Workaholism, Exercise, and Stress-Related Illness

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Abstract

The purpose of this study was to examine whether workaholism is associated with an increased risk of stress-related illness and if exercise is linked to a reduced risk of stress-related illness. Data were collected through administration of an online survey in the spring of 2013. The sample consisted of 266 employees in a medical school in the United States, 69% women, with a mean age of 47 years. Logistic regression analysis demonstrated that workaholism was significantly associated with the presence of stress-related illness (OR = 1.47, p = .009) and exercise with absence of stress-related illness (OR = 1.68, p = .003), even after controlling for age, family history, gender, income, and hours worked. We concluded that workaholism is a significant risk factor for stress-related illnesses and that physical exercise mitigates the negative effects of workaholism.

Key words: USA; workaholism; work behavior; occupational health; exercise; stress-

related Workaholism, Exercise, and Stress-Related Illness

Workaholism is "the overindulgence in and preoccupation with work, often to the exclusion and detriment of the workaholic's health, intimate relationships, and participation in child rearing" (Flowers & Robinson, 2002; p. 517). Although workaholism might be related to both poor mental and physical health (Seybold & Salomone, 1994; Shimazu, Schaufeli, & Taris, 2010), the magnitude of this relationship has not yet been well established. If this is the case, are there steps that the workaholic can take to mitigate the effects of workaholism on poor health?

Workaholism is a popular term first coined by Oates (1971) to describe one's compulsive work behavior. While long work hours has been viewed as its primary indicator, one can work long hours but not be a workaholic; hours worked do not solely define workaholism (Burke, 2003; McMillan, Brady, O'Driscoll, & Marsh, 2002). Workaholics are characterized by a combination of long work hours, intrinsic work motivation, and the emotional rush from hard work (Bonebright, Clay, & Ankenmann, 2000). Satisfaction is derived only from work, and other aspects of life (e.g., health, relationships) are neglected (McMillan, O'Driscoll, & Brady, 2004; Robinson, 1996; Snir & Harpaz, 2009). For example, workaholism is positively related to marital estrangement (Robinson, Carroll, & Flowers, 2001) and marital disaffection (Robinson, Flowers, & Ng, 2006). For the workaholic, work serves as a reinforcer and other areas of life noticeably decline, eventually causing one to become dysfunctional (Piotrowski & Vodanovich, 2006). For example, workaholics are more likely to have higher work-life imbalance and lower life satisfaction than nonworkaholics (Aziz & Zickar, 2006; Bonebright et al., 2000).

Workaholism and Health Problems

Despite limited research on the relationship between workaholism and health issues, studies that do exist suggest workaholism is associated with unhealthy outcomes (Andreassen,

Ursin, & Eriksen, 2007; Burke & Cooper, 2008; Shimazu et al. 2010). The workaholic lifestyle can contribute to physiological problems, including heart disease, and the development of secondary types of addictions, such as alcoholism and overeating (Seybold & Salomone, 1994). Workaholics also often ignore, or do not notice, warning signs such as aches and pains (Robinson, 2007). Andreassen et al. (2007) found positive correlations between workaholism and such health-related outcomes as burnout, work stress, and subjective health complaints.

A question pertaining to the incidence of hypertension, kidney disease, cancer, and mental illness was included in our study as they share an indirect or causal relationship with stress. Specifically, each condition has a strong genetic and familial component that could be related to the effects of work stress. Hypertension is a known risk factor for the development of kidney and heart disease and is exacerbated by work stress (Gilbert-Ouimet, Brisson, Vezina, Milot, & Blanchette, 2012; Pickering et al., 1996; Schnall, Schwartz, Landsbergis, Warren, & Pickering, 1998). While work stress has no direct proven causal effect on the development of cancer, it has been shown to create a physiological and psychological environment that is conducive to its progression through a variety of mechanisms (Dalton, Boesen, Ross, Schapiro, & Johansen, 2002; Garssen, 2004; Garssen & Goodkin, 1999). Mental health issues have also been linked to imbalanced and/or stressful work environments (Smith & Bielecky, 2012; Stansfeld & Candy, 2006).

Heart disease, high cholesterol, and type 2 diabetes are known to be associated with personality dimensions that overlap somewhat with workaholism (Burke, Matthiesen, & Pallesen, 2006; Robinson, 1996). For instance, there is an association between heart disease and the hostility component of Type A behavior (Smith, Glazer, Ruiz, & Gallo, 2004). Additionally, Sutin et al. (2010) found low conscientiousness was related to lower HDL (“good”) cholesterol.

Finally, anxiety and depression are associated with variations in glycemic control in patients with type 2 diabetes (Lane et al., 2000).

In summary, previous research indicates that workaholism may be causally related to stress-related illnesses. The purpose of the presently reported research was to determine the extent to which workaholism is associated with the incidence of stress-related illness after controlling for demographic characteristics, as well as the possible contribution of physical exercise as a mitigating factor.

Exercise and Health Problems

Physical exercise has been shown to mitigate both mental (Atlantis, Chow, Kirby, & Singh, 2004; Carek, Laibstein, & Carek, 2011; Penedo & Dahn, 2005) and physical health problems (Chen, Fredericson, Matheson, & Philips, 2013; Department of Health, 2004; White et al., 2011). The beneficial effects of exercise have been reported to be even greater among workaholics than among others (Bakker, Demerouti, Oerlemans, & Sonnentag, 2013).

Aerobic exercise and resistance training were found to lead to reduced HbA_{1c} levels and improvements in mitochondrial markers of disordered lipid and glucose metabolism (Church et al., 2010; Sparks et al., 2013). Physical exercise interventions have been shown to reduce fatigue and depression and increase health-related quality of life in breast cancer patients and survivors (Duijts, Faber, Oldenburg, van Beurden, & Aaronson, 2011). Exercise and drug interventions are equally effective with respect to secondary prevention of prediabetes and coronary heart disease, and exercise more effective than drug interventions for stroke patients (Naci & Ioannidis, 2013). Among overweight and obese patients with high blood pressure, the addition of exercise to a dietary intervention significantly increased the reduction of blood pressure (Blumenthal et al., 2010).

There is also evidence that exercise can prevent or delay the development of health problems. For example, the development of insulin resistance has been found to be a consequence of a sedentary lifestyle rather than simple aging (Amati, Dubé, Coen, Stefanovic-Racic, Toledo, & Goodpaster, 2009). Gerber and Pühse (2009) reviewed research publications relevant to the hypothesis that exercise can moderate the effects of stress on health. They found that about half of the 27 publications fully supported the hypothesis that exercise moderates the effects of stress on health. They also discussed other ways that exercise can reduce the effect of stress on health, including a direct effect of exercise on the perception of stress.

Control Variables

Age and family history of stress-related illness are known risk factors for stress-related illness (Anisimov, 2004; Grundy, 2006; Guttmacher, Collins, & Carmona, 2004; Wilson, Castelli, & Kannel, 1987; Yamagata et al., 2007). In addition to age and family history, hours worked, income, and gender were controlled.

Study Hypotheses

Hypothesis 1 (H1). Workaholism will be positively related to stress-related illness.

Hypothesis 2 (H2): After controlling for demographics, workaholism will still be related to stress-related illness.

Hypothesis 3 (H3): After controlling for demographics and workaholism, physical exercise will be associated with a reduction in the incidence of stress-related illness.

Purpose of Study

The current study was designed to examine if workaholism is related to stress-related illnesses (i.e., heart disease, high cholesterol, type 2 diabetes, high blood pressure, cancer, kidney disease, and mental illness) after controlling for demographic characteristics. Also investigated was the role of exercise in mitigating stress-related health problems.

Our results should contribute to the existing literature by determining the extent to which workaholism and exercise are linked to stress-related illnesses. A better understanding of this connection could improve employee health and well-being, thereby enhancing productivity by reducing rates of absenteeism and turnover.

Method

Participants

Participants were 266 full-time employees of a school of medicine located in the Southeastern region of the United States. Each had volunteered to complete an online survey. The sample included men (31%) and women (69%), 76% were married or otherwise living with another; 69% reported having one or more children. The mean age of respondents was 47 years (*SD* = 12). Approximately 86% of the respondents were Caucasian American and 9% African-American. Fifty percent had earned a graduate degree, and for 40% the highest degree was an associate or bachelor's degree. Mean time at the current organization was 9.7 years (*SD* = 8.9) and mean time in current position was 7.1 years (*SD* = 7.3). On a weekly basis, participants worked from 40 to 90 hours a week (*M* = 49.7, *SD* = 10.7). Median income was between $40,000 and $59,999.

Measures

Workaholism. Robinson's (1999) Work Addiction Risk Test (WART) is a 25-item self-report measure scored on a 4-point scale, ranging from 1 (*very untrue of me*) to 4 (*very true of me*), with higher scores indicating higher levels of work addiction (sample item: "I feel guilty when I am not working on something"). Robinson (1999) reported a test-retest reliability of .83, Cronbach's alpha of .88, and good face and content validity. Criterion related validity was established by demonstrating the expected correlations with measures of anxiety and measures of characteristics associated with Type A personality.

Self-report and family history of health conditions. Participants were asked to indicate if they were currently suffering from type 2 diabetes, heart disease, high cholesterol, high blood pressure, cancer, kidney disease, and mental illness. Participants were also asked if they had a family history of any of these conditions, whereby family history was defined as parents, siblings, grandparents, and/or cousins having had the specified illness. These questions were in a checkbox format, whereby participants checked the box(es) with the appropriate condition(s), if any. Additionally, participants were asked to indicate the number of times they exercise per week, the amount of time they exercise per session (in minutes), and how many hours they work per week. Weekly minutes of exercise was calculated as the product of weekly times exercised and minutes exercised per session. They were also asked to select into which of nine categories their annual income fell – from less than $20,000 to $350,000 or more.

Procedure

The medical school listserv was employed to solicit volunteers. The recruitment solicitation included a brief description of the study, its duration, the requirements for participation, and a link to the survey in Qualtrics, an online survey tool. The study was reviewed for ethics and approved by the Institutional Review Board (IRB); all IRB ethical standards in the treatment of participants were followed. Informed consent was appropriately obtained. Completion of the survey took approximately ten minutes.

Results

A participant's survey was included in the statistical analysis if at least 23 of the 25 WART questions, as well as questions on gender, age, exercise, hours worked, and income had been answered. Twelve cases were excluded due to missing data—nine on exercise, one on income, one on gender, and one on age. The number of scores available (266) was sufficient to provide over 99% power for detecting effects of medium size ($\rho = .3$) in both the univariate and

the multivariate analyses. Multiple imputation was employed to confirm the results first obtained with listwise deletion.

Descriptive statistics are shown in Tables 1 and 2. The number of respondents reporting a particular stress-related illness ranged from 1 to 58. Most of the illnesses had frequencies too small to provide reasonable power at the specific illness level. Accordingly, we created a composite variable, "illness," such that respondents who reported having none of these illnesses received a score of zero and those who reported having one or more of these illnesses a score of one. A preliminary analysis using OLS multiple regression to predict the number of illnesses respondents reported produced results very consistent with that of the binary logistic regression, with one exception—gender had a significant partial effect in that analysis, with men reporting more stress-related illnesses than did women. We were, however, unable to meet the distributional assumptions of OLS multiple regression, therefore we switched to the binary logistic regression.

Those who reported having stress-related illness scored significantly higher on the WART (M = 2.64, SD = .47) than did those reporting no such illness (M = 2.50, SD = .47), $t(264) = 2.29$, $p = .023$, $d = .29$, 95% CI [.04, .54].

The control variables (i.e., family history, age, hours worked, income, and gender) were entered in the first step of the sequential binary logistic regression predicting presence of stress-related illness. As a block, the control variables were significantly related to illness, $\chi^2(5, N = 266) = 31.14$, $p < .001$. Partial effects were significant for family history (OR = 3.47, p = .012) and age in decades (OR = 1.77, $p < .001$), but the effects of hours worked (OR = 1.00, p = .89), income (OR = .88, p = .23), and gender (OR = .70, p = .30) fell short of statistical significance.

Adding WART to the model, in the second step, significantly increased the fit between model and data, $\chi^2(1, N = 266) = 7.11$, $p = .008$. The model remained significant, $\chi^2(6, N = 266) = 38.25$, $p < .001$. The odds of reporting a stress-related illness were increased multiplicatively by 2.245 for each one-point increase in score on the WART.

In the final step, exercise was added to the model, significantly increasing the fit between model and data, $\chi^2(1, N = 266) = 10.24$, $p = .001$. The model remained significant, $\chi^2(7, N = 266) = 48.49$, $p < .001$ and the odds ratio for exercise was .94. Inverting this ratio to ease interpretation, each additional minute of exercise increased the odds of not reporting a stress-related illness by 1.06. When interpreting the value of this odds ratio, it is important to keep in mind that one minute is a very short period of time.

Interpretation of the relative magnitudes of the effects (odd ratios) in a logistic regression can be facilitated by standardizing the predictors. Accordingly, we conducted one final analysis with such standardization. The standardized odds ratios are presented in Table 3. In this table, the predictors are ordered by magnitude of partial effect (deviation of odds ratios from one) from greatest effect to least effect. To aid interpretation, inverted odds ratios are provided for those predictors with odds ratios less than one. Age had the greatest effect. For each one standard deviation increase in age, the odds of having a stress-related illness doubled. Exercise was associated with lack of illness. For each one standard deviation increase in exercise, the odds of not having a stress-related illness were multiplied by 1.68. The partial effects of WART and family history were nearly identical in magnitude—for each one standard deviation increase in the predictor, the odds of having a stress-related illness were multiplied by 1.47. None of the remaining predictors had a significant partial effect.

Multiple imputation was performed with IBM SPSS Statistics 20. In every imputation, the pattern of results matched those previously obtained with listwise deletion. For the final model, the significant pooled partial effects (unstandardized) were: for age (OR = 1.78, p < .001), exercise (OR = 0.94, p = .005), WART (OR = 2.42, p = .005), and family history (OR = 3.18, p = .021). The relative efficiency for the exercise predictor was .995, and that for all other predictors was between .998 and 1.000.

Discussion

The purpose of the current study was to determine whether workaholism and physical exercise are related to self-reported stress-related illness, controlling for hours worked and other variables possibly confounded with workaholism. Ours is the first study to investigate whether exercise might ameliorate the long-term health risk associated with workaholism.

The results support the prediction that workaholism would positively correlate with stress-related illness. After controlling for age, family history, gender, hours worked, and income, and including exercise in the model, for each one standard deviation increase in the WART, the odds of having a stress-related illness multiplicatively increased by 1.47, 95% CI [1.09, 1.97]. The magnitude of the observed effect on stress-related illness is comparable to that reported in other behavioral studies. For example, Chandola, Bruner, and Marmot (2006) reported a 95% CI of [1.31, 3.85] for the effect of high job stress on the likelihood of developing a metabolic syndrome.

Exercise was significantly related to absence of illness, even after controlling for the effects of workaholism and the control variables in the final model. This result is consistent with the hypothesis that exercise buffers the effect of stress on health (Gerber & Pühse, 2009).

Therefore, exercise may be one way that workaholics can reduce the incidence of illnesses likely to affect them.

Limitations

Given the cross-sectional design and the self-report nature of the study, causal inferences cannot be made. Longitudinal designs should be applied in future studies to examine more properly the degree to which workaholic behavior is a cause of stress-related illnesses.

Future Research

Additional research is needed to determine why workaholism is related to stress-related illness. For example, substance abuse might mediate the effect of workaholism on stress-related illness. Workaholics might use stimulants (e.g., caffeine) to enhance their work productivity and depressants (e.g., alcohol) to "wind down" after a long day at work. Another candidate is frequency of work-related stressful events. Perhaps workaholics are prone to behave at work in ways that lead them into stressful experiences, with the resulting stress leading to ill health.

Kumanyika, Jeffery, Morabia, Ritenbaugh, and Antipatis (2002) reported that obesity is a major contributor to the development of heart disease, type 2 diabetes, hypertension, and stroke. Although it has become an issue of major public health concern, very little is known about the relationship of work-related issues with obesity, heart disease, and type 2 diabetes (Rodbard, Fox, & Grandy, 2009). Thus, another area for future research is to examine if there is a link between workaholism and obesity.

Essentially, our body of research provides the groundwork for many future studies. For instance, future research should also focus on the family history of health problems, further examine the relationship between age and the development of these particular health issues, investigate the genetics of behavioral addictions and, ultimately, establish if interventions designed to reduce workaholism could alter the risk of stress-related illness.

Practical Implications

Although more evidence is needed before strong conclusions can be drawn about the relationships between workaholism, exercise, and health, findings from the current study suggest a link between workaholism and stress-related illness. Given the influence workaholic behaviors can have on employees' health, employers could help promote a healthy workforce and minimize the health-related costs of current employees. Systematic interventions to alleviate widespread workaholism, such as an organizational culture that fosters work-life balance, have been discussed in the workaholism literature (Burke & Cooper, 2008; Burke & Fiksenbaum, 2009; Eby, Casper, Lockwood, Bordeaux, & Brinley, 2005). For example, Halpern (2005) found that employees with flexible-time work policies indicated lower stress, higher commitment, and lower costs to the organization due to fewer absences/days late/missed deadlines—organizations that implement such family-friendly policies are promoting work-life balance, which in turn could reduce workaholism. Employers could also encourage their workers exercise more, which should help reduce the detrimental effects of stress and workaholism.

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Table 1

Frequency of Stress-Related Illness

Health Condition	*N*	Percentage
High blood pressure	58	21.8
High cholesterol	50	18.8
Type 2 diabetes	13	4.9
Heart disease	8	3.0
Mental illness	8	3.0
Cancer	5	1.9
Kidney disease	1	0.4
One or more of these	98	36.8

Table 2

Descriptive Statistics

Predictor	*M*	*SD*
WART	2.55	.47
Age (decades)	4.69	1.21
Exercise (minutes)	9.24	8.21
Income Category	3.95	2.00
Hours Worked	49.70	10.70

Table 3

Full Model with Standardized Odds Ratios

Predictor	Wald χ^2	*p*	*OR*	1/*OR*
Age	18.72	< .001	2.01	
Exercise	8.77	.003	0.59	1.68
WART	6.75	.009	1.47	
Family History	5.11	.024	1.47	
Gender Female	1.89	.17	.80	1.25
Income	0.62	.43	.84	1.19
Hours Worked	0.32	.57	.89	1.12