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The Healthy Lifeworks Project: the role of organisational health in the personal health of employees

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Abstract

Purpose – This paper aims to present the results of a three-year comprehensive workplace initiative which provided an unprecedented opportunity to explore the potential relationship between organisational health, stress, and health outcomes.

Design/methodology/approach – Data were collected from 325 employees participating in a comprehensive workplace wellness intervention taking place in a large governmental organisation. Organisational health was measured using a 16-item measure of organisational health indicators and a four-item measure of health culture. Personal health outcomes were assessed using 12 indicators: personal wellness profile, health age, blood pressure, nutrition, fat intake, fibre intake, alcohol use, fitness, smoking status, cancer risk, stress, and good health practices.

Findings – Analyses indicated that after controlling for gender and age, organisational health was associated with increased personal wellness, lower health age, better overall nutrition, reduced fat intake, increased fibre intake, reduced alcohol consumption, increased fitness, reduced cancer risk, lower stress, and more positive health practices. For several outcome measures, organisational health had a stronger impact on personal health for men. Personal health of correctional workers and youth workers was most influenced by organisational health. Finally, stress mediated the relationship between organisational health and health outcomes for all measures of wellness except for alcohol consumption.

Originality/value – Organisational health is often overlooked by employers when considering the personal health of employees. Interventions aimed at influencing organisational health (generally considered a low cost intervention) can have beneficial influences on personal health.

Keywords Organisational health, Stress, Stress and health, Personal health, Health outcomes, Gender and health, Employees, Health care

Paper type Research paper



The workplace is becoming a more and more important part of people's lives. For instance, in 2008 Canadians spent 10.3 per cent of their time performing paid work; up from 8.7 per cent in 1976 (as a percentage of work hours over total available hours in a year; Statistics Canada, 2008). Accordingly, the workplace's importance as a source of stress is increasing (Kelloway and Day, 2005). Employers who are concerned about the health of their employees have found that work-based interventions can be effective, and that occupational health programs can result in increased productivity as well as reduced organisational costs resulting from illness (e.g. absenteeism; Bertera, 1990). Moreover, although the workplace's physical environment may account for some of the most salient injuries, ill-health, or losses of productivity (e.g. encounters with physical and chemical agents), an employee's psychological environment is also an important contributor to employee health and safety outcomes (Demerouti *et al.*, 2001; Maslach and Jackson, 1981; Nahrgang *et al.*, 2011; Sauter *et al.*, 1990; Siegrist, 1996).

Psychological stress

A vast body of research supports the links between psychological stress and decreased physiological health, decreased cardiovascular health, and impaired immune functioning (Cohen *et al.*, 1991; Johnson and Hall, 1988; Segerstrom and Miller, 2004; Siegrist, 1996). The effects of psychological stress are found across diverse socio-economic statuses, and can be explained at least in part in terms of work design, work relationships, and management policies (Marmot *et al.*, 1978; Marmot *et al.*, 1991). Likewise, psychological stress has implications for employees' psychological well-being. Employees who experience chronic or acute work stress are more likely to develop depression, burnout, or anxiety disorders (Sauter *et al.*, 1990; Maslach and Jackson, 1981; Maslach *et al.*, 2001) exhibit strain in the form of behavioural avoidance such as reduced affective commitment (Meyer *et al.*, 2002) and increases in other deleterious behaviours such as smoking or alcohol consumption (Frone *et al.*, 1994). The results of employee stress at the organisational level speak for themselves: increased compensation claims, increased intention to turnover, and reduced productivity, to name a few (Jex and Crossley, 2005). Thankfully, research regarding stress and psychological well-being continues to progress, and stress models such as the Job Demands-Resources (JD-R; Bakker and Demerouti, 2007; Demerouti *et al.*, 2001) model have been successfully applied to explain how work initiatives or policies link to stress and stress outcomes (Bakker *et al.*, 2003).

Sources of work stress

In practice, because stress tends to be understood as an individual's response to challenging or difficult situations in their environment (Sonnentag and Frese, 2003) there exists an incredible diversity of potential workplace stressors. The Institute for Occupational Health and Safety (NIOSH) identifies a number of workplace characteristics that workload and work pace as important sources of workplace stress (Sauter *et al.*, 1990). Organisations can expect workload and work pace to become a challenge in situations where an employee's workload is not matched to their capacities. This is true for both blue-collar (e.g. correctional officers; Schaufeli and Peeters, 2000) and white-collar settings (Krantz *et al.*, 2005; Lundberg and Frankenhaeuser, 1999; Ogiwara *et al.*, 2008; Sato *et al.*, 2009). Other stressors identified by NIOSH (e.g. career concerns, role conflict, interpersonal relationships, and perceived job control; Sauter *et al.*,

1990) have also consistently shown to be linked to employees experience of workplace stress (Appelberg *et al.*, 1996; Beehr and Glazer, 2005; Elsass and Veiga, 1997; Frone, 2000; Karasek, 1979; Kelloway and Day, 2005; Liu *et al.*, 2005; Viswesvaran *et al.*, 1999).

The JD-R model (Bakker and Demerouti, 2007; Demerouti *et al.*, 2001) proposes to address the complexity of studying and intervening on stress in the workplace proposing a single model whereby according to a health impairment process, workplace demands (e.g. workload and emotional demands) create strain in employees and eventually result in the negative outcomes associated with stress. Likewise, according to a motivational process, workplace sources such as social support (Viswesvaran *et al.*, 1999) foster engagement, growth, and learning, and eventually lead to more positive workplace outcomes as well as employee health. Thus, the underlying discourse to discussions of the JD-R model suggests that healthier organisations are those that are characterised by more resources and lower demands whereas organisations characterised by higher demands and lower resources fare much worse (Bakker and Demerouti, 2007). Because both the motivational and health impairment of the JD-R model are well supported (Bakker *et al.*, 2003; Bakker and Demerouti, 2007; Nahrgang *et al.*, 2011) this suggests that organisations that are interested in having a positive role in their employees' health and well-being have a number of fruitful avenues of intervention open to them.

Purpose of current project

The purpose of this project was to further explore the role of organisational health in personal wellness. As described above, it has been well documented that stress results in poor health outcomes and that poor organisational health results in stress for employees. The Healthy Lifeworks project was a three-year comprehensive workplace wellness initiative designed to assess the health and well-being of employees of a department within a provincial public service in Canada. Although the primary focus of the project was on physical health and wellness, organisational health was also assessed at the beginning and end of the project. Thus, this study provides an opportunity to explore the relationship between organisational health and health outcomes, and to ascertain the role of stress in that relationship. Therefore, the focus of this paper is on examining how organisational health influences personal health and well-being, and how stress may mediate that relationship.

First, in accordance to the basic relationships outlined in the JD-R (Bakker and Demerouti, 2007) model, we expect to find that organisational health will be associated with indicators of psychological stress and with individual health profiles. Additionally, we expect to find that the relationship between organisational health and health profile will be mediated by stress. More specifically:

H1. Decreases in organisational health will predict increased indicators of stress as well as a reduced health profile.

H2. The effect of organisational health on health indicators will be mediated by stress.

Additionally, because there is evidence that men and women experience different workplace stressors and cope with stress differently (Desmarais and Alksnis, 2005), we explored the differential effects of stress on gender. Finally, we also explored the effects of organisational health on different employee subgroups (e.g. youth workers, administrative workers, correctional workers).

Method

Participants and design

In all, 733 employees were recruited over a three-year period to participate in a comprehensive workplace wellness intervention. This study reports on data originating from 325 employees for whom organisational health and personal health outcomes were collected both prior to and after the completion of the workplace intervention. Participants self-classified into one of a number of occupational categories, including administration (mostly clerical), management, correctional worker, youth worker, professional (mostly lawyers), technical, and other.

The comprehensive workplace wellness intervention consisted of programs and policies to support employees in making lifestyle changes to improve their health including: health risk assessments (HRAs), workshops, group presentations, health fairs, competitions, incentives programs, a variety of educational materials as well as one-on-one counselling via telephone, and computer-based support across lifestyle risk factors. Topics covered a wide range of health issues identified by the HRA including nutrition, and weight management with a focus on establishing and monitoring healthy eating habits; smoking cessation by telephone and onsite group sessions; physical activity with a focus on how to exercise safely and effectively to increase endurance, strength, and flexibility; ergonomics and musculoskeletal injury prevention with emphasis on train-the-trainer sessions for sustainability, home and work physical activity programs, education about posture, sitting technique to prevent injuries, and the importance of maintaining a healthy weight and improving fitness levels including strength and flexibility. Results of the impact of the workplace wellness intervention are reported elsewhere (see Makrides *et al.*, 2011) thus will not be discussed here.

Procedure and measures

Personal health measures: a total of 12 personal health measures were assessed. These measures are primarily composite scores developed based on responses to a self-report health risk appraisal and a physical examination of participants. Means, standard deviations, and range for all measures are included in Table I. The 12 health scores were:

- (1) Personal wellness profile (PWP): PWP is a computerised health and lifestyle assessment tool consisting of 39 questions including age, gender, personal and family health histories, daily physical activities, nutrition, stress level, safety, smoking history, and readiness to change (Wellsource[®] Personal Wellness Profile Questionnaire, 2008). These 39 questions are combined to provide an overall personal wellness score, ranging from 0 to 100, with higher scores indicating greater wellness.
- (2) Health age: health age is calculated based on the person's current age, life expectancy, and the number of good health practices currently reported (see Berkman and Breslow, 1983).
- (3) Overall blood pressure score: the overall blood pressure score was determined using actual measures of systolic and diastolic blood pressure. Systolic blood pressure readings 140 or higher and a diastolic pressure of 90 or higher would put the individual in the highest risk category. This score has a possible range of 1-100, with higher scores indicating lower risk.

Table I.
Means, standard
deviations, minimums,
and maximums for
personal health outcome
measures

Outcome variable	<i>M</i>	SD	Minimum	Maximum
Personal wellness profile	49.07	19.99	10	90
Health age	46.35	7.96	24.9	75.5
Overall blood pressure score	58.25	27.46	1	100
Nutrition	62.49	20.42	20	100
Fat intake	63.43	14.28	20	100
Fibre intake	63.93	19.40	20	100
Alcohol score	81.17	20.63	5	100
Fitness score	50.70	20.89	13	96
Smoking status	1.99	1.50	1	6
Cancer score	46.97	17.59	20	97
Good health practices	5.02	1.30	1	7
Stress score	75.63	15.76	10	100

Note: *n* = 325

- (4) Nutrition score: the overall nutrition score was determined by combining scores on four areas of nutrition: low-saturated fat meals, high-fibre foods, fast food and snacks, and having a daily breakfast. Higher scores (ranging from 20-100) indicate better nutrition.
- (5) Fat intake: this score is based on the frequency of having low-saturated fat meals. Participants having only low-saturated fat meals receive the highest possible score of 100.
- (6) Fibre score: fibre score was determined based on participant responses to a question concerning the number of servings of grains per day which are whole grains. If participants reported eating only whole grains, they receive a score of 100, whereas participants eating only refined cereals receive a score of 20.
- (7) Alcohol score: alcohol score was determined by the number of drinks per week reported by participants. For both men and women scores could potentially range from 5 to 100, with 0 drinks per week equalling 100, and 22 or more drinks for males, and 21 or more drinks for females resulting in a score of 5.
- (8) Fitness score: fitness score was based on responses to three items: strength, flexibility, and aerobic fitness (days per week of exercise) and body composition (body mass index). Potential scores ranged from 0 to 100, with higher scores indicating better fitness.
- (9) Smoking status score: the smoking status score was determined by participant responses to a smoking frequency item. Participants who have never smoked receive a score of 6, and those who smoke 10 or more cigarettes per day receive the lowest score of 1.
- (10) Cancer score: cancer scores range from a potential low of 15 to a maximum of 100. Higher scores indicate less cancer risk, and are calculated based on personal history of such factors as: family or personal history of cancer, alcohol intake, age, smoking, sun exposure, dietary habits, and aerobic exercise.

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- (11) Good health practices: the good health practices score was a comprehensive measure derived from the number of health indicators (of 15 assessed) where the participant was “doing well” or better. The 15 health indicators included aerobic exercise, nutrition, cholesterol, body composition, blood pressure, heart health, stress, alcohol, seat belt use, happiness, sleep, cancer score, sick days, and several other factors. Scores potentially range from 1 to 15, with higher numbers indicating more good health practices.
 - (12) Stress score: overall stress score was determined based on the combination of four scale scores: perceived stress, stress signals (health issues, thoughts of suicide, emotional problems), stress load (bodily pain, self-esteem), and happiness/energy level. Higher scores indicate a lower incidence of stress indicators.

Organisational health measures

As with the personal health data, organisational health was measured both prior to and at the end of the comprehensive workplace intervention. However, because the organisational health scores were virtually identical pre- and post-intervention, and because the personal health outcomes measures are the most relevant, we will concentrate on the post-intervention measures of organisational and personal health.

Two measures of organisational health were employed. Key features of healthy work culture were assessed using a 16-item measure derived from research on the Health Scorecard (Pratt, 2001). This scale asked questions regarding the employees' perception of work satisfaction, control, and autonomy in the workplace, the work environment, knowledge of the job, and training and development. All responses were reported on five-point scales ranging from 1 (strongly disagree) to 5 (strongly agree) with items such as “I am proud to say I work for [organisation]” and “There is someone at my work who encourages my professional development”. Responses to all 16 items were averaged to obtain a scale score. Mean scores ranged from 1.75 to 5, with a scale mean of 3.75 and a standard deviation of 0.60. This 16-item measure was highly reliable ($\alpha = 0.91$).

Organisational culture was assessed with the four-item business health culture index (BHCI) published by Health Canada (Shain, 2000). These four items were: “I am satisfied with the amount of involvement I have in decisions that affect my work”; in the last six months, I have experienced worry, “nerves”, or stress from mental fatigue at work (reverse scored); I feel I am rewarded (in terms of praise and recognition) for the level of effort I put out for my job. “In the last six months too much time pressure has caused me worry or stress” (reverse scored). All responses were on five-point scales ranging from 1 (strongly disagree) to 5 (strongly agree). Responses to all four items were averaged to obtain a scale score. Mean scores ranged from 1 to 5, with a scale mean of 3.23 and a standard deviation of 0.85 for the sample. Reliability of this four-item scale was good ($\alpha = 0.76$). Overall, the organisational health measure incorporates content that assesses employees' perceptions of most stressors discussed in the NIOSH framework (e.g. workload, job control, role conflict, interpersonal relationships; Sauter *et al.*, 1990) as well as overall satisfaction with the job and the organisation.

Both measures were highly correlated ($r = 0.72$), therefore, the two scales were combined to create one measure of organisational health. This new measure was

highly reliable ($\alpha = 0.93$) and had a mean of 3.65, a standard deviation of 0.61, and ranged from 1.65 to 5.00. Men and women did not differ in their perceptions of organisational health, $F(2, 323) = 0.34$, $p = 0.56$, although organisational health scores did differ across occupational groups $F(6, 313) = 4.17$, $p < 0.01$. *Post-hoc* tests found that correctional workers rated organisational health significantly lower ($M = 3.14$) than administrators ($M = 3.75$, $p < 0.01$) or management ($M = 3.74$, $p < 0.01$). No other differences were found between occupational groups.

Results

Overview of analyses

Four primary sets of analyses were conducted. First, general linear model (GLM) ANOVA analyses using SPSS 17.0 were conducted with organisational health predicting all 12 measures of personal health outcomes. Participant age and gender were included as control variables, as these factors consistently play a role in health. Thus these analyses explored the impact of organisational health after controlling for life factors known to contribute to health outcomes. Second, separate analyses were conducted to assess if organisational health interacted with gender – that is, does the role of organisational health on personal health outcomes differ for men and women. Third, the data were split according to occupational group. As mentioned above, it is quite possible that the impact of organisational health on personal health outcomes might differ according to occupational groups. Thus we reanalysed the data split by occupational category. Finally, using mediational analyses, we explored if stress mediated the relationship between organisational health and personal health outcomes.

Organisational health as a predictor of personal health outcomes

In all, 12 regression analyses were conducted with age, gender, and the organisational health measure as predictors of each measure of personal wellness. As can be seen in Table II, age was a significant predictor of PWP, health age, overall blood pressure score, nutrition score, fat intake, and cancer score. Gender was a significant predictor of PWP, health age, overall blood pressure score, nutrition score, fat intake, alcohol score, and good health practices. Follow-up regression analyses indicated that with the exception of cancer score, women score as more healthy and as engaged in more healthy behaviours.

After controlling for age and gender, organisational health was a significant predictor of several personal health outcomes (see Table II). Specifically, increased organisational health was related to increased personal wellness, reduced health age, increased nutrition, reduced fat intake, increased fibre intake, reduced alcohol consumption, increased fitness, reduced cancer score, better health practices, and less stress. More importantly, stress score (Table II) was clearly the factor most strongly related to organisational health (and interestingly, not related to age or gender; $F(1, 320) = 85.10$, $p < 0.001$).

The role of gender

In all, 12 additional regression analyses were conducted with age, gender, the organisational health measure, and the interaction between gender and organisational health as predictors of each measure of health outcomes. Means, standard deviations, and standardised regression coefficients for organisational health predicting personal health outcomes, split by gender are presented in Table III. For men, organisational health predicted PWP, overall blood pressure score, nutrition score, fat intake, fibre

Outcome variable	Predictor		
	Age	Gender	Organisational health
Personal wellness profile	8.49**	23.50**	15.29**
Health age	1,863.51**	7.50**	9.92**
Overall blood pressure score	45.12**	37.73**	0.35
Nutrition score	3.73*	26.48**	6.15*
Fat intake	4.05*	14.29**	6.61*
Fibre score	1.84	1.01	14.50**
Alcohol score	2.96	9.77**	9.85**
Fitness score	0.35	0.57	3.78*
Smoking status	2.60	0.06	0.28
Cancer score	10.47**	0.48	5.04*
Good health practices	2.23	15.94**	5.47*
Stress score	0.88	0.31	85.10**

Notes: * $p \leq 0.05$; ** $p \leq 0.01$

Table II.
F-tests and significance levels for age, gender, organisational health and health culture index (BHCI) as predictors of personal health

	Men			Women		
	<i>M</i>	<i>SD</i>	β	<i>M</i>	<i>SD</i>	β
Personal wellness profile	42.28	18.95	2.88** _a	50.57	20.19	2.13 _b
Health age	46.27	8.64	1.75 _a	46.03	8.24	0.87 _b
Overall blood pressure score	48.81	23.18	3.97** _a	63.62	27.12	2.98 _a
Nutrition score	54.58	20.69	3.25** _a	64.07	20.20	2.06 _a
Fat intake	58.85	14.71	2.37** _a	64.65	14.39	1.44 _a
Fibre score	61.25	20.40	3.18** _a	63.55	19.39	2.05** _a
Alcohol score	78.12	21.55	3.54** _a	83.42	20.46	2.02 _b
Fitness score	50.28	20.86	3.23 _a	49.39	21.35	2.31 _a
Smoking status	2.00	1.54	0.25 _a	2.139	1.641	0.16 _b
Cancer score	49.03	16.84	2.72** _a	44.36	17.55	1.93 _b
Good health practices	4.62	1.30	0.20** _a	5.069	1.349	0.14 _b
Stress score	73.87	17.31	2.27** _a	75.40	15.71	1.47** _b

Notes: * $p \leq 0.05$; ** $p \leq 0.01$; coefficient pairs sharing subscripts do not differ significantly

Table III.
Standardised regression coefficients and significance organisational health as a predictor of personal health for men and women

score, alcohol consumption, cancer score, good health practices, and stress. However, organisational health predicted only fibre score and stress for women. Pairs of coefficients that do not share subscripts differ significantly (i.e. the interaction term was significant in the ANOVA model), overall the relationship between organisational health and personal health was significantly stronger for men than for women for PWP, alcohol score, cancer score, good health practices, and stress score (see Table III).

The role of occupational group

Participants self-identified as belonging to one of several occupational groups (i.e. professional, administration, management, technical, correctional worker, youth worker, and other). Consequently we were able to conduct regression analyses as above, but with the data split by occupational group. As presented in Table IV, the results of these analyses suggest that the role of organisational health differed across

Table IV.
F-values and significance
for organisational health
as a predictor of personal
health indicators by
job category

Outcome Variable	Occupational health by job type					
	Professional (n = 26)	Management (n = 62)	Administration (n = 117)	Technical (n = 14)	Correctional worker (n = 25)	Youth worker (n = 40)
Personal wellness profile	0.21	1.05	3.51***	0.10	12.39**	2.87***
Health age	0.36	1.35	1.59	1.50	4.23*	2.60
Overall BP score	0.02	1.18	3.64***	0.08	0.86	0.22
Nutrition	1.78	3.89*	1.22	1.14	1.04	0.22
Fat intake	0.40	0.02	1.79	4.80*	0.27	0.17
Fibre intake	0.07	7.83**	6.70*	0.04	0.09	0.01
Alcohol score	1.70	0.02	0.35	1.15	10.76**	5.64*
Fitness score	0.74	0.35	3.23†	0.64	2.70	0.16
Smoking status	0.17	0.03	0.36	0.12	0.19	7.73**
Cancer score	0.47	0.11	1.92	0.51	3.89***	4.36*
Good health practices	0.26	0.95	2.09	0.61	4.11***	1.50
Stress score	5.19*	13.20**	21.18**	27.35**	7.19*	6.14*

Notes: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.10$

occupational sub-types (“other” employees were omitted from this analysis, as it is impossible to know what job they do).

Specifically, correctional workers and youth workers had more health outcomes significantly related to organisational health than other groups. This is compelling in that both correctional workers and youth workers are smaller groups in the sample (n 's = 25 and 40, respectively). Management employees and administrative employees also showed a substantial number of significant effects (see Table IV). Interestingly, aside from the relationship between organisational health and stress (which was significant across all occupational groups) professionals and technical staff were least influenced by organisational health (although this may well be a statistical power issue as these two groups have 26 and 14 participants, respectively).

Mediational analyses

Previous research has suggested that occupational health is related to stress experienced by employees, and increased stress results in negative health outcomes (see Kelloway and Day, 2005). Thus it is quite plausible that the significant relationship between organisational health and personal health outcomes is mediated by stress – that is, stress is the mechanism for the link between organisational health and personal health. The regressions above provide initial support for this as stress is the personal health outcome which is more strongly influenced by organisational health (see Table II).

Therefore, we tested for mediation by conducting a series of hierarchical regression analyses following procedures specified by Baron and Kenny (1986). For each regression where organisational health predicted health outcomes (i.e. all outcomes except overall blood pressure, smoking status) stress score was added as a predictor. Because stress was used to calculate PWP, it would not be appropriate to explore stress score as a predictor of this health outcome, thus we did not perform this assessment. For all other measures, if stress score was a significant predictor, this would indicate

that stress score at least partially mediated the relationship between organisational health and the personal health outcome. If organisational health remained significant, this would indicate that stress is a partial mediator, whereas if organisational health was no longer a significant predictor, this would indicate stress was a complete mediator of the relationship. Sobel tests of mediation were conducted to verify the significance of any mediational effects.

As predicted, for health age, nutrition score, fat intake, fitness score, cancer score and good health practices, stress score was a complete mediator of the relationship between organisational health and these health outcomes. In other words, for these outcomes, organisational health influenced stress, which subsequently influenced health outcomes (all p 's < 0.05). The relationship between organisational health and fibre score was partially mediated by stress, in that to some extent organisational health influenced fibre intake directly. Interestingly, the relationship between organisational health and alcohol intake was not mediated by stress, thus organisational health directly influenced alcohol intake.

Discussion

The results of this study supported our hypotheses that organisational health can have a significant impact on employee health, and for the most part, this was mediated by the stress induced by poor organisational health. Furthermore, as we noted above, the impact of organisational health appeared to be exacerbated in men, and seems to have the most impact on correctional workers and youth workers within the organisation. Within the context of the organisational stress literature, these findings underscore the importance of psychological health to an organisation's workforce's well-being, and justify effort aimed at improving organisational health to improve employee wellness.

The results of the survey suggest that in the organisation men may be more susceptible to the deleterious effects of poor organisational health than women (i.e. the standardised regression coefficients were stronger for men than women in a number of categories, and more of them were significant). Moreover, the analyses suggest that the relationship between indicators of well-being and organisational health is mediated by stress with the exception of alcohol use and fibre intake (a separate analysis was performed to test if there were changes in mediation when tested separately by gender with no changes in the results). At face value these results are somewhat surprising given that there is little evidence of gender effects in the perceptions of stress and the stress strain relationship (see Desmarais and Alksnis, 2005).

It appears that in this case men's stress score was more strongly related to organisational health than women's (Table III). This observed gender difference has a number of potential causes. First, research suggests that men tend to draw on work-based sources of social support (Greenglass, 1993), thus in situations of poor organisational health they may have less access to an important means of coping with increased stress. Moreover, women tend to have access to more social support than men (e.g. Eagly and Crowley, 1986), which may help to moderate the impact of organisational health on stress.

Second, beyond established workplace stressors such as workload or role conflict, women must also contend with additional workplace stressors such as sexual harassment and additional worklife balance issues associated with traditional

gender roles (see Desmarais and Alksnis, 2005) which were not specifically assessed in the present study. As such this aspect of gender-related organisational stress may have been overlooked. Conversely, traditional male roles may dictate more involvement of time and energy into the workplace (Desmarais and Alksnis, 2005) thereby enhancing the organisational health to stress relationship, especially considering how organisational health was assessed in this study (e.g. questions about reward, fairness, and job satisfaction).

Moreover, research about gender differences suggests that time and effort wasters, or lack of reward and recognition, are especially salient stressors for men; whereas interpersonal stressors seem to be more relevant for women (Narayanan *et al.*, 1999). In this case, the organisational health instrument assessed both the reward/recognition aspect as well as the interpersonal aspects of work stress (time and effort wasters were not explicitly assessed). As such, one might suspect that the rewards/recognition aspect may need further investigation for the organisation and could be the focus of future psychological well-being interventions.

Finally, we also observed that although men's alcohol score was significantly related to organisational health (and not women's) this relationship was not mediated by stress scores (which accounts for a number of psychological and emotional indicators of stress). This suggests that men's alcohol use is directly influenced by organisational health. This observation is consistent with research suggesting that men are more likely to use alcohol as a means of disengagement coping (Carver *et al.*, 1989).

After separating the data by occupational group categories, the correctional worker and youth worker categories stand out as particularly susceptible to poor organisational climate. This should come as no surprise considering that work with correctional populations of all kinds (adult or juvenile) has long been considered to be extremely stressful (Huckabee, 1992). The nature of the working environment and job demands of correctional workers and the work stress issues of correctional workers are well studied in the research literature. The results of this study are consistent with past literature that suggests that participation in decision making, job satisfaction, and commitment, are all important predictors of stress in correctional workers (Dowden and Tellier, 2004). Other critical aspects of correctional and juvenile workers' experience of work stress, such as the difficulties related to working in tense interpersonal situations with the recipients of their services (Schaufeli and Peeters, 2000), as well as the sense of personal danger (Auerbach *et al.*, 2003) were not assessed in the present study.

Although we understand that for these two sub-populations we do not have a complete portrait of the relevant workplace stressors we note that for both subgroups organisational health was predictive of more aspects of personal well-being than other groups. Additionally these two are the only subgroups for whom alcohol consumption is associated with organisational health. Moreover, the observation that increased alcohol consumption is not mediated by indicators of stress but rather directly related to organisational health suggests that employees drink at least in part as a means of coping with existing workplace stressors. However, the use of alcohol (and potentially other substances) is a short-term maladaptive coping strategy that may have deleterious effects on long-term health (Lundquist and Cooper, 1999). Stress coping theory suggests that in general employees will engage in such coping strategies in situations where they cannot take control and engage in problem-based coping strategies (see Cartwright and Cooper, 2005).

Limitations and future research

Overall this study provides intriguing information about the links between organisational health and the personal well-being of employees, however, there are a number of limitations. First, the measures used to assess organisational health and indicators of stress were not ideal. As mentioned earlier, several aspects of work-related stress that are salient for populations of interest (i.e. women, correctional and youth workers) were not assessed. Thus it is possible that if different aspects of stress had been measured, this would have allowed us to refine our predictions and conclusions arising from this study.

Second, the variable sizes of the organisational groups limited our ability to draw firm conclusions. However, despite this limitation we were still able to find a number of significant relationships. Indeed, in terms of predicting wellness, some of the strongest effects were found for correctional workers and youth workers. These were two of the smaller groups in the sample. Nonetheless larger samples of some occupational groups would have been preferred.

The results of this study also provide a number of directions for future research. For example, it would be worthwhile to develop workplace interventions to address organisational health. The comprehensive workplace intervention we describe above did not begin at the outset with the goal to influence workplace health. As we have mentioned above, organisational health did not change across the length of the study. Clearly, it would be fruitful to explore how an effective organisational health intervention might influence the relationships we have identified.

It may also be worthwhile to eventually perform a more in-depth investigation of the specific issues relating to job control in the correctional and youth worker populations. It would also be important to assess the extent to which the prevailing culture in these subgroups fosters drinking behaviour in the form of drinking networks (i.e. work-based social networks in which alcohol is an imbedded element). Such networks may have an important role in predicting problematic alcohol consumption in employees above and beyond stressful working conditions (Martin *et al.*, 1996).

Thus, we have a valuable, though somewhat incomplete, portrait of the sources of stress for this organisation that begs for more investigation. Such an investigation would ideally focus on clarifying the observed gender differences on the effects of organisational health, or on gathering additional empirical data to help address the stressors experienced by correctional and youth workers.

Conclusions

The results of this study indicate that changing organisational health in a meaningful way has the potential to have positive and broad-based influence on personal health through the mechanism of experienced stress. Moreover, even though the research base on primary level organisational stress interventions is sparse and difficult to parse (Hurrell, 2005), it appears that primary intervention can be effective when the following practices are observed: focus on a few key stressors that are experienced by the majority of employees; avoid introducing too many changes too quickly; use both objective and subjective measures to evaluate outcomes; use theory to guide interventions; maximise response rates; avoid ad-hoc measures if at all possible; and the intervention should be evaluated by independent researchers (Hurrell, 2005; Parkes and Sparkes, 1998).

Overall, employers that strive to improve their organisational health should have a positive impact on the personal health outcomes of their employees. As such,

any comprehensive approach to improving overall organisational health will need to account for the psychological work environment as well as individual health practices and the physical work environment.

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