UBC Social Ecological Economic Development Studies (SEEDS) Sustainability Program

Student Research Report

Standing Desk Wellbeing Analysis: Investigating Whether Standing Desks Can Affect Our Overall Well-Being

Aleah Loa, Russell Nesbitt, Ilze Pretorius, Yiwu Zhang

University of British Columbia

PSYC 321

Wellbeing

April 5, 2018

Take A Stand: Investigating Whether Standing Desks Can Affect Our Overall Well-being

Executive Summary

Many individuals develop severe mechanical back problems via the development of musculoskeletal problems from sitting at a desk. University of British Columbia (UBC) has approximately 14,000 employees, and an overwhelming majority of these people are staff and faculty members. It is a common assumption that those who experience chronic pain tend to be less productive as its effects can transcend into cognitive interference. As proposed by exercise sport science experts from the University of Queensland, "even when adults meet physical activity guidelines, sitting for prolonged periods can compromise metabolic health" (Owen, Healy, Matthews & Dunstan, 2010). Considering the above, in conjunction with the UBC SEEDS Program, we explore the outcomes of both perceived productivity and health status amongst staff and faculty members. Currently, there are two locations on the UBC Vancouver campus that provide standing desks for staff and faculty; thus, we investigate our variables of interest via a within-subjects correlational design study in coordination with the UBC Centre of Interactive Research on Sustainability and the UBC First Nations House of Learning.

Introduction

A growing body of research explores the contemporary work environment and how sedentary behaviour can be a catalyst to the problematic health outcomes we experience. As summarized by experts from the American College of Occupational and Environmental Medicine, "the workplace is a key contributor to the total time that individuals spend in sedentary behaviour…" (Olsen, Brown, Kolbe-Alexander & Burton, 2018). Moreover, Heidi M. Olsen from the University of Queensland's School of Human Movement and Nutrition Sciences states that "physically active workers can deliver significant tangible benefits...such as reduced costs associated with absenteeism, reduction in employee turnover, and improved productivity" (Olsen et al., 2018). Following this line of research, we underline the need for further studies dissecting the relationship between sedentary behaviour, more specifically, via standing desk use and employees' perceived productivity. Additional studies emphasize the catastrophically "...low levels of physical activity and high levels of sedentary time within contemporary human environments" (King et al., 2016). For instance, researcher at the Weill Cornell Medical Centre, Gregory F. Dakin has demonstrated "...the adverse impact of prolonged sedentary time on cardio-metabolic biomarkers of risk" and its consequences on persons who are at a heightened risk for severe obesity (King et al., 2016). Considering these critical implications within the University of British Columbia community, we examine the use (and therefore, lack of) of standing desks within the UBC Centre of Interactive Research on Sustainability (CIRS) and the UBC First Nations House of Learning (FNHL) and its effects on both perceived productivity levels and health status.

Research Question & Hypothesis

Our study poses the following research question: Is the use of standing desks associated with a significant increase in perceived productivity and perceived health status among staff and faculty members in the UBC Centre of Interactive Research on Sustainability building and the UBC First Nations House of Learning? Thus, our two variables of interest are 1) perceived productivity and 2) perceived health status. More specifically, we hypothesize that the use of standing desks will initially be correlated with lower levels of perceived productivity, and

prolonged use will be accompanied with higher levels of perceived productivity. We also expect to see a similar relationship for perceived health status, as described above. With our study, we build upon the growing body of research that emphasizes the detrimental effects of sitting for extended periods of time and the potential aid of standing desks.

Methods

Participants

We draw our participant sample from the two locations at the UBC Vancouver campus that offer standing desks for staff and faculty - UBC Centre of Interactive Research (CIRS) on Sustainability and the UBC First Nations House of Learning (FNHL). To assess our hypotheses, we collect our data from staff members from CIRS and FNHL who currently have a standing desk and those who do not. Collecting our participants' demographics via a Google Forms survey, we present the following breakdown of participants according to gender and group (affiliation with either CIRS or FNHL): N = 21 (n = 17 from CIRS, n = 4 from FNHL). For further clarification, we note that only 10 participants from the 17 staff and/or faculty members from CIRS currently have a standing desk; whereas, the 4 participants from FNHL represent the 4 out of 5 staff members who currently have a standing desk. Out of our total sample size, 14 identified as female, 6 as male, and 1 as non-binary. The age range for this sample is 25 to 51+ years old; in addition, the majority of our sample fell into the age ranges of 25-30 and 51+. Our locations differ in that CIRS only supplies standing desks upon request, therefore not all staff and faculty with in the building have standing desks; FNHL on the other hand has supplied all offices with a standing desk that have an adjustable option.

Conditions

Our conditions are as followed: 1) the state of individuals, in terms of their perceived productivity and health status prior to their use of a standing desk and 2) the state of individuals, in terms of their perceived productivity and health status after their use of a standing desk.

Measures

Furthermore, we are interested in the variables of perceived productivity and health status. To avoid the possibility of participant biases, we organize our survey accordingly, by first introducing questions discussing physical activity levels, standing desk status (whether they have one or not), then productivity and health status; we include questions about demographics such as membership to CIRS or FNHL and preferred gender at the very end. More specifically, we aim to address the primary variables at hand and ones that may also impact one's experience of using a standing desk. In addition, the questions implying perceived productivity also relate to how often participants utilized their standing desks. (Please refer to Appendix A for our full survey.)

Procedure

Past studies imply "...a negative impact on sedentary behaviour with employees in [the] workplace [by the] increasing time spent sitting...at the office" (Olsen et al., 2018). Building upon their research on worker productivity effects, we identify key variables that prove the need for further investigation on frequency of standing desk use, comfortability, levels of physical activity, hours of work per standard work day, etc. We focus on the variables of frequency of use, perceived productivity and health status to test the limits of our hypotheses. After

pinpointing our variables, we operationalize such through the use of Likert-type scale questions in our Google Forms survey. For example, we ask our participants, if applicable, how their standing desk use has influenced their productivity. (Please refer to Appendix A). In our survey, we also include open-ended questions inviting participants to provide anecdotal evidence about their personal experience using a standing desk. (Please refer to Appendix B for a complete list of responses from this open-ended question). Our participants from both locations completed a brief survey via Google Forms; we circulated our survey in person by speaking to staff and faculty members at CIRS and relaying an email list. After reviewing our responses, we categorized our sample into those who do not have a standing desk and those who do. For staff and faculty who use their standing desk at work, we perform linear statistical analyses via the Statistical Package for the Social Sciences (SPSS) such as bivariate correlations reported as Pearson product-moment correlation coefficients.

Results

To highlight the relationships between standing desk use and the key variables we mentioned above, we perform Pearson product-moment correlation coefficients calculations to accommodate for our small sample size. We realize how problematic conducting an independent samples t-test (comparing those who have a standing desk and those who do not) can be as we would obtain very skewed results from our uneven participant distributions. Considering such, we correlate our samples of 10 CIRS participants and 4 FNHL participants who have standing desks separately. Our CIRS sample reveal a small correlation of .33 r between frequency of standing desk use and perceived levels of productivity; on the other hand, we found a correlation of .96 r for this same correlation amongst the 4 FNHL staff. This extreme result is included to demonstrate a major weakness of our correlational study: a shy handful of participants to draw reliable data from. For one's perceived health status and frequency of use, we see another small correlation of .12 r for our CIRS participants and r = .19 for the FNHL staff and faculty. Although our results prove to either be non-significant or too small to draw further conclusions, we stress the value in our addition of open-ended questions. For instance, we find that over 65% of our total participant sample would recommend the use of a standing desk with none saying they would not recommend. As seen in **Graph 1.0** below, over 42% of our participants indicated that it has improved their quality of health. Although this percentage reflects attitudes on perceived health, it poses the critical question of how arranging our work space can have an effect on employees' subjective well-being. (Please refer to Appendix C for Graph 1.0). We stress the importance of also recognizing the data from the open-ended question (Appendix B) from all participants, which provides further insight into those who don't have a standing desk.

Insert Graph 1.0 here.

Discussion

Despite our limited number of participants, we still find a bivariate correlation between standing desk usage and perceived productivity. As we were only able to personally conduct the survey during office hours, we found it difficult to collect further data without disturbing the CIRS' work atmosphere. Having the ability to send our online survey through a larger email listing would've allowed us to collect more data; instead, we relayed our Google Forms link by forming an email addressed approximately 25-30 staff members. To note, in our email, we

mentioned how as researchers, we were working in conjunction with the UBC SEEDS program to review their feedback about standing desks and the potential for interested staff to obtain one. Furthermore, one participant did not have a standing desk, but had a standing monitor set up that allowed them to raise their workstation to a standing person's eye level; they did not consider their functional monitor station as a standing desk. We also observed another participant who has a standing desk, but chose to sit while working. These examples lead us to wonder if there may be other confounding variables at play. Referring back to our research question of whether standing desk use is associated with an increase in perceived productivity and health status, our data prompts another question of whether or not standing desks are optimal for everyone. After all, everyone's bodies are different, and one's perception of their optimal productivity is likely to be different from another person's. Taking these arguments into account, more in-depth research must be executed, such as the conjunction between one's perceived well-being and the actual effects a standing desk can have on cardiovascular health. Future studies could also examine the relationship between objective measures of physical activity and how breaks in sedentary behaviour can impact one's perceived productivity health outcomes.

Recommendations

Our pool of anecdotal evidence indicates that most participants would like to have a standing desk and suffer from mechanical postural problems and lower back related chronic pain. We feel that a more functional standing desk, i.e. one that can be adjusted to a preferred height, is a more viable solution. Perhaps, standing for extended periods of time can also result in adverse effects on one's lower back. The current arrangement of UBC office spaces present a situation that encourages sedentary behaviour. As it directly contradicts the intent of campaigns such as Move UBC, we stress the need for further funding for more standing desks for our staff and the construction of more functional shared student spaces with standing desks. Proposed by a team of researchers from the University of Pittsburgh and the Weill Cornell Medical Centre such as Wendy C. King and David R. Flum, "...cardio-metabolic health may be improved by low-intensity [physical activity]" (King et al., 2016). Drawing upon their research on sedentary time and cardio-metabolic health, we urge the implementation of programs amongst CIRS staff members that encourage intermittent breaks and physical activity throughout the work day.

References

King, W. C., Chen, J.-Y., Courcoulas, A. P., Mitchell, J. E., Wolfe, B. M., Patterson, E. J., … Belle, S. H. (2016). Objectively-measured sedentary time and cardiometabolic health in adults with severe obesity. *Preventive Medicine: An International Journal Devoted to Practice and Theory*, *84*, 12–18. https://doi.org/10.1016/j.ypmed.2015.12.007

Olsen, H. M., Brown, W. J., Kolbe-Alexander, T., & Burton, N. W. (2018). Flexible work: The impact of a new policy on employees' sedentary behavior and physical activity. *Journal of Occupational and Environmental Medicine*, *60*(1), 23–28. https://doi.org/10.1097/JOM.0000000000001190

Owen, N. (2012). Sedentary behavior: Understanding and influencing adults' prolonged sitting time. *Preventive Medicine: An International Journal Devoted to Practice and Theory*, *55*(6), 535–539. https://doi.org/10.1016/j.ypmed.2012.08.024

Appendix A

Below is the full survey we used to collect our data, as exported from Google Forms.

Standing Desks Survey

The following survey investigates the use of standing desks among specific staff and/or faculty members within UBC Vancouver. Thank you for participating.

* Required

Consent form

UNIVERSITY OF BRITISH COLUMBIA

Department of Psychology
University of British Columbia
Vancouver, BC, V6T 1Z4
Phone: 604.822.2755
Fax: 604.822.6923

Consent Form

Class Research Projects in PSYC 321 - Environmental Psychology

Principal Investigator: Dr. Jiaying Zhao
Course Instructor
Department of Psychology
Institute for Resources, Environment and Sustainability
Email: jiayingz@psych.ubc.ca

Introduction and Purpose

Students in the PSYC 321 – Environment Psychology class are required to complete a research project on the UBC campus as part of their course credit. In this class, students are required to write up a research proposal, conduct a research project, analyze data, present their findings in class, and submit a final report. Their projects can include surveys, observations, and simple experiments on waste sorting on campus, student health and wellbeing, food consumption and diet, biodiversity perception, and exercise habits. The goal of the project is to train students to learn research techniques, how to work in teams and work with UBC clients selected by the UBC SEEDS (Social Ecological Economic Development Studies) program.

Study Procedures

If you agree to participate, the study will take about 10 to 15 minutes of your time. You will answer a few questions in the study. The data will be strictly anonymous. Your participation is entirely voluntary, and you can withdraw at any point without any penalty. Your data in the study will be recorded (e.g., any answer you give) for data analysis purposes. If you are not sure about any instructions, please do not hesitate to ask. Your data will only be used for student projects in the class. There are no risks associated with participating in this experiment.

Confidentiality

Your identity will be kept strictly confidential. All documents will be identified only by code number and kept in a locked filing cabinet. You will not be identified by name in any reports of the completed study. Data that will be kept on a computer hard disk will also be identified only by code number and will be password protected so that only the principle investigator and course instructor, Dr. Jiaying Zhao and the teaching assistant will have access to it. Following the completion of the study, the data will be transferred to a password protected hard drive and stored in a locked filing cabinet. Please note that the results of this study will be used to write a report which is published on the SEEDS library.

Remuneration

There is no remuneration for your participation.

Contact for information about the study

This study is being conducted by Dr. Jiaying Zhao, the principal investigator. Please contact her if you have any questions about this study. Dr. Zhao may be reached at (604) 827-2203 or jiayingz@psych.ubc.ca.

Version 2: October 26, 2017 1/2

UNIVERSITY OF BRITISH COLUMBIA

Department of Psychology
University of British Columbia
Vancouver, BC, V6T 1Z4
Phone: 604.822.2755
Fax: 604.822.6923

Contact for concerns about the rights of research subjects

If you have any concerns or complaints about your rights as a research participant and/or your experiences while participating in this study, contact the Research Participant Complaint Line in the UBC Office of Research Ethics at 604-822-8598 or if long distance e-mail RSIL@ors.ubc.ca or call toll free 1-877-822-8598.

Consent

Your participation in this study is entirely voluntary and you may refuse to participate or withdraw from the study at any time without jeopardy to your class standing. You may also withdrawal from the experiment at any time during or after your participation and request that your data be deleted.

Please feel free to ask the experimenter any additional questions you may have about the study. Your signature below indicates that you have received a copy of this consent form for your own records.

Your signature indicates that you consent to participate in this study.

_____
Subject Signature Date

_____
Printed Name of the Subject

Version 2: October 26, 2017 2/2

By clicking next, you are consenting to participate in the following study.

Standing Desk

1. **How often do you engage in physical activity?** *
Mark only one oval.

- ◯ More than 5 times a week
- ◯ 4-5 times a week
- ◯ 2-3 times a week
- ◯ Once a week
- ◯ Rarely engage in physical activity

2. **Do you have a standing desk in your office?** *
Mark only one oval.

- ◯ Yes
- ◯ No

3. **Have you used a standing desk at work?** *
Mark only one oval.

- ◯ Yes
- ◯ No

4. **How frequently do you use a standing desk when at work?** *
Mark only one oval.

- ◯ Daily
- ◯ 4-5 times a week
- ◯ 2-3 times a week
- ◯ Once a week
- ◯ Rarely
- ◯ N/A

5. **I find my standing desk comfortable.** *
Mark only one oval.

- ◯ Strongly disagree
- ◯ Disagree
- ◯ Somewhat disagree
- ◯ Neutral
- ◯ Agree
- ◯ Somewhat agree
- ◯ Strongly agree
- ◯ N/A

6. **In an average day, how many hours of work do you do?** *

Standing Desks Survey

7. **At work, how productive do you believe you are?** *

Mark only one oval.

	1	2	3	4	5	6	7	8	9	10	
Not at all productive	◯	◯	◯	◯	◯	◯	◯	◯	◯	◯	Very productive

8. **How has your standing desk influenced your productivity?** *

Mark only one oval.

- ◯ It has improved my productivity.
- ◯ It has not changed my productivity.
- ◯ It has impaired my productivity.
- ◯ Not applicable

9. **If applicable, do you believe there was any change in your productivity after the first month of using a standing desk?** *

Mark only one oval.

- ◯ Less productive
- ◯ More productive
- ◯ No change in productivity
- ◯ Not applicable

Standing Desks Survey

10. **How has your standing desk influenced your health status?** *

Mark only one oval.

- ◯ It has improved my quality of health.
- ◯ It has not changed my quality of health.
- ◯ It has imparied my quality of health.
- ◯ Not applicable

11. **If applicable, do you believe there was any change in your health status after the first month of using a standing desk?** *

Mark only one oval.

- ◯ Less healthy
- ◯ More healthy
- ◯ No change in health status
- ◯ Not applicable

Standing Desks Survey

12. **Would you recommend a standing desk to other staff within UBC?** *

Mark only one oval.

- ◯ Yes
- ◯ No
- ◯ Maybe
- ◯ N/A

13. **Would you like to have a standing desk** *

Mark only one oval.

- ◯ Yes
- ◯ No
- ◯ Maybe
- ◯ I already have one

14. **Is there anything you would like to tell us about your experience with a standing desk?**

_____

_____

_____

_____

_____

Standing Desks Survey

15. **I am a staff/faculty member of the _____.** *

Mark only one oval.

- ◯ UBC Centre of Interactive Research on Sustainability
- ◯ UBC First Nations House of Learning

16. **Which gender do you most identify with?** *
Mark only one oval.

- ◯ Female
- ◯ Male
- ◯ Transgender: female affirmed
- ◯ Transgender: male affirmed
- ◯ Non-binary
- ◯ Gender fluid
- ◯ Agender
- ◯ Other: _____

17. **What is your age?** *
Mark only one oval.

- ◯ <25
- ◯ 25-30
- ◯ 31-35
- ◯ 36-40
- ◯ 41-45
- ◯ 46-50
- ◯ 51+

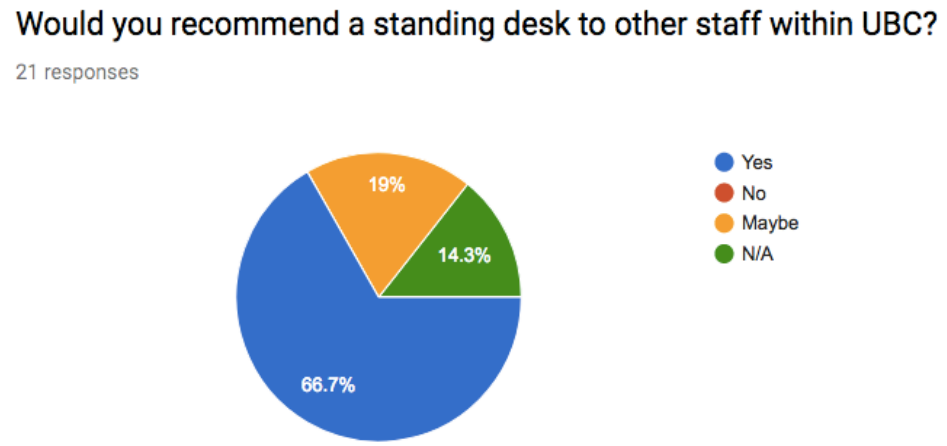
Powered by Google Forms

Appendix B

We have included the individual responses from question 14: “Is there anything you would like to tell us about your experience with a standing desk?” below.

- “the sit stand desk allows me a little movement and adjustment while working long hours - I find that my back and shoulders are not as sore at the end of the day - when I am reading documents I often stand and do little leg raises or bends. this helps me stay relaxed. I am very productive most days but I believe the desk offers me options which allows me to feel better ... even if it is just from my mental perspective - overall enjoy the desk. - it is hard to measure if the desk has added to my productivity as I manage to do a lot in a day - but, if I stay in a healthy mind frame I believe I get more done and more importantly enjoy my time at work - the two go hand in hand.”
- “Sometimes when I'm tired I sit down, I like the fact that my standing desk has an option for me to sit down”
- “I find that standing is actually quite painful for me if I do it for more than 10 minutes at a time and my chiropractor has also not recommended it for longer periods of time. I also walk a lot between buildings so I find I don't need it to break up my day as much as other people who might actually sit all day.”
- “Not something I would consider (unless I were to be dealing with a back issue).”
- “its clunky.... annoying”
- “Not all standing desks are the same. I had a desktop standing desk and I found it hard to use and restrictive in how I can use my desk. I would love a standing desk where the whole desk can be lowered or raised but I think those are only for senior staff members.”
- “It's fantastic!”

Appendix C



Graph 1.0 - Proportion of total participants' opinions on recommending a standing desk to other staff within the UBC Vancouver campus.