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Signature of Faculty Advisor

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Date

# Work Ability and Job Burnout: A Moderated Mediation Model of Health-Related Organizational Climate and Work-Health Management Interference

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**Abstract**

The purpose of this study was to determine how work ability, health-related organizational climate, and work health management interference (WHMI) contributed to burnout, with a particular interest in those with lower levels of work ability as a result of chronic illness/disease. The overall research objective was to examine whether health-related organizational climate moderated the mediating effect of work-health management interference on the relationship between work ability and job burnout. A convenience sample of 2,056 adults living and working in the United States who responded to a recruitment message participated in this study. Participants accessed a survey in Qualtrics via a link provided in an email or accessible via electronic posting and completed a survey that included sociodemographic and job-related items, as well as measures to evaluate levels of work ability, burnout, WHMI, and health-oriented organizational climate. Results showed that work ability had a significant predictive effect on burnout, WHMI played a mediating role in the relationship between work ability and burnout, and organizational health-related climate was found to play a moderating role in the relationship between work ability and WHMI. These findings add to research on the relationship between work ability and burnout and serve as a foundation for organizations to adapt and develop strategies to better support employees with lowered work ability due to chronic disease/health conditions in order to reduce job burnout and improve well-being and productivity.

*Keywords:* work ability, burnout, chronic disease, WHMI, organizational health-related climate

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## Introduction

According to the American Psychological Association's 2021 *Work and Well-being Survey*, three in five employees report that they are affected by burnout (Abramson, 2022). Job-related burnout is now recognized by the World Health Organization (WHO) and is included in the most recent version of the International Classification of Diseases (ICD-11; WHO, 2019). Though the WHO describes burnout as an occupational phenomenon rather than a medical condition, burnout is associated with symptoms and outcomes such as fatigue, exhaustion, negative feelings, and reduced efficiency (WHO, 2019). In a systematic review, Salvagioni et al. (2017) found that burnout predicted several psychological, physical, and occupational consequences including, but not limited to insomnia, depressive symptoms, headaches, coronary heart disease, chronic fatigue, musculoskeletal pain, job dissatisfaction, and absenteeism. Additionally, research has shown that burnout can affect employees with chronic illnesses more than those who do not have chronic illnesses. For example, Ahola et al. (2009) found that severe burnout increased the likelihood of receiving work disability pension by 15% in an eight-year cohort study of Finnish forest industry workers. However, burnout was not a predictor of pensioning for employees who self-reported being healthy at baseline and not having a chronic illness (Ahola et al., 2009).

Employees with chronic health conditions (CHCs) are at an even greater risk of experiencing job burnout due to their health conditions (Ahola et al., 2009). According to the Centers for Disease Control and Prevention (CDC), "chronic diseases are defined broadly as conditions that last 1 year or more and require ongoing medical attention or limit activities of daily living or both" (CDC, 2022, para.1). Examples of CHCs include

but are not limited to: Alzheimer's disease, diabetes, heart disease, cancer, arthritis, anxiety, depression, endometriosis, headache disorders, chronic kidney disease, and obesity. Chronic illness of employees can negatively impact effectiveness and positivity in the workplace (Ilmarinen, 2007). The effects of chronic illness on work can be evaluated through measuring one's level of work ability, which indicates how well an employee might be able to meet job demands while accounting for their health status (Ilmarinen, 2007). That said, because CHCs are long-term conditions, it can be difficult to accurately evaluate work ability because the impact of a CHC can change over time due to the changing nature of the condition, itself (Bhatti et al., 2011), and the high rate of co-occurrence among CHCs (e.g., diabetes and depression; Khaledi et al., 2019).

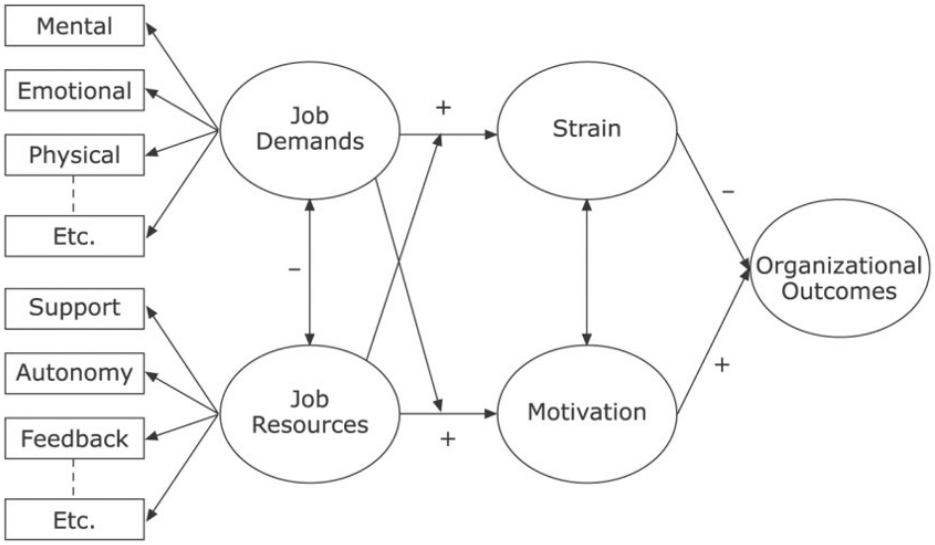
The job demands-resources (JD-R) model (Demerouti et al., 2001) presents a theoretical framework for the development of burnout that takes into account the fact that various job fields have different risks, demands, and stressors. The JD-R model assumes that stress can be an outcome of the interaction between job demands and job resources. In the JD-R model, job demands refer to physical, social, or organizational aspects of a job that require physical and mental effort from an employee, which in turn can lead to psychological or physiological costs (e.g., exhaustion, fatigue, insomnia, depression, anxiety; Demerouti et al., 2001). Job resources include mental, physical, and organizational aspects of a job that may be functional in achieving work goals, reduce job demand costs, or promote individual growth and development (i.e., mentorship program; Demerouti et al., 2001). Additionally, job resources take into account support employees are given, autonomy in the workplace, as well as whether feedback is given to the employees.

The interaction between job demands and resources can lead to positive and negative outcomes through two processes: the motivational process and the health impairment process (see Figure 1). Bakker and Demerouti (2007) found that job resources have motivational potential and can lead to positive outcomes, such as high work engagement, commitment, and improved performance. Within the motivational process, job resources can serve as a source of intrinsic or extrinsic motivation. As a source of intrinsic motivation, job resources may provide employees with a sense of internal fulfilment via nurturing their autonomy, growth, learning, and development. As a source of extrinsic motivation, job resources provide employees with the means necessary to complete work tasks and accomplish goals (Bakker & Demerouti, 2007), leading to desired consequences (e.g., approval, tangible rewards; Gagné & Deci, 2005).

The second process within the JD-R model is the health impairment process, wherein poorly designed jobs or chronic job demands (e.g., work overload and emotional demands) exhaust employees' mental health and physical resources, leading to the depletion of the employees' energy (Bakker & Demerouti, 2007). Without sufficient job resources, job strain can occur in response to long-term exposure to job demands, leading to decreased energy and the development of health issues (Bakker & Demerouti, 2007).

**Figure 1**

*The Job Demands-Resource Model (Bakker & Demerouti, 2007)*




The JD-R model offers a broad framework regarding physical, mental, social, and job characteristics. Brauchli et al. (2015) expanded on the JD-R model and proposed a JD-R health model to illustrate how the interaction between job demands and job resources affects workers with CHCs. In their comprehensive JD-R health model, paths link job demands and job resources to both negative and positive biopsychosocial health outcomes. Doing so provides a generic health development framework with the conception of positive and negative health conditions (Brauchli et al., 2015). In the JD-R health model, job demands can be perceived as obstacles by employees and high job demands can increase stress (Kwon & Kim, 2020). Brauchli et al. (2015) also notes that job resources (e.g., support and help from coworkers on a project) can help mitigate negative outcomes of job demands on people with CHCs.

Work-health management interference (WHMI) and health-related organizational climate can affect the ability of employees experiencing lowered work ability due to

chronic health and/or disability to effectively manage both health and job-related demands. WHMI describes how employees with chronic health illnesses balance stressors associated with both their health conditions and work responsibilities (McGonagle et al., 2020). WHMI takes into account the interaction between personal health demands and job demands. Personal health demands are not included in the JD-R model, but personal demands associated with one's health can interfere with work responsibilities, creating additional work demands and likely increasing the need for supportive job resources from the organization.

Health-related organizational climate describes how an organization's attitude and environment is viewed by people with health concerns and the company norms and conditions relating to that (Gragnano et al., 2017). McGonagle et al. (2020) found that WHMI affects the level of burnout experienced by individuals with chronic illnesses; as WHMI increases, levels of burnout increase. Within the JD-R model framework, health-related organizational climate can be viewed as a job (organizational) resource. Employees in an organization whose climate is supportive of their health might experience lower levels of burnout and disengagement (Gragnano et al., 2017). While research on health-related organizational climate is limited, MacDavitt et al. (2007) found that organizational climate influenced nurse outcomes (i.e., turnover, burnout, job satisfaction, and occupational safety) more than patient outcomes.

Earlier research has evaluated the effect of work ability on burnout. However, this relationship has not been studied while considering the mediating effect of WHMI and the moderating effect of health-related organizational climate. Both WHMI and health-

related organizational climate are newer variables of interest within the organizational psychology literature, and the current study aims to expand on them.

## Literature Review and Hypotheses

### Work Ability and Burnout

Job burnout occurs when employees experience high levels of exhaustion and have negative attitudes about their work (Demerouti et al., 2010). Schaufeli et al. (2020) defined burnout as an "a work-related state of exhaustion that occurs among employees, which is characterized by extreme tiredness, reduced ability to regulate cognitive and emotional processes, and mental distancing. These four core dimensions of burnout are accompanied by depressed mood as well as by non-specific psychological and psychosomatic complaints" (p. 4). Burnout was first described as being caused by job demands, which in turn leads to poor health and negative organizational outcomes. Job resources have been identified as the main drivers of work engagement and can lead to increased well-being and positive organizational outcomes (Bakker et al., 2014). JD-R theory was the first to describe burnout using exhaustion and disengagement as outcomes of work conditions, job demands, and job resources (de Beer et al., 2022). Burnout can develop from being overworked, ambiguous job responsibilities, lack of resources in the workplace, etc. Individual (employee) consequences of burnout include physical and mental fatigue, which can lead to increased susceptibility to mental disorders, anxiety, and weakened immune systems (Ahola et al., 2009). In addition, Nazarov et al. (2019) found that the presence of burnout in employees predicted the increase of depressive symptoms. Depressive symptoms were worsened if the individual also had a chronic illness. Burnout also intensified depressive symptoms if the depressive symptoms were

already present before the individual became burnt out (Nazarov et al., 2019). Employees who are burnt out are more likely to be absent from work, be inefficient in terms of work productivity, and participate in counterproductive work behaviors and other negative actions (Schouteten, 2016). When people with chronic illness have physically demanding jobs, it is more likely that other factors such as fatigue, high workload, and an unsupportive work climate are more likely to occur (Ahola et al., 2009).

Work ability is defined as how well a worker can perform work tasks and responsibilities now and, in the future, and how able the worker is to do their work regarding job demands and health and mental resources (Tuomi et al., 2001). Work ability is typically assessed via self-report surveys that are distributed to employees. Surveys of work ability evaluate resources employees have in the workplace, demands of the work, and the workers' health statuses (Tuomi et al., 1998). Within the JD-R model, predictors of work ability (e.g., supervisor support, coworker support, autonomy) have been identified as common job resources (McGonagle et al., 2022). Schouteten (2016) found that work ability, more than job characteristics, predicted increased absenteeism among Dutch university employees.

Previous research has provided evidence associating low levels of work ability with increased levels of burnout among employees with CHCs/chronic illnesses; therefore, we hypothesized that:

*H1*: Work ability would be negatively related to job burnout. Specifically, higher levels of work ability would be related to lower levels of job burnout.

**Mediating Role of Work-Health Management Interference in the Work Ability-Burnout Relationship**

Work-health management interference (WHMI) is defined as experiencing interference between responsibilities from work/management and an employee's health condition(s) (McGonagle et al., 2020). We contend that WHMI can, at least partially, explain the inverse relationship between work ability and burnout. We propose that low levels of work ability can lead to an increase in WHMI, which in turn could result in increased job burnout because of the physical and mental stress caused by CHCs and job responsibilities. Sarwar et al. (2021) found that resources (e.g., job control, job social support, enriched job characteristics) employees can use to improve performance can be influenced by contextual job factors, like WHMI.

McGonagle and colleagues (2020) identified and defined two types of WHMI: energy-based and time-based. Energy-based WHMI refers to when the majority of one's energy is being used to manage work-related demands, leaving the individual with less energy available to spend on managing their health. Time-based WHMI refers to when completing work responsibilities (work domain) absorbs the majority of one's time, leaving the individual with less time to spend on managing their health. WHMI can lead to or increase the probability of job burnout when insufficient organizational resources exist to simultaneously manage work and health demands. As a result, higher levels of WHMI may call for individual, and possibly organizational, interventions to promote healthier and more sustainable employment opportunities for individuals who have CHCs (McGonagle et al., 2020).

Since WHMI is a fairly new concept, related concepts, such as work-family conflict, have been researched more heavily. Work-family conflict has been defined as conflict that occurs when pressures from family or work roles interfere with each other causing complications (Greenhaus & Beutell, 1985). Multiple studies have found that work-family conflict has led to high rates of burnout due to the stress of managing time, energy, and responsibilities between work and family life (Shirom, 2003). Work-family conflict is similar to WHMI because an individual has to manage their health condition instead of (or alongside) family and work-related responsibilities. For example, doctor appointments pertaining to one's chronic illness may interfere with work responsibilities that have deadlines.

The concept of WHMI aligns with the JD-R model because it mediates the input and output variables (McGonagle et al., 2020). WHMI relates to the job demands categories because it refers to the stressors between work and health-related issues. The JD-R model assumes that stress can be an outcome of job demands and job resources (Beutell, 2010). On the basis of JD-R theory and previous research, we hypothesized that:

*H2a*: Work ability would have an indirect negative impact on job burnout mediated through energy-based work-health management interference. In other words, energy-based work-health management interference would mediate the negative effect of work ability on job burnout.

*H2b*: Work ability would have an indirect negative impact on job burnout mediated through time-based work-health management interference. In other words, time-based work-health management interference would mediate the negative effect of work ability on job burnout.

**Moderating Role of Health-Related Organizational Climate in the Work Ability-Work Health Management Interference Relationship**

Health-related organizational climate is defined as the shared perception that members of an organization have regarding norms and culture related to health (MacDavitt et al., 2007) and can affect how employees handle their CHCs in the workplace. Health-related organizational climate can also affect the perspectives of employees without chronic illnesses on those who do have chronic illnesses. Health-related organizational climate affects employees, which, in turn, affects the work ability and also burnout. If the health-related organizational climate is poor, for example, the work ability of an employee could potentially be decreased due to the lack of support for employees' health from the organization. Furthermore, if the health-related organizational climate is unsupportive this could increase risk of job burnout.

Health-related organizational climate relates to another concept, workplace health friendliness. Both concepts incorporate work environments and type of climate. Workplace health friendliness is when an organization has formal or informal practices in place to design, create, and maintain healthy work environments that allow individuals to prioritize their health in the workplace (Drach-Zahavy, 2008). We proposed that health-related organizational climate would moderate (strengthen) the negative relationship between work ability and WHMI. The climate of an organization may affect how employees with health conditions respond to managing health-related and work-related responsibilities (i.e., WHMI). If an organization's climate reflects an effective support system for employees with chronic illnesses, the probability that employees are better

able to manage work and health-related demands increases because stress is taken off the employee with an illness due to the support given by the organization.

While health-related organizational climate is a newer variable of study within the literature, organizational climate, more generally, has been examined in prior studies. Organizational climate has shown to be associated with how employees perceive job resources (Albrecht, 2014). For example, if the organizational climate is supportive of employee utilization of health resources provided by the organization (i.e., therapy sessions), then an employee would be more likely to use those resources. The resources that an organization can provide are vital to employees with chronic illnesses because they can help alleviate stress with balancing health concerns and work responsibilities. Therefore, we hypothesized that:

*H3a*: Health-related organizational climate would moderate the negative relationship between work ability and energy-based work-health management interference, such that the relationship would be stronger for those with higher versus lower levels of health-related organizational climate.

*H3b*: Health-related organizational climate would moderate the negative relationship between work ability and time-based work-health management interference, such that the relationship would be stronger for those with higher versus lower levels of health-related organizational climate.

*H4a*: Health-related organizational climate would moderate the indirect negative relationship (via energy-based work-health management interference) between work ability and job burnout, such that the relationship is stronger

for those with higher versus lower levels of health-related organizational climate.

*H4b*: Health-related organizational climate would moderate the indirect negative relationship (via time-based work-health management interference) between work ability and job burnout, such that the relationship is stronger for those with higher versus lower levels of health-related organizational climate.

## Method

### Participants

Participants were 2,056 individuals who were at least 18 years of age (*M* = 31.04, *SD* = 7.16), currently living in the United States, and employed (either part-time or full-time) at the time data was collected. Participants' levels of work ability ranged from poor to excellent; levels of work ability were impacted by a variety of factors, including the number of current diseases and CHCs diagnosed by a physician (Tuomi et al., 1998; see Method section for specific details on how work ability was evaluated). Sociodemographic and job characteristics of participants are shown in Table 1.

**Table 1**

*Sociodemographic and Job-Related Characteristics*

| Characteristics and Categories | *n* | % |
|---|---|---|
| Age | | |
| 18-24 | 275 | 13.4 |
| 25-34 | 1273 | 61.9 |
| 35-44 | 413 | 20.1 |
| 45-54 | 64 | 3.1 |
| 55-64 | 25 | 1.2 |

| | | |
|---|---|---|
| 65+ | 6 | 0.3 |
| Sex | | |
| Male | 1245 | 60.6 |
| Female | 800 | 38.9 |
| Prefer not to answer | 9 | 0.4 |
| Gender | | |
| Male | 1221 | 59.4 |
| Female | 811 | 39.4 |
| Transgender | 11 | 0.5 |
| None of these | 4 | 0.2 |
| Prefer not to answer | 8 | 0.4 |
| Race | | |
| African American/Black | 233 | 11.3 |
| American Indian/Alaskan Native | 336 | 16.3 |
| Asian/Pacific Islander | 92 | 4.5 |
| Caucasian/White | 1230 | 59.8 |
| Hispanic/Latinx | 141 | 6.9 |
| Other | 12 | 0.6 |
| Prefer not to answer | 12 | 0.6 |
| Employment status | | |
| Employed full-time | 1745 | 84.9 |
| Employed part-time | 202 | 9.8 |
| Self-employed full-time | 83 | 4.0 |
| Self-employed part-time | 23 | 1.1 |
| Years of experience | | |
| <1 year | 51 | 2.5 |
| 1-2 years | 397 | 19.3 |

| | | |
|---|---|---|
| 3-5 years | 934 | 45.4 |
| 6-10 years | 479 | 23.3 |
| 11-15 years | 110 | 5.4 |
| 16-20 years | 22 | 1.1 |
| >20 years | 40 | 1.9 |
| Industry | | |
| Agriculture, forestry, fishing, and hunting | 80 | 3.9 |
| Mining, quarrying, and oil and gas extraction | 78 | 3.8 |
| Utilities | 137 | 6.7 |
| Construction | 204 | 9.9 |
| Manufacturing | 413 | 20.1 |
| Wholesale trade | 138 | 6.7 |
| Retail trade | 143 | 7.0 |
| Transportation and warehousing | 82 | 4.0 |
| Information | 101 | 4.9 |
| Finance and insurance | 112 | 5.4 |
| Real estate and rental and leasing | 79 | 3.8 |
| Professional, scientific, and technical services | 76 | 3.7 |
| Management of companies and enterprises | 87 | 4.2 |
| Administrative and support and waste management and remediation services | 20 | 1.0 |
| Educational services | 144 | 7.0 |
| Health care and social assistance | 42 | 2.0 |
| Arts, entertainment, and recreation | 70 | 3.4 |
| Other services (except public administration) | 10 | 0.5 |
| Public administration | 19 | 0.9 |
| Other | 20 | 1.0 |

| | | |
|---|---|---|
| Managerial Status | | |
| Yes | 1485 | 72.2 |
| No | 567 | 27.6 |

*Note.* $N$ = 2,056.

**Procedure**

Data were collected from November through mid-to-late December 2022, after obtaining approval from the University of Minnesota's Institutional Review Board (IRB). Data for this study were collected as part of a larger study on worker well-being. Participants self-identified in response to recruitment messages that were disseminated via professional email list servs (i.e., University of Minnesota Duluth Business Announce, University of Minnesota Morris Faculty/PA Email List), Chronic Disease Coalition Ambassadors, and the researchers' social media platforms. Recruitment messages included background information regarding the study, inclusion criteria, participant requirements, and a link to an online survey hosted on Qualtrics (see Appendix A for recruitment messages).

Once participants accessed the survey, they read the information sheet for research and provided electronic agreement before proceeding (see Appendix B for the information sheet for research). Participants were asked to complete a survey that included sociodemographic and job-related items, two attention check items (i.e., a commitment request and a prompt requiring a textual response), as well as measures to evaluate levels of work ability, burnout, work health management interference, and health-oriented organizational climate (see Appendix C for the survey items). To encourage participation, individuals who completed the survey were able to provide an

email address, via a link to a form unassociated with their survey responses, to be entered into a prize drawing for one of 50 $10 Amazon eGift Cards.

Participants may have experienced discomfort when being asked questions regarding job burnout and organizational stressors. Participants had been informed that they had the right to withdraw from the study at any time. At the end of the survey, a statement that recommended participants to seek additional help from their employee health administrator within their organization, and a link to the Mayo Clinic's (2021) article, *Job Burnout: How to Spot It and Take Action*, was provided.

## Measures

### *Sociodemographic and Job-Related Characteristics*

The survey included eight items regarding participants' demographic characteristics. These questions asked about age, gender, race, current employment status, number of years employed, managerial status, and job industry.

### *Work Ability*

Work ability was measured with the Work Ability Index (*WAI*; Tuomi et al., 1998). The WAI is a seven part self-assessment of whether work is or is not physical in nature, perceived typical and maximum work ability, work ability in relation to their job demands, current diseases or disabilities, estimated work impairment due to those diseases or disabilities, any illnesses had within the last year, an estimation of work ability in two years, and mental capacity.

The first part of the WAI is the perceived typical and maximum work ability; it included one item that participants rated on a 10-point Likert-type scale that ranged from 0 (*cannot currently work at all*) to 10 (*work ability at its best*). The second section is

work ability in relation to job demands; it included two items that participants rated on a 5-point Likert-type scale that ranged from 1 (*very poor*) to 5 (*very good*). The third section asked participants to disclose current diseases, as well as to indicate whether a physician had diagnosed or treated these diseases by indicating a response on a 3-point scale: 2 (*yes, own opinion*), 1 (*yes, physician's diagnosis*), and 0 (*no*). When scored, only diagnosed diseases are counted. The fourth section asks respondents to estimate the level of work impairment due to their diseases on a 6-point Likert-type scale ranging from 1 (*in my opinion I am entirely unable to work*) to 6 (*there is no hindrance / I have no diseases*). The fifth section asked respondents to indicate the number of whole days taken off due to illness within the past year on a 5-point Likert-type scale that ranged from 1 (*100-354 days*) to 5 (*none*) to. The sixth section was an estimation of one's own work ability in the past two years; respondents rated one item on a 3-point Likert-type scale ranging from 1 (*unlikely*) to 7 (*relatively certain*) to indicate whether they believed they would be able to do their current job two years from now. In the seventh and final section, respondents were asked about their mental capacities; they responded to 3 items using a 4-point Likert-type scale ranging from 0 (*never*) to 4 (*often*) to. Sample WAI items included, "How do you rate your current work ability with respect to the physical demands of your work?" and "Do you believe, according to your present state of health, that you will be able to do your current job two years from now?"

A total score for work ability was obtained following the scoring procedures outlined in Tuomi et al. (1998), and total scores ranged from 7 to 49 points. While scores can be categorized into one of four categories to describe levels of work ability (i.e., poor (7 – 27 points), moderate (28 - 36 points), good (37 - 43 points), and excellent (44 - 49

points), the total work ability score (as a continuous variable) was used in the analyses for this study. The internal consistency of the WAI for this study's sample was, $\alpha = .69$.

***Burnout***

The shortened version of the Burnout Assessment Tool (BAT-12) was used to measure burnout in this study (*BAT-12*; de Beer et al., 2022). This 12-item measure included items to evaluate four dimensions of burnout: exhaustion, mental distance, cognitive impairment, and emotional impairment. Respondents rated items on a 5-point Likert-type scale that ranged from 1 (*never*) to 5 (*always*). A sample item from the exhaustion dimension of the scale was "At work, I feel mentally exhausted." A sample item from the mental distance dimension included "I struggle to find any enthusiasm for my work." A sample item from the cognitive impairment dimension was "I make mistakes in my work because I have my mind on other things." Lastly, A sample item from the emotional impairment dimension included "I do not recognize myself in the way I react emotionally at work" (de Beer et al., 2022).

Subscale scores of the BAT-12 were found by summing the three items associated with each of the four subscales and computing the average. The overall burnout score was used in this study's analysis and was found by summing all 12 items and computing the average. Higher scores on the BAT-12 represented higher levels of burnout. Internal consistency values for each of the four dimensions of burnout for this study's sample were: exhaustion, $\alpha = .79$; mental distance, $\alpha = .78$; cognitive impairment, $\alpha = .81$; and emotional impairment, $\alpha = .79$. Internal consistency for the BAT-12, overall, was $\alpha = .91$.

***Work Health Management Interference***

The eight-item work-health management interference scale (*WHMI*; McGonagle et al., 2020) was used to measure two dimensions of WHMI: time-based and energy-based work-health management interference. A sample item from the time-based dimension included, "My work schedule makes it difficult to schedule necessary medical visits, treatments, or procedures." A sample item from the energy-based dimension included "Work depletes the *mental* energy I need to take care of my health." Items were rated on a 5-point Likert-type scale that ranged from 1 (*strongly agree*) to 5 (*strongly disagree*).

WHMI's subscale scores were found by calculating the average of the four items relevant to each subscale. The internal consistency for the WHMI's two dimensions were: time-based: $\alpha = .86$ and energy-based: $\alpha = .86$.

***Health-Related Organizational Climate***

The five-item health climate subscale of the Work-Health Balance Questionnaire (*WHBq*; Gragnano et al., 2017) was used to measure employees' perception of their organizations' attitudes towards health issues. An example of an item used in this scale included "Senior management acts decisively when concerns about health emerge between employees." Items were rated on a 5-point Likert-type scale that ranged from 1 (*strongly disagree)* to 5 (*strongly agree*).

The health climate subscale score was calculated by summing individual item scores and computing the average. Higher scores reflected a more supportive health climate. The internal consistency for the health climate subscale was $\alpha = .86$.

**Attention Checks**

Two items were included in the survey as attention checks to improve data quality. The first item was a commitment request and stated, “We care about the quality of our survey data. For us to get the most accurate measures of your responses, it is important that you provide thoughtful answers to each question in this survey. Do you commit to providing thoughtful answers to the questions in this survey?” Participants were asked to select one of three responses options: “I can't promise either way”, “Yes, I will,” or “No, I will not”. The second item was an open-ended item that stated, “Please type "Hello" to show you are paying attention to this question.” Data for participants who selected “Yes, I will” and who typed “Hello” (disregarding the inclusion/exclusion of quotes and letter case) remained in the data set during data cleaning.

**Study Design, Statistical Analyses, and A Priori Power Analysis**

This study used a non-experimental, cross-sectional research design. Work ability was the predictor variable, WHMI was the mediator, burnout was the outcome variable, and health-related climate organization was the moderator. Descriptive statistics were produced for all variables, and a correlation matrix was produced to assess the relationships among study variables and identify potential covariates. The Pearson product-moment correlation was used to evaluate the relationship between work ability and burnout (Hypothesis 1). Cohen’s (1988) guidelines were used to evaluate the strength of correlation coefficients, wherein an absolute value of $r$ = .10 – .29 is classified as small, an absolute value of $r$ = .30 - .49 is classified as medium, and an absolute value of $r$ = .50 – 1.00 is classified as large.

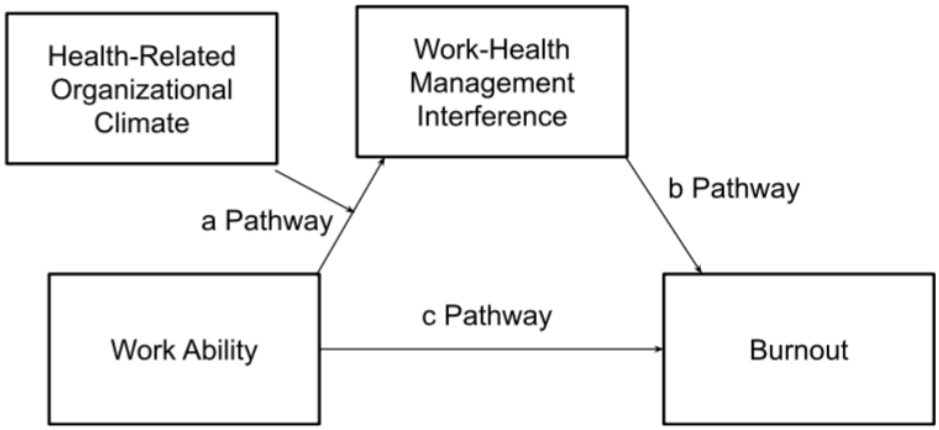
The hypothesized mediation model was tested in a single model to assess the significance of the indirect effects of work ability on burnout through WHMI; energy- and time-based WHMI were examined separately (Hypotheses 2a & 2b). The hypothesized mediation model was tested in a single model to assess the significance of the mediated effects moderated by health-related organizational climate via path a (Figure 2). Again, energy- and time-based WHMI were examined separately (Hypotheses 3a & 3b and Hypotheses 4a & 4b).

Analyses were computed using the PROCESS macro, Models 4 (mediation) and Models 7 (moderated mediation), v4.1 (Hayes, 2022) on IBM SPSS v27. Both models used a bootstrapping approach (Hayes, 2022) with bias-corrected 95% confidence intervals ($n$ = 5000). An index of moderated mediation was used to test the significance of the moderated mediation, and significant effects are supported by the absence of zero within the confidence intervals. Analyses used heteroscedasticity robust standard errors, and variables were mean-centered to avoid potential multicollinearity issues with the interaction terms (Hayes, 2022).

To estimate the sample size for the analyses, an a priori statistical power analysis was performed using with G*Power 3.1 (Faul et al., 2009). Sample sizes needed for a small ($f^2$ = 0.02), medium ($f^2$ = 0.15), and large effect size ($f^2$ = 0.35) with $\alpha$ = 0.05 and power = 0.80, were $N$ = 485, $N$ = 68, and $N$ = 31, respectively (see Appendix D).

**Figure 2**

*Proposed Model*




## Results

### Data Cleaning and Response Quality Assessment

Survey responses were downloaded, and a response quality assessment was performed to examine the quality of data before conducting analyses. A total of 3,240 responses were analyzed using the ExpertReview feature in Qualtrics (Qualtrics, 2023), and 1,184 responses were removed from the study because they were identified as fraudulent responses (i.e., spam, bots, duplicates), failed to agree to participate or confirm agreement to participate, were ineligible (i.e., failed screening items, reported age < 18, or failed to report age), failed or did not respond to attention check items, did not finish/complete the survey, or failed to respond to all items necessary to calculate a WAI score. Appendix E includes a detailed breakdown of the frequency of responses for each reason for exclusion. Only data from completed surveys are reported; thus, data for 2,056 respondents were included in the analyses.

**Descriptive Statistics**

Table 2 lists the means, standard deviations, and score ranges of the primary study variables. No less than 2,055 of 2,056 participants responded to each of the variable scale measures. The average work ability (*M* = 37.56) and overall burnout scores (*M* = 2.41) indicate that participants experienced moderate levels of work ability and slightly below average levels of job burnout. Average scores for exhaustion (*M* = 2.61), mental distance (*M* = 2.31), cognitive impairment (*M* = 2.39), and emotional impairment (*M* = 2.32) reflect slightly below or slightly above levels of each subdimension of burnout. The energy-based WHMI (*M* = 3.00) and time-based WHMI (*M* = 2.89) scores indicate the sample reported above average levels of work-health management interference. The average health climate score (*M* = 3.64) indicates that respondents' perceptions of their organizations' attitudes towards health issues were slightly above "neutral".

**Table 2**

*Work Ability, Burnout, Work-Health Management Interference, and Health Climate Descriptive Statistics*

| Variable | *N* | *M* (*SD*) | Range |
|---|---|---|---|
| Work Ability | 2,056 | 37.56 (6.37) | 14.00-49.00 |
| Burnout (Overall) | 2,056 | 2.41 (0.66) | 1.00-5.00 |
| Exhaustion | 2,054 | 2.61 (0.76) | 1.00-5.00 |
| Mental Distance | 2,056 | 2.31 (0.82) | 1.00-5.00 |
| Cognitive Impairment | 2,056 | 2.39 (0.80) | 1.00-5.00 |
| Emotional Impairment | 2,055 | 2.32 (0.77) | 1.00-5.00 |
| Energy-Based WHMI | 2,055 | 3.00 (0.91) | 1.00-5.00 |
| Time-Based WHMI | 2,055 | 2.89 (0.92) | 1.00-5.00 |
| Health Climate | 2,056 | 3.64 (0.77) | 1.00-5.00 |

*Note.* This table shows descriptive statistics of the study variables. The Work Ability Index scores ranged from 7 (*poor*) to 49 (*excellent*). The BAT-12 scores ranged from 1 (*never*) to 5 (*always*). The Work-Health Management Interference scores ranged from 1 (*strongly agree*) to 5 (*strongly disagree*). The Health Climate (i.e., health-related organizational climate) scores ranged from 1 (*strongly agree*) to 5 (*strongly disagree*).

## Intercorrelations Among Study Variables

Table 3 shows the intercorrelations among work ability, overall burnout, each dimension of burnout (exhaustion, mental distance, cognitive impairment, emotional impairment), energy-based WHMI, time-based WHMI, and health-related organizational climate. Using Cohen's (1988) guidelines, the Pearson's *r* correlation analysis revealed

significant correlations among study variables: a medium, negative relationship between work ability and burnout (overall); a medium, negative correlation between each of the four dimensions of burnout and work ability; a small, negative correlation between work ability and energy-based WHMI; a small, negative correlation between work ability and time-based WHMI; a small, positive correlation between WHMI and burnout; a small, positive correlation between health-related organizational climate and work ability; a small, negative correlation between health-related organizational climate and energy-based WHMI; and a small, negative correlation between health-related organizational climate and time-based WHMI.

**Table 3**

*Intercorrelations Between Work Ability, Burnout, Work-Health Management Interference, and Health Climate*

| Variable | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|
| 1. Work Ability | — | | | | | | | | |
| 2. Burnout (Overall) | -.54** | — | | | | | | | |
| 3. Exhaustion | -.34** | .77** | — | | | | | | |
| 4. Mental Distance | -.49** | .88** | .60** | — | | | | | |
| 5. Cognitive Impairment | -.46** | .86** | .50** | .71** | — | | | | |
| 6. Emotional Impairment | -.50** | .83** | .50** | .63** | .64** | — | | | |
| 7. Energy-Based WHMI | -.36** | .40** | .35** | .34** | .30** | .34** | — | | |
| 8. Time-Based WHMI | -.34** | .32** | .25** | .28** | .22** | .34** | .67** | — | |
| 9. Health Climate | .36** | -.26** | -.17** | -.30** | -.22** | -.20** | -.32** | -.33** | — |

*Note. N = 2,053. All values are based on listwise exclusion.*

** $p < .01$ (2-tailed).

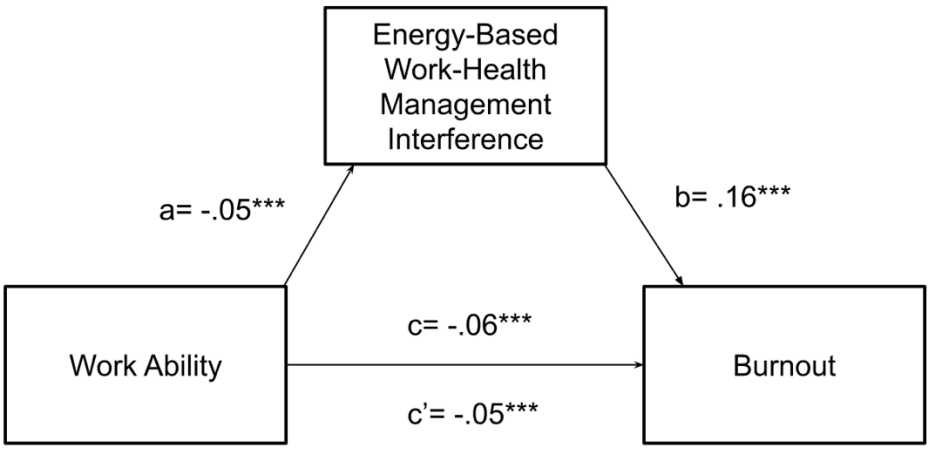
## Test of Indirect Effects

### *Energy-Based WHMI as a Mediator in the Work Ability – Burnout Relationship*

Figure 3 displays the test of mediation and the unstandardized coefficients of each pathway. Model 4 of the PROCESS macro (Hayes, 2022) was used to investigate the predictive effect of work ability on burnout, and the mediating role of energy-based WHMI. The full model accounted for 57.35% of the variance in burnout, $R^2 = 0.33$, $F(2, 2052) = 519.98$, $p < .001$. The total effect of work ability (path c), without considering the mediator variable, was a significant negative predictor of burnout, $b = -.0551$, $t = -29.19$, $p < .0001$, CI = -.0588; -.0514, supporting H1. Results revealed that greater work ability was related to lower energy-based WHMI (path a), and lower energy-based WHMI was related to lower burnout (path b). The indirect negative effect through energy-based WHMI ($a_1b_1 = -.0085$, CI = -.0104; -.0067) was significant, supporting H2a. The negative relationship between work ability and burnout remained significant after entering in the mediator (path c'), ($b = -.0466$, $t = -22.64$, $p < .001$, CI = -.0506; -.0426), suggesting that energy-based WHMI functioned as partial mediator.

**Figure 3**

*Unstandardized Regression Coefficients for the Relationship Between Work Ability and Burnout as Mediated by Energy-Based WHMI*




*Note.* $N$ = 2,055. *** $p < .001$.

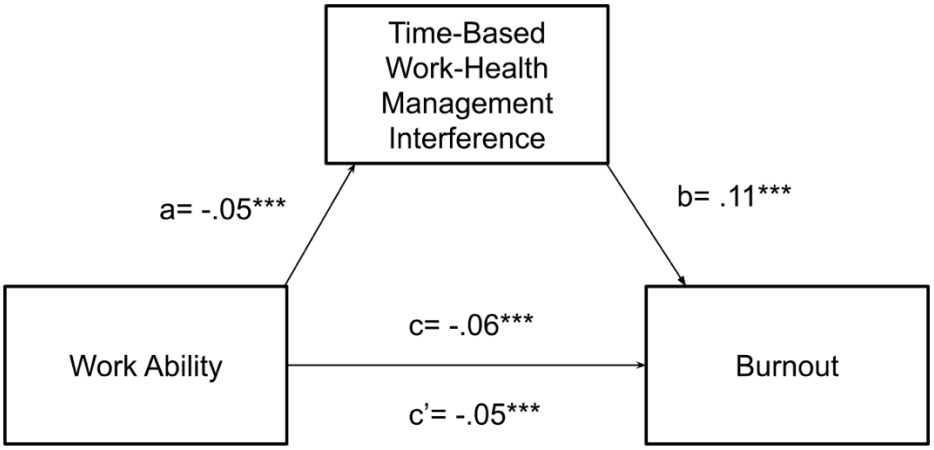
***Time-Based WHMI as a Mediator in the Work Ability – Burnout Relationship***

Figure 4 displays the test of mediation and the unstandardized coefficients of each pathway. Model 4 of the PROCESS macro was used to investigate the predictive effect of work ability on burnout, and the mediating role of time-based WHMI (Hayes, 2022). The full model accounted for 55.27% of the variance in exhaustion, $R^2 = 0.31$, $F(2, 2052) = 486.67$, $p < .001$. The total effect of work ability (path c), without considering the mediator variable, was a significant negative predictor of burnout, $b = -.0551$, $t = -29.19$, $p < .0001$, CI = -.0588; -.0514, supporting H1. Results revealed that greater work ability was related to lower time-based WHMI (path a), and lower time-based WHMI was related to lower burnout (path b). The indirect negative effect through time-based WHMI ($a_1b_1 = -.0054$, CI = -.0071; -.0036) was significant, supporting H2b. The negative relationship between work ability and burnout remained significant after entering in the

mediator (path c'), ($b$ = -.0497, $t$ = -23.42, $p$ < .001, CI = -.0538 – -.0455), suggesting that time-based WHMI functioned as a partial mediator.

**Figure 4**

*Unstandardized Regression Coefficients for the Relationship Between Work Ability and Burnout as Mediated by Time-Based WHMI*




*Note.* $N$ = 2,055. *** $p$ < .001.

**Test of the Conditional Indirect Effects**

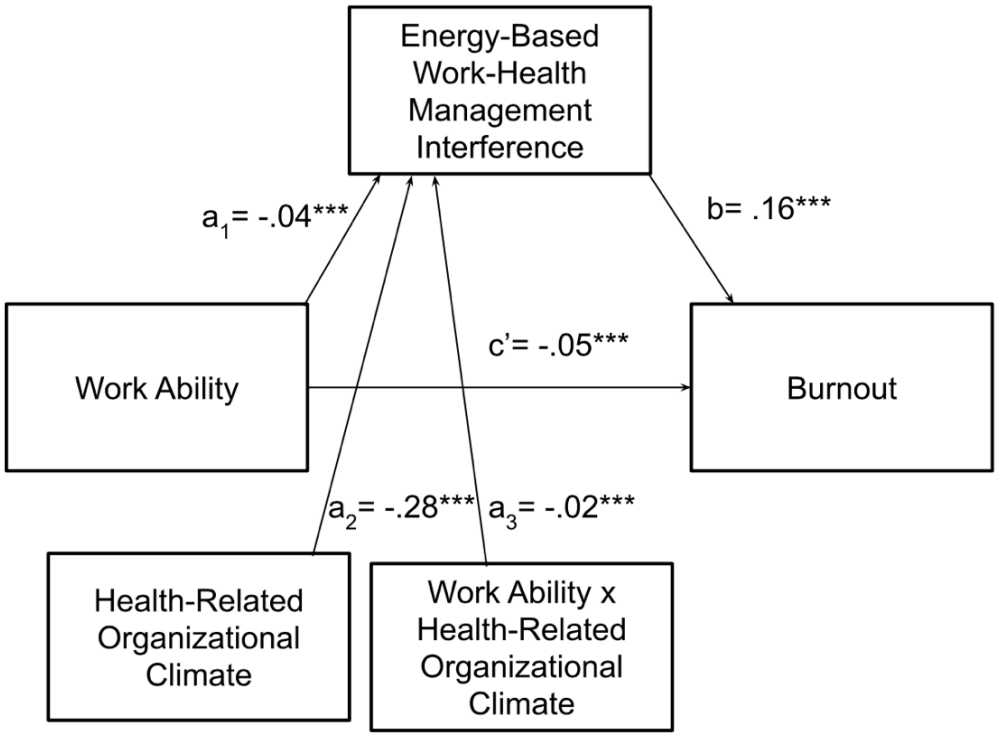
***Health-Related Organizational Climate as a Moderator in the Work Ability – Energy-Based WHMI – Burnout Relationship***

Figure 5 displays the test of moderated mediation and the unstandardized coefficients of each pathway (PROCESS macro, Model 7). The study assessed the significance of the indirect effect moderated by health-related organizational climate. Health-related organizational climate was found to moderate the effect of work ability and energy-based WHMI (path $a_3$, unstandardized $b$ = -.0223, $b_{se}$ = .0039, $t$ = -5.68, $p$ < .001), supporting H3a. Lower energy-based WHMI was associated with lower burnout (path b), $b$ = .1638, $b_{se}$ = .0165, $t$ = 9.95, $p$ < .001. The overall moderated mediation model was supported with the index of moderated mediation = -.0036 (95% CI = -.0053;

-.0023). As zero is not within the CI, this indicates a significant moderating effect of health-related organizational climate on work ability on the indirect effect via energy-based WHMI (Hayes, 2022), supporting H4a. The conditional indirect effect was strongest for in those high in health-related organizational climate (*M* +1 SD; effect = -.0097, *SE* = .0013, 95% CI = -.0124; -.0073) and weakest in those low in health-related organizational climate (*M* −1 SD; effect = -.0041, *SE* = .0007, 95% CI = -.0056; -.0027).

**Figure 5**

*Unstandardized Regression Coefficients for the Relationship Between Work Ability and Burnout as Mediated by Energy-Based WHMI and Moderated by Health-Related Organizational Climate*

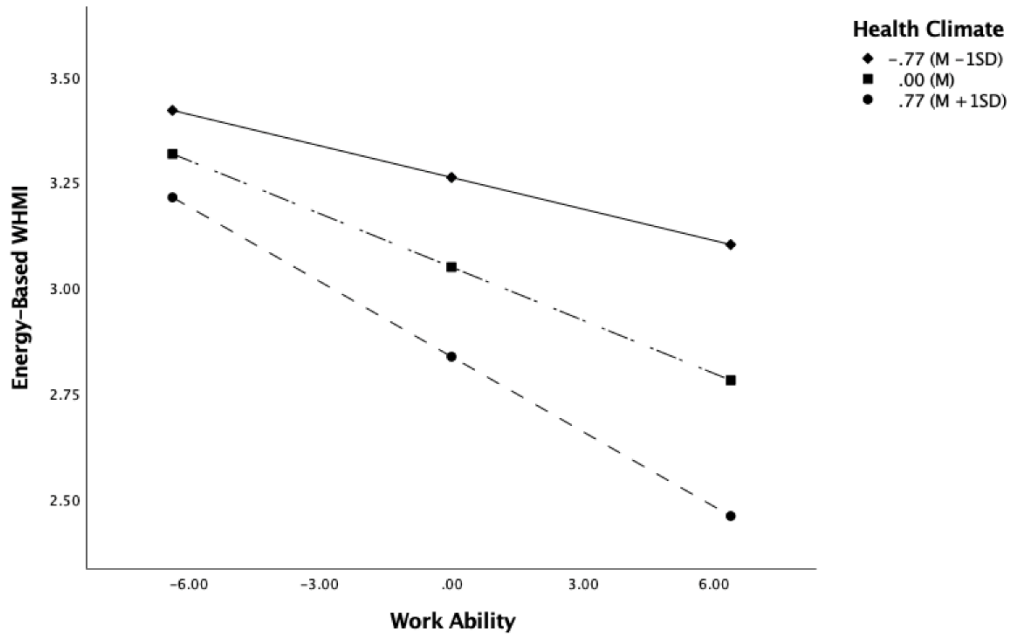



*Note. N* = 2,055. *** *p* < .001.

Tests of simple slopes (i.e., conditional effects on path a) found a stronger negative association between work ability and energy-based WHMI for those high in health-related organizational climate (*M* +1 SD; $b$ = -.0593, $b_{se}$ = .0047, $t$ = -12.51, $p$ < .001) relative to those low in health-related organizational climate (*M* −1 SD; $b$ = -.0249, $b_{se}$ = .0039, $t$ = -6.37, $p$ < .001). Participants higher in health-related organizational climate and work ability had lower energy-based WMHI than those low in health-related organizational climate (Figure 6). The Johnson-Neyman technique identified one significant transition point, indicating that the relationship between work ability and energy-based WHMI was not significant when values of health-related organizational climate were lower than -1.3844.

**Figure 6**

*Simple Slopes of Work Ability Predicting Energy-Based WHMI for 1 SD Below the Mean of Health-Related Organizational Climate, the Mean of Health-Related Organizational Climate, and 1 SD Above the Mean of Health-Related Organizational Climate*

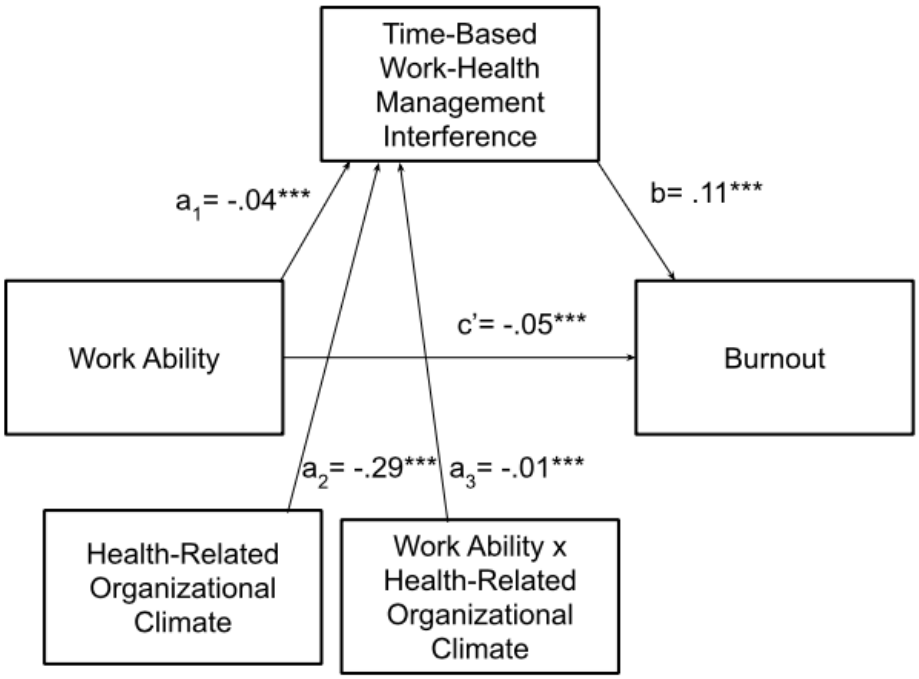


***Health-Related Organizational Climate as a Moderator in the Work Ability – Time-Based WHMI – Burnout Relationship***

Figure 7 displays the test of moderated mediation and the unstandardized coefficients of each pathway (PROCESS macro, Model 7). The study assessed the significance of the indirect effects moderated by health-related organizational climate. Health-related organizational climate was found to moderate the effect of work ability and time-based WHMI (path $a_3$, unstandardized interaction $b$ = -.0089, $b_{se}$ = .0043, $t$ = -2.07, $p$ = .0382), supporting H3b. Lower time-based WHMI was associated with lower burnout (path b), $b$ = .1114, $b_{se}$ = .0172, $t$ = 6.46, $p$ < .001. The overall moderated mediation model was supported with the index of moderated mediation = -.0010 (95% CI = -.0021; -.0001). As zero is not within the CI, this indicates a significant moderating effect of health-related organizational climate on work ability on the indirect effect via time-based WHMI (Hayes, 2022), supporting H4b. The conditional indirect effect was strongest for those high in health-related organizational climate ($M$ +1 SD; effect = -.0048, $SE$ = .0010, 95% CI = -.0069; -.0031) and weakest in those low in health-related organizational climate ($M$ −1 SD; effect = -.0033, $SE$ = .0007, 95% CI = -.0047; -.0021).

**Figure 7**

*Unstandardized Regression Coefficients for the Relationship Between Work Ability and Burnout as Mediated by Time-Based WHMI and Moderated by Health-Related Organizational Climate*



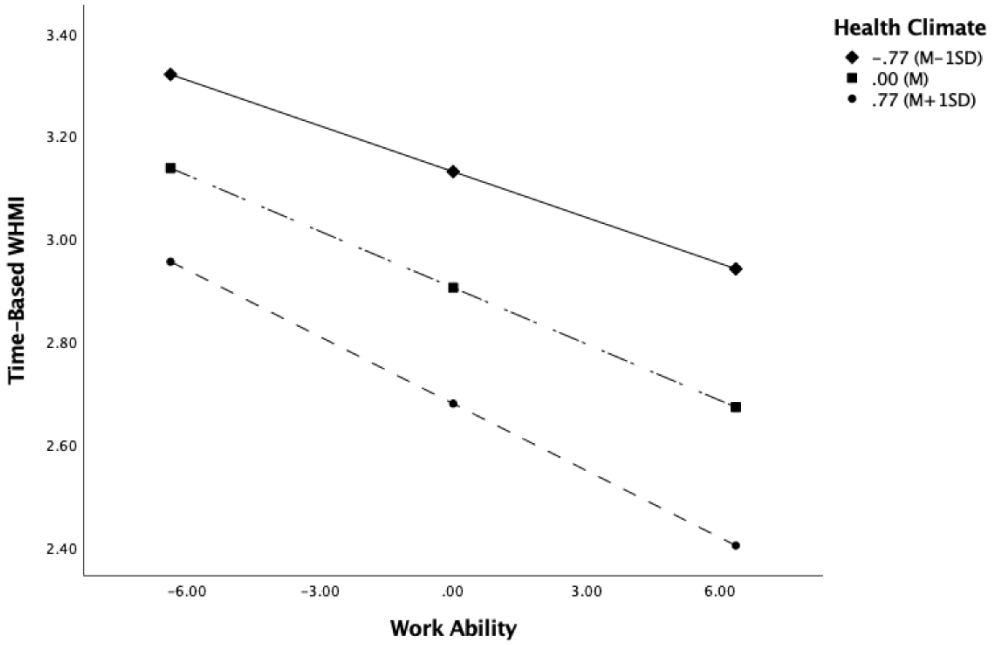

*Note.* $N$ = 2,055. *** $p < .001$.

Tests of simple slopes (i.e., conditional effects on path a) found a stronger negative association between work ability and time-based WHMI for those high in health-related organizational climate ($M$ +1 SD; -.0433, $b_{se}$ = .0050, $t$ = -8.63, $p < .001$) relative to those low in health-related organizational climate ($M$ −1 SD; $b$ = -.0297, $b_{se}$ = .0041, $t$ = -7.19, $p < .001$). Participants higher in health-related organizational climate and in work ability had lower time-based WMHI than those low in health-related organizational climate (Figure 8). The Johnson-Neyman technique identified one significant transition point, indicating that the relationship between work ability and time-

based WHMI was not significant when values of health-related organizational climate were lower than -2.1213.

**Figure 8**

*Simple Slopes of Work Ability Predicting Time-Based WHMI for 1 SD Below the Mean of Health-Related Organizational Climate, the Mean of Health-Related Organizational Climate, and 1 SD Above the Mean of Health-Related Organizational Climate*




## Discussion

The overall objective of this study was to examine whether health-related organizational climate moderated the mediating effect of work-health management interference on the relationship between work ability and job burnout. The negative relationship found between work ability and burnout (first hypothesis) is consistent with previous research (Ahola et al., 2009; Brauchli et al., 2015; McGonagle et al., 2022) and suggests that it may be easier for individuals with higher levels of work ability to manage work demands because fewer demands and obstacles related to factors impacting work

ability (e.g., health demands) exist. Within the JD-R model, predictors of work ability, such as autonomy, have been identified as common job resources (McGonagle et al., 2022). Schouteten (2016) also found that low work ability predicted increased employee absenteeism, which is a behavioral symptom of burnout.

Supporting the second hypothesis, WHMI mediated the relationship between work ability and job burnout. Specifically, higher levels of work ability were related to lower energy-based WHMI and time-based WHMI, and lower levels of both types of WHMI were related to lower levels of job burnout. This finding aligns with previous research in which job demands and resources mediated the negative relationship between work ability and job burnout (Li & Yang, 2021). Additionally, McGonagle (2020), found that both energy-based WHMI and time-based WHMI were positively related to work-family conflict and CHC severity (increased CHC severity would negatively impact one's work ability). Furthermore, energy-based WHMI and time-based WHMI were associated with increased burnout and predicted 21.8% of the variance in burnout (McGonagle, 2020).

As predicted in hypotheses three and four, health-related organizational climate moderated the negative relationship between work ability and WHMI (energy-based and time-based), indirect negative relationship (via energy-based and time-based WHMI) between work ability and job burnout. In both cases, the negative relationships were stronger for those with higher versus lower levels of health-related organizational climate. Therefore, when the health-related organizational climate is positive or higher, employees feel supported and there is less risk for the development of burnout. These results are supported in previous research on organizational factors that support

employees with CHCs. For example, in a study of older workers with CHCs, Vanajan et al. (2020) found that workers who perceived access to flexible work arrangements and a psychologically safe organizational climate were more likely to report fewer health-related work limitations. In another study, Ostovarfar et al. (2021) found a significant (though weak), positive correlation between health-promoting lifestyle and organizational climate in a sample of government employees. These findings support the idea that a positive health-related organizational climate may reduce work interference between job and health-related demands; in other words, employees may experience fewer health-related work limitations, which would lead to decreased WHMI. Overall, findings revealed that the hypothesized moderated mediation model was a good fit for the data in this study and suggest that JD-R theory was an appropriate framework for the current study.

**Limitations**

One limitation of this study is that it used a cross-sectional design, which limits the ability to draw conclusions about the directionality and causality of the relationships between the variables. Because the data were collected at the same time, there is no way to guarantee that the cause happened before the effect. Therefore, while the current study found significant associations between work ability, energy-based and time-based WHMI, and burnout, it is unclear if changes in one variable directly caused changes in one of the other variables. For example, to assert causality, work ability (predictor) must come before WHMI (mediator), which must come before burnout (outcome) in time. Longitudinal studies would be better suited to establish the time order of events (i.e., temporal sequence of the variables) and allow for stronger inferences about causality.

Another limitation is that this study relied on self-report measures, which are subject to social desirability bias and memory recall issues. Participants may have provided responses that they thought were socially desirable or may have had difficulty accurately recalling their experiences. Other measures such as behavioral measures could be used in future research to supplement self-report measures. For example, number of days that were missed at work to attend medical appointments or turnover that was due to medical reasons could be recorded. Additionally, job demand and resource assessments could be conducted to determine how work ability affects job tasks and performance. Finally, behavioral symptoms of burnout such as complaints about work-related stress and impaired mental health, could be examined.

A third limitation is that this study only investigated two dimensions of one mediator (energy-based and time-based WHMI) and one moderator (health-related organizational climate) in the relationship between work ability and burnout. Other variables exist that could function as mediators or moderators in this relationship that were not investigated. Previous research suggests that job demands may serve as mediator in the relationship between work ability and job burnout. For example, high work ability might lead to low job demands, which would lead to low burnout (Schouteten et al., 2016); whereas, low work ability might lead to high job demands, which would lead to high burnout (Ilmarinen, 2007). Other moderators have also been examined in previous research. For example, the relationship between work ability, work-health management interference, and burnout was moderated by job control (McGonagle et al., 2022), and work engagement (Kinnunen et al., 2017).

**Strengths**

In spite of its limitations, this study had strengths. First, this study's large sample size increases the generalizability of the study's findings. By recruiting a large sample, the study was able to achieve a more representative sample of the population. The large number of participants also increases the statistical power of the study, which allows for smaller effects and reduces the likelihood of type II errors. Overall, the large sample size of this study enhances the reliability and validity of the results and provides a strong starting point for future research.

A related strength of this study is the breadth of occupations represented among participants, including healthcare, education, mining, and manufacturing. The diversity of occupational backgrounds enhances generalizability and increases the likelihood that the results can be applied to individuals in different work settings. The inclusion of participants from diverse occupations can provide valuable insights into how the study's variables may operate similarly and differently across different work environments.

In addition, most of the study's measures had high levels of internal consistency. This enhances the reliability of the measures used. Cronbach's alpha coefficients were calculated for all measures, and the results indicated good levels of internal consistency for all but one scale ($\alpha > .80$); the WAI had an acceptable level of internal consistency. This suggests that the items within each measure were highly correlated and reliably measured the intended variables. High levels of internal consistency enhance the validity of the study's findings because the likelihood of measurement error is reduced, increasing the accuracy of results.

**Practical Implications**

Findings from this research provide managers, supervisors, and subordinates with a better understanding of chronic health issues in the workplace. The current study also serves a foundation for how organizations can better adapt to support employee well-being and productivity. For example, we recommend that managers who employ individuals with lower levels of work ability establish a strong and positive health-related organizational climate. Doing so may create a work environment in which employees feel comfortable enough to disclose and/or tend to CHCs that may impact their work ability levels. Employees with lower work ability or have high levels of WHMI may also be more likely to engage in seeking social support or job crafting. Social support from coworkers, supervisors, family, or friends can help employees cope with stress and reduce burnout (Halbesleben & Buckley, 2004). Job crafting, an employee-initiated strategy, involves modifying job tasks, relationships, and perceptions to align better with personal preferences and abilities, and research has shown that job crafting can help employees reduce burnout (Tims et al., 2013).

**Recommendations for Future Research**

Due to limited research on WHMI and health-related organizational climate, more research is needed to further validate, replicate, and extend the current study's findings. Future studies might examine how types of leadership influence and impact work ability, WHMI, and health-related organizational climate. For example, one type of leadership that could be explored is health-oriented leadership (HoL). HoL refers to a leadership style that promotes and maintains the health and well-being of employees (Franke & Pundt, 2014). Health-oriented leaders prioritize employee health and well-being over

other goals, such as productivity or profit, and encourage healthy behaviors. They also create a supportive work environment that values health and well-being, provides resources and opportunities for healthy behaviors, and reduces stress and health risks (Franke & Pundt, 2014). Overall, other types of leadership could be investigated, including transformational leadership (Gillet et al., 2013), authentic leadership (Leroy et al., 2012), and servant leadership (Liden et al., 2008).

**Conclusion**

In conclusion, this study focuses on the question of whether health-related organizational climate moderated the mediating effect of work-health management interference on the relationship between work ability and job burnout. This study found the relationships of work ability, burnout, WHMI, and health-related organizational climate to be significant. This study also further expands on the information gap between these fairly new variables. The present research, therefore, contributes to a growing body of evidence suggesting that health-related organizational climate does moderate the mediating effect of work-health management interference on the relationship between work ability and job burnout.

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**Appendix A**

## Recruitment Message Disseminated via Email & Listservs

**Subject Line:** Survey Research Participation Opportunity: Work, Health, & Well-Being

Greetings,

We are recruiting working adults to participate in a research survey to gather information on factors that impact workplace well-being.

To be eligible to participate in this research, you must be: (1) at least 18 years of age (2) reside in the United States and (3) currently employed.

The survey will take approximately 20 minutes to complete, and your participation is voluntary. After completion of the survey, you will have a chance to enter an email address if you would like to be entered into the drawing for one of 50 $10 Amazon eGift Cards.

There are no foreseeable risks associated with participation, as no identifying information will be collected. This research study has been reviewed and approved by the University of Minnesota's Institutional Review Board (IRB ID: STUDY00017535).

To participate in this voluntary research survey, please use the following link: https://z.umn.edu/work-health-wellbeing

The survey will remain open until **January 16, 2023**. If you have any questions about this study or issues accessing the survey, please email us directly. **Finally, feel free to share this recruitment message with others you know who are eligible to participate.**

Thank you,

Jessica Cole, Candidate, M.A. Psychological Science
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Email: cole0939@d.umn.edu

Mariah McDonough, Candidate, M.A. Psychological Science
Affiliation: University of Minnesota Duluth, Department of Psychology
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Julie M. Slowiak, Ph.D., BCBA-D (Faculty Advisor)
Affiliation: University of Minnesota Duluth, Department of Psychology
Email: jslowiak@d.umn.edu

## Recruitment Messages Disseminated via Social Media

### Twitter (limit of 280 characters)

Research survey on the worker health and well-being, with the chance to win one of 50 $10 gift cards: https://z.umn.edu/work-health-wellbeing

Jessica Cole, Mariah McDonough, & Julie Slowiak, jslowiak@d.umn.edu, University of Minnesota Duluth. IRB ID: STUDY00017535

### Facebook, LinkedIn, and Instagram

Are you at least 18 years of age, living in the United States, and employed? If so, please consider taking our research survey to gather information on factors that impact worker well-being.

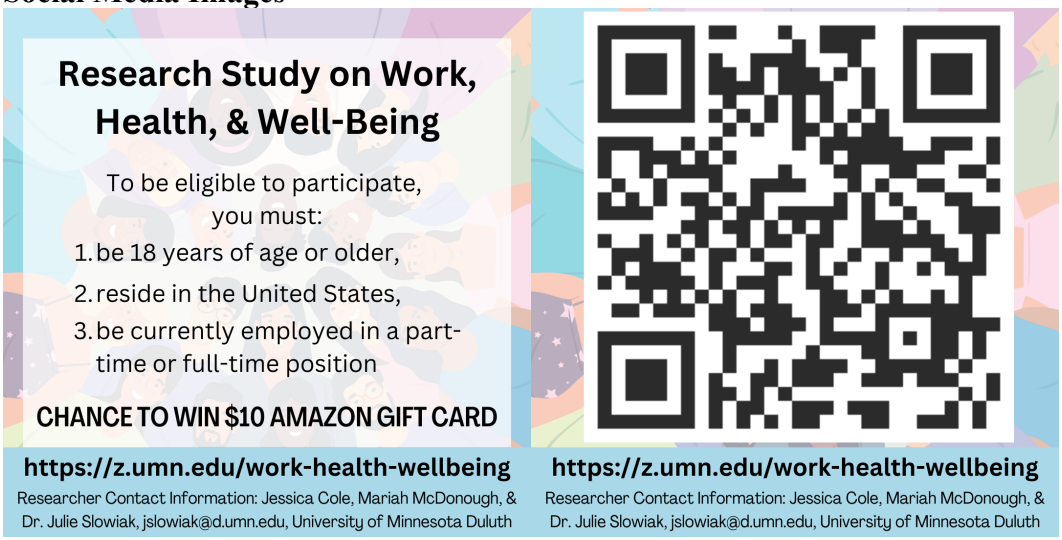
The survey will take approximately 20 minutes to complete, and your participation is voluntary. At the end of the survey, you will have the opportunity to be entered into a drawing for one of 50 $10 Amazon eGift Cards.

Feel free to share this post or the survey link below with others you know who are eligible to participate!

Survey Link: https://z.umn.edu/work-health-wellbeing

This research is being conducted out of the University of Minnesota Duluth, Psychology Department, by Jessica Cole (cole0939@d.umn.edu), Mariah McDonough (mcdo1204@d.umn.edu), and Julie M. Slowiak, Ph.D. (jslowiak@d.umn.edu). This study has been reviewed and approved by the University of Minnesota's Institutional Review Board (IRB ID: STUDY00017535).

### Social Media Images



## Appendix B

## INFORMATION SHEET FOR RESEARCH

Work, Health, and Well-Being

You are invited to be in a research study to understand factors that influence health and well-being among working adults. You were identified as a possible participant because you are at least 18 years old, reside in the United States, and are currently employed. We ask that you read this form and ask any questions you may have before agreeing to be in the study.

**This study is being conducted by:** Jessica Cole and Mariah McDonough (Student Investigators) and Julie M. Slowiak, Ph.D., BCBA-D (Principal Investigator and Faculty Advisor), Department of Psychology, University of Minnesota Duluth.

**Procedures:** If you agree to be in this study, we will ask you to complete a survey questionnaire containing sociodemographic and job-related items, as well as items to gather information about job decision latitude, work ability, work-health management interference, health-related organizational climate, and job burnout. Completing the survey will take approximately 20 minutes.

**Confidentiality:** The records of this study will be kept private. In any sort of report we might publish or presentation of the findings, we will not include any information that will make it possible to identify a subject. Research records will be stored securely and only researchers will have access to the records.

**Voluntary Nature of the Study:** Participation in this study is voluntary. Your decision whether or not to participate will not affect your current or future relations with the University of Minnesota. If you decide to participate, you are free to not answer any question or withdraw at any time without affecting those relationships.

**Will I be compensated for my participation?** If you agree to take part in this research study, you will have the opportunity to be entered into a prize drawing. After completing the survey, you will see a link to a separate survey form that will allow you to enter an email address if you would like to be entered into the drawing for one of 50 $10 Amazon eGift Cards. Odds of winning depend upon the number of entries received; however, we anticipate the odds for winning will be between 1:8 to 1:10. The drawing will be conducted no later than March 1, 2023. The Principal Investigator will send the electronic gift card to each winner by the email provided.

**Contacts and Questions:** The researchers conducting this study are Jessica Cole, Mariah McDonough, and Julie M. Slowiak, Ph.D., BCBA-D. You may email any questions that you have before agreeing to participate. If you have questions later, you are encouraged to contact Julie M. Slowiak at the Department of Psychology, University of Minnesota Duluth, 218-726-7116, jslowiak@d.umn.edu.

This research has been reviewed and approved by an IRB within the Human Research Protections Program (HRPP). To share feedback privately with the HRPP about your research experience, call the Research Participants' Advocate Line at 612-625-1650 (Toll Free: 1-888-224-8636) or go to z.umn.edu/participants. You are encouraged to contact the HRPP if:

- Your questions, concerns, or complaints are not being answered by the research team.
- You cannot reach the research team.
- You want to talk to someone besides the research team.
- You have questions about your rights as a research participant.
- You want to get information or provide input about this research.

Agreement to Participate

☐ I would like to participate in this study.
☐ I do not want to participate in this study.

(Next Screen Page)

Please confirm your decision to participate in this study:

☐ I confirm that I would like to participate in this study.
☐ Oops…never mind. I do not want to be a participant.

# Appendix C

## Survey Items

**Information Sheet for Research** (will be inserted here on the screen preceding screening items and survey items)

**Screening Question to Confirm Eligibility**
The question below will appear after individuals consent to participate and before the primary survey items. If a participant selects "No" to the screening question, they will be directed to the end of the study, and their participation will end. Numbers in parentheses indicate codes.

1. Are you currently employed?
    a. Yes (1)
    b. No (2)

2. Are you currently residing and working in the United States?
    a. Yes (1)
    b. No (2)

3. Are you at least 18 years of age?
    a. Yes (1)
    b. No (2)

**Sociodemographic Items**
Items with an asterisk allow multiple answers to be selected. N/A: non-applicable. Numbers in parentheses indicate codes. Codes will be added for each unique fill-in-the-blank response.

1. What is your current age (in years)? (fill in the blank)_____

2. What sex were you assigned at birth, on your original birth certificate?
    a. Male (1)
    b. Female (2)
    c. Prefer Not to Answer (3)

3. How do you currently describe yourself?
    a. Male (1)
    b. Female (2)
    c. Transgender (3)
    d. None of these (4)
    e. Prefer Not to Answer (5)

4. What race/ethnicity describes you?
    a. African American/Black (1)

b. American Indian/Alaskan Native (2)
c. Asian/Pacific Islander (3)
d. Caucasian/White (4)
e. Hispanic/Latinx (5)
f. Other (6)
g. Prefer Not to Answer (7)

5. What is your current employment status?
    1. Employed Full-Time (1)
    2. Employed Part-Time (2)
    3. Self-Employed Full-Time (3)
    4. Self-Employed Part-Time (4)

6. How many years have you been employed at your current place of employment? (fill in the blank) _____

7. In what general industry do you work?
    a. Agriculture, Forestry, Fishing, and Hunting (1)
    b. Mining, Quarrying, and Oil and Gas Extraction (2)
    c. Utilities (3)
    d. Construction (4)
    e. Manufacturing (5)
    f. Wholesale Trade (6)
    g. Retail Trade (7)
    h. Transportation and Warehousing (8)
    i. Information (9)
    j. Finance and Insurance (10)
    k. Real Estate and Rental and Leasing (11)
    l. Professional, Scientific, and Technical Services (12)
    m. Management of Companies and Enterprises (13)
    n. Administrative and Support and Waste Management and Remediation Services (14)
    o. Educational Services (15)
    p. Health Care and Social Assistance (16)
    q. Arts, Entertainment, and Recreation (17)
    r. Other Services (except Public Administration) (18)
    s. Public Administration (19)
    t. Other (20)

8. Do you currently hold a managerial or supervisory position at work?
    a. Yes (1)
    b. No (2)

## 12-item short form Burnout Assessment Tool (BAT-12)

de Beer, L. T., Schaufeli, W. B., & Bakker, A. B. (2022). Investigating the validity of the short form Burnout Assessment Tool: A job demands-resources approach. *African Journal of Psychological Assessment*, *4*(0), Article 95. https://doi.org/10.4102/ajopa.v4i0.95

INSTRUCTIONS: In this section, you will see a series of statements with which you will indicate the frequency of engagement in the behavior.

Never (1); Rarely (2); Sometimes (3); Very Often (4); Always (5)

1. At work, I feel exhausted.
2. After a day at work, I find it hard to recover my energy.
3. At work, I feel physically exhausted.
4. I struggle to find enthusiasm for my work.
5. I feel a strong aversion towards my job.
6. I'm cynical about what my job means to others.
7. At work, I have trouble staying focused.
8. When I'm working, I have trouble concentrating.
9. I make mistakes in my work because I have my mind on other things.
10. At work, I feel unstable to control my emotions.
11. I do not recognize myself in the way I react emotionally at work.
12. At work, I may overreact unintentionally.

Scoring & Interpretation Information:
Exhaustion items are 1, 2, 3.
Mental distance items are 4, 5, 6.
Cognitive impairment items are 7, 8, 9.
Emotional impairment items are 10, 11, 12.

Scoring & Interpretation Information:
Items associated with each of the exhaustion, mental distance, cognitive impairment, and emotional impairment subscales should be summed, and an overall average score computed; higher scores indicate higher levels of each dimension of job burnout.

## Job Crafting Scale (JCS)

Tims, M., Bakker, A. B., & Derks, D. (2012). Development and validation of the job crafting scale. *Journal of Vocational Behavior*, *80*(1), 173-186. https://doi.org/10.1016/j.jvb.2011.05.009

INSTRUCTIONS: In this section, you will see a series of statements with which you will indicate the frequency of engagement in the behavior.

Never (1); Rarely (2); Sometimes (3); Often (4); Always (5)

1. I try to develop my capabilities.

2. I try to develop myself professionally.
3. I try to learn new things at work.
4. I make sure that I use my capacities to the fullest.
5. I decide on my own how I do things.
6. I make sure that my work is mentally less intense.
7. I try to ensure that my work is emotionally less intense.
8. I manage my work so that I try to minimize contact with people whose problems affect me emotionally.
9. I organize my work so as to minimize contact with people whose expectations are unrealistic.
10. I try to ensure that I do not have to make many difficult decisions at work.
11. I organize my work in such a way to make sure that I do not have to concentrate for too long a period at once.
12. I ask my supervisor to coach me.
13. I ask whether my supervisor is satisfied with my work.
14. I look to my supervisor for inspiration.
15. I ask others for feedback on my job performance.
16. I ask colleagues for advice.
17. When an interesting project comes along, I offer myself proactively as project co-worker.
18. If there are new developments, I am one of the first to learn about them and try them out.
19. When there is not much to do at work, I see it as a chance to start new projects.
20. I regularly take on extra tasks even though I do not receive extra salary for them.
21. I try to make my work more challenging by examining the underlying relationships between aspects of my job.

Scoring & Interpretation Information:
Increasing structural job resources are 1, 2, 3, 4, 5.
Decreasing hindering job demands are 6, 7, 8, 9, 10, 11.
Increasing social job resources are 12, 13, 14, 15, 16.
Increasing challenging job demands are 17, 18, 19, 20, 21.

Items associated with each of the increasing structural job resources, decreasing hindering job demands, increasing social job resources, and increasing challenging job demands subscales should be summed, and an overall average score computed; higher scores indicate higher levels of each dimension of job crafting.

## Job Decision Latitude (JDL) scale

Smith, C., Tisak, J., Hahn, S., & Schmieder, R. (1997). The measurement of job control. *Journal of Organizational Behavior*, *18*(3), 225-237. http://www.jstor.org/stable/3100142

INSTRUCTIONS: In this section, you will see a series of statements with which you may agree or disagree. For each item, please rate the extent to which you agree with each statement.

Strongly Disagree (5); Disagree (4); Neither (3); Agree (2); Strongly Agree (1)

1. My job requires that I learn new things.
2. My job involves a lot of repetitive work.
3. My job requires me to be creative.
4. My job allows me to make a lot of decisions on my own.
5. My job requires a high level of skill.
6. On my job, I have very little freedom to decide how I work.
7. I get to do a variety of different things on my job.
8. I have a lot of say about what happens on my job.
9. I have an opportunity to develop my own special abilities.

Scoring & Interpretation Information:
Skill discretion items are 1, 2, 3, 5, 7, 9.
Decision authority items are 4, 6, 8.

Items associated with each of the skill discretion and decision authority subscales should be summed, and an overall average score computed; higher scores indicate higher levels of each dimension of job decision latitude.

## Work Ability Index (WAI)

Tuomi, K., Ilmarinen, J., Jahkola, A., Katajarinne, L., & Tulkki, A. (1998). Work ability index. *2nd Edition, Finnish Institute of Occupational Health*, Helsinki, Finland.

Instructions: The Work Ability Index (WAI) contains questions concerning your work, your work ability and your health. Your answers help you at the final conclusion whether measures for improving your health have to be taken and if your work ability must be improved. Please fill in the questionnaire thoroughly and answer all questions.

Yes (1); No (2)

1. Is your work psychologically demanding?
2. Is your work physically demanding?
3. Is your work physically and psychologically demanding?

<u>Current work ability compared to highest work ability ever</u>

Currently cannot work at all (0); Work ability at its best (10)

4. Assume that your work ability at its best has a value of 10 points. How many points would you give your current work ability?

<u>Work ability in relation to demands</u>

Very good (5); Rather good (4); Moderate (3); Rather poor (2); Very poor (1)

How do you rate your current work ability with respect to:

5. The physical demands of your work.
6. The mental demands of your work.

Scoring & Interpretation Information:

For physically demanding work, the work ability score for the physical demands of the job is multiplied by 1.5 and the work ability score for the mental demands of the job is multiplied by 0.5. For mentally demanding work, the work ability score for the physical demands of the job is multiplied by 0.5 and the work ability score for the mental demands of the job is multiplied by 1.5. For work that is both physically and mentally demanding the work ability score remains unchanged.

Current Diseases

In the following list, mark your current diseases or injuries. Also indicate whether a physician has diagnosed or treated these diseases.

Yes, own opinion (2); Yes, physician's diagnosis (1); No (0)

7. Injury due to an accident
8. Musculoskeletal disease in back, limbs or other part of the body (e.g. repeated pain in joint muscle, sciatica, rheumatism, arthritis)
9. Cardiovascular disease (e.g. hypertension, coronary heart disease)
10. Respiratory disease (e.g. repeated infections of the respiratory tract, emphysema)
11. Mental disorder (e.g. depression, "burn-out", anxiety or insomnia)
12. Neurological or sensory disease (e.g. hearing or visual disease, migraine, epilepsy)
13. Digestive disease/condition (e.g. gastritis, gallstones, liver or pancreatic disease, repeated constipation)
14. Genitourinary disease (e.g. infection in urinary tract, gynecological disease or prostate)
15. Skin disease (e.g. allergic or other rash, varicose veins)
16. Tumor or cancer
17. Endocrine or metabolic disease (e.g. diabetes, severe obesity or gout)
18. Blood diseases (e.g. anemia, other blood disorder or defect)
19. Birth defects
20. Other disorder or disease

Scoring & Interpretation Information:

Points are determined by the following: 5 or more diseases = 1 point; 4 diseases = 2 points; 3 diseases = 3 points; 2 diseases = 4 points; 1 disease = 5 points; no disease = 7 points (only diseases diagnosed by a physician are counted)

Estimated work impairment due to diseases

Is your illness or injury a hindrance to your current job? Check more than one alternative if needed.

21. There is no hindrance/I have no diseases (6)
22. I am able to do my job, but it causes some symptoms (5)
23. I must sometimes slow down my work pace or change my work methods. (4)
24. I must often slow down my work pace or change my work methods. (3)
25. Because of my condition, I feel I am able to do only part time work. (2)
26. In my opinion I am entirely unable to work. (1)

Illness within last year (12 months)

27. During the last 12 months: How many whole days have you been off work because of illness?

None (5); Max. 9 days (4); 10-24 days (3); 25-99 days (2); 100-354 days (1)

Estimation of own work ability in 2 years

28. Do you believe, according to your present state of health, that you will be able to do your current job two years from now?

Unlikely (1); Not Certain (4); Relatively certain (7)

Mental capacities

Often (4); Rather often (3); Sometimes (2); Rather seldom (1); Never (0)

Considering the last three months:

29. Have you been able to enjoy your regular daily activities?
30. Have you been active and alert?
31. Have you felt yourself to be full of hope about the future?

Scoring & Interpretation Information:

This item is divided into three questions that are added together and the sum is modified as follows: sum is 0–3 = 1 point; sum is 4–6 = 2 points; sum is 7–9 = 3 points; sum is 10–12 = 4 points; (i.e., item 29 = 3, item 30 = 4, item 31 = 3; total points = 10 - The score for mental capacities is 4).

Overall WAI Scoring & Interpretation Information: Scores from each section are added. The table describes the current work ability of the respondents and, at the same time, permits forecasts to be made of the health risk. Half points in the final scores are rounded off the next whole number (e.g., 28.5 is rounded off 29 points).

| SCORE | WORK ABILITY | ACTION |
|---|---|---|
| **7-27 points** | **POOR** | **RESTORE** |
| **28-36 points** | **MODERATE** | **IMPROVE** |
| **37-43 points** | **GOOD** | **SUPPORT** |
| **44-49 points** | **EXCELLENT** | **MAINTAIN** |

## Work Health Management Interference

McGonagle, A. K., Schmidt, S., & Speights, S. L. (2020). Work-health management interference for workers with chronic health conditions: Construct development and scale validation. *Occupational Health Science*, *4*(4), 445-470.

Instructions: Rate items from 1 (*strongly agree*) to 5 (*strongly disagree*) based on the statements below.

1. My work schedule makes it difficult to schedule necessary medical visits, treatments, or procedures. (T3a)
2. I cannot take time off work needed to treat my chronic health condition. (T5a)
3. Time spent at work interferes with my ability to conform to a long-term treatment plan. (T6a)
4. I have to miss doctor appointments or treatments due to the amount of time I must spend on my work responsibilities. (T8a)
5. I have a difficult time following a health condition treatment plan because I am tired from work. (E2a)
6. Work depletes the mental energy I need to take care of my health. (E3a)
7. Work depletes the physical energy I need to take care of my health. (E4a)
8. I am too tired after working to do things that are good for health condition management (e.g., exercise, eating a healthy diet). (E5a)

Scoring & Interpretation Information: There are 4 items of energy based WHMI (items 1-4) and 4 items of time based WHMI (items 5-8). Items are rated on a 5-point Likert-type scale that ranges from 1 (*strongly agree*) to 5 (*strongly disagree*). WHMI's subscale scores are found by calculating the average of items relevant to each in the subscale that ranges from 1 to 5.

## Health Climate

Gragnano, A., Miglioretti, M., Frings-Dresen, M. H., & de Boer, A. G. (2017). Adjustment between work demands and health needs: development of the work–health balance questionnaire. *Rehabilitation Psychology*, *62*(3), 374.

Instructions: Please rate each statement either of the following: 1 (*strongly disagree),* 2 (*disagree*), 3 (*neither agree nor disagree*), 4 (*agree*), and 5 (*strongly agree*).

1. Senior management acts decisively when concerns about health emerge between employees.
2. Senior management considers employee health to be as important as productivity.
3. In my organization, health prevention involves all levels of the organization.
4. Employees are encouraged to become involved in safety and health matters.
5. Information about disease prevention is always brought to your attention by your manager/supervisor.

Scoring & Interpretation Information: The health climate subscale score is calculated by summing individual item scores and computing the average based on points allotted to each response. Items are rated on a 5-point Likert-type scale that ranges from 1 (*strongly agree*) to 5 (*strongly disagree*). This 5-item health-oriented organizational climate subscale of the Work-Health Balance Questionnaire (WHBq; Gragnano et al., 2017) is used to measure employees' perception of their organizations' attitudes towards health issues.

# Appendix D

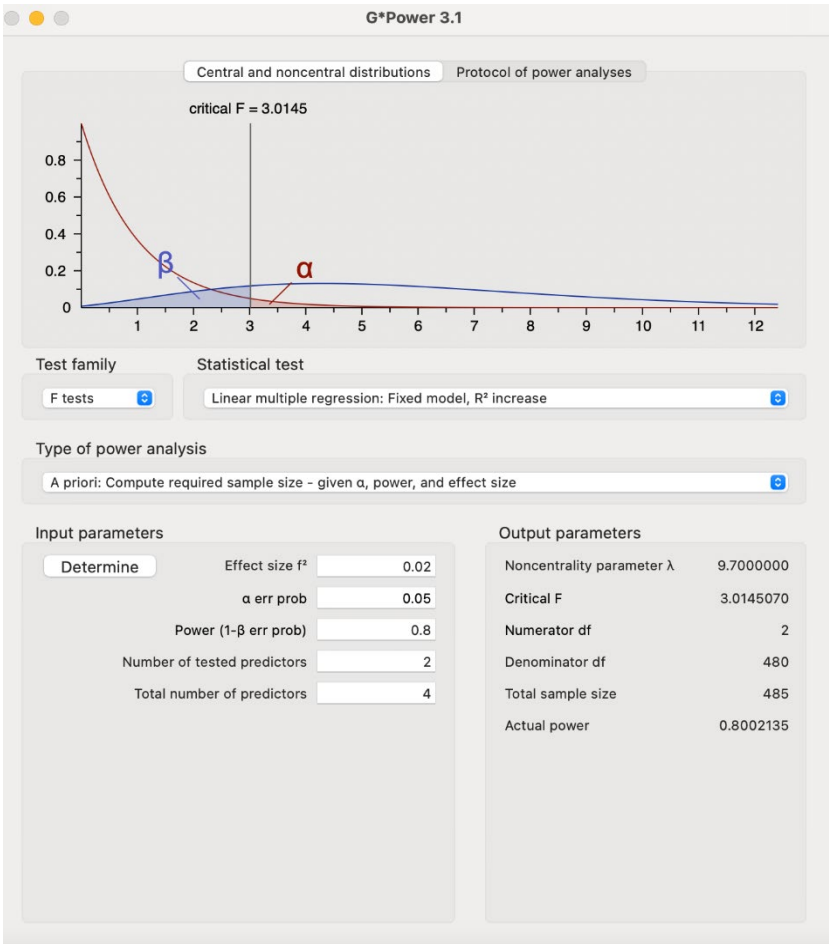
## Power Analysis in G*Power

Predictors:

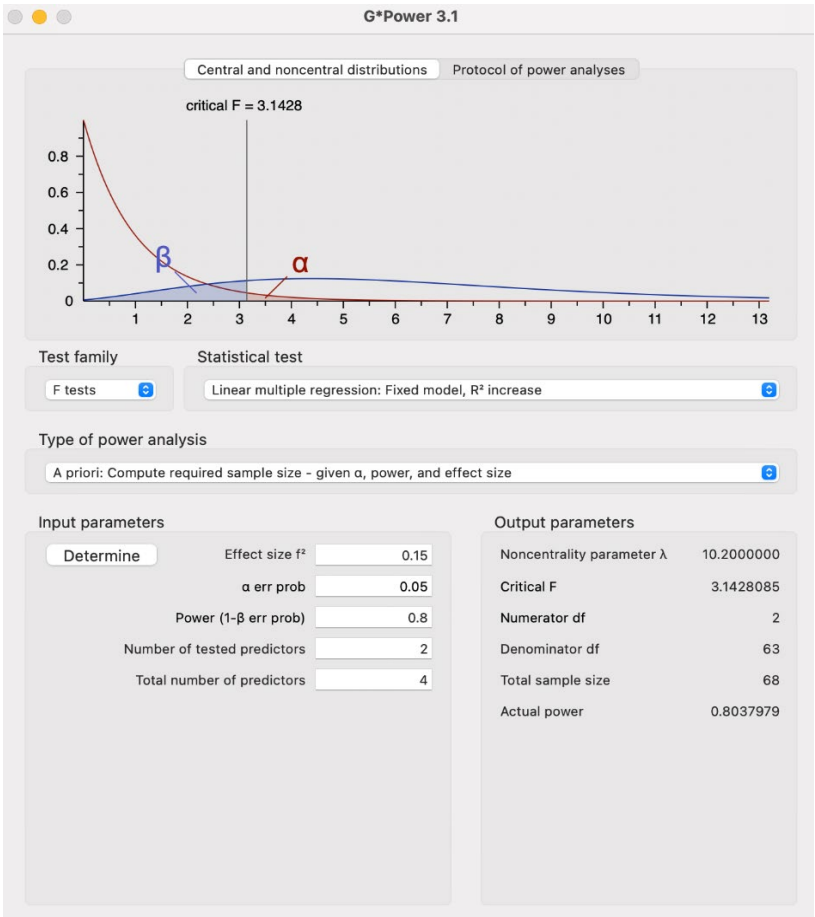
X
W
X*W (Interaction for the moderated a'-path)
Conditional indirect effect (moderated mediation)

Total: 4 predictors

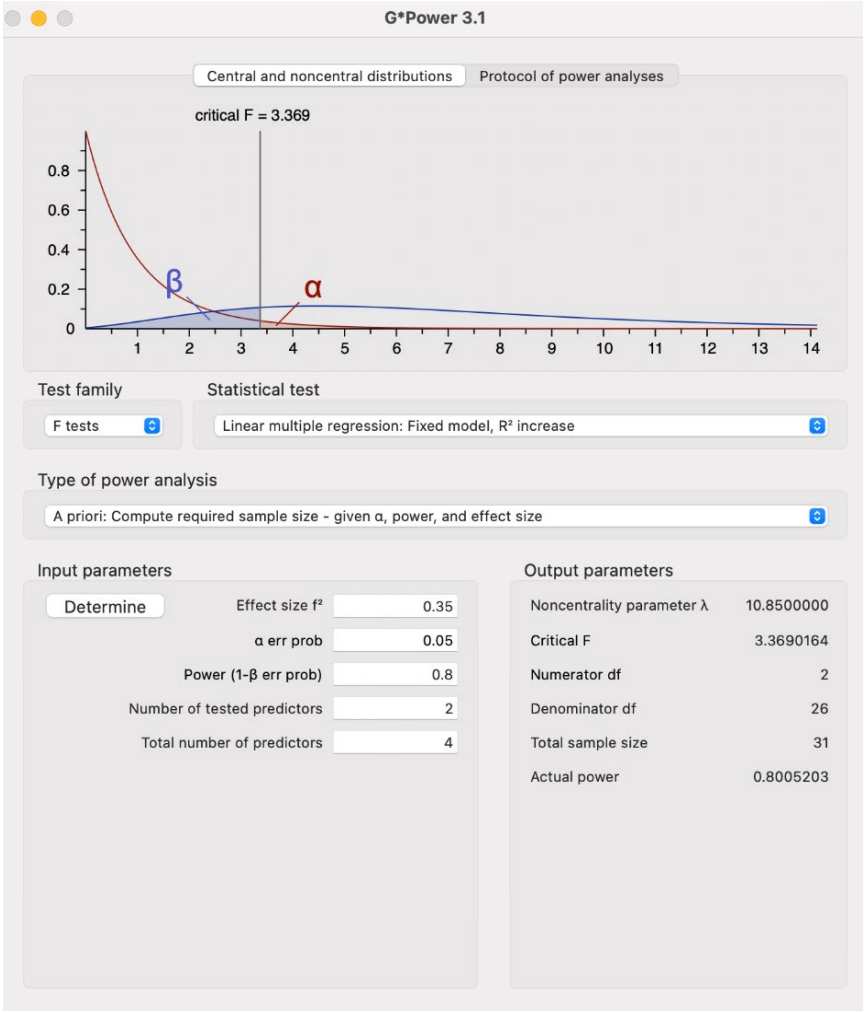
## Small Effect Size



## Medium Effect Size



## Large Effect Size



## Appendix E

## Data Cleaning Results

| Reason for Exclusion | *n* |
|---|---|
| Flagged as SPAM via the "Status" field | 40 |
| Failed criteria for all 5 fraudulent detention fields (i.e., Q_RecaptchaScore, Q_RelevantIDFraudScore, Q_RelevantIDDuplicate, Q_RelevantIDDuplicateScore, Q_ BallotBoxStuffing) | 3 |
| Failed criteria for all 3 Duplicate detention fields (i.e., Q_RelevantIDDuplicate, Q_RelevantIDDuplicateScore, Q_ BallotBoxStuffing) | 150 |
| Failed criteria for all 2 Fraud-Bot detention fields (i.e., Q_RecaptchaScore, Q_RelevantIDFraudScore) | 78 |
| Did Not Agree to Participate | 7 |
| Failed or Did Not Respond to Confirm Agreement to Participate | 51 |
| Failed or Did Not Respond to Screening Item #1 (Age) | 36 |
| Failed or Did Not Respond to Screening Item #2 (Employment) | 50 |
| Failed or Did Not Respond to Screening Item #3 (U.S. Location) | 24 |
| Failed or Did Not Respond to Attention Check 1 | 102 |
| Failed or Did Not Respond to Attention Check 2 | 441 |
| Did Not Finish via the "Finish" field | 97 |
| Reported Age < 18 years or Did Not Respond to Age Item | 51 |
| Insufficient Data to Compute WAI Score | 54 |
| **Total Responses Excluded** | **1,184** |
| **Total Responses Included** | **2,056** |
| **Total Responses in Raw Data Set** | **3,240** |

*Note.* Responses were excluded in the order that reasons are reported (top to bottom). The percentage of total participants excluded was 36.54%.