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Abstract

A large research literature attests to the important role of work in human health. Less research has investigated the potential role of work environments as a key factor shaping racial and ethnic health disparities. Work environments that are physically demanding, stressful, and hazardous are typically associated with earlier onset of physical health decline that may be associated with increased risk of early retirement due to disability. No research to date, however, has examined how differential exposure to work environments are associated with early disability retirement among Black, Hispanic, and white individuals. We use data from the Health and Retirement Study Life History Mail survey linked to information on work environments from the Occupational Information Network to characterize potentially harmful lifetime work contexts. We find that a wide range of harmful work environments are associated with early disability retirement, at or before age 62. Black workers are more likely than white workers to retire due to disability and are exposed to higher average levels of hazardous work environments over their careers. Lifetime average occupational exposures account for some of the association between race and early disability retirement. Findings related to ethnicity were inconclusive. Eliminating racial and ethnic disparities in disability may hinge in part on understanding the role of potentially modifiable aspects of the work environment.

Citation

Introduction

A large research literature attests to the important role of work in human health (Sorensen et al. 2021). Less research has investigated the potential role of work environments as a key factor shaping racial and ethnic health disparities. Jobs that are potentially harmful to physical and psychological health are not randomly distributed in society (Burgard and Lin 2013). Occupational selection into potentially harmful jobs is related to early life disadvantages through educational opportunities and hiring practices that can be racially patterned (Lang and Lehmann 2012; Penner 2008). For example, Black and Hispanic individuals are more likely than non-Hispanic whites to hold jobs that involve shiftwork (Kochhar 2005; Toussaint-Comeau 2006), that are more physically demanding and dangerous (Seabury et al. 2017), and that involve higher levels of exposure to environmental hazards such as toxins and workplace injury (Sabbath 2019).

Work environments that are physically demanding, stressful, and hazardous are typically associated with earlier onset of physical health decline (Peckham et al. 2019; MacMillan and Shanahan 2021) that may be associated with increased risk of early retirement due to disability (Nicholas et al. 2020). Despite the growing scholarly interest between work and health, we are aware of no research to date that has examined how differential exposure to work environments are associated with early disability retirement among Black, Hispanic, whites individuals. Eliminating racial and ethnic disparities in disability (Crimmins et al. 2004) may hinge in part on understanding the role of potentially modifiable aspects of the work environment. Furthermore, those who leave the workforce because of disability often take either Social Security Disability Insurance

(SSDI) if they qualify or Old-Age Survivors Disability Insurance (OASDI) benefits at age

62 (instead of full retirement benefits as age 65-67), which are both associated with

lower benefit levels (Bronshtein et al. 2020; Center on Budget and Policy Priorities

2021). Given that non-Hispanic Black and Hispanic individuals rely more heavily on

Social Security than non-Hispanic whites (Rhee 2013), understanding more about

potentially modifiable aspects of work environments could be one path to reducing racial

and ethnic wealth disparities related to Social Security.

     To date, research on the impact of work environments on later life health

outcomes has been limited by incomplete information on occupational exposures over

the life course. New data resources from the Health and Retirement (HRS) Life History

Mail Survey (LHMS) provide a more complete accounting of lifetime occupational

history than previously available. In conjunction with linkage to job characteristic

information from the Occupation Information Network database (O*NET) and with rich

information on later life health and work transitions in the HRS, we are now in a position

to more fully characterize the health and labor force impacts of lifetime occupational

exposures.

     The present study builds on research by Nicholas, Done and Baum (2020) that

used information from the HRS core biennial survey on occupational exposures linked

to a selection of O*NET job demands and work context measures, including routine and

nonroutine cognitive tasks and routine manual tasks. A major innovation of this study is

that they were able to characterize an average of 37.5 years of job tenure in order to

evaluate the impact of lifetime occupational exposures on later-life disability. On the one

hand, they found that exposure to jobs that involve routine manual tasks (indicated by

machine-paced work and frequent repetitive motions) was associated with an increased likelihood of receipt of SSDI and having a work-limiting health condition at age 62. On the other hand, exposure to cognitive interpersonal job demands (indicated by developing relationships, guiding and coaching others, and interacting with others in multiple ways) and routine cognitive demands (indicated by doing repetitive physical or mental activities, importance of accuracy, structured job) had the opposite effect. Importantly, their research affirmed the value of characterizing the jobs held earlier in life as important for accurately assessing the effect of lifetime occupational exposures on later life disability. We extend their research by evaluating racial and ethnic differences in these relationships. We also use a wider set of O*NET work context measures to better characterize hazardous work environments beyond physical demand. By using the job histories from the LHMS, we also provide a more complete accounting of occupational exposures earlier in life (20s and 30s).

Our main hypothesis is that differential lifetime exposure to harmful work contexts can help explain racial and ethnic disparities in early disability retirement. To set the stage for understanding this set of connections, we first examine the potential association between lifetime exposure to a range of potentially harmful work contexts and early disability retirement. We then examine racial and ethnic differences in lifetime work exposure, expecting that we will see higher levels of lifetime exposure to harmful work contexts among Black and Hispanic individuals relative to white individuals. Given well-documented racial and ethnic disparities in disability, we expect that Black and Hispanic workers will be more likely to retire early due to disability compared to non-Hispanic whites. In a final step, we look to see if exposure to harmful potentially harmful

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work contexts jobs explains some of the association between race and ethnicity and early disability retirement.

Method

Data

We use Health and Retirement Study (HRS) data sets linked with an O*NET-Census 2010 occupation data set that our team developed with the support of the MRDRC and released for public use.[1] We use HRS data from the core interview and from the Life History Mail Survey (LHMS).

The HRS is a cohort-based nationally representative longitudinal study of adults older than 50. A core biennial interview (1992 to 2022) contains measurement across a wide range of domains. The study implements a complex survey design with oversampling of Black and Hispanic individuals to ensure adequate sample size for studies focused on racial and ethnic disparities. The RAND HRS Longitudinal File is a processed version of much of the core survey. Whenever possible, we use constructed variables from this data file, for example, *longest held job*.[2]

The HRS core interview gathers extensive information about the lives of respondents after age 50. To fill in the gaps in early life, HRS created a paper and pencil life event history assessment, the LHMS, which asks respondents to report

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[1] https://claudepeppercenter.fsu.edu/onet/

[2] In the baseline HRS interview, respondents are asked to report on current or previous job(s) and up to three previous jobs held for five years or more. RAND uses this information to create a constructed variable called longest held job that they continue to update each wave for respondents who continue working.

retrospectively on their life events and experiences from early childhood through mid-life. The employment section of the LHMS includes a "job grid" that asked respondents to list up to 10 jobs they have held for at least one year since leaving full-time education.

The O*NET occupational taxonomy offers the most detailed occupational coding scheme publicly available, resulting in 1000+ detailed occupational codes. We use a data set we created with a comprehensive set of measures from O*NET curated for use with survey data coded using Census occupation codes, the FSU-UM Census-O*NET (Carpenter et al. 2022). We link LHMS data on lifetime occupational history data (coded using the Census 2010) to measures from the Census-O*NET data.

Sample

The analytic sample includes all HRS respondents who completed a "job grid" in the 2017 LHMS, have start and end dates for at least one job, and reached at least the age of 65 by 2017, the age when most individuals are retired. Using data through 2017, we identified 7,054 respondents meeting these criteria, including 396 respondents who identify as Hispanic and 1,051 respondents who identify as Black or African American.

Measures

Outcome variables

We created four different measures of early disability retirement, one based on a question from the LHMS and three based on questions from the HRS core survey. For each of the four measures, we combine each disability indicator with an indicator of retirement before or at age 62. Thus, each early disability retirement indicator equals 1 if the individual is retired before or at age 62 and is disabled at the time according to the

criteria for each of the indicators we created.

Applied for or received SSDI

In all waves of the core interview, respondents were asked questions about Social Security Disability Insurance or SSDI. The RAND HRS Longitudinal File includes a constructed variable related to respondents' status with regard to SSDI and Supplemental Security Income or SSI. We combined codes 10 (Apply for SSDI), 11 (Apply for SSDI + SSI), 12 (Apply for SSDI/Received SSI), 20 (Receiving SSDI), 21 (Receiving SSDI/Apply SSI), and 22 (Receiving SSDI + SSI) to create a dichotomous variable for either applying for or receiving SSDI/SSI in any wave from 1992 through 2016.

Work-limiting health problem

In all waves of the core survey, respondents were asked if health problems limited their ability to work ("Do you have any impairment or health problem that limits the kind or amount of paid work you can do"). We created a dichotomous indicator of disability beginning the first year that respondents reported continuously that they had a work-limiting health problem. For example, if one said yes in 1996, but no for 1998 and 2000, then yes thereafter starting in 2002, we marked this individual as disabled since 2002 instead of 1996.

LHMS medical leave or disability

In the 2017 LHMS survey, respondents report up to 10 jobs they worked for at least a year after completing their education. For each job, they were also asked what they do after leaving the job ("What did you do after leaving this job?"). There are 6 choices: (1) Started next job, (2) Worked short-term job(s), (3) Cared for/started a

family, (4) Unemployed, (5) Medical leave/disability, and (6) Other. Respondents can check all that apply. We created a dichotomous flag for individuals who reported they were on medical leave or disabled after any job were flagged as disabled beginning from the year they left that job (including the current year).

Poor health as a very important reason to retire

In the HRS core survey, in all waves 1992 through 2016, respondents who reported being retired in a given wave were asked if poor health was an important reason for retirement ("I'm going to read you a list of reasons why some people retire. Poor health…Was this a very important reason for your retirement, a moderately important reason, somewhat important, or not important at all?"). We created a dichotomous indicator of disability beginning the first year that respondents reported that they had retired and that poor health was a "very important" reason (from 1992 through 2016).

Lifetime work exposure measures

Using a procedure outlined in detail in Appendix A, we used information from the 2017 LHMS to reconstruct individual job histories for up to 10 jobs respondents worked for at least a year after completing their education. Individuals also reported the occupation of each job. These were coded using 2010 occupation codes, which we used to link the LHMS job history to a set of 35 work context measures in the Census-O*NET data set that we conjectured were examples of "bad" work contexts.

The work context variables we used had two different code frames. For some measures, the codes indicate the amount of time spent in a context (1= Never, 2=Once a year or more but not every month, 3=Once a month or more but not every week,

4=Once a week or more but not every day, and 5=Every day). For other measures, the coding was indicative of how often an exposure occurred (1= Never, 2=Less than half the time, 3=About half the time, 4=More than half the time, 5=Continually or almost continually) with a higher number indicating a higher level of exposure. For each work context measure, we created a lifetime average, which was the mean value of the annual-level, nonmissing measures from the first year people reported a job in the LHMS to 2017 (the date of the LHMS data collection). This exposure measurement reflects the average level of exposure over the entire career.

Race and ethnicity

HRS asks respondents to self-report their race and ethnicity. For the purposes of this study, we created two dichotomous variables. For race, 1=Black, 0=White. For ethnicity, 1=Hispanic and 0=non-Hispanic.

Controls

Gender is a dichotomous measure coded 1=female and 0=male. Male is the reference category in regression models. Education is a series of dichotomous variables for the highest level achieved for less than high school, GED, high school graduates, some college, and college and above. Less than high school is the reference category in regression models. Cohort is a series of dichotomous variables for being in each enrollment cohort: AHEAD, Children of the Depression, HRS, War babies, Early baby boomers, and Mid baby boomers. AHEAD is the reference category in regression models.

Analyses

We conducted probit and linear regressions to investigate our hypotheses. For each of these analyses, we evaluated separate models for each work context measure. All models include controls for gender, education, and birth cohort.

We first evaluated whether average lifetime exposure to the selected work contexts was associated with early disability retirement with a set of probit regressions. Specifically, we estimate the following equation separately for each outcome variable in combination with a single "bad" work context measure.

$$probit\ d_i^{rd}\ =\ \beta_0 + \beta_1 wc_i\ +\ Controls \tag{1}$$

where d_i^{rd} is a dichotomous variable for individual i retiring early due to disability and wc_i is the work context exposure measurement for individual i.

We next examined whether Black and Hispanic workers had higher levels of average lifetime exposure to the given work contexts. We estimate the following equation:

$$reg\ wc_i\ =\ \beta_0 + \beta_1 d_i^{blk}\ +\ \beta_2 d_i^{his}\ +\ Controls \tag{2}$$

where wc_i is the work context exposure measurement for individual i, d_i^{blk} is a dichotomous indicator for individual i being Black, and d_i^{his} is a dichotomous indicator for individual i being Hispanic.

We also examined whether Black and Hispanic workers were more likely to retire early due to disability. We estimate the following equation:

$$probit\ d_i^{rd}\ =\ \beta_0 + \beta_1 d_i^{blk}\ +\ \beta_2 d_i^{his}\ +\ Controls \tag{3}$$

Then we examined whether the association between race and ethnicity and early

disability retirement is accounted for (mediated) by average lifetime work context

exposure by adding a term for work context exposure to the model examining the effect

of race on early disability retirement. We estimate the following equation

$$probit\ d_i^{rd}\ =\ \beta_0 + \beta_1 wc_i\ +\ \beta_2 d_i^{blk} + \beta_3 d_i^{his} +\ Controls \tag{4}$$

We also evaluated whether there are group level differences in the effect of work

context on early disability retirement by testing the significance of an interaction

between work context and race and work context and ethnicity. We estimate the

following equation:

$$probit\ d_i^{rd}\ =\ \beta_0 + \beta_1 wc_i\ +\ \beta_2 d_i^{blk} + \beta_3 d_i^{blk} \times wc_i\ +\ \beta_4 d_i^{his}\ +\ \beta_5 d_i^{his} \times wc_i \atop +\ Controls \tag{5}$$

A final model examines the mediational effect of work context on the association

between race and ethnicity and early disability retirement using the work context

measures that were statistically significant in the single variable probit regressions

(equation 1) evaluating whether there are racial or ethnic differences in the effect of

work context in early disability retirement. We estimate the following equation:

$$probit\ d_i^{rd}\ =\ \beta_0 + \overrightarrow{\beta_1 wc_i}\ +\ \beta_2 d_i^{blk} + \beta_3 d_i^{his} +\ Controls \tag{6}$$

where $\overrightarrow{wc_i}$ is a vector of work context measures that show statistically significant racial

or ethnic differences in average lifetime exposures for individual i.

Results

Table 1 presents descriptive statistics for the study sample. Overall, 5.4% of the

study sample reported early (before or at age 62) disability retirement/LHMS medical

leave or disability; 15.9% reported early disability retirement/work-limiting health

problem; 9.3% reported early disability retirement-poor health was an important reason for retirement; and 8.4% reported early disability retirement-applied for or received SSDI/SSI. Black individuals were much more likely to retire early due to disability across all four measures. There were negligible differences between Hispanic and white individuals on the retirement indicators. Similarly, there were relatively small or negligible differences between white and Hispanic individuals for the work context measures. Therefore, we report results for tests related to Hispanic ethnicity in Appendix B only.

Table 2 summarizes all of the individual variable regressions (each row presents regression coefficients for separate models for each work context measure) for early disability retirement-application for or receipt of SSDI/SSI. Column 1 shows results of probit regression models that evaluate the connection between average lifetime exposure to each work context and early disability retirement (equation 1). A positive sign indicates that the given exposure is associated with an increased probability of early disability retirement-application for or receipt of SSDI/SSI. A negative sign represents an association with a reduced probability of early disability retirement. As expected, many of the harmful work context measures (e.g., exposed to contaminants, exposed to high places, exposed to hazardous conditions, and spending time kneeling, crouching, stooping, or crawling) were associated with a statistically significant increase in the probability of early disability retirement-application for or receipt of SSDI/SSI. Several work context measures that were associated with a reduced probability of early disability retirement are work contexts that may be associated with white collar occupations. Interestingly, contrasting existing literature, our study found that time spent

sitting was associated with a lower probability of early disability retirement whereas time spent standing is associated with an elevated probability of the outcome. It may be that time spent sitting is indicative of white collar work.

Column 2 in Table 2 displays regression coefficients from OLS regression models (equation 2) that evaluate race and ethnic[3] differences in lifetime average exposure to each work context measure. A negative sign indicates that Black individuals have lower lifetime average exposure to the given work context measure. Black individuals have a statistically significantly higher lifetime average exposure to a range of potentially harmful work contexts, including, for example, exposure to contaminants, exposure to disease or infections; time spent bending or twisting the body; standing, crouching, stooping, or crawling. On the other hand, Black individuals have lower lifetime exposure to work contexts characterized by, for example, freedom to make decisions, frequency of conflict situations, face-to-face discussions, and contact with others. Interestingly, Black individuals have lower lifetime exposure to high places, exposure to radiation, and exposure to whole body vibration.

Column 3, Table 2 presents the probit regression coefficient for the association between race and early disability retirement-application for or receipt of SSDI/SSI (equation 3), showing that Black individuals are statistically significantly more likely to both retire before or at age 62 and apply for or receive SSDI/SSI. Column 4 reports the probit regression coefficients for models regressing early disability retirement-application for or receipt of SSDI/SSI on race accounting for each lifetime work context exposure (equation 4). A reduction in the size of the regression coefficient in column 4

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[3] Recall that results for ethnicity are presented in Appendix B.

relative to column 3 suggests that some of the racial differences in early disability retirement-application for or receipt of SSDI/SSI are accounted for by lifetime work context exposures. Overall, for 20 out of 35 of the work context measures investigated, we observe a small reduction in the racial difference in early disability retirement-application for or receipt of SSDI/SSI.

In column 5, Table 2 we investigate the interaction of race and work context exposure on the likelihood of early disability retirement-application for or receipt of SSDI/SSI (equation 5). For the early disability retirement measure that incorporates application and receipt of SSDI/SSI, there are no statistically significant interactions, suggesting that there is no racial difference in the impact of a work context exposure alone on this outcome.

Table 3 provides results of the individual variable regressions for the early disability retirement indicator that incorporates report of having a working-limiting health problem. Note that the results in Column 2 are the same across all four tables of regression results (Tables 2 to 5). We provide them in each table for easy reference. While there are some differences in Column 1 relative to Column 1 in Table 2, the overall pattern of results is similar to those found in Table 2, although there are fewer statistically significant associations overall. Specifically, there is some evidence of relatively modest mediation and no statistically significant interactions between race and work context in predicting early disability retirement with a work-limiting health problem across all of the work context measures.

The early disability retirement indicator in Table 4 uses the indicator of medical leave or disability from the LHMS. The pattern of results is very similar to Table 2. In the

final set of models presented in Table 5, which incorporates the indicator for reporting poor health as an important reason for retirement into the early disability retirement outcome, the overall pattern is again very similar with the exception that 15 out of 35 of the interaction terms in the final model were statistically significant. The negative sign on the interaction indicates that higher exposure in that work context decreases the racial difference in early disability retirement-poor health.

Finally, the second column of Table 6 shows the results of multivariable probit regressions for each early disability retirement indicator (equation 6). The first column shows the regression coefficient for the effect of race on each early disability retirement indicator. The second column adds the work context indicators that were statistically significant in the models examining racial differences in work context exposures. Specifically, when we added the vector of racially significant work context exposures to the model evaluating the effect of race on each early retirement indicator, we find that work exposure accounts for a portion of the racial difference in the outcome. In the case of the indicator that incorporates having a work-limiting health problem, the vector of work context exposures completely explains the racial difference in this outcome.

Discussion

This is the first study to our knowledge that uses national panel data to shed light on racial disparities in early disability retirement by investigating the role of potentially harmful work contexts. We found a majority of the work context measures we investigated were associated with early disability retirement across all four indicators of early disability retirement we investigated. This finding is in accord with a large literature implicating hazardous work environments in human disablement over the life course. A

range of work contexts involving physicals demands (for example, those characterized by exposure to cramped work spaces and involving time spent bending or crouching) were associated with a greater likelihood of early disability retirement. These results resonate with findings in Nicholas et al. (2020) relating to routine manual tasks. Interestingly, we found the smallest number of statistically significant associations with the early retirement indicator that included a self-report of a work-limiting health problem, which is the measure used by Nicholas et al. This underscores the value of assessing a range of outcome indicators.

We extend Nicholas et al. by separately examining a wide range of additional measures that represent potentially dangerous work conditions. For example, work context characterized by hazardous conditions or equipment, requiring safety equipment, very hot or cold temperatures were associated with all four indicators of early disability retirement suggesting robust associations. We also evaluated several work contexts that we found were associated with lower likelihood of early disability retirement including, for example, work contexts that involve face-to-face discussion, freedom to make decisions and, interestingly, time spent sitting. These measures are in line with the nonroutine cognitive interpersonal tasks examined in Nicholas et al. (2020) that lower individuals' likelihood of retiring early due to disability. As these authors note, earlier studies that only evaluated work exposures on current jobs of older workers found null results. They speculate that it is necessary to capture lifetime exposure to demonstrate effects on health-related work transitions toward retirement, which we have done. Also in accord with Nicholas et al. the effects we find are moderate overall.

Going beyond previous research by examining racial and ethnic differences, we

found that Black workers had higher lifetime exposure to a range of the harmful work contexts we investigated and lower levels of exposure to work contexts associated with lower likelihood of early disability retirement. For a small number of potentially hazardous work contexts (e.g., radiation, high places), Blacks workers had lower lifetime exposure compared to white workers, possibly indicating barriers to entry, such as certifications, that make Black workers less likely to hold jobs where such exposures occur. Black individuals were also more likely to retire before or at age 62 across all four measures of disability. Taken together, these findings supported our expectations based on research literature demonstrating differential occupational sorting by race and well-documented racial disparities in health and functional status.

In contrast, we did not find statistically significant differences in exposure to harmful work contexts or early disability retirement between Hispanic and white workers. This might be explained by the well-known "Hispanic Paradox" — that Hispanics have lower mortality than non-Hispanic whites despite lower socioeconomic status —not extending to disability (Hayward et al. 2014). Indeed findings across a range of national data sets suggest that Hispanics' rates of disability are similar to non-Hispanic Blacks (Hayward et al. 2014). The lack of significance is likely because our sample of Hispanic individuals was relatively small.

The primary focus of our study was to explore the role that exposure to potentially harmful work contexts might play in early disability retirement disparities. We found, across a range of the harmful work contexts, as well as the salutary work contexts we investigated, that lifetime work exposures matter. Specifically, after accounting for gender, education, and cohort, we found that lifetime occupational

exposures accounts for (potentially mediates) some of the association between race and early disability retirement. This finding was robust across all four indicators of early disability retirement. When we investigated level differences by race in the effect of work context on early disability retirement (interacting race and work context), we found that only the indicator that included poor health as a very important reason for retiring held significant interactions. To account for the fact that work contexts are not, in reality, experienced in isolation, we explored mediational models that included multiple racially significant (where exposure levels varied by race) work context measures simultaneously. Not surprisingly, the degree of mediation was larger than when we considered each work context separately.

This project represents a first step in our work. We plan a range of analyses to refine the modelling of these relationships. For example, our next steps include conducting formal mediation analyses that would allow us to better model selection into occupations and account for mortality selection. Since we are looking at an outcome occurring before or at age 62, the force of mortality selection is less. Nonetheless, accounting for both sources of bias will yield a clearer picture of the impact of work exposures on racial disparities in early disability retirement. In addition, the LHMS data were linked to the 26.1 O*NET database, which is based on jobs in the 2010 Census coding regime, which are not completely reflective of jobs across the decades covered by the LHMS. We will also test the cumulative lifetime sum of exposure to various work contexts. In the present study, we selected the average lifetime exposure because it is less influenced by career length, but it may be instructive to examine cumulative exposures as well. To further inform intervention planning, we also plan to explore age-

based exposure to identify potential sensitive periods in relation to disability retirement, whether exposures to harmful work environment at specific age ranges (e.g., 30 to 39) might have a greater impact on early disability retirement than exposure at other ages.

Another area that merits attention is racial differentials in work trajectories. For example, are there racial differences in movement out of potentially harmful jobs as careers progress, thus limiting exposure? We chose a measure of lifetime exposure (average) that is less influenced by job tenure. For example, an individual could work in a job for a long time at a low level of exposure or a short amount of time at a high level of exposure, so a measure of cumulative lifetime exposure might overstate the risk of the former and understate the risk of the latter, particularly if there are sensitive periods of exposure. Careful examination of movement into and out of various work contexts over the life course is a fruitful area for research on racial disparities in early disability retirement.

Our next step will also involve further interpreting our findings related to Hispanic ethnicity. In particular, we did not explore the possibility that the "Hispanic paradox" is in effect in our data, which could account for the finding of no differences by ethnicity in early disability retirement. Our next series of analyses will include a measure of being U.S. born, which is one way to address the issue. Another important direction will be to include history of smoking, which is increasingly implicated not just in mortality but also in functional status (Hayward et al., 2014). Research has documented lower smoking rates among Hispanic relative to both white and Black individuals and may be a key variable in modeling how potentially harmful jobs might affect ethnic differences in early disability retirement.

While it is premature to propose remedial policy; nonetheless it is interesting to speculate on the possibilities. Many of the work contexts we explored represent potentially modifiable environments. Given the strong racial/ethnic sorting into occupation, these might help narrow disparities between racial/ethnic groups. Differential OASI calculations for specific job characteristics (or combinations of characteristics) might help offset the unsalutary effects of certain types of jobs. In sum, continued exploration in this area might eventually inform ways to modify work environments in ways that could improve the lives of workers in potentially harmful while also reducing racial and ethnic disparities in financial well-being related to early disability retirement.

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Tables

Table 1: Descriptive statistics for the study sample, by race and ethnicity

	Range	Total (N=7,054)		White (N=5,607)		Black (N=1,051)		Hispanic (N=396)	
		Mean/ Percent	SD	Mean/ Percent	SD	Mean/ Percent	SD	Mean/ Percent	SD
Dependent variables									
Medical leave/Disability	0-1	0.054	0.227	0.044	0.205	0.11	0.314	0.053	0.224
Work-limiting health problem	0-1	0.159	0.366	0.151	0.358	0.212	0.409	0.144	0.351
Poor health import reason to retire	0-1	0.093	0.29	0.08	0.272	0.162	0.368	0.086	0.281
Applied for or received SSDI	0-1	0.084	0.278	0.065	0.246	0.186	0.39	0.091	0.288
Controls									
Gender (Female=1)	0-1	58.07%		57.30%		64.32%		52.27%	
Education									
Less than high school		10.88%		7.69%		18.08%		36.87%	
GED		4.45%		4.23%		5.04%		6.06%	
High school graduate		30.10%		31.36%		25.50%		24.49%	
Some college		26.16%		25.32%		32.54%		21.21%	
College and above		28.40%		31.40%		18.84%		11.36%	
Cohort									
AHEAD		1.25%		1.39%		0.38%		1.52%	
CODA		6.42%		7.33%		2.85%		3.03%	
HRS		34.47%		36.36%		25.12%		32.58%	
War babies		19.95%		20.91%		17.41%		13.13%	
Early baby boomers		27.61%		24.92%		40.34%		31.82%	
Mid baby boomers		10.29%		9.08%		13.89%		17.93%	
Work context measures (lifetime average)									

Contact With Others	1-5	4.078	0.855	4.111	0.83	3.951	0.943	3.93	0.929
Cramped Work Space, Awkward Positions	1-5	1.657	0.671	1.642	0.666	1.706	0.683	1.745	0.698
Deal With Physically Aggressive People	1-5	1.492	0.524	1.477	0.506	1.595	0.608	1.446	0.517
Deal With Unpleasant or Angry People	1-5	2.879	0.726	2.884	0.712	2.892	0.778	2.779	0.768
Exposed to Contaminants	1-5	2.309	0.906	2.262	0.891	2.451	0.917	2.614	0.991
Exposed to Disease or Infections	1-5	1.719	0.846	1.691	0.827	1.902	0.948	1.634	0.769
Exposed to Hazardous Conditions	1-5	1.56	0.749	1.549	0.751	1.566	0.701	1.699	0.825
Exposed to Hazardous Equipment	1-5	1.653	0.91	1.644	0.913	1.632	0.862	1.838	0.977
Exposed to High Places	1-5	1.311	0.608	1.321	0.62	1.239	0.538	1.357	0.61
Exposed to Minor Burns, Cuts, Bites, or Stings	1-5	1.761	0.774	1.729	0.766	1.85	0.774	1.983	0.833
Exposed to Radiation	1-5	1.058	0.364	1.062	0.371	1.041	0.343	1.038	0.318
Exposed to Whole Body Vibration	1-5	1.108	0.43	1.107	0.43	1.096	0.416	1.161	0.45
Extremely Bright or Inadequate Lighting	1-5	1.687	0.654	1.68	0.652	1.682	0.656	1.793	0.673
Face-to-Face Discussions	1-5	4.17	0.857	4.203	0.836	4.022	0.929	4.078	0.91
Freedom to Make Decisions	1-5	3.598	0.801	3.643	0.785	3.406	0.839	3.46	0.839
Frequency of Conflict Situations	1-5	2.789	0.698	2.82	0.681	2.687	0.756	2.617	0.732
In an Open Vehicle or Equipment	1-5	1.286	0.629	1.275	0.61	1.279	0.653	1.468	0.789
Indoors, Not Environmentally Controlled	1-5	1.84	0.855	1.833	0.853	1.816	0.841	2.006	0.912
Outdoors, Exposed to Weather	1-5	1.895	0.963	1.884	0.954	1.873	0.943	2.108	1.11
Physical Proximity	1-5	3.126	0.762	3.116	0.743	3.185	0.847	3.122	0.784

Sounds, Noise Levels Are Distracting or Uncomfortable	1-5	2.714	0.788	2.719	0.775	2.675	0.828	2.735	0.851
Spend Time Bending or Twisting the Body	1-5	2.088	0.799	2.02	0.757	2.362	0.917	2.352	0.852
Spend Time Climbing Ladders, Scaffolds, or Poles	1-5	1.184	0.446	1.188	0.449	1.148	0.417	1.23	0.462
Spend Time Keeping or Regaining Balance	1-5	1.362	0.445	1.337	0.43	1.46	0.497	1.478	0.473
Spend Time Kneeling, Crouching, Stooping, or Crawling	1-5	1.647	0.582	1.612	0.56	1.789	0.654	1.771	0.62
Spend Time Making Repetitive Motions	1-5	2.833	0.797	2.794	0.771	2.985	0.889	2.994	0.845
Spend Time Sitting	1-5	2.8	1.062	2.878	1.042	2.467	1.08	2.546	1.086
Spend Time Standing	1-5	2.846	0.969	2.788	0.94	3.076	1.059	3.068	1.019
Spend Time Using Your Hands to Handle, Control, or Feel	1-5	2.916	0.901	2.873	0.88	3.051	0.96	3.183	0.961
Spend Time Walking and Running	1-5	2.379	0.78	2.323	0.742	2.61	0.894	2.583	0.838
Structured versus Unstructured Work	1-5	3.615	0.801	3.659	0.784	3.424	0.844	3.488	0.846
Time Pressure	1-5	3.539	0.769	3.558	0.751	3.464	0.837	3.473	0.832
Very Hot or Cold Temperatures	1-5	1.864	0.899	1.839	0.882	1.898	0.922	2.15	1.017
Wear Common Protectives or Safety Equipment such as Safety Shoes, Glasses, Gloves, Hearing Protection, Hard Hats, or Life Jackets	1-5	2.346	1.24	2.281	1.228	2.571	1.258	2.693	1.254
Wear Specialized Protective or Safety Equipment such as Breathing Apparatus, Safety Harness, Full Protection Suits, or Radiation Protection	1-5	1.336	0.602	1.326	0.601	1.36	0.609	1.413	0.597

Table 2: Models examining lifetime average work context exposure and early disability retirement-application or receipt of SSDI/SSI

Work context measure	Column 1 Effect of work context exposure on early disability retirement[1]	Column 2 Racial difference in work context exposure[2]	Column 3 Racial difference in early disability retirement[3]	Column 4 Racial difference in early disability retirement accounting for work context[4]	Column 5 Effect of race differences in the effect of work context on early disability retirement[5]
Contact With Others	-0.0176	-0.1906***	0.4408***	0.4374***	0.0695
Cramped Work Space, Awkward Positions	0.1323***	0.0011	0.4408***	0.4433***	-0.101
Deal With Physically Aggressive People	0.0091	0.1020***	0.4408***	0.4399***	0.0014
Deal With Unpleasant or Angry People	-0.0165	-0.0283	0.4408***	0.4402***	0.0707
Exposed to Contaminants	0.0880***	0.0825**	0.4408***	0.4352***	-0.0499
Exposed to Disease or Infections	0.0343	0.1808***	0.4408***	0.4345***	-0.0068
Exposed to Hazardous Conditions	0.0985**	-0.0308	0.4408***	0.4453***	-0.0507
Exposed to Hazardous Equipment	0.1040***	-0.0608*	0.4408***	0.4517***	-0.097
Exposed to High Places	0.1197**	-0.1112***	0.4408***	0.4560***	-0.0229
Exposed to Minor Burns, Cuts, Bites, or Stings	0.1284***	0.0342	0.4408***	0.4386***	-0.0155
Exposed to Radiation	0.084	-0.0379**	0.4408***	0.4440***	-0.0097
Exposed to Whole Body Vibration	0.1815***	-0.0427**	0.4408***	0.4507***	-0.0757
Extremely Bright or Inadequate Lighting	0.0980**	-0.0443*	0.4408***	0.4467***	-0.0575

Face-to-Face Discussions	-0.0107	-0.2081***	0.4408***	0.4386***	0.0869
Freedom to Make Decisions	-0.0118	-0.2260***	0.4408***	0.4381***	0.0777
Frequency of Conflict Situations	-0.035	-0.1194***	0.4408***	0.4361***	0.0932
In an Open Vehicle or Equipment	0.1093**	-0.0419*	0.4408***	0.4460***	-0.0398
Indoors, Not Environmentally Controlled	0.0573*	-0.0531	0.4408***	0.4449***	-0.02
Outdoors, Exposed to Weather	0.0627*	-0.0432	0.4408***	0.4438***	0.0355
Physical Proximity	0.0292	0.0087	0.4408***	0.4411***	-0.0067
Sounds, Noise Levels Are Distracting or Uncomfortable	0.0545*	-0.0813**	0.4408***	0.4471***	-0.0168
Spend Time Bending or Twisting the Body	0.1037***	0.1894***	0.4408***	0.4212***	-0.0671
Spend Time Climbing Ladders, Scaffolds, or Poles	0.1472**	-0.0687***	0.4408***	0.4521***	0.0247
Spend Time Keeping or Regaining Balance	0.1390**	0.0601***	0.4408***	0.4325***	-0.0476
Spend Time Kneeling, Crouching, Stooping, or Crawling	0.1283***	0.0930***	0.4408***	0.4291***	-0.0377
Spend Time Making Repetitive Motions	0.0233	0.0434	0.4408***	0.4392***	0.046
Spend Time Sitting	-0.0917***	-0.3515***	0.4408***	0.4133***	0.0892
Spend Time Standing	0.0703**	0.1607***	0.4408***	0.4307***	-0.0073
Spend Time Using Your Hands to Handle, Control, or Feel	0.0645**	0.0194	0.4408***	0.4393***	-0.0148
Spend Time Walking and Running	0.0699**	0.1673***	0.4408***	0.4293***	-0.0043
Structured versus Unstructured Work	-0.0195	-0.2302***	0.4408***	0.4365***	0.1025
Time Pressure	-0.0067	-0.1318***	0.4408***	0.4399***	0.0497
Very Hot or Cold Temperatures	0.0895**	-0.0192	0.4408***	0.4433***	-0.0076
Wear Common Protectives or Safety Equipment such as Safety Shoes, Glasses, Gloves, Hearing Protection, Hard Hats, or Life Jackets	0.0751***	0.1526***	0.4408***	0.4311***	-0.0712

Wear Specialized Protective or Safety Equipment such as Breathing Apparatus, Safety Harness, Full Protection Suits, or Radiation Protection	0.1311***	-0.0148	0.4408***	0.4444***	-0.1256

Note: all models include controls for gender, education, and birth cohort; N=7,054; *p<.05, p**<.01, p***<.0001

1Probit regression evaluating the effect of work exposure on early disability retirement-application or receipt of SSDI

2Linear regression evaluating whether there are racial differences in each work context measure

3Probit regression evaluating the effect of race on early disability retirement-application or receipt of SSDI

4Probit regression evaluating whether adding the work context measure partially mediates the association between race and early disability retirement-application or receipt of SSDI

5Probit regression evaluating whether there are race group-level differences in the effect of each work context measure on early disability retirement-application or receipt of SSDI

Table 3: Models examining lifetime average work context exposure and early disability retirement-work-limiting

health problem

Work context measure	Column 1 Effect of work context exposure on early disability retirement[1]	Column 2 Racial difference in work context exposure[2]	Column 3 Racial difference in early disability retirement[3]	Column 4 Racial difference in early disability retirement accounting for work context[3]	Column 5 Effect of race differences in the effect of work context on early disability retirement[5]
Contact With Others	-0.0303	-0.1906***	0.1572**	0.1510**	-0.0127
Cramped Work Space, Awkward Positions	0.0392	0.0011	0.1572**	0.1576**	-0.0199
Deal With Physically Aggressive People	0.0537	0.1020***	0.1572**	0.1520**	-0.0715
Deal With Unpleasant or Angry People	-0.0144	-0.0283	0.1572**	0.1567**	-0.0205
Exposed to Contaminants	0.0348	0.0825**	0.1572**	0.1546**	-0.0301
Exposed to Disease or Infections	0.0434*	0.1808***	0.1572**	0.1492**	-0.0403
Exposed to Hazardous Conditions	0.0228	-0.0308	0.1572**	0.1582**	-0.072
Exposed to Hazardous Equipment	0.0344	-0.0608*	0.1572**	0.1603**	-0.0601
Exposed to High Places	0.0117	-0.1112***	0.1572**	0.1588**	-0.0706
Exposed to Minor Burns, Cuts, Bites, or Stings	0.0586*	0.0342	0.1572**	0.1557**	0.0154
Exposed to Radiation	0.0097	-0.0379**	0.1572**	0.1577**	-0.098
Exposed to Whole Body Vibration	0.0613	-0.0427**	0.1572**	0.1606**	-0.1111
Extremely Bright or Inadequate Lighting	0.0332	-0.0443*	0.1572**	0.1591**	-0.0246
Face-to-Face Discussions	-0.032	-0.2081***	0.1572**	0.1503**	-0.0091

Freedom to Make Decisions	-0.031	-0.2260***	0.1572**	0.1500**	-0.0055
Frequency of Conflict Situations	-0.0256	-0.1194***	0.1572**	0.1539**	-0.0124
In an Open Vehicle or Equipment	0.0237	-0.0419*	0.1572**	0.1585**	0.0081
Indoors, Not Environmentally Controlled	0.0148	-0.0531	0.1572**	0.1582**	-0.0228
Outdoors, Exposed to Weather	0.0217	-0.0432	0.1572**	0.1582**	0.0417
Physical Proximity	0.0165	0.0087	0.1572**	0.1573**	-0.0533
Sounds, Noise Levels Are Distracting or Uncomfortable	0.0232	-0.0813**	0.1572**	0.1597**	-0.0479
Spend Time Bending or Twisting the Body	0.0569*	0.1894***	0.1572**	0.1462**	-0.036
Spend Time Climbing Ladders, Scaffolds, or Poles	0.0294	-0.0687***	0.1572**	0.1596**	-0.0609
Spend Time Keeping or Regaining Balance	0.0875*	0.0601***	0.1572**	0.1521**	-0.0537
Spend Time Kneeling, Crouching, Stooping, or Crawling	0.0634*	0.0930***	0.1572**	0.1512**	-0.0385
Spend Time Making Repetitive Motions	-0.0075	0.0434	0.1572**	0.1577**	-0.0086
Spend Time Sitting	-0.0838***	-0.3515***	0.1572**	0.1283*	0.0039
Spend Time Standing	0.0419*	0.1607***	0.1572**	0.1508**	-0.0234
Spend Time Using Your Hands to Handle, Control, or Feel	0.0205	0.0194	0.1572**	0.1570**	-0.015
Spend Time Walking and Running	0.0421	0.1673***	0.1572**	0.1503**	-0.0422
Structured versus Unstructured Work	-0.0429*	-0.2302***	0.1572**	0.1474**	0.0035
Time Pressure	-0.0437*	-0.1318***	0.1572**	0.1512**	0.0034
Very Hot or Cold Temperatures	0.0203	-0.0192	0.1572**	0.1578**	0.0258
Wear Common Protectives or Safety Equipment such as Safety Shoes, Glasses, Gloves, Hearing Protection, Hard Hats, or Life Jackets	0.0312	0.1526***	0.1572**	0.1526**	-0.0205

Wear Specialized Protective or Safety Equipment such as Breathing Apparatus, Safety Harness, Full Protection Suits, or Radiation Protection	0.0375	-0.0148	0.1572**	0.1581**	-0.0945

Note: all models include controls for gender, education, and birth cohort; N=7,054; *p<.05, p**<.01, p***<.0001

[1] Probit regression evaluating the effect of work exposure on early disability retirement-work-limiting health problem

[2] Linear regression evaluating whether there are racial differences in each work context measure

[3] Probit regression evaluating the effect of race on early disability retirement-work-limiting health problem

[4] Probit regression evaluating whether adding the work context measure partially mediates the association between race and early disability retirement-work-limiting health problem

[5] Probit regression evaluating whether there are race group-level differences in the effect of each work context measure on early disability retirement-work-limiting health problem

Table 4: Models examining lifetime average work context exposure and early disability retirement-LHMS medical leave or disability

Work context measure	Column 1 Effect of work context exposure on early disability retirement[1]	Column 2 Racial difference in work context exposure[2]	Column 3 Racial difference in early disability retirement[3]	Column 4 Racial difference in early disability retirement accounting for work context[4]	Column 5 Effect of race differences in the effect of work context on early disability retirement[5]
Contact With Others	-0.017	-0.1906***	0.2955***	0.2915***	-0.0019
Cramped Work Space, Awkward Positions	0.1096**	0.0011	0.2955***	0.2994***	-0.1295
Deal With Physically Aggressive People	0.0137	0.1020***	0.2955***	0.2944***	-0.1105
Deal With Unpleasant or Angry People	-0.0123	-0.0283	0.2955***	0.2946***	-0.0541
Exposed to Contaminants	0.0874**	0.0825**	0.2955***	0.2924***	-0.1115
Exposed to Disease or Infections	0.0182	0.1808***	0.2955***	0.2924***	-0.0579
Exposed to Hazardous Conditions	0.0842*	-0.0308	0.2955***	0.3009***	-0.0871
Exposed to Hazardous Equipment	0.1098***	-0.0608*	0.2955***	0.3093***	-0.0959
Exposed to High Places	0.0788	-0.1112***	0.2955***	0.3064***	-0.0352
Exposed to Minor Burns, Cuts, Bites, or Stings	0.1263***	0.0342	0.2955***	0.2948***	-0.0165
Exposed to Radiation	0.0523	-0.0379**	0.2955***	0.2980***	-0.1671
Exposed to Whole Body Vibration	0.1752**	-0.0427**	0.2955***	0.3073***	-0.1359
Extremely Bright or Inadequate Lighting	0.1009*	-0.0443*	0.2955***	0.3037***	-0.112
Face-to-Face Discussions	-0.006	-0.2081***	0.2955***	0.2942***	0.016
Freedom to Make Decisions	-0.0064	-0.2260***	0.2955***	0.2939***	0.0316

Frequency of Conflict Situations	-0.0206	-0.1194***	0.2955***	0.2922***	0.0185
In an Open Vehicle or Equipment	0.1024*	-0.0419*	0.2955***	0.3016***	-0.0747
Indoors, Not Environmentally Controlled	0.0748*	-0.0531	0.2955***	0.3025***	-0.0442
Outdoors, Exposed to Weather	0.0578*	-0.0432	0.2955***	0.2991***	0.0101
Physical Proximity	0.0237	0.0087	0.2955***	0.2964***	-0.0454
Sounds, Noise Levels Are Distracting or Uncomfortable	0.0610*	-0.0813**	0.2955***	0.3043***	-0.0562
Spend Time Bending or Twisting the Body	0.0834**	0.1894***	0.2955***	0.2808***	-0.1031
Spend Time Climbing Ladders, Scaffolds, or Poles	0.0998	-0.0687***	0.2955***	0.3043***	-0.0136
Spend Time Keeping or Regaining Balance	0.1317*	0.0601***	0.2955***	0.2883***	-0.0565
Spend Time Kneeling, Crouching, Stooping, or Crawling	0.1084*	0.0930***	0.2955***	0.2865***	-0.0755
Spend Time Making Repetitive Motions	0.0123	0.0434	0.2955***	0.2953***	-0.0812
Spend Time Sitting	-0.0900***	-0.3515***	0.2955***	0.2648***	0.0181
Spend Time Standing	0.0591*	0.1607***	0.2955***	0.2883***	-0.0588
Spend Time Using Your Hands to Handle, Control, or Feel	0.0597*	0.0194	0.2955***	0.2962***	-0.0859
Spend Time Walking and Running	0.0492	0.1673***	0.2955***	0.2887***	-0.0851
Structured versus Unstructured Work	-0.0232	-0.2302***	0.2955***	0.2899***	0.0427
Time Pressure	-0.0119	-0.1318***	0.2955***	0.2935***	-0.0391
Very Hot or Cold Temperatures	0.0966**	-0.0192	0.2955***	0.3005***	-0.0479
Wear Common Protectives or Safety Equipment such as Safety Shoes, Glasses, Gloves, Hearing Protection, Hard Hats, or Life Jackets	0.0715**	0.1526***	0.2955***	0.2870***	-0.0654

Wear Specialized Protective or Safety Equipment such as Breathing Apparatus, Safety Harness, Full Protection Suits, or Radiation Protection	0.0917*	-0.0148	0.2955***	0.2985***	-0.1173

Note: all models include controls for gender, education, and birth cohort; N=7,054; *p<.05, p**<.01, p***<.0001

[1] Probit regression evaluating the effect of work exposure on early disability retirement-LHMS medical leave or disability

[2] Linear regression evaluating whether there are racial differences in each work context measure

[3] Probit regression evaluating the effect of race on early disability retirement-LHMS medical leave or disability

[4] Probit regression evaluating whether adding the work context measure partially mediates the association between race and early disability retirement-LHMS medical leave or disability

[5] Probit regression evaluating whether there are race group-level differences in the effect of each work context measure on early disability retirement-LHMS medical leave or disability

Table 5: Models examining lifetime average work context exposure and early disability retirement-poor health very important reason for retirement

Work context measure	Column 1 Effect of work context exposure on early disability retirement[1]	Column 2 Racial difference in work context exposure[2]	Column 3 Racial difference in early disability retirement[3]	Column 4 Racial difference in early disability retirement accounting for work context[4]	Column 5 Effect of race differences in the effect of work context on early disability retirement[5]
Contact With Others	0.0191	-0.1906***	0.2667***	0.2709***	-0.0462
Cramped Work Space, Awkward Positions	0.1609***	0.0011	0.2667***	0.2700***	-0.1328
Deal With Physically Aggressive People	0.1294***	0.1020***	0.2667***	0.2560***	-0.1712*
Deal With Unpleasant or Angry People	0.0402	-0.0283	0.2667***	0.2691***	-0.093
Exposed to Contaminants	0.1372***	0.0825**	0.2667***	0.2608***	-0.1581**
Exposed to Disease or Infections	0.0942***	0.1808***	0.2667***	0.2509***	-0.0925
Exposed to Hazardous Conditions	0.1162***	-0.0308	0.2667***	0.2732***	-0.1326
Exposed to Hazardous Equipment	0.1368***	-0.0608*	0.2667***	0.2809***	-0.1291*
Exposed to High Places	0.1185**	-0.1112***	0.2667***	0.2824***	-0.1305
Exposed to Minor Burns, Cuts, Bites, or Stings	0.1466***	0.0342	0.2667***	0.2648***	-0.0845
Exposed to Radiation	0.1558**	-0.0379**	0.2667***	0.2736***	-0.1155
Exposed to Whole Body Vibration	0.2440***	-0.0427**	0.2667***	0.2816***	-0.2473*
Extremely Bright or Inadequate Lighting	0.1511***	-0.0443*	0.2667***	0.2775***	-0.1744*
Face-to-Face Discussions	0.0169	-0.2081***	0.2667***	0.2705***	-0.0368
Freedom to Make Decisions	0.0251	-0.2260***	0.2667***	0.2727***	-0.0163

Frequency of Conflict Situations	0.0324	-0.1194***	0.2667***	0.2714***	-0.0531
In an Open Vehicle or Equipment	0.1511***	-0.0419*	0.2667***	0.2754***	-0.1274
Indoors, Not Environmentally Controlled	0.1074***	-0.0531	0.2667***	0.2755***	-0.0983
Outdoors, Exposed to Weather	0.0931***	-0.0432	0.2667***	0.2725***	-0.0509
Physical Proximity	0.0886***	0.0087	0.2667***	0.2693***	-0.1456**
Sounds, Noise Levels Are Distracting or Uncomfortable	0.1127***	-0.0813**	0.2667***	0.2811***	-0.1376*
Spend Time Bending or Twisting the Body	0.1311***	0.1894***	0.2667***	0.2440***	-0.1707**
Spend Time Climbing Ladders, Scaffolds, or Poles	0.1526**	-0.0687***	0.2667***	0.2791***	-0.1244
Spend Time Keeping or Regaining Balance	0.2133***	0.0601***	0.2667***	0.2551***	-0.1968*
Spend Time Kneeling, Crouching, Stooping, or Crawling	0.1535***	0.0930***	0.2667***	0.2547***	-0.2093**
Spend Time Making Repetitive Motions	0.0435	0.0434	0.2667***	0.2649***	-0.0705
Spend Time Sitting	-0.0624**	-0.3515***	0.2667***	0.2470***	0.0741
Spend Time Standing	0.0954***	0.1607***	0.2667***	0.2554***	-0.1336**
Spend Time Using Your Hands to Handle, Control, or Feel	0.0973***	0.0194	0.2667***	0.2669***	-0.1132*
Spend Time Walking and Running	0.0914***	0.1673***	0.2667***	0.2533***	-0.1444*
Structured versus Unstructured Work	0.0103	-0.2302***	0.2667***	0.2691***	0.0077
Time Pressure	0.0331	-0.1318***	0.2667***	0.2716***	-0.0461
Very Hot or Cold Temperatures	0.1183***	-0.0192	0.2667***	0.2714***	-0.0815
Wear Common Protectives or Safety Equipment such as Safety Shoes, Glasses, Gloves, Hearing Protection, Hard Hats, or Life Jackets	0.0999***	0.1526***	0.2667***	0.2544***	-0.0980*

Wear Specialized Protective or Safety Equipment such as Breathing Apparatus, Safety Harness, Full Protection Suits, or Radiation Protection	0.1746***	-0.0148	0.2667***	0.2721***	-0.1626*

Note: all models include controls for gender, education, and birth cohort; N=7,054; *p<.05, p**<.01, p***<.0001

[1] Probit regression evaluating the effect of work exposure on early disability retirement-poor health retirement

[2] Linear regression evaluating whether there are racial differences in each work context measure

[3] Probit regression evaluating the effect of race on early disability retirement-poor health retirement

[4] Probit regression evaluating whether adding the work context measure partially mediates the association between race and early disability retirement-poor health retirement

[5] Probit regression evaluating whether there are race group-level differences in the effect of each work context measure on early disability retirement-poor health retirement

Table 6: Regression models comparing the race difference in each early disability retirement outcome with

models adding a vector of lifetime average work context exposure measures

Early disability retirement variable	Racial difference	Racial difference with vector of work context exposure measures
Applied for or received SSDI/SSI	0.4408***	0.4129***
Work-limiting health problem	0.1572**	0.1000
LHMS medical leave/disability	0.2955***	0.2903***
Poor health very important reason to retire	0.2667***	0.2213***

Note: all models include controls for gender, education, and birth cohort; N=7,054; *p<.05, p**<.01, p***<.0001

Appendix A: Procedure to create complete job histories in the LHMS

Using information from the 2017 LHMS, we reconstructed individual job histories for up to 10 jobs respondents worked for at least a year after completing their education. For each job listed, respondents reported the start and end years and whether the job was full-time or part-time. Each job was also coded using Census 2010 occupational codes, which we used to link to Work Context Measures from O*NET. When either the start or end year were missing, we imputed a year based on information from HRS core surveys. This yielded a data set where each observation was uniquely identified by individual, job, FT/PT status, start and end year, and a given work context measure.

	Job	FT/PT Status	Start Year	End Year	Work Context measure
Individual 1	Job 1	FT	1992	1995	2
Individual 1	Job 2	PT	1994	1998	3
Individual 1	Job 3	FT	2000	2008	5

↓

	Year	Job	FT/PT Status	Work context measure
Individual 1	1992	Job 1	FT	2
Individual 1	1993	Job 1	FT	2
Individual 1	1994	Job 1	FT	2
Individual 1	1994	Job 2	PT	3
Individual 1	1995	Job 1	FT	2
Individual 1	1995	Job 2	PT	3
Individual 1	1996	Job 2	PT	3
Individual 1	1997	Job 2	PT	3
Individual 1	1998	Job 2	PT	3
Individual 1	2000	Job 3	FT	5
Individual 1	2001	Job 3	FT	5
…	…	…	…	…

This is close to an unbalanced panel, where there could be multiple observations in a year when an individual held more than one job in one year. This can be the consequence of switching from one job to another or the result of having a part-time job while working full-time somewhere else. Prior to calculating the exposure measurements, we imputed the full-/part-time status for each job, which is the key variable to weight the exposure measurements across jobs. The imputation is based on the job tenures. Specifically, we generate the empirical distribution of full-time and part-time jobs for each possible tenure. Then jobs with missing full-/part-time status were randomly assigned as full-time or part-time according to the empirical distribution of the exact same tenure.

Job Tenure	FT/PT Status
…	…
10	0.8
10	0.2
…	

➔

Job ID	Random Num.	Imputed FT/PT Status
1	0.3488	FT
2	0.0711	FT
3	0.8759	PT
4	0.5551	FT

Next, we convert the data set into a true panel by combining the exposure measurements using (imputed) full-time and part-time status as the weight. Specifically, we weight full-time jobs by 1, while weighting part-time jobs by 0.5. For years when respondents did not work, the new measure is missing.

	Year	Job	FT/PT Status	Measure	Weight	Total Weight	New Measure
…	…	…	…		…	…	…
Individual 1	1993	Job 1	FT	2	1	1	= 2*1 = 2
Individual 1	1994	Job 1	FT	2	1	1.5	= (2*1+3*0.5)/1.5 = 2.33
Individual 1	1994	Job 2	PT	3	0.5	1.5	= (2*1+3*0.5)/1.

							5 = 2.33
…	…	…	…	…	…	…	…
Individual 1	1998	Job 2	PT	3	0.5	0.5	= 3*0.5 = 1.5
Individual 1	1999	-	-	-	-	-	missing
Individual 1	2000	Job 3	FT	5	1	1	= 5*1 = 5
…	…	…	…	…	…	…	…

After weighting the exposures, there is a unique value for exposure for each individual and year. In other words, the data now becomes a panel, where each individual has only one observation per year from the first year they held a job to 2017.

Job history imputation

We use information from the HRS core about current jobs and employment status to fill in the missing values for LHMS job start and end dates as follows.

Step 1 – Use <u>current job tenure</u> to determine the end dates. For each core wave, we have information on the survey start and end dates as well as the current job tenure. Using this information, we infer a range of the start date (by year) for the current job (survey start/end date minus current job tenure). If this range matches the start year of a job in LHMS with a missing end date, then we will fill in the start year of the survey as the imputed end date. We repeat this procedure for each wave (1992 to 2020). We created a flag variable called *fix_end_flag* and labelled "1 – Fix End Year with Current Job Tenure."

Step 2 – Use <u>longest job tenure</u> to determine the end dates. For each wave of HRS Cores, we observe the start and end dates the survey is conducted as well as the longest job tenure. If the longest job tenure increases from wave N to wave $N + 1$ of HRS Core, then the current job in wave N from HRS Core corresponds to the job with

longest tenure. In this case, longest job tenure and survey dates from wave N can determine a range of start date. If a record from LHMS still has a missing end date and its start date falls within the range determined by wave N, then the imputed end date is determined by the start date (from LHMS) plus the longest tenure from wave $N + 1$. By repeating this procedure in the order of wave 1 to 14, the longest of all longest tenure across waves is used. In this step, we filled-in the missing end dates for 102 respondents-job records. All these observations are flagged as "2 – Fix End Year with Longest Job Tenure" in variable *fix_end_flag*.

Step 3 – Use <u>retirement status</u> to determine the end dates. For each wave of HRS Cores, we observe the start and end dates the survey is conducted as well as whether participants considered themselves as retired. Based on this information, we can infer if an individual is still in the workforce. If they considered themselves as retired, then their jobs must have ended before the survey. If the last job an individual reported in LHMS has a missing end date, the retirement date from HRS Core is used as the imputed end date. In this step, we filled-in the missing end dates for five respondents-job records. All these observations are flagged as "3 – Fix End Year with Year of Retirement" in variable *fix_end_flag*.

Step 4 – Use <u>the year last worked</u> to determine the end dates. For each wave of HRS Cores, we observe the last year a participant reported to be working. For jobs from LHMS still missing an end date, the last year this individual reported to be working is used as the end date. If another job with a valid start date exists after the job that still has a missing end date, then the last year worked prior to the start of the next job is used. In this step, we filled-in the missing end dates for 121 respondents-job records. All

these observations are flagged as "4 – Fix End Year by Last Worked Year" in variable *fix_end_flag*.

Step 5 – Use <u>the currently working status</u> to determine the end dates. For each wave of HRS Cores, we observe if the participant is still working. For jobs from LHMS still missing an end date, the latest year this individual reported currently working is used as the end date. If another job with a valid start date exists after the job that still has a missing end date, then the last year reported to be currently working prior to the start of the next job is used. In this step, we filled-in the missing end dates for 191 respondents-job records. All these observations are flagged as "Fix End Year with Currently Working" in variable *fix_end_flag*.

After the 5 steps stated above, 87.18% of the jobs with missing end dates are imputed. Analogously, steps 1, 2, 4, and 5 are used to fix records with missing start dates, where records are matched base on their end dates.

Appendix B: Regression results by ethnicity

Appendix Table 1: Models examining lifetime average work context exposure and early disability retirement-application or receipt of SSDI

Work context measure	Column 1 Effect of work context exposure on early disability retirement[1]	Column 2 Ethnic difference in work context exposure[2]	Column 3 Ethnic difference in early disability retirement[3]	Column 4 Ethnic difference in early disability retirement accounting for work context[4]	Column 5 Effect of ethnic differences in the effect of work context on early disability retirement[5]
Contact With Others	-0.0176	-0.1730**	-0.1327	-0.1377	-0.1702*
Cramped Work Space, Awkward Positions	0.1323***	-0.0838*	-0.1327	-0.1116	-0.3024*
Deal With Physically Aggressive People	0.0091	-0.0044	-0.1327	-0.1324	-0.4584**
Deal With Unpleasant or Angry People	-0.0165	-0.0960*	-0.1327	-0.1359	-0.2715**
Exposed to Contaminants	0.0880***	0.0254	-0.1327	-0.1277	-0.2637**
Exposed to Disease or Infections	0.0343	0.0089	-0.1327	-0.1313	-0.3491*
Exposed to Hazardous Conditions	0.0985**	-0.0456	-0.1327	-0.1212	-0.2757*
Exposed to Hazardous Equipment	0.1040***	-0.0769	-0.1327	-0.1155	-0.2208*
Exposed to High Places	0.1197**	-0.1058***	-0.1327	-0.1125	-0.3447*
Exposed to Minor Burns, Cuts, Bites, or Stings	0.1284***	-0.0286	-0.1327	-0.1216	-0.2657**
Exposed to Radiation	0.084	-0.0445*	-0.1327	-0.1269	-0.8369**
Exposed to Whole Body Vibration	0.1815***	-0.0627**	-0.1327	-0.1145	-0.4737*

Extremely Bright or Inadequate Lighting	0.0980**	-0.0657	-0.1327	-0.1208	-0.2765*
Face-to-Face Discussions	-0.0107	-0.1498*	-0.1327	-0.1353	-0.1538*
Freedom to Make Decisions	-0.0118	-0.1660**	-0.1327	-0.1359	-0.2033*
Frequency of Conflict Situations	-0.035	-0.1238**	-0.1327	-0.14	-0.2184*
In an Open Vehicle or Equipment	0.1093**	-0.0034	-0.1327	-0.1326	-0.199
Indoors, Not Environmentally Controlled	0.0573*	-0.0608	-0.1327	-0.124	-0.2430*
Outdoors, Exposed to Weather	0.0627*	0.0059	-0.1327	-0.1317	-0.097
Physical Proximity	0.0292	-0.0644	-0.1327	-0.1283	-0.2756**
Sounds, Noise Levels Are Distracting or Uncomfortable	0.0545*	-0.1124*	-0.1327	-0.1212	-0.2571**
Spend Time Bending or Twisting the Body	0.1037***	-0.0071	-0.1327	-0.1234	-0.3720***
Spend Time Climbing Ladders, Scaffolds, or Poles	0.1472**	-0.0693**	-0.1327	-0.1151	-0.5242**
Spend Time Keeping or Regaining Balance	0.1390**	-0.0135	-0.1327	-0.1253	-0.5072**
Spend Time Kneeling, Crouching, Stooping, or Crawling	0.1283***	-0.0463	-0.1327	-0.1176	-0.4285**
Spend Time Making Repetitive Motions	0.0233	-0.054	-0.1327	-0.1301	-0.2475**
Spend Time Sitting	-0.0917***	-0.1076	-0.1327	-0.1447	-0.0807
Spend Time Standing	0.0703**	-0.0353	-0.1327	-0.1234	-0.2482**
Spend Time Using Your Hands to Handle, Control, or Feel	0.0645**	-0.0456	-0.1327	-0.1243	-0.2768***
Spend Time Walking and Running	0.0699**	-0.0038	-0.1327	-0.1272	-0.2917**
Structured versus Unstructured Work	-0.0195	-0.1386**	-0.1327	-0.1371	-0.1797*
Time Pressure	-0.0067	-0.1459**	-0.1327	-0.1345	-0.2309**
Very Hot or Cold Temperatures	0.0895**	-0.008	-0.1327	-0.1279	-0.1812*
Wear Common Protectives or Safety Equipment such as Safety Shoes, Glasses, Gloves,	0.0751***	-0.0218	-0.1327	-0.1222	-0.2234**

Hearing Protection, Hard Hats, or Life Jackets					
Wear Specialized Protective or Safety Equipment such as Breathing Apparatus, Safety Harness, Full Protection Suits, or Radiation Protection	0.1311***	-0.0542	-0.1327	-0.1177	-0.5015***

Note: all models include controls for gender, education, and birth cohort; N=7,054; *p<.05, p**<.01, p***<.0001

[1] Probit regression evaluating the effect of work exposure on early disability retirement-application or receipt of SSDI

[2] Linear regression evaluating whether there are ethnic differences in each work context measure

[3] Probit regression evaluating the effect of ethnicity on early disability retirement-application or receipt of SSDI

[4] Probit regression evaluating whether adding the work context measure partially mediates the association between ethnicity and early disability retirement-application or receipt of SSDI

[5] Probit regression evaluating whether there are ethnicity group-level differences in the effect of each work context measure on early disability retirement-application or receipt of SSDI

Appendix Table 2: Models examining lifetime average work context exposure and early disability retirement-

work-limiting health problem

Work context measure	Column 1 Effect of work context exposure on early disability retirement[1]	Column 2 Ethnic difference in work context exposure[2]	Column 3 Ethnic difference in early disability retirement[3]	Column 4 Ethnic difference in early disability retirement accounting for work context[3]	Column 5 Effect of ethnic differences in the effect of work context on early disability retirement[5]
Contact With Others	-0.0303	-0.1730**	-0.2005*	-0.2081*	-0.1380*
Cramped Work Space, Awkward Positions	0.0392	-0.0838*	-0.2005*	-0.1966*	-0.1206
Deal With Physically Aggressive People	0.0537	-0.0044	-0.2005*	-0.1993*	-0.2002
Deal With Unpleasant or Angry People	-0.0144	-0.0960*	-0.2005*	-0.2028*	-0.1703*
Exposed to Contaminants	0.0348	0.0254	-0.2005*	-0.2008*	-0.1327
Exposed to Disease or Infections	0.0434*	0.0089	-0.2005*	-0.2002*	-0.0838
Exposed to Hazardous Conditions	0.0228	-0.0456	-0.2005*	-0.1992*	-0.0891
Exposed to Hazardous Equipment	0.0344	-0.0769	-0.2005*	-0.1975*	-0.0889
Exposed to High Places	0.0117	-0.1058***	-0.2005*	-0.1991*	-0.2047
Exposed to Minor Burns, Cuts, Bites, or Stings	0.0586*	-0.0286	-0.2005*	-0.1988*	-0.078
Exposed to Radiation	0.0097	-0.0445*	-0.2005*	-0.2000*	-0.5541*
Exposed to Whole Body Vibration	0.0613	-0.0627**	-0.2005*	-0.1964*	-0.2482
Extremely Bright or Inadequate Lighting	0.0332	-0.0657	-0.2005*	-0.1978*	-0.1764
Face-to-Face Discussions	-0.032	-0.1498*	-0.2005*	-0.2076*	-0.1290*
Freedom to Make Decisions	-0.031	-0.1660**	-0.2005*	-0.2078*	-0.1667*

Frequency of Conflict Situations	-0.0256	-0.1238**	-0.2005*	-0.2049*	-0.1499
In an Open Vehicle or Equipment	0.0237	-0.0034	-0.2005*	-0.2006*	-0.1094
Indoors, Not Environmentally Controlled	0.0148	-0.0608	-0.2005*	-0.1993*	-0.1009
Outdoors, Exposed to Weather	0.0217	0.0059	-0.2005*	-0.2011*	-0.031
Physical Proximity	0.0165	-0.0644	-0.2005*	-0.1985*	-0.1987**
Sounds, Noise Levels Are Distracting or Uncomfortable	0.0232	-0.1124*	-0.2005*	-0.1972*	-0.1384
Spend Time Bending or Twisting the Body	0.0569*	-0.0071	-0.2005*	-0.1993*	-0.1472
Spend Time Climbing Ladders, Scaffolds, or Poles	0.0294	-0.0693**	-0.2005*	-0.1979*	-0.3008
Spend Time Keeping or Regaining Balance	0.0875*	-0.0135	-0.2005*	-0.1990*	-0.2033
Spend Time Kneeling, Crouching, Stooping, or Crawling	0.0634*	-0.0463	-0.2005*	-0.1967*	-0.1362
Spend Time Making Repetitive Motions	-0.0075	-0.054	-0.2005*	-0.2012*	-0.1648*
Spend Time Sitting	-0.0838***	-0.1076	-0.2005*	-0.2151*	-0.1606*
Spend Time Standing	0.0419*	-0.0353	-0.2005*	-0.1976*	-0.1163
Spend Time Using Your Hands to Handle, Control, or Feel	0.0205	-0.0456	-0.2005*	-0.1986*	-0.1841**
Spend Time Walking and Running	0.0421	-0.0038	-0.2005*	-0.1992*	-0.1334
Structured versus Unstructured Work	-0.0429*	-0.1386**	-0.2005*	-0.2093*	-0.1576*
Time Pressure	-0.0437*	-0.1459**	-0.2005*	-0.2100*	-0.1576*
Very Hot or Cold Temperatures	0.0203	-0.008	-0.2005*	-0.2004*	-0.0784
Wear Common Protectives or Safety Equipment such as Safety Shoes, Glasses, Gloves, Hearing Protection, Hard Hats, or Life Jackets	0.0312	-0.0218	-0.2005*	-0.1992*	-0.0883

Wear Specialized Protective or Safety Equipment such as Breathing Apparatus, Safety Harness, Full Protection Suits, or Radiation Protection	0.0375	-0.0542	-0.2005*	-0.1977*	-0.2361

Note: all models include controls for gender, education, and birth cohort; N=7,054; *p<.05, p**<.01, p***<.0001

[1] Probit regression evaluating the effect of work exposure on early disability retirement-work-limiting health problem

[2] Linear regression evaluating whether there are ethnic differences in each work context measure

[3] Probit regression evaluating the effect of ethnicity on early disability retirement-work-limiting health problem

[4] Probit regression evaluating whether adding the work context measure partially mediates the association between ethnicity and early disability retirement-work-limiting health problem

[5] Probit regression evaluating whether there are ethnicity group-level differences in the effect of each work context measure on early disability retirement-work-limiting health problem

Appendix Table 3: Models examining lifetime average work context exposure and early disability retirement-

LHMS medical leave or disability

Work context measure	Column 1 Effect of work context exposure on early disability retirement[1]	Column 2 Racial difference in work context exposure[2]	Column 3 Racial difference in early disability retirement[3]	Column 4 Racial difference in early disability retirement accounting for work context[4]	Column 5 Effect of race differences in the effect of work context on early disability retirement[5]
Contact With Others	-0.017	-0.1730**	-0.2009	-0.2065	-0.1615*
Cramped Work Space, Awkward Positions	0.1096**	-0.0838*	-0.2009	-0.1817	-0.2975*
Deal With Physically Aggressive People	0.0137	-0.0044	-0.2009	-0.2	-0.4007*
Deal With Unpleasant or Angry People	-0.0123	-0.0960*	-0.2009	-0.2037	-0.2800*
Exposed to Contaminants	0.0874**	0.0254	-0.2009	-0.1967	-0.184
Exposed to Disease or Infections	0.0182	0.0089	-0.2009	-0.1995	-0.3849*
Exposed to Hazardous Conditions	0.0842*	-0.0456	-0.2009	-0.1905	-0.2527
Exposed to Hazardous Equipment	0.1098***	-0.0769	-0.2009	-0.1854	-0.1187
Exposed to High Places	0.0788	-0.1058***	-0.2009	-0.1881	-0.171
Exposed to Minor Burns, Cuts, Bites, or Stings	0.1263***	-0.0286	-0.2009	-0.1909	-0.1776
Exposed to Radiation	0.0523	-0.0445*	-0.2009	-0.1969	-0.6558*
Exposed to Whole Body Vibration	0.1752**	-0.0627**	-0.2009	-0.1854	-0.2094
Extremely Bright or Inadequate Lighting	0.1009*	-0.0657	-0.2009	-0.1879	-0.2263
Face-to-Face Discussions	-0.006	-0.1498*	-0.2009	-0.2026	-0.1287
Freedom to Make Decisions	-0.0064	-0.1660**	-0.2009	-0.2027	-0.139

Frequency of Conflict Situations	-0.0206	-0.1238**	-0.2009	-0.2057	-0.1891
In an Open Vehicle or Equipment	0.1024*	-0.0034	-0.2009	-0.2058	0.0293
Indoors, Not Environmentally Controlled	0.0748*	-0.0608	-0.2009	-0.1911	-0.0895
Outdoors, Exposed to Weather	0.0578*	0.0059	-0.2009	-0.203	0.0385
Physical Proximity	0.0237	-0.0644	-0.2009	-0.1966	-0.2372*
Sounds, Noise Levels Are Distracting or Uncomfortable	0.0610*	-0.1124*	-0.2009	-0.187	-0.2095*
Spend Time Bending or Twisting the Body	0.0834**	-0.0071	-0.2009	-0.1923	-0.3117**
Spend Time Climbing Ladders, Scaffolds, or Poles	0.0998	-0.0693**	-0.2009	-0.1894	-0.2606
Spend Time Keeping or Regaining Balance	0.1317*	-0.0135	-0.2009	-0.1937	-0.3463
Spend Time Kneeling, Crouching, Stooping, or Crawling	0.1084*	-0.0463	-0.2009	-0.1869	-0.3567*
Spend Time Making Repetitive Motions	0.0123	-0.054	-0.2009	-0.1988	-0.2788**
Spend Time Sitting	-0.0900***	-0.1076	-0.2009	-0.2172	-0.0881
Spend Time Standing	0.0591*	-0.0353	-0.2009	-0.1924	-0.1967*
Spend Time Using Your Hands to Handle, Control, or Feel	0.0597*	-0.0456	-0.2009	-0.1916	-0.2579**
Spend Time Walking and Running	0.0492	-0.0038	-0.2009	-0.1957	-0.2596*
Structured versus Unstructured Work	-0.0232	-0.1386**	-0.2009	-0.2066	-0.1248
Time Pressure	-0.0119	-0.1459**	-0.2009	-0.2044	-0.1901*
Very Hot or Cold Temperatures	0.0966**	-0.008	-0.2009	-0.1982	-0.0704
Wear Common Protectives or Safety Equipment such as Safety Shoes, Glasses, Gloves, Hearing Protection, Hard Hats, or Life Jackets	0.0715**	-0.0218	-0.2009	-0.1919	-0.1507

| Wear Specialized Protective or Safety Equipment such as Breathing Apparatus, Safety Harness, Full Protection Suits, or Radiation Protection | 0.0917* | -0.0542 | -0.2009 | -0.192 | -0.2441 |

Note: all models include controls for gender, education, and birth cohort; N=7,054; *p<.05, p**<.01, p***<.0001

[1] Probit regression evaluating the effect of work exposure on early disability retirement-LHMS medical leave or disability

[2] Linear regression evaluating whether there are ethnic differences in each work context measure

[3] Probit regression evaluating the effect of ethnicity on early disability retirement-LHMS medical leave or disability

[4] Probit regression evaluating whether adding the work context measure partially mediates the association between ethnicity and early disability retirement-LHMS medical leave or disability

[5] Probit regression evaluating whether there are ethnicity group-level differences in the effect of each work context measure on early disability retirement-LHMS medical leave or disability

Appendix Table 4: Models examining lifetime average work context exposure and early disability retirement-poor health very important reason for retirement

Work context measure	Column 1 Effect of work context exposure on early disability retirement[1]	Column 2 Ethnic difference in work context exposure[2]	Column 3 Ethnic difference in early disability retirement[3]	Column 4 Ethnic difference in early disability retirement accounting for work context[4]	Column 5 Effect of ethnic differences in the effect of work context on early disability retirement[5]
Contact With Others	0.0191	-0.1730**	-0.2211*	-0.2175*	-0.05
Cramped Work Space, Awkward Positions	0.1609***	-0.0838*	-0.2211*	-0.2023*	-0.0567
Deal With Physically Aggressive People	0.1294***	-0.0044	-0.2211*	-0.2192*	-0.2721
Deal With Unpleasant or Angry People	0.0402	-0.0960*	-0.2211*	-0.2166*	-0.1116
Exposed to Contaminants	0.1372***	0.0254	-0.2211*	-0.2211*	-0.1255
Exposed to Disease or Infections	0.0942***	0.0089	-0.2211*	-0.2199*	-0.2366
Exposed to Hazardous Conditions	0.1162***	-0.0456	-0.2211*	-0.2123*	-0.0712
Exposed to Hazardous Equipment	0.1368***	-0.0769	-0.2211*	-0.2060*	-0.0456
Exposed to High Places	0.1185**	-0.1058***	-0.2211*	-0.2065*	0.0624
Exposed to Minor Burns, Cuts, Bites, or Stings	0.1466***	-0.0286	-0.2211*	-0.2140*	-0.104
Exposed to Radiation	0.1558**	-0.0445*	-0.2211*	-0.2134*	-0.2533
Exposed to Whole Body Vibration	0.2440***	-0.0627**	-0.2211*	-0.2055*	0.0208
Extremely Bright or Inadequate Lighting	0.1511***	-0.0657	-0.2211*	-0.2081*	-0.0643
Face-to-Face Discussions	0.0169	-0.1498*	-0.2211*	-0.2184*	-0.0249
Freedom to Make Decisions	0.0251	-0.1660**	-0.2211*	-0.2167*	-0.0206

Frequency of Conflict Situations	0.0324	-0.1238**	-0.2211*	-0.2164*	-0.0797
In an Open Vehicle or Equipment	0.1511***	-0.0034	-0.2211*	-0.2238*	-0.069
Indoors, Not Environmentally Controlled	0.1074***	-0.0608	-0.2211*	-0.2099*	-0.05
Outdoors, Exposed to Weather	0.0931***	0.0059	-0.2211*	-0.2239*	0.0154
Physical Proximity	0.0886***	-0.0644	-0.2211*	-0.2140*	-0.173
Sounds, Noise Levels Are Distracting or Uncomfortable	0.1127***	-0.1124*	-0.2211*	-0.2060*	-0.0757
Spend Time Bending or Twisting the Body	0.1311***	-0.0071	-0.2211*	-0.2167*	-0.1934
Spend Time Climbing Ladders, Scaffolds, or Poles	0.1526**	-0.0693**	-0.2211*	-0.2084*	0.0034
Spend Time Keeping or Regaining Balance	0.2133***	-0.0135	-0.2211*	-0.2180*	-0.1384
Spend Time Kneeling, Crouching, Stooping, or Crawling	0.1535***	-0.0463	-0.2211*	-0.2098*	-0.1588
Spend Time Making Repetitive Motions	0.0435	-0.054	-0.2211*	-0.2180*	-0.1238
Spend Time Sitting	-0.0624**	-0.1076	-0.2211*	-0.2261*	0.0578
Spend Time Standing	0.0954***	-0.0353	-0.2211*	-0.2137*	-0.1482
Spend Time Using Your Hands to Handle, Control, or Feel	0.0973***	-0.0456	-0.2211*	-0.2131*	-0.1712*
Spend Time Walking and Running	0.0914***	-0.0038	-0.2211*	-0.2180*	-0.159
Structured versus Unstructured Work	0.0103	-0.1386**	-0.2211*	-0.2196*	-0.0131
Time Pressure	0.0331	-0.1459**	-0.2211*	-0.2146*	-0.1072
Very Hot or Cold Temperatures	0.1183***	-0.008	-0.2211*	-0.2185*	-0.0623
Wear Common Protectives or Safety Equipment such as Safety Shoes, Glasses, Gloves, Hearing Protection, Hard Hats, or Life Jackets	0.0999***	-0.0218	-0.2211*	-0.2124*	-0.1152

| Wear Specialized Protective or Safety Equipment such as Breathing Apparatus, Safety Harness, Full Protection Suits, or Radiation Protection | 0.1746*** | -0.0542 | -0.2211* | -0.2073* | -0.1538 |

Note: all models include controls for gender, education, and birth cohort; N=7,054; *p<.05, p**<.01, p***<.0001

[1] Probit regression evaluating the effect of work exposure on early disability retirement-poor health retirement

[2] Linear regression evaluating whether there are ethnic differences in each work context measure

[3] Probit regression evaluating the effect of ethnicity on early disability retirement-poor health retirement

[4] Probit regression evaluating whether adding the work context measure partially mediates the association between ethnicity and early disability retirement-poor health retirement

[5] Probit regression evaluating whether there are ethnicity group-level differences in the effect of each work context measure on early disability retirement-poor health retirement