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Workplace health beliefs concerning physical activity and sedentary behaviour

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Background	Sedentary behaviour (SB) in the form of uninterrupted sitting constitutes a risk factor for chronic disease that is independent of the risks associated with insufficient physical activity (PA). However, little is known about employee and manager health beliefs concerning SB and PA.
Aims	We assess health beliefs of desk-based workers concerning PA and SB accrued at work versus during leisure. We ask whether recreational PA attenuates the perceived ill-health effects of prolonged occupational SB, and compare attitudes of employees and managers to interventions aimed at reducing/interrupting workplace sitting.
Methods	Two hundred and twenty-two desk-based employees and 121 managers located in Melbourne, Australia, rated the healthiness of vignettes describing combinations of uninterrupted sitting, sitting with breaks, light PA and moderate-to-vigorous PA accumulated at work and during leisure time. Participants also responded to open-ended questions concerning the implications of reducing workplace sitting.
Results	Mixed-model ANOVA revealed that the presence of leisure-time PA greatly diminished the perceived detrimental effects to health of workplace sitting. Subsequent thematic analysis of qualitative data further revealed that participants' concerns with SB were primarily musculoskeletal and workplace performance rather than chronic health.
Conclusions	Employees and their managers do not rate uninterrupted sitting as being unhealthy when it is presented to them in the form of an 'active couch potato' lifestyle (a person who meets minimum PA recommendations but spends much of their work time and non-PA time sitting). We recommend that interventions targeting workplace SB take into account the contextual nature of health beliefs.

Key words Health beliefs; occupational health; physical activity; sedentary behaviour; workplace sitting.

Introduction

Insufficient physical activity (PA) is a risk factor for various chronic health conditions, but regular moderate-to-vigorous intensity PA (MVPA) and even light-intensity PA (LPA) can reduce these risks [1]. Sedentary behaviour (SB), particularly in the form of *sitting* during TV viewing or during desk-based work, is also now recognized as a chronic health risk [2], one that is independent of PA (or reduced only by very high levels of PA) [3]. Little is known about desk-based workers' health beliefs concerning SB and PA as a function of the context (recreational/workplace) in which the activity occurs. Our aim was to evaluate these beliefs particularly in the context of the 'active couch potato' phenomenon, whereby an individual who meets PA guidelines (recreationally) fails to appreciate that they are compromising their health because they are sedentary throughout the rest of the day (occupationally) [4].

Given the historical focus on promoting recreational PA, we hypothesized that the healthiest perceived combination of context and activity would be recreational PA. In accordance with the active coach potato, we further hypothesized that lifestyles incorporating recreational PA would attenuate any perceived ill-effects of workplace SB.

Managers are instrumental in promoting workplace change, yet their beliefs about workplace SB interventions do not always agree with those of their employees, particularly in relation to cost-productivity implications

[5]. Thus, we included both employees and managers in our study along with a qualitative component asking them to respond to an open-ended question about the implications of reducing/interrupting workplace sitting.

Methods

Participants were desk-based adult workers recruited via an online database of businesses in metropolitan Melbourne. Thirty-eight of the 260 organizations formally declined upon initial contact (with common reasons given including 'survey fatigue' and being 'too busy'). The study was completed anonymously online, with no identifying information requested.

Participants used Likert scales ranging from 0 'extremely unhealthy' to 10 'extremely healthy' to rate the perceived healthiness of three activities—SB (sitting), LPA, MVPA—described as occurring during work *or* leisure. Participants then rated *lifestyles* consisting of combinations of these activities over the course of a typical day, with four workplace activities (sitting, taking breaks from sitting, LPA and MVPA) coupled with three leisure-time activities (sitting, LPA and MVPA). Finally, participants were invited to comment on the implications of reducing/interrupting workplace sitting.

Ethical approval to conduct the research was granted by our University's Human Ethics Advisory Group—Health.

Prior to analyses, data were screened for missing values (<5% of cases and distributed randomly) and variables were confirmed to be normally distributed. Univariate outliers were capped to 1.5 SDs and no multivariate outliers were detected. Four participants (managers) were excluded for not being desk-bound (reporting spending less than half their workdays sitting).

Results

Questionnaires were completed by 222 desk-based employees (163 women and 59 men, mean age 35 years [SD = 11.93]) and 121 managers (74 women and 47 men, mean age 39 years [SD = 12.12]). A 2 × 2 × 3 × 2 ANOVA on 'single-activity' ratings by gender, work role (employee/manager), activity type (sedentary/LPA/MVPA) and context (leisure/work) revealed no effects of gender or work role. As hypothesized, more intense PA was perceived as healthier, $F(2,634) = 1486.13$, $P < 0.001$, $\eta_p^2 = 0.82$, and recreational activities were perceived as healthier than occupational ones, $F(1,317) = 351.37$, $P < 0.001$, $\eta_p^2 = 0.53$. An interaction between activity and context, $F(2,634) = 186.8$, $P < 0.001$, $\eta_p^2 = 0.37$, indicated that occupational MVPA was perceived as less healthy than recreational MVPA.

A 2 × 2 × 4 × 3 ANOVA on 'lifestyle' healthiness ratings by gender, work role, occupational activity type (sedentary/sedentary with breaks/LPA/MVPA) and recreational activity type (sedentary/LPA/MVPA) also revealed no effects of gender or work role. Main effects of activity type were obtained in both the occupational, $F(3,921) = 374.52$, $P < 0.001$, $\eta_p^2 = 0.55$, and recreational contexts, $F(2,614) = 1162.04$, $P < 0.001$, $\eta_p^2 = 0.79$, with more PA generally perceived as healthier

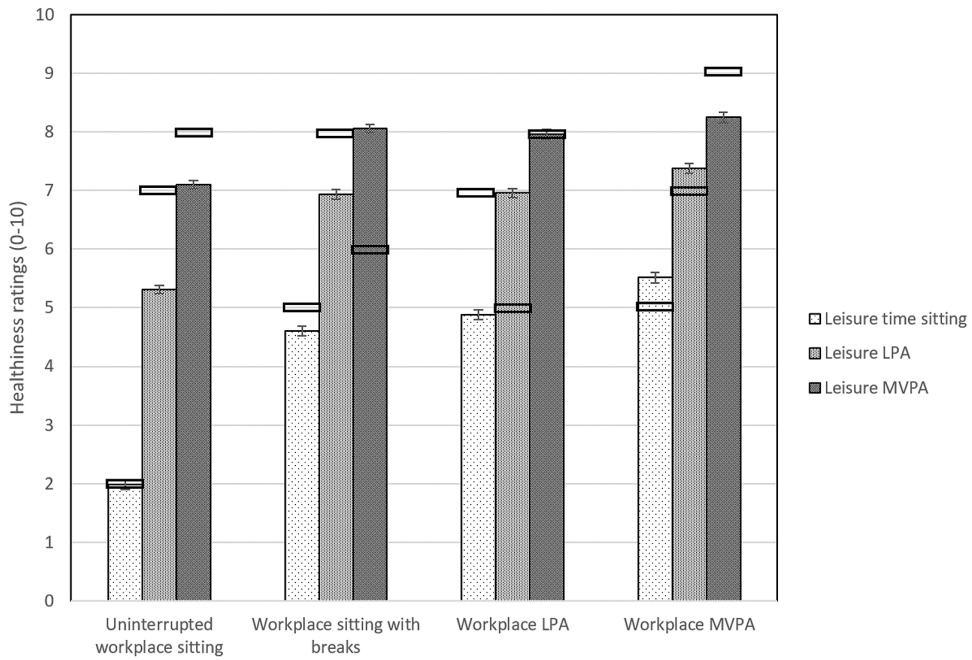

Figure 1. Mean healthiness ratings of 'lifestyles' described as a combination of two activity types matched with two contexts (i.e. an activity undertaken at work and a [possibly different] activity undertaken during leisure). Bars represent means (with ±1 SE bars included); horizontal boxes represent median values for each condition.

and uninterrupted sitting perceived as least healthy. However, an interaction between activity type and context, $F(6,1842) = 67.16$, $P < 0.001$, $\eta_p^2 = 0.18$, indicated that in the presence of leisure-time PA, workplace sitting had little influence on healthiness ratings (see Figure 1).

Qualitative data were analysed via a bottom-up, data-driven, 'analytic' thematic analysis (the reader is referred to [6] for a detailed description of this approach). The results are presented in Table 1 along with representative quotes. Both employees and managers considered the benefits of reducing workplace SB to be primarily musculoskeletal and improved morale, motivation and staff retention, with concerns expressed by both groups about the possibility of work disruption, distraction and costs associated with reducing workplace SB.

Discussion

In terms of single-activity ratings, employees and managers rated MVPA during leisure as most healthy followed by LPA (leisure or at work), then MVPA at work, with SB (leisure or at work) as least healthy. This is consistent with the well-established and well-promoted health benefits of recreational MVPA [7], and with the idea that occupational MVPA is regarded as more arduous and hazardous [8]. However, while both groups rated uninterrupted sitting as unhealthy (at work or leisure), ratings of lifestyles confirmed the active couch potato phenomenon [4] whereby the presence of leisure-time MVPA or LPA strongly diminished the perceived ill-health effects of sitting at work. In terms of qualitative findings, both employees and managers focused on musculoskeletal and performance issues relating to SB rather than chronic ill-health [9]. The perceived benefits of reducing sitting in creating a more positive psychosocial environment were consistent with past research among employees and middle managers [10]. Comments about workplace breaks causing disruption and worker resistance highlight the need for workplace interventions to be inclusive and consultative.

Table 1. Results of thematic analysis on consequences of reducing workplace sitting (A) for the individual, and (B) for the workplace (presented in order from most frequent [top] to least frequent [bottom])

(A) Implications for the individual		
Theme	Sub-theme	Example(s)
Physical	Musculoskeletal	(+) 'Reduced muscle and joint strain injuries'; 'Less physical injuries, back, neck, shoulder pain'
	Fitness and energy levels	(+) 'Greater cardio fitness'; 'Burns calories'
	Health	(+) 'Health benefits associated with increased movement and energy expenditure'; 'Heart problems could be avoided'; 'Live longer'; 'Reduced sedentary risks factors for diabetes and heart disease'; 'Increased life expectancies'
Performance	Attention and motivation	(+) 'Greater concentration levels'; 'I wouldn't get as tired during the day'; 'Moving away from the desk can help you think more clearly'; 'More alert'; 'More motivated'; 'More productive time'; 'Potential increase in efficiency' (−) 'Less work gets done in the same amount of time'; 'Lose focus on workplace requirements'; 'May find distracting to complete work tasks'; 'Decreased work time to complete the tasks'
Well-being	Personal	(+) 'Happier, better for mental health'; 'better overall wellbeing'; 'Improved sense of wellbeing'; 'Possibly stress reductions from having a break'; 'Less stress and anxiety about being immobilised and confined to a computer'; 'more sociable' (−) 'Potentially more stress as need to compress workplace in shorter time frames'
(B) Implications for the workplace		
Theme	Sub-theme	Example(s)
Performance	Productivity	(+) 'More productive as time at desk is limited'; 'More alert workforce'; 'Better focused employees'; 'If not managed well, there is a risk of loss of productivity'; 'Unless done in a structured way, loss of productivity' (−) 'Interruptions to workflow'; 'More easily side-tracked if not at desk'; 'Potentially less work achieved'; 'more wasted time'; 'Excess noise would be distracting'
	Attendance and retention	(+) 'Improved attendance at work'; 'Higher employee retention rates through reducing medical issues'; 'Staff retention, less sick leave'
Costs	Affordability	(+) 'Less work cover claims'; 'Costs of standing desks would be offset by productivity'; 'Decreased costs in terms of long term staff health and improved quality of work'; 'Decrease in work cover complaints' (−) 'Costs associated with initiatives to reduce sitting'; 'Potential costs of loss of time and productivity'; 'Costs unlikely to be supported in current economic climate'
Well-being	Psychological	(+) 'Happier environments'; 'Positive attitudes, motivation increases' (−) 'Challenges about telling us how to act'; 'Some may resent certain strategies'
	Social	(+) 'Employees happier, better moral'; 'Improved social interaction, friendlier workplace environment'

'+' denotes positive themes; '−' denotes negative themes.

In conclusion, health beliefs about workplace SB appear to be strongly influenced by the presence of recreational PA. The implication is that interventions should not target workplace SB in isolation but address underlying assumptions held by workers concerning the interaction between SB and PA. However, this conclusion and recommendation must be tempered by the fact that our study's vignette-rating approach was limited in terms of relying on self-reports concerning hypothetical, not actual/personal, scenarios.

Key points

- Desk-based employees and managers do not perceive occupational sitting as unhealthy when it is accompanied by sufficient leisure-time physical activity.
- The foci of concern of employees and employers in relation to occupational sitting are musculoskeletal and performance-related rather than chronic health.
- Interventions targeting workplace sedentary behaviour should highlight the health benefits of reducing or interrupting occupational sitting and improve awareness that recreational physical activity does little to attenuate the ill-effects of occupational sitting.

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Competing interests

None declared.

References

1. White RL, Babic MJ, Parker PD, Lubans DR, Astell-Burt T, Lonsdale C. Domain-specific physical activity and mental health: a meta-analysis. *Am J Prev Med* 2017;**52:**653–666.
2. Teychenne M, Ball K, Salmon J. Sedentary behavior and depression among adults: a review. *Int J Behav Med* 2017;**17**:1–9.
3. Ekelund U, Steene-Johannessen J, Brown WJ *et al.*; Lancet Physical Activity Series 2 Executive Committe; Lancet Sedentary Behaviour Working Group. Does physical activity attenuate, or even eliminate, the detrimental association of sitting time with mortality? A harmonised meta-analysis of data from more than 1 million men and women. *Lancet* 2016;**388:**1302–1310.
4. Owen N, Sparling PB, Healy GN, Dunstan DW, Matthews CE. Sedentary behavior: emerging evidence for a new health risk. *Mayo Clin Proc* 2010;**85:**1138–1141.
5. Hadgraft NT, Brakenridge CL, LaMontagne AD *et al.* Feasibility and acceptability of reducing workplace sitting time: a qualitative study with Australian office workers. *BMC Public Health* 2016;**16:**933.
6. Braun V, Clarke V. Using thematic analysis in psychology. *Qual Res Psychol* 2006;**3:**77–101.
7. Norton K, Norton L, Sadgrove D. Position statement on physical activity and exercise intensity terminology. *J Sci Med Sport* 2010;**13:**496–502.
8. CBHA (Commission to Build a Healthier America). *Work Matters for Health. Issue Brief 4: Work and Health*. Commission to Build a Healthier America, 2008. http://www.commissiononhealth.org/PDF/0e8ca13d-6fb8-451d-bac8-7d15343aacff/Issue%20Brief%204%20Dec%2008%20-%20Work%20and%20Health.pdf (13 July 2017, date last accessed).
9. Gilson N, Straker L, Parry S. Occupational sitting: practitioner perceptions of health risks, intervention strategies and influences. *Health Promot J Austr* 2012;**23:**208–212.
10. Gilson ND, Burton NW, van Uffelen JG, Brown WJ. Occupational sitting time: employees' perceptions of health risks and intervention strategies. *Health Promot J Austr* 2011;**22:**38–43.