

BEYOND NINE TO FIVE: IS WORKING TO EXCESS BAD FOR HEALTH?

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This study investigated whether two sides of working to excess, namely working long hours and a compulsive work mentality (workaholism), are detrimental for employee health by using biomarkers of metabolic syndrome, a direct precursor of cardiovascular diseases. In addition, we examined if working to excess has the same health outcomes for employees who enjoy their work versus employees who do not. Despite the common sense belief that working long hours is bad for health, we did not find a relationship between work hours and risk factors of metabolic syndrome (RMS; e.g. high blood pressure, elevated cholesterol levels) in a study among 763 employees. Instead, we found that workaholism was positively related to RMS, but only when work engagement was low. Surprisingly, we found that workaholism was negatively related to RMS in the highly engaged group. When further exploring mediation mechanisms, we found that workaholism, but not work hours, was related to reduced subjective well-being (e.g. depressive feelings, sleep problems), which in turn elicited a physical health impairment process. We also found that, compared with non-engaged workaholics, engaged workaholics had more resources, which they may use to halt the health impairment process. Our findings underscore that not long hours *per se*, but rather a compulsive work mentality is associated with severe health risks, and only for employees who are not engaged at work. Work engagement may actually protect workaholics from severe health risks.

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Editor Comments

Those of us that trained for a career in academia could not help but hear the phrase, “Publish or perish!” Having had that idea drilled into our heads as graduate students, many of us became habitualized to working extremely long hours. Labeled by our friends and family as “workaholics,” many of us have also become accustomed to hearing a myriad of warnings such as, “keep working like that and the only place it’ll get you is an early grave”! But is that truly the case? Do excessive work hours really make one a “workaholic”? And are excessive work hours or workaholism necessarily deleterious to one’s health? Research addressing such questions is equivocal, in part because objective health measures are hard to come by and in part because it’s often difficult to clearly separate out the effects of workaholism from work hours. However, in “Beyond nine to five” the authors have—using rigorous methods—managed to address both of these problems, and in the process, generate a number of important discoveries. If you are a workaholic that loves his or her work, then read on for some encouraging news. . . But regardless of how many hours you put in each week, the insights gleaned from this analysis should not be overlooked as they have some important implications for management theory in general, and theories of work stress in particular.

-Peter Bamberger, Action Editor

Reduced work week made top priority of labor congress.

– Ottawa Citizen, May 31, 1984

Protect the full-time work week.

– The Hill Congress Blog, January 7, 2015

In the last century, weekly work hours have drastically decreased in industrialized countries. Whereas 57-hour work weeks were not uncommon at the end of the nineteenth century, the average work week in industrialized nations was 32.7 hours at the start of the 21st century (Lee, McCann, & Messenger, 2007). The United States is the only industrialized country in which work hours are again on the rise. In 2005, eighteen percent of the American workforce worked 49+ hours (Lee et al., 2007). Given the recent upward trend of work hours, it is important to know the health consequences of long work-weeks. Unfortunately, research on the relationship between work hours and health outcomes is sparse and studies do not consistently show that work hours have an impact on health outcomes (Harrington, 2001; Van der Hulst, 2003). Indeed, there are three factors to consider before we can answer the question of whether working long hours is bad for health.

First, it is possible that previous studies have produced ambiguous results on the relationship between work hours and health because long work hours may go hand-in-hand with an inner drive to work hard among employees in the current workforce. Because of a lack of legal regulations at the turn of the 20th century, low wage employees (e.g., textile industry, or farmers) worked excessive hours because they had no other choice (Lee et al., 2007). The recent increase in work hours in the United States is mainly attributed to the excessive work hours of professionals, who often choose to work long hours for psychological rewards, such as self-esteem and job satisfaction (Brett & Stroh, 2003). Some of these achievement-striving professionals can be considered workaholics, a term coined in 1971 by Wayne Oates. Workaholics work longer hours than is reasonably expected of them by their supervisor or coworkers and have a compulsive inner drive to work to such a degree that they feel guilty when they are not working (Schaufeli, Bakker, Van der Heijden, & Prins, 2009). Work hours and workaholism are closely related constructs as both are indicators of working to excess, and therefore, are often used interchangeably. For instance, individuals who work long hours are sometimes called workaholics, even when it is unclear if they have an inner drive to work hard (Harpaz & Snir, 2003), and long work hours are the most often named core characteristic of workaholism (Oates, 1971; Scott, Moore, & Miceli, 1997). Yet, there is an important difference between these constructs because work hours refer to a work *behavior*—how many hours a week one works—whereas workaholism refers to a work *mentality*—the compulsive inner drive to work hard. The general assumption is that working long hours (Van der Hulst, 2003) and workaholism (Andreassen, 2014) are bad for employee health, but studies that examine the health consequences of both

Author’s voice:

Why is this research important to you?



Author’s voice:

What is important about this research?



simultaneously are lacking. Because each construct highlights a different aspect of working to excess, it is important to study their effects on health together because only focusing on one of them may dilute or mask the effects of the other.

Second, in their review of work hours and health, Spurgeon, Harrington, and Cooper (1997) suggest that it might be difficult to detect a relationship between work hours and objective health indicators because individuals who work long hours might enjoy their work. Work enjoyment might attenuate the risk of health consequences associated with long work hours (Oates, 1971; Schaufeli, Taris, & Van Rhenen, 2008) and therefore, it is crucial to take this factor into account when examining the relationship between work hours and health. Likewise, the workaholism literature has taken this factor into account by differentiating between two types of workaholics—those who are engaged and those who are not engaged² (Van Beek, Taris, & Schaufeli, 2011). *Engaged workaholics* work excessively and compulsively, but also enjoy their work and report feeling vigorous, absorbed, and dedicated while working (Schaufeli, Bakker, & Salanova, 2006). *Nonengaged workaholics* refers to employees who work excessively and compulsively, but who do not enjoy their work, in that they are less vigorous, absorbed by, and dedicated to their work. Without taking into account work engagement, it is possible that the true effects of work hours and workaholism on health outcomes have remained hidden.

Third, a limitation of past research that examines the effects of working to excess on health is that they almost exclusively measure health by self-reported health complaints of ailments such as headaches, perceived stress, and fatigue. These studies agree that long work hours (see for review studies: Sparks, Cooper, Fried, & Shirom, 1997; Van der Hulst, 2003) and workaholism (Andreassen, Ursin, & Eriksen, 2007; Chamberlin & Zhang, 2009; Clark, Michel,

Zhdanova, Pui, & Baltes, 2014) generally increase self-reported health complaints. Although important as indicators of how a person feels, self-reported health complaints are distinct from objectively measurable physiological health outcomes (e.g., enhanced blood pressure, high cholesterol levels). Physiological health outcomes are essential to understand, in that they are proximal precursors of disease endpoints (e.g., cardiovascular diseases, lethal heart attacks). Such physiological health problems are consequential for employees and their families from a health and well-being standpoint. They also have implications for organizations and society at large because employee health problems are associated with substantial economic costs because of absenteeism, turnover, and healthcare costs (Goetzel, Hawkins, Owzminkowski, & Wang, 2003).

To address these limitations, we investigate the effects of work hours and employees' workaholic tendencies on risk of metabolic syndrome, an immediate precursor of cardiovascular disease. In addition, we examine whether working to excess (i.e., work hours and workaholism) has the same health outcomes for those who are highly engaged at work compared as for those who are not. The main goal of this study is to bring more clarity around the often voiced but insufficiently tested assumption that working to excess is bad for health. We contribute to the literature on occupational health and employee well-being in three ways. First, we unravel the aspects of working to excess that are detrimental for health: working long hours (work behavior), working compulsively (work mentality), or both. Second, we examine if working to excess is bad under all conditions, or if some forms of working to excess (i.e., while being highly engaged with work) are less detrimental to employees' health. Third, we investigate the severity of the consequences of working to excess by examining its influence on physiological health indicators in addition to self-reported health complaints.

LONG WORK HOURS AND HEALTH

Researchers suggest that excessive work hours are related to impaired health because they impede full recovery, and poor recovery is thought to disturb physiological processes (e.g., increased heart rate, high cortisol levels) that go together with psychosomatic and physical health complaints (Chandola, Brunner, & Marmot, 2006; Van der Hulst, 2003). This health impairment process is explained by Allostatic load theory (Ganster & Rosen, 2013). The core tenet

² There have been several definitions of work engagement in the literature (Kahn, 1990; Rothbard, 2001; Schaufeli et al., 2006; see Rothbard & Patil, 2011 for a review). Some definitions of work engagement involve cognitive focus on the job (i.e., attention and absorption; Rothbard, 2001) as well as energy (Rothbard & Patil, 2011), whereas others also include a positive affective component (Schaufeli et al., 2006). Although there is considerable overlap between these definitions, the Schaufeli et al. (2006) definition of work engagement as "a positive, fulfilling work-related state of mind that is characterized by vigor, dedication, and absorption" is the broadest, in that it captures the component of positive/pleasurable engagement in work. In the current study, we conceptualize engaged workaholics as being both cognitively focused on their work and enjoying it; thus, we use Schaufeli et al.'s (2006) broader definition of engagement as it includes the positive affective component.

Author's voice:
How did the paper evolve and change
as you worked on it?



of this theory is that individuals experiencing ongoing stress first develop relatively minor health complaints (e.g., a headache) that eventually disturb various body systems and trigger more serious health complaints (e.g., high blood pressure).

A literature review of studies on the relationship between work hours and health, including self-reported health complaints and objective health indicators (e.g., high blood pressure, cortisol levels), illustrates both the scarcity and the inconsistency of findings. In the meta-analysis by Sparks et al. (1997), two out of the nineteen studies examined cardiovascular diseases. Both studies reported positive correlations between work hours and coronary heart disease. Spurgeon et al. (1997) reviewed studies on work and health in the period between 1960 and 1996 and report that three studies found a positive relationship between excessive work hours and cardiovascular diseases, whereas one study did not find an effect. Van der Hulst (2003) reviewed studies conducted between 1996 and 2001. Of the 27 studies, two studies (using an all-male sample) reported a positive relationship between long work hours, hypertension, and myocardial infarction, whereas five studies found no significant relationship. Four studies that examined cholesterol as the outcome variable did not find a significant relationship with work hours. Summarizing, review studies have identified seven studies that reported a positive relation and ten studies that did not find a significant relation between work hours and objective health indicators. Taking into account the file drawer effect (Rosenthal, 1979), it is possible that more (unpublished) studies found null effects between work hours and physiological health outcomes. In line with this observation, the authors of these review and meta-analytic studies remark that more research is needed to draw firm conclusions about the relationship between work hours and physiological health (Spurgeon et al., 1997; Van der Hulst, 2003).

WORKAHOLISM

Recent studies most commonly conceptualize workaholism along two dimensions, working excessively and working compulsively (Taris, Schaufeli, & Verhoeven, 2005). Working excessively is different from actual work hours as it regards work hours that are neither necessary from an economic standpoint nor demanded by the organization (Scott et al., 1997). In other words, working excessively captures the individual's belief that he or she needs to work hard, and this personal norm exceeds expectations in the employee's social context (e.g., national economy, organizational culture). Working compulsively refers to the employee's preoccupation with work, whereby he

or she finds it difficult to detach from work and feels guilty when not working.

Workaholism is related to Type A personality, which also encapsulates an inner drive to work hard (Burke, 2000). Type A behavior consists of two dimensions, namely achievement-striving (e.g., competitiveness, job involvement, ambitious, etc.) and irritability/impatience (e.g., time urgency, aggressiveness, hostility; Hallberg, Johansson, & Schaufeli, 2007; Scott et al., 1997). Although workaholics may share a number of characteristics with Type A personalities, such as being ambitious and competitive, to be a workaholic, one would also need to spend excessive amounts of time at work and constantly think about work (Scott et al., 1997). Moreover, whereas Type A is a personality trait that is dispositional, workaholism is a pattern of beliefs and cognitions that is learned either early in childhood from parents or later in life from the organization's culture (Robinson, 1996). Researchers have found significant correlations between Type A personality and workaholism and suggest that Type A personality is a precursor of workaholism (Robinson, 1999). In this study, we focus on workaholism because it is the work-related outcome of Type A personality. In other words, whereas Type A personality can affect all life domains (e.g., being a competitive marathon runner; feeling irritated while waiting in a cashier line), workaholism is more context-specific and looks at competitive and compulsive work cognitions.

WORKAHOLISM AND HEALTH

Workaholics typically have a continuous influx of work demands (Andreassen et al., 2007; Spence & Robbins, 1992) because they often seek high-pressure jobs and create additional work for themselves (Ng, Sorensen, & Feldman, 2007; Porter, 1996). They stay psychologically attached to work and take little time for recovery (Taris et al., 2005; Taris, Geurts, Schaufeli, Blonk, & Lagerveld, 2008). Because of the combination of continuous work demands and lack of recovery, workaholics are likely to experience debilitating, ongoing stress (Hobfoll & Shirom, 2000). As described by Allostatic load theory (Ganster & Rosen, 2013), ongoing stress may trigger a health impairment process that eventually puts workaholics at a higher risk for cardiovascular diseases (Chandola et al., 2006; Van der Hulst, 2003).

Similar to the literature on work hours, there is little support in the workaholism literature for the assumption that workaholics have a higher risk for objective health outcomes (Andreassen, 2014; Vodanovich et al., 2007), despite having ample support for a relationship between workaholism and self-reported health complaints (Andreassen et al.,

2007; Chamberlin & Zhang, 2009; Clark et al., 2014). This leads to our first research question: Do working long hours and/or workaholism increase the risk for impaired physiological health? In line with Allostatic load theory, we examine if work hours and workaholism are associated with a health impairment process that is characterized by health complaints (e.g. headaches, heartburns), followed by impaired physiological health. As our physiological health outcome we focus on the Risk factors for Metabolic Syndrome (RMS), a composite measure of abdominal obesity, elevated blood pressure, low high-density lipoprotein cholesterol, and elevated triglycerides because these risk factors are highly predictive of the development of cardiovascular disease and diabetes (Eckel, Grundy, & Zimmert, 2005).

WORK ENGAGEMENT

Spurgeon et al. (1997) suggested decades ago that working hard might not be as harmful for employees' health when they enjoy their work. Work enjoyment has also been a topic for debate in the workaholism literature (Aziz & Zickar, 2006; Clark et al., 2014; Ng et al., 2007). The lack of enjoyment is prevalent in Oates's (1971) initial description of workaholics as "persons whose chronic over-involvement with work disturbs personal health and happiness and interferes with the establishment of wholesome relationships." Other scholars responded to this negative image by underscoring that workaholism may have positive features as well, such as enjoyment, creativity, and career success (Machlowitz, 1980; Ng et al., 2007). Spence and Robbins (1992) bridged this divide by identifying two types of workaholics: those who enjoy their work and those who do not.

More recent studies have continued to pursue this line of research by showing the conceptual difference between workaholism and work enjoyment, using work engagement as a proxy for work enjoyment (Schaufeli et al., 2008, 2009; Van Beek, Hu, Schaufeli, Taris, & Schreurs, 2012). In addition, various studies examined differences in wellbeing and reported health outcomes of workaholics and engaged employees (Andreassen et al., 2007; Shimazu & Schaufeli, 2009). These studies examine the main effects of workaholism and engagement on well-being and health, and consistently show that engaged employees have better subjective well-being and report fewer health complaints than workaholics.

Only a few studies (Bonebright, Clay, & Ankenmann, 2000; Kanai, Wakabayashi, & Fling, 1996; Van Beek et al., 2011), however, test Spence and Robbins' (1992) the original idea that there are two types of workaholics (low vs. high in work enjoyment), which assumes an interaction effect. These studies report

that well-being is more impaired among nonengaged workaholics as compared to engaged workaholics, as indicated by higher scores on burnout (Van Beek et al., 2012) and stress (Kanai et al., 1996), and lower scores on life satisfaction and purpose in life (Bonebright et al., 2000). These findings support the hunch that work engagement may counterbalance the detrimental health effects caused by workaholism.

Empirical evidence on the buffering effect of work engagement on the relationship between work hours and health is even scarcer, if not absent. We suggest that engagement might have a similar buffering effect. Specifically, the health risks associated with working long hours may be reduced when the employee is highly engaged with work. This leads to our second research question: Does work engagement buffer the harmful effect of work hours and workaholism on health outcomes? We examine a potential attenuating effect at two points in the health impairment process. First, we investigate if work hours and workaholism are less strongly related to self-reported health complaints when work engagement is high as opposed to low. Second, we examine if health complaints are less likely to result in severe health risks (i.e., RMS) when work engagement is high as opposed to low. The relationships examined in this study are summarized in Figure 1.

METHOD

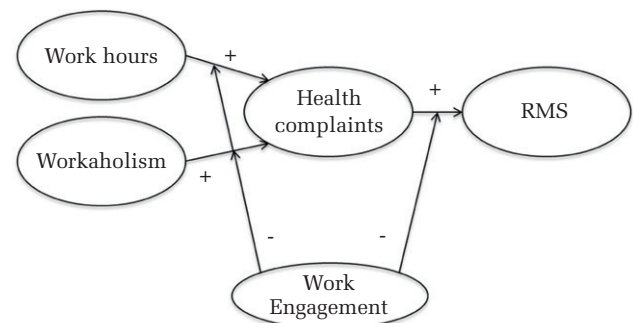
Sample and Procedure

Data were collected in 2010 at the Dutch subsidiary of an international financial consulting firm

Author's voice:
What motivated you personally to undertake this research?



FIGURE 1
Proposed Relationships between Work Hours, Workaholism, and Health Outcomes



Author's voice:

How did you get access to your data or site?



with more than 3,500 employees. We conducted a survey among employees and obtained both employees' health screening and personnel records. We collected survey data in April 2010 using a web-based questionnaire where we measured employee's workaholism, work engagement, and health complaints along with several control variables. Employees were informed about the questionnaire through digital newsletters and reminded several times to complete the survey. Although the organization encouraged employees to participate in the survey, employees were also informed that participation was voluntary. After participating in the survey, employees could voluntarily sign up for a health screening, conducted by medical staff. The health screenings took place in May and June 2010. The data sources were merged using the employee ID numbers.

Of a total 3,735 employees, 1,277 completed the questionnaire (34 percent response rate). Of those respondents, 763 participated in the health screening (60 percent). We analyzed whether the respondents who participated in the survey but not in the health screening differed from our sample. Using an analysis of variance, we found no significant difference in the means of our sample and the means of the dropouts on any of the model variables that were measured in the survey (e.g., workaholism, self-reported health complaints). Forty-seven percent of the respondents held a management position. Respondents worked 41.93 hours weekly on average. Although the gender distribution in our sample was fairly equal with 379 men (49.7 percent) and 384 women (50.3 percent), there were more females in the response group than in the total company population (company: 58.5 percent male vs. 41.5 percent female, t -value = 273.60, $p < .001$). The mean age of our sample was 38.40, which is higher than the statistic for the overall personnel (35.08, t -value = 10.32, $p < .001$). Over half of the employees had a university degree (54 percent), whereas the rest of the employees had either higher vocational education (associate degree; 24 percent) or a middle to lower vocational education (22 percent). More than two-thirds of all employees (81 percent) were married or cohabiting.

MEASURES

Risk Factors for Metabolic Syndrome

A review of Allostatic load studies points out that composite measures, in which various indicators of

second stage Allostatic load factors are combined, are the most reliable indicators of RMS (Ganster & Rosen, 2013). We followed the definition of Grundy, Brewer, Cleeman, Smith, & Lenfant (2004) that includes the following risk factors for metabolic syndrome: waist measurement, triglycerides, high-density lipoprotein cholesterol, blood pressure, and blood glucose. We used the cut-off points from the American Heart Association (Grundy et al., 2004) for waist measurement (men: >102 cm; women: >88 cm), triglycerides (>150 mg/dl), high-density lipoprotein cholesterol (men: <50 mg/dl; women <40 mg/dl), and hypertension (systolic blood pressure >130 mm Hg or diastolic blood pressure >85 mm Hg). Because we had only non-fasting blood glucose measures, we dropped this biomarker from the analysis.³ For each risk factor we created a dummy variable, with the scores 0 (cut-off value and lower) and 1 (above cut-off point). The four resulting dummy variables were combined and used as indicators of a formative measure (Edwards & Bagozzi, 2000) of risk for metabolic syndrome, ranging from 0 to 4. This approach is in line with the medical literature assuming that health risk is significantly higher the more risk factors are present in a patient (Grundy et al., 2005). This implies that the indicators are the causes of the construct, which is the most fundamental characteristic of a formative measure (Edwards, 2011). Note that we do not diagnose employees, but that, consistent with the medical literature (Grundy et al., 2005), we merely test to see if they have higher versus lower risk for metabolic syndrome based on the number of risk factors present.

Workaholism

Workaholism was measured using the short version of the work addition risk test developed by Taris et al. (2005). In line with our definition of workaholism, the nine-item scale consists of two subdimensions: working excessively and working compulsively. This scale has been validated by multiple studies (Taris et al., 2005; Schaufeli et al., 2008). Items include "I find myself continuing to work after my coworkers have called it quits," "I feel guilty when I am not working on something," and "I put myself under pressure with self-imposed deadlines when I work" ($\alpha = .82$).

³ We tested whether including nonfasting glucose as an indicator of RMS changed the results of our models. This was not the case. However, because nonfasting glucose is not necessarily an indicator of RMS, we did not include this biomarker in our main analyses.

Response categories ranged from 1 (strongly disagree) to 5 (strongly agree).

Work Hours

We asked employees to report weekly *work hours*, including overtime, but not commute time.

Work Engagement

We used the thirteen-item version of the Utrecht Work Engagement Scale (UWES; Schaufeli et al., 2006). The UWES includes three subscales that reflect the underlying dimensions of engagement: vigor (five items), dedication (four items), and absorption (four items). Example items are “At my job, I feel strong and vigorous,” “I am enthusiastic about my job,” and “When I am working, I forget everything else around me” ($\alpha = .87$). Together, the subdimensions form an overall work engagement scale that has been validated in various studies across countries (Bakker, Schaufeli, Leiter, & Taris, 2008). All items were scored on a five-point rating scale ranging from 1 (totally disagree) to 5 (totally agree).

Physical Health Complaints

We used a scale of self-reported health complaints developed by occupational physicians in the Netherlands (VVBA: Van Veldhoven & Meijman, 1994). The 12-item scale ($\alpha = .82$) covers physical symptoms that are characteristic of the first AL stage and that have been related to stress in previous research (Bonger, Ijmker, Van den Heuvel, & Blatter, 2006; Cohen, Tyrrell, & Smith, 1999; Van der Hulst, 2003). Items were rated on five-point scales ranging from 1 (*never*) to 5 (*always*). Sample items are “Do you suffer from severe headaches?”, “Do you have stomach upsets?”, and “Do you have recurrent problems with your sinuses (congestion, running nose, sneezing)?”

Controls

Research shows that genetics, age, lifestyle, and stress are RMS's potential antecedents (Alberti, Zimmet, & Shaw, 2005). Thus, we control for hereditary predisposition for cardiovascular disease, age, and healthy lifestyle. *Hereditary cardiovascular disease* asked about the occurrence of cardiovascular disease in the primary family line (parents, siblings) before the age of 60, scored as a dummy variable (0 = no, 1 = yes). *Age* was a continuous variable. Four lifestyle factors—exercise, smoking, excessive alcohol intake, and diet—were combined

for our healthy lifestyle variable (Grundy et al., 2004). We asked whether the respondent exercised three times a week for more than 30 minutes (0 = no, 1 = yes). Smoking was measured as a dummy variable (0 = no, 1 = yes). Cut-offs for excessive alcohol (0 = no, 1 = yes) were 15 drinks a week for women and 21 for men (Meerkerk, Aarns, Dijkstra, Weisscher, Njoo, & Boomsma, 2009). In two other questions, respondents were asked about their diet, one question referred to a high-fat diet (0 = low fat, 1 = high fat) and another to a high fiber diet (0 = low fiber, 1 = high fiber). After reversing smoking, alcohol use, and high-fat diet, the five resulting dummy variables were used as indicators of a formative measure (Edwards & Bagozzi, 2000) of *healthy lifestyle*, ranging from 0 to 5. We also controlled for employee gender, education, and supervisor position as these variables may relate to workaholism and health outcomes (Doerfler & Kammer, 1986; Schaufeli et al., 2009; Van der Hulst, 2003). Gender was coded as a dummy variable (0 = male, 1 = female). The highest completed education variable ranged from 1 (high school) to 4 (university degree). We also controlled for burnout to take into account individual differences in general outlook on life. Burnout was measured using the two core dimensions (five items each) emotional exhaustion and cynicism of the Maslach Burnout Inventory-General Survey (MBI-GS; Schaufeli, Leiter, Maslach, & Jackson, 1996). Items were rated on a five-point scale ranging from 1 (*never*) to 5 (*always*). A sample item for emotional exhaustion was, “I feel exhausted when I get up in the morning”. A cynicism item was, “I am more cynical about the contribution of my work.” Finally, we asked if employees supervised others and if they received paid help with household chores and childcare tasks to take into account that engaged employees might have higher ranked jobs with certain perks that makes their jobs more manageable or pleasant (Goh, Pfeffer, Zenios, 2015). These three dummy variables were all coded as (0 = no, 1 = yes).

ANALYSES

We tested the proposed model using structural equation modeling and moderated mediation in MPlus (Muthén & Muthén, 1998–2012). We used several fit indices to measure the fit of our model with the data, including the root mean square error of approximation (RMSEA), the comparative-fit-index (CFI), and the standardized root mean residual (SRMR). Models with fit indices of $>.95$ and an RMSEA and SRMR of $< .06$ indicate a close fit between the model and the data, whereas fit indices between $.90$ and $.95$ represent a reasonable fit (Hu &

Bentler, 1999). In the structural model, we included regression pathways from the control variables to both endogenous variables.

We used bootstrapping to test the significance of the hypothesized indirect effects. Bootstrapping is a statistical resampling method that estimates the parameters of a model and their standard errors from the sample (Preacher & Hayes, 2008). We extracted new samples (with replacement) from our sample 2000 times and reported the direct and indirect estimates of the hypothesized model. We also used bootstrapping to test the expected moderation effect. The moderation effects were tested in a two-stage moderated mediation model including engagement as a continuous variable. We estimated the indirect relationship for values of one standard deviation above and below the mean of engagement (Preacher, Rucker, & Hayes, 2007).

We tested the models with and without each control variable, thus removing them one at a time. Five of the control variables, education, burnout, supervisor position, and help with household chores and child-care, had no effect on the relationships under study and did not significantly relate to RMS. We dropped these variables from the models to create more parsimonious models (Spector & Branninck, 2011).

RESULTS

Descriptive Statistics

Table 1 provides the means, standard deviations, and correlations of all model variables. RMS was positively related to work hours and hereditary cardiovascular disease while being negatively correlated with healthy lifestyle. Also, men and older employees had higher RMS scores. Workaholism, but not work hours, was positively related to health complaints. We did not find a significant bivariate correlation between health complaints and RMS, so we ran a partial correlation to better understand this relationship. When controlling for gender, the correlation between health complaints and RMS became significant ($r = .08, p < .05$). The suppressed correlation seems to be due to the fact that women in general report more health complaints (Ihlebaek & Eriksen, 2003), whereas women's biological risk for RMS is lower (Regitz-Zagrosek, Lehmkuhl, & Weickert, 2006). This is also shown by the correlations in our sample between gender and health complaints ($r = .19, p < .01$) and gender and RMS ($r = -.44, p < .01$).

Work Hours, Workaholism, and Health

Table 2 (Mediation Model), shows the path estimates of our model whereby work hours and

workaholism are indirect predictors of RMS through health complaints. The model shows a close fit to the data ($\chi^2(13) = 302.57, p < .01$; RMSEA = .00; SRMR = .00; CFI = 1.00, TLI = 1.00). Work hours were not significantly related to health complaints or RMS. To make sure we did not miss possible non-linear effects, we calculated the squared term of work hours, and we created a dummy variable for excessive work hours based on the mean of work hours (0 = 41 hours or less; 1 = 42+ hours). We ran these two additional models but neither the quadratic term, nor the dummy variable was significantly related to health complaints or RMS.

Workaholism was positively related to health complaints ($B = .183, SE = .038, p < .001$), and health complaints were positively related to RMS ($B = .148, SE = .064, p < .05$). The estimate of the indirect pathway from workaholism to RMS was significant ($B = .029, SE = .014, p < .05$). Note that we also found a direct negative relationship between workaholism and RMS ($B = -.127, SE = .064, p < .05$).

To test whether the indirect effect of work hours and workaholism on RMS differed between non-engaged and engaged employees, we estimated a moderated-mediation model with engagement as the moderator of the indirect effect of work hours and workaholism on RMS through health complaints. This two-stage moderated-mediation model had an adequate model fit ($\chi^2(21) = 376.114, p < .01$; RMSEA = .085; SRMR = .009; CFI = .98). Table 2 (Moderated Mediation Model) reports the unstandardized coefficients for each pathway in the model. Although the first part of the indirect relationships (work hours \rightarrow health complaints and workaholism \rightarrow health complaints) were not moderated by engagement, we found support for engagement moderating the second part (health complaints \rightarrow RMS) of the indirect relationship ($B = -.243, SE = .132, p < .05$).

In turn, we estimated the indirect effect of work hours and workaholism on RMS through health complaints for two conditional values of work engagement. The indirect effect of work hours on RMS was not significant for employees with a low (mean - 1SD) or with a high (mean + 1SD) score on engagement because work hours were not significantly related to health complaints in either group. For employees low in engagement, the indirect, positive relationship of workaholism on RMS was significant ($B = .054, SE = .020, p < .05$), whereas this indirect relationship was not significant for employees high in engagement ($B = .006, SE = .018$ ns). This interaction effect is depicted in Figure 2. These findings indicate that the indirect relationship between workaholism and RMS differs between employees high versus low in engagement because the second part of this mediated relationship

TABLE 1
Correlations of Model Variables

	M	SD	1	2	3	4	5	6	7	8	9	10	11
1. RMS	1.26	1.10											
2. Work hours	41.93	8.52	.17**										
3. Workaholism	3.04	0.60	.00	.48**									
4. Engagement	3.40	0.44	.01	.08*	.06								
5. Health complaints	2.11	0.64	.01	-.04	.16**	-.26**							
6. Depressive feelings	1.85	0.75	-.02	.03	.28**	-.38**	.41**						
7. Need for recovery	2.50	0.66	.03	.16**	.44**	-.25**	.39**	.51**					
8. Sleep problems	2.47	0.83	-.04	-.06	.25**	-.32**	.42**	.56**	.45**				
9. Healthy life style	3.89	0.94	-.13**	-.12**	-.11**	.10**	-.13**	-.15**	-.23**	-.13**			
10. Hereditary cardiovascular diseases	1.26	0.44	.12**	-.12**	-.04	-.06	.10**	.00	-.03	.03	.03		
11. Gender (female)	.50	0.50	-.44**	-.47**	-.14**	-.01	.19**	.03	-.01	.13**	.14**	.08*	
12. Age	38.40	10.15	.20**	-.19**	-.13**	.09*	-.01	-.05	-.13**	-.08*	.10**	.19**	-.07*

Note: N = 763
** $p < .01$
* $p < .05$

TABLE 2
Result Path Analysis of the Mediation Model and Moderated-Mediation Model

	Mediation				Moderation			
	Health Complaints		RMS		Health Complaints		RMS	
	<i>B</i>	SE	<i>B</i>	SE	<i>B</i>	SE	<i>B</i>	SE
Work hours	-.003	.003	.003	.006	-.001	.003	.002	.006
Workaholism	.209***	.043	-.127*	.064	.215***	.042	-.134*	.063
Healthy lifestyle	-.099***	.025	-.096*	.040	-.082**	.025	-.097*	.040
Hereditary cardiovascular diseases	.129*	.054	.292***	.080	.103*	.053	.294***	.080
Gender	.271***	.050	-.968***	.082	.287**	.048	-.960***	.082
Age	.001	.003	.016***	.004	.003	.002	.015***	.004
Health complaints			.138**	.060			.145*	.060
Work engagement					-.382***	.053	.093	.083
Work hours* engagement					-.007	.007	.013	.012
Workaholism* engagement					.026	.095	-.099	.130
Health complaints* engagement							-.243*	.132
<i>Effect size</i>								
<i>R-Square</i>	.101		.252		.168		.257	

Note: $N = 763$. Unstandardized regression estimates.

*** $p < .001$

** $p < .01$

* $p < .05$

(health complaints \rightarrow RMS) is attenuated by work engagement.

Posthoc Analysis 1: Relationship between Work Hours and Workaholism

As a first discovery, we found that work hours have no adverse effects on health, whereas workaholism was positively related to RMS through increased health complaints. This unexpected finding led us to further explore the relationship between workaholism and work hours. As mentioned previously, workaholism and long work hours are closely related, but different components of working to excess, which could mean that both need to be present for work hours to instigate a health impairment process. Therefore, we looked at the possibility that work hours are detrimental for health, but only when the employee is a workaholic. The interaction effects between workaholism and work hours on health complaints ($B = .008$, $SE = .005$, $p > .05$) and RMS ($B = .011$, $SE = .007$, $p > .05$) were, however, not significant.

Second, given the key role that excessive work hours play in the definition of workaholism (Andreassen et al., 2007; Scott et al., 1997; Taris et al., 2005), we looked at the possibility that workaholics experience health problems *because* they work long hours. In this alternative model, work hours are treated as the first mediator, and health complaints as the second mediator, between workaholism and RMS. Workaholism was strongly positively related to work hours ($B = 5.609$, $SE = .0406$, $p < .001$); however, work hours were not significantly related to

health complaints ($B = -.003$, $SE = .003$, $p > .05$) or RMS ($B = .003$, $SE = .006$; $p > .05$). The results of this double mediation model are presented in Table 3.⁴ Again, these results indicate that work hours are not significantly related to health complaints and RMS.

Posthoc Analysis 2: Work Hours Versus Workaholism

Our main findings and first *posthoc* analysis show that an employee's compulsive work mentality, but not work hours per se, is detrimental to health. This finding raises the question, "what sets workaholics

Author's voice:
 Was there anything that surprised you about the findings? If so, what?

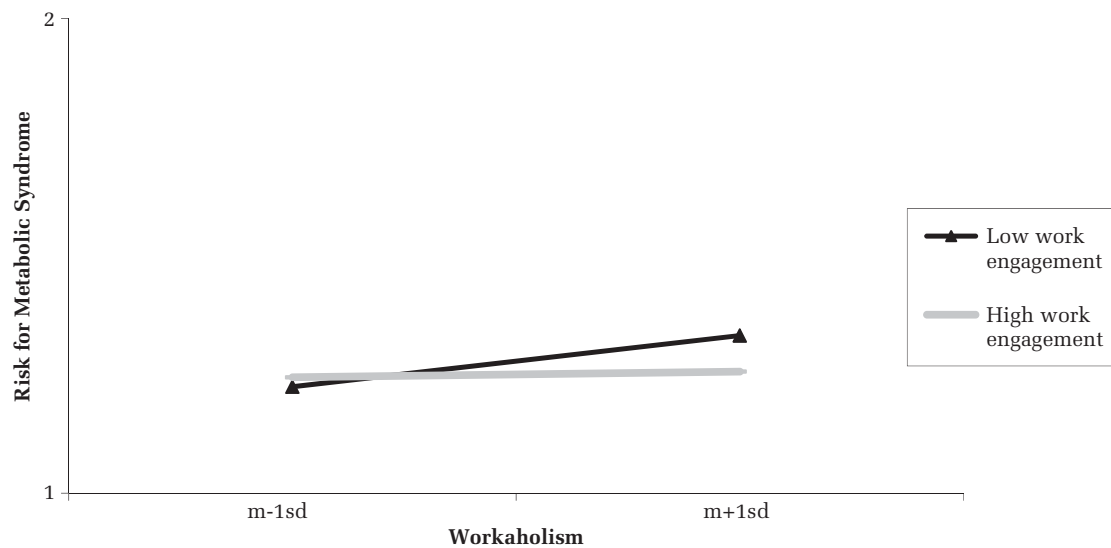


Author's voice:
 What drew you to this research? Why?



⁴ We also tested a chain model (workaholism \rightarrow work hours \rightarrow health complaints \rightarrow RMS), in which workaholism was not related directly to the health outcomes but only indirectly through work hours. In this model, work hours were also not significantly related to health complaints or RMS.

FIGURE 2
Moderation Effect of Work Engagement on the Indirect Effect of Workaholism on RMS



apart from individuals who simply work long hours?” Workaholics are characterized by their constant obsession over work, and not detaching from work (Scott et al., 1997; Taris et al., 2005), suggesting that workaholics’ negative psychological experience (e.g. rumination, depression) of work may play a decisive role in their declining health. To gain further insight into the difference between individuals who work long hours and workaholics, we chose to include three subjective well-being indicators that have been previously related to workaholism and examine if those impaired subjective well-being indicators explain workaholics’ health complaints. The first indicator we chose was depressive feelings because workaholics are known to

set higher goals after each accomplishment while rarely feeling satisfied with their accomplishments (Porter, 1996), creating feelings of frustration and despair. Second, we looked at sleep problems because workaholics find it difficult to detach from work (Scott et al., 1997) and sleep problems are indicative of ongoing rumination and distress (Querstret & Cropley, 2012). Finally, we looked at the need for recovery, a concept that includes time needed to unwind after work, feeling depleted after work, and the inability to connect with others at home after work; all indicators of severe distress that have been associated with workaholism (Bonebright et al., 2000; Taris et al., 2008). The measurement instruments are reported in the Appendix.

TABLE 3
Posthoc Analysis 1: Result Path Analysis with Work Hours as Mediator

	Work Hours		Health Complaints		RMS	
	<i>B</i>	SE	<i>B</i>	SE	<i>B</i>	SE
Workaholism	5.609***	.406	.209***	.043	-.127*	.064
Work Hours			-.003	.003	.003	.006
Health complaints					.138*	.060
Healthy lifestyle	-.063	.258	-.099***	.025	-.096*	.040
Hereditary cardiovascular diseases	-.717	.568	.129	.054	.292***	.080
Gender	-7.206***	.458	.271***	.050	-.968***	.082
Age	-.130***	.024	.001	.003	.016***	.004
Effect size						
R-Square	.426		.101		.252	

Note: *N* = 763. Unstandardized regression estimates.

****p* < .001

***p* < .01

**p* < .05

TABLE 4
Posthoc Analysis 2: Result Path Analysis of the Double Mediation Model

	Depressive Feelings		Sleep Problems		Need for Recovery		Health Complaints		RMS	
	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>	<i>B</i>	<i>SE</i>
Work hours	-.012**	.004	-.020***	.005	-.006	.003	.003	.003	.003	.006
Workaholism	.416***	.055	.464***	.060	.491***	.046	-.023	.041	-.143*	.068
Depressive feelings							.159***	.035	-.076	.061
Sleep problems							.159***	.031	.013	.052
Need for recovery							.190***	.039	.084	.068
Health complaints									.138*	.068
Healthy lifestyle	-.104**	.031	-.108***	.031	-.130***	.024	-.040	.023	-.092*	.041
Hereditary cardiovascular diseases	.010	.061	.057	.068	-.010	.050	.120*	.049	.292***	.080
Gender	.048	.060	.150*	.065	.055	.049	.229***	.047	-.971***	.082
Age	-.001	.003	-.005	.003	-.004	.002	.003	.002	.016***	.004
Effect size										
R-Square	.110		.129		.235		.285		.254	

Note: *N* = 763. Unstandardized regression estimates.

****p* < .001

***p* < .01

**p* < .05

We used the same analytic techniques in Mplus to test indirect effects, as described previously. The post hoc model is a double mediation model whereby work hours and workaholism predict RMS first via the three subjective well-being variables and then via health complaints. We included covariances between the three mediator variables depressive feelings, need for recovery, and sleep problems. The double-mediation model had a close fit ($\chi^2(40) = 1291.562$, $p < .001$; RMSEA = .000; SRMR = .000; CFI = 1.00) and the unstandardized estimates of the relationships are reported in Table 4. To be better able to compare the impact of workaholism and work hours, we report the standardized estimates here. Workaholism was positively related to depressive feelings ($\beta = .333$, $p < .001$), sleep problems ($\beta = .338$, $p < .001$), and need for recovery ($\beta = .451$, $p < .001$). Interestingly, work hours were negatively related to depressive feelings ($\beta = -.134$, $p < .01$) and sleep problems ($\beta = -.201$, $p < .001$), and not significantly related to the need for recovery ($\beta = -.077$, $p > .05$). Depressive feelings ($\beta = .188$, $p < .001$), sleep problems ($\beta = .207$, $p < .001$), and need for recovery ($\beta = .196$, $p < .001$) were positively related to health complaints, in turn, were positively related to RMS ($\beta = .080$, $p < .05$). The positive, double indirect effects of workaholism on RMS through depression ($B = .009$, $SE = .005$, $p < .05$), sleep problems ($B = .010$, $SE = .006$, $p < .05$), and need for recovery ($B = .013$, $SE = .007$, $p < .05$) and health complaints (second mediator) were significant, whereas the negative double indirect effects of work hours on RMS were not significant.

Posthoc Analysis 3: Engaged Versus Nonengaged Workaholics

Our second discovery, that workaholism was only positively related to RMS for employees with low work engagement but not for employees with high work engagement raises the question, “what makes engaged workaholics different from nonengaged workaholics?” Researchers assert that engaged employees have more contextual resources at work (e.g., job autonomy) and at home (e.g., social support), as well as personal resources (e.g., optimism) that help them cope with stress and its potentially harmful effects on health (Bakker, 2009; Van Beek et al., 2011, 2012). To test this idea, we calculated the mean scores on various personal, work, and nonwork resources for engaged versus nonengaged workaholics. The measurement instruments are reported in the Appendix.

We followed the procedure of Van Beek et al. (2011) using mean scores of the workaholism and work engagement scales as cut-off points. This results in four categories of employees: non-engaged workaholics, engaged workaholics, engaged employees, and nonworkaholic/nonengaged employees. The group means and the results of the Bonferroni test are shown in Table 5. In comparison with nonengaged workaholics, engaged workaholics score higher on all work resources (job autonomy, co-worker support, and supervisor support), non-work resources (social support at home and work-life balance), and personal resources (time management skills, communication skills, and intrinsic motivation).

TABLE 5
Posthoc Analysis 3: Means, Standard Deviations, and Significant Difference Test of Resources for Four Groups

	Nonengaged Workaholic		Engaged Workaholic		Engaged Employee		Nonengaged Non workaholic		Bonferroni Test		
	M	SD	M	SD	M	SD	M	SD	$\Delta UW - EW$	$\Delta UW - E$	$\Delta UW - N$
<i>Nonwork resources</i>											
Family social support	3.75	.75	4.00	.60	4.04	.66	3.89	.70	-.25**	-.29***	-.14
Work-life balance	2.19	.62	2.60	.66	3.05	.62	2.95	.62	-.41***	-.87***	-.77***
<i>Personal resources</i>											
Time management skills	3.46	.48	3.62	.54	3.66	.48	3.35	.56	-.16*	-.20**	.11
Communication skills	3.81	.37	3.97	.38	3.91	.33	3.71	.34	-.15***	-.10	.10
Intrinsic job motivation	2.82	.51	3.36	.46	3.35	.43	2.87	.49	-.54***	-.54***	-.05
<i>Work resources</i>											
Job autonomy	2.50	.48	2.81	.42	2.76	.55	2.54	.57	-.32***	-.26***	-.04
Co-worker support	3.65	.50	3.92	.41	3.96	.43	3.74	.47	-.28***	-.32***	-.08
Supervisor support	3.31	.74	3.62	.59	3.70	.59	3.41	.69	-.31***	-.40***	-.10
N	167		203		193		200				

To gain further insight into the relationship between workaholism and RMS for employees who score high versus low on engagement, we estimated the double mediation model from *posthoc* analysis 2 for both groups using a multigroup analysis in Mplus. A model that allowed free pathway estimates for each group fit the data significantly better than a constrained model ($\Delta\chi^2(18) = 45.45, p < .001$), which indicates that the pathway estimates are not equal in both groups. Figure 3 reports the path estimates for groups scoring above and below average on work engagement.

The multigroup results show that in both groups (engaged and nonengaged), workaholism is positively related to the three indicators of impaired subjective well-being, which are in turn positively related to health complaints. The difference between engaged and nonengaged workaholics starts in the last stage of the mediation model; only in the nonengaged group are health complaints significantly related to RMS ($B = .330, SE = .086, p < .001$). Therefore, positive indirect effects of workaholism on RMS through the three impaired subjective well-being indicators and health complaints are only significant in the nonengaged group (depressive feelings: $B = .021, SE = .009, p < .05$; sleep problems: $B = .029, SE = .011, p < .05$; need for recovery: $B = .033, SE = .014, p < .05$) and not in the engaged group. Interestingly, this multigroup analysis also showed that the unexpected direct, negative relationship between workaholism and RMS is only significant in the engaged group ($B = -.226, SE = .111, p < .05$). Thus, although the slopes of the direct negative relationship between workaholism and RMS do not statistically differ between nonengaged and engaged employees (i.e., the interaction term was not significant), the simple slope is only

significantly different from zero in the group scoring above average on work engagement.

Finally, we compared the structured means on RMS between the two groups and calculated the effect size (Cohen's *d*). A structured mean takes into account possible confounding effects of control variables. The structured means on RMS differed significantly [mean difference = $-.168 (.045), p < .001$] between the engaged group (mean = 1.151) and the nonengaged group (mean = 1.319). The Cohen's *d* was .27, which indicates a medium effect size. In other words, the score on RMS is significantly higher among nonengaged as compared to engaged workaholics when taking into account all model variables.

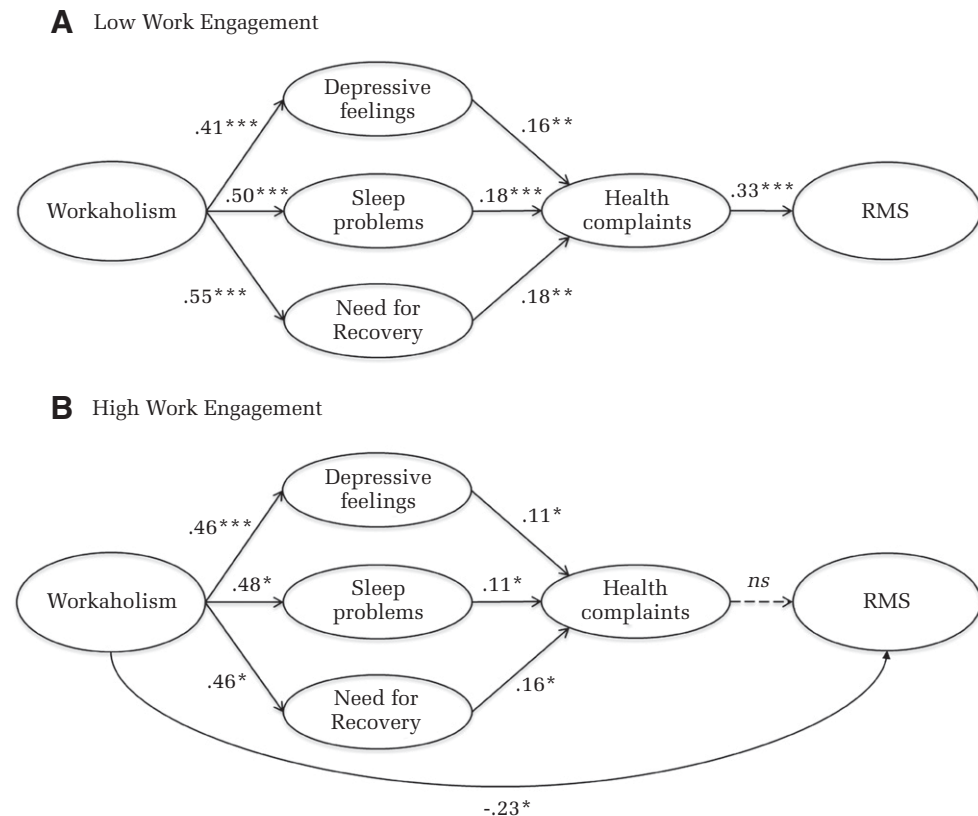
DISCUSSION

Work Hours or Work Mentality?

The first goal of this study was to disentangle which aspect(s) of working to excess (working long hours or a compulsive work mentality) has adverse effects on objective health.

Surprisingly, work hours neither affected self-reported health complaints nor the risk factors of metabolic syndrome. Workaholism, however, was significantly related to both health outcomes—workaholics reported more physical health complaints, and, in turn, scored higher on risk factors of metabolic syndrome. This unexpected finding led us to further explore the similarities and differences between the behavioral (i.e., work hours) and cognitive (i.e., workaholism) components of working to excess. In the first *posthoc* analysis, we found that workaholism is related to impaired health, regardless of how many hours employees work. We also found that most workaholics do work long hours, but that long work hours per se are not the reason why workaholics have

FIGURE 3
Path Estimates for Employees Low and High in Work Engagement



Note: *** $p < .001$, ** $p < .01$, * $p < .05$

impaired health. The second *posthoc* analysis revealed that workaholics' lower subjective well-being, as indicated by increased depressive feelings, sleep problems, and need for recovery, explained why they have more psychosomatic and physiological health symptoms. These findings contradict the common assumption that excessive work hours are responsible for the ill health of workaholics (Andreassen et al., 2007; Harpaz & Snir, 2003; Scott et al., 1997) and suggest that impaired subjective well-being better explains the increased health risks of workaholics.

Our results also highlight that just the behavior of working long hours is not necessarily harmful for health. The work hours literature has pointed insufficient recovery as the key mechanism that leads to health impairment (Chandola et al., 2006; Van der Hulst, 2003). Based on our findings, however, it seems that recovery is not impaired even if the employee works long hours. Nonworkaholics may be better at switching off after a long workday. After working extended hours, they may feel satisfied, sleep well, and hence, feel recovered on the next

morning. By contrast, workaholics' inability to *psychologically* detach from work seems to impede their recovery (Andreassen et al., 2007; Sonnentag, 2012) and causes them to experience ongoing distress (Scott et al., 1997). Workaholics are more likely to keep obsessing and worrying over work, even when they are not technically working, whereas they are less likely to be content with their performance (Porter, 1996), which may interfere with their ability to sleep and cause them to feel more depressed and fatigued. This sets the stage for the start of the Allostatic load process whereby ongoing distress pushes body systems out of balance triggering psychosomatic complaints and physiological health issues such as high blood pressure and elevated cholesterol (Ganster & Rosen, 2013).

Work Engagement

The second goal of our study was to examine if the health consequences of workaholism and working extended hours are similar for employees who are engaged versus those who are not engaged with their

work. Work hours were not related to health complaints or RMS regardless of the employee's level of work engagement. However, we found two differences in the health outcomes of engaged versus nonengaged workaholics. First, even though workaholism was related to more self-reported psychological and physical health complaints regardless of the level of work engagement, health complaints were only associated with worse objective health (i.e., higher RMS) when work engagement was low. One explanation for this is based on conservation of resource theory (Hobfoll, 2002), which suggests that individuals with more resources can use those resources as buffers for losses, or to collect new resources. As shown by our third *posthoc* analysis, engaged employees have more contextual resources (e.g., job autonomy, social support at home, etc.) and personal resources (e.g., time management skills). They could use these resources to prevent their primary health complaints from accumulating into more severe health risks. For instance, engaged workaholics who notice they often have a headache because of their excessive work behavior may use resources (e.g., focusing on a rewarding family life, taking time off to recover) to diminish these headaches.

The second and more unexpected difference in the health outcomes of engaged versus nonengaged workaholics was that for engaged workaholics, workaholism was directly, negatively related to RMS (i.e., objectively better health). A possible interpretation of this finding is that the rewarding effects of being engaged in work pay off in the long run (Hobfoll, 2002). Indeed, workaholic behavior and its accompanying work stressors may provoke a short-term stress response (e.g., sleep problems, a headache), but an engaged workaholic is more likely to successfully handle the task because of the resources available to him/her. This process has been described in the thriving literature (Blascovich & Mendes, 2001; Epel, McEwen, & Ickovics, 1998) and has been compared with training a muscle. Although visits to the gym may result in muscle ache in the next couple of days, after weeks of training, the muscle becomes stronger. In a similar vein, engaged workaholics may develop first stage health complaints because of their investment in work, but after a while, they grow stronger and improve their health condition.

Thriving further assumes that an individual's health condition may improve in response to stress if the stressors are appraised as challenges as opposed to threats (Blascovich & Mendes, 2001). Dealing with a challenge stressor initiates anabolic processes that help build and develop the body's resources, whereas threat stressors initiate catabolic processes,

which break down the body's resources (Epel et al., 1998). Employees are more likely to appraise a stressor as a challenge when they believe they have the resources to deal with the stressor (Lazarus & Folkman, 1984). Because engaged workaholics have more resources, they are more likely to make challenge appraisals of their work tasks. They may then learn, adapt, and eventually thrive by coping with work demands, as indicated by their better physical health condition.

Implications for Theory Development

Our findings open up interesting avenues for future theory development. To begin with, our study does not provide support for the often voiced concern that working long hours is bad for employee health (Van der Hulst, 2003). At a minimum, our findings suggest that it is not very informative to look only at work hours when one is interested in employee health because it is unclear why the employee works long hours. The number of work hours only tells us something about the employees' behavior, not about underlying work cognitions and affective work experiences. Our results show that work cognitions (i.e., workaholism) and affective work experiences (i.e., work engagement) are more predictive of employee health. Therefore, instead of assessing the employee's weekly work hours, it is more informative to ask if someone has compulsive work tendencies and whether or not they feel engaged at work. Although the majority of workaholics work long hours (Taris et al., 2005), not all employees who work long hours are workaholics. This distinction is important because we did not find health risks for employees who work long hours but are not workaholics. This implies that the core theoretical assumption in the work hours literature needs change: employees' compulsive work mentality poses a more serious health risk rather than the act of working long hours. Our study further adds to theory development by giving insight into why the health implications differ between employees who work long hours and workaholics. New models in the work hours and workaholism literature could emphasize the pivotal role of subjective well-being, explaining that there is a real risk for physical health problems when working to excess goes together with depressive feelings, sleep problems, and neglect of nonwork domains.

Our study also moves the workaholism literature forward by offering specific direction for theoretical models that explain the consequences of workaholism. Theoretical frameworks in the workaholism literature remain scarce (Andreassen, 2014). If explicitly mentioned at all, studies most commonly use an addiction perspective (Ng et al., 2007; Porter,

1996), comparing workaholism with a psychological disorder with antecedents (e.g., disposition) and consequences (e.g., disruptive family relationships and low well-being) that are similar to addictions. This relatively broad framework may be less suitable to fully understand how workaholics develop health complaints. Our findings showed that workaholism appears to trigger a health impairment process. This health impairment process is described by Allostatic load theory, which is the dominant theoretical framework used to explain physiological responses to work stress (Ganster & Rosen, 2013).

According to the Allostatic load perspective, stress activates several body systems (e.g., cardiovascular, neuroendocrine, etc.) that help individuals cope, following a sequential pattern. In the first stage, stress triggers responses such as stress hormones (e.g., cortisol) and individuals experience psychological (e.g., anxiety) and psychosomatic ailments (e.g., a headache). When this situation continues, these initial responses push the cardiovascular, immunological, and metabolic systems out of balance, which is reflected in secondary stage indicators (e.g., elevated triglycerides in the blood, low high-density lipoprotein, and weight gain; McEwen, 1998; Ursin & Eriksen, 2004). Finally, if the biological systems keep working around elevated set points, individuals risk cardiovascular diseases, diabetes, and even death (the third stage outcomes).

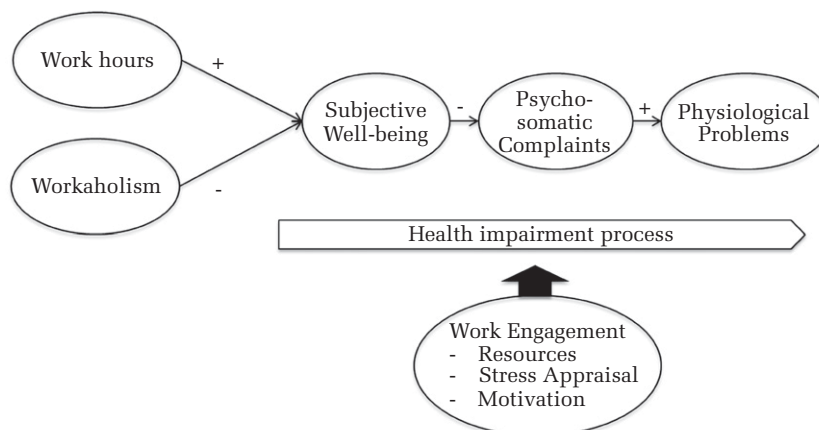
The Allostatic load model is helpful because it explains well how workaholics may develop psychological and psychosomatic health complaints in response to stress that eventually trigger more severe physiological health impairments such as RMS. In turn, our results inform the Allostatic load model by highlighting the strong connection

between body and mind: physiological health risks seem to be preceded by impaired subjective well-being. Therefore, we propose AL theory as a suitable framework to better understand the health and well-being consequences of workaholism in future research.

Our discovery that engaged workaholics had lower health risks than nonengaged workaholics offers another avenue for theory development. Given our *posthoc* findings that, unlike nonengaged workaholics, engaged workaholics have access to a wider arsenal of resources, conservation of resource theory (Hobfoll, 2002) might be a fruitful starting point to further explain how engaged workaholics might use resources to prevent adverse outcomes, while they keep collecting new resources to ensure their success, health, and personal growth. The idea of thriving (Blascovich & Mendes, 2001; Epel et al., 1998) also seems promising. The literature on thriving highlights that the individual's appraisal of a stressor is decisive for whether physical thriving occurs (Epel et al., 1998). Psychological thriving, whereby the individual approaches a stressor with optimism, vitality, and eagerness to learn (Spreitzer, Sutcliffe, Dutton, Sonenshein, & Grant, 2005), can lead to physical thriving, whereas physical thriving is unlikely when the individual appraises the stressor as a threat. Thus, an employee's outlook on work may explain why engaged workaholics can thrive, although this is not the case for non-engaged workaholics.

Based on the previously mentioned contributions to the theory, we propose a new, preliminary model that reorganizes the relationships between work hours, workaholism, work engagement, and health (see Figure 4). In this model, work hours and workaholism are both considered to be aspects of

FIGURE 4
Preliminary Conceptual Model of Relationships between Working to Excess, Work Engagement, and Health Outcomes



working to excess. The model proposes that workaholics have impaired subjective well-being, in turn triggering an Allostatic load process in which psychosomatic and physiological health complaints accumulate. However, unlike workaholics, employees who work long hours but have no workaholic tendencies have enhanced subjective wellbeing, preventing them from entering a physical health impairment process. Our study has started to explore reasons of why working long hours does not impair and may even improve subjective well-being. Further endeavors to develop this model could look into the role of fulfillment and psychological detachment after work. Unlike employees who simply work excessive hours, workaholics may stay psychologically connected to work and never feel satisfied about their performance.

Engagement is included in our preliminary model as the overarching construct that moderates the health impairment process of workaholics. More specific characteristics of engaged employees, such as access to ample resources (Hobfoll, 2002), a challenge approach to work tasks (Blascovich & Mendes, 2001; Spreitzer et al., 2005), and intrinsic as opposed to extrinsic motivation (Van Beek et al., 2012), could further explain why engaged workaholics are able to break free of the health impairment process.

Limitations, Future Directions for Research, and Practical Implications

This study has several strengths, such as using multisource data, objective health measures, and a large sample, but there are also some limitations. Although the biomarkers (dependent variable) were collected after the survey was conducted, the survey measures are cross-sectional, and it is not clear what time lag is needed to draw causal conclusions about longer term health effects of workaholism. Our results indicate that health complaints and RMS are more prevalent among nonengaged workaholics. Future research is needed to fully test the causal sequence between those health outcomes. Another potential limitation is that the data were collected from employees of a single company, limiting the generalizability of our findings. However, a sample from a single organization may also be an advantage as it rules out differences in physical health due to work conditions. Nevertheless, we acknowledge that our sample mainly includes professionals (e.g., accountants, consultants, secretaries, etc.), or at least employees with office jobs. This means that our results are relevant for the commercial service sector, but that more research is needed to examine the impact of long work hours and workaholism in other

industries. Finally, we note the restriction in range of work hours in our sample (mean = 42, SD = 8.5), making it difficult to know whether at a certain point (e.g. workweeks of above 65 hours), work hours may indeed start to have an adverse impact on health.

Our study suggests several new directions for future research. A first suggestion is to further investigate why employees who work long hours did not develop psychological health complaints, while workaholics did. A possible direction could be to examine the role of psychological detachment and fulfilment, as suggested previously. Another option is to compare stress mindsets, more specifically whether an individual believes stress is good or bad (Crum, Salovey, & Aker, 2013), between employees who work long hours but are not workaholics versus employees who are. In addition, future research is needed to confirm our speculation that health issues do not accumulate in the same way among engaged workaholics as they would with nonengaged workaholics because engaged workaholics experience work as a challenge, whereas nonengaged workaholics appraise work stressors as a threat. These different appraisals could then explain why nonengaged workaholics enter a downward cycle in which health issues accumulate, whereas nonengaged workaholics have lower risk for severe health risks. Another direction for future research is to examine differences in resources, job motivation, and personality traits between nonengaged and engaged workaholics. For instance, extrinsic motivation (Van Beek et al., 2012), low self-esteem (Graves, Ruderman, Ohlott, & Weber 2012), type A personality (Seybold & Salomone, 1994), and high neuroticism and perfectionism (Burke, Burgess, & Oberklaid, 2003) in nonengaged workaholics may explain why this group is more susceptible for health risks. Also, longitudinal research is needed to test the possibility that engaged workaholics build resistance after an initial setback and eventually thrive by dedicating themselves fully to their passion.

Our study offers important insights for employees and employers. The results show that long work hours are not necessarily bad for health, but that a compulsive work mentality is associated with severe health risks. Our findings, therefore, echo previously raised concerns (Porter, 2006; Shimazu & Schaufeli, 2009) about the dark side of workaholism, but provides further nuance by adding that workaholism primarily impairs health when work engagement is low. To prevent health risks, nonengaged workaholics' beliefs (Burke et al., 2003) could be a target of intervention. Nonengaged workaholics are driven by the desire to live up to their own and others' expectations, often causing them to feel guilty and anxious (Van Wijhe, Peeters,

& Schaufeli, 2011). Interventions at the individual level could aim to change these beliefs and focus on the intrinsic value of work (e.g., meaningful contribution to society), instead of extrinsic rewards (e.g., status or money). Interventions could further focus on increasing work engagement (Bakker, 2009) as work engagement seems to have a protective effect for health. Previous research has shown that engagement goes up when employees receive feedback, have rewarding relationships at work, and perform challenging and meaningful tasks (Bakker, 2009). Job designs that include these factors may encourage engagement, thereby preventing impaired health among workaholics. Organizational culture is another possible target for intervention (Brett & Stroh, 2003). Organizations could implement incentive systems that reward engagement and output quality instead of staying connected to work 24/7 (Brady, Vodanovich, & Rotunda, 2008).

CONCLUSION

We tested the commonly held assumption that working to excess is bad for health. We found that the employee's workaholic tendency, but not work hours per se, is bad for health. The main difference between workaholics and employees who worked long hours was that the first had impaired subjective well-being, whereas this was not the case for the latter. Consequently, workaholics reported more psychosomatic health complaints and scored higher on various objective health indicators (e.g., high blood pressure, low high-density lipoprotein cholesterol, etc.) that are predictive of cardiovascular diseases. In addition, we found that workaholism is not *always* bad for health. Whereas nonengaged workaholics had higher risk for metabolic syndrome, engaged workaholics actually had lower risk for this physical health condition. One of the possible explanations for this discovery is that engaged workaholics have more resources to deal effectively with early health impairments. We hope our study inspires employees and organizations to fight what Spruelli (1987, p. 44) described as "the most rewarded addiction in our culture" or at least to strive for the engaged form of workaholism, characterized by investing a lot of time and energy in work, being preoccupied with work, but also enjoying one's work.

REFERENCES

- Alberti, K. G. M. M., Zimmet, P., & Shaw, J. 2005. The metabolic syndrome: A new worldwide definition. *The Lancet*, 366: 1059–1062.
- Andreassen, C. S. 2014. Workaholism: An overview and current status of the research. *Journal of Behavioral Addictions*, 3(1), 1–11.
- Andreassen, C. S., Ursin, H., & Eriksen, H. R. 2007. The relationship between strong motivation to work, "workaholism", and health. *Psychology and Health*, 22, 615–629.
- Aziz, S., & Zickar, M. 2006. A cluster analysis investigation of workaholism as a syndrome. *Journal of Occupational Health Psychology*, 11(1): 52–62.
- Bakker, A. B. 2009. Building engagement in the workplace. In R. J. Burke & C. L. Cooper (Eds.), *The peak performing organization*: 50–72. Oxon, UK: Routledge.
- Bakker, A. B., Schaufeli, W. B., Leiter, M. P., & Taris, T. W. 2008. Work engagement, an emerging concept in occupational health psychology. *Work & Stress*, 22(3): p. 187–200.
- Blascovich, T., & Mendes, W. B. 2001. Challenge and threat appraisals: The role of affective cues. In: J. P. Fargas (Ed.), *Feeling and thinking: the role of affect in social cognition*: 59–82. Cambridge UK: Cambridge University Press.
- Bonebright, C. A., Clay, D. L., & Ankenmann, R. D. 2000. The relationship between workaholics with work-life conflict, life satisfaction, and purpose in life. *Journal of Counseling Psychology*, 47(4): 469–477.
- Bonger, P. M., Ijmker, S., Van den Heuvel, S., & Blatter, B. M. 2006. Epidemiology of work related neck and upper limb problems: Psychological and personal risk factors (Part I) and effective interventions from a bio behavioral perspective (Part II). *Journal of Occupational Rehabilitation*, 16(3): 272–295.
- Brady, B. R., Vodanovich, S. J., & Rotunda, R. 2008. The impact of workaholism on work-family conflict, job satisfaction, and perception of leisure activities. *The Psychologist-Manager Journal*, 11: 241–263.
- Brett, J. M., & Stroh, L. K. 2003. Working 61 plus hours a week: Why do managers do it? *Journal of Applied Psychology*, 88: 67–78.
- Burke, R. J. 2000. Workaholism in organizations: The role of personal beliefs and fears. *Anxiety, Stress, and Coping*, 13: 53–64.
- Burke, R. J., Burgess, Z., & Oberklaid, F. 2003. Predictors of workaholic behaviors among Australian psychologists. *Career Development International*, 8: 301–308.
- Chamberlin, C. M., & Zhang, N. 2009. Workaholism, health, and self-acceptance. *Journal of Counseling and Development*, 87(2): 159–169.
- Chandola, T., Brunner, E., & Marmot, M. 2006. Chronic stress at work and the metabolic syndrome: Prospective study. *British Medical Journal*, 332: 521–525.
- Clark, M. A., Michel, J. S., Zhdanova, L., Pui, S. Y., & Baltes, B. B. 2014. All work and no play? A meta-analytic examination of the correlates and outcomes of workaholism. *Journal of Management*, 42(7): 1836–1873.

- Cohen, S., Tyrrell, D. A. J., & Smith, A. P. 1999. Psychological stress and susceptibility to the common cold. *The New England Journal of Medicine*, 325(9): 606–612.
- Crum, A. J., Salovey, P., & Achor, S. 2013. Rethinking stress: The role of mindsets in determining the stress response. *Journal of Personality and Social Psychology*, 104(4): 716–733.
- Doerfler, M. C., & Kammer, P. P. 1986. Workaholism, sex, and sex role stereotyping among female professionals. *Sex Roles*, 14: 551–560.
- Eckel, R. H., Grundy, S. M., & Zimmet, P. Z. 2005. The metabolic syndrome. *The Lancet*, 365: 1415–1428.
- Edwards, J. R. 2011. The fallacy of formative measurement. *Organizational Research Methods*, 14(2): 370–388.
- Edwards, J. R., & Bagozzi, R. P. 2000. On the nature and direction of relationships between constructs and measures. *Psychological Methods*, 5: 155–174.
- Epel, E. S., McEwen, B. S., & Ickovics, J. R. 1998. Embodying psychological thriving: Physical thriving in responses to stress. *Journal of Social Issues*, 54: 301–322.
- Ganster, D. C., & Rosen, C. C. 2012. Work stress and employee health: A multidisciplinary review. *Journal of Management*, 39(5): 1085–1122.
- Goetzel, R. Z., Hawkins, K., Ozminkowski, R. J., & Wang, S. 2003. The health and productivity cost burden of the “top 10” physical and mental health conditions affecting six large U.S. employers in 1999. *Journal of Occupational and Environmental Medicine*, 45(1): 5–14.
- Goh, J., Pfeffer, J., & Zenios, S. A. 2015. Workplace stressors & health outcomes: Health policy for the workplace. *Behavioral Science & Policy*, 1(1): 43–52.
- Graves, L. M., Ruderman, M. N., Ohlott, P. J., & Weber, T. J. 2012. Driven to work and enjoyment of work: Effects on managers’ outcomes. *Journal of Management*, 38: 1655–1680.
- Grundy, S. M., Brewer, H. B., Cleeman, J. I., Smith, S. C., & Lenfant, C. 2004. Definition of metabolic syndrome: Report of the National Heart, Lung, and Blood Institute/American Heart Association Conference on scientific issues related to definition. *Circulation*, 109: 433–438.
- Grundy, S. M., Cleeman, J. I., Daniels, S. R., Donato, K. A., Eckel, R. H., Franklin, B. A., Gordon, D. J., Krauss, R. M., Savage, P. J., Smith, S. C., Spertus, J. A., & Costa, F. 2005. Diagnosis and management of the metabolic syndrome: An American Heart Association/National Heart, Lung and Blood Institute scientific statement. *Circulation*, 112: 2735–2752.
- Hallberg, U. E., Johansson, G., & Schaufeli, W. B. 2007. Type A behavior and work situation: Associations with burnout and work engagement. *Scandinavian Journal of Psychology*, 48: 135–142.
- Harpaz, I., & Snir, R. 2003. Workaholism: Its definition and nature. *Human Relations*, 56(3): 291–319.
- Harrington, J. M. 2001. Health effects of shift work and extended hours of work. *Occupational and Environmental Medicine*, 58, 68–72.
- Hobfoll, S. E. 2002. Social and psychological resources and adaptation. *Review of General Psychology*, 6: 307–324.
- Hobfoll, S. E., & Shirom, A. 2000. Conservation of resources theory: Applications to stress and management in the workplace. In R. T. Golembiewski (Ed.), *Handbook of organization behavior* (2nd ed.): 57–81. New York: Dekker.
- Hu, L., & Bentler, P. M. 1999. Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*, 1: 1–55.
- Ihlebaek, C., & Eriksen, H. R. 2003. Occupational and social variation in subjective health complaints. *Occupational Medicine*, 53: 270–278.
- Kahn, W. A. 1990. Psychological conditions of personal engagement and disengagement at work. *Academy of Management Journal*, 33(4): 692–724.
- Kanai, A., Wakabayashi, M., & Fling, S. 1996. Workaholism among employees in Japanese corporations: An examination based on the Japanese version of the workaholism scale. *Japanese of Psychological Research*, 38(4): 192–203.
- Karasek, R., Brisson, C., Kawakami, N., Houtman, I., Bongers, P., & Amick, B. (1998). The Job Content Questionnaire (JCQ): An instrument for internationally comparative assessments of psychosocial job characteristics. *Journal of Occupational Health Psychology*, 3: 322–355.
- King, L. A., Mattimore, L. K., King, D. W., & Adams, G. A. 1995. Family support inventory for workers: A new measure of perceived social support from family members. *Journal of Organizational Behavior*, 16: 235–258.
- Kohout, F. J., Berkman, L. F., Evans, D. A., & Cornoni-Huntley, J. 1995. Two shorter forms of the CES-D depression symptoms index. *Journal of Aging and Health*, 5: 179–193.
- Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal, and coping*. New York: Springer.
- Lee, S., McCann, D., & Messenger, J. C. 2007. *Working time around the world: Trends in working hours, laws and policies in a global comparative perspective*. New York: Routledge.
- Macan, T. H. 1994. Time management: Test of a process model. *Journal of Applied Psychology*, 79: 381–391.

- Machlowitz, M. (1980). *Workaholics: Living with them, working with them*. New York: Simon & Schuster.
- Marks, S. R., & MacDermid, S. M. 1996. Multiple roles and the self: A theory of role balance. *Journal of Marriage and the Family*, 58: 417–432.
- McEwen, B. S. 1998. Protective and damaging effects of stress mediators. *New England Journal of Medicine*, 338: 171–179.
- Meerkerk, G. J., Aarns, T., Dijkstra, R. H., Weisscher, P., Njoo, K., & Boomsma, L. J. 2009. Standards for problematic alcohol consumption. *NHG-standaarden voor de huisarts*, 5: 538–557.
- Muthén, L. K., & Muthén, B. O. 1998–2012. *Mplus user's guide*, (7th ed.). Los Angeles, CA: Muthén & Muthén.
- Ng, T. W. H., Sorensen, K. L., & Feldman, D. C. 2007. Dimensions, antecedents, and consequences of workaholism: A conceptual integration and extension. *Journal of Organizational Behavior*, 28: 111–136.
- Oates, W. 1971. *Confessions of a workaholic: The facts about work addiction*. New York: World.
- Porter, G. 1996. Organizational impact of workaholism: Suggestions for researching the negative outcomes of excessive work. *Journal of Occupational Health Psychology*, 1: 70–84.
- Porter, G. 2006. Profiles of workaholism among high-tech managers. *Career Development International*, 11: 440–462.
- Preacher, K. J., & Hayes, A. F. 2008. Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods*, 40: 879–891.
- Preacher, K. J., Rucker, D. D., & Hayes, A. F. 2007. Addressing moderated mediation hypotheses: Theory, methods, and prescriptions. *Multivariate Behavioral Research*, 42(1): 185–227.
- Querstret, D., & Cropley, M. 2012. Exploring the relationship between work-related rumination, sleep quality, and work-related fatigue. *Journal of Occupational Health Psychology*, 17(3): 341–353.
- Regitz-Zagrosek, V., Lehmkuhl, E., & Weickert, M. O. 2006. Gender differences in the metabolic syndrome and their role for cardiovascular disease. *Clinical Research in Cardiology*, 95: 136–147.
- Robinson, B. E. 1996. The psychosocial and familial dimensions of work addiction: Preliminary perspectives and hypotheses. *Journal of Counseling & Development*, 74: 447–452.
- Robinson, B. E. 1999. The work addiction risk test: Development of a tentative measure of workaholism. *Perceptual and Motor Skills*, 88: 199–210.
- Rosenthal, R. 1979. The file drawer problem and tolerance for null results. *Psychological Bulletin*, 86(3): 638–641.
- Rothbard, N. P. 2001. Enriching or depleting? The dynamics of engagement in work and family roles. *Administrative Science Quarterly*, 46: 655–684.
- Rothbard, N. P., & Patil, S. 2011. Being there: Work engagement and positive organizational scholarship. In: K. Cameron & G. Spreitzer (Eds.), *Handbook of positive organizational scholarship*. Oxford University Press.
- Schaufeli, W. B., Bakker, A. B., & Salanova, M. 2006. The measurement of work engagement with a brief questionnaire: A cross-national study. *Educational and Psychological Measurement*, 66: 701–716.
- Schaufeli, W. B., Bakker, A. B., Van der Heijden, F. M. M. A., & Prins, J. T. 2009. Workaholism among medical residents: It is the combination of working excessively and compulsively that counts. *International Journal of Stress Management*, 16: 249–272.
- Schaufeli, W. B., Leiter, M. P., Maslach, C., & Jackson, S. E. (1996). The Maslach Burnout Inventory – GS. In C. Maslach, S. E. Jackson, & M. P. Leiter (Eds.), *Maslach Burnout Inventory manual*: 22–26. Palo Alto, CA: Consulting Psychologists Press.
- Schaufeli, W. B., Taris, T. W., & Van Rhenen, W. 2008. Workaholism, burnout, and work engagement: Three of a kind or three different kinds of employee well-being? *Applied Psychology: An International Review*, 57: 173–203.
- Scott, K. S., Moore, K. S., & Miceli, M. P. 1997. An exploration of the meaning and consequences of workaholism. *Human Relations*, 50(3): 287–314.
- Seybold, K. C., & Salomone, P. R. 1994. Understanding workaholism: A review of causes and counseling approaches. *Journal of Counseling and Development*, 73: 4–9.
- Shimazu, A., & Schaufeli, W. B. 2009. Is workaholism good or bad for employee well-being? The distinctiveness of workaholism. *Industrial Health*, 47: 495–502.
- Sonnentag, S. 2012. Psychological detachment from work during leisure time: The benefits of mentally disengaging from work. *Current Directions in Psychological Science*, 21: 114–118.
- Sparks, K., Cooper, C., Fried, Y., & Shirom, A. (1997). The effects of hours of work on health: A meta-analytic review. *Journal of Occupational and Organizational Psychology*, 10: 391–408.
- Spector, P. E., & Brannick, M. T. 2011. Methodological urban legends: The misuse of statistical control variables. *Organizational Research Methods*, 14: 287–305.

- Spence, J. T., & Robbins, A. S. 1992. Workaholism: Definition, measurement, and preliminary results. *Journal of Personality Assessment*, 58: 160–178.
- Spreitzer, G., Sutcliffe, K., Dutton, J., Sonenshein, S., & Grant, A. M. 2005. A socially embedded model of thriving at work. *Organization Science*, 16(5): 537–549.
- Spruell, G. 1987. Work fever. *Training and Development Journal*, 41: 41–45.
- Spurgeon, A., Harrington, J. M., & Cooper, C. L. 1997. Health and safety problems associated with long working hours: A review of the current position. *Occupational and Environmental Medicine*, 54: 367–375.
- Taris, T. W., Geurts, S. A. E., Schaufeli, W. B., Blonk, R. W. B., & Lagerveld, S. E. 2008. All day and all of the night: The relative contribution of two dimensions of workaholism to well-being in self-employed workers. *Work & Stress*, 22(2): 153–165.
- Taris, T. W., Schaufeli, W. B., & Verhoeven, L. C. 2005. Internal and external validation of the Dutch Work Addiction Risk Test: Implications for jobs and non-work conflict. *Journal of Applied Psychology: An International Review*, 54: 37–60.
- Ursin, H., & Eriksen, H. R. 2004. The cognitive activation theory of stress. *Psychoneuroendocrinology*, 29: 567–592.
- Van Beek, I., Hu, Q., Schaufeli, W. B., Taris, T. W., & Schreurs, B. H. J. 2012. For fun, love, or money: What drives workaholic, engaged, and burned-out employees at work? *Applied Psychology: An International Review*, 61: 30–55.
- Van Beek, I., Taris, T. W., & Schaufeli, W. B. 2011. Workaholic and work engaged employees: Dead ringers or worlds apart? *Journal of Occupational Health Psychology*, 16: 468–482.
- Van der Hulst, M. 2003. Long work hours and health. *Scandinavian Journal of Work, Environment, & Health*, 29: 171–188.
- Van Veldhoven, M., & Meijman, T. 1994. *Measurement of psychosocial labor burden: The questionnaire perception and assessment of labor (VVBA)*. Amsterdam: NIA.
- Van Wijhe, C. I., & Peeters, M. C. W., & Schaufeli, W. B. 2011. To stop or not to stop, that's the question: About persistence and mood of workaholics and work engaged employees. *International Journal of Behavioral Medicine*, 18: 361–372.
- Vodanovich, S. J., Piotrowski, C., & Wallace, J. C. 2007. The relationship between workaholism and health: A report of negative findings. *Organization Development Journal*, 25: 70–75.
- Voydanoff, P. 2002. Linkages between the work-family interface and work, family, and individual outcomes: An integrative model. *Journal of Family Issues*, 23: 138–164.



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APPENDIX

Measures *Posthoc* Analysis 1

Depressive feelings. We used the scale on depressive feelings measured by a short form from the Center of Epidemiologic Studies of Depression (CES-D) scale (Kohout, Berkman, Evans, & Cornoni-Huntley, 1995). This short form consisted of eight items that assessed employees' feelings during the past two weeks ($\alpha = .92$). The sample items included, "I felt depressed," "I was unhappy," "I felt lonely," "I felt sad," and "I did not enjoy life," rated on five-point scales ranging from 1 (strongly disagree) to 5 (strongly agree).

Sleep problems. Sleep problems was measured with six items developed by Van Veldhoven and Meijman (1994). The sleep problems scale ($\alpha = .85$) included items such as "I have difficulty falling asleep", "I wake up several times during the night", and "I often do not feel rested when I wake up in the morning". The response scale ranged from 1 (*strongly disagree*) to 5 (*strongly agree*).

Need for recovery. Need for recovery (NFR) was measured with six items developed by Van Veldhoven and Meijman (1994). The Need for recovery scale ($\alpha = .81$) included items such as "If I come home after work I need to be alone for a while" and "I usually can only relax on a second day off". The response scale ranged from 1 (*never*) to 5 (*always*).

Measures *Posthoc* Analysis 2

Nonwork resources. Two indicators were used to measure resources at home: family social support and work–life balance. Social support from the nonwork domain was measured using items from the scale developed by King, Mattimore, King, and Adams (1995). The scale ($\alpha = .85$) consists of three items on emotional social support, such as "When something at work is bothering me, members of my family show that they understand how I'm feeling," and three items on instrumental social support, e.g., "members of my family cooperate with me to get things done around the house." In case respondents had no partner and/or children, the part "members of my family" was replaced by "extended family or friends." Items were rated on a 5-point scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*).

The extent to which employees manage to find a balance between work and family roles is another indicator of whether employees have resources beyond work (Voydanoff, 2002). Therefore, we measured work–life balance, which was included in the questionnaire as a single item as is common in work–life balance research (Marks & MacDermid, 1996). Respondents were asked to rate the following question on a scale ranged from 1 (*not at all successful*) to 5 (*very successful*): "How successful do you find yourself in finding a balance between your work and non-work life?"

Personal resources. We included two personal resources that are particularly relevant for employees working high pressure jobs (time management) that require frequent personal interaction (communication skills). Time management skills were measured by five items of a scale developed by Macan (1994). The sample items were "I make a list of things to do on a daily basis", and "I keep a list of long-term goals" ($\alpha = .72$). We used a scale of Van Veldhoven and Meijman (1994) to measure communication skills. The sample items of the six-item scale are "In I disagree with someone, I am willing to listen to their point of view", and "I am a good listener" ($\alpha = .68$). Answer categories of both scales ranged from 1 (*strongly disagree*) to 5 (*strongly agree*).

Finally, we measured intrinsic motivation with the five-item subdimension of the Work-related Flow Inventory (Bakker, 2008). A sample item was "I would still do this work, even if I received less pay", and "I get my motivation from the work itself, and not from the reward for it" ($\alpha = .87$). The items were rated on five-point scales ranging from 1 (*strongly disagree*) to 5 (*strongly agree*).

Work resources. Job autonomy was measured on the Decision Authority Scale (Karasek, Brisson, Kawakami, Houtman, Bongers, & Amick et al., 1998). The scale consisted of four items, such as "Can you determine the content of your work yourself?" ($\alpha = .77$), using a four-point scale ranging from 1 (*almost never*) to 4 (*always*). Co-worker social support was measured on four items from the JCQ (JCQ; Karasek et al., 1998). A sample item is "My colleagues help me get my work done" ($\alpha = .73$). Supervisor social support was measured on five JCQ items, such as "My direct supervisor is a good coach" ($\alpha = .89$). All items of the abovementioned two variables were rated on five-point scales, ranging from 1 (*strongly disagree*) to 5 (*strongly agree*).