UNIVERSITY OF CALIFORNIA,

IRVINE

Physical and Mental Health-Related Quality of Life Among Hispanic/Latino Workers: Costs of Occupational Hazards and Status

THESIS

submitted in partial satisfaction of the requirements
for the degree of

MASTER OF ARTS

in Psychological Science

by

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2024

DEDICATION

To

mis padres

Alma y Gabriel
como reconocimiento y agradecimiento por sus sacrificios que permitieron mi vida y mi educación en los Estados Unidos

my siblings

Erick and Vanessa
for their unconditional love, guidance, support

Este título de máster no es solamente mío sino de toda la familia *Barajas-Ceballos*

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ACKNOWLEDGEMENTS

I wish to extend my heartfelt appreciation to my committee chair and graduate advisor, Dr. Kristine M. Molina. Her prowess in research and scholarship, coupled with her dedication to prioritizing her students is truly inspiring. I am grateful for her guidance throughout both my journey in graduate school and the completion of this thesis.

I am also indebted to my secondary graduate advisor, Dr. Paul K. Piff, whose effortless wit and gentle reminders to savor the process have been invaluable. His support has been very helpful during the writing of this thesis. A special note of gratitude goes to my third committee member, Dr. Jun Wu, for her insightful feedback and support.

Lastly, I extend my thanks to Dr. Linda Gallo and the collaborative team from San Diego State University for their generosity in granting access to the data that were used to conduct this investigation.

ABSTRACT OF THE THESIS

Physical and Mental Health-Related Quality of Life Among Hispanic/Latino Workers:

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By

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Master of Arts in Psychological Science

University of California, Irvine, 2024

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The health of Hispanic/Latino workers in the U.S. is inextricably tied to our nation's long-term health and economic viability. Exposure to physical hazards (e.g., solvents, pesticides) disproportionately affects Hispanics/Latinos, who are more likely to be *overrepresented* in low-status occupations (e.g., agricultural, janitorial, and service work). Despite privileges associated with high-status occupations (e.g., professional positions), Hispanics/Latinos in these occupations are *underrepresented* and, thus, disproportionately more likely to experience solo status and marginalization in their work environments. Prior research has not considered the health impacts of different occupational hazards to which low and high-status workers may be exposed differently (or similarly). Thus, the aims of this study were (1) to examine the independent associations of exposure to physical hazards and workplace discrimination with both physical and mental health-related quality of life (HRQoL) among Hispanics/Latinos and (2) to test whether occupational status (high vs. low) moderated associations between occupational hazards on HRQoL measures.

The present study employed data from (N=4,433) Hispanic/Latino adults (ages 18–74 years) from the Hispanic Community Health Study/Study of Latinos (HCHS; 2008-11) and its Sociocultural Ancillary Study (SOL; 2010-11) and who reported their longest-held job at baseline

(Visit 1) in the HSCH/SOL assessment. Participants were recruited from the Bronx, NY; Chicago, IL; Miami, FL; and San Diego, CA. Information about participants' occupations, exposure to physical hazards, reports of workplace discrimination, and physical and mental HRQoL were ascertained through interviewer-administered surveys. Survey-weighted linear regression models were estimated for each HRQoL outcome measure, adjusting for sociodemographic and behavioral factors.

Key findings for *physical* HRQoL indicated that only workplace discrimination (b= -.20, p< .05), not physical hazards (b= -.24, p= .109), was associated with worse physical HRQoL. Occupational status did not moderate any associations. Findings for *mental* HRQoL showed that physical hazards and workplace discrimination were each associated with worse mental HRQoL; these associations were moderated by occupational status. The occupational status x physical hazards interaction was significant (F (1, 644) = 5.94, p< .05); increases in physical hazards were associated with significantly worse mental HRQoL among Hispanics/Latinos reporting low (b= -.79, p < .001) and moderate (b= -.55, p < .01) levels, not high levels (b= -.30, p =.141) of workplace discrimination. The workplace discrimination x occupational status interaction was significant, F (1, 644) = 6.89, p< .001); the adverse mental HRQoL effects of workplace discrimination was strongest among those in low-status (vs. high-status) occupations.

Findings suggest that when focusing on contributors to health, *social hazards are critical to include when examining workers' physical HRQoL*, and also highlight the importance of considering individual differences in occupational status and exposure to occupational hazards on how they impact *psychological* health—all of which have implications for organizational policies and interventions.

Chapter 1

Introduction

There are 29 million Hispanic/Latino workers in the United States (US) labor force, with the proportion of this segment of workers increasing from 8.5% in 1990 to 18% in 2020, and by 2030, they will represent 1-in-5 workers in the US (Dubina, 2021). Hispanic/Latino workers report higher rates of poor health, including injuries and diseases, than workers from other racial/ethnic groups (Seabury et al., 2017). Occupational diseases and injuries are the 8th leading cause of death in the US (Steenland et al., 2003). Occupational hazards are aspects of the work environment that have garnered much attention as potential contributors to poor health-related outcomes (Patel et al., 2021) and early mortality (Runsten & Kerney, 1994). Identifying occupational hazards as possible contributors to poor health and whether the risk of occupational hazards on health differs by occupational status is vital to reducing health risk factors and, in so doing, ultimately reducing occupational health inequities in the fastest growing segment of the US labor workforce.

Occupational Hazards & Health-Related Outcomes

A growing body of research suggests that exposure to occupational hazards can increase workers' risk of injury, chronic diseases, and impairment (Krieger et al., 2008; Patel et al., 2021), all of which correlate with worse health-related quality of life (i.e., HRQoL). Epidemiological research in this area has mainly centered on physical hazards, defined as occupational agents, factors, or circumstances that can cause damage from the agent to the person (CDC, 2022). Occupational physical hazards include acute or chronic exposure to chemicals or solvents, volatile organic compounds, noise, radiation, or static working postures (e.g., prolonged standing or sitting) (CDC, 2022; Runsten & Kerney, 1994). Systematic and meta-analytic reviews find that physical hazards (such as biological, chemical, ergonomic, and mechanical hazards) are associated with mortality (any or all causes), gastroenteritis, occupational injuries, communicable and non-communicable diseases,

epidermal outcomes (e.g., bruises and lacerations), respiratory diseases, and musculoskeletal and physiological health outcomes (Zolnikov, et al., 2021; Oza et al., 2022). Although examined to a lesser extent, physical hazards can also impact mental health. Contemporary evidence supports the role of physical hazards in the development of mental health disorders (Robertson, Jayne, & Oakman, 2021). For example, prior research shows that exposure to physical hazards (e.g., noise and vibration) can contribute to an increased risk of depression and anxiety (Kwon et al., 2021; Russo et al., 2019). Conceptual models of occupational health posit that exposure to physical hazards can impact subsequent health-related outcomes via physiological, psychological, and stress-mediated pathways (Krieger et al., 2010; Limscomb et al., 2006). For example, Leka et al. (2015) find that physical hazards can negatively impact mental health through increased work-related stress, whereas other studies find that mental health can be negatively impacted by psychological distress (e.g., anxiety and depression; Hovey & Magaña, 2002) and physiological responses (e.g., accelerated heart rate, perspiration, tense muscles, and shallow breathing; Hovey & Seligman, 2006).

More recent work on occupational health suggests more attention be given to other types of hazards to which workers, especially racially minoritized workers, may be exposed. For example, the American Psychological Association's (2023) Work and Well-being survey on workplace health found that 1-in-5 American workers said their workplace was "very" or "somewhat toxic." Moreover, 58% of workers who reported a toxic work environment reported that their overall mental health was fair/poor (versus 21% of those who did not report a toxic workplace), whereas 76% of those who reported a toxic workplace reported that their work environment harmed their mental health (APA, 2023). However, racially minoritized workers were more likely to report witnessing or experiencing workplace discrimination, and Black and Hispanic workers were more likely to report feeling a lack of support from their employers than their White counterparts (APA, 2023).

Racial/ethnic-based discrimination is posited as a "toxic" social hazard to which racially minoritized workers in different sectors of the labor force are more likely to be exposed than their White counterparts (Filut, Alvarez, & Carnes, 2020; Stainback & Irvin, 2012). Biopsychosocial (Clark et al., 1999) and socio-cognitive models (Brondolo, Blair, & Kaur, 2017) of racism posit that racial discrimination can act as a chronic toxic stressor that can impact cognitive, behavioral, psychological, and physiological mechanisms associated with increased risk of poor mental and physical health. For example, discrimination in the workplace is found to have adverse effects on psychosocial outcomes such as career advancement, job satisfaction, stress levels, and feeling unwelcome, devalued, and exhausted (Amaro et al., 1987; Filut, Alvarez, & Carnes, 2020; Hall et al., 2011; Jimeno-Ingrum et al., 2009; Zambrana et al., 2021). Additionally, exposure to discrimination at work has also been linked to health-damaging behavioral responses (e.g., smoking, substance use) and coping strategies (e.g., increased vigilance; avoidance) (Krieger et al., 2015; Hall et al., 2011)—mechanisms implicated in poor mental and physical health-related outcomes. Research with an ethnically diverse sample of workers found higher rates of poor mental health among those who reported being discriminated against than those who did not (Roberts, Swanson, & Murphy, 2009). In a national study of practicing physicians, of those who rated their physical health as "fair/poor," 65% had experienced discrimination; in contrast, the 27% who reported their physical health as "excellent" reported experiencing discrimination of any type (Nunez-Smith et al., 2009).

Occupational Hazards & Health: The Role of Occupational Status

As a result of social stratification within the US, racially minoritized groups are more likely to be at risk of experiencing structural vulnerability in society and their work environments, which can put them at increased risk of adverse health (Braveman & Barclay, 2009). Hispanics/Latinos —a racially minoritized group in the US, are more likely to be concentrated in non-skilled occupations (i.e., those that typically do not require a high school degree and involve manual labor) relative to

their proportion in the labor force (US Bureau of Labor Statistics, 2021). These occupations include agricultural, service, construction, janitorial, maintenance, transportation, and material-moving labor (US Bureau of Labor Statistics, 2021). Often referred to as "blue-collar" and "working-class" jobs, these occupations tend to be stigmatized and associated with stereotypes such as "dirty jobs." Scholars have conceptualized these jobs as "low-status" occupations due to these jobs typically being associated with lower education and income, requiring manual labor and involving non-skilled or semi-skilled work, having less control over work circumstances, and jobs centered on repetitive tasks experience (Elser et al., 2018; Lundberg, 2006; Maron et al., 2015).

In contrast, the percentage of Hispanics/Latinos in occupations such as executive positions and those that require advanced degrees (e.g., lawyers, university professors, scientists and engineers, physicians, and management) is woefully low (American Bar Association, 2020; Association of American Medical Colleges, 2019; Davis & Fry, 2019; Fry et al., 2021) relative to their total number of the US workforce population (10.4% vs. 18%) (Bennett, 2021). These occupations are perceived as socially prestigious and are often associated with more power and status (e.g., greater autonomy and ability to shape the content and speed of one's work, responsibility for other coworkers, self-employed individuals; Lundberg, 2006; Maron et al., 2016), and can be conceptualized as "high-status" occupations.

Findings from a systematic review (Elser et al., 2018) focused on studies examining the association between occupational status and health showed that workers in low-status occupations (e.g., repair occupations, transportation, and moving occupations, and equipment cleaners, helpers, and laborers) were significantly more likely than those in high-status professions to be at increased risk of worse physical health outcomes (e.g., musculoskeletal or respiratory outcomes and cardiovascular disease). Other studies also find that bodily injury (Krieger et al., 2008) and psychophysiological stress (Lundberg, 2006) are higher in low-status versus high-status occupations.

Moreover, empirical studies indicate that Hispanic/Latino workers in non-skilled occupations report significantly more exposure to occupational physical hazards than those in professional/technical professions (Bulka, 2018). Together, these studies suggest that physical hazards may impact the *physical* health-related quality of life (i.e., HRQoL) of workers in low-status occupations more than their high-status counterparts. Data is scarce on how low and high-status workers compare on how physical hazards impact their mental health, although it is conceivable that low-status workers' *mental* HRQoL would be affected more than high-status workers since physical hazards (e.g., noise and vibration) associated with poorer mental health are more likely to be concentrated in low-status occupations (Kwon et al., 2021; Russo et al., 2019).

In addition to physical exposure to hazards, workers in low-status occupations can experience occupational social hazards. Social psychological research indicates that workers in low-status and blue-collar occupations are dehumanized, mistreated, and stereotyped as incompetent (Durante & Fiske, 2017), which can negatively impact health. Research shows that racial discrimination and other forms of marginalization among Hispanic/Latino day laborers are associated with health-damaging behaviors and poor health, which are implicated in poor health-related quality of life (Fleming et al., 2018). However, workers in low-status occupations (vs. high-status occupations) may be less impacted by experiences of interpersonal racial discrimination in the workplace due to the greater concentration of co-ethnics or similar others (e.g., low-income and immigrant workers)—potential sources of social support and social networks, sense of collective identity and belonging, and greater cohesiveness and exchange of social capital that may insulate them from racial discrimination (Steinback & Irvin, 2012) and adverse health outcomes (Lee, 2009; Riina et al., 2012; Shell, Peek, & Eschback, 2013). One study found that working with predominantly same-race coworkers is associated with perceiving less racial discrimination (Steinback & Irvin, 2012). Prior research also finds that in neighborhood contexts where there is a high concentration of

racially minoritized groups (inclusive of immigrants; Pasco, White, & Seaton, 2021; White et al., 2020), residents of color are less likely to report discrimination and more likely to report positive aspects of ethnic identity and access to health knowledge and services than when they are numerical minorities. Research with Hispanics/Latinos also shows that high neighborhood Hispanic/Latino /immigrant concentration confers health benefits, including reduced risk of mental health, physical health, and health-damaging behaviors (e.g., depressive symptoms, any past-year alcohol use, respiratory problems, cancer, acute physical symptoms, stroke, all-cause mortality (Cagney et al., 2007; Eschbach et al., 2004; Lee & Ferraro, 2007; Molina, Alegria, & Chen, 2012; Ostir et al., 2003; Shell, Peek, & Eschbach, 2013). Together, this evidence is consistent with the "ethnic-enclave hypothesis," which posits that a high density of co-ethnics and similar others can counterbalance structural vulnerability and risk of ill-health as a result of increased protective social and cultural factors (Eschbach et al., 2004),

On the other hand, Hispanic/Latino workers are woefully underrepresented in mostly white-dominated professions, often making them numerical minorities in their work environments (Chavez, 2011; Jackson et al., 1995; Zambrana et al., 2021) and more likely to experience "solo status." Hispanics/Latinos in high-status occupations may occupy "solo status" (i.e., being the only one [or one of a few] of one's social group in an otherwise homogenous group), which may simultaneously reduce their sense of belonging and increase their understanding of difference (Sekaquaptewa & Thompson, 2002). Thus, despite the economic and social privileges and health benefits often associated with high-status occupations, findings from ethnographic (Chavez, 2011; Chavez et al., 2014) and quantitative research (Zambrana et al., 2016; Zambrana, 2018) show that Hispanic/Latino professionals experience toxic work environments, including exposure to discrimination, stigma, and devaluation that put them at increased risk of poor health outcomes. Moreover, a systematic review of quantitative and qualitative studies focused on the experiences and

impact of discrimination among physicians of color (Filut, Alvarez, & Carnes, 2020) showed these professionals described feeling isolated, alone, invisible, and treated like an outsider and a "token minority," and also reported frequent instances of being excluded from social networks and lack of institutional support. In studies with Hispanics/Latinos and other workers of color across different types of high-status occupations (e.g., management, business owners, university professors, physicians), findings showed that higher reports of discrimination (including employment discrimination) are associated with higher stress levels, lower life satisfaction and well-being, psychological distress, and higher counts of physical symptoms (Amaro et al., 1987; Maddox, 2013; Zambrana et al., 2021).

However, several studies (Hudson et al., 2012; Molina & Simon, 2014; Ward et al., 2019; Zhang & Hong, 2012) find that racially minoritized groups of higher socioeconomic status (who are presumably more likely to be employed in high-status occupations) report more discrimination, including in the workplace, and that exposure to this occupational social hazard is associated with poorer mental and physical health outcomes (e.g., major depression, depressive symptoms, psychological distress, chronic health conditions) when compared to their lower socioeconomic status counterparts. The diminished returns hypothesis (Farmer & Ferraro, 2005) posits that for racially minoritized persons, holding a socioeconomically privileged status does not necessarily equate with health benefits that usually result from acquired levels of human capital and economic gains because these individuals may be more attuned to and aware of experiences of unfair treatment that may generate feelings of relative deprivation, low self-esteem, anxiety and distress—all of which may increase, rather than reduce risk of poor health-related outcomes (Hudson et al., 2012; Molina & Simon, 2014; Ward et al., 2019; Zhang & Hong, 2012). Moreover, stress and coping research with racially minoritized groups suggest that effortful coping—the expenditure of high levels of effort to handle and overcome barriers to success from a disadvantaged position in society—may contribute

to adverse physical and mental health outcomes, especially among high status racially minoritized persons (Hudson et al., 2016; James, Hartnett, & Kalsbeek, 1983), who are more likely to work in environments lacking in racial/ethnic diversity and social support and where they may feel pressured to prove themselves and be respected (Chavez, 2011; Filut, Alvarez, & Carnes, 2020; Hall et al., 2011; Zambrana et al., 2021). Thus, we conjecture that the association between workplace discrimination and *mental and physical* HRQoL would be stronger among Hispanics/Latinos in high-status occupations than their low-status counterparts.

Although theoretical and empirical evidence suggests potential differences in the extent to which occupational hazards may impact low and high-status workers, most research on occupational health has not considered how occupational status may moderate associations between occupational hazards and mental and physical health-related outcomes.

Synergistic Associations Between Occupational Hazards

There is also the potential that occupational hazards can impact health interactively, not only independently. Krieger and colleagues' (2010) argue that seemingly disparate hazards are likely to be clustered and affect health interactively, such that exposure to high levels of one type of hazard is likely to impact health as a function of exposure to high levels of other hazards. Evidence suggests that exposure to multiple risk factors increases workers' risk of disease and functional limitations (cf. Fox et al., 2021). Further, in a community sample of multi-racial/ethnic low-income workers (Krieger et al., 2010), findings showed that exposure to one or more was associated with an increased risk of psychological distress compared to no exposure to occupational hazards in the past year. Thus, whether physical hazards interact with workplace discrimination to impact mental and physical HRQoL among Hispanic/Latino workers, independent of occupational status, remains an empirical question.

Present Study

The current study addresses three empirical gaps in the literature. First, we examined if physical and social occupational hazards were independently associated with physical and mental health-related quality of life measures. We hypothesized that both occupational hazards would be associated with worse physical and mental health-related quality of life. However, social hazards (i.e., workplace discrimination) were expected to be more consistently related to physical and mental HRQoL measures. Second, we examined if and how occupational status moderated hypothesized associations between occupational hazards and physical and mental HRQoL measures. We expected the association between physical hazards and physical and mental HRQoL to be stronger among Hispanics/Latinos in *low-status* occupations than their high-status counterparts. Alternatively, we expected hypothesized associations between social hazards and physical and mental HRQoL measures to be stronger among Hispanics/Latinos in *high-status* occupations. Third, we investigated whether physical and social occupational hazards are synergistically associated with physical and mental HRQoL measures, independent of occupational status. We hypothesized that higher levels of workplace discrimination would exacerbate the expected negative association between physical hazards and physical and mental HRQoL measures.

Chapter 2

Methods

Participants & Procedures

Data for the present study are from the Hispanic Community Health Study/Study of Latinos (HCHS/SOL) and the HCHS/SOL Sociocultural Ancillary Study (SCAS). Data collection for HCHS/SOL and SCAS took place via face-to-face interviews and administered in Spanish or English by trained interviewers. Study participants provided written informed consent, were reimbursed for travel expenses, and were financially compensated for their participation in each study. A detailed description of the HCHS/SOL and SCAS sampling procedures and study

protocols is reported elsewhere (Gallo et al., 2014; LaVange et al., 2010). The Institutional Review Boards (IRB) at each study site approved all HCHS/SOL and SCAS study procedures. Secondary data analysis of the HCHS/SOL and SCAS data met UCI's IRB exempt status.

Briefly, the HCHS/SOL (Visit 1; 2008-2011) is a population-based, multi-center cohort study of 16,515 self-identified Hispanic/Latin adults aged 18 to 74 at baseline of diverse backgrounds (i.e., Cuban, Central American, Dominican, Mexican, Puerto Rican, and South American). The primary aim of the HCHS/SOL was to examine the prevalence and development of disease among Hispanics/Latinos (LaVange et al., 2010). The sampling design consisted of a stratified two-stage probability sample of households located in four field sites (Bronx, New York; Chicago, Illinois; Miami, Florida; and San Diego, California). Eligible individuals included those who self-identified as Hispanic/Latino, could complete the study examination, and reported no plans to move from the study area. Enrolled participants underwent an extensive examination that included sociodemographic, biological, and behavioral assessments.

The SCAS cohort (2009-2010) is a subsample of participants from the baseline HCHS/SOL cohort who provided consent to be re-contacted and were available to attend another visit within nine months of their HCHS baseline examination. The primary aim of SCAS was to identify sociocultural and psychosocial correlates of disease (Gallo et al., 2014). The SCAS sample is representative of the main HCHS/SOL cohort, except for the lower participation of individuals of higher socioeconomic status (Gallo et al., 2014). Of the 7,312 respondents contacted and eligible to participate, 5,313 (72.6%) consented to participate in SCAS. The analytic sample for the present study includes the subset of respondents who participated in both the HSCH/SOL and SCAS surveys and who reported their longest-held job at baseline (Visit 1) in the HSCH/SOL assessment (N= 4,433).

Measures

Occupational Status. We created a dichotomous variable that classified respondents into one of two occupation statuses: 0 "high-status (reference)" or 1 "low-status." *Low-status* occupations included occupations not generally regarded as prestigious or requiring an advanced degree; these included non-skilled workers, service workers, farmers, and drivers. *High-status* occupations included skilled workers, professional/technical workers, administrative/ executive, or office staff. The categorization of occupation status has been previously used in other HCHS/SOL studies (see Bulka et al., 2019).

Occupational Hazards

Physical Hazards. We used 17 items asking about respondents' exposure to occupational physical hazards (e.g., noise, vapors, dust, fumes, hazardous chemicals, hazardous metals, acids or alkalis, and solvents or degreasers) at their longest-held job. Response options were in a 0=No/1=Yes format. A variable representing the sum of affirmative responses was generated, with higher scores indicating greater exposure to any physical occupational hazard.

Social Hazards. We assessed exposure to ethnic-based discrimination using the 17-item Brief Perceived Ethnic Discrimination Questionnaire Community Version (PEDQ-CV; Brondolo et al., 2005). The PEDQ-CV is a multidimensional measure that assesses four forms of racism. For purposes of this study, we used the *discrimination at work/school* subscale (4 items), which assesses the extent to which one is treated unfairly at work or school because of their race or ethnicity (e.g., "*Has your boss or supervisor been unfair to you?*"). Response options are rated on a scale from "1= never happened" to "5= happened often". The demographic composition of the sample suggests most participants referred to workplace-based discrimination (as opposed to school-based). Given three out of the four items were specific to workplace discrimination, and the one school item referred to

discrimination by teachers or *staff*, we decided to include all four items. We calculated a summary score (α= .73), with higher scores reflecting a greater frequency of workplace discrimination. The PEDQ-CV workplace discrimination subscale has been previously used with Hispanic/Latino adults (Ornelas et al., 2016).

Health Measures

Physical & Mental Health-Related Quality of Life (HRQoL). The physical (PCS) and mental (MCS) health component summary scores of the 12-item Short-Form Health Survey (SF-12; Ware et al., 1996) were used to assess subjective physical and mental well-being. Per guidelines, the PCS and MCS scores are calculated by weighting each item using the standard US norm-based methods and summing items to create component scores of physical and mental well-being (Ware et al., 1996). Higher scores (range = 0–100) indicate better physical and mental health-related quality of life. The PCS (α= .84) and MCS (α= .80) component subscales demonstrated high internal consistency.

Covariates

Sociodemographic and behavioral factors were included as potential covariates in statistical models (see "Preliminary Analyses" section for a description of covariate selection). Sociodemographic characteristics included age (in years: 18-24, 25-34, 35-44, 45-54, 55+), sex (female or male), Hispanic/Latino background (Dominican, Central American, Cuban, Mexican, Puerto Rican, and South American), highest level of education (Less than high school diploma, high school diploma or GED, greater than high school diploma/GED)" annual household income (Less than $10,000 to 4= more than $40,000), language preference at interview (English or Spanish), marital status (single; married or living with a partner; separated, divorced, or widowed), nativity status/years in the US (US-born; foreign- born and < 5 years in the US; foreign-born and ≥5 but < 10yrs; foreign- born and ≥10 years), field center (Bronx, Chicago, Miami, San Diego), health

insurance coverage (yes or no), and employment status (retired and not currently employed, not retired-but not currently employed, employed part-time [≤35 hours/week], or employed full-time [>35 hours/week]). We included the following *health-related behaviors*, which are known correlates of health status: physical activity (measured as physical activity in a typical week across three contexts, including work, recreation, and transport [does not meet guidelines or meets guidelines], smoking status (never, former, current), and current alcohol status (never, former, current).

Data Analysis

All analyses were conducted using Stata 17/SE software. Tests of significance were two-sided at the 5% level.

Preliminary Analyses. All preliminary analyses were conducted using Stata/SE 17 software using the *svy* suite command for complex survey data. We conducted bivariate associations between all potential covariates and outcome variables. Associations with p-values of $< .05$ for any outcome were considered in a fully adjusted model of covariates to arrive at a more parsimonious model of potential confounders; covariates significant at the $p < .05$ level were included in multivariable regression models for physical and mental health-related quality of life (Heeringa & West, 2017).

Descriptive Statistics. We conducted weighted cross-tabulations (i.e., frequencies, proportions, and standard errors) to obtain information on the total analytic sample's sociodemographic characteristics and by occupational status **(**see Table 1). The Rao-Scott statistics for the Pearson chi-square test for contingency tables were computed for categorical variables to test for differences in proportions. We obtained weighted means and standard deviations for continuous measures for the total analytic sample and by occupational status (see Table 2); the design-based adjusted-Wald test was used to test for differences between occupation statuses (low vs. high). Further, point-biserial correlations were conducted to examine associations between binary (i.e., occupational status) and continuous variables (i.e., physical and social occupational hazards, mental

and physical health measures). Pearson's r correlations were conducted to examine associations between continuous-by-continuous variables (e.g., physical and social occupational hazards, mental and physical health measures).

Main Analyses. The main analyses consisted of estimating multivariable linear regression models for continuous outcomes. We modeled health outcomes by building three models for each health-related quality of life measure, adjusting for covariates. In Model 1 ("main effects model"), we entered occupational status (high vs. low) and occupational hazards measures (i.e., physical hazards and workplace discrimination) as independent predictor variables. In Model 2, we included the interaction of occupational status × physical hazards to test whether occupational status moderated the association between physical hazards and each HRQoL measure. Finally, in Model 3, we added the occupational status × workplace discrimination interaction term to test whether occupational status moderated the association between workplace discrimination and each HRQoL measure. We also tested whether workplace discrimination moderated the association between physical hazards and each HRQoL measure by including the interaction between physical hazards and workplace discrimination. Continuous variables included in interaction terms were mean-centered to reduce multicollinearity (Aiken & West, 1991). To aid in interpreting and illustrating any significant interactions, we used coefficients from the respective final model (Model 3) to calculate predicted marginal means of HRQoL outcomes at different levels of the predictor hazards variable (at the mean and 1± standard deviation from the mean), representing "low," "moderate," and "high" levels, respectively) and plot simple slopes (Aiken et al., 1991). All main analyses accounted for the complex sampling design to obtain representative estimates, account for unequal probability of selection, and estimate standard errors in the presence of stratification and clustering.

Chapter 3

Results

Descriptive Statistics & Preliminary Analyses

Table 1 presents the distribution of selected sociodemographic characteristics of the total analytic sample. Participants were, on average, middle-aged (M= 42.8; SD =15.3), predominately female (54%), of Mexican heritage (39%), married or living with a partner (49%), foreign-born (74%), had a high school diploma or less (59%), and were either currently working (part-time or full-time; 47%) or unemployed but not retired (43%).

Table 2 reports descriptive statistics for key study variables among the total sample and by occupational status. Low and high-status workers did not differ significantly from each other on any of the occupational hazards or health-related quality of life measures.

Table 3 reports the unweighted correlations among key study variables for the total analytic sample. All key study variables (i.e., physical hazards, workplace discrimination, mental and physical HRQoL measures) were significantly associated. Occupational status was significantly associated only with physical hazards ($p < .01$).

Weighted Multivariable Linear Regression Models

Physical Health-related Quality of Life (HRQoL)

In Model 1, occupational status was not associated with physical HRQoL (data not shown). Regarding occupational hazards, only workplace discrimination was significantly associated with worse physical HRQoL ($\beta = -.18$, 95% CI [-.319, -.049], $p < .01$). Physical hazards and physical HRQoL were not associated ($p = 0.11$). In Model 2, where we added the occupational status x physical hazards product term, we did not find significant independent associations or interactions (data not shown). In the final model (Model 3), where we included all 2-way interaction terms, we

did not find any statistically significant (data not shown). The final model was significant (F (39, 606) = 13.30, p < .001), with variables in the model explaining 18.20% of the variance in physical HRQoL.

Mental Health-related Quality of Life (HRQoL)

In Model 1, occupational status was not associated with mental HRQoL (data not shown). Regarding occupational hazards, physical hazards (β = -.49, 95% CI [-.804, -.170], p < .05) and workplace discrimination (β = -.59, 95% CI [-.789, -.391], p < .001) were significantly associated with worse mental HRQoL. Model 2 results revealed that the independent associations for physical hazards and workplace discrimination on mental HRQoL remained significant. However, the two-way interaction between occupational status and physical hazards was non-significant (β = .30, 95% CI [-.262, .868], p >.29).

The final model (Model 3) was significant (F (39, 606) = 10.24, p < .001), with variables in the model explaining 16.05% of the variance in mental HRQoL. In this final model, we found that occupational status moderated the association between workplace discrimination and mental HRQoL (F (1, 644) = 6.89, p< .001). Specifically, the slopes of the regression lines between workplace discrimination and mental HRQoL were significantly different (β = -.50, 95% CI [-.887, -.111], p <.05) for Hispanics/Latinos in low versus high-status occupations. Simple slope analyses revealed that increasing levels of workplace discrimination among both occupation statuses were associated with worse mental HRQoL; however, the slope for Hispanics/Latinos in low-status occupations was steeper than those in high-status occupations (see Figure 1). In Model 3, we also found that the physical hazards x workplace discrimination interaction term was significant (F (1, 644) = 5.94, p< .05). Simple slope analyses revealed among Hispanics/Latinos reporting low or moderate levels of workplace discrimination, that increasing levels of physical hazards were associated with worse mental HRQoL. However, among Hispanic/Latino workers reporting high

levels of workplace discrimination, increasing levels of physical hazards were not related to mental HRQoL. Figure 2 shows the plotted simple slopes and predicted marginal means of mental HRQoL as a function of physical hazards and workplace discrimination.

Supplementary Analyses

Given that occupational status may differentially expose Hispanic/Latino individuals to physical and social hazards, we examined whether the interaction between physical hazards and workplace discrimination varied as a function of occupational status. We included two three-way interaction terms (physical hazards × workplace discrimination × occupational status) with each HRQoL outcome. None of the 3-way interaction terms were significant (data not shown).

Discussion

Our study is the first to examine direct and interactive associations of occupational physical and social hazards and occupational status with mental and physical health-related quality of life. Our study makes significant contributions using data from a population-based study with a diverse and representative sample of Hispanic/Latino adults across four regions in the US, enhancing the generalizability of our findings. This rich data allowed for consideration of heterogeneity among low- and high-status workers' retrospective reports of exposure to occupational hazards and to capture potential underlying processes relevant to their health-related quality of life. As Zambrana et al. (2021) highlight, analysis of epidemiological datasets of Hispanics/Latinos in the US is valuable for identifying scientific gaps and future directions and allocating resources to reduce health inequities in segments of our population at the highest risk of poor health.

Occupational Hazards & Health-Related Quality of Life

Consistent with hypotheses, workplace discrimination was associated with lower physical and mental HRQoL. Our findings align with biopsychosocial models of racism (Clark et al., 1999; Harrell et al., 2000), which posit that exposure to ethnic-based discrimination, including in the work

domain, can engender emotional, cognitive, and behavioral responses that can negatively impact mental and physical health. Consistent with this theorizing, meta-analytic studies of discrimination, including workplace discrimination, find that higher levels of anxiety, psychological distress, job stress, dissatisfaction, lower perceived sense of justice, and unhealthy behaviors (e.g., alcohol, smoking, and substance use) help explain associations between perceptions of discrimination and health outcomes (Dhanani, Beus, & Joseph, 2017; Lee & Ahn, 2011). Other research indicates that more frequently reported interpersonal discrimination is associated with more physical and mental health functional impairment among Hispanics/Latinos and other racially minoritized groups (Waldman et al., 2019). Overall, our findings for workplace discrimination suggest it can be conceived as a "toxic" occupational health hazard.

We found partial support for hypotheses concerning physical occupational hazards, such that higher reports of exposure to physical occupational hazards were associated with worse mental HRQoL, not worse physical HRQoL. Albeit limited, our findings for mental HRQoL are supported by previous research that demonstrates exposure to physical hazards (e.g., noise, vibration) can contribute to an increased risk of depression and anxiety (Kwon et al., 2021; Russo et al., 2019). One potential explanation for our null findings with physical hazards could be the methodological differences between our study and others. Most prior studies on occupational health find significant associations between specific types of physical hazards and discrete chronic health conditions, focusing on workers in particular occupations, or did not account for social hazards in their statistical models (Qi et al., 2022; Oza et al., 2022; Archangelidi et al., 2021). Together, our findings for mental and physical HRQoL could be partly explained by the life-course perspective's latency concept (Gee, Walsemann, & Brondolo, 2012), such that the effects of exposures (e.g., physical toxins) may take longer to develop into impaired physical health functioning than mental health-related functioning.

Nonetheless, our findings for associations between physical hazards and workplace discrimination with HRQoL measures must be examined with our moderation analyses, which provide additional insight into how associations depended on occupational hazards and occupational type.

Occupational Hazards & Health-Related Quality of Life: The Role of Occupational Status

When we included the interaction between occupational hazards and occupational status, results indicated that occupational status moderated the association between workplace discrimination and mental HRQoL—contrary to hypotheses. Although our findings suggest that workplace discrimination is cross-sectionally associated with worse mental health functioning for Hispanics/Latinos in low- and high-status occupations, this association was significantly stronger for workers in low-status occupations. Exposure to interpersonal discrimination is consistently found to correlate with worse mental health-related outcomes across groups with high/privileged or low/marginalized statuses (Kaur et al., 2022). We offer potential explanations for our findings of workers in low- and high-status occupations.

The findings for Hispanic/Latino workers in high-status occupations could be explained with the diminished returns hypothesis (Farmer & Ferraro, 2005), which posits that experiences of discrimination and the frustration that may result from it may undermine the health benefits that usually result from occupational privilege and socioeconomic gains for racialized workers (Chavez, 2011; Jackson et al., 1995; Zambrana et al., 2021). However, unlike workers in low-status occupations, Hispanic/Latino workers in high-status occupations might have had greater job autonomy, ability to communicate with supervisors, and resources to cope with discrimination in the workplace (e.g., money, support from colleagues) (Fujishiro & Koessler, 2020; Hall, Everett, & Hamilton-Mason, 2011; Li et al., 2021).

On the other hand, drawing from a life span theory of control, which posits that individuals strive for primary control when confronted with challenges and adversity (Heckhausen & Schulz, 1995), it is plausible that low-status workers may have felt a sense of powerlessness, perceived inability to seek justice and hopelessness, perhaps contributing to worse emotional health, especially if experiences were perceived as uncontrollable (Negi, 2012). Qualitative studies indicate that when immigrant day laborers experience structural racism in the workplace (e.g., loss of income due to wage theft, workplace violations), they report economic loss and feelings of worthlessness and depression (Walter et al., 2002). Other studies find that job instability and the threat of deportation can discourage Hispanic/Latino workers in low-status occupations from responding to workplace abuse, creating additional stress, sadness, anxiety, loneliness, and abuse of substances to cope (Fussell, 2011; Negi, 2010). From a resource constraints perspective, perhaps Hispanic/Latino workers in low-status occupations, even if covered by health insurance, may not have had the option or time to take days off or the material and financial resources (e.g., transportation, copayments) to access mental health services, which might have been more accessible to workers in high-status occupations (Nicholson, Hande, & Manitoba, 2023).

Interactive Associations of Environmental Injustices on Health-Related Quality of Life

We also found a significant interaction between workplace discrimination and physical hazards on mental HRQoL. Specifically, contrary to hypotheses, increases in reports of physical hazards were associated with worse mental HRQoL among workers reporting low and moderate workplace discrimination, not among Hispanic/Latino workers reporting high workplace discrimination. This finding suggests a "ceiling effect" – Hispanic/Latino workers reporting high workplace discrimination perhaps became accustomed to or desensitized to a toxic work environment. Consistent with the theory of embodiment (Krieger, 2005; Krieger, 2016), the bodies of these racialized workers may have become desensitized to the effects of additional toxic agents

"under the skin." Indeed, at low levels of physical hazards, Hispanic/Latino workers reporting high workplace discrimination reported significantly lower mental HRQoL than those reporting moderate or low workplace discrimination.

Limitations and Future Directions

Despite our study's strengths, we acknowledge several key limitations. First, the cross-sectional study design limits our ability to make claims about causality or temporal associations. However, there is epidemiological and experimental evidence that demonstrates exposure to occupational physical hazards predicts work-related health outcomes (Ekpenyong & Asuquo, 2017; Elser et al., 2018) and the onset of contracting chronic diseases later in life (Dembe et al., 2014). Similarly, previous research indicates that exposure to workplace discrimination (Okechukwu et al., 2013; Dhanani, Beus, & Joseph, 2017) prospectively predicts mental health outcomes. Still, future studies should examine how exposure to occupational physical and social hazards changes and impacts health over time, controlling for prior exposures in and outside of the workplace environment.

Another limitation is the reliance on self-report measures, which could have contributed to common method, recall, and social desirability bias. For example, among racially minoritized groups, social desirability is associated with avoiding conflict and evaluating others (Gong, Gage, & Tacata, 2003; Zane & Yeh, 2002). Perhaps participants underreported their exposure to physical and social hazards due to the need to provide socially desirable and culturally appropriate answers, especially if they feared reporting on workplace issues that could make them be seen as "victims" or in a negative light or could impact them negatively (Ramos et al., 2018). Although low reports of physical exposures might have biased associations with health outcomes (Krieger, Smith, Naishadham, Hartman, & Barbeau, 2005), it seems less the case for associations involving self-reported workplace discrimination because lower levels might have biased our results toward the null hypothesis.

Lastly, we only included global measures of self-reported physical and mental HRQoL. Previous studies show that specific physical hazards are associated with an increased risk of particular health conditions (Elser et al., 2018). Future studies should also consider other physical hazards, such as physical-ergonomic hazards (e.g., less workstation adjustability, working in a cramped or awkward posture), to which workers across occupation types and statuses are exposed and which can increase the risk of arthritis and musculoskeletal injuries, discomforts, and disorders that can impact physical-related functioning (Delp & Wang, 2013; Pompeii et al. 2009; Tak & Calvert, 2011). Whenever possible, future studies should include self-report and objective assessments of occupational physical hazards (e.g., electromyography, accelerometers, and video recordings; Oakman, Ketels, & Clays, 2021) and workplace discrimination (e.g., institutional discrimination; e.g., wage inequities, wage theft). It will also be essential to consider global and discrete health and work-related conditions, impairments, and health-related quality of life.

Implications

Findings from the present study have several implications across multiple levels. First, evidence shows that implementing community-based programs that educate immigrant populations about occupational health and safety can enhance working conditions for a diverse workforce through increased awareness of occupational safety and workers' rights (Gany et al., 2014). Programs such as the Chicago Interfaith Workers' Rights Center offer an example of how community organizations can support and empower workers from racially/ethnically diverse backgrounds by providing them resources such as free access to information and training on labor rights (e.g., the right to report occupational hazards exposure at work; Gany et al., 2014). The provision of resources and community spaces for workers across different occupations may empower them to organize, form labor unions, and get engaged with democratic participation to support the passing of

legislation at multiple levels and collective bargaining to improve working conditions (Hagedorn et al., 2016).

Second, research shows passing legislation on resource accessibility in the workplace, such as access to paid family or medical leave, can improve health outcomes for individuals and their families (Krieger et al., 2006). Increased workplace hazard protections and higher and more equitable wages and benefits (e.g., health benefits, paid time off, subsidized childcare) and access to structural and social resources (e.g., procedure for grievances, employee mentorship) can also help promote health and well-being for workers Greer, 2018; Hagedorn et al., 2016).

Third, findings from intervention and correlational studies on workplace discrimination and other forms of marginalization (e.g., workplace bullying) show that when employees receive high levels of supervisory social support or when supervisors promote a psychosocially safe climate or participate in justice-based training, stress-related responses (e.g., perceived stress, sleep) are reduced or diminished and work-related outcomes improved (e.g., lower rates of intention to leave due to emotional exhaustion, increased work engagement) (Jang et al., 2016; Srivastava & Agarwal, 2020; Tago & Amponsah,-Tawiah, 2019) among workers. Thus, workplaces should consider training supervisors and human resources personnel on supporting their subordinates in a justice-oriented manner to create psychologically healthy workplaces where all employees feel respected, valued, and can thrive (Day, Kelloway, & Hurrell Jr., 2014). Lastly, it is crucial to develop programs that help Hispanic/Latino navigate and cope with environmental injustices by assisting them to recognize, examine, and externalize rather than internalize them, which may empower them to advocate for themselves and workers' rights.

Conclusion

Hispanic/Latino workers will account for 20% of the US workforce by 2030 (Dubina, 2021), and they (similar to other ethnic groups) spend most of their waking hours during the majority of

their lifetime at workplaces (Giattino & Ortiz-Ospina, 2020). Further, on average, Hispanics/Latinos live longer than the general population (Arias, 2016). However, this does not equate to better functioning and health-related quality of life across the lifespan for this population segment. Given that illness and disability are significant factors for being out of work involuntarily among racially minoritized workers (Wilson & Jones, 2018), focusing on Hispanics'/Latinos' workplace experiences and subsequent outcomes is critically important to the health, productivity, and economic viability of individuals, communities, and society at large. Thus, examining potential mechanisms linking exposure to occupational hazards and health-related quality of life among Hispanic/Latino workers and factors at multiple levels that may offer protection across occupations where they are overrepresented and underrepresented will be necessary.

Further, moving this line of work forward is particularly important due to the ongoing anti-Hispanic/Latino/immigrant rhetoric (e.g., the use of "illegal aliens" to describe immigrant and Hispanic/Latino workers, regardless of documentation status), racial profiling, and policies (Molina et al., 2019). Understanding the different work environments that Hispanic/Latino workers navigate and the hazards they are exposed to is crucial for reducing health inequities and improving the health and quality of life of the largest racially minoritized group in the US.

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APPENDIX

TABLES AND FIGURES

Table 1. Weighted Distribution of Selected Characteristics among the Total Sample (N= 4,433)

Characteristics	M (SD)	N[a]	%	S.E.
Age (in years)	**42.8 (15.3)**			
18-24		366	13.0%	0.01
25-34		480	20.0%	0.01
35-44		824	22.5%	0.01
45-54		1415	20.4%	0.01
≥55		1358	24.1%	0.01
Sex				
Female		2,732	53.9%	0.02
Male		1,711	46.1%	0.02
Hispanic/Latino Background				
Dominican		437	12.0%	0.10
Central American		471	7.8%	0.10
Cuban		638	20.0%	0.02
Mexican		1,770	39.0%	0.02
Puerto Rican		712	16.2%	0.01
South American		299	5.0%	0.01
Education				
<High school diploma		1,565	31.0%	0.01
High school diploma/GED		1,157	28.0%	0.01
>High school diploma/GED		1,715	41.0%	0.01
Household Income				
≤$10,000		723	17.0%	0.01
$10,001-$20,000		1,374	33.0%	0.01
$20,001-$40,000		1,367	33.0%	0.01
≥$40,001		642	18.0%	0.01
Language Preference				
English		854	24.1%	0.02
Spanish		3,589	74.9%	0.02
Marital Status				
Single		1,210	33.0%	0.01
Married or living with a partner		2,241	49.0%	0.01
Separated/divorced/widow		985	18.0%	0.01
Years Living in the US/Nativity Status				
U.S.-born		1,012	26.0%	0.01
Foreign-born, <5 years		979	23.0%	0.01
Foreign-born, ≥5 but <10 years		1,674	29.0%	0.01
Foreign-born, ≥10 years		770	22.0%	0.01

Field Center			
Bronx	1,063	29.2%	0.02
Chicago	1,130	16.2%	0.01
Miami	1,110	29.1%	0.03
San Diego	1,140	25.5%	0.02
Health Insurance			
Yes	2,240	52.0%	0.01
No	2,194	48.0%	0.01
Employment Type			
Retired and not currently employed	446	10.0%	0.01
Not retired and not currently employed	1,888	43.0%	0.01
Part-time ≤35 hours/week	813	19.0%	0.01
Full-time >35 hours/week	1,296	28.0%	0.01
Physical Activity			
Does not meet guidelines	1,657	35.0%	0.01
Meets guidelines	2,774	65.0%	0.01
Smoker Status			
Never	2,702	61.2%	0.01
Former	935	18.3%	0.01
Current	802	20.5%	0.01
Current Alcohol Consumption			
Never drank	902	19.0%	0.01
Former drinker	1,445	30.0%	0.01
Current drinker	2,094	51.0%	0.01

Note. Percentages and standard errors are weighted. S.E.=Standard error.
[a]N is unweighted.

Table 2. Weighted Descriptive Statistics for Key Study Variables among the Total Sample and by Occupational Status

	Total Sample (n = 4,433)		Occupational Status: Low-Status[a] (n = 2,471)		Occupational Status: High-Status[b] (n = 1,972)		*F-statistic*	*p-value*
	M	SD	M	SD	M	SD		
Occupational Hazards								
Physical hazards	1.13	2.60	1.23	2.72	1.02	2.50	F (1,644) = 2.54	0.111
Workplace discrimination	6.23	2.94	6.21	2.96	6.25	2.91	F (1,644) = 0.05	0.821
Health Measures								
Physical Health-related Quality of Life	49.77	10.04	49.89	10.09	49.62	10.00	F (1,644) = 0.47	0.495
Mental Health-related Quality of Life	48.57	12.27	47.93	12.77	49.29	11.66	F (1,644) = 3.40	0.065

Note. [a]Low-status workers include non-skilled, service, driver, and farmer occupations. [b]High-status workers include skilled and professional/technical workers, administrative/executive, and office staff occupations. M=Mean; SD= Standard deviation.
The reported p-values are based on the *F*-statistic of the survey design-adjusted Wald test.

Table 3. Correlations among Key Study Variables for the Total Sample

	1	2	3	4	5
1. Occupational Status (low-status) [a]	--				
2. Workplace Discrimination	-0.03	--			
3. Physical Hazards	0.04**	0.08***	--		
4. Mental Health-related Quality of Life	-0.00	-0.03*	-0.07***	--	
5. Physical Health-related Quality of Life	-0.00	-0.15***	-0.07***	0.05**	--

Note. Higher scores on self-rated mental and physical health-related quality of life measures reflect poorer physical and mental health, respectively.

[a]The reference group is high-status occupation.

*p <.05, **p <. 01, ***p<.001

Figure 1. Predicted Marginal Means of Mental Health-Related Quality of Life as a Function of Workplace Discrimination and Occupational Status

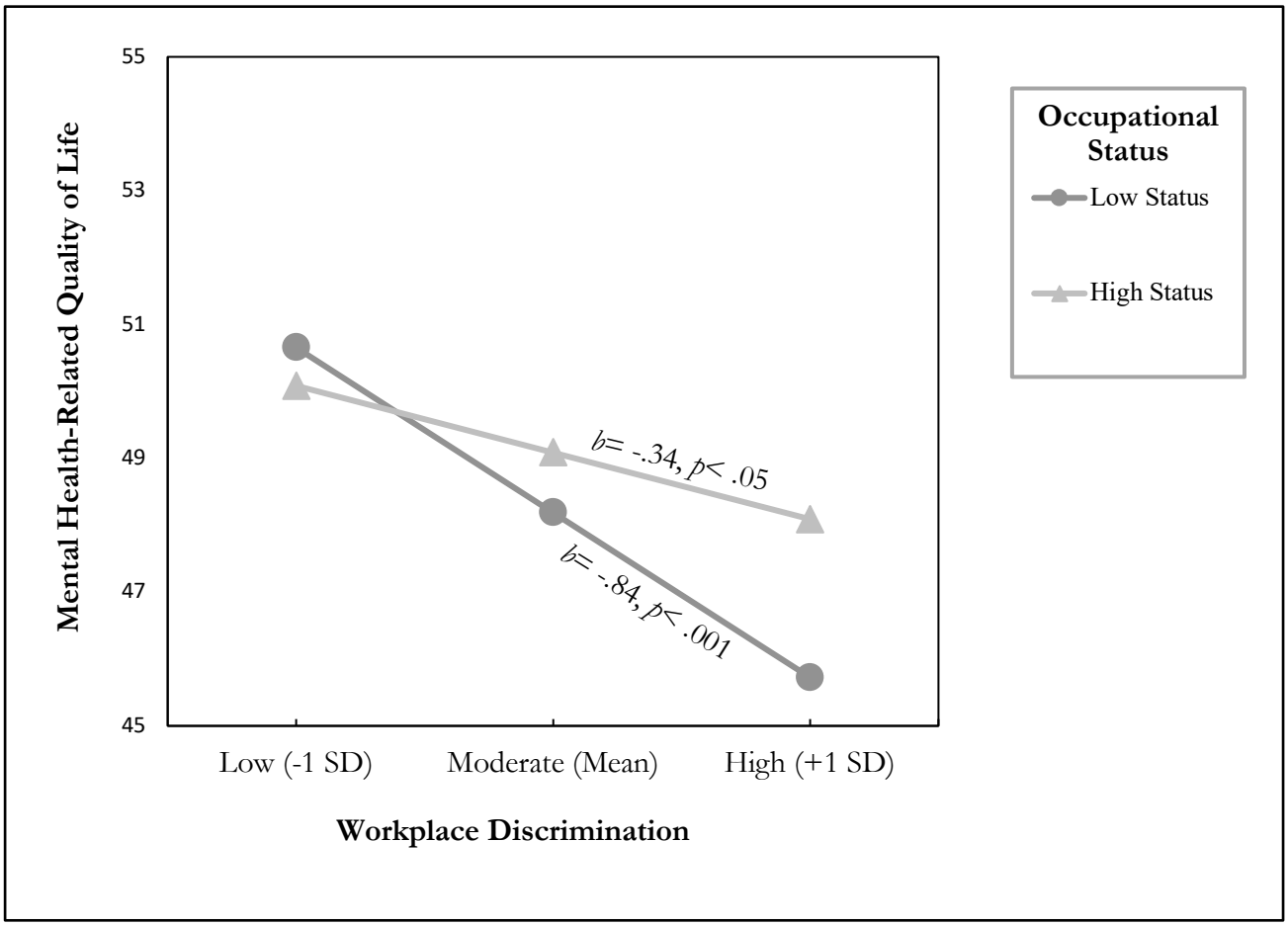

Figure 2. Predicted Marginal Means of Mental Health-Related Quality of Life as a Function of Physical Hazards and Workplace Discrimination