686*** (0.0179)	0.570*** (0.0141)	− 0.082*** (0.0039)	− 0.121*** (0.0047)	− 0.042*** (0.0054)	− 0.009*** (0.0031)	− 0.025*** (0.0062)
Hispanic	0.233*** (0.0160)	0.332*** (0.0168)	0.199*** (0.0149)	− 0.006 (0.0052)	− 0.058*** (0.0059)	− 0.001 (0.0042)	− 0.006 (0.0044)	− 0.024*** (0.0072)
Asian	− 0.082*** (0.0216)	− 0.162*** (0.0297)	− 0.116*** (0.0268)	0.010 (0.0092)	− 0.041*** (0.0068)	0.021*** (0.0050)	− 0.008 (0.0069)	− 0.057*** (0.0118)
Other race	0.046 (0.0288)	0.154*** (0.0405)	0.128*** (0.0348)	− 0.036*** (0.0076)	− 0.054*** (0.0082)	− 0.028*** (0.0064)	− 0.001 (0.0076)	− 0.036*** (0.0091)
(Rich household)*(Black)	0.028 (0.0397)	− 0.089** (0.0421)	− 0.105** (0.0423)	0.003 (0.0100)	0.003 (0.0119)	0.007 (0.0071)	− 0.023*** (0.0088)	0.003 (0.0124)
(Rich household)*(Hispanic)	− 0.101 (0.0616)	− 0.024 (0.0629)	0.034 (0.0549)	0.020 (0.0200)	0.016 (0.0171)	− 0.021 (0.0125)	0.040** (0.0165)	0.034* (0.0203)
(Rich household)*(Asian)	− 0.048 (0.0663)	− 0.089 (0.0741)	− 0.062 (0.0554)	0.022 (0.0161)	0.017 (0.0218)	0.013 (0.0116)	− 0.039*** (0.0110)	0.073*** (0.0217)
(Rich household)*(Other race)	− 0.091 (0.1009)	0.065 (0.1208)	0.117 (0.1007)	0.028 (0.0249)	0.075*** (0.0256)	− 0.074*** (0.0269)	0.063** (0.0309)	− 0.039 (0.0338)
(Poor household)*(Black)	0.268*** (0.0210)	0.141*** (0.0283)	− 0.012 (0.0297)	− 0.017*** (0.0063)	− 0.022*** (0.0046)	− 0.037*** (0.0051)	0.008 (0.0054)	− 0.011 (0.0085)

Table 9 (continued)

Variables	(1) OLS: bpl Full set of controls	(2) OLS: bpla Full set of controls	(3) OLS: bpla Full set of controls + bpl control	(4) OLS: worry Full set of controls	(5) OLS: stress Full set of controls	(6) OLS: citysat Full set of controls	(7) OLS: anger Full set of controls	(8) OLS: social support Full set of controls
(Poor household)*(Hispanic)	0.282*** (0.0266)	− 0.165*** (0.0299)	− 0.326*** (0.0295)	− 0.027*** (0.0063)	− 0.062*** (0.0065)	0.030*** (0.0045)	0.009 (0.0062)	− 0.029** (0.0127)
(Poor household)*(Asian)	0.143*** (0.0455)	0.021 (0.0454)	− 0.061 (0.0446)	− 0.029** (0.0122)	− 0.040*** (0.0128)	0.006 (0.0098)	0.007 (0.0106)	− 0.003 (0.0182)
(Poor household)*(Other race)	0.176*** (0.0515)	0.097 (0.0655)	− 0.004 (0.0583)	0.009 (0.0118)	− 0.020 (0.0157)	− 0.014 (0.0110)	0.019 (0.0129)	− 0.027 (0.0168)
Constant	7.608*** (0.0260)	8.773*** (0.0259)	4.418*** (0.0446)	0.271*** (0.0067)	0.538*** (0.0055)	0.895*** (0.0053)	0.124*** (0.0048)	1.049*** (0.0090)
Observations	466,854	466,854	466,854	466,854	466,854	466,854	340,010	148,168
R-squared	0.167	0.162	0.367	0.146	0.152	0.066	0.065	0.114
MSA dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Clustered standard errors (at MSA-level) in parentheses

***$p < 0.01$; **$p < 0.05$; *$p < 0.1$

Note: These regressions include all respondents, except those who reported being in the top income category. They also include the 196 MSAs for which sampling weights were available at least in 1 year, except for social support, where 200 MSAs were available. All specifications use the 2010–2015 period, except for anger (2010–2013) and social support (2008–2012). The individual-level controls from Table 2 were included but are not displayed, except those related to race and income

Table 10 Base specification, income adjusted by household size (respondents in the top income bracket are included)

Variables	(1) OLS: bpl Full set of controls	(2) OLS: bpla Full set of controls	(3) OLS: bpla Full set of controls + bpl control	(4) OLS: worry Full set of controls	(5) OLS: stress Full set of controls	(6) OLS: citysat Full set of controls	(7) OLS: anger Full set of controls	(8) OLS: social support Full set of controls
Reported life satisfaction today (0–10)			0.578***					
			(0.0045)					
Poor household	− 0.313***	− 0.102***	0.079***	0.029***	0.028***	− 0.019***	0.006**	− 0.024***
	(0.0108)	(0.0120)	(0.0100)	(0.0023)	(0.0025)	(0.0022)	(0.0024)	(0.0038)
Rich household	0.332***	0.293***	0.101***	− 0.019***	− 0.011***	0.008***	− 0.001	0.005*
	(0.0077)	(0.0097)	(0.0082)	(0.0018)	(0.0022)	(0.0016)	(0.0021)	(0.0027)
Black	0.176***	0.677***	0.574***	− 0.082***	− 0.125***	− 0.044***	− 0.008***	− 0.030***
	(0.0179)	(0.0173)	(0.0132)	(0.0037)	(0.0046)	(0.0059)	(0.0031)	(0.0058)
Hispanic	0.224***	0.328***	0.199***	− 0.009*	− 0.063***	− 0.002	− 0.005	− 0.023***
	(0.0149)	(0.0170)	(0.0148)	(0.0056)	(0.0058)	(0.0044)	(0.0042)	(0.0066)
Asian	− 0.074***	− 0.131***	− 0.088***	0.009	− 0.046***	0.019***	− 0.008	− 0.062***
	(0.0204)	(0.0281)	(0.0230)	(0.0072)	(0.0060)	(0.0043)	(0.0067)	(0.0113)
Other race	0.046*	0.132***	0.106***	− 0.036***	− 0.057***	− 0.027***	− 0.000	− 0.045***
	(0.0270)	(0.0344)	(0.0295)	(0.0081)	(0.0081)	(0.0059)	(0.0069)	(0.0091)
(Rich household)*(Black)	− 0.098***	− 0.190***	− 0.133***	− 0.004	− 0.005	0.014***	− 0.018***	0.009
	(0.0305)	(0.0282)	(0.0244)	(0.0065)	(0.0072)	(0.0053)	(0.0060)	(0.0103)
(Rich household)*(Hispanic)	− 0.180***	− 0.166***	− 0.062*	0.021*	0.033***	− 0.003	0.045***	0.013
	(0.0381)	(0.0388)	(0.0316)	(0.0108)	(0.0096)	(0.0068)	(0.0088)	(0.0122)
(Rich household)*(Asian)	− 0.139***	− 0.149***	− 0.069**	− 0.003	0.009	0.014**	− 0.016*	0.009
	(0.0367)	(0.0349)	(0.0280)	(0.0108)	(0.0154)	(0.0072)	(0.0084)	(0.0170)
(Rich household)*(Other race)	− 0.085	− 0.094	− 0.044	0.030	0.046**	− 0.040***	0.036**	− 0.021
	(0.0547)	(0.0640)	(0.0564)	(0.0195)	(0.0195)	(0.0138)	(0.0140)	(0.0210)
(Poor household)*(Black)	0.305***	0.165***	− 0.011	− 0.018***	− 0.019***	− 0.035***	0.007	− 0.007
	(0.0197)	(0.0278)	(0.0296)	(0.0061)	(0.0043)	(0.0050)	(0.0053)	(0.0082)

Table 10 (continued)

Variables	(1) OLS: bpl Full set of controls	(2) OLS: bpla Full set of controls	(3) OLS: bpla Full set of controls + bpl control	(4) OLS: worry Full set of controls	(5) OLS: stress Full set of controls	(6) OLS: citysat Full set of controls	(7) OLS: anger Full set of controls	(8) OLS: social support Full set of controls
(Poor household)*(Hispanic)	0.287*** (0.0264)	− 0.159*** (0.0289)	− 0.325*** (0.0280)	− 0.026*** (0.0063)	− 0.063*** (0.0060)	0.029*** (0.0042)	0.008 (0.0064)	− 0.030** (0.0121)
(Poor household)*(Asian)	0.122*** (0.0434)	− 0.006 (0.0435)	− 0.077* (0.0435)	− 0.030** (0.0119)	− 0.039*** (0.0126)	0.005 (0.0089)	0.007 (0.0111)	0.003 (0.0186)
Poor household)*(Other race)	0.180*** (0.0510)	0.126** (0.0633)	0.023 (0.0550)	0.008 (0.0120)	− 0.018 (0.0156)	− 0.016 (0.0112)	0.018 (0.0129)	− 0.018 (0.0165)
Constant	7.642*** (0.0224)	8.756*** (0.0212)	4.336*** (0.0381)	0.274*** (0.0063)	0.545*** (0.0051)	0.904*** (0.0052)	0.129*** (0.0043)	1.036*** (0.0079)
Observations	574,914	574,914	574,914	574,914	574,914	574,914	413,705	179,705
R-squared	0.177	0.162	0.373	0.134	0.138	0.065	0.061	0.109
MSA dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Clustered standard errors (at MSA-level) in parentheses

***$p < 0.01$; **$p < 0.05$; *$p < 0.1$

Note: These regressions include the 196 MSAs for which sampling weights were available at least in 1 year, except for social support, where 200 MSAs were available. All specifications use the 2010–2015 period, except for anger (2010–2013) and social support (2008–2012). The individual-level controls from Table 2 were included but are not displayed, except those related to race and income

Table 11 Base specification, income adjusted by household size and poverty thresholds as defined by the Census Bureau

Variables	(1) OLS: bpl Full set of controls	(2) OLS: bpla Full set of controls	(3) OLS: bpla Full set of controls + bpl control	(4) OLS: worry Full set of controls	(5) OLS: stress Full set of controls	(6) OLS: citysat Full set of controls	(7) OLS: anger Full set of controls	(8) OLS: social support Full set of controls
Reported life satisfaction today (0–10)			0.578***					
Poor household	−0.314***	−0.070***	0.112***	0.034***	0.034***	−0.022***	0.016***	−0.036***
	(0.0180)	(0.0235)	(0.0209)	(0.0036)	(0.0039)	(0.0031)	(0.0037)	(0.0052)
Rich household	0.420***	0.311***	0.069***	−0.008***	0.015***	0.020***	0.001	0.010***
	(0.0082)	(0.0094)	(0.0079)	(0.0020)	(0.0023)	(0.0020)	(0.0020)	
Black	0.231***	0.713***	0.580***	−0.085***	−0.126***	−0.050***	−0.007**	−0.029***
	(0.0191)	(0.0147)	(0.0115)	(0.0037)	(0.0046)	(0.0060)	(0.0030)	(0.0056)
Hispanic	0.271***	0.302***	0.145***	−0.016***	−0.080***	0.004	−0.004	−0.027***
	(0.0137)	(0.0196)	(0.0197)	(0.0051)	(0.0055)	(0.0048)	(0.0039)	(0.0084)
Asian	−0.065***	−0.137***	−0.099***	0.002	−0.053***	0.024***	−0.004	−0.053***
	(0.0225)	(0.0292)	(0.0252)	(0.0089)	(0.0057)	(0.0043)	(0.0069)	(0.0105)
Other race	0.066**	0.175***	0.137***	−0.027***	−0.056***	−0.036***	0.004	−0.046***
	(0.0267)	(0.0353)	(0.0309)	(0.0064)	(0.0067)	(0.0066)	(0.0071)	(0.0083)
(Rich household)*(Black)	−0.263***	−0.269***	−0.117***	0.006	−0.008	0.016**	−0.002	−0.012
	(0.0329)	(0.0284)	(0.0246)	(0.0066)	(0.0092)	(0.0061)	(0.0070)	(0.0131)
(Rich household)*(Hispanic)	−0.180***	−0.149***	−0.045*	0.013*	0.037***	0.002	0.026***	0.009
	(0.0306)	(0.0313)	(0.0260)	(0.0078)	(0.0085)	(0.0058)	(0.0088)	(0.0110)
(Rich household)*(Asian)	−0.137***	−0.097**	−0.018	0.004	0.005	0.000	−0.009	−0.026*
	(0.0273)	(0.0404)	(0.0359)	(0.0128)	(0.0100)	(0.0065)	(0.0099)	(0.0146)
(Rich household)*(Other race)	−0.065	−0.251***	−0.213***	0.011	0.014	0.005	0.013	−0.038**
	(0.0651)	(0.0726)	(0.0647)	(0.0148)	(0.0148)	(0.0137)	(0.0156)	(0.0193)
(Poor household)*(Black)	0.380***	0.165***	−0.055	−0.020***	−0.023***	−0.035***	0.000	−0.003
	(0.0333)	(0.0364)	(0.0359)	(0.0071)	(0.0064)	(0.0070)	(0.0073)	(0.0111)

Table 11 (continued)

Variables	(1) OLS: bpl Full set of controls	(2) OLS: bpla Full set of controls	(3) OLS: bpla Full set of controls + bpl control	(4) OLS: worry Full set of controls	(5) OLS: stress Full set of controls	(6) OLS: citysat Full set of controls	(7) OLS: anger Full set of controls	(8) OLS: social support Full set of controls
(Poor household)*(Hispanic)	0.354***	−0.197***	−0.402***	−0.017**	−0.051***	0.032***	0.009	−0.038***
	(0.0294)	(0.0408)	(0.0381)	(0.0070)	(0.0069)	(0.0070)	(0.0069)	(0.0131)
(Poor household)*(Asian)	0.162**	−0.053	−0.147**	−0.007	−0.013	−0.014	−0.023	0.001
	(0.0671)	(0.0641)	(0.0634)	(0.0167)	(0.0186)	(0.0145)	(0.0196)	(0.0258)
(Poor household)*(Other race)	0.220***	0.132	0.004	−0.012	−0.014	−0.009	0.024	−0.016
	(0.0693)	(0.0868)	(0.0753)	(0.0146)	(0.0186)	(0.0153)	(0.0180)	(0.0236)
Constant	7.526***	8.693***	4.340***	0.279***	0.543***	0.896***	0.129***	1.029***
	(0.0224)	(0.0217)	(0.0371)	(0.0061)	(0.0050)	(0.0052)	(0.0043)	(0.0080)
Observations	574,914	574,914	574,914	574,914	574,914	574,914	413,705	179,705
R-squared	0.178	0.162	0.373	0.134	0.138	0.065	0.061	0.110
MSA dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Clustered standard errors (at MSA-level) in parentheses

***$p < 0.01$; **$p < 0.05$; *$p < 0.1$

Note: These regressions include the 196 MSAs for which sampling weights were available at least in one year, except for Social support, where 200 MSAs were available. All specifications use the 2010-2015 period, except for anger (2010-2013) and social support (2008-2012). The individual-level controls from Table 2 were included but are not displayed, except those related to race and income

Table 12 Base specification, using thresholds for minimum number of Poor African Americans by MSA

	(1) OLS: bpl	(2) OLS: bpla	(3) OLS: bpla w/ bpl control	(4) OLS: worry	(5) OLS: stress	(6) OLS: citysat	(7) OLS: anger
Panel A: MSAs with more than 30 (Poor Household)*(Black) observations							
Black	0.201***	0.675***	0.566***	− 0.090***	− 0.144***	− 0.053***	− 0.007**
	(0.015)	(0.016)	(0.014)	(0.004)	(0.004)	(0.009)	(0.003)
(Rich household)*(Black)	− 0.238***	− 0.220***	− 0.091***	0.014*	0.008	0.016***	0.002
	(0.030)	(0.027)	(0.026)	(0.008)	(0.008)	(0.005)	(0.006)
(Poor household)*(Black)	0.377***	0.238***	0.034	− 0.014**	0.001	− 0.025***	0.013**
	(0.027)	(0.027)	(0.030)	(0.007)	(0.005)	(0.006)	(0.005)
Panel B: MSAs with more than 50 (Poor Household)*(Black) observations							
Black	0.211***	0.676***	0.563***	− 0.092***	− 0.146***	− 0.055***	− 0.011***
	(0.018)	(0.019)	(0.016)	(0.004)	(0.004)	(0.012)	(0.004)
(Rich household)*(Black)	− 0.245***	− 0.211***	− 0.080***	0.015*	0.012	0.021***	0.003
	(0.032)	(0.029)	(0.027)	(0.009)	(0.009)	(0.005)	(0.007)
(Poor household)*(Black)	0.350***	0.236***	0.049	− 0.016**	− 0.000	− 0.024***	0.011**
	(0.031)	(0.034)	(0.033)	(0.008)	(0.006)	(0.007)	(0.006)
Panel C: MSAs with more than 100 (Poor Household)*(Black) observations							
Black	0.229***	0.683***	0.562***	− 0.100***	− 0.148***	− 0.056***	− 0.011**
	(0.026)	(0.020)	(0.016)	(0.004)	(0.005)	(0.016)	(0.005)
(Rich household)*(Black)	− 0.254***	− 0.221***	− 0.088***	0.014	0.002	0.015**	0.001
	(0.032)	(0.035)	(0.033)	(0.009)	(0.009)	(0.006)	(0.008)
(Poor household)*(Black)	0.352***	0.247***	0.062**	− 0.005	0.000	− 0.018**	0.018***
	(0.045)	(0.034)	(0.027)	(0.011)	(0.008)	(0.009)	(0.006)

Clustered standard (at the MSA level) errors in parentheses

***$p < 0.01$; **$p < 0.05$; *$p < 0.1$

Note: This table displays only the coefficients for Black, (Black)*(Poor household), and (Black)*(Rich household), but all the other individual-level controls from Table 2 were included in the regressions (but are not displayed)

d) Include month and (MSA) × (year) dummies

A possible objection to the specification laid out in Eq. (1) is that, by using year and MSA dummies separately (i.e., without adding their interaction), we are imposing a parallel time trend on all MSAs. If the MSAs happened to follow heterogeneous time trends during the period under analysis, the absence of interaction dummies could bias our estimates. Similarly, the time of the year of the interview might be correlated with our variables of interest. Table 13 below displays the results when we include both month and (MSA) × (year) dummies. The coefficient estimates and significance are nearly unchanged, suggesting that neither factor was in fact introducing a meaningful bias into our estimates.

Table 13 Base specification, plus month and (MSA) × (year) dummies

Variables	(1) OLS: bpl Full set of controls	(2) OLS: bpla Full set of controls	(3) OLS: bpla Full set of controls + bpl control	(4) OLS: worry Full set of controls	(5) OLS: stress Full set of controls	(6) OLS: citysat Full set of controls	(7) OLS: anger Full set of controls	(8) OLS: social support Full set of controls
Poor household	− 0.334***	− 0.226***	− 0.040***	0.029***	0.016***	− 0.018***	− 0.001	− 0.025***
	(0.0107)	(0.0113)	(0.0100)	(0.0025)	(0.0026)	(0.0023)	(0.0023)	(0.0028)
Rich household	0.400***	0.275***	0.052***	− 0.007***	0.014***	0.017***	0.002	0.008***
	(0.0072)	(0.0078)	(0.0069)	(0.0020)	(0.0024)	(0.0018)	(0.0017)	(0.0019)
Black	0.173***	0.644***	0.547***	− 0.083***	− 0.131***	− 0.052***	− 0.006*	− 0.029***
	(0.0133)	(0.0147)	(0.0128)	(0.0035)	(0.0040)	(0.0069)	(0.0029)	(0.0040)
(Rich household)*(Black)	− 0.217***	− 0.214***	− 0.093***	0.007	− 0.001	0.019***	− 0.001	− 0.007
	(0.0259)	(0.0239)	(0.0223)	(0.0067)	(0.0066)	(0.0045)	(0.0055)	(0.0088)
(Poor household)*(Black)	0.382***	0.258***	0.046**	− 0.014***	− 0.007*	− 0.023***	0.008*	− 0.015**
	(0.0227)	(0.0215)	(0.0219)	(0.0051)	(0.0041)	(0.0051)	(0.0045)	(0.0067)
Observations	770,899	770,899	770,899	770,899	770,899	770,899	608,787	347,080
R-squared	0.177	0.166	0.368	0.131	0.132	0.066	0.063	0.113
Month dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
MSA × year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Clustered standard errors (at MSA-level) in parentheses

***$p < 0.01$; **$p < 0.05$; *$p < 0.1$

Note: These regressions include the 196 MSAs for which sampling weights were available at least in 1 year, except for social support, where 200 MSAs were available. All specifications use the 2010–2015 period, except for anger (2010–2013) and social support (2008–2012). This table displays only the coefficients for Black, (Black)*(Poor household), and (Black)*(Rich household), but all the individual-level used in Table 2 were included in the regressions

Table 14 Base specification, with national-level survey weights

Variables	(1) OLS: bpl Full set of controls	(2) OLS: bpla Full set of controls	(3) OLS: bpla Full set of controls + bpl control	(4) OLS: worry Full set of controls	(5) OLS: stress Full set of controls	(6) OLS: citysat Full set of controls	(7) OLS: anger Full set of controls	(8) OLS: social support Full set of controls
Poor household	− 0.337***	− 0.214***	− 0.027***	0.029***	0.017***	− 0.015***	0.001	− 0.021***
	(0.0100)	(0.0101)	(0.0085)	(0.0023)	(0.0023)	(0.0018)	(0.0021)	(0.0026)
Rich household	0.396***	0.275***	0.055***	− 0.006***	0.014***	0.018***	0.002	0.008***
	(0.0068)	(0.0071)	(0.0060)	(0.0019)	(0.0023)	(0.0017)	(0.0015)	(0.0017)
Black	0.162***	0.641***	0.551***	− 0.081***	− 0.130***	− 0.053***	− 0.009***	− 0.029***
	(0.0122)	(0.0124)	(0.0104)	(0.0031)	(0.0038)	(0.0067)	(0.0027)	(0.0036)
(Rich household)*(Black)	− 0.198***	− 0.230***	− 0.121***	0.007	0.005	0.020***	0.002	− 0.009
	(0.0226)	(0.0223)	(0.0186)	(0.0055)	(0.0056)	(0.0044)	(0.0051)	(0.0095)
(Poor household)*(Black)	0.365***	0.236***	0.034*	− 0.017***	− 0.009**	− 0.022***	0.012***	− 0.017***
	(0.0214)	(0.0190)	(0.0190)	(0.0046)	(0.0040)	(0.0053)	(0.0041)	(0.0061)
Observations	918,683	918,683	918,683	918,683	918,683	918,683	704,497	393,473
R-squared	0.173	0.167	0.370	0.131	0.132	0.068	0.063	0.108
MSA dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Clustered standard errors (at MSA-level) in parentheses.

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

Note: All specifications use the 2010–2015 period and cover 389 MSAs, except for anger (2010–2013, 363 MSAs) and social support (2008–2012, 363 MSAs). This table displays only the coefficients for Black, (Black)*(Poor household), and (Black)*(Rich household), but all the individual-level used in Table 2 were included in the regressions

Table 15 Base specification, no survey weights

Variables	(1) OLS: bpl Full set of controls	(2) OLS: bpla Full set of controls	(3) OLS: bpla Full set of controls + bpl control	(4) OLS: worry Full set of controls	(5) OLS: stress Full set of controls	(6) OLS: citysat Full set of controls	(7) OLS: anger Full set of controls	(8) OLS: social support Full set of controls
Poor household	− 0.367***	− 0.291***	− 0.067***	0.035***	0.023***	− 0.017***	0.002	− 0.022***
	(0.0069)	(0.0084)	(0.0075)	(0.0017)	(0.0017)	(0.0015)	(0.0014)	(0.0020)
Rich household	0.400***	0.303***	0.058***	− 0.008***	0.014***	0.016***	− 0.001	0.007***
	(0.0053)	(0.0065)	(0.0053)	(0.0016)	(0.0019)	(0.0013)	(0.0010)	(0.0016)
Black	0.185***	0.685***	0.572***	− 0.082***	− 0.121***	− 0.048***	− 0.011***	− 0.028***
	(0.0119)	(0.0120)	(0.0096)	(0.0025)	(0.0030)	(0.0067)	(0.0019)	(0.0029)
(Rich household)*(Black)	− 0.190***	− 0.245***	− 0.130***	0.007	0.003	0.020***	0.004	− 0.008
	(0.0173)	(0.0176)	(0.0159)	(0.0049)	(0.0048)	(0.0036)	(0.0039)	(0.0075)
(Poor household)*(Black)	0.405***	0.329***	0.082***	− 0.019***	− 0.011***	− 0.021***	0.011***	− 0.016***
	(0.0191)	(0.0161)	(0.0153)	(0.0037)	(0.0034)	(0.0041)	(0.0035)	(0.0048)
Observations	918,683	918,683	918,683	918,683	918,683	918,683	704,497	393,473
R-squared	0.182	0.165	0.386	0.127	0.138	0.064	0.055	0.093
MSA dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Clustered standard errors (at MSA-level) in parentheses

***$p < 0.01$; **$p < 0.05$; *$p < 0.1$

Note: All specifications use the 2010–2015 period and cover 389 MSAs, except for anger (2010–2013, 363 MSAs) and social support (2008–2012, 363 MSAs). This table displays only the coefficients for Black, (Black)*(Poor household), and (Black)*(Rich household), but all the individual-level used in Table 2 were included in the regressions

e) Robustness to use and type of survey weights

The base specification estimates in Table 2 use MSA-level weights. A possible concern is that the results may be sensitive to the type of survey weights, or simply to their use.

Table 14 below displays the results when the national-level survey weights are used. I this case, we are no longer restricted to the 196 MSAs for which we have MSA-level survey weights at some point during the 2010–2015 period, and as a result, our sample increases and encompasses nearly all the existing MSAs. The coefficient estimates for our variables of interest, however, suffer no relevant change.

Table 15 also uses this enlarged sample of respondents located in any MSA, but instead uses no weights. The differences to Table 2 are small and the coefficient estimates are often of a higher magnitude.

Appendix 3 Ordered logit and logit estimation

As mentioned in the main text, we re-estimate the main tables of the article under ordered logit and logit specifications. Tables 16 to 21 below show that our findings are robust to the choice of estimation framework.

Table 16 Re-estimation of Table 1, using ordered logit and logit models

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Ord Logit: bpl	Ord Logit: bpla	Ord Logit: bpla	Logit: worry	Logit: stress	Logit: citysat	Logit: anger	Logit: social support
Variables	No individual-level controls (196 MSAs)	No individual-level controls (196 MSAs)	With bpl control (196 MSAs)	No individual-level controls (196 MSAs)	No individual-level controls (196 MSAs)	No individual-level controls (196 MSAs)	No individual-level controls (196 MSAs)	No individual-level controls (200 MSAs)
Reported life satisfaction today (0–10)			0.617***					
			(0.0065)					
Poor household	− 0.787***	− 0.335***	0.096***	0.583***	0.381***	− 0.530***	0.409***	− 0.626***
	(0.0147)	(0.0120)	(0.0131)	(0.0160)	(0.0149)	(0.0192)	(0.0191)	(0.0202)
Rich household	0.614***	0.371***	0.077***	− 0.172***	0.008	0.406***	− 0.155***	0.315***
	(0.0078)	(0.0080)	(0.0076)	(0.0117)	(0.0130)	(0.0178)	(0.0196)	(0.0198)
Black	− 0.011	0.906***	1.071***	− 0.293***	− 0.368***	− 0.548***	0.081***	− 0.301***
	(0.0143)	(0.0127)	(0.0139)	(0.0204)	(0.0221)	(0.0431)	(0.0246)	(0.0327)
Hispanic	0.127***	0.627***	0.672***	0.006	− 0.128***	− 0.186***	0.170***	− 0.256***
	(0.0169)	(0.0191)	(0.0260)	(0.0211)	(0.0199)	(0.0375)	(0.0272)	(0.0407)
Asian	− 0.008	0.258***	0.313***	− 0.010	− 0.028	0.018	− 0.008	0.005
	(0.0221)	(0.0256)	(0.0226)	(0.0280)	(0.0205)	(0.0374)	(0.0386)	(0.0695)
Other race	− 0.067***	0.476***	0.592***	0.077***	0.014	− 0.431***	0.289***	− 0.398***
	(0.0251)	(0.0295)	(0.0324)	(0.0276)	(0.0268)	(0.0417)	(0.0396)	(0.0468)
(Rich household)*(Black)	− 0.155***	− 0.277***	− 0.237***	− 0.014	− 0.067**	0.038	− 0.014	− 0.138*
	(0.0266)	(0.0323)	(0.0303)	(0.0429)	(0.0325)	(0.0430)	(0.0530)	(0.0835)

Table 16 (continued)

Variables	(1) Ord Logit: bpl No individual-level controls (196 MSAs)	(2) Ord Logit: bpla No individual-level controls (196 MSAs)	(3) Ord Logit: bpla With bpl control (196 MSAs)	(4) Logit: worry No individual-level controls (196 MSAs)	(5) Logit: stress No individual-level controls (196 MSAs)	(6) Logit: citysat No individual-level controls (196 MSAs)	(7) Logit: anger No individual-level controls (196 MSAs)	(8) Logit: social support No individual-level controls (200 MSAs)
(Rich household)*(Hispanic)	− 0.110***	− 0.189***	− 0.150***	0.112***	0.126***	0.010	0.129*	0.095
	(0.0261)	(0.0238)	(0.0280)	(0.0402)	(0.0274)	(0.0584)	(0.0667)	(0.0728)
(Rich household)*(Asian)	− 0.147***	− 0.185***	− 0.142***	0.039	0.028	0.046	0.063	− 0.357***
	(0.0347)	(0.0313)	(0.0290)	(0.0413)	(0.0406)	(0.0610)	(0.0655)	(0.0873)
(Rich household)*(Other race)	− 0.047	− 0.215***	− 0.211***	0.011	− 0.026	− 0.080	0.098	− 0.181*
	(0.0465)	(0.0515)	(0.0533)	(0.0701)	(0.0624)	(0.0902)	(0.0836)	(0.1100)
(Poor household)*(Black)	0.383***	0.231***	0.056**	− 0.022	− 0.033*	0.025	0.034	− 0.044
	(0.0228)	(0.0241)	(0.0271)	(0.0237)	(0.0191)	(0.0318)	(0.0327)	(0.0455)
(Poor household)*(Hispanic)	0.435***	− 0.134***	− 0.400***	− 0.099***	− 0.180***	0.287***	0.042	− 0.117**
	(0.0259)	(0.0327)	(0.0366)	(0.0251)	(0.0281)	(0.0281)	(0.0347)	(0.0476)
(Poor household)*(Asian)	0.465***	0.249***	0.016	− 0.198***	− 0.104*	0.019	− 0.101	0.214*
	(0.0400)	(0.0382)	(0.0395)	(0.0538)	(0.0529)	(0.0669)	(0.0805)	(0.1205)
(Poor household)*(Other race)	0.220***	0.079	− 0.034	− 0.044	0.006	0.023	0.058	− 0.080
	(0.0581)	(0.0573)	(0.0560)	(0.0531)	(0.0515)	(0.0618)	(0.0679)	(0.0783)

Table 16 (continued)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Ord Logit: bpl	Ord Logit: bpla	Ord Logit: bpla	Logit: worry	Logit: stress	Logit: citysat	Logit: anger	Logit: social support
Variables	No individual-level controls (196 MSAs)	No individual-level controls (196 MSAs)	With bpl control (196 MSAs)	No individual-level controls (196 MSAs)	No individual-level controls (196 MSAs)	No individual-level controls (196 MSAs)	No individual-level controls (196 MSAs)	No individual-level controls (200 MSAs)
Observations	770,899	770,899	770,899	770,899	770,899	770,899	608,787	347,080
MSA dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Clustered standard errors (at MSA-level) in parentheses

***$p < 0.01$; **$p < 0.05$; *$p < 0.1$

Note: These regressions include the 196 MSAs for which sampling weights were available at least in 1 year, except for social support, where 200 MSAs were available. All specifications use the 2010–2015 period, except for anger (2010–2013) and social support (2008–2012). Only controls included refer to race and income, as well as year and MSA fixed effects

Table 17 Re-estimation of Table 2, using ordered logit and logit models

	(1) Ord Logit: bpl	(2) Ord Logit: bpla	(3) Ord Logit: bpla	(4) Logit: worry	(5) Logit: stress	(6) Logit: citysat	(7) Logit: anger	(8) Logit: social support
Variables	Full set of controls (196 MSAs)	Full set of controls (196 MSAs)	Full set of controls + bpl control (196 MSAs)	Full set of controls (196 MSAs)	Full set of controls (196 MSAs)	Full set of controls (196 MSAs)	Full set of controls (196 MSAs)	Full set of controls (200 MSAs)
Reported life satisfaction today (0–10)			0.709***					
			(0.0081)					
Poor household	− 0.325***	− 0.138***	0.051***	0.141***	0.085***	− 0.157***	0.000	− 0.206***
	(0.0107)	(0.0102)	(0.0105)	(0.0129)	(0.0126)	(0.0172)	(0.0181)	(0.0214)
Rich household	0.446***	0.270***	0.055***	− 0.033*	0.071***	0.231***	0.014	0.107***
	(0.0071)	(0.0076)	(0.0079)	(0.0109)	(0.0108)	(0.0182)	(0.0183)	(0.021)
Black	0.160***	0.786***	0.829***	− 0.455***	− 0.626***	− 0.400***	− 0.037	− 0.279***
	(0.0135)	(0.0186)	(0.0180)	(0.0204)	(0.0200	(0.0427)	(0.0254)	(0.0337)
Hispanic	0.273***	0.363***	0.270***	− 0.104***	− 0.390***	0.017	− 0.031	− 0.194***
	(0.0144)	(0.0173)	(0.0218)	(0.024)	(0.0204)	(0.0322)	(0.0238)	(0.0379)
Asian	− 0.082***	− 0.158***	− 0.122***	− 0.011	− 0.253***	0.101**	− 0.055	− 0.376***
	(0.0210)	(0.0326)	(0.0291)	(0.0320)	(0.0239)	(0.0399)	(0.0418)	(0.0741)
Other race	0.117***	0.294***	0.272***	− 0.102***	− 0.279***	− 0.216***	0.075*	− 0.347***
	(0.0250)	(0.0242)	(0.0271)	(0.0274)	(0.0289)	(0.0416)	(0.0407)	(0.0498)
(Rich household)*(Black)	− 0.210***	− 0.210***	− 0.121***	0.015	0.004	0.031	− 0.020	− 0.112
	(0.0267)	(0.0321)	(0.0314)	(0.0412)	(0.0328)	(0.0413)	(0.0543)	(0.0796)
(Rich household)*(Hispanic)	− 0.154***	− 0.115***	− 0.036	0.133***	0.196***	− 0.002	0.157**	0.031
	(0.0258)	(0.0245)	(0.0263)	(0.0400)	(0.0321)	(0.0561)	(0.0621)	(0.0731)

Table 17 (continued)

Variables	(1) Ord Logit: bpl Full set of controls (196 MSAs)	(2) Ord Logit: bpla Full set of controls (196 MSAs)	(3) Ord Logit: bpla Full set of controls + bpl control (196 MSAs)	(4) Logit: worry Full set of controls (196 MSAs)	(5) Logit: stress Full set of controls (196 MSAs)	(6) Logit: citysat Full set of controls (196 MSAs)	(7) Logit: anger Full set of controls (196 MSAs)	(8) Logit: social support Full set of controls (200 MSAs)
(Rich household)*(Asian)	− 0.124***	− 0.055	0.002	− 0.015	0.044	0.046	0.033	− 0.232**
	(0.0361)	(0.0353)	(0.0311)	(0.0456)	(0.0441)	(0.0594)	(0.0677)	(0.0921)
(Rich household)*(Other race)	− 0.084*	− 0.148***	− 0.106**	0.045	0.055	− 0.097	0.109	− 0.184
	(0.0468)	(0.0480)	(0.0490)	(0.0710)	(0.0632)	(0.0928)	(0.0848)	(0.1137)
(Poor household)*(Black)	0.416***	0.247***	0.039	− 0.026	− 0.038*	− 0.007	0.061*	− 0.029
	(0.0245)	(0.0244)	(0.0255)	(0.0281)	(0.0200)	(0.0325)	(0.0340)	(0.0433)
(Poor household)*(Hispanic)	0.301***	− 0.160***	− 0.368***	− 0.001	− 0.108***	0.151***	0.169***	− 0.159***
	(0.0210)	(0.0261)	(0.0302)	(0.0243)	(0.0266)	(0.0341)	(0.0368)	(0.0497)
(Poor household)*(Asian)	0.214***	0.054	− 0.071*	0.035	0.067	− 0.113*	0.064	0.028
	(0.0381)	(0.0388)	(0.0404)	(0.0578)	(0.0564)	(0.0670)	(0.0835)	(0.1125)
(Poor household)*(Other race)	0.180***	0.054	− 0.037	− 0.007	0.029	− 0.047	0.122*	− 0.087
	(0.0551)	(0.0552)	(0.0557)	(0.0519)	(0.0519)	(0.0620)	(0.0680)	(0.0811)
Lacked money for food (past 12m)	− 0.717***	− 0.182***	0.266***	0.686***	0.614***	− 0.451***	0.466***	− 0.778***
	(0.0131)	(0.0116)	(0.0099)	(0.0127)	(0.0120)	(0.0140)	(0.0168)	(0.0194)
Lacked money for healthcare (past 12m)	− 0.552***	− 0.276***	0.041***	0.566***	0.503***	− 0.333***	0.338***	− 0.744***
	(0.0105)	(0.0087)	(0.0110)	(0.0126)	(0.0101)	(0.0128)	(0.0136)	(0.0175)
Ages 25–34	− 0.216***	− 0.169***	− 0.069***	0.042***	− 0.139***	− 0.072***	− 0.048**	− 0.408***
	(0.0143)	(0.0133)	(0.0142)	(0.0161)	(0.0154)	(0.0178)	(0.0209)	(0.0385)
Ages 35–44	− 0.302***	− 0.523***	− 0.439***	0.100***	− 0.258***	0.064***	− 0.062***	− 0.781***
	(0.0159)	(0.0151)	(0.0154)	(0.0180)	(0.0148)	(0.0246)	(0.0217)	(0.0391)

Table 17 (continued)

Variables	(1) Ord Logit: bpl	(2) Ord Logit: bpla	(3) Ord Logit: bpla	(4) Logit: worry	(5) Logit: stress	(6) Logit: citysat	(7) Logit: anger	(8) Logit: social support
	Full set of controls (196 MSAs)	Full set of controls (196 MSAs)	Full set of controls + bpl control (196 MSAs)	Full set of controls (196 MSAs)	Full set of controls (196 MSAs)	Full set of controls (196 MSAs)	Full set of controls (196 MSAs)	Full set of controls (200 MSAs)
Ages 45–54	− 0.343***	− 0.799***	− 0.739***	0.079***	− 0.454***	0.211***	− 0.251***	− 1.054***
	(0.0170)	(0.0158)	(0.0158)	(0.0196)	(0.0157)	(0.0242)	(0.0239)	(0.0383)
Ages 55–64	− 0.250***	− 1.168***	− 1.235***	− 0.119***	− 0.769***	0.335***	− 0.457***	− 1.124***
	(0.0165)	(0.0152)	(0.0175)	(0.0174)	(0.0165)	(0.0282)	(0.0254)	(0.0377)
Age 65+	0.073***	− 1.542***	− 1.822***	− 0.574***	− 1.356***	0.668***	− 0.748***	− 0.851***
	(0.0158)	(0.0176)	(0.0171)	(0.0197)	(0.0207)	(0.0263)	(0.0304)	(0.0428)
Male	− 0.309***	− 0.366***	− 0.234***	− 0.145***	− 0.222***	− 0.064***	0.109***	− 0.084***
	(0.0082)	(0.0066)	(0.0053)	(0.0095)	(0.0074)	(0.0148)	(0.0099)	(0.0150)
Single	− 0.244***	− 0.077***	0.065***	− 0.003	− 0.015*	− 0.093***	0.012	0.255***
	(0.0086)	(0.0084)	(0.0075)	(0.0108)	(0.0086)	(0.0130)	(0.0140)	(0.0205)
Divorced/separated	− 0.333***	− 0.007	0.199***	0.105***	0.093***	− 0.163***	0.041**	0.138***
	(0.0090)	(0.0107)	(0.0111)	(0.0104)	(0.0096)	(0.0156)	(0.0164)	(0.0177)
Widowed	− 0.202***	− 0.210***	− 0.103***	− 0.020	− 0.090***	0.143***	− 0.226***	0.508***
	(0.0135)	(0.0137)	(0.0127)	(0.0179)	(0.0144)	(0.0252)	(0.0266)	(0.0309)
Underweight	− 0.130***	− 0.122***	− 0.059**	0.090***	0.017	− 0.096***	− 0.017	− 0.101**
	(0.0273)	(0.0223)	(0.0232)	(0.0249)	(0.0245)	(0.0355)	(0.0429)	(0.0515)
Overweight	− 0.074***	− 0.016***	0.023***	− 0.050***	− 0.001	− 0.039***	0.025**	− 0.086***
	(0.0066)	(0.0058)	(0.0054)	(0.0077)	(0.0074)	(0.0116)	(0.0121)	(0.0157)
Obese	− 0.176***	− 0.062***	0.032***	− 0.110***	− 0.023***	− 0.055***	0.040***	− 0.157***
	(0.0082)	(0.0077)	(0.0068)	(0.0085)	(0.0084)	(0.0148)	(0.0141)	(0.0178)

Table 17 (continued)

Variables	(1) Ord Logit: bpl Full set of controls (196 MSAs)	(2) Ord Logit: bpla Full set of controls (196 MSAs)	(3) Ord Logit: bpla Full set of controls + bpl control (196 MSAs)	(4) Logit: worry Full set of controls (196 MSAs)	(5) Logit: stress Full set of controls (196 MSAs)	(6) Logit: citysat Full set of controls (196 MSAs)	(7) Logit: anger Full set of controls (196 MSAs)	(8) Logit: social support Full set of controls (200 MSAs)
Health problems	− 0.397***	− 0.342***	− 0.157***	0.388***	0.405***	− 0.217***	0.147***	− 0.184***
	(0.0095)	(0.0078)	(0.0078)	(0.0090)	(0.0103)	(0.0132)	(0.0132)	(0.0174)
Experienced physical pain	− 0.361***	− 0.273***	− 0.103***	0.847***	0.838***	− 0.308***	0.830***	− 0.310***
	(0.0077)	(0.0081)	(0.0072)	(0.0106)	(0.0090)	(0.0119)	(0.0126)	(0.0163)
Smokes	− 0.297***	0.027***	0.213***	0.149***	0.202***	− 0.276***	0.260***	− 0.222***
	(0.0083)	(0.0089)	(0.0089)	(0.0093)	(0.0087)	(0.0112)	(0.0135)	(0.0175)
Exercises at least once over the last 7 days	0.257***	0.224***	0.106***	− 0.195***	− 0.168***	0.072***	− 0.140***	0.066***
	(0.0060)	(0.0088)	(0.0081)	(0.0076)	(0.0069)	(0.0091)	(0.0121)	(0.0132)
Religious preference (vs. atheist	0.108***	0.145***	0.105***	0.006	− 0.018**	0.133***	− 0.054***	0.185***
	(0.0064)	(0.0074)	(0.0081)	(0.0091)	(0.0083)	(0.0156)	(0.0147)	(0.0200)
Less than HS	0.002	− 0.205***	− 0.209***	− 0.183***	− 0.337***	− 0.078***	0.112***	− 0.452***
	(0.0188)	(0.0242)	(0.0243)	(0.0187)	(0.0226)	(0.0219)	(0.0233)	(0.0313)
HS graduate	− 0.062***	− 0.048***	− 0.012	− 0.240***	− 0.361***	− 0.069***	0.003	− 0.233***
	(0.0081)	(0.0088)	(0.0087)	(0.0129)	(0.0125)	(0.0180)	(0.0146)	(0.0231)
Technical/vocational school	− 0.152***	− 0.015	0.073***	− 0.161***	− 0.241***	− 0.167***	0.027	− 0.265***
	(0.0125)	(0.0145)	(0.0128)	(0.0154)	(0.0149)	(0.0203)	(0.0212)	(0.0273)
Some college	− 0.118***	− 0.004	0.069***	− 0.098***	− 0.120***	− 0.162***	0.017	− 0.183***
	(0.0063)	(0.0061)	(0.0056)	(0.0127)	(0.0094)	(0.0137)	(0.0129)	(0.0200)
Post-graduate	0.147***	0.080**	0.003	0.060***	0.109***	0.039***	− 0.021	0.047**
	(0.0071)	(0.0071)	(0.0064)	(0.0098)	(0.0085)	(0.0137)	(0.0158)	(0.0213)

Table 17 (continued)

Variables	(1) Ord Logit: bpl Full set of controls (196 MSAs)	(2) Ord Logit: bpla Full set of controls (196 MSAs)	(3) Ord Logit: bpla Full set of controls + bpl control (196 MSAs)	(4) Logit: worry Full set of controls (196 MSAs)	(5) Logit: stress Full set of controls (196 MSAs)	(6) Logit: citysat Full set of controls (196 MSAs)	(7) Logit: anger Full set of controls (196 MSAs)	(8) Logit: social support Full set of controls (200 MSAs)
(3) Self-employed	0.035***	0.291***	0.334***	0.246***	0.123***	− 0.064***	0.124***	
	(0.0124)	(0.0117)	(0.0125)	(0.0186)	(0.0165)	(0.0247)	(0.0257)	
Employed PT	0.273***	0.103***	− 0.042***	− 0.088***	− 0.267***	0.112***	− 0.119***	
	(0.0113)	(0.0112)	(0.0099)	(0.0216)	(0.0166)	(0.0263)	(0.0261)	
Underemployed	− 0.276***	− 0.005	0.182***	0.266***	0.030**	− 0.163***	0.113***	
	(0.0124)	(0.0108)	(0.0111)	(0.0152)	(0.0147)	(0.0191)	(0.0210)	
Unemployed	− 0.490***	0.094***	0.466***	0.450***	0.111***	− 0.240***	0.173***	
	(0.0160)	(0.0145)	(0.0171)	(0.0161)	(0.0185)	(0.0210)	(0.0199)	
Not in workforce	0.171***	− 0.032***	− 0.121***	− 0.011	− 0.272***	0.015	− 0.019	
	(0.0076)	(0.0076)	(0.0073)	(0.0094)	(0.0100)	(0.0123)	(0.0159)	
Observations	770,899	770,899	770,899	770,899	770,899	770,899	608,787	347,080
MSA dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Clustered standard errors (at MSA-level) in parentheses

***$p < 0.01$; **$p < 0.05$; *$p < 0.1$

Note: These regressions include the 196 MSAs for which sampling weights were available at least in 1 year, except for social support, where 200 MSAs were available. All specifications use the 2010–2015 period, except for anger (2010–2013) and social support (2008–2012)

Table 18 Re-estimation of Table 3, using ordered logit and logit models

	(1) Ord Logit: bpl	(2) Ord Logit: bpla	(3) Ord Logit: bpla	(4) Logit: worry	(5) Logit: stress	(6) Logit: citysat	(7) Logit: anger	(8) Logit: social support
Variables	Full set of controls (196 MSAs)	Full set of controls (196 MSAs)	Full set of controls + bpl control (196 MSAs)	Full set of controls (196 MSAs)	Full set of controls (196 MSAs)	Full set of controls (196 MSAs)	Full set of controls (196 MSAs)	Full set of controls (200 MSAs)
Bl0061ck	− 0.031	0.654***	0.801***	− 0.349***	− 0.665***	− 0.484***	0.266***	− 0.753***
	(0.0275)	(0.0310)	(0.0317)	(0.0306)	(0.0318)	(0.0422)	(0.0421)	(0.0771)
Ages 25–34	− 0.271***	− 0.192***	− 0.059***	0.049**	− 0.110***	− 0.107***	− 0.003	− 0.416***
	(0.0136)	(0.0154)	(0.0168)	(0.0206)	(0.0205)	(0.0231)	(0.0253)	(0.0480)
Ages 35–44	− 0.388***	− 0.558***	− 0.428***	0.124***	− 0.231***	0.042	0.019	− 0.878***
	(0.0137)	(0.0161)	(0.0176)	(0.0219)	(0.0175)	(0.0297)	(0.0244)	(0.0516)
Ages 45–54	− 0.454***	− 0.839***	− 0.717***	0.118***	− 0.443***	0.146***	− 0.164***	− 1.226***
	(0.0163)	(0.0165)	(0.0189)	(0.0228)	(0.0189)	(0.0294)	(0.0253)	(0.0511)
Ages 55–64	− 0.344***	− 1.192***	− 1.206***	− 0.091***	− 0.779***	0.267***	− 0.377***	− 1.320***
	(0.0162)	(0.0172)	(0.0204)	(0.0204)	(0.0185)	(0.0331)	(0.0278)	(0.0496)
Age 65+	− 0.008	− 1.555***	− 1.791***	− 0.574***	− 1.381***	0.629***	− 0.667***	− 0.992***
	(0.0164)	(0.0200)	(0.0209)	(0.0222)	(0.0209)	(0.0307)	(0.0293)	(0.0540)
(Black)*(Ages 25–34)	0.096***	0.116***	0.064*	0.032	-0.002	0.012	− 0.181***	0.080
	(0.0317)	(0.0348)	(0.0346)	(0.0388)	(0.0340)	(0.0393)	(0.0479)	(0.0945)
(Black)*(Ages 35–44)	0.222***	0.249***	0.148***	− 0.072*	0.032	0.006	− 0.320***	0.383***
	(0.0346)	(0.0365)	(0.0358)	(0.0385)	(0.0332)	(0.0431)	(0.0496)	(0.0867)
(Black)*(Ages 45–54)	0.534***	0.350***	0.079**	− 0.273***	− 0.002	0.165***	− 0.426***	0.657***
	(0.0317)	(0.0352)	(0.0362)	(0.0372)	(0.0332)	(0.0486)	(0.0530)	(0.0811)

Table 18 (continued)

	(1) Ord Logit: bpl	(2) Ord Logit: bpla	(3) Ord Logit: bpla	(4) Logit: worry	(5) Logit: stress	(6) Logit: citysat	(7) Logit: anger	(8) Logit: social support
Variables	Full set of controls (196 MSAs)	Full set of controls (196 MSAs)	Full set of controls + bpl control (196 MSAs)	Full set of controls (196 MSAs)	Full set of controls (196 MSAs)	Full set of controls (196 MSAs)	Full set of controls (196 MSAs)	Full set of controls (200 MSAs)
(Black)*(Ages 55–64)	0.488***	0.274***	0.009	− 0.256**	0.077**	0.258***	− 0.455***	0.844***
	(0.0341)	(0.0322)	(0.0324)	(0.0382)	(0.0359)	(0.0492)	(0.0607)	(0.0914)
(Black)*(Age 65+)	0.430***	0.052	− 0.196***	− 0.178***	0.190***	0.131**	− 0.572***	0.448***
	(0.0432)	(0.0382)	(0.0357)	(0.0448)	(0.0446)	(0.0567)	(0.0739)	(0.0995)
	770,899	770,899	770,899	770,899	770,899	770,899	608,787	347,080
	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Clustered standard errors (at MSA-level) in parentheses

***$p < 0.01$; **$p < 0.05$; *$p < 0.1$

Note: These regressions include the 196 MSAs for which sampling weights were available at least in 1 year, except for social support, where 200 MSAs were available. All specifications use the 2010–2015 period, except for anger (2010–2013) and social support (2008–2012). All individual-level controls from Table 2 were included but are not displayed

Table 19 Re-estimation of Table 4, using ordered logit and logit models

Variables	(1) Ord Logit: bpl Full set of controls	(2) Ord Logit: bpla Full set of controls	(3) Ord Logit: bpla Full set of controls + bpl control	(4) Logit: worry Full set of controls	(5) Logit: stress Full set of controls	(6) Logit: citysat Full set of controls	(7) Logit: anger Full set of controls	(8) Logit: social support Full set of controls
Rural	− 0.011	− 0.092***	− 0.097***	− 0.050***	− 0.085***	− 0.076***	− 0.081***	0.055*
	(0.0132)	(0.0121)	(0.0130	(0.0173)	(0.0203)	(0.0294)	(0.0190)	(0.0287)
Black	0.393***	0.763***	0.670***	− 0.437***	− 0.637***	− 0.456***	0.066***	− 0.323***
	(0.0207)	(0.0208)	(0.0226)	(0.0285)	(0.0239)	(0.0344)	(0.0232)	(0.0390)
Hispanic	0.410***	0.099***	− 0.101**	− 0.005	− 0.408***	0.099***	0.148***	− 0.388***
	(0.0133)	(0.0346)	(0.0417)	(0.0285)	(0.0197)	(0.0366)	(0.0305)	(0.0559)
Asian	0.102***	− 0.160***	− 0.224***	0.073	− 0.116***	0.015	− 0.026	− 0.236***
	(0.0265)	(0.0321)	(0.0337)	(0.0589)	(0.0446)	(0.0543)	(0.0634)	(0.0863)
Other race	0.226***	0.189***	0.108***	− 0.065*	− 0.269***	− 0.247***	0.146***	− 0.440***
	(0.0363)	(0.0329)	(0.0357)	(0.0380)	(0.0317)	(0.0718)	(0.0485)	(0.0741)
(Rural)*(Black)	0.137***	− 0.040	− 0.117***	− 0.000	0.053	− 0.046	0.002	0.008
	(0.0424)	(0.0449)	(0.0413)	(0.0483)	(0.0553)	(0.0396)	(0.0664)	(0.0772)
(Rural)*(Hispanic)	− 0.077*	0.070	0.103*	− 0.017	0.019	0.052	0.013	0.162
	(0.0457)	(0.0446)	(0.0609)	(0.0497)	(0.0562)	(0.0649)	(0.0545)	(0.0985)
(Rural)*(Asian)	0.214	0.385***	0.307***	− 0.222	− 0.037	− 0.181	0.224	− 0.007
	(0.1522)	(0.1158)	(0.0898)	(0.1879)	(0.1593)	(0.2298)	(0.2492)	(0.3396)
(Rural)*(Other race)	− 0.076	− 0.014	0.032	0.013	0.015	− 0.102	0.031	0.272**
	(0.0766)	(0.0612)	(0.0516)	(0.0979)	(0.0740)	(0.0814)	(0.0786)	(0.1144)

Table 19 (continued)

Variables	(1) Ord Logit: bpl Full set of controls	(2) Ord Logit: bpla Full set of controls	(3) Ord Logit: bpla Full set of controls + bpl control	(4) Logit: worry Full set of controls	(5) Logit: stress Full set of controls	(6) Logit: citysat Full set of controls	(7) Logit: anger Full set of controls	(8) Logit: social support Full set of controls
Observations	225,576	225,576	225,576	225,576	225,576	225,576	177,294	104,326
State dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Clustered standard errors (at the state level) in parentheses

***$p < 0.01$; **$p < 0.05$; *$p < 0.1$

Note: These regressions include only poor individuals. The remaining individual-level controls that were used for Table 2 were also used, but are not displayed

Table 20 Re-estimation of Table 5, using ordered logit and logit models

Variables	(1) Ord Logit: bpl Full set of controls	(2) Ord Logit: bpla Full set of controls	(3) Ord Logit: bpla Full set of controls + bpl control	(4) Logit: worry Full set of controls	(5) Logit: stress Full set of controls	(6) Logit: citysat Full set of controls	(7) Logit: anger Full set of controls	(8) Logit: social support Full set of controls
Rural	0.058***	− 0.028***	− 0.067***	− 0.082***	− 0.098***	− 0.093***	− 0.117***	0.043***
	(0.0076)	(0.0078)	(0.0083)	(0.0116)	(0.0107)	(0.0231)	(0.0154)	(0.0158)
Poor household	− 0.283***	− 0.120***	0.057***	0.144***	0.102***	− 0.141***	0.039***	− 0.158***
	(0.0135)	(0.0114)	(0.0121)	(0.0111)	(0.0107)	(0.0124)	(0.0143)	(0.0210)
Rich household	0.423***	0.260***	0.047***	− 0.013*	0.078***	0.266***	0.004	0.085***
	(0.0062)	(0.0053)	(0.0065)	(0.0082)	(0.0098)	(0.0183)	(0.0165)	(0.0156)
(Rural)*(Poor household)	− 0.054***	− 0.098***	− 0.077***	0.041**	0.020	0.014	0.047**	0.029
	(0.0169)	(0.0172)	(0.0182)	(0.0198)	(0.0226)	(0.0187)	(0.0232)	(0.0344)
(Rural)*(Rich household)	0.008	0.069***	0.079***	− 0.003	− 0.056**	− 0.236***	0.069	− 0.120***
	(0.0181)	(0.0195)	(0.0207)	(0.0235)	(0.0258)	(0.0340)	(0.0450)	(0.0431)
Observations	926,901	926,901	926,901	926,901	926,901	926,901	721,240	408,110
State dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Clustered standard errors (at the state level) in parentheses

***$p < 0.01$; **$p < 0.05$; *$p < 0.1$

Note: These regressions include only white non-hispanic individuals. The remaining individual-level controls that were used for Table 2 were also used, but are not displayed

Table 21 Re-estimation of Table 6, using ordered logit and logit models

Variables	(1) Ord Logit: bpl Full set of controls (194 MSAs)	(2) Ord Logit: bpla Full set of controls (194 MSAs)	(3) Ord Logit: bpla Full set of controls + bpl control (194 MSAs)	(4) Logit: worry Full set of controls (194 MSAs)	(5) Logit: stress Full set of controls (194 MSAs)	(6) Logit: citysat Full set of controls (194 MSAs)	(7) Logit: anger Full set of controls (194 MSAs)	(8) Logit: social support Full set of controls (198 MSAs)
Reported life satisfaction today (0–10)			0.709***					
			(0.0081)					
Log(Gini Index)	− 0.076	0.399	0.460**	0.149	− 0.161	− 0.808*	− 0.490	0.953*
	(0.2318)	(0.2481)	(0.2300)	(0.3136)	(0.2804)	(0.4249)	(0.5350)	(0.5241)
Log(mean MSA household income)	0.079	0.241	0.172	0.458**	0.173	− 0.218	− 0.015	− 0.213
	(0.1776)	(0.1659)	(0.1608)	(0.2165)	(0.1833)	(0.3415)	(0.3885)	(0.3632)
Log(MSA composite death rate per 100,000 people, all races, 35–64)-	− 0.072*	− 0.073*	− 0.043	0.133***	0.031	− 0.034	0.001	− 0.095
	(0.0426)	(0.0374)	(0.0347)	(0.0495)	(0.0422)	(0.0834)	(0.0889)	(0.0882)
Log(white non-Hispanic share of population (%), MSA-level)	− 0.861**	− 0.146	0.304	− 0.025	0.265	− 1.108*	0.956	0.828
	(0.3630)	(0.2902)	(0.3303)	(0.5059)	(0.4274)	(0.6670)	(1.1328)	(1.2640)
Poor household	− 0.325***	− 0.137***	0.051***	0.142***	0.085***	− 0.156***	− 0.002	− 0.206***
	(0.0107)	(0.0103)	(0.0105)	(0.0129)	(0.0126)	(0.0172)	(0.0181)	(0.0214)
Rich household	0.446***	0.270***	0.054***	− 0.033***	0.072***	0.232***	0.014	0.106***
	(0.0072)	(0.0076)	(0.0079)	(0.0109)	(0.0108)	(0.0182)	(0.0183)	(0.0213)
Black	0.160***	0.787***	0.830***	− 0.455***	− 0.626***	− 0.399***	− 0.038	− 0.281***
	(0.0135)	(0.0186)	(0.0180)	(0.0204)	(0.0201)	(0.0427)	(0.0255)	(0.0339)
Hispanic	0.273***	0.363***	0.268***	− 0.104***	− 0.390***	0.018	− 0.034	− 0.193***
	(0.0145)	(0.0174)	(0.0219)	(0.0250)	(0.0206)	(0.0323)	(0.0237)	(0.0380)

Table 21 (continued)

Variables	(1) Ord Logit: bpl Full set of controls (194 MSAs)	(2) Ord Logit: bpla Full set of controls (194 MSAs)	(3) Ord Logit: bpla Full set of controls + bpl control (194 MSAs)	(4) Logit: worry Full set of controls (194 MSAs)	(5) Logit: stress Full set of controls (194 MSAs)	(6) Logit: citysat Full set of controls (194 MSAs)	(7) Logit: anger Full set of controls (194 MSAs)	(8) Logit: social support Full set of controls (198 MSAs)
Asian	− 0.082***	− 0.158***	− 0.123***	− 0.010	− 0.253***	0.102**	− 0.057	− 0.374***
	(0.0210)	(0.0326)	(0.0291)	(0.0321	(0.0240)	(0.0399)	(0.0417)	(0.0741)
Other race	0.117***	0.293***	0.272***	− 0.100***	− 0.278***	− 0.213***	0.075*	− 0.346***
	(0.0250)	(0.0242)	(0.0271)	(0.0274)	(0.0289)	(0.0418)	(0.0406)	(0.0498)
(Rich household)*(Black)	− 0.211***	− 0.211***	− 0.122***	0.014	0.006	0.027	− 0.016	− 0.117
	(0.0267)	(0.0321)	(0.0314)	(0.0414)	(0.0328)	(0.0412)	(0.0543)	(0.0796)
(Rich household)*(Hispanic)	− 0.153***	− 0.115***	− 0.036	0.133***	0.194***	− 0.008	0.157**	0.037
	(0.0258)	(0.0246)	(0.0263)	(0.0402)	(0.0321)	(0.0558)	(0.0624)	(0.0736)
(Rich household)*(Asian)	− 0.126***	− 0.054	0.004	− 0.017	0.044	0.045	0.035	− 0.234**
	(0.0361)	(0.0353)	(0.0311)	(0.0457)	(0.0441)	(0.0595)	(0.0676)	(0.0922)
(Rich household)*(Other race)	− 0.086*	− 0.144***	− 0.101**	0.048	0.052	− 0.104	0.113	− 0.183
	(0.0469)	(0.0479)	(0.0489)	(0.0710)	(0.0633)	(0.0927)	(0.0848)	(0.1141)
(Poor household)*(Black)	0.417***	0.246***	0.037	− 0.027	− 0.039*	− 0.008	0.062*	− 0.028
	(0.0246)	(0.0244)	(0.0255)	(0.0281)	(0.0281)	(0.0326)	(0.0341)	(0.0435)
(Poor household)*(Hispanic)	0.300***	− 0.159***	− 0.367***	− 0.002	− 0.109***	0.151***	0.174***	− 0.160***
	(0.0210)	(0.0263)	(0.0304)	(0.0242)	(0.0267)	(0.0343)	(0.0368)	(0.0498)
(Poor household)*(Asian)	0.215***	0.054	− 0.072*	0.035	0.065	− 0.117*	0.063	0.025
	(0.0382)	(0.0388)	(0.0403)	(0.0578)	(0.0564)	(0.0670)	(0.0837)	(0.1124)

Table 21 (continued)

Variables	(1) Ord Logit: bpl Full set of controls (194 MSAs)	(2) Ord Logit: bpla Full set of controls (194 MSAs)	(3) Ord Logit: bpla Full set of controls + bpl control (194 MSAs)	(4) Logit: worry Full set of controls (194 MSAs)	(5) Logit: stress Full set of controls (194 MSAs)	(6) Logit: citysat Full set of controls (194 MSAs)	(7) Logit: anger Full set of controls (194 MSAs)	(8) Logit: social support Full set of controls (198 MSAs)
(Poor household)*(Other race)	0.182***	0.056	− 0.035	− 0.010	0.027	− 0.049	0.120*	− 0.086
	(0.0551)	(0.0552)	(0.0559)	(0.0519)	(0.0519)	(0.0621)	(0.0681)	(0.0814)
Observations	768,810	768,810	768,810	768,810	768,810	768,810	606,699	345,631
MSA dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Clustered standard errors (at MSA-level) in parentheses

***$p < 0.01$; **$p < 0.05$; *$p < 0.1$

These regressions include all the MSAs for which sampling weights and death rates were available at least in 1 year. The individual-level controls from Table 2 are not displayed (except those related to race and income) but were included

Appendix 4 The geography of stress and pain, by race group

Figure 5 below displays the maps for stress and pain, which are not in the main text.

Figure 6 shows the corresponding boxplots of state coefficients for each of the five mapped variables. Although the geographical patterns are different for whites and minorities, the dispersion in absolute terms is similar for both groups, except for life satisfaction, where location seems to matter substantially more for minorities.

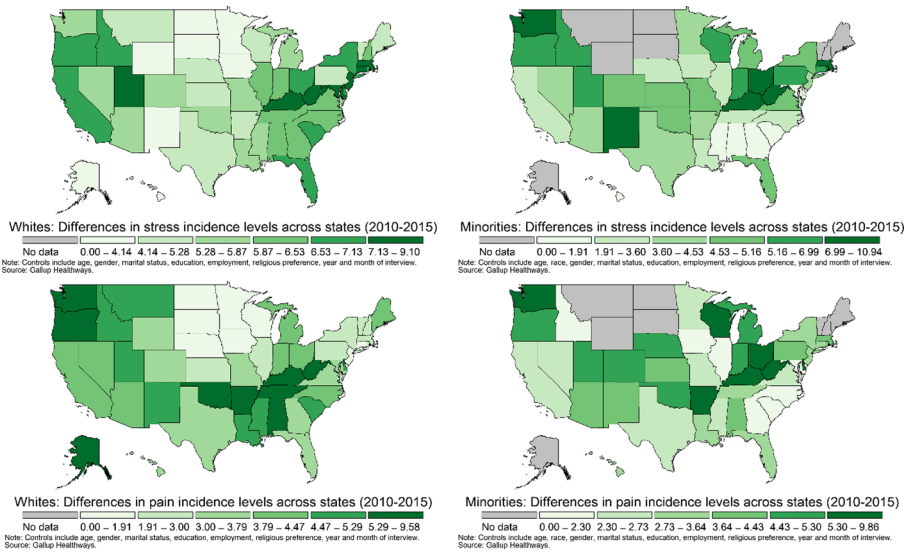

Fig. 5 The geography of stress and pain, by race groups

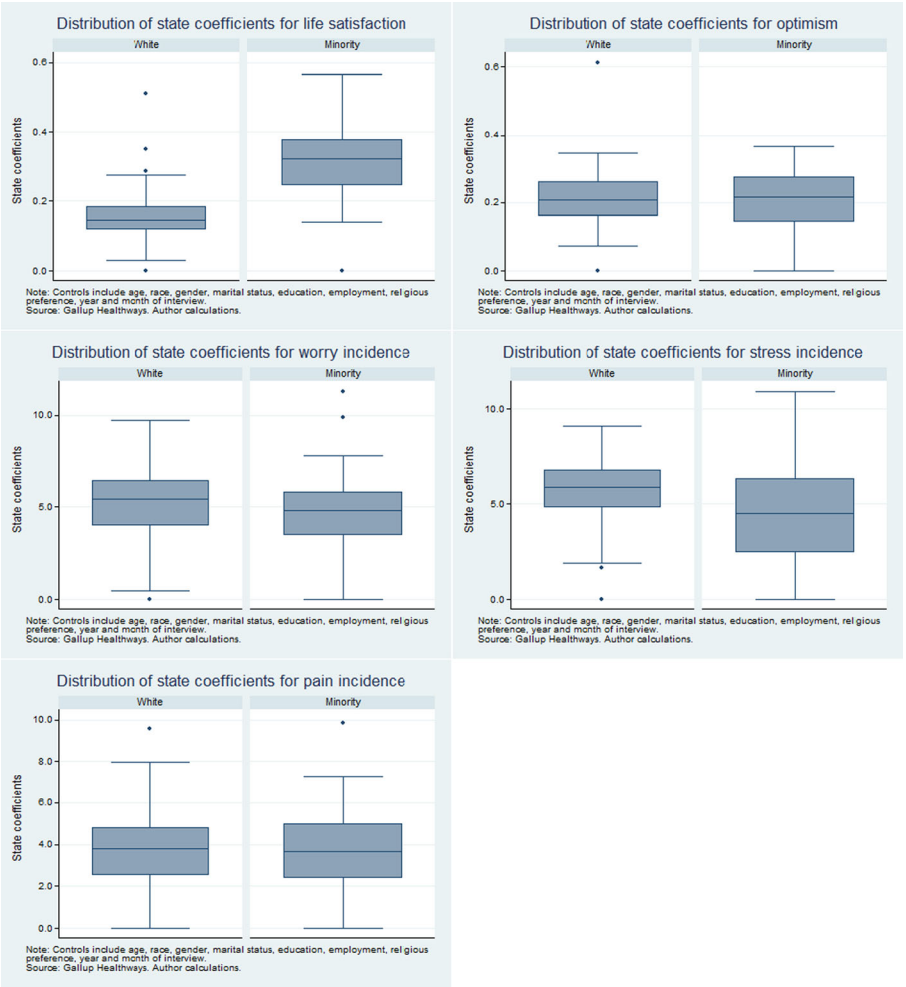

Fig. 6 The geography of stress and pain, by race groups

References

Adrianzen B, Graham GG (1973) The high costs of being poor. Arch Environ Health 28(6):312–315

Andrews R, Casey M, Hardy B, Logan T (2017) Location matters: historical racial segregation and intergenerational mobility outcomes. Econ Lett 158:67–72. https://doi.org/10.1016/j.econlet.2017.06.018

Angelini V, Casi L, Corazzini L (2013) Life satisfaction of immigrants: does cultural assimilation matter? J Popul Econ 28:817–844

Assari S, Lankarani M (2016) Depressive symptoms are associated with more hopelessness among white than black older adults. Front Public Health 4(82):1–10

Black S, Furman J, Rackstraw E, Rao N (2016) The long-term decline in US prime-age male labour force participation. VoxEU.org, July 6

Blanchflower D, Oswald A (2004) Well-being over time in Britain and the USA. J Public Econ 88(7-8):1359–1386. https://doi.org/10.1016/S0047-2727(02)00168-8

Blanchflower D, Oswald A (2008) Is well-being U-shaped over the life cycle? Soc Sci Med 66(8):1733–1749. https://doi.org/10.1016/j.socscimed.2008.01.030

Blanchflower D Oswald A (2018) Unhappiness and pain in modern America: a review essay and further evidence on Carol Graham's happiness for all? J Econ Lit, forthcoming

Case A, Deaton A (2015a) Rising morbidity and mortality in midlife among white non-Hispanic Americans in the 21st century. Proc Natl Acad Sci 112(49):15078–15083. https://doi.org/10.1073/pnas.1518393112

Case A Deaton A (2015b) Suicide, age, and wellbeing: an empirical investigation. Center for Health and Wellbeing, Princeton University. http://www.nber.org/papers/w21279

Case A Deaton A (2017) Mortality and morbidity in the 21st century, Brookings Papers on Economic Activity, Spring 2017

Cherlin A (2016) Why are white death rates rising? New York Times. February 22

Chetty R, Hendren N, Kline P, Saez E (2014) Where is the land of opportunity? The geography of intergenerational mobility in the United States. Q J Econ 129(4):1553–1623. https://doi.org/10.1093/qje/qju022

Chetty R, Stepner M, Abraham S, Lin S, Scuderi B, Turner N, Bergeron A, Cutler D (2016) The association between income and life expectancy in the United States, 2001–2014. J Am Med Assoc 315(16):1750–1766. https://doi.org/10.1001/jama.2016.4226

Clark A (2006) A note on unhappiness and unemployment duration. IZA Discussion Papers, No. 2406, October

Clark A, Oswald A (1994) Unhappiness and unemployment. Econ J 104(424):648–659

De Neve JE (2013) In: Helliwell J, Layard R, Sachs J (2013) World Happiness Report, 2013. New York: Earth Institute Press

Demyank Y, Hyrshko D, Luego-Prado, MJ, Sorensen B (2017). "The Rise and Fall of Consumption in the 00's: A Tangled Tale", Working Paper, Federal Reserve Bank of Cleveland, (December). www.cepr.org/active/publications/discussion_papers/dp.php?dpno=12522

Dursun B, Cesur R (2016) Transforming lives: the impact of compulsory schooling on hope and happiness. J Popul Econ 29(3):911–956

Dwyer-Lindgren L, Bertozzi-Villa A, Stubbs RW, Morozoff C, Kutz MJ, Huynh C, Barber RM, Shackelford KA, Mackenbach JP, van Lenthe FJ, Flaxman AD, Naghavi M, Mokdad AH, Murray CJL (2016) U.S. county-level trends in mortality rates for major causes of death, 1980-2014. J Am Med Assoc 316(22):2385–2401. https://doi.org/10.1001/jama.2016.13645

Eberstadt N (2016) Men without work: America's invisible crisis. Templeton, W.C. Pennsylvania

Gelman A, Auerbach J (2016) Age aggregation bias in mortality trends. Proc Natl Acad Sci 113(7):E816–E817. https://doi.org/10.1073/pnas.1523465113

Graham C (2008) Happiness and health: lessons—and questions—for policy. Health Aff 27(2):72–87. https://doi.org/10.1377/hlthaff.27.1.72

Graham C (2017) Happiness for all? Unequal hopes and lives in pursuit of the American dream. Princeton University Press, Princeton 2017

Graham C, Pettinato S (2002) Frustrated achievers: winners, losers, and subjective well-being in new market economies. J Dev Stud 38(4):100–140. https://doi.org/10.1080/00220380412331322431

Graham C, Ruiz-Pozuelo J (2017) Happiness, stress, and age: how the U-curve varies across people and places. J Popul Econ 30(1):225–264. https://doi.org/10.1007/s00148-016-0611-2

Graham C, Eggers A, Sukhtankar S (2004) Does happiness pay? An initial exploration based on panel data from Russia. J Econ Behav Organ 55:319–342

Herbst C (2013) Welfare reform and the subjective well-being of single mothers. J Popul Econ 26(1):203–238. https://doi.org/10.1007/s00148-012-0406-z

Isenberg N (2016) White trash: the 400-year untold history of class in America. Viking, New York

Jackson J (2015) The role of well-being measures in minority aging research. Presentation to National Institutes of Aging Conference on Well-Being and Aging, Orlando, November 18

K Kawashima-Ginsberg, Sullivan F (2017). Sixty percent of rural Millennials lack access to a political life. The Conversation, March 27

Keyes C, Simoes E (2012) To flourish or not: positive mental health and all-cause mortality. Am J Public Health 102(11):2164–2172. https://doi.org/10.2105/AJPH.2012.300918

Krekel C, Tiefenbach T, Ziebarth NR (2015) How natural disasters can affect environmental concerns, risk aversion, and even politics: evidence from Fukushima and three European countries. J Popul Econ 28: 1137–1180

Krueger A (2017) Where have all the workers gone: an inquiry into the decline of the U.S. labor force participation rate. Brookings Papers on Economic Activity Fall 2017, forthcoming

Krugman P (2015) Despair, American style. New York Times, November 9, A19

Kuziemko I, Norton M, Saez E, Stantcheva S (2015) How elastic are preferences for redistribution? Evidence from randomized survey experiments. Am Econ Rev 105(4):1478–1508. https://doi.org/10.1257/aer.20130360

Oswald A, Wu S (2011) Well-being across America. Rev Econ Stat 93(4):1118–1134. https://doi.org/10.1162/REST_a_00133

Pierce JR, Schott PK (2016) Trade liberalization and mortality: evidence from U.S. counties. Finance and Economics Discussion Series, Federal Reserve Board, Washington, D.C.

Porter E (2015) Education gap widens between rich and poor. New York Times, September 23, B1

Reardon S, Portilla X (2015) Recent trends in socioeconomic and racial school readiness gaps at kindergarten entry. Center for Education Policy Analysis Working Papers, No. 15–02, Stanford University

Ruffing K (2017) Decline in labor-force participation not due to disability programs. Center on Budget and Policy Priorities Blogs, August 25

Ryff C (2015) Varieties of well-being and their links to health. Presentation to National Institutes of Aging Conference on Well-Being and Aging, Orlando, November 18

Schwandt H (2016) Unmet aspirations and an explanation for the age-U shape in well-being. J Econ Behav Organ 122:75–87. https://doi.org/10.1016/j.jebo.2015.11.011

Shiels M et al (2017) Trends in premature mortality in the USA by sex, race, and ethnicity from 1999 to 2014: an analysis of death certificate data. Lancet 389(10073):1043–1054. https://doi.org/10.1016/S0140-6736(17)30187-3

Steptoe A, Deaton A, Stone A (2015) Subjective well-being, health, and ageing. Lancet 385(9968):640–648. https://doi.org/10.1016/S0140-6736(13)61489-0

Stone A, Mackie C (2013) Subjective well-being: measuring happiness, suffering, and other dimensions of human experience. National Research Council of the National Academies, Washington, DC http://www.nap.edu/catalog.php?record_id=18548

Tavernise S (2016) Black Americans see gains in life expectancy. The New York Times, **May 8**

Trisi D (2016a) Safety net cut poverty nearly in half last year. Center on Budget and Policy Priorities Blogs, September 14

Trisi D (2016b) Three essays on poverty and social welfare policy. PhD Dissertation, University of Maryland, College Park