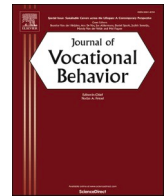




ELSEVIER

Contents lists available at [ScienceDirect](https://www.sciencedirect.com)

Journal of Vocational Behavior

journal homepage: www.elsevier.com/locate/jvbDecent work and physical health: A multi-wave investigation[☆]Ryan D. Duffy^{a,*}, Carla G. Prieto^a, Haram J. Kim^a, Trish L. Raque-Bogdan^b,
Nicole O. Duffy^a^a University of Florida, United States of America^b University of Denver, United States of America

ARTICLE INFO

Keywords:

Physical health

Decent work

Psychology of working

ABSTRACT

The current study examined the links between decent work and three components of physical health (general health, health symptoms, health behaviors) with a sample of 569 employed adults. Data were gathered at three time points over a two-month period. Drawing from Psychology of Working Theory (PWT), survival need fulfillment and workplace fatigue (Wave 2) were positioned as mediating variables between decent work (Wave 1) and physical health outcomes (Wave 3). Hypotheses were partially supported. Decent work directly, and indirectly via workplace fatigue, predicted overall physical health; decent work predicted health symptoms indirectly via workplace fatigue; and decent work predicted health behaviors indirectly via survival need fulfillment. Findings offer a more nuanced picture of how decent work connects to physical health. Specifically, for overall health and health symptoms, workplace fatigue appears to be the main connecting variable. Individuals working in jobs considered decent may be less likely to suffer workplace fatigue, and in turn, more generally healthy with less negative health symptoms. For healthy habits, such as diet and exercise, survival need satisfaction appears more salient. Meeting one's survival needs via work may help an individual have the time, and live in the type of environment, that more allows for access to a healthy lifestyle. Implications for research and practice are discussed.

Work and health are intertwined. Given that the majority of adults in the U.S. are working, the relation between work and health is an important area to further explore. A robust literature exists linking positive and negative experiences in the workplace with physical health outcomes (e.g., [Ettner, 2001](#); [Näswall, Sverke, & Göransson, 2014](#)). Generally speaking, individuals working in jobs that promote regular hours, workplace safety, access to healthcare, and a supportive climate report greater physical health compared to individuals in more demanding, dangerous, and unsupportive environments ([Duffy et al., 2019](#)). These outcomes include broad assessments of physical health as well as more specific assessments, such as weight, diet quality, exercise, sleep quality, and specific symptoms (e.g. headache, backache; [Olafsen, Niemiec, Halvari, Deci, & Williams, 2017](#)). Despite a myriad of prior studies examining the work-health link, one area in need of further examination in this literature concerns the reasons behind the relation. What types of workplace experiences and environments may have helpful or harmful links with an individual's overall health?

The goal of the current study is to examine this question using a theory-driven approach with data collected from working adults

[☆] Author's note. Ryan D. Duffy, Department of Psychology University of Florida; Carla G. Prieto, Department of Psychology, University of Florida; Haram J. Kim, Department of Psychology, University of Florida; Trish L. Raque-Bogdan, University of Denver; Nicole O. Duffy, Department of Family, Youth, and Community Sciences, University of Florida.

* Corresponding author at: University of Florida, Department of Psychology, PO Box 112250, Gainesville 32611, FL, United States of America.
E-mail address: rduf@ufl.edu (R.D. Duffy).

<https://doi.org/10.1016/j.jvb.2021.103544>

Received 10 September 2020;

Available online 2 February 2021

0001-8791/© 2021 Elsevier Inc. All rights reserved.

across time. Specifically, we draw from Psychology of Working Theory (PWT; Duffy, Blustein, Diemer, & Autin, 2016) and explore the connection between access to decent work and three physical health outcomes (general health, health symptoms, healthy behaviors) as mediated by survival needs and work fatigue. We gather data at three time points over a two-month period to examine mediation effects, while accounting for common method bias. It is hoped that the results of this study will be useful in providing possible explanations for the work-health connection, which may be beneficial to career counseling practitioners and organizational leaders seeking to build a healthy workforce.

1.1. Psychology of working theory

PWT was developed to describe individuals' work-related experiences and, in particular, address the structural and psychological variables that allow individuals to attain decent work (Duffy et al., 2016). Decent work first defined by the International Labor Organization (ILO) as:

“Opportunities for work that is productive and delivers a fair income, security in the workplace and social protection for families, better prospects for personal development and social integration, freedom for people to express their concerns, organize and participate in the decisions that affect their lives and equality of opportunity and treatment for all women and men (ILO, 2020).” There is a vast and interdisciplinary literature from the fields of public health, Public policy, economics, government, and more on the attainment of decent work and how this influences individuals' mental and physical health (Blustein, Olle, Connors-Kellgren, & Diamonti, 2016). Indeed, the promotion of individual health as well as communal and global health equity is one of the core motivations for studying and intervening to promote decent work (Blustein et al., 2016).

PWT is grounded upon research from many disciplines that has demonstrated the associations between decent work and job and well-being outcomes, including physical health. Within PWT, decent work is defined as work that provides physical and interpersonal safety, reasonable work hours, organizational values compatible with the worker's values, adequate compensation, and access to healthcare (Duffy et al., 2016). PWT is interested in both the predictors and outcomes of decent work and recognizes that, in addition to psychological variables, structural factors (i.e., predictors) within individuals' social and cultural environments—such as income, family wealth, and experiences of marginalization—can limit or enhance individuals' access to decent work (Duffy et al., 2016).

According to PWT, when individuals attain decent work, it leads to greater work-related and general well-being due to the fulfillment of basic needs. Within PWT, well-being is theorized to consist of both life satisfaction and physical health. The basic needs that are theorized to be associated with well-being include the need for survival, social contribution, and self-determination (Autin et al., 2019; Duffy, Kim, et al., 2019). Specifically, social contribution needs refer to individuals being able to use their work to help others and self-determination needs are comprised of individuals' perceptions of their own autonomy, competence, and relatedness in the workplace (Duffy et al., 2016).

Survival needs, hypothesized in the present study as one of two mediators of the relation between decent work and physical health outcomes, are fulfilled when an individual's work permits them to access food, shelter, and social capital (Duffy et al., 2016). The importance of survival needs and its connection to both decent work and well-being within PWT was first proposed by Blustein (2006) in the original Psychology of Working Framework (PWF) taxonomy and was based on previous work, both within and outside the field of psychology, that has demonstrated the importance of decent work and survival needs in promoting well-being. Work that is decent or indecent is defined, in part, by whether compensation is adequate or inadequate and whether people have time for non-work activities (Duffy et al., 2016). This, in turn, influences where people live and how much time and energy they are able to spend and expend, respectively, doing non-work health-promoting activities. These factors have been linked to physical health, through, for example, the ability of an individual and their community to afford healthful food, live in a neighborhood in which there is a grocery store with an adequate selection of both healthful and affordable food, feel safe to exercise outside or afford a gym membership, and have sufficient time and energy to engage in exercise (Schulz, Krieger, & Galea, 2002).

The linear model (Duffy et al., 2016) that followed PWF theorized that psychological and physical well-being are directly predicted by whether decent work succeeds in fulfilling the fundamental needs discussed above. Various studies have examined the tenets of PWT using both qualitative and quantitative methods, yet the majority have focused on the predictors of decent work (Douglass, Velez, Conlin, Duffy, & England, 2017; Duffy, Kim, et al., 2019; Duffy, Kim, Allan, & Prieto, 2020; England et al., 2020; Tokar & Kaut, 2018). There remains a need for research that focuses on the outcomes of decent work using the PWT model. Though a small number of studies have confirmed the PWT hypothesis that decent work is associated with well-being and physical health (Autin et al., 2019; Duffy, Kim, et al., 2019), Duffy, Kim, et al. (2019) is the only study, to the authors' knowledge, to include need satisfaction as a mediator of the relation between decent work and well-being, comprised of both mental and physical health. The authors found that survival, social contribution, and self-determination need satisfaction mediated the relation between decent work and mental health, whereas only survival need satisfaction partially mediated the relation between decent work and physical health. Here, physical health was measured as one latent construct comprised of three observed indicators: general physical health, stomach symptoms, and malaise symptoms. In the present study, the definition of physical health has been expanded to reflect its multiple components based on research from various disciplines that has demonstrated the influence of various aspects of decent work on multiple indicators of physical health.

The study by Duffy, Kim, et al. (2019) supported PWT's core propositions—that decent work promotes well-being through need fulfillment. However, a large amount of variance remained unaccounted for in the relation between decent work and physical health, suggesting that additional variables should be assessed to explain this link. Additionally, Duffy, Kim, et al. (2019) looked at general physical health as a single latent construct, versus breaking it apart into specific components (e.g., overall health, health symptoms, healthy behaviors). The present study addresses the previous study's limitations by a) including workplace fatigue as an additional

mediator along with survival need satisfaction, b) exploring how these variables relate to subcomponents of physical health, and c) examining these relations using a time-lagged methodology. Research findings that support the theoretical rationales above for including an additional mediator in the PWT model, adding various indicators of physical health, and using a time-lagged model are reviewed in the following sections.

2. Work and health

We focus on three health-related outcomes of decent work (general physical health, health symptoms, and healthy behaviors) along with the two proposed mediators. We chose the three variables for several reasons. First, each of these has been independently linked with experiences in the workplace and we review these below in an effort to build formal hypotheses. Second, they represent distinct approaches to considering physical health – a general, overall assessment, an assessment of more specific health symptoms, and positive health behaviors such as healthy eating and exercise. Capturing these distinct variables will allow for a better understanding of the potential unique effects of decent work on physical health.

2.1. General health

Americans working full-time spend about one-third of their day and the majority of their week at work (Centers for Disease Control and Prevention, 2016) and a number of studies have linked aspects of decent work with how individuals feel in general about their health. Specifically, as described above, Duffy, Kim, et al., 2019 used the PWT model to explore the relation between decent work and both mental and physical health, finding that that satisfaction of survival needs (e.g., food, shelter, utilities) partially mediated decent work's relation to physical health. In addition, social support in the workplace and worker autonomy have been positively linked to self-reported health (Melchior, Berkman, Niedhammer, Chea, & Goldberg, 2003), while high job demands, excessive work hours, and tight deadlines have all been associated with poorer self-reported general physical health (Burdorf & Jansen, 2006; Leitjen et al., 2015). Grzywacz and Dooley (2003) found that those with jobs classified as "optimal" (i.e., jobs with both economic and psychological resources, such as adequate pay and social support) reported significantly better physical health than persons in "economically good" jobs (i.e., jobs that paid well but lacked psychological resources).

Additionally, among a large sample ($N = 1778$) of working women, it was found that perceived work discrimination significantly and negatively influenced women's self-reported physical health, even after controlling for emotional health, physical health limitations, and previous experiences of discrimination (Pavalko, Mossakowski, & Hamilton, 2003). A number other studies have found relations between components of decent work (e.g. low pay, unsafe conditions) and physical health (Dich, Lund, Hansen, & Rod, 2019; Hoobler, Rospenda, Lemmon, & Rosa, 2010; Magee, Stefanic, Caputi, & Iverson, 2012; Pohling, Buruck, Jungbauer, & Leiter, 2016; Schrijvers, van de Mheen, Stronks, & Mackenbach, 1998). Based on the findings described above, we suspect similar relations will exist between decent work and general health. Specifically, we hypothesize a positive relation between decent work and overall physical health (*Hypothesis 1*).

2.2. Health symptoms

Work environments and demands have been shown to be related to some of the most common health concerns of workers, including muscular pain, headache, fatigue, cardiovascular problems, and insomnia (Parent-Thirion, Fernández Macías, Hurley, & Vermeylen, 2007). For example, those working longer hours report a greater number and increased severity of health complaints, like tiredness, headaches, and musculoskeletal complaints (e.g., backache, wrist pain), compared to individuals working fewer hours per week (Sparks, Cooper, Fried, & Shirom, 1997). A study sampling long-haul truck drivers ($N = 316$) who spent an average of 17 days per month driving found that, despite these drivers describing their general health as good, most drivers (83.6%) had obesity, almost 60% reported symptoms of insomnia, 56.3% reported experiencing fatigue, and about two-fifths of the sample reported cardiovascular disease concerns (Apostolopoulos, Sönmez, Shattell, Gonzales, & Fehrenbacher, 2013).

Additionally, physically demanding work has been linked to musculoskeletal disorders (Häkkänen, Viikari-Juntura, & Martikainen, 2001), while work stress has been linked to various chronic diseases and chronic disease indicators, such as elevated blood pressure and cholesterol (Semmer & Meier, 2009). For example, a study with a large sample ($N = 732$) of Swedish workers demonstrated that physically demanding work coupled with low social support was linked to job absence because of lower back pain (Hoogendoorn et al., 2001), and a longitudinal study of healthy employees found that new cases of diabetes were linked to workload and job demands, even after controlling for sociodemographic, physiological, and behavioral diabetes risk factors (Toker, Shirom, Melamed, & Armon, 2012). These studies demonstrate the influence of physical work demands and conditions, work hours, and work stress on various health symptoms and conditions, such as back pain, obesity, insomnia, and diabetes. As such, we suspect similar relations will exist between decent work and health symptoms. Specifically, we hypothesize a negative relation between decent work and problematic physical health symptoms, which are measured by an assessment of present physical ailments such as trouble sleeping, chest pain, and shortness of breath (*Hypothesis 2*).

2.3. Healthy behaviors

Years of research have demonstrated relations between aspects of decent work attainment and engagement in health-promoting behaviors, such as eating a healthy diet and exercise. For example, research has found that employees with long work hours and

high-stress/cognitively draining environments have increased saturated fat and sugar consumption (Wardle, Steptoe, Oliver, & Lipsey, 2000) as well as decreased physical activity (Mazzola, Moore, & Alexander, 2017). Conversely, individuals with more flexible work hours are less likely to feel exhausted from work and are more likely to engage in physical activity (Mausner-Dorsch & Eaton, 2000; Nomaguchi & Bianchi, 2004). Among a diverse sample of employed parents, work conditions, such as hours, shifts, and job security, related to food choice coping strategies. That is, working long hours, nonstandard hours, and having irregular work schedules were positively associated with take-out meals, prepared entrees and restaurant meals, further highlighting the influence of aspects of decent work on healthy and unhealthy behaviors (Devine et al., 2009).

One corollary of health behaviors is weight gain. A study comparing day-shift workers to night-shift workers average weight gain since starting the job on the current shift found that night-shift workers gained, on average, almost ten pounds since beginning their job, compared to an average weight gain of two pounds for day-shift workers (Geliebter, Gluck, Tanowitz, Aronoff, & Zammit, 2000). Similarly, a longitudinal study of Japanese male workers showed that alternating shift work was an independent risk factor for weight gain and BMI increases over a 14-year period (Suwazono et al., 2008). In a review of studies examining work stress and health risk behaviors, Siegrist and Rödel (2006) cited 12 studies finding that inadequate financial compensation at work and low job control were associated with weight gain and obesity (see Hellestedt & Jeffery, 1997; Kouvonen, Kivimäki, Cox, Cox, & Vahtera, 2005; Niedhammer, Goldberg, Leclerc, Bugel, & David, 1998; Popkin & Gordon-Larsen, 2004). Other studies have found relations between work hours and healthy behaviors, such as healthy eating and physical activity (Atkinson, Fullick, Grindey, & Maclaren, 2008). Based on these findings, we suspect similar relations will exist between decent work and healthy behaviors. Specifically, we hypothesize a positive relation between decent work and positive health behaviors, as measured by healthy eating and exercise (*Hypothesis 3*).

3. Hypothesized mediating mechanisms

In the current study, the relations between decent work and the three health outcomes are hypothesized to be mediated by survival need satisfaction and workplace fatigue. More specifically, we propose that higher levels of decent work attainment will promote greater physical health because that works helps fulfill survival needs and is less fatiguing. These mediation hypotheses imply relations between decent work and the mediators (survival need satisfaction and workplace fatigue) as well as among these two mediators and the three health outcomes. In the following sections, we briefly review research that supports these linkages and, where applicable, studies that have tested similar mediation propositions.

3.1. Survival needs

Survival needs are one of three needs proposed by PWT to connect decent work with well-being outcomes. An individual meeting their survival needs depends on the attainment of decent work, as adequate compensation is necessary to obtain healthful food and suitable and safe housing. Additionally, the geographic location of one's home, determined by social indicators like income, often determines whether one has access to grocery stores that offer affordable and nutritious food. Initial studies have verified this by demonstrating that strong links exist between decent work and survival needs. For example, in their instrument development study, Autin et al. (2019) found decent work and survival needs to be strongly correlated and Duffy, Kim, et al.'s (2019) study demonstrated strong links between these constructs even after controlling for the other two sets of needs within PWT. Based on PWT and the findings above, we predict decent work will relate to survival need satisfaction (*Hypothesis 4*), such that as decent work increases individuals will be more likely to feel their survival needs are fulfilled.

Models founded upon social determinants of health (SDOH) provide possible explanations for how the components of survival needs influence physical health. Specifically, SDOH models posit that sociodemographic (e.g., income) and environmental (e.g., financial and geographic access to healthful food) factors produce health inequity (Schulz et al., 2002). Research supports SDOH theories: Survival needs have been shown to be related to physical health at the general and specific level. In Duffy, Kim, et al.'s (2019) study, individuals with greater levels of decent work attainment had less physical symptom complaints and greater overall physical health. A robust literature outside of PWT domain also exists connecting survival need fulfillment with a variety of health outcomes. For example, numerous studies have demonstrated relations between related constructs such as food sufficiency (Robaina & Martin, 2013; Seligman, Laraia, & Kushel, 2010; Vozoris & Tarasuk, 2003), shelter (Burgard, Seefeldt, & Zelner, 2012; Desmond & Kimbro, 2015), and social capital (Kawachi & Berkman, 2000; Yip et al., 2007) with a plethora of health outcomes, including general health, cardiovascular disease, and health behaviors. Based on these findings, we hypothesize that survival need fulfillment will relate to all three physical health outcomes: general physical health (*Hypothesis 5*), health symptoms (*Hypotheses 6*), and health behaviors (*Hypotheses 7*). Individuals who are meeting their survival needs at work will evidence greater general physical health, less negative health symptoms, and more positive health behaviors.

Finally, survival need fulfillment is proposed to mediate the relation between decent work and each of these outcomes. Duffy, Kim, et al. (2019) found the indirect effect of decent work and physical health via survival needs to be significant. No other studies have examined need satisfaction as mediating work experience variables with physical health. However, using a PWT framework, need satisfaction has been found to mediate the relation of underemployment and meaningful work (Kim & Allan, 2019) and studies using a self-determination framework have found survival needs to mediate the relation of workplace context variables with well-being outcomes (Deci, Olafsen, & Ryan, 2017). Drawing from the Duffy, Kim, et al. (2019) study and other studies using similar constructs, it may be that a reason individuals with decent work have more positive health outcomes is because that work helps meet their survival needs (Duffy, Kim, et al., 2019). As such, we propose that survival need fulfillment will mediate the relation of decent work to general physical health (*Hypothesis 8*), health symptoms (*Hypothesis 9*), and health behaviors (*Hypothesis 10*).

3.2. Workplace fatigue

Workplace fatigue represents an additive variable not originally proposed within PWT. However, when conceptualizing why a lack of decent work may have down road impacts on physical health based on the literature, it seems reasonable to conclude that it could be due—in part—to fatigue. Specifically, using PWT, working in environments with long hours, a lack of healthcare coverage, and physically or psychologically unsafe working conditions may leave employees exhausted. Garrick et al. (2014) provided support for this notion when they found that psychosocial safety moderates the relation of job demands and fatigue. Further, literature regarding Job Demands-Resources (JDR) theory provides a useful lens from which to conceptualize the relations among decent work, fatigue, and health outcomes (Demerouti, Bakker, Nachreiner, & Schaufeli, 2001). Specifically, JDR posits that indecent work, in part, leads to burnout, of which fatigue is a part (Bakker & de Vries, 2020). Specifically, work that is physically or emotionally unsafe and/or requires sustained physical and emotional engagement, is stressful, and provides little psychosocial support leads to burnout (Demerouti et al., 2001). Moreover, fatigue caused by burnout is associated with heart disease, diabetes, and mortality (Ahola et al., 2012; Ahola, Väänänen, Koskinen, Kouvonon, & Shirom, 2010). We felt adding work fatigue to the model was logical as it pertains to in the moment feelings, referring to negative physical, mental, and emotional feelings as the direct result of experiences in the workplace. This variable serves as a complement to survival needs, which has more to do with the ability of work to maintain the health of oneself and one's family through accruing material resources.

A number of studies have connected aspects of decent work with workplace fatigue. For example, the Maastricht Cohort Study of Fatigue at Work ($N = 8833$) found that physical and emotional demands at work, decision latitude (i.e., autonomy), and social support predicted fatigue among workers. Specifically, physical and emotional demands increased fatigue risk, whereas decision latitude buffered against fatigue for men and social support was protective against fatigue for women (Bültmann, Kant, Kasl, Beurskens, & van den Brandt, 2002; Bültmann, Kant, van Amelsvoort, van den Brandt, & Kasl, 2001). Other studies have suggested similar relations among aspects of decent work (e.g. unsafe conditions) and workplace fatigue (Bakker, Demerouti, & Dollard, 2008; Preckel, Von Känel, Kudielka, & Fischer, 2005). Based on these findings, in the current study, we propose that decent work attainment will relate to less workplace fatigue. Individuals with greater levels of decent work will be less exhausted from their work (*Hypothesis 11*).

A robust literature exists connecting workplace fatigue with physical health at the general and specific level. For example, the European Community Directive on Working Time suggested that work fatigue is a major occupational hazard with a variety of negative health outcomes (Spurgeon, Harrington, & Cooper, 1997). This has been supported by research that has shown that individuals who experience fatigue from work have poorer physical health (Maslach, 2001) and that higher levels of work fatigue are linked to more rapid physical health deterioration throughout the course of 1 year (Kim, Ji, & Kao, 2011). Other studies have found relations between work fatigue and health symptoms (e.g., fatigue, headache, heart disease, and musculoskeletal pain; Salvagioni et al., 2017) and health behaviors (Ahola et al., 2012; Alexandrova-Karamanova et al., 2016). Based on these findings, we propose that in the current study workplace fatigue will predict general physical health (*Hypothesis 12*), health symptoms (*Hypothesis 13*), and health behaviors (*Hypothesis 14*). Specifically, individuals experiencing greater fatigue due to their work will evidence worse general physical health, more problematic health behaviors, and less positive health behaviors.

Finally, workplace fatigue is proposed to mediate the relation of decent work to the three health outcomes. To date, no studies have tested this exact mediation effect as this is the first study of which we are aware to incorporate workplace fatigue into the PWT framework. However, several studies have found workplace fatigue to mediate the relation of similar work-related constructs to physical health. For example, a study with a large sample ($N = 4000$) of medical staff, construction workers, and drivers (e.g., bus drivers, truck drivers) found that work fatigue mediated the negative relation between unfavorable work demands and poor sleep quality, among other objective and psychosomatic health complaints (Sluiter, de Croon, Meijman, & Frings-Dresen, 2003). Other studies have demonstrated similar relations between components of decent work and physical health while positioning work fatigue or fatigue as a mediator (Åkerstedt, Fredlund, Gillberg, & Jansson, 2002; de Croon, Sluiter, & Frings-Dresen, 2003; Meijman & Mulder, 2013; Sluiter et al., 2003). Based on these findings, we propose that workplace fatigue will mediate the relation of decent work to general physical health (*Hypothesis 15*) health symptoms (*Hypothesis 16*), and health behaviors (*Hypothesis 17*). Individuals with greater decent work attainment will evidence greater physical health, less physical health symptoms, and more positive health behaviors because they are not exhausted by their work.

3.3. The present study

The goal of the current study was to examine the links between securing decent work and physical health in greater depth. In particular, we sought to examine three physical health outcomes (overall physical health, physical health symptoms, healthy behaviors) and two mediator variables (survival need fulfillment and workplace fatigue). We recruited a large sample of employed adults to take surveys at three-time points over a two-month period. Akin to a recent PWT framed study published in the *Journal of Vocational Behavior* (Smith, Baranik, & Duffy, 2020), we used a time lagged approach to test a mediation model. The main benefit of this design is eliminating common method bias by collecting data at multiple time points across time. Additionally, as noted by Smith et al. (2020) who used a two-week time lag, for panel studies having shorter times lags has been suggested, in particular when proposing one directional models using SEM (Dorman & Griffin, 2015). This is because shorter time lags give a greater ability to detect effects given a greater likelihood of variable stability.

Indeed, Dormann and Griffin specifically tied this recommendation to applied psychology work, noting “For example, many cause–effect relationships between work experiences and work attitudes might not take long to be expressed” (p. 499). Drawing from Dormann and Griffin’s general suggestions, we chose a one-month time lag between each measurement. This was because a) we

wanted to create enough distance between measurements as to limit common method bias. Additionally, b) we drew from recently published research on PWT predictor variables and decent work across time, which used 3-month intervals (Duffy et al., 2020). Here the authors found decent work to be relatively stable, but also found that all variables in their study (including decent work) evidenced a meaningful amount of change from time to time. Indeed, Duffy et al. (2020) noted that “24.4–46.8% of participants experienced a change greater than .50 standard deviations between waves” (p. 22). Duffy et al. (2020) were particularly focused on studying change, whereas in the current study we are more interested in mediation and therefore would prefer more variable stability. As such, we chose a smaller time interval of one month between measurements. Finally, an added benefit of measuring variables across time is akin to a suggestion by Spector (2019) on maximizing the quality of cross-sectional research, which is to try and find ways to demonstrate temporal precedence. However, it is critical to note that our data still cannot assess causality given we don’t analyze repeated assessments of the same variables across time (Hamaker, Kuiper, & Grasman, 2015).

For our analyses, structural equation modeling was used to examine direct and indirect effects. We measured our constructs at three time points according to the three-level model proposed by PWT – decent work leading to need satisfaction leading to well-being. As such, we assessed decent work at Time 1, need satisfaction and workplace fatigue at Time 2, and physical health at Time 3. Results from this study may add to the growing PWT literature informing the effects of securing decent work, as well as provide greater specificity around the relations of decent work and health.

4. Method

4.1. Participants

The current study consisted of 569 working adults who completed at least two of the three waves of the survey. Data were collected through the online survey platform ResearchMatch, discussed in greater detail in the Procedure section. All participants completed the first wave and the demographic information from this survey is used below. Participants predominantly identified as women (79.8%, $n = 454$), with the remainder identifying as men ($n = 94$, 16.5%), transgender ($n = 5$, < 1%), genderqueer ($n = 12$, 2.1%), and as gender not specified in the survey ($n = 4$, < 1%). Regarding race/ethnicity, 510 (89.6%) participants identified as White/European American, 27 (4.7%) identified as African/African-American/Black, 17 (3.0%) identified as Hispanic/Latinx American, 17 (3.0%) identified as Asian/Asian American, 9 (1.6%) identified as Multiracial, 7 (1.2%) identified as American Indian/Native American/First Nation, 4 (< 1%) identified as Arab American/Middle Eastern, 2 (< 1%) identified as Asian Indian, 2 (< 1%) identified as Pacific Islander, and 6 (< 1%) selected “other”. For employment status, 448 (78.7%) of participants reported being employed full-time, 105 (18.5%) reported being employed part-time, 6 (1.1%) reported being self-employed full-time, and 10 (1.8%) reported being self-employed part-time. Note, it is common in PWT studies to use participants that are employed both part time and full time, given that decent work applies to work across the spectrum of hours (e.g., Autin et al., 2019; Duffy et al., 2020; England et al., 2020). However, we do include employment status as a covariate in our structural model test.

In regards to average yearly household income, 58 (10.2%) respondents reported an average yearly household income of less than \$25,000 per year, 166 (29.2%) reported an average yearly household income within the range of \$25,000–\$50,000, 161 (28.3%) within the range of \$50,000–\$75,000, and 184 (32.3%) within the range of \$75,000–\$100,000. Note we excluded participants with a household income of over \$100,000, which is elaborated on in the Procedure section. For self-reported social class, 1 (< 1%) participant identified as upper class, 68 (12%) identified as upper-middle-class, 304 (53.4%) identified as middle class, 181 (31.8%) identified as working class, and 15 (2.6%) identified as living in poverty. Regarding highest level of education attained, 204 (35.9%) reported obtaining a professional degree, 238 (41.8%) of participants reported obtaining a college degree, 211 (12.4%) reported attending some college, 53 (3.1%) reported attending trade/vocational school, 49 (2.9%) reported obtaining a high school degree, 3 (0.2%) reported attending some high school, and 1 reported attending less than high school.

4.2. Instruments

4.2.1. Decent work

The U.S. version of the Decent Work Scale (DWS; Duffy et al., 2017) was used to measure the five components for decent work proposed by Duffy et al. (2016) at Wave 1. The scale consists of 15 items that participants answered on a seven-point Likert scale ranging from *strongly disagree* to *strongly agree*. The scale consists of five, three-item subscales corresponding to the five decent work components: safe working conditions, access to healthcare, adequate compensation, free time for rest, and organizational and societal value match. In the instrument development study, scores on all five subscales and the overall scale demonstrated strong internal consistency and correlated in the expected directions with measures of work-related well-being (Duffy et al., 2017). The authors found the scale to have strong fit indices when composed as a correlational, higher-order, or bifactor model, with the bifactor model demonstrating the best fit.

Studies using the scale have measured it primarily using a bifactor model (Douglass et al., 2017; Duffy et al., 2018; Tokar & Kaut, 2018). Additionally, in a recent special issue the *Journal of Vocational Behavior* on decent work, the majority of studies also found a bifactor structure of the DWS to best fit the data (Duffy, Blustein, Allan, Diemer, & Cinamon, 2020). To confirm the best fitting DWS structure in the current study, we examined the fit of the correlational ($\chi^2(80) = 248.78$, $p < .001$, CFI = 0.97, RMSEA = 0.06, higher-order ($\chi^2(85) = 278.11$, $p < .001$, CFI = 0.97, RMSEA = 0.06), and bifactor ($\chi^2(71) = 131.01$, $p < .001$, CFI = 0.99, RMSEA = 0.04) models. In the current study the bifactor model also evidenced the best fit. Based on these findings and prior studies, we followed this approach in the current study which we discuss in more detail in the Results section. In the current study, the estimated internal

consistency reliability of scale scores for the subscales and total scale were as follows: safe working conditions (0.76), access to healthcare (0.98), adequate compensation (0.89), free time for rest (0.89), values match (0.93), and overall scale (0.85).

4.2.2. Survival needs

The degree to which participants felt they were meeting their survival needs over previous month through work at Wave 2 was measured by the Survival Needs subscale of the Work Need Satisfaction Scale (WNSS; [Autin et al., 2019](#)). The scale was developed specifically to measure needs as conceptualized in PWT and has five subscales. In the current study, we only use the four-item Survival Needs subscale, which participants answered on a seven-point Likert scale ranging from *strongly disagree* to *strongly agree*. Example items include, “My work allows me to have the resources to provide nutritious food for myself and my family” and “My work allows me to have the resources to pay for utilities, such as water, heating, and electric, on time.” In the instrument development study, scores on the scale evidenced strong internal consistency reliability and correlated in the expected direction with measures of decent work and Maslow’s need hierarchy. The scale has been used in several other studies since its publication, finding its scores to be reliable to correlate with other variables, including physical and mental health and work-related well-being ([Autin & Allan, 2020](#); [Duffy, Gensmer, et al., 2019](#)). The estimated internal consistency of scale scores in the current study was 0.93.

4.2.3. Work fatigue

Participants’ level of fatigue due to their work was measured at Wave 2 by the Three-Dimensional Work Fatigue Inventory (TDWFI; [Frone & Tidwell, 2015](#)). The scale consists of three, six-item subscales measuring physical, mental, and emotional work fatigue. Each item contained the following stem, “During the last month, how often do you...”. Example items include, “feel physically drained at the end of the workday?”, “feel mentally worn out at the end of the workday?”, and “want to emotionally shut down at the end of the workday?”. Participants answered these items on a six-point scale ranging from “not at all” to “22–30 days.” In the instrument development study, scores on the three subscales and overall scale demonstrated strong internal consistency reliability and added significant variance in the prediction of mental health, physical health, and job satisfaction. The estimated internal consistency reliability for subscale scores and overall score in the current study were as follows: physical (0.97), mental (0.98), emotional (0.98), and overall (0.98).

4.2.4. General physical health

Participants’ general physical health was measured at Wave 3 by two items developed by [Frone \(2007\)](#). These two items were, “Over the past month, in general, would you say your physical health is (poor, fair, good, very good, or excellent)?” and “Over the past month, in general, compared to most people your age, is your physical health (much better, somewhat better, about the same, somewhat worse, or much worse)?” These items were modeled off widely used self-reported health items in public health and epidemiological research for individual assessment and population health monitoring ([Hays, Spritzer, Thompson, & Cella, 2015](#)). More specifically, these two items are similar to the most commonly used self-report health question — an item from the Patient-Reported Outcomes Measurement Information System (PROMIS) — but [Frone \(2007\)](#) revised the wording to specify physical health rather than general health. Prior research using these two physical health self-report items have reported negative associations between employees’ physical health with job and employment insecurity, and positive associations with mental health and organizational commitment ([Frone, 2018](#)). In the current study, these items were significantly correlated (0.67).

4.2.5. Health symptoms

The degree to which participants experienced negative health symptoms at Wave 3 was measured by nine items of the Patient Health Questionnaire—Somatic Symptom Scale (PHQ-15; [Kroenke, Spitzer, & Williams, 2002](#)). The PHQ-15 consists of 15 items which participants answer on a three-point scale based on their experiences with somatic symptoms within the past month. The scale ranges from *not bothered at all* to *bothered a lot* and example items include, “Back pain”, “Shortness of breath” and “Chest pain.” Items on the PHQ-15 account for more than 90% of patients’ symptom presentation in primary care settings, excluding upper respiratory symptoms ([Kroenke et al., 2002](#)). In the instrument development study, PHQ-15 scores predicted increased health care utilization (i.e., physician visits), disability days, and functional impairment. Patients with high scores on the PHQ-15 have approximately double the amount of outpatient and inpatient medical utilization and twice the annual health care costs than patients with low scores ([Interian, Allen, Gara, Escobar, & as-Martinez, 2006](#)). Other studies have utilized the PHQ-15 in primary care, hospital, and general practice medical settings as well as work settings ([Howard, Howard, & Smyth, 2012](#)) with general, veteran, and older adult populations ([Kroenke, Spitzer, Williams, & Löwe, 2010](#)). Cronbach alpha’s have been reported as higher than 0.75 (e.g., [Interian et al., 2006](#)).

In the current study, we only used nine of the 15 items. Using a subset of items is a very common procedure with this scale ([Jasper, Hiller, Rist, Bailer, & Witthöft, 2012](#)) as often items do not load well together or their frequency of concern is extremely low. For the current study, we conducted an exploratory factor analysis using maximum likelihood estimation and a Promax rotation ([Weston & Gore Jr, 2006](#)) with 12 of the 15 items. We initially excluded, “Menstrual cramps or other problems with your periods (women only), “Fainting spells”, and “Pain or problems during sexual intercourse” given concerns with these items in previous studies ([Jasper et al., 2012](#)). Our goal was to identify common factors while excluding items whose loading did not exceed 0.40 and/or cross-load within 0.10 with multiple factors. We ultimately ending up using nine items, which grouped into three, three-item scales representing stomach problems (Constipation, loose bowels, or diarrhea; Nausea, gas, or indigestion; Stomach pain), fatigue (Feeling tired or having low energy; Trouble sleeping; Back pain) and cardiovascular issues (Feeling your heart pound or race; Chest pain; Shortness of breath). The three items that were not included either did load onto one of the three main factors or had low cross loadings spaced across the three factors (Pain in arms, legs, or joints; Dizziness; Headaches). The estimated internal consistency reliabilities for scores on each of

these three subscales were as follows: stomach issues (0.76), fatigue (0.60), and cardiovascular issues (0.65). Although these final two subscales don't meet the traditional 0.70 threshold for internal consistency reliability, they may be considered acceptable given the subscales are only 3 items (Taber, 2018).

4.2.6. Health behaviors

Participants' engagement in positive health behaviors at Wave 3 was measured with several items from the Food and Physical Activity Questionnaire (FPAQ; Murray et al., 2017). The FPAQ is a questionnaire assessing individuals eating and physical activity habits, which in the current study was assessed based on their behaviors over the previous month. Items from the FPAQ have been used as an evaluative tool in the Expanded Food and Nutrition Education Program (EFNEP), a program run through the United States Department of Agriculture to improve the health behaviors of low-income families. In the current study, participants were presented with the following general item stem "Please mark the response that *best* describes how you *usually* do things over the past month". We used nine items from this questionnaire, six to assess healthy eating and three to assess physical activity. Example items included, "How many times a day do you eat fruit?" and "In the past month, how many days on average per week did you exercise for at least 30 minutes? Only nine items from the questionnaire were chosen as the other 11 items were more concerned with food safety (e.g., How often do you wash your hands with soap and running water before preparing food?), food security (e.g., In the past month, how often did you eat less than you wanted so there was more food for your family?), and food resource management (e.g., "How often do you plan your meals before you shop for groceries"). The possible responses to each item varied, and as such we z-scored the scores on each item to normalize them and combine them together into subscale scores. In the current study, the estimated internal consistency reliabilities for scale scores were as follows: healthy eating (0.77), exercise (0.78).

4.3. Procedure

After receiving IRB approval to conduct the study, data were gathered using the data collection service ResearchMatch (ResearchMatch, RM). RM, a service similar to MTurk, is an online data collection forum where participants are presented with research tasks and volunteer to participate based on interest and qualifications. RM consists of over 100,000 volunteers and has been used in over 750 studies since its inception in 2019. RM is available to researchers to use at no cost if their organization or institution has partnered with the service. The current study was conducted at a large, American university where RM was available for use. An early study by Harris et al. (2012) documented the breadth of RM in terms of population size and diversity as well as how volunteers tended to have positive reactions interfacing with the platform.

An initial sample of 1340 participants completed the first wave of the survey. This same group of participants was sent follow up emails one and two months later after initial survey completion. Within the follow-up email was another link to a survey hosted on Qualtrics which participants had to once again agree to participate in. A total of 1340 participants completed Wave 1, 893 participants completed Wave 2, and 833 participants completed Wave 3. Within each survey we inserted validity check items (e.g. please answer "strongly disagree") as well as an item at the end of the survey asking if participants took it seriously. Participants who failed any of the three validity check items in each survey or answered no to this final question were completely removed from the dataset. Participants were also removed from the dataset who were not employed. This resulted in a total of 1012 participants at Wave 1, 573 at Wave 2, and 543 at Wave 3.

Finally, we decided to make two more amendments to our final sample. First, we only included participants who completed at least two waves of data (i.e., 1 and 2, 1 and 3, all three). This resulted in the removal of 291 participants from Wave 1 who had only completed that wave.

Second, a limitation of ResearchMatch is that it gathers data from individuals higher than average in terms of income and educational attainment. Our data bore this out as 20% of our sample had an annual household income of over \$100,000, making our sample not representative of American working adults nor well in line with some of the main aims of PWT in terms of desired populations. We decided to eliminate this group of respondents ($n = 152$). This resulted in a more even split in our sample, with close to 40% earning under \$50,000 a year and the remaining 60% earning between \$50,000 and \$100,000 a year. According to the U.S. Census, the median household income in 2018 was \$61,937.

We did compare the excluded high-income participants to our included sample on our study's main variables and found that – not surprisingly – those making over \$100,000 a year evidenced higher means on all main constructs. The effect sizes on these differences ranged from small (health behaviors; $t = 2.30$; $d = 0.25$) to medium (survival needs; $t = 5.25$, $d = 0.59$). These differences confirmed our decision to reduce our sample to minimize the relative level of privilege among participants which is linked with the limitations of our data collection platform. Our final sample consisted of 569 participants at Wave 1, 445 at Wave 2, and 429 at Wave 3.

5. Results

5.1. Preliminary analyses

5.1.1. Variable construction

The eventual structural model we sought to test (see Fig. 1) was composed of eleven latent constructs. These latent constructs each had their own observed variables. Six of these latent constructs came from the DWS at Wave 1, as we followed previous studies (Douglass et al., 2017; Duffy et al., 2018; Tokar & Kaut, 2018) and examined decent work using a bi-factor model. Specifically, each of the five DWS subscales were their own latent factors represented by their three respective items. The general factor of decent work was

composed of all 15 DWS items. The paths between the five latent subscales and other model variables were then constrained to zero. This allowed for the examination of how the general factor of decent work predicted work and health outcomes and was consistent with procedures done in previous PWT studies. Survival needs at Wave 2 consisted of the four scale items and workplace fatigue at Wave 2 consisted of total scores from the three subscales of the TDWFI: physical fatigue, mental fatigue, and emotional fatigue. At Wave 3, physical health consisted of two general health items, health symptoms consisted of scores from three subscales from the PHQ-PS (stomach issues, fatigue, cardiovascular issues), and health behaviors consisted of scores from two subscales from the FPAQ (healthy eating and exercise). In total, our model consisted of 29 observed indicators. However, in the structural model we also included employment status (full time/part time) as a covariate.

5.1.2. Data screening

We calculated means for each of the 11 latent constructs to conduct a number of analyses examining the adequacy of our data across various dimensions. First, we assessed for skewness and kurtosis using [Weston and Gore Jr \(2006\)](#) criteria of skewness $> |3|$ or kurtosis values $> |10|$. None of our 11 variables had values that approached either of these thresholds. Second, we examined missing data and whether certain types of participants were more likely to have missing data. We grouped participants by those who had (305) or did not have (264) at least one point of missing data across the three surveys. We assessed for differences between missing data across key demographic groups: gender, racial/ethnic majority/minority status, annual income, and employment status (part-time/full time). No significant differences ($p < .05$) were found with any of these groups, indicating that different types of participants were just as likely to have or not have missing data. These findings suggest it is appropriate to use full information maximum likelihood to impute missing values (FIML; [Singer & Willett, 2003](#); [Tabachnick & Fidell, 2013](#)), which we do in conducting our multivariate analyses. It should be noted that missing data is very common for longitudinal studies both at the item and wave level ([Jeličić, Phelps, & Lerner, 2009](#)), and that recent large-scale simulation studies have shown the multiple imputation for missing data is an effective strategy to address missing data ([Huque, Carlin, Simpson, & Lee, 2018](#))

Third, we conducted identical group difference analyses for participants who completed all three waves of the survey ($n = 305$) versus those who had completed just two waves ($n = 264$). Here again we found no significant differences across group types on these demographic variables, suggesting participants from a variety of demographic groups were just as likely to complete all survey waves. We also found only one significant difference between the groups on our main study variables which was work fatigue ($t = 2.10, d = 0.21$), with those who completed two wave having higher fatigue. In sum, these data screening findings made us feel confident about conducting our primary model tests without any data modifications.

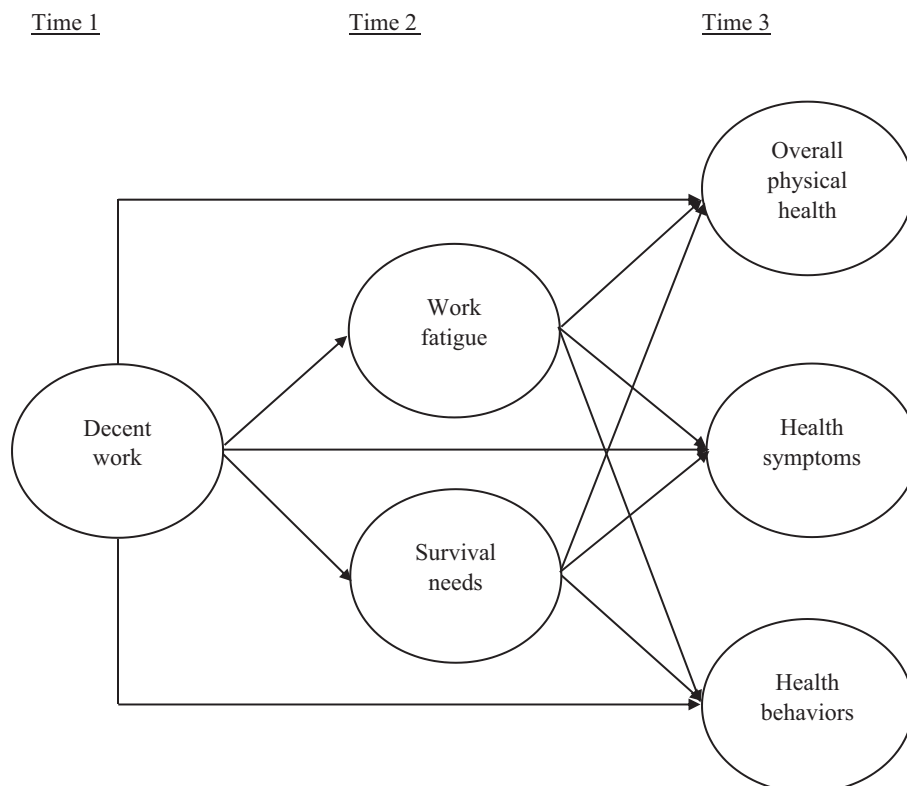


Fig. 1. Hypothesized structural model.

5.2. Model Testing

5.2.1. Measurement model and descriptive statistics

We used MPlus 8.0 to conduct all our larger model tests. The comparative fit index (CFI) and the root mean square error of approximation (RMSEA) were our primary indicators of fit, using the following criteria: CFI > 0.95; RMSEA < 0.08; Hu & Bentler, 1999 (Quintana & Maxwell, 1999; Weston and Gore Jr, 2006). For the measurement model, we had our 29 observed indicators load onto eleven latent constructs and then allowed all eleven latent constructs used in the structural model to correlate with one another. All variables were standardized prior to analyses. The model was a good fit to the data: $\chi^2(348) = 741.16, p < .001$, CFI = 0.96, RMSEA = 0.045. The latent factor correlations and raw means and standard deviations can be seen in Table 1.

5.2.2. Structural model

Next, we tested structural model (See Fig. 1). In this model, like the measurement model, all variables are either correlated or predicted by all other model variables. One addition to this model was the single item of employment status (part time versus full time). We added this as a covariate to control for potential differences across employment status. The model fit was also strong: $\chi^2(371) = 897.94, p < .001$, CFI = 0.95, RMSEA = 0.05. As seen in Fig. 2, decent work had significant, direct effects on general physical health (Hypothesis 1), survival needs (Hypothesis 4), and workplace fatigue (Hypothesis 11). General physical health was predicted by workplace fatigue (Hypothesis 12), health symptoms were predicted by workplace fatigue (Hypothesis 13), and health behaviors was predicted by survival needs (Hypothesis 7). All hypotheses are listed in Table 2. In total, the model predicted 38% of the variance in physical health, 59% of the variance in health symptoms, and 17% of the variance in health behaviors.

5.2.3. Indirect effects

We used this model test for six indirect effects, with decent work related to the three health outcomes as mediated by workplace fatigue and survival needs respectively. We used Shrout and Bolger's (2002) recommendations and generated 1000 bootstrapped samples to generate indirect effects estimates (Table 3). As hypothesized, workplace fatigue mediated the relation of decent work to general physical health (95% CI [0.10, 0.27]; Hypothesis 12) and health symptoms (95% CI -0.25, -0.12]; Hypothesis 13). Also as hypothesized, survival needs mediated the relation of decent work to health behaviors (95% CI [0.01, 0.18]; Hypothesis 9). However, counter to hypotheses, survival needs did not mediate the effects of decent work on physical health or health symptoms and workplace fatigue did not mediate the effect of decent work on health behaviors. Overall, nine of the 17 hypotheses were confirmed (Table 2).

6. Discussion

In the current study, we used time-lagged methodology to examine the degree to which decent work predicted three physical health outcomes, as mediated by survival need satisfaction and workplace fatigue. Hypotheses were partially confirmed and shed light on the potentially nuanced ways that attaining decent work may link with overall physical health, physical health symptoms, and health behaviors. In the following sections, we review these findings by honing in on each of the three health outcomes.

6.1. Overall physical health

We predicted that decent work would directly link to physical health and also be mediated by workplace fatigue and survival needs. Hypotheses were partially supported, as survival need satisfaction was unrelated to physical health in the full model and thus did not mediate the decent work-physical health relation. This finding is counter to the Duffy, Kim, et al. (2019) study and suggests that the connection between decent work and general physical health may have more to do with workplace fatigue and less with meeting needs for survival.

In our study, workplace fatigue concerned individuals' experiences of mental, physical, and emotional exhaustion due to experiences in the workplace whereas survival need satisfaction concerned how well one's job allowed an individual to meet their needs. Considering our study was only over 2 months, it may be that - corresponding with previous research (Kim et al., 2011; Maslach, 2001) - the emotional toll from exhaustion has a greater immediate effect on overall health compared to the potentially longer-term effects that may result from not meeting survival needs. To put it another way, decent work strongly related to both fatigue and need fulfillment. If individuals in our study were unable to secure decent work, they were much more likely to be exhausted from work and

Table 1
Latent Factor Correlations of Variables at Three Time Points (N = 569).

	1	2	3	4	5	6
1. Decent work T1	–					
2. Survival needs T2	0.60	–				
3. Workplace fatigue T2	–0.53	–0.31	–			
4. Physical health T3	0.52	0.40	–0.54	–		
5. Health symptoms T3	–0.57	–0.44	0.71	–0.77	–	
6. Health behaviors T3	0.33	0.37	–0.25	0.67	–0.36	–

Note. All correlations significant at the $p < .01$ level.

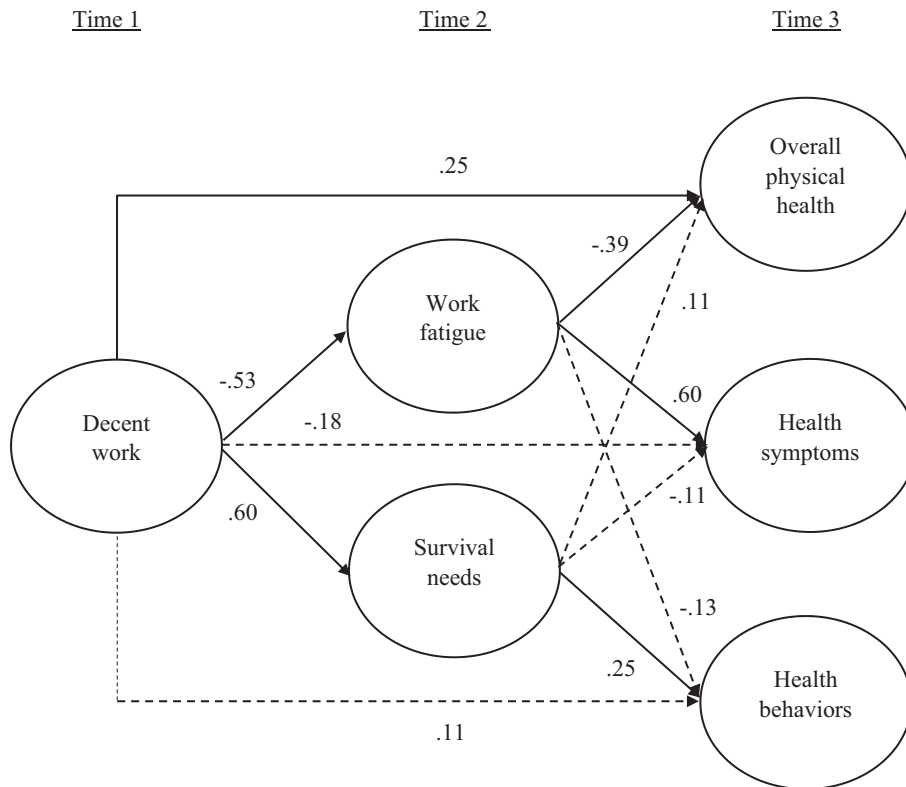


Fig. 2. Final structural model. Dashed lines equal non-significant paths. Employment status (full versus part time) controlled for. The three health outcomes were correlated.

Table 2
Hypothesis testing from structural model.

Hypothesized path	Support?
1. Decent work → Physical health	Supported
2. Decent work → Health symptoms	Unsupported
3. Decent work → Health behaviors	Unsupported
4. Decent work → Survival needs	Supported
5. Survival needs → Physical health	Unsupported
6. Survival needs → Health symptoms	Unsupported
7. Survival needs → Health behaviors	Supported
8. Decent work → Survival needs → Physical health	Unsupported
9. Decent work → Survival needs → Health symptoms	Unsupported
10. Decent work → Survival needs → Health behaviors	Supported
11. Decent work → Workplace fatigue	Supported
12. Workplace fatigue → Physical health	Supported
13. Workplace fatigue → Health symptoms	Supported
14. Workplace fatigue → Health behaviors	Unsupported
15. Decent work → Workplace fatigue → Physical health	Supported
16. Decent work → Workplace fatigue → Health symptoms	Supported
17. Decent work → Workplace fatigue → Health behaviors	Unsupported

feel their survival needs were not being met. However, it was how these two variables related to physical health where key differences existed, with fatigue being the sole significant predictor. It will be important for future studies to examine the longer-term effects of having or not having one’s survival needs met on overall health.

6.2. Health symptoms

Decent work was hypothesized to predict health symptoms, and it was expected that both workplace fatigue and survival needs would mediate this relation. Our findings partially supported these hypotheses. In our study physical health symptoms were measured by individuals’ experiences of somatic symptoms, including, but not limited to, back pain, shortness of breath, and chest pain. Similar

Table 3
Test of unique indirect relations (N = 569).

Predictor	Mediator	Criterion	Indirect relation		95% CI of indirect relation	
			B	SE	Lower bound	Upper bound
Decent work	Workplace fatigue*	Physical health	0.19	0.04	0.11	0.27
Decent work	Workplace fatigue*	Health symptoms	-0.19	0.03	-0.25	-0.12
Decent work	Workplace fatigue	Health behaviors	0.04	0.03	-0.01	0.10
Decent work	Survival needs	Physical health	0.06	0.04	-0.03	0.14
Decent work	Survival needs	Health symptoms	-0.04	0.03	-0.10	0.02
Decent work	Survival needs*	Health behaviors	0.10	0.04	0.01	0.18

* $p < .05$.

to the pattern of relations between the predictors and overall health, workplace fatigue was found to significantly, strongly predict physical health symptoms whereas survival needs was a nonsignificant predictor. That is, the presence of negative physical health symptoms such as stomach problems and cardiovascular issues was more likely when individuals felt fatigued from work. Also contrary to the study hypotheses, decent work was not found to directly predict health symptoms.

Two parts of these findings are worth further discussion. First, the effect size differences for fatigue and survival needs are similar to the effect size differences in predicting general physical health. It may be that, like these links, fatigue may have more immediate effects on physical health symptoms whereas limited survival needs may be more long term. Second, the non-significant direct effect of decent work on health symptoms indicates this relation was fully mediated. Although one cannot infer causality from the present study's results, the findings suggest that decent work relates to physical health symptoms because of its positive or negative effects on workplace fatigue. This is consistent with previous literature and theory which have positioned aspects of workplace fatigue as the primary factor connecting workplace experiences and health (Sluiter et al., 2003). Considering how workplace fatigue functioned as a strong mediator for both general physical health and health symptoms, it may be important to consider within PWT as a whole. Namely, fatigue may be more important than survival needs in explaining the link of decent work to overall health and health symptoms, and it may be important to merge this variable into future PWT model tests with physical health as an outcome.

6.3. Health behaviors

Our results partially supported our hypotheses related to health behaviors, as survival needs significantly predicted health behaviors and mediated the relation of decent work to health behaviors. Contrary to the hypotheses, however, neither decent work nor workplace fatigue significantly predicted health behaviors. Previous literature has demonstrated that workplace fatigue predicts health behaviors such as healthy eating and physical activity (Ahola et al., 2012; Alexandrova-Karamanova et al., 2016; Padilla, Wilson, Vandenberg, Davis, & Clark, 2019) and that workplace fatigue mediates the relation of workplace factors to health (Bao & Zhong, 2019), yet the present study's findings are inconsistent with this literature. Studies examining workplace fatigue have tended to include only one possible predictor of health behaviors and behavior-related health risks. Thus, when other possible predictors of health behaviors are included in a model, it may be that fatigue becomes non-significant in comparison to other variables.

By contrast, one can imagine that survival needs, such as access to housing, health care, and safe and nutritious food, provide the means through which to engage in health-promoting behaviors such as healthy eating and physical activity. Indeed, food sufficiency, shelter, access to health care, and income have all been found to relate to health behaviors (Desmond & Kimbro, 2015). Other studies have demonstrated the relation of neighborhood characteristics, such as neighborhood safety, to engagement in physical activity (Laraia, Messer, Evenson, & Kaufman, 2007; Lawman & Wilson, 2012; Singh, Kogan, Siahpush, & Van Dyck, 2008), suggesting that characteristics related to and resultant of survival needs, including one's ability to afford housing in a safe area, also influence health behaviors. For instance, the ability to walk in one's neighborhood safely as a form of exercise illustrates the potential link between survival needs being met and the engagement in healthy behaviors. Like health symptoms, the decent work to health behaviors link was fully mediated, in this case by only survival needs. This suggests that the primary reason individuals engaging in decent work were more likely to engage in health behaviors was because of their survival needs being met.

7. Summary

In sum, the results of this short term, three-wave study provide added clarity concerning the nuanced links between access to decent work and physical health. When it comes to overall health and health symptoms, workplace fatigue appears to be the main connecting variable. Although causality cannot be inferred, it may be that individuals working in jobs considered decent are less likely to suffer workplace fatigue, and in turn, are more generally healthy with less negative health symptoms. When it comes to healthy habits, such as diet and exercise, survival need satisfaction appears to be a more salient connector. Meeting one's survival needs via work may help an individual have the time, and live in the type of environment, that more allows for access to a healthy lifestyle. From a theoretical perspective, the findings showcase the importance of incorporating workplace fatigue, in addition to need fulfillment, when documenting decent work's possible impact on physical health.

7.1. Practical implications

The current findings strengthen the evidence regarding the direct and indirect associations between decent work and physical health for working adults (Duffy, Kim, et al., 2019). Thus, these findings suggest the significance of attending to work conditions in health settings (e.g., primary care settings) and to physical health in vocational settings (e.g., workplace employee assistance programs). Given that 58% of the variance in health symptoms and 38% of overall physical health were accounted for in this PWT model, psychologists working in health settings could improve holistic patient care by incorporating questions about patients' access to decent work, survival needs, and work fatigue in assessments of patients' well-being.

Moreover, the critical role of work fatigue in the relation between decent work with overall physical health and health symptoms suggests the value in accounting for the contextual factors embodied in decent work (e.g., safety, organizational values, access to healthcare) when designing workplace interventions aimed at increasing employees' vigor. Similarly, interventions aimed at improving health behaviors may be enhanced by considering the quality of workplace conditions and the opportunity for the fulfillment of survival needs through work. Rather than only focusing on intrapersonal factors as they predict employee physical health, the current findings point to the need to account for workplace structures within which employees are embedded.

7.2. Limitations and future directions

The findings of the current study should be considered in light of its limitations. First, findings are based on self-report data from ResearchMatch participants and may not be generalizable to all working-age adults. More specifically, it is noteworthy that the majority of the sample identified as white, as female, with a college degree, and as a full time employee. Although we adjusted the income levels represented by this sample to be more consistent with the median American income level, the generalizability of findings related to survival needs in particular warrants replication with samples representing more diverse gender identities, racial compositions, work status, and educational levels.

Moreover, the use of self-report measures alone may result in mono-method bias (Heppner, Wampold, Owen, Wang, & Thompson, 2015). Relatedly, the internal consistencies for health symptoms and behaviors were lower relative to other measures in the current study and to what has been reported elsewhere (e.g., Interian et al., 2006). Given the wide range of conceptualizations of health and health behaviors, future research capturing both subjective and objective health markers could be beneficial. Additionally, we did not attend to how cross-lagged effects may vary based on intersectional demographic differences in gender, race, work status, educational background, or social class. Future research utilizing larger sample sizes could better examine how demographic differences, and in particular intersecting identities, may relate to any within-group variations in decent work, work fatigue, survival needs, and health outcomes.

Another key limitation and future direction center on the five decent work subscales. In the current study, we were interested in the general decent work factor. However, it may be that some components of decent work are more predictive of health outcomes than others. For exploration purposes, we did examine the relations of the five subscales and outcomes, using the correlational model we tested when deciding which structure of the Decent Work Scale was most appropriate. Here, all five subscales significantly correlated with survival needs, workplace fatigue, physical health, and health symptoms, and three of the five subscales significantly correlated with health behaviors. There do appear to be some differences in effect sizes, where for example safe working conditions related more strongly to fatigue in comparison to access to healthcare and free time and rest was a more robust correlate of health symptoms than the other factors. However, it is difficult to draw any large conclusions until research is completed for the specific purposes of exploring differences among the subscales.

Finally, as noted in the introduction, this was a three-wave study but still tested a mediation model with unique variables at each time point. In this way we were able to address for limitations in common method bias, but we still cannot determine causality. This is a very key limitation. For example, it may be that people who are more physical healthy over time are more likely to access decent work. Or, if the model was able to account for all variables it may be the degree to which certain variables mediate one another changes, is strengthened, or is diminished. Recently researchers have recommended gathering all variables at each time point and novel methods have begun being used to test longitudinal mediation models with all variables included (Hamaker et al., 2015; Mulder & Hamaker, 2020). However, these models are complex and challenging to execute when including multiple mediators and multiple outcomes. Nevertheless, as longitudinal research continues with PWT, it will be important to incorporate these cutting-edge methods to better determine variable causality.

CRedit authorship contribution statement

Ryan D. Duffy: Conceptualization, Formal analysis, Writing – review & editing, Project administration. **Carla G. Prieto:** Conceptualization, Writing – review & editing. **Haram J. Kim:** Writing – review & editing. **Trish L. Raque-Bogdan:** Conceptualization, Writing – review & editing. **Nicole O. Duffy:** Conceptualization, Writing – review & editing.

Declaration of competing interest

The authors report no conflict of interest for the publication.

References

- Ahola, K., Pulkki-Råback, L., Kouvonen, A., Rossi, H., Aromaa, A., & Lönnqvist, J. (2012). Burnout and behavior-related health risk factors: Results from the population-based Finnish health 2000 study. *J. Occup. Environ. Med.*, *54*(1), 17–22. <https://doi.org/10.1097/JOM.0b013e31823ea9d9>.
- Ahola, K., Väänänen, A., Koskinen, A., Kouvonen, A., & Shirom, A. (2010). Burnout as a predictor of all-cause mortality among industrial employees: A 10-year prospective register-linkage study. *J. Psychosom. Res.*, *69*(1), 51–57. <https://doi.org/10.1016/j.jpsychores.2010.01.002>.
- Åkerstedt, T., Fredlund, P., Gillberg, M., & Jansson, B. (2002). Work load and work hours in relation to disturbed sleep and fatigue in a large representative sample. *J. Psychosom. Res.*, *53*(1), 585–588. [https://doi.org/10.1016/s0022-3999\(02\)00447-6](https://doi.org/10.1016/s0022-3999(02)00447-6).
- Alexandrova-Karamanova, A., Todorova, I., Montgomery, A., Panagopoulou, E., Costa, P., Baban, A., ... Mijakoski, D. (2016). Burnout and health behaviors in health professionals from seven European countries. *Int. Arch. Occup. Environ. Health*, *89*(7), 1059–1075. <https://doi.org/10.1007/s00420-016-1143-5>.
- Apostolopoulos, Y., Sönmez, S., Shattell, M. M., Gonzales, C., & Fehrenbacher, C. (2013). Health survey of US long-haul truck drivers: Work environment, physical health, and healthcare access. *Work*, *46*(1), 113–123. <https://doi.org/10.3233/wor-121553>.
- Atkinson, G., Fulllick, S., Grindey, C., & Maclaren, D. (2008). Exercise, energy balance and the shift worker. *Sports Med.*, *38*(8), 671–685. <https://doi.org/10.2165/00007256-200838080-00005>.
- Autin, K. L., & Allan, B. A. (2020). Socioeconomic privilege and meaningful work: A psychology of working perspective. *Journal of Career Assessment*, *28*, 241–256. <https://doi.org/10.1177/1069072719856307>.
- Autin, K. L., Duffy, R. D., Blustein, D. L., Gensmer, N. P., Douglass, R. P., England, J. W., & Allan, B. A. (2019). The development and initial validation of need satisfaction scales within the psychology of working theory. *J. Couns. Psychol.*, *66*(2), 195–209. <https://doi.org/10.1037/cou0000323>.
- Bakker, A. B., & de Vries, J. D. (2020). Job demands-resources theory and self-regulation: New explanations and remedies for job burnout. *Anxiety Stress Coping*, 1–21.
- Bakker, A. B., Demerouti, E., & Dollard, M. F. (2008). How job demands affect partners' experience of exhaustion: Integrating work-family conflict and crossover theory. *J. Appl. Psychol.*, *93*(4), 901. <https://doi.org/10.1037/0021-9010.93.4.901>.
- Bao, Y., & Zhong, W. (2019). How stress hinders health among Chinese public sector employees: The mediating role of emotional exhaustion and the moderating role of perceived organizational support. *Int. J. Environ. Res. Public Health*, *16*(22), 4408. <https://doi.org/10.3390/ijerph16224408>.
- Blustein, D. L. (2006). *The psychology of working: A new perspective for career development, counseling, and public policy*. NY: Routledge.
- Blustein, D. L., Olle, C., Connors-Kellgren, A., & Diamonti, A. J. (2016). Decent work: A psychological perspective. *Front. Psychol.*, *7*, 1–10. <https://doi.org/10.3389/fpsyg.2016.00407>.
- Bültmann, U., Kant, I., Kasl, S. V., Beurskens, A. J., & van den Brandt, P. A. (2002). Fatigue and psychological distress in the working population: Psychometrics, prevalence, and correlates. *J. Psychosom. Res.*, *52*(6), 445–452.
- Bültmann, U., Kant, I., van Amelsvoort, L. G., van den Brandt, P. A., & Kasl, S. V. (2001). Differences in fatigue and psychological distress across occupations: Results from the Maastricht cohort study of fatigue at work. *J. Occup. Environ. Med.*, *43*(11), 976–983. <https://doi.org/10.1097/00043764-200111000-00008>.
- Burdorf, A., & Jansen, J. P. (2006). Predicting the long term course of low back pain and its consequences for sickness absence and associated work disability. *Occup. Environ. Med.*, *63*, 522–529. <https://doi.org/10.1136/oem.2005.019745>.
- Burgard, S. A., Seefeldt, K. S., & Zelner, S. (2012). Housing instability and health: Findings from the Michigan recession and recovery study. *Soc. Sci. Med.*, *75*(12), 2215–2224. <https://doi.org/10.1016/j.socscimed.2012.08.020>.
- Centers for Disease Control and Prevention. (2016). *Workplace health model*. Atlanta, GA: Centers for Disease Control and Prevention. <https://www.cdc.gov/workplacehealthpromotion/model/index.html>.
- de Croon, E. M., Sluiter, J. K., & Frings-Dresen, M. H. (2003). Need for recovery after work predicts sickness absence: A 2-year prospective cohort study in truck drivers. *J. Psychosom. Res.*, *55*(4), 331–339. [https://doi.org/10.1016/s0022-3999\(02\)00630-x](https://doi.org/10.1016/s0022-3999(02)00630-x).
- Deci, E. L., Olafsen, A. H., & Ryan, R. M. (2017). Self-determination theory in work organizations: The state of a science. *Annu. Rev. Organ. Psych. Organ. Behav.*, *4*(1), 19–43. <https://doi.org/10.1146/annurev-orgpsych-032516-113108>.
- Demerouti, E., Bakker, A. B., Nachreiner, F., & Schaufeli, W. B. (2001). The job demands–resources model of burnout. *J. Appl. Psychol.*, *86*(3), 499–512. <https://doi.org/10.1037/0021-9010.86.3.499>.
- Desmond, M., & Kimbro, R. T. (2015). Eviction's fallout: Housing, hardship, and health. *Social Forces*, *94*(1), 295–324. <https://doi.org/10.1093/sf/sov044>.
- Devine, C. M., Farrell, T. J., Blake, C. E., Jastran, M., Wethington, E., & Bisogni, C. A. (2009). Work conditions and the food choice coping strategies of employed parents. *J. Nutr. Educ. Behav.*, *41*(5), 365–370. <https://doi.org/10.1016/j.jneb.2009.01.007>.
- Dich, N., Lund, R., Hansen, Å. M., & Rod, N. H. (2019). Mental and physical health effects of meaningful work and rewarding family responsibilities. *PLoS One*, *14*(4), Article e0214916. <https://doi.org/10.1371/journal.pone.0214916>.
- Dorman, C., & Griffin, M. A. (2015). Optimal time lags in panel studies. *Psychol. Methods*, *20*, 487–505. <https://doi.org/10.1037/met0000041>.
- Douglass, R. P., Velez, B. L., Conlin, S. E., Duffy, R. D., & England, J. W. (2017). Examining the psychology of working theory: Decent work among sexual minorities. *J. Couns. Psychol.*, *64*(5), 550–559. <https://doi.org/10.1037/cou0000212>.
- Duffy, R. D., Allan, B. A., England, J. W., Blustein, D. L., Autin, K. L., Douglass, R. P., ... Santos, E. J. R. (2017). The development and initial validation of the Decent Work Scale. *J. Couns. Psychol.*, *64*(2), 206–221. <https://doi.org/10.1037/cou0000191>.
- Duffy, R. D., Blustein, D. L., Diemer, M. A., & Autin, K. L. (2016). The psychology of working theory. *J. Couns. Psychol.*, *63*(2), 127–148. <https://doi.org/10.1037/cou0000140>.
- Duffy, R. D., Blustein, D. L., Allan, B. A., Diemer, M. A., & Cinamon, R. G. (2020). Introduction to the special issue: A cross-cultural exploration of decent work. *J. Vocat. Behav.*, *116*, Article 103351.
- Duffy, R. D., Gensmer, N., Allan, B. A., Kim, H. J., Douglass, R. P., England, J. W., ... Blustein, D. L. (2019). Developing, validating, and testing improved measures within the psychology of working theory. *J. Vocat. Behav.*, *112*, 199–215. <https://doi.org/10.1016/j.jvb.2019.02.012>.
- Duffy, R. D., Kim, H. J., Allan, B. A., & Prieto, C. (2020). Predictors of decent work across time: Testing propositions from psychology of working theory. *J. Vocat. Behav.*, *123*, 103507. <https://doi.org/10.1016/j.jvb.2020.103507>.
- Duffy, R. D., Kim, H. J., Gensmer, N. P., Raque-Bogdan, T. L., Douglass, R. P., England, J. W., & Buyukgoze-Kavas, A. (2019). Linking decent work with physical and mental health: A psychology of working perspective. *J. Vocat. Behav.*, *112*, 384–395. <https://doi.org/10.1016/j.jvb.2019.05.002>.
- Duffy, R. D., Velez, B. L., England, J. W., Autin, K. L., Douglass, R. P., Allan, B. A., & Blustein, D. L. (2018). An examination of the psychology of working theory with racially and ethnically diverse employed adults. *J. Couns. Psychol.*, *65*, 280–293. <https://doi.org/10.1037/cou0000247>.
- England, J. W., Duffy, R. D., Gensmer, N. P., Kim, H. J., Buyukgoze-Kavas, A., & Larson-Konar, D. M. (2020). Women attaining decent work: The role of workplace climate in psychology of working theory. *J. Couns. Psychol.*, *67*, 251–264. <https://doi.org/10.1037/cou0000411251>.
- Ettner, S. (2001). Workers' perceptions of how jobs affect health: A social ecological perspective. *J. Occup. Health Psychol.*, *6*(2), 101–113. <https://doi.org/10.1037/1076-8998.6.2.101>.
- Frone, M. R. (2007). Obesity and absenteeism among U.S. workers: Do physical health and mental health explain the relation? *J. Work. Behav. Health*, *22*(4), 65–79. <https://doi.org/10.1080/15555240802157403>.
- Frone, M. R. (2018). What happened to the employed during the Great Recession? A U.S. population study of net change in employee insecurity, health, and organizational commitment. *J. Vocat. Behav.*, *107*, 246–260. <https://doi.org/10.1016/j.jvb.2018.05.001>.
- Frone, M. R., & Tidwell, M. C. O. (2015). The meaning and measurement of work fatigue: Development and evaluation of the three-dimensional work fatigue inventory (3D-WFI). *J. Occup. Health Psychol.*, *20*, 273–288.
- Garrick, A., Mak, A. S., Cathcart, S., Winwood, P. C., Bakker, A. B., & Lushington, K. (2014). Psychosocial safety climate moderating the effects of daily job demands and recovery on fatigue and work engagement. *J. Occup. Organ. Psychol.*, *87*(4), 694–714.
- Geliebter, A., Gluck, M. E., Tanowitz, M., Aronoff, N. J., & Zammit, G. K. (2000). Work-shift period and weight change. *Nutrition*, *16*(1), 27–29. [https://doi.org/10.1016/S0899-9007\(99\)00228-2](https://doi.org/10.1016/S0899-9007(99)00228-2).

- Grzywacz, J. G., & Dooley, D. (2003). "Good jobs" to "bad jobs": Replicated evidence of an employment continuum from two large surveys. *Soc. Sci. Med.*, 56(8), 1749–1760. [https://doi.org/10.1016/s0277-9536\(02\)00170-3](https://doi.org/10.1016/s0277-9536(02)00170-3).
- Häkkinen, M., Viikari-Juntura, E., & Martikainen, R. (2001). Job experience, work load, and risk of musculoskeletal disorders. *Occup. Environ. Med.*, 58(2), 129–135. <https://doi.org/10.1136/oem.58.2.129>.
- Hamaker, E. L., Kuiper, R. M., & Grasman, R. P. (2015). A critique of the cross-lagged panel model. *Psychol. Methods*, 20(1), 102–116. <https://doi.org/10.1037/a0038889>.
- Harris, P. A., Scott, K. W., Lebo, L., Hassan, N., Lighter, C., & Pulley, J. (2012). ResearchMatch: A national registry to recruit volunteers for clinical research. *Academic Medicine: Journal of the Association of American Medical Colleges*, 87, 66. <https://doi.org/10.1097/acm.0b013e31823ab7d2>.
- Hays, R. D., Spritzer, K. L., Thompson, W. W., & Cella, D. (2015). U.S. general population estimate for "excellent" to "poor" self-rated health item. *J. Gen. Intern. Med.*, 30, 1511–1516. <https://doi.org/10.1007/s11606-015-3290-x>.
- Hellerstedt, W. L., & Jeffery, R. W. (1997). The association of job strain and health behaviours in men and women. *Int. J. Epidemiol.*, 26(3), 575–583. <https://doi.org/10.1093/ije/26.3.575>.
- Heppner, P. P., Wampold, B. E., Owen, J., Wang, K. T., & Thompson, M. N. (2015). *Research designs in counseling* (4th ed.). Boston, MA: Cengage Learning.
- Hoobler, J. M., Rospenda, K. M., Lemmon, G., & Rosa, J. A. (2010). A within-subject longitudinal study of the effects of positive job experiences and generalized workplace harassment on well-being. *J. Occup. Health Psychol.*, 15(4), 434. <https://doi.org/10.1037/a0021000>.
- Hoogendoorn, W. E., Bongers, P. M., De Vet, H. C., Houtman, I. L., Ariens, G. A., Van Mechelen, W., & Bouter, L. M. (2001). Psychosocial work characteristics and psychological strain in relation to low-back pain. *Scand. J. Work Environ. Health*, 27(4), 258–267. <https://doi.org/10.5271/sjweh.613>.
- Howard, K. J., Howard, J. T., & Smyth, A. F. (2012). The problem of absenteeism and presenteeism in the workplace. In R. J. Gatchel, & Z. I. Schultz (Eds.), *Handbook of occupational health and wellness* (pp. 151–179). New York: Springer Science + Business Media.
- Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, 6(1), 1–55. <https://doi.org/10.1080/10705519909540118>.
- Huque, M. H., Carlin, J. B., Simpson, J. A., & Lee, K. J. (2018). A comparison of multiple imputation methods for missing data in longitudinal studies. *BMC Med. Res. Methodol.*, 18(1), 168.
- Interian, A., Allen, L. A., Gara, M. A., Escobar, J. I., & as-Martinez, A. M. (2006). Somatic complaints in primary care: Further examining the validity of the patient health questionnaire (PHQ-15). *Psychosomatics*, 47, 392–398. <https://doi.org/10.1176/appi.psy.47.5.392>.
- International Labor Organization. (2020). Decent work. <https://www.ilo.org/global/topics/decent-work/lang-en/index.htm>.
- Jasper, F., Hiller, W., Rist, F., Bailer, J., & Withhöft, M. (2012). Somatic symptom reporting has a dimensional latent structure: Results from taxometric analyses. *J. Abnorm. Psychol.*, 121, 725–738. <https://doi.org/10.1037/a0028407>.
- Jelčić, H., Phelps, E., & Lerner, R. M. (2009). Use of missing data methods in longitudinal studies: The persistence of bad practices in developmental psychology. *Dev. Psychol.*, 45(4), 1195–1199. <https://doi.org/10.1037/a0015665>.
- Kawachi, I., & Berkman, L. (2000). Social cohesion, social capital, and health. *Social Epidemiology*, 17(7), 290–319. <https://doi.org/10.1093/med/9780195377903.003.0008>.
- Kim, T., & Allan, B. A. (2019). Underemployment and meaningful work: The role of psychological needs. *J. Career Assess.*, 28, 76–90. <https://doi.org/10.1177/1069072718824004>.
- Kim, H., Ji, J., & Kao, D. (2011). Burnout and physical health among social workers: A three-year longitudinal study. *Soc. Work*, 56(3), 258–268. <https://doi.org/10.1093/sw/56.3.258>.
- Kouvonen, A., Kivimäki, M., Cox, S. J., Cox, T., & Vahtera, J. (2005). Relationship between work stress and body mass index among 45,810 female and male employees. *Psychosom. Med.*, 67(4), 577–583. <https://doi.org/10.1097/01.psy.0000170330.08704.62>.
- Kroenke, K., Spitzer, R., & Williams, J. B. W. (2002). The PHQ-15: Validity of a new measure for evaluating the severity of somatic symptoms. *Psychosom. Med.*, 64(2), 258–266. <https://doi.org/10.1097/00006842-200203000-00008>.
- Kroenke, K., Spitzer, R., Williams, J. B. W., & Löwe, B. (2010). The patient health questionnaire somatic, anxiety, and depressive symptom scales: A systematic review. *Gen. Hosp. Psychiatry*, 32, 345–359. <https://doi.org/10.1016/j.genhosppsych.2010.03.006>.
- Laraia, B., Messer, L., Evenson, K., & Kaufman, J. S. (2007). Neighborhood factors associated with physical activity and adequacy of weight gain during pregnancy. *J. Urban Health*, 84(6), 793–806. <https://doi.org/10.1007/s11524-007-9217-z>.
- Lawman, H. G., & Wilson, D. K. (2012). A review of family and environmental correlates of health behaviors in high-risk youth. *Obesity*, 20(6), 1142–1157. <https://doi.org/10.1038/oby.2011.376>.
- Leitjen, F. R. M., Sweene, G. H., van der Beck, A. M., Fekke Yberma, J., Robrock, S. J. W., & Burdorf, A. (2015). Associations of work-related factors and work engagement with mental and physical health: A 1-year follow up study among older workers. *J. Occup. Rehabil.*, 25, 86–95. <https://doi.org/10.1007/s10926-014-9525-6>.
- Magee, C. A., Stefanic, N., Caputi, P., & Iverson, D. C. (2012). The association between job demands/control and health in employed parents: The mediating role of work-to-family interference and enhancement. *J. Occup. Health Psychol.*, 17(2), 196. <https://doi.org/10.1037/a0027050>.
- Maslach, C. (2001). What have we learned about burnout and health? *Psychol. Health*, 16(5), 607–611. <https://doi.org/10.1080/08870440108405530>.
- Mausner-Dorsch, H., & Eaton, W. W. (2000). Psychosocial work environment and depression: Epidemiologic assessment of the demand-control model. *Am. J. Public Health*, 90(11), 1765. <https://doi.org/10.2105/AJPH.90.11.1765>.
- Mazzola, J. J., Moore, J. T., & Alexander, K. (2017). Is work keeping us from acting healthy? How workplace barriers and facilitators impact nutrition and exercise behaviors. *Stress. Health*, 33(5), 479–489. <https://doi.org/10.1002/smi.2731>.
- Meijman, T. F., & Mulder, G. (2013). Psychological aspects of workload. In *A handbook of work and organizational psychology* (pp. 15–44). Psychology Press. <https://doi.org/10.4324/9780203765449>.
- Melchior, M., Berkman, L. F., Niedhammer, I., Chea, M., & Goldberg, M. (2003). Social relations and self-reported health: A prospective analysis of the French Gazel cohort. *Soc. Sci. Med.*, 56(8), 1817–1830. [https://doi.org/10.1016/s0277-9536\(02\)00181-8](https://doi.org/10.1016/s0277-9536(02)00181-8).
- Mulder, J. D., & Hamaker, E. L. (2020). Three extensions of the random intercept cross-lagged panel model. *Struct. Equ. Model.* <https://doi.org/10.1080/10705511.2020.1784738>.
- Murray, E. K., Auld, G., Baker, S. S., Barale, K., Franck, K., Khan, T., Palmer-Keenan, D., & Walsh, J. (2017). Methodology for developing a new EFNEP food and physical activity behaviors questionnaire. *J. Nutr. Educ. Behav.*, 49(9), 777–783.E1. <https://doi.org/10.1016/j.jneb.2017.05.341>.
- Näswall, K., Sverke, M., & Göransson, S. (2014). Is work affecting my health? Appraisals of how work affects health as a mediator in the relationship between working conditions and work-related attitudes. *Work Stress*, 28, 342–361. <https://doi.org/10.1080/02678377.2014.959092>.
- Niedhammer, I., Goldberg, M., Leclerc, A., Bugel, I., & David, S. (1998). Psychosocial factors at work and subsequent depressive symptoms in the Gazel cohort. *Scand. J. Work Environ. Health*, 24(3), 197–205. <https://doi.org/10.5271/sjweh.299>.
- Nomaguchi, K. M., & Bianchi, S. M. (2004). Exercise time: Gender differences in the effects of marriage, parenthood, and employment. *J. Marriage Fam.*, 66(2), 413–430. <https://doi.org/10.1111/j.1741-3737.2004.00029.x>.
- Olafsen, A. H., Niemiec, C. P., Halvari, H., Deci, E. L., & Williams, G. C. (2017). On the dark side of work: A longitudinal analysis using self-determination theory. *European Journal of Work and Organizational Psychology*, 26, 275–285. <https://doi.org/10.1080/1359432X.2016.1257611>.
- Padilla, H. M., Wilson, M., Vandenberg, R. J., Davis, M., & Clark, M. A. (2019). Health behavior among working adults: Workload and exhaustion are associated with nutrition and physical activity behaviors that lead to weight gain. *J. Health Psychol.*, 1–13. <https://doi.org/10.1177/1359105319851205>.
- Parent-Thirion, A., Fernández Macías, E., Hurley, J., & Vermeylen, G. (2007). *Fourth European survey on working conditions*. Dublin: European Foundation for the Improvement of Living Standards.
- Pavalko, E. K., Mossakowski, K. N., & Hamilton, V. J. (2003). Does perceived discrimination affect health? Longitudinal relationships between work discrimination and women's physical and emotional health. *J. Health Soc. Behav.*, 44(1), 18–33. <https://doi.org/10.2307/1519813>.

- Pohling, R., Buruck, G., Jungbauer, K. L., & Leiter, M. P. (2016). Work-related factors of presenteeism: The mediating role of mental and physical health. *J. Occup. Health Psychol.*, 21(2), 220. <https://doi.org/10.1037/a0039670>.
- Popkin, B. M., & Gordon-Larsen, P. (2004). The nutrition transition: Worldwide obesity dynamics and their determinants. *Int. J. Obes.*, 28(3), S2–S9. <https://doi.org/10.1038/sj.ijo.0802804>.
- Preckel, D., Von Känel, R., Kudielka, B. M., & Fischer, J. E. (2005). Overcommitment to work is associated with vital exhaustion. *Int. Arch. Occup. Environ. Health*, 78(2), 117–122. <https://doi.org/10.1007/s00420-004-0572-8>.
- Quintana, S. M., & Maxwell, S. E. (1999). Implications of recent developments in structural equation modeling for counseling psychology. *Couns. Psychol.*, 27, 485–527.
- Robaina, K. A., & Martin, K. S. (2013). Food insecurity, poor diet quality, and obesity among food pantry participants in Hartford, CT. *J. Nutr. Educ. Behav.*, 45(2), 159–164. <https://doi.org/10.1016/j.jneb.2012.07.001>.
- Salvagioni, D. A. J., Melanda, F. N., Mesas, A. E., González, A. D., Gabani, F. L., & Andrade, S. M. D. (2017). Physical, psychological and occupational consequences of job burnout: A systematic review of prospective studies. *PLoS One*, 12(10), Article e0185781. <https://doi.org/10.1371/journal.pone.0185781>.
- Schrijvers, C. T., van de Mheen, H. D., Stronks, K., & Mackenbach, J. P. (1998). Socioeconomic inequalities in health in the working population: The contribution of working conditions. *Int. J. Epidemiol.*, 27(6), 1011–1018. <https://doi.org/10.1093/ije/27.6.1011>.
- Schulz, A. J., Krieger, J., & Galea, S. (2002). Addressing social determinants of health: Community-based participatory approaches to research and practice. *Health Educ. Behav.*, 29(3), 287–295. <https://doi.org/10.1177/109019810202900302>.
- Seligman, H. K., Laraia, B. A., & Kushel, M. B. (2010). Food insecurity is associated with chronic disease among low-income NHANES participants. *J. Nutr.*, 140(2), 304–310. <https://doi.org/10.3945/jn.109.112573>.
- Semmer, N. K., & Meier, L. L. (2009). Individual differences, work stress and health. *International Handbook of Work and Health Psychology*, 3, 99–122. <https://doi.org/10.1002/9780470682357.ch6>.
- Shrout, P. E., & Bolger, N. (2002). Mediation in experimental and nonexperimental studies: New procedures and recommendations. *Psychol. Methods*, 7, 422. <https://doi.org/10.1037/1082-989X.7.4.422>.
- Siegrist, J., & Rödel, A. (2006). Work stress and health risk behavior. *Scand. J. Work Environ. Health*, 32(6), 473–481. <https://doi.org/10.5271/sjweh.1052>.
- Singer, J. D., & Willett, J. B. (2003). *Applied longitudinal data analysis: Modeling change and event occurrence*. New York, NY: Oxford University Press.
- Singh, G. K., Kogan, M. D., Siahpush, M., & Van Dyck, P. C. (2008). Independent and joint effects of socioeconomic, behavioral, and neighborhood characteristics on physical inactivity and activity levels among US children and adolescents. *J. Community Health*, 33(4), 206–216. <https://doi.org/10.1007/s10900-008-9094-8>.
- Sluiter, J. K., de Croon, E. M., Meijman, T. F., & Frings-Dresen, M. H. W. (2003). Need for recovery from work related fatigue and its role in the development and prediction of subjective health complaints. *Occup. Environ. Med.*, 60(Suppl. 1), i62–i70. https://doi.org/10.1136/oem.60.suppl_1.i62.
- Smith, R. W., Baranik, L. E., & Duffy, R. D. (2020). Psychological ownership within psychology of working theory: A three-wave study of gender and sexual minority employees. *J. Vocat. Behav.*, 118, 103374. <https://doi.org/10.1016/j.jvb.2019.103374>.
- Sparks, K., Cooper, C., Fried, Y., & Shirom, A. (1997). The effects of hours of work on health: A meta-analytic review. *J. Occup. Organ. Psychol.*, 70(4), 391–408. <https://doi.org/10.1111/j.2044-8325.1997.tb00656.x>.
- Spector, P. E. (2019). Do not cross me: Optimizing the use of crosssectional designs. *J. Bus. Psychol.*, 34(2), 125–137. <https://doi.org/10.1007/s10869-018-09613-8>.
- Spurgeon, A., Harrington, J. M., & Cooper, C. L. (1997). Health and safety problems associated with long working hours: A review of the current position. *Occup. Environ. Med.*, 54(6), 367–375. <https://doi.org/10.1136/oem.54.6.367>.
- Suwazono, Y., Dochi, M., Sakata, K., Okubo, Y., Oishi, M., Tanaka, K., ... Nogawa, K. (2008). A longitudinal study on the effect of shift work on weight gain in male Japanese workers. *Obesity*, 16(8), 1887–1893. <https://doi.org/10.1038/oby.2008.298>.
- Tabachnick, B. G., & Fidell, L. S. (2013). *Using multivariate statistics* (6th ed.). Boston, MA: Pearson Education.
- Taber, K. S. (2018). The use of Cronbach's alpha when developing and reporting research instruments in science education. *Res. Sci. Educ.*, 48, 1273–1296. <https://doi.org/10.1007/s11165-016-9602-2>.
- Tokar, D. M., & Kaut, K. P. (2018). Predictors of decent work among workers with Chiari malformation: An empirical test of the psychology of working theory. *J. Vocat. Behav.*, 106, 126–137. <https://doi.org/10.1016/j.jvb.2018.01.002>.
- Toker, S., Shirom, A., Melamed, S., & Armon, G. (2012). Work characteristics as predictors of diabetes incidence among apparently healthy employees. *J. Occup. Health Psychol.*, 17(3), 259. <https://doi.org/10.1037/a0028401>.
- Vozoris, N. T., & Tarasuk, V. S. (2003). Household food insufficiency is associated with poorer health. *J. Nutr.*, 133(1), 120–126. <https://doi.org/10.1093/jn/133.1.120>.
- Wardle, J., Steptoe, A., Oliver, G., & Lipsey, Z. (2000). Stress, dietary restraint and food intake. *J. Psychosom. Res.*, 48(2), 195–202. [https://doi.org/10.1016/S0022-3999\(00\)00076-3](https://doi.org/10.1016/S0022-3999(00)00076-3).
- Weston, R., & Gore, P. A., Jr. (2006). A brief guide to structural equation modeling. *Couns. Psychol.*, 34, 719–751. <https://doi.org/10.1177/0011000006286345>.
- Yip, W., Subramanian, S. V., Mitchell, A. D., Lee, D. T., Wang, J., & Kawachi, I. (2007). Does social capital enhance health and well-being? Evidence from rural China. *Soc. Sci. Med.*, 64(1), 35–49. <https://doi.org/10.1016/j.socscimed.2006.08.027>.