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Work-Health Management Interference for Workers with Chronic Health Conditions: Construct Development and Scale Validation

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Abstract

A large and growing percentage of working adults has one or more chronic health conditions (CHCs). One under-appreciated issue for workers with CHCs is experiencing competing, incompatible pressures from the need to manage one's health condition and the need to manage one's work responsibilities. We refer to this as work-health management interference (WHMI). Despite its potential significance to the working lives of many people, scarce research has addressed WHMI. In this study, we explained the construct of WHMI, developed and evaluated a WHMI measure, and tested its relationships with work-related outcomes. We found support for time- and energy-based WHMI in workers with CHCs using qualitative (N = 35) and quantitative (including lagged) data samples (N = 204, N = 250, and N = 158). As expected, time- and energy-based WHMI positively related to work-family conflict and health condition severity, and negatively related to boundary flexibility. Energy-based WHMI predicted variance in work burnout beyond time-based WHMI and work-family conflict in all three samples, and energy-based WHMI predicted variance in work withdrawal beyond time-based WHMI and work-family conflict in two of three samples. Energy-based WHMI also predicted variance in perceived work ability beyond time-based WHMI and work-family conflict. A high level of WHMI signals a need for intervention for the individual (through education, coaching, job accommodations, etc.) and/or the organization (through supervisor training, implementing flexibility, etc.) to promote healthier and more sustainable employment for affected individuals

Work-Health Management Interference for Workers with Chronic Health Conditions: Construct Development and Scale Validation

Chronic health conditions (CHCs) are defined as illnesses and health issues that last at least one year and restrict an individual’s activities and/or require ongoing management (Centers for Disease Control and Prevention, 2019). In the United States, 60 percent of adults have at least one CHC, 42 percent have two or more CHCs, and 12 percent have five or more CHCs (Buttorff, Ruder, & Bauman, 2017). The financial and productivity-related challenges CHCs pose to employing organizations and larger healthcare and economic systems are well-documented. For example, Asay, Roy, Lang, Payne, and Howard (2016) reported that U.S. organizations’ costs due to absenteeism from CHCs ranged from $16 to $286 per employee per year. Gaskin and Richard (2012) found that nationwide costs stemming from health care use and productivity loss due to chronic pain alone in the U.S. were between $560 and $635 billion annually.

For individuals, working with CHCs may lead to poor quality of working life, high levels of absenteeism and/or presenteeism (Munir et al., 2007; Patel et. al., 2012), and even permanent work disability (Häuser et al., 2014; Nahin, 2015; Walsh et al., 2008). It is critical to examine individual challenges related to working with CHCs in order to design effective interventions, policies, and supports for vulnerable workers. One such issue for workers with CHCs is experiencing competing, incompatible pressures from the need to manage one’s health condition and the need to manage one’s work responsibilities. This is the focus of the current paper, and we refer to it as *work-health management interference (WHMI)*. We argue that WHMI is important for workers’ well-being, behaviors, and work ability, and has likely implications for employing organizations. From a practical perspective, high levels of WHMI signal a need for intervention for the individual (through education, coaching, job accommodations, etc.) and/or the organization (through supervisor training, job flexibility, etc.) to promote healthier and more sustainable employment for affected individuals. Despite its potential significance to the working lives and well-being of a large percentage of the workforce, along with the bottom lines of employing organizations, scarce research has addressed WHMI.

The purpose of this study is to explain the construct of WHMI, develop and evaluate a WHMI measure, and understand its relations with work-related outcomes. We proposed a WHMI construct that is grounded in theory and existing literature and used qualitative and quantitative (cross-sectional and time-lagged) data from workers with a variety of CHCs across industries and job types to develop a measure, assess its psychometric properties, and demonstrate relations with other variables. In doing so, we contribute to the limited, yet growing, literature on challenges for workers with CHCs and provide a measure that researchers and practitioners may use to assess WHMI.

WHMI from a Life Domain Perspective

Although disparate in type and manifestation, all CHCs impose a need for continuing treatment and management and/or limitations on activities of daily living (Goodman, Posner, Huang, Parekh, & Koh, 2013; U.S. Department of Health and Human Services, 2010). For this reason, we frame our examination of WHMI in terms of the growing conversation around life domains beyond that of work and family. Life domains are spheres of activities that make up a person's identity (Keeney, Boyd, Sinha, Westring, & Ryan, 2013). Scholars have criticized the collapsing of the entire "life" or "non-work" domain and highlight the importance of distinguishing specific life domains (Keeney et al., 2013; Waldrop, Erb, & Grawitch, 2017; Wilson & Baumann, 2015) because each domain may conflict differently with others and the relevance of domains varies by individual (Keeney et al., 2013; Swindle & Moos, 1992). In addition to work and family, scholars have identified several domains such as community, friends, religion (Keeney et al., 2013), and the self (Wilson & Baumann, 2015).

There are several activities involved in maintaining oneself. Most relevant to this study, Keeney and colleagues (2013) identified the health domain, which involves all activities to maintain physical and mental health. The authors found that health was the third most important domain (among eight) after family and romantic relationships, and health was also among the top three life domains to interfere with work. Yet, the definition provided by Keeney et al. includes general personal maintenance, including haircuts and manicures. To the contrary, our study focuses on activities workers perceive as necessary for CHC management (e.g., following a treatment plan, attending medical appointments)[1].

The life domain of health management takes on particular importance for individuals working with CHCs for at least a few key reasons. First, workers with CHCs may see health management as critical for them to retain the ability to continue working; a situation that

[1] Additionally, the health domain by Keeney et al. (2013) is one of several dimensions of a broader life domains scale that has parallel items with different life domains at the end of each. Because of our specific interest in providing solutions for those with CHCs, we created an entire measure for health management starting with input from workers with CHCs rather than using a common set of items and varying the domain.

becomes especially urgent when considering that in the U.S., health insurance benefits are typically tied to employment. Second, CHCs can be salient individual identities (e.g., "asthma sufferer;" "cancer survivor;" "person living with ulcerative colitis"), which in turn may drive identity-congruent health management behaviors (e.g., Adams, Pill, & Jones, 1997). Additionally, CHCs may affect others, including family members and coworkers. Therefore, caretaking for one's own health condition may be not only self-imposed (i.e., try to stay healthy to not burden others) but also socially imposed (e.g., the need one to be functional enough fulfill social roles). An expectation for maintaining health and functionality despite a CHC is particularly likely in individualistic cultures such as the U.S., where personal control and independence are highly valued (Gelfand, Erez, & Aycan, 2007). Taken together, we believe that, for those who are working with CHCs, the life domain of health management is particularly salient, and may conflict with the life domain of work. The competing demands of managing a CHC while managing work responsibilities is likely to create WHMI[2].

Previous empirical evidence underscores the importance of the broader health domain for those with CHCs. For example, using qualitative data, Gignac et al. (2012) found that having arthritis was associated with role conflict and strain. Further, in a sample of 36 individuals who were working and had inflammatory arthritis, Lacaille, White, Backman, and Gignac (2007) found that lack of time and energy for arthritis care and concern about taking time off from work were commonly-reported problems. Fewer studies have examined related constructs quantitatively using standardized instruments, yet two notable exceptions exist. First, Gignac and colleagues (2014) published the Work-Health-Personal Life Conflict scale, which examined the degree to which "work/personal life negatively impacts arthritis" and "arthritis negatively impacts work" (p. 573). Our construct and accompanying scale of WHMI departs from the Gignac et al. (2014) study in a few important ways. First, rather than conceptualizing the domain as the health condition itself (e.g., arthritis), more consistent with role conflict theory, we instead propose that the conflict arises from the *management of* a CHC. Secondly, rather than considering conflict between work and health as a single dimension, we draw from work-family

[2] Importantly, although we take an "interference" approach, we do not mean to imply that work is solely or mainly detrimental to workers with CHCs. To the contrary, we acknowledge that work is important to well-being for workers with CHCs (Gignac et al., 2014; Nilsen & Anderssen, 2014). Yet, at the same time, we argue that understanding WHMI is critical to efforts to promote sustainable work for workers with CHCs.

conflict theory and research on psychosocial impacts of CHCs on work to propose time- and energy-based WHMI.

In a second related study, Gragnano, Miglioretti, Frings-Dresen, and de Boer (2017) proposed the Work-Health Balance Questionnaire, which includes three dimensions: work-health incompatibility, health climate, and external support. We argue, however that health climate and external support are important *predictors* of WHMI, and as such, are separate constructs. The authors' single dimension of work-health incompatibility comes close to our definition of WHMI; yet it assumes that incompatibility is a single dimension (time-based conflict). The authors include items that assess both directions (the extent to which work interferes with health and the extent to which health interferes with work) in a single dimension. Yet, the work-family conflict literature demonstrates value in measuring directions separately (Greenhaus & Beutell, 1985; Mesmer-Magnus & Viswesvaran, 2005).

Although we acknowledge that WHMI may be bi-directional (in that managing a CHC also likely interferes with managing work responsibilities), we focus solely on the degree to which *work interferes with health management* in this study. One reason for this is that interference stemming from the work domain (work interfering with CHC management) can inform work-related interventions for supervisors and organizations, and therefore may be of greater interest to organizational practitioners than interference stemming from CHC management. Further, employers (particularly in the U.S.) may be wary of assessing the degree to which health management interferes with work. It would likely be seen as outside the purview of an organization to suggest changes to health management strategies; therefore, implications for intervention for health management interfering with work are less clear. To the contrary, organizations may alter the structure and environment in which work is performed to help mitigate WHMI (e.g., similar to work-family conflict interventions, by training supervisors to be supportive and implementing flexibility and autonomy; Butts, Casper, & Yang, 2013; Kossek, Pichler, Bodner, & Hammer, 2011).

In sum, grounded in theories of life domains (Keeney et al., 2013; Swindle & Moos, 1992) and work-family conflict (Greenhaus & Beutell, 1985), we develop a measure of WHMI for individuals managing CHCs. In the next section, we use these theories to support our logic for the content domain and dimensionality of this new measure.

WHMI Content Domain and Dimensionality

Like other studies of conflicts with work and life domains, we propose that WHMI is multi-dimensional (Greenhaus, Allen, & Spector, 2006; Greenhaus & Beutell, 1985). Greenhaus and colleagues suggested that there are four conflict dimensions: time-, strain-, behavior-, and energy-based. *Time-based* conflict occurs when the time spent in one domain interferes with time spent in the other. *Strain-based* conflict occurs when tension or strain from one domain inhibits participation in another domain. *Behavior-based* conflict occurs when behavioral expectations of one domain interfere with or are incompatible with those of the other. *Energy-based* conflict occurs when exhaustion from engaging in one domain inhibits participation in the other.

Consistently, studies of conflict between work and non-work domains focus on the time and strain dimensions (Fisher, Bulger, & Smith, 2009; Keeney et al., 2013). Interestingly, despite early conversations regarding the fatigue and physical drain of negotiating demands between domains (Small & Riley, 1990), energy-based conflict is not often captured in measures of work-life conflict (Carlson, Kacmar, & Williams, 2000; Fisher et al., 2009). This omission is notably incongruent with the growing recognition that energy is a key resource of successful work for all workers (Fritz, Fu Lam, & Spreitzer, 2011; Parker, Zacher, de Bloom, Verton, & Lentink, 2017). Previous research has advocated for the inclusion of an energy dimension when investigating the work-life interface in the context of manual jobs (Grzywacz, Arcury, Marín, & Carrillo, 2007).

Of the dimensions in the literature, we argue that time and energy most readily apply to workers who are managing work and a CHC. First, insufficient time for medical appointments (i.e., doctor visits, therapy sessions, medication administration appointments, diagnostics), which typically occur during traditional working hours, diminishes workers' ability to manage their health condition. We therefore propose that time-based WHMI occurs when time needed for work interferes with time needed to manage a health condition. Second, energy is vital for workers with CHCs (e.g., Swain, 2000) and yet illness and pain deplete energy resources (Christian, Eisenkraft, & Kapadia, 2015). Often, for those with CHCs, time away from work is spent resting and recovering to restore energy resources so they can return to work the next day (Liedberg & Henriksson, 2002). Consistent with the definition that energy-based conflict depletes energy and diminishes performance in the other domain (Greenhaus et al., 2006), we suggest that energy-based WHMI occurs when an individual's management of work responsibilities depletes the energy they need to enact behaviors necessary to manage their health condition (e.g., feeling too tired from work to engage in daily physical therapy routines).

In a departure from the original conceptualization of work-family conflict, we do not include a behavior-based conflict dimension. Empirical evidence for behavior-based conflict is lacking (Kelloway, Gottlieb, & Barham, 1999) and most measures of work-family conflict omit behavior-based conflict. In addition, we omitted a strain-based dimension and instead included what we argue is the more appropriately termed energy-based WHMI. Strain-based conflict is typically operationalized using such terms as “frazzled” and “emotionally drained” (Carlson et al., 2000) – and are thought to, in turn, negatively affect participation in and performance in the other domain. Notably, these terms also reflect an energy depletion process that we have argued is critical to the experiences of workers with CHCs. In sum, time and energy are two critical and limited resources that workers with CHCs must allocate to important life domains of health management and work management. We expect that WHMI in workers with CHCs arises when allocating time and energy resources to work interferes with or impedes health management.

WHMI and Related Constructs

We now turn to a discussion of constructs that are related to, yet separate from WHMI in an effort to further develop WHMI as a construct and frame hypotheses around construct validity. First, we expect that WHMI will positively relate to work-family conflict because both represent interference between work and non-work domains. The time and energy required to fulfill work responsibilities and manage health may also keep people from fulfilling family responsibilities. For workers who are having trouble managing both work and health, family and domestic tasks are likely to also be impeded. We also expect that domain-specific characteristics of the CHC and work will influence individuals’ WHMI experiences. More severe CHCs require greater allocation of resources of time and energy to manage; thus greater levels of WHMI. For instance, a worker with a more severe or aggressive form of cancer would likely require a greater number of medical appointments and treatments, and more time for recovery, and therefore may experience greater levels of WHMI than a worker with a less severe form of cancer.

In terms of work characteristics, boundary flexibility is the ability of an individual to move between domains (in this case, work and health management) to meet demands of both (Matthews & Barnes-Farrell, 2010). With more boundary flexibility, individuals with CHCs can “self-accommodate” (McGonagle & Barnes-Farrell, 2014, p. 312) or adjust their work schedules around their health routines (e.g., injection protocols, standing or taking a brief walk every hour). The ability to flex boundaries also allows workers to work when they feel the most healthy, energetic, and focused (Liedberg & Henriksson, 2002). Without flexibility, these workers may experience difficulties scheduling appointments or may feel stigmatized because their need to leave work conflicts with norms of being present (McGonagle & Barnes-Farrell, 2014).

Hypotheses 1a-c: Time- and energy-based WHMI positively relate to work-family conflict (a) and CHC severity (b), and negatively relate to work boundary flexibility (c).

Outcomes of WHMI

Work burnout refers to a state of resource depletion in response to chronic or ongoing work stress (Shirom, 2003), including work-family conflict (Amstad, Meier, Fasel, Elfering, & Semmer, 2011; Reichl, Leiter, & Spinath, 2014). Domain demands drain physical and mental resources, and competition between demands can impede recovery. As those with CHCs manage work demands and health, they may exhaust resources and experience burnout. According to appraisal theory (Lazarus & Folkman, 1984), stress may result from an individual's appraisal of an event or situation as personally relevant and potentially threatening to well-being or goal attainment. Particularly when one's personal resources are inadequate to cope with a threatening event or situation, stress is a likely result. Perceiving a high level of WHMI may be seen as a stress appraisal; to the extent that management of health is perceived as important and personally-relevant (which is likely the case for workers with CHCs), such interference is stressful. Ongoing WHMI is likely to lead to burnout.

Withdrawing from work allows workers to minimize time and energy spent on work tasks while maintaining employment (Hanisch & Hulin, 1990) and can occur for many reasons. Some withdraw from work to avoid challenging workplace situations (Chi & Liang, 2013; Scott & Barnes, 2011) and for others, non-work demands lead to withdrawal behaviors (Hammer, Bauer, & Grandey, 2003). Similarly, managing work and health may result in withdrawal behaviors (Liedberg & Henriksson, 2002). Workers with CHCs who experience WHMI may withdraw from work because they perceive that their manager or the organization does not support their well-being. They may realize that their work situation is unsustainable; that their work efforts come at the expense of their health and they may begin to disengage and consider alternative jobs or career paths. Although health regimens may be ignored (e.g., skipping medication doses, ignoring diet restrictions, or missing therapy appointments), these are not effective long-term strategies because detriments to health and possible disability could result.

Perceived work ability (PWA) refers to a worker's perception or appraisal of their ability to continue working in their current job, given the characteristics of the job and their personal resources (Ilmarinen, Gould, Järvikoski, & Järvisalo, 2008). PWA is a robust predictor of absenteeism (Ahlstrom, Grimby-Ekman, Hagberg, & Dellve, 2010), turnover intentions and turnover (Camerino et al., 2008), early retirement (Sell et al., 2009), and disability leave (von Bonsdorff et al., 2011). Because health is a strong and consistent predictor of PWA (e.g., McGonagle, Fisher, Barnes-Farrell, & Grosch, 2015), we argue that WHMI will negatively relate to PWA. Constant negotiation and management of work and health regimens may lead workers with CHCs to perceive their current jobs to be unsustainable, particularly if they perceive their health to be suffering consequently. We have argued that the health domain is particularly critical to workers with CHCs. It follows that the health domain specificity of WHMI (as opposed to the family domain) will capture unique variance in our proposed outcomes beyond work-family conflict. We therefore include work-family conflict as a control variable when assessing predicted outcomes of WHMI.

Hypotheses 2a-c: Time- and energy-based WHMI positively predict burnout (a) and work withdrawal (b), and negatively predict PWA (c) beyond work-family conflict.

Overview of Scale Development and Validation Procedures

In line with scale development approaches outlined by Hinkin (1998) and Wright, Campbell-Quick, Hannah, and Hargrove (2017) we started with a definition of WHMI as the incompatibility of managing a health condition and work, and used theory to drive item creation. We then collected qualitative data from an initial sample of workers with CHCs and wrote items based on their responses (Phase 1). We checked the consistency of items with our WHMI definition and examined results of item analysis and factor analysis to cull our initial list of items and test scale dimensionality using multiple samples of workers with CHCs (Phase 2). Once a measure was established, we tested hypothesized relationships with study variables using multiple cross-sectional samples of workers with CHCs (Phase 3). We then used a two-wave dataset from workers with CHCs to assess the predictive validity of our measure on hypothesized (lagged) outcomes while controlling for work-family conflict and replicated these analyses using the two cross-sectional datasets (Phase 4). The two-wave sample helped address concerns about possible common method variance. Table 1 lists study samples, phases, and purposes.

Phase 1: Item Generation

Phase 1 Method

Sample 1 participants and procedure. Participants were recruited from MTurk to complete an online survey. Participation was restricted to U.S. workers with at least one CHC who worked at least 40 hours per week for pay; a prescreening survey was used to determine eligibility. *N* = 64 workers met inclusion criteria and were invited to complete a survey, and 35 of these (55%) participated and received an incentive worth $5.00 USD. The average age of respondents was 35.83 (*SD* = 10.74), the sample was 51.4% male, and the average organizational tenure was 6.57 years. Most of the sample (68.5%) reported having at least a 4-year college degree and 28.6% reported having some college education.

Sample 1 measures. We used two open-ended survey questions[3] for time and energy-based WHMI. The questions were as follows. "Has time spent at work or performing your job prevented you from or decreased your ability to treat your illness? Please explain." "Does the energy you exert on your job deplete or lower your ability to treat your illness? Please explain."

Phase 1 Results and Discussion

The second author on this paper and one other post-graduate student who was unfamiliar with the study conducted thematic coding using a directed approach (Hsieh & Shannon, 2005) based on the proposed dimensions. After initial item generation, the coders met and reviewed each item. Items were edited for grammar and wording clarity, and redundant items were deleted. As shown in Table 2, 20 items were generated (10 per dimension) from the responses.

Phase 2: Item Reduction and Scale Dimensionality

In Phase 2, prior to evaluating measurement properties of the WHMI items and measure, we inspected the 20 items from Phase 1 in light of our definition of WHMI as interference stemming from the incompatibility of managing work and managing a health condition. We removed two time-based and three energy-based items (T9, T10, E8, E9, and E10 in Table 2) because they were inconsistent with this definition. For example, we removed, "I often come in to work when not feeling well or symptoms are flaring up" because it is focused on symptoms

[3] These were selected from a larger survey based on relevance to the aforementioned definition of WHMI. This initially included more general items, e.g., "How has work interfered or affected your illness?" These were excluded in this paper because they yielded responses that were not aligned with the definition of WHMI as interference stemming from the *management* of work and the *management* of a health condition. For example, these responses included work tasks causing one's symptoms to worsen.

and not health management. Table 2 contains rationales for all items removed. We proceeded with 15 items (8 time- and 7 energy-based) for the rest of Phase 2.

Phase 2 Method

We used two cross-sectional data samples from workers with various CHCs (Samples 2 and 3) to examine properties of items (item analysis) and scales to establish factor structure.

Sample 2 participants and procedure. Sample 2 participants were recruited from MTurk and social media, including Twitter and two online forums that allowed us to advertise the study. Inclusion criteria were the same as for Sample 1. When recruiting from social media, we made efforts to ensure only eligible participants could respond (limiting IP access to U.S. individuals, one response per IP address and including prescreening questions at the start of the survey). MTurk participants were only allowed to respond when they were a) currently living in the U.S. and b) had answered questions on a pre-screening survey indicating that they currently work at least 40 hours per week at a job outside of MTurk and have one or more CHCs.

We offered a $5.00 USD online gift card incentive for participating. Because this can incentivize people to take the survey who are not qualified, we took a number of additional data cleaning steps for the social media recruits. We first looked for duplicate IP addresses[4] and removed 31 cases. We then examined responses to three insufficient effort responding items (IER; e.g., “If you are reading this please select neutral”) and eliminated an additional 13 cases. We removed several responses due to respondents taking less than 10 minutes to complete the survey (as pilot testing indicated this was not possible while paying attention to instructions). The final sample (*N* = 204) included 113 female and 86 male respondents. Respondents, were, on average, 40.8 years old (*SD* = 10.35) and were diagnosed with their CHC for 9.2 years (*SD* = 8.12). The average number of hours worked per week was 44.42 (*SD* = 6.49) and the average organizational tenure was 8.11 years (*SD* = 6.67). In terms of CHCs, 20% reported having heart disease or hypertension, 18% of the sample reported asthma or chronic obstructive pulmonary disorder, 17% reported ankylosing spondylitis, 16% reported rheumatoid or psoriatic arthritis, 12% reported type 1 or type 2 diabetes, 12% reported chronic pain or chronic fatigue, 11% reported celiac disease, chronic gastritis, ulcerative colitis, or Crohn’s disease, 9% reported other

[4] Although the survey software restricted duplicate IP address access, participants could get around that by clearing cookies from their browsers or using a virtual private network (VPN).

autoimmune disorders (e.g., multiple sclerosis; lupus), 8% reported chronic migraines, and 7% reported some form of mental illness (e.g., anxiety disorder; depression).

Sample 3 participants and procedure. Sample 3 was recruited exclusively from MTurk to avoid issues with recruiting from social media encountered with Sample 2. We administered a prescreening survey similar to the one for Sample 2 and used the same restrictions, yet we relaxed the hours worked per week for an organization outside of MTurk to 31+ hours per week in an effort to attain as large a sample as possible. $N = 276$ prescreened individuals responded to the survey, and an incentive of $5.00 USD was given for each completed survey. Twenty three respondents took less than five minutes to respond and were removed from the dataset. Two respondents were removed for IER, and one respondent was removed due to excessive missing data (>50% of responses). The sample size for analysis was $N = 250$. Fifty percent of the sample was female. Respondents, were, on average, 34.8 years old ($SD = 9.3$) and were diagnosed with their CHC for 9.46 years ($SD = 7.41$). The average number of hours worked per week was 43.53 ($SD = 7.33$) and the average organizational tenure was 5.93 years ($SD = 5.15$). In terms of education, 10% had a high school diploma or GED, 31% had some college, 37% had a 4-year college degree, and 18% had at least some graduate school. Participants reported the following CHCs: mental illness (e.g., anxiety; depression; PTSD; 30%), chronic pain (27%), type 1 or type 2 diabetes (16%), hypertension or heart disease (14%), asthma/COPD (12%), arthritis (osteoarthritis; rheumatoid arthritis; psoriatic arthritis; 10%), chronic migraines (9%), celiac disease, Crohn’s disease, or ulcerative colitis (7%), sleep disorder (7%), and other chronic gastrointestinal diseases (e.g., gastroparesis; 6%).

Samples 2 and 3 measures. The 15 WHMI items were used, with a 5-point Likert-type scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*).

Phase 2 Results and Discussion

Results. We used item analysis and factor analysis with the goal of culling our initial list of items and testing scale dimensionality using Samples 2 and 3. An item analysis revealed that, in both samples, all items had standard deviations above one, and means were generally above the scale midpoint, ranging from 2.95 to 3.73. We then examined skewness and kurtosis to determine meaningful deviations from normality. In both samples, no skewness scores exceeded |1|; most skewness values were negative and below -.60 in both samples. However, in both samples, one item, T4 (“I am not easily able to leave work for medical appointments”) exceeded

-1.00 for Kurtosis (-1.10, *SE* = .34 in Sample 2 and -1.30 *SE* = .31 in Sample 3). We also examined inter-item correlations for possible redundancy. T4 correlated with T3 at $r = .72$ in Sample 3; this combined with the kurtosis findings led us to remove item T4. Items E6 and E7 correlated at $r = .75$ in Sample 2 and $r = .76$ in Sample 3. We therefore removed E7 as it also displayed kurtosis > -1.0 in Sample 2[5]. Item E1 correlated with item E2 at $r = .76$ in Sample 3 and $r = .68$ in Sample 2; E1 also correlated at $r = .74$ with E5 in Sample 3 and $r = .65$ in Sample 2 (item wording was also redundant between E1 and E5). We therefore removed item E1. In sum, three items were removed based on item analysis results; 12 items remained (seven time- and five energy-based).

We then conducted exploratory factor analysis (EFA) with the 12 items using a maximum likelihood estimator in M*Plus* v. 7.4. We used chi square difference testing to determine relative fit of a one-factor versus two-factor model. We also examined differences in CFI values; a difference of .002 is meaningful (Meade, Johnson, & Braddy, 2008). An EFA using Sample 2 resulted in a first eigenvalue of 5.93 and a second eigenvalue of 1.38 (no additional eigenvalues exceeded one). A two-factor model fit the data better than a one-factor model $\Delta X^2(11) = 160.60$, $p < .001$; ΔCFI = .13. An EFA using Sample 3 resulted in a first eigenvalue of 7.02 and second eigenvalue of 0.97. Again, a two factor model fit the data better than a one factor model $\Delta X^2(11) = 96.18$, $p < .001$; ΔCFI = .05. The factor correlations between energy- and time-based WHMI were .61 (Sample 2) and .65 (Sample 3).

EFA geomin (oblique) rotated factor loadings for Samples 2 and 3 are displayed in Table 3. We looked at loadings for both samples to interpret results. The items generally loaded more strongly onto their expected factor, except for E6, which loaded more strongly onto the time-based factor in both samples. Item T2 double-loaded on both factors in both samples and loaded more strongly on the energy-based factor in Sample 2. We therefore removed items E6 and T2 and re-ran the EFA using the ten remaining items. In Sample 2, again two eigenvalues exceeded one (5.01; 1.28) and the two-factor model fit better than a one-factor model $\Delta X^2(9) = 138.32$, $p < .001$; ΔCFI = .14. In Sample 3, eigenvalues were 5.92 and 0.97; again, the two-factor model fit better than a one-factor model $\Delta X^2(9) = 96.08$, $p < .001$; ΔCFI = .06. Factor correlations were .62

[5] In addition, when determining whether to remove E6 or E7, we looked at item wording. E6 contained the term “drained” as opposed to “tired” in E7. The word “tired was also used in E1, E2, and E5, so we chose to retain E6 to include diversity in wording for the energy-based WHMI items.

(Sample 2) and .73 (Sample 3). In sum, the two factor solution fit best, and most items loaded as expected on time- and energy-based dimensions.

Because we retained more time-based items (six) than energy-based items (four) from the EFA, we then re-examined factor loadings with the goal of removing two additional time-based items. Revised EFA geomin rotated factor loadings in Table 3 indicated that all items loaded significantly on the expected dimensions. However, in Sample 2, items T1 and T7 also loaded on the energy-based dimension. We looked to the item wording, and decided to remove item T7 because its wording was very close to that of an energy-based item (item E2). We then re-ran the EFA without item T7 in both samples (results in Table 3). The revised results demonstrated double loading of T1 in both samples. We therefore removed item T1 and retained four items for each dimension (T3, T5, T6, and T8 for time-based and E2, E3, E4, and E5 for energy-based WHMI). Coefficient alphas were .82 (time-based) and .85 (energy-based) for Sample 2 and .87 (time-based) and .85 (energy-based) for Sample 3. As displayed in Table 3, all loadings exceeded the recommended minimum value of .32 (Tabachnick & Fidell, 2001).

Discussion. In sum, in Phase 2 we removed items that were inconsistent with WHMI, redundant with other items, or cross-loaded on both dimensions. A basic assumption of this study - that workers with CHCs experience interference when attending to both health management and work - was supported by participants' responses to WHMI items. Scale means for WHMI items were consistently above scale midpoints in both samples.

Using two samples in this phase was a strength, in that EFA findings often vary between samples and we did not rely on results from a single sample when making decisions about which items to remove. In Sample 2, in which we recruited some individuals from online forums, it is possible that the study attracted individuals experiencing higher levels of WHMI (sample bias). Individuals who are visiting online illness-related forums may be experiencing greater problems with health management than the general population of workers with CHCs. On the other hand, we aimed to minimize sample bias by attempting to conceal the purpose of the study for MTurk recruits; participants completed prescreening studies with several distractor questions. Consistent with the demographics of MTurk workers, Sample 3 was fairly young (Goodman, Cryder, & Cheema, 2013). Because CHCs are more prevalent with increasing age, we may expect higher levels of WHMI if our samples were older. Yet, age could possibly influence the experience of WHMI in other ways; for instance, older workers and workers who have who have had CHCs for longer periods of time may have developed strategies for managing them, avoiding WHMI. Workers more established in their careers may have greater flexibility and be better able to craft jobs that limit WHMI. These are areas for future research. In addition, it is possible that T5 overlaps with measures of work flexibility, and this should be considered in future research.

Phase 3: Construct Validity

In Phase 3, we used Samples 2, 3, and a new, time-lagged sample (Sample 4) to conduct confirmatory factor analysis (CFA) in order to determine overall model fit when replicating factor structure attained in Phase 2 and assess composite reliability. We then tested hypotheses about relations of time- and energy-based WHMI with work-family conflict, CHC severity, and work boundary flexibility using each of the three samples. The inclusion of the time-lagged sample (Sample 4) helped to address concerns about common method variance.

Phase 3 Method

Sample 4 participants and procedure. An additional, separate, time- lagged sample of participants was recruited from a larger pool of 850 MTurk participants in the U.S. who completed a different study of work and well-being (citation redacted for blind review). We included questions in that study about work hours and CHCs, and subsequently invited participants of that study to complete two online surveys for the current study (N = 227) if they did not fail IER checks and met current study qualifications. We used randomly-generated codes connected to participants' MTurk IDs to link data from Time 1 to Time 2 (two weeks after Time 1). Participants received an incentive of $2.00 USD through MTurk for completing each of the ten-minute surveys. Of the 227, N = 211 participated in the first wave (Time 1), and none failed the IER check, so all were recruited for Time 2. Of those who completed Time 1, 166 completed Time 2 (79%). Eight were excluded due to matching issues over time; final N = 158.

The most commonly-reported CHCs in Sample 4 included anxiety or depressive disorders (n = 24), various autoimmune diseases (e.g., Grave's disease, ulcerative colitis, rheumatoid arthritis, lupus, multiple sclerosis, Crohn's disease; n = 16), cardiovascular diseases (e.g., hypertension, heart failure; n = 16), chronic pain (n = 16), and diabetes (n = 12). Participants worked, on average, 43.02 hours per week (SD = 6.20) and had M = 8.06 years' tenure with their organizations (SD = 5.95). Participants' average age was 41.26 (SD = 10.19). Sixty one percent (n = 96) were female, and 62 percent had a four year college degree or higher.

Samples 2, 3, and 4 measures. The same measures were used across the three samples.

WHMI. The eight retained WHMI items from Phase 2 were used (see Table 2).

CHC severity. We used five items from the Consequences subscale of the Revised Illness Perceptions Questionnaire (Moss-Morris et al., 2002). Participants were first asked to list their CHC(s) and to select one that affects their life the most to consider when answering the severity questions. An example item is "My chronic illness is a serious condition." Responses ranged from (1) *strongly disagree* to (5) *strongly agree*.

Work-family conflict. We used five items to assess work interfering with family from Netemeyer, Boles, and McMurrian (1996), e.g., "The demands of my job interfere with my home and family life." The response scale ranged from (1) *strongly disagree* to (5) *strongly agree*.

Work boundary flexibility. We used four items from Matthews and Barnes-Farrell (2010). Items were rated on a scale ranging from (1) *strongly disagree* to (5) *strongly agree.* A sample item is, "If something came up in my personal life, it would be alright if I arrived to work late."

Phase 3 Results and Discussion

CFA results. We used CFA (maximum likelihood) to estimate factor loadings and determine model fit and composite reliabilities. Sample 2 model fit was good according to criteria from Hu and Bentler (1999): $X^2(19) = 18.93$, CFI = 1.0, RMSEA = .00, SRMR = .028. All factor loadings were significant; the correlation between time- and energy-based WHMI was .63. Item R^2 values ranged from .47 (T3) to .59 (T8) for time-based WHMI and .53 (E3) to .68 (E4) for energy-based WHMI. Sample 3 model fit was also good: X^2 (19) = 50.03, CFI = .971, RMSEA = .081, SRMR = .036. Again, all factor loadings were significant on the expected factor and the correlation between the time- and energy-based WHMI factors was .81. For Sample 3, item R^2 values ranged from .54 (T5) to .66 (T8) for time-based and .47 (E4) to .72 (E2) for energy-based WHMI. Sample 4 model fit was adequate, $X^2(19) = 87.96$, CFI = .941, RMSEA = .152, SRMR = .038[6]. All factor loadings were significant and the correlation between factors was .83[7]. R^2 values ranged from .65 (T3) - .84 (T6) for time-based and .69 (E3) - .85 (E2) for energy-based WHMI.

[6] The RMSEA exceeds recommended cutoff values (.06 from Hu & Bentler, 1999; .08 from MacCallum, Browne, & Sugawara, 1996). Recently, Kenny, Kaniskan, and McCoach (2015) demonstrated that RMSEA is not a reliable measure of model fit for models with small degrees of freedom such as this one unless the sample size is very large. Our sample size (N = 158) was modest, therefore we relied on CFI and SRMR to determine adequacy.

[7] We tested an alternative model using Sample 4 in which all items loaded on a common factor. The model fit was significantly worse: $X^2(20) = 196.03$, CFI = .849, RMSEA = .236, SRMR = .061; $\Delta X^2(1) = 108.07$ ($p<.001$), which supports the discriminant validity of energy and time dimensions in Sample 4.

Using standardized factor loadings and error variances from our final CFA model results, we calculated composite reliability estimates (see Bagozzi, 1982; Williams, Hartman, & Cavazotte, 2010). Composite reliabilities are considered more accurate than coefficient alpha because they do not assume equal loadings of items on respective latent factors (yet in this sample, they are similar to coefficient alphas). Composite reliabilities were .80, .87, and .91 for time-based and .86, .85, and .93 for energy-based WHMI in Samples 2, 3, and 4, respectively.

Descriptive statistics and correlations. Table 4 contains descriptive statistics for Phase 3 variables in Samples 2, 3, and 4. We estimated correlations using CFAs with latent variables in M*plus* v. 7.4. As displayed in Table 5, both time- and energy-based WHMI correlated positively with CHC severity (time-based r = .39 in Sample 2 and r = .55 in Sample 3; energy-based r = .63 in Sample 2 and r = .52 in Sample 3). Both time- and energy-based WHMI also correlated positively with work-family conflict (time-based r = .49 in Sample 2 and r = .58 in Sample 3; energy-based r = .56 in Sample 2 and r = .62 in Sample 3) and negatively with boundary flexibility (time-based r = -.43 in Sample 2 and r = -.57 in Sample 3; energy-based r = -.28 in Sample 2 and r = -.47 in Sample 3). In Sample 4, we examined both cross-sectional and lagged latent variable correlations. As displayed in Table 6, for the cross-sectional correlations, time- and energy-based WHMI correlated positively with work-family conflict (r = .70 and r = .68, respectively) and CHC severity (r = .38 and r = .41) and negatively with boundary flexibility (r = -.41 and r = -.29). Similarly, for the time-lagged correlations, time- and energy-based WHMI correlated positively with work-family conflict (r = .68 and r = .64, respectively) and CHC severity (r = .27 and r = .35) and negatively with boundary flexibility (r = -.38 and r = -.27). In sum, Hypotheses 1a, 1b, and 1c were supported.

We also tested for discriminant validity between time- and energy-based WHMI and the three hypothesized variables by estimating a series of models wherein time- and energy-based WHMI items were set to load on a) work-family conflict, b) CHC severity, and c) boundary flexibility latent variables. We found that, in all cases, a model with time- and energy-based WHMI loading on separate latent variables to be significantly better according to chi square difference testing (all results available from the first author upon request).

Discussion. In sum, we found a positive relationship between WHMI and work-family conflict, which was expected because it represents interference with another life domain. We also found a positive relationship of WHMI with CHC severity, which was expected because more severe conditions likely require more management, which would produce more WHMI. Finally, we also found a negative relation of WHMI with boundary flexibility, indicating that when workers have or are willing to flex boundaries between work and health management, they are less likely to experience high levels of WHMI. Although WHMI related to all three constructs, tests of discriminant validity demonstrated the uniqueness of WHMI from each.

One limitation of Phase 3 is the cross-sectional nature of Samples 2 and 3, which may raise concerns about common method variance (e.g., Podsakoff, MacKenzie, Lee, & Podsakoff, 2012). However, we were able to demonstrate correlations between variables as expected using different time points in Sample 4. It is also noteworthy that Samples 2 and 3 demonstrated weak, non-significant correlations among CHC, boundary flexibility, and work withdrawal, which may further alleviate concerns about common method variance. Another limitation relates to our measurement of work-family conflict. In hindsight, it would have been helpful if we had included time- and energy- forms of work-family conflict, instead of general work-family conflict. Use of a general measure of work-family conflict may have resulted in underestimations of the true correlations between the constructs.

Phase 4: Predictive Validity

Phase 4 Method

We used Sample 4 to test the predictive validity of WHMI at Time 1 on lagged burnout, work withdrawal, PWA at Time 2 while controlling for work-family conflict at Time 1. We then replicated analyses using cross-sectional data from Samples 2 and 3.

Samples 2, 3, and 4 measures. Coefficient alphas are in Table 4 (all exceed .70).

Burnout. We used the seven-item work-related Copenhagen Burnout Inventory (Kristensen, Borritz, Villadsen, & Christensen, 2005) in Samples 2 and 3, e.g., “Do you feel worn out at the end of the working day?” Responses ranged from (1) *never/to a low degree* to (5) *always/to a very high degree*. We used a three item subscale from the same measure in Sample 4; e.g., “Do you feel burned out because of your work?”

Work withdrawal. We used a 10-item measure in Samples 2, 3, and 4, with a response scale ranging from (1) *never* to (4) *many times* (Hanisch & Hulin, 1990; 1991). A sample question is “Ignored non-essential tasks.”

PWA. In Sample 4, we used the four-item scale validated by McGonagle et al. (2015), e.g., “Assume that your best work ability is has a value of 10 points. How many points would you give your current ability to work right now?" The response scale ranged from 0 (*currently unable to work*) to 10 (*work ability at its lifetime best*).

Phase 4 Results and Discussion

Correlations are in Tables 4 and 5. Both time- and energy-based WHMI at Time 1 correlated positively with Time 2 burnout and work withdrawal and negatively with Time 2 PWA in Sample 4. Time- and energy-based WHMI also correlated positively with burnout and work withdrawal in Samples 2 and 3. To test predictive validity using Sample 4, we regressed each of the three outcome variables at Time 2 on time- and energy-based WHMI at Time 1, controlling for work-family conflict at Time 1. Using hierarchical multiple regression and mean composite variables, we entered work-family conflict in a first step and both time- and energy-based WHMI simultaneously in a second step. Sample 4 results indicated that energy-based WHMI significantly predicted burnout ($\beta = .43$, $p < .001$), but time-based WHMI did not ($\beta = .04$, $p = .68$). The R^2 change when adding time- and energy-based WHMI was .116. Energy-based WHMI also predicted work withdrawal ($\beta = .33$, $p = .008$), but time-based WHMI did not ($\beta = -.12$, $p = .32$); $\Delta R^2 = .042$. Energy-based WHMI also predicted PWA ($\beta = -.28$, $p = .02$), but time-based WHMI did not ($\beta = -.02$, $p = .85$); $\Delta R^2 = .042$.

Sample 3 results replicated Sample 4 results. Energy-based WHMI predicted burnout ($\beta = .43$, $p < .001$), yet time-based WHMI did not ($\beta = .11$, $p = .15$); $\Delta R^2 = .173$. Energy-based WHMI also predicted work withdrawal ($\beta = .26$, $p = .005$), yet time-based WHMI did not ($\beta = .08$, $p = .38$); $\Delta R^2 = .07$. Sample 2 results partially replicated Sample 4 results. In Sample 2, both time-based ($\beta = .23$, $p < .001$) and energy-based WHMI ($\beta = .39$, $p < .001$) predicted burnout while controlling for work-family conflict; $\Delta R^2 = .218$. Contrary to Sample 4, time-based WHMI predicted work withdrawal ($\beta = .23$, $p = .009$), yet energy-based WHMI did not ($\beta = .02$, $p = .79$); $\Delta R^2 = .044$. Thus, Hypotheses 2a, 2b, and 2c were partially supported.

Discussion. In sum, energy-based WHMI was a robust predictor of work burnout in all three samples. In Sample 2, time-based WHMI also predicted burnout, but this was not found in the other two samples. Interestingly, when energy-based WHMI was included in the regression equations, time-based WHMI became non-significant. This is consistent with burnout being a form of exhaustion resulting from resource depletion (Shirom, 2003). In terms of work withdrawal, again energy-based (but not time-based) WHMI was a significant predictor in Samples 3 and 4, but time-based (and not energy-based) WHMI was a significant predictor in

Sample 2. Regression results viewed in conjunction with bivariate correlations suggests that time- and energy-based WHMI relations with work withdrawal are weaker and less consistent than relations with burnout. This makes sense when considering that work withdrawal involves behaviors that are, for many workers, a step removed from cognitive and affective reactions to WHMI, such as burnout. Individuals experiencing resource loss or depletion, such as those experiencing burnout, may either invest further resources to try to overcome the loss, or withdraw to preserve existing resources (Hobfoll, 1989; 2001). It is therefore likely that the relationship between WHMI and work withdrawal is contingent upon decisions about further resource investment, including, for instance, whether further resource attainment from resource investment in work is expected to be successful (Bandura, 1986). Additional moderating factors may include perceived consequences of withdrawal. For many workers in the U.S., employment is necessary to maintain health insurance coverage, and if withdrawal is seen as jeopardizing one's job, it is likely to be avoided. Future studies should examine these and other possible contingencies in the WHMI- work withdrawal relationship.

Energy-based (but not time-based) WHMI was also a negative predictor of lagged PWA in Sample 4. Yet, both time- and energy-based WHMI negatively correlated with PWA at Times 1 and 2, and time-based WHMI significantly predicted lagged PWA when controlling for work-family conflict but excluding energy-based WHMI (β = -.25, p = .04). The relationship of WHMI with PWA was expected because work ability is closely tied to health perceptions (Ilmarinen et al., 2008). For some workers, high levels of WHMI will signal an unsustainable work situation.

A limitation of Phase 4 was that only one of our three samples had two time points. Additionally, the time points in Sample 4 were close, separated by just two weeks. The correlations between some variables at Time 1 and Time 2 in Sample 4 were very strong, reflecting stability of those variables over the two-week period. Because burnout results from exposure to chronic stress, it would be informative to test relations between WHMI and burnout over longer periods of time using a longitudinal design.

General Discussion

For many, living with a CHC requires health management while employed. The purpose of this study was to develop a psychometrically sound measure of the interference that may arise between the management of one's work and health condition. Based on the literature on life domain conflict and working with CHCs, we proposed time- and energy-based WHMI. We developed items and found evidence supporting time- and energy- based WHMI as separate, yet related dimensions that can be reliably measured using four items each.

Overall, our findings support time- and energy-based dimensions of WHMI, with energy-based being the more robust predictor of outcomes. Specifically, time- and energy-based WHMI both positively related to work-family conflict and CHC severity and negatively related to boundary flexibility as expected. Energy-based WHMI predicted variance in work burnout beyond time-based WHMI and work-family conflict in all three samples, and energy-based WHMI predicted variance in work withdrawal beyond time-based WHMI and work-family conflict in two of three samples. Energy-based WHMI also predicted PWA beyond time-based WHMI and work-family conflict in Sample 4.

The energy dimension was added to the work-family typology when scholars were specifically concerned about the implications of conflict on physical and mental health (Greenhaus et al., 2006). Consistent with this logic and that of the broader conversations around life domains, including health (Keeney et al., 2013), we proposed an energy-based WHMI dimension – and found it to be a critical predictor of burnout, work withdrawal, and PWA. Of course, we cannot rule out the existence of other dimensions of WHMI based on this study, but the results demonstrate the existence and importance of energy-based WHMI, i.e., when work demands leave individuals with CHCs too tired to properly take care of their health conditions. This is particularly illuminating because it demonstrates that employees managing CHCs not only need time to manage their conditions, but they also need work environments that allow them to leave with mental and physical energy resources required to keep them healthy. This represents a contribution to the literature beyond existing studies of similar constructs, which omit energy-based forms of conflict (Gignac et al., 2014; Gragnano et al., 2017).

Practical Implications

We recommend a more holistic view to work-life issues that encompasses health management alongside other domains such as family. Our WHMI measure may be used by coaches, counselors, or therapists assisting individual workers who are managing CHCs, or by organizations alongside work-family benefits and policies to more comprehensively and accurately assess work-life issues for workers. Organizations should consider improving the "health-friendliness" of their work cultures (Drach-Zahavy, 2008, p. 197). Implementing job leeway/work flexibility (e.g., Shaw et al., 2014), training supervisors to provide support (e.g., Dimoff & Kelloway, 2019; Hammer et al., 2011), effectively scheduling adequate work breaks, allowing workers to pace their work to minimize energy drain, and other job modifications may also be helpful for workers managing CHCs at work.

Alongside these, more individual approaches may be implemented, including one-one-one coaching (McGonagle, Beatty, & Joffe, 2014) and/or training on time and energy management strategies. Indeed, coaches may use our WHMI scale in initial assessments of clients with CHCs who present issues related work. Because CHCs are stigmatizing in the workplace (McGonagle & Barnes-Farrell, 2014), we also recommend that organizations work to improve workplace culture around health. If employees feel comfortable disclosing a CHC, they may receive needed assistance to maintain work ability (Beatty & Joffe, 2006). There is a robust avenue for future research to examine the specific dimensions and implementation of these suggested interventions.

Additional Limitations and Future Research Directions

Although we included multiple samples with a diverse array of CHCs, our study focused only on those with CHCs, which limits the generalizability of our findings. However, we believe our focus on health, the importance of energy-based interference and the creation of holistic workplace practices that support non-work domains more broadly and is likely important for many working adults without CHCs. A shift in thinking by managers and organizational leaders focused on reserving and restoring energy of employees would be an incredibly fruitful avenue for future research.

As noted in the Discussion for each study phase, our use of MTurk samples may be seen as a limitation. We note, however, that workers with CHCs are a difficult population to reach; people may be reluctant to self-disclose having a CHC. Using MTurk allowed us to identify qualified individuals to participate in the study through use of a prescreening survey, which avoids some of the selection bias that would occur if we recruited solely from internet forums for chronic illness or snowball sampling (where we would likely find more individuals who experience CHC-related issues). Indeed, a strength of this study is its inclusion of multiple samples with a diverse array of CHCs, which should help generalizability. Finally, limiting our samples to those working at least 30 hours per week could have excluded individuals with more severe CHCs. Nevertheless, the noted high mean values for WHMI suggest that WHMI is a problem for our study participants, even if such sample bias occurred.

It could be argued that our developed measure is overly limited. We did not include strain and behavior-based conflicts and we only investigated one direction of conflict. While we do not deny the potential importance of including these elements, our decisions were guided by a desire to be both methodologically robust and practically useful. We began our investigation guided by the narratives of individuals working with a CHC, generating several potential items. We then examined these items and only included those that stringently fit our construct definition to avoid creating redundancy with existing measures and related concepts of fatigue, stress, and burnout. We also desired a practically useful measure, thus focused on work interfering with health management. Nevertheless, we do not dispute the existence of health management interfering with work.

In conclusion, we developed a measure of WHMI that includes time-based and energy-based dimensions. Both dimensions related to work-family conflict, CHC severity, and boundary flexibility. Further, while both dimensions related to work burnout, work withdrawal, and PWA, *energy-based* (as opposed to time-based) WHMI more consistently predicted outcomes when controlling for work-family conflict. Organizations and people who coach and counsel workers with CHC should assess levels of WHMI and intervene when levels are high. Organizations should implement flexibility and autonomy for all workers and train supervisors to be supportive to help reduce the risk of WHMI.

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Table 1

Study Samples and Phases

Sample Description and Phase	*N*	Data Source
Sample 1 – Phase 1	35	MTurk
Sample 2 – Phase 2, Phase 3, Phase 4	204	MTurk and social media
Sample 3 – Phase 2, Phase 3, Phase 4	250	MTurk
Sample 4 – Phase 2, Phase 3, Phase 4	158	MTurk
Phase Descriptions and Purposes		**Sample(s) Used**
Phase 1 – Item Generation		1
Phase 2 – Item Reduction and Scale Dimensionality Testing		2, 3
Phase 3 –Construct Validity Testing (Hypotheses 1a-1c)		2, 3, 4
Phase 4 –Criterion-Related Validity Testing (Hypotheses 2a-2c)		2, 3, 4

Table 2

Items Generated in Phase 1

Item		(If Removed) Reason for Removal
T1	Time at work prevents my ability to treat my health condition (e.g. take medicine, exercise, rest).	Removed based on EFA results
T2	Spending time at work prevents me from taking time to recuperate from my health condition symptom flare-ups.	Removed based on EFA results
T3*	My work schedule makes it difficult to schedule necessary medical visits, treatments, or procedures.	Retained
T4	I am not easily able to leave work for medical appointments.	Removed based on item analysis results
T5*	I cannot take time off work needed to treat my chronic health condition.	Retained
T6*	Time spent at work interferes with my ability to conform to a long-term treatment plan.	Retained
T7	I have a difficult time following a health condition treatment plan because I am spending time focusing on work.	Removed based on EFA results
T8*	I have to miss doctor appointments or treatments due to the amount of time I must spend on my work responsibilities.	Retained
T9	I often come in to work when not feeling well or symptoms are flaring up.	Removed; inconsistent with definition (symptoms; not health management)
T10	I am afraid that if I take time to treat my chronic health condition that I will lose my job.	Removed; inconsistent with definition (focused on outcomes of WHMI)
E1	I am often so tired from work that I cannot perform activities that help my illness management such as exercise, eating certain foods, etc.	Removed based on item analysis results
E2*	I have a difficult time following a health condition treatment plan because I am tired from work	Retained
E3*	Work depletes the *mental* energy I need to take care of my health.	Retained
E4*	Work depletes the *physical* energy I need to take care of my health.	Retained
E5*	I am too tired after working to do things that are good for health condition management (e.g., exercise, eating a healthy diet).	Retained
E6	I am too drained from work at the end of the day to schedule health-related appointments.	Removed based on EFA results
E7	I am too tired by the end of the workday to make it to health-related appointments.	Removed based on item analysis results
E8	Energy exerted at work increases my chronic health condition symptoms.	Removed; inconsistent with definition (symptoms; not health management)
E9	I have to exert more energy in order to maintain my job performance due to my chronic health condition.	Removed; inconsistent with definition (energy exertion; not depletion)
E10	I do not feel like attending doctor appointments or receiving medical treatments after a long day or week at work.	Removed; inconsistent with definition (not energy depletion)

Note: *indicates retained item; T = time-based and E = energy-based WHMI. EFA = Exploratory Factor Analysis.

Table 3

Phase 2 EFA Results: Geomin Rotated Factor Loadings

	Initial EFA Results				Revised EFA Results (1)				Revised EFA Results (2)			
	Sample 2		Sample 3		Sample 2		Sample 3		Sample 2		Sample 3	
Item	F1	F2	F1	F2	F1	F2	F1	F2	F1	F2	F1	F2
T1	**.43***	.30*	**.68***	.14	**.47***	.23*	**.62***	.18	**.47***	.23*	**.53***	.28*
T2	**.29***	.49*	**.51***	.29*	--	--	--	--	--	--	--	--
T3	**.57***	.14	**.77***	-.07	**.61***	.09	**.78***	.00	**.60***	.10	**.82***	-.00
T5	**.64***	.10	**.82***	-.10	**.72***	.03	**.82***	-.08	**.71***	.04	**.75***	-.00
T6	**.69***	.03	**.70***	.19	**.73***	-.01	**.62***	.26*	**.72***	-.002	**.51***	.36*
T7	**.55***	.23	**.72***	.12	**.54***	.21*	**.66***	.19	--	--	--	--
T8	**.89***	-.12	**.78***	-.01	**.86***	-.11	**.79***	-.00	**.86***	-.11	**.82***	.00
E2	.08	**.72***	.36*	**.55***	.09	**.72***	.25*	**.63***	.09	**.72***	.22*	**.67***
E3	-.00	**.73***	.32*	**.44***	-.00	**.73***	.22*	**.51***	-.00	**.73***	.16	**.57***
E4	-.05	**.86***	-.01	**.75***	-.02	**.84***	-.14	**.82***	-.02	**.84***	-.09	**.77***
E5	.02	**.74***	.17	**.71***	.03	**.74***	.01	**.84***	.02	**.74***	.001	**.84***
E6	.72*	**-.03**	.52*	**.28***	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**

Notes. F = Factor. Sample 2 *N* =203-204; Sample 3 *N* =247-250. **p* <.05. Bolded text indicates the factor loading on the expected factor.

Table 4

Descriptive Statistics and Coefficient Alpha Reliabilities for Samples 2, 3, and 4

	Sample 2			Sample 3			Sample 4		
Variable	*M*	*SD*	*α*	*M*	*SD*	*α*	*M*	*SD*	*α*
Time-Based WHMI	3.18	0.86	.82	3.21	1.00	.87	2.57	1.18	.92
Energy-Based WHMI	3.45	0.96	.85	3.60	0.91	.85	3.00	1.25	.93
Work-Family Conflict	3.55	0.91	.89	3.35	1.02	.93	2.25	0.83	.97
CHC Severity	3.54	0.74	.73	3.62	0.72	.76	3.05	0.99	.88
Boundary Flexibility	3.20	0.97	.84	3.14	1.01	.88	3.63	1.04	.90
Work Burnout	3.15	0.66	.79	3.20	0.78	.86	2.91	1.09	.87
Work Withdrawal	2.24	0.51	.78	2.27	0.66	.88	1.92	0.65	.86
Perceived Work Ability	--	--	--	--	--	--	8.19	1.39	.83

Notes. Sample 2 *N* =203-204; Sample 3 *N* =247-250. For Sample 4, *N* = 146-158 and all variable descriptive statistics and alphas are from Time 1 in Sample 4 except Work Burnout, Work Withdrawal, and Perceived Work Ability, which are at Time 2. α is Cronbach's alpha.

Table 5

Correlations for Samples 2 and 3

Variable	1	2	3	4	5	6	7
1. Time-Based WHMI	--	.82**	.55**	.58**	-.57**	.65**	.29*
2. Energy-based WHMI	.63**	--	.52**	.62**	-.47**	.80**	.36**
3. CHC Severity	.39**	.77**	--	.36**	-.30**	.40**	.28**
4. Work-Family Conflict	.49**	.56**	.53**	--	-.46**	.63**	.23**
5. Boundary Flexibility	-.43**	-.28**	-.11	-.23**	--	-.43**	-.04
6. Work Burnout	.67**	.79**	.60**	.61**	-.40**	--	.47**
7. Work Withdrawal	.19*	.27**	.05	.24**	-.11	.44**	--

Notes. Sample 2 N =198-204; Sample 3 N =243-250; Sample 2 below diagonal and Sample 3 above diagonal. *Statistically significant at $p < .05$ **Statistically significant at $p < .01$.

Table 6

Correlations for Sample 4

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Time-Based WHMI^{T1}	--														
2. Energy-based WHMI^{T1}	.83	--													
3. CHC Severity^{T1}	.38	.41	--												
4. Work-Family Confl.^{T1}	.70	.68	.26	--											
5. Boundary Flexibility^{T1}	-.41	-.29	-.18	-.35	--										
6. Work Burnout^{T1}	.54	.62	.26	.53	-.33	--									
7. Work Withdrawal^{T1}	.28	.37	.15	.32	.02	.37	--								
8. Perc. Work Ability^{T1}	-.33	-.37	-.39	-.34	.25	-.37	-.26	--							
9. Time-Based WHMI^{T2}	.81	.72	.32	.69	-.44	.52	.31	-.36	--						
10. Energy-based WHMI^{T2}	.72	.90	.36	.64	-.33	.66	.44	-.36	.85	--					
11. CHC Severity^{T2}	.27	.35	.83	.26	-.21	.24	.14	-.39	.35	.38	--				
12. Work-Family Confl.^{T2}	.68	.64	.30	.85	-.34	.51	.27	-.34	.76	.70	.32	--			
13. Boundary Flexibility^{T2}	-.38	-.27	-.15	-.39	.91	-.26	.11	.18	-.48	-.32	-.13	-.37	--		
14. Work Burnout^{T2}	.57	.65	.21	.57	-.38	.99	.32	-.34	.57	.66	.25	.56	-.33	--	
15. Work Withdrawal^{T2}	.28	.37	.07	.36	.00	.33	.98	-.24	.34	.40	.10	.35	.07	.35	--
16. Perc. Work Ability^{T2}	-.35	-.42	-.45	-.35	.24	-.34	-.17	.97	-.42	-.41	-.44	-.38	.16	-.35	-.14

Notes. $N = 158$. ^{T1} =measured at Time 1; ^{T2} =measured at Time 2. Correlations greater than |.16| are statistically significant at $p < .05$. Correlations greater than |.21| are statistically significant at $p < .01$. Correlations greater than |.26| are significant at $p < .001$