



## UBC Sustainability Scholar Program

### Workplace health and wellbeing program at UBC

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## Executive summary

Work-related stress is defined as ‘the adverse reaction people have to excessive pressures or other types of demand placed on them at work’.<sup>1</sup> Stress carries several negative health consequences, including heart disease, stroke, and high blood pressure, as well as immune and circulatory complications.<sup>2</sup> If stress persists, there are adverse changes in neuroendocrine, cardiovascular, autonomic and immunological functioning, leading to mental and physical ill health effects such as anxiety, depression, and heart disease.<sup>3</sup> Work stress is known to increase the development of recurrent coronary heart disease by 65%.<sup>4</sup> Exposure to stress can also contribute to behaviors such as smoking, over-consumption of alcohol, and less healthy eating habits.<sup>5</sup>

We aimed to obtain facts and statistics related to health and work stress through the best practices tested in other institutions to prepare a health initiative programs. We also aimed to develop an improved version of a stress model for the Workplace Experiences Survey of faculty and staff based on scientific evidence. These two important tasks resulted in the collection of over 120 peer reviewed articles, all of which were reviewed for the purpose of preparing this report. The current report summarizes the scientific evidence to substantiate two objectives:

1. Development of a healthy workplace initiative programs (HWIP)
2. Development and evaluation of stress model for a workplace experience survey (WES)

To address the first objective, a comprehensive literature review was conducted. The evidence from the literature strongly suggests that yoga, bicycling, aerobic exercises, art/craft/creative activities, community gardening and health challenges/competitions will improve health and

reduce stress at work. It is recommended<sup>1</sup> that UBC employees be informed about the value of such programs to improve enthusiasm to participate in work-stress-reduction programs. An inclusive plan for both faculty and staff, arranged to address both physical and mental health programs, may be communicated with each department to negotiate implementation policies, infrastructure, and budget.

The second objective was addressed by conducting a broad literature review, describing occupational stress models, examining UBC Workplace Experiences Survey (WES) questions (from the 2014 survey), obtaining commonly used tools to identify work stress, and comparing the current WES with questions related to work stress models in the literature. Finally, a list of questions suitable as adjunctive to the current WES was introduced.

We concluded that questions utilized in the previous WES are not compatible with a single occupational stress models (e.g., Control-Demand Model or Effort-Reward Model) but rather a combination of stress models. The most commonly used questionnaires in the literature were studied. By identifying the validity and reliability of these tools, we were able to add highly scored relevant questions to the current WES, enriching its capacity to measure work stress based on tested occupational stress model. We then recommended a proposal for future workplace stress surveys specifying the methodology (study design, target population, data collection, sampling technique, validity assessment, and data analysis). Moreover, specific questions are recommended to be added to the future WES-surveys on work stress.

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<sup>1</sup> The recommendations are solely based on the scientific evidence. Such recommendations are to support the decision making process in UBC Human Resources.



Keywords: Work stress, Healthy workplace, Work stress questionnaire

## Introduction

The project objectives are consecutively addressed in two main sections as two inter-related sections of this report. Each section is comprised of research background, study methodology, results and conclusion.

### Chapter 1. Healthy Workplace Initiatives Program

The Healthy Workplace Initiatives Program (HWIP) is a health promotion program implemented by Human Resources at the University of British Columbia (UBC). It is a part of the Focus on People program, a university-wide framework envisioned to appreciate the university's values. HWIP is designed to address the university's goal of an employee-centered, socially sustainable community, of which health and wellbeing is an important component.

HWIP currently is undergoing an evaluation program to identify the best practices for the creation and maintenance of socially sustainable health initiatives. One of the main objectives of this evaluation is to provide insight into best practices available in the literature in order to enhance the programming capacity and increase the rate of success for top practices. There are lessons to be learned from similar health initiative programs in other institutions or other countries. These practices are often cited in scientific journals. A thorough literature review into the body of evidence was deemed essential to collect facts about the success or failure of

various health initiatives so that the UBC community (staff and faculty alike) could be guided towards successfully tested programs.

#### Objective

- To find facts and statistics related to health and work stress in order to clarify the scope of the problem and to assist with the development of packages and toolkits to support the Healthy Workplace Initiative Program.
- To conduct a literature review to identify action plans (interventions) that can minimize causes of stress and how the interventions used in other studies could reduce the stress levels of UBC staff and faculty.

#### Project deliverables

- A list of facts and relevant statistics related to work-stress and health.
- A database of relevant literature using Mendeley software
- A report summarizing evidence regarding action plans or interventions that led to reduction of workplace stress

#### Method

##### Literature search

First, a search strategy was developed using MeSH terms in MEDLINE (OvidSP) as well as relevant keywords. Subject headings explored in OvidSP included work-stress, occupational stress, workplace stress, workload, and job satisfaction. Synonym mapping and scope notes in MEDLINE were used to identify the appropriate subject headings. All the relevant words (e.g.

stress), phrases (e.g. stress, psychological) and a combination were used. All possible synonyms (e.g. suffering vs. stress), alternate terminologies (e.g. workplace vs. workforce), and variant word endings (stress vs. stresses) were also adopted. No alternate spellings were required. Boolean logic was used to combine concepts and drop irrelevant articles.

Second, the following broader MeSH terms were added to the search depending on the intervention under study: exercise, nutrition, bicycle, yoga, creativity, artistic expression, competition and social interaction. Keywords adopted from other search strategies of relevant studies were added to the current search.

The search for relevant publications was carried out in two stages; the first focused on identification of systematic reviews and/or meta-analyses, the second on original studies. The original search was conducted in November 2015 (going back until January 2008) and then updated to the end of February 2016. This lag-time process enabled the most recent articles to be included, thereby maximizing the number of studies included whilst balancing time and resources. The following databases were searched: MEDLINE, Cochrane Central Register of Controlled Trials, EMBASE, CINHALL, PSYCINFO and Google Scholar. Searches were completed via OvidSP and EBSCO. The search strategy was saved in Ovid in order to replicate the search. A sample of the Ovid search history is shown in Figure 1.




































Permanent Searches (top)	
<input type="checkbox"/> a b   	
Art	2015_12_08
<input type="checkbox"/> a b   	
Art craft RCT work stress	2015_12_08
<input type="checkbox"/> a b   	
Community gardening	2015_12_07
<input type="checkbox"/> a b   	
Community gardening_Medline	2015_12_07
<input type="checkbox"/> a b   	
Craft_Embase	2015_12_07
<input type="checkbox"/> a b   	
Health competition	2016_1_12
<input type="checkbox"/> a b   	
Medline_stress adj work and exercise	2015_11_9
<input type="checkbox"/> a b   	
Medline_Work stress and model	2015_11_9
<input type="checkbox"/> a b   	
RCT art and craft	2015-12_08
<input type="checkbox"/> a b   	
Sport equipment	2015_11_24
<input type="checkbox"/> a b   	
Ursula search for health competition	2016_1_12
<input type="checkbox"/> a b   	
work stress and exercise_review	2015_11_9

Figure 1 Permanent search in Ovid

To access this search, go to the Ovid account for the project entitled username: Sustainability, password: Scholar.<sup>2</sup>

<sup>2</sup> Available at <http://ovidsp.tx.ovid.com.ezproxy.library.ubc.ca>

## Reference management

Articles were screened at three levels: title, abstract, and full paper within the database platforms. Articles were then stored in Mendeley (<https://www.mendeley.com/>). Mendeley is a desktop and web-based program for managing and sharing research papers. It provides an opportunity to share a collected library with colleagues with colleagues and compile stored articles in PDF format. Duplicates were deleted. The remaining articles were screened to ensure the related PDF file was found and stored.

Articles were read and notes were taken.<sup>3</sup> A summary of facts and scientific evidence for each intervention and work-stress related program were written in a narrative format. Standard quotations and referencing were employed when necessary.

## Results

### Work and stress

Stress carries several negative health consequences, including heart disease, stroke, and high blood pressure, as well as immune and circulatory complications.<sup>4</sup> Exposure to stress can also contribute to behaviors such as smoking, over-consumption of alcohol, and less healthy eating habits.<sup>5</sup> Work stress is known to increase the development of recurrent coronary heart disease (hazard ratio:1.65, 95%Confidence interval: 1.23-2.22).<sup>4</sup>

Several health initiation programs intended to reduce work stress are noted in the literature. The main types of programs which have had successful results in reducing stress and increasing

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<sup>3</sup> To access these articles please contact Tanja Maier or Miranda Massie, who have access to the shared Mendeley account for this project.

health outcomes include physical exercises such as yoga, cycling, and aerobic fitness; programs that improve mental health such as art, crafts and creative activities, and community gardening; and health challenges and competition.

The following health initiative program fact sheets were created by reading, summarizing and quoting the articles.

### Programs that improve physical activity

Encouragement of physical activity at an organizational level seems to reduce absenteeism.<sup>6</sup>

<sup>7</sup> A recently published systematic review studied workplace physical activity interventions and their impact on mental health outcomes. The review covered literature that was published between 1990-2013, employing several main databases including EMBASE, PubMed and the Cochrane Central Register of Controlled Trials. Inclusion criteria were physical activity trials, working populations and mental health outcomes. From 3650 articles screened for relevance, 34 full papers were assessed for eligibility and quality assessment and 17 articles were included in the final analysis. The study reached the following conclusions:

- Physical activity programs with a personalized supervision approach are effective in attaining beneficial mental health outcomes
- Yoga programs directed by experienced trainers conducted at the worksite have improved self-identified anxiety among workers.
- No adverse effect was reported from any of the physical activity interventions or yoga programs.

- Employers should take into account employees' baseline characteristics such as mental health status, age, gender, and socioeconomic status before incorporating physical activity or yoga into the worksite health and wellness programs

## Yoga

Yoga practice over an 8-week period was found to significantly reduce stress scores.<sup>8</sup> This randomized control trial was conducted on a small population of 37 staff from a British local government authority. The intervention group received a 50 min Dru Yoga session each week for 8 weeks and a 20 min DVD for home practice while the control group received no intervention.

Table 1 shows a description of the Dru Yoga program.

Table 1 *Dru yoga intervention*

Activation exercises (10 min)	Flowing warm-up movements aimed at enhancing circulation, releasing tension and preparing the body for movement.
Energy block release movements (15 min)	A sequence of 12 movements including stretching, twisting, bending (forwards, backwards, and sideways), and squatting intended to increase circulation and 'energy flow', performed slowly with joints unlocked and slightly flexed, and the limbs and torso relaxed.
Postures (15 minutes)	Two postures chosen: the cat and the cobra. All postures were performed slowly with joints unlocked, with spinal wave and with conscious intention.
Relaxation (10 minutes)	Guided relaxation involved three parts: breathe and relax, visualize and affirm, and stretch and awaken. Activating the parasympathetic nervous system to achieve greater physical and emotional balance.

A similar study on 48 staff and academics from a large British university suggested similar findings.<sup>9</sup> Compared with controls, participants in a 6-week yoga program showed a significant increase in resilience to stress, and substantial improvements in composure, clear-mindedness, elation, energy and confidence.

Similarly, a rather large study of 239 staff working for an American insurance company found that a Viniyoga Stress Reduction Program produced significant improvements in perceived stress and sleep quality for participants compared with a control group that received no intervention.<sup>10</sup>

The therapeutic yoga program was one hour per week for 12 weeks. It was developed by the American Viniyoga Institute including breathing techniques, guided relaxation, mental techniques, and education about starting a home practice. This program was combined with a mindfulness-based stress management intervention. The additional mindfulness program was offered because of its documented benefits in decreasing reported stress. Mindfulness at Work was a 12-week (14-hr) stress management program based upon the principles and practices of mindfulness meditation. Participants in mindfulness programs learned to focus attention on feelings, thoughts, and sensations “exactly as they occur without elaboration, censorship, judgment or interpretation”.

Yoga has also been studied in trials focusing on reducing lower back pain, a common side effect of work overload and extensive sitting hours at desk jobs. A randomized study of 228 participants from an integrated health care organization with chronic low back pain showed a significant reduction in back pain over a period of 12 weeks.<sup>11</sup> Each yoga session lasted 75 minutes and training material was provided for supplemental home exercises.

Likewise, Tilbrook et al. offered a 12 week yoga program to a group of 313 workers with chronic low back pain. Classes were held on multiple sites throughout the United Kingdom. When compared with the control group that received a back pain education booklet, the yoga group reported substantial reductions in back pain scores after 12 weeks.<sup>12</sup>

In conclusion, the studies listed above suggest a strong health benefit from Yoga programs. Yoga programs have decreased self-perceived stress and lower back pain. These two outcomes have been repeatedly reported as major health concerns related to the work environment.<sup>5,13,14</sup>



The Health Evaluation Initiative program report<sup>15</sup> suggests that Yoga programs were picked up by 6 departments at UBC from 2008 to 2012. The Yoga programs have been self-sustaining financially and ran on a limited budget. Factors that led to the success of these programs included running *the classes at a convenient time and low cost*; both of these factors led to higher participation rates. Continuation of these programs is recommended if the application process is simplified. Stewards initiating such programs commented that filling out the application was outside of their skillset. It is therefore recommended that a session be held at Human Resources or individual departments at UBC, inviting the stakeholders from interested departments in the program to discuss the benefits of the program, how to apply for the assigned budget, how to sustain the program for a longer period of time and how to engage higher numbers of participants.

The HWIP evaluation report (2015)<sup>4</sup> identifies details of health initiative programs since 2008, one of which is the continuation of yoga classes. The evaluation is based on a qualitative study. Yoga is identified as one of the activities picked up by staff. However, a major barrier to continuing with this program has been stated as the high cost of hiring UBC instructors to maintain such classes. To fully provide the benefits of stress relief associated with yoga exercises, it is recommended to estimate the cost of conducting long-term yoga classes for interested departments. This will require further studies involving benefit- versus cost- analysis.

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<sup>4</sup> To access the full report, please contact Miranda Massie. The report summarizes the program description of HWIP, a summary of which is as follows: HWIP kicked off in early 2008 providing annual budget of \$100,000. The fund is available to UBC departments, units and operational committees to support healthy activities in the workplace. The intention of the program is to start health-related, sustainable initiatives or to enable already existing initiatives to expand their services. Departments at UBC are responsible for maintaining and running the program, and design their own initiatives. Yoga has been an integral part of the physical activities adopted by some departments.

## *Bicycling*

Bicycling has been proven healthy by many studies.<sup>16-19</sup> Cycling to work is found to reduce the risk of mortality by 40%.<sup>20</sup> The average time spent cycling for those who benefited from this reduction in mortality was 3 hours per week. Active commuting is positively associated with fitness<sup>18</sup> and inversely associated with obesity (by 50%), triglyceride levels (by 22%), blood pressure (about 2 mmHg units), and insulin level (14%).<sup>21</sup> A national survey of travel behavior and health indicators in Europe, North America, and Australia was conducted via a systematic review approach.<sup>22</sup> Countries with the highest levels of active transportation had the lowest obesity rates. In 2000, Europeans bicycled more (188 km versus 40 km per person per year) than those in other countries.

Studies have also shown that cycling as a mode of transport is associated with less work absenteeism.<sup>23,17</sup> A study of a company's absenteeism records of 1236 Dutch employees for one year suggested that the mean total duration of absenteeism was more than 1 day shorter in cyclists than in non-cyclists.<sup>17</sup>

Universities are more conscious about the benefits of cycling and promote such activity among students and faculty. An implementation of a Public Bicycle Share Program in Spain led to a clinically meaningful reduction in Body Mass Index among 173 students who used the program to attend university.<sup>19</sup>

At UBC, Dr. Kay Teschke from the School of Population and Public Health has published many studies in relation to the benefits of cycling. She listed benefits of cycling in one of her publications entitled "Bicycling: health risk or benefit?".<sup>24</sup>

*“Data at the individual and population level show that cycling for transportation can increase physical activity and reduce weight”*

<sup>5</sup>In cases where riding to work proves challenging, using an electrically assisted bicycle has been shown to reduce muscle strains and physiological stress.<sup>16</sup>

UBC has the Bike Co-op program for students; the student-run organization is dedicated to making UBC a better place for cyclists and their bikes. The Staff Bike-Share Program also provides access to a few bikes for a maximum of three hours ride. It is not clear what the usage rates of these bikes are, whether all the staff and faculty at UBC are aware of services offered, what are the health consequences/benefits of using the rides on UBC students and employees, and whether cycling adequately reduces work stress among esteemed scientific community who might be over-worked and stressed. Future studies may shed light on these questions.

### *Aerobic fitness*

Physical activity is one of the most powerful weapons against stress.<sup>7,20,25</sup> It automatically promotes some of the other stress-relieving techniques such as better sleep, exposure to sunlight, muscle relaxation, guided imagery, and deep breathing exercises.<sup>26</sup> It also improves physical wellbeing. The effects of aerobic fitness, specifically, on physiological stress responses was examined in a group of teachers. The findings suggested that a higher level of aerobic fitness may reduce muscle tension, heart rate and perceived work stress in teachers.<sup>27</sup>

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<sup>5</sup> Dr. Kay Teschke has been named one of the 14 most influential Canadians in Cycling. She is a professor in the School of Population and Public Health with a long record of studies on helmet laws, bike-share systems, hospitalization rates, etc. She is also a lead investigator of the Cycling in Cities research program, which focuses on factors that encourage or discourage bicycling. More information about the results of this study can be found at <http://cyclingincities.spph.ubc.ca/>.

The effectiveness of 24-week aerobic and weight training exercise program was studied on 3800 employees in a randomized controlled trial.<sup>28</sup> Participants were prescribed a regime of moderate- to high-intensity aerobic exercise for minimum of 20-min duration, 3 days/week on treadmill, bicycle, stepper, or concept II rowing ergometer machines. Compared with those who were on a wait-list as controls, the following outcomes were significantly improved in those who were physically active: mental health ( $P = 0.005$ ), vitality ( $P < 0.001$ ), general health ( $p = 0.009$ ), bodily pain ( $p = 0.005$ ), physical functioning ( $p = 0.004$ ), depression ( $p = 0.048$ ), and stress ( $p = 0.036$ ) scales. The study concluded that multimodal exercise is as effective as other single-modality exercise treatments for depressive symptoms and in improving quality of life outcomes.

Another experimental study showed the effect of eight weeks of aerobic and progressive exercises (3 sessions per week) on blood estrogen and other factors affecting bone density.<sup>29</sup> Eight weeks of intensive exercise caused a significant change in the amount of hormones such as estrogen, blood calcium, and phosphorus. The authors concluded that long progressive physical exercises, especially weight bearing ones, can be effective in increasing the estrogen level, thereby preventing osteoporosis, and also in preserving bone salts (calcium and blood phosphorus), by causing hormonal changes effective on these salts.

### Programs that improve mental health

Academic life can be stressful at times.<sup>30</sup> Causes of stress include extreme pressure to publish, an exceptionally competitive funding environment, demand for high quality scholarly performance, time constraints, and unpredictable employment status.<sup>31</sup> A stressful work environment can lead to mental health hazards such as depression, anxiety, and psychological problems<sup>32</sup> which can

inadvertently and negatively impact the professional student-professor relationship or affect psychological and physical health.<sup>13</sup>

- The evidence surrounding properly tested and well-developed interventions to allude specific and systematic approaches towards resolving stress for academics are scarce. We found a randomized controlled trial involving teachers and instructors aiming at alleviating work-related stress in this population.<sup>32</sup> The objective of this study was to strengthen teachers' health. The intervention was based on a manual introduced by the Federal Institute for Occupational Safety and Health, an agency of the German Federal Ministry of Labor. This multi-central study registered 337 teachers and randomized them into two groups of intervention and control. The intervention constituted of 10 monthly 90-minute group sessions which were moderated by a psychotherapist. Five major findings were discussed in the paper:
  - Improved basic knowledge of stress physiology and the effects of interpersonal relationships on health parameters motivating the relaxation techniques;
  - Improved mental attitudes with particular respect to authenticity and identification with the professional role;
  - competence in handling relationships with students;
  - competence in handling relationships with colleagues; and
  - strengthening collegiality and social support among the staff

The study findings suggest that those who attended at least 50% of the sessions benefited from the intervention. Measured outcomes included “emotional exhaustion” and “personal accomplishment”, both of which were improved due to the intervention.

A smaller quasi-experimental study of 58 teachers was done in Poland.<sup>33</sup> Participants were randomly assigned to experimental and control groups. The program included a two-days, 6-hours each stress management workshop. The objective was to assist the instructors to improve stress-coping mechanisms when dealing with high job demands such as work overload. The study findings suggest that emotional exhaustion, perceived workload and somatic complaints diminished considerably in the intervention group. Participants identified several direct benefits of the intervention including improved ability to manage their work environment, clarity in their perception of stressful job characteristics, and finally reducing emotional exhaustion.

Observational studies conducted on faculty members also contribute to the body of evidence. In these studies, strategies to cope with occupational stress include physical exercise, working on time management techniques, and spending time with family.<sup>34</sup>

### *Art, craft and creative activities*

There is limited experimental research on the effect of art on reduction of work stress. A recent study described how undertaking craft activities in a group can offer transactional space to gain experiences to manage everyday occupations.<sup>35</sup>

Art therapy has been used among those undergoing a stressful life situation, such as cancer patients,<sup>36</sup> patients with HIV,<sup>37</sup> those with psychological problems<sup>38</sup> and those under general stress.<sup>39</sup> A systematic review on the efficacy of art therapy suggests that there is a small body of

quantifiable evidence to support the claim that art therapy is effective in treating various health issues.<sup>40</sup> A randomized clinical trial cited in this review found a positive impact for art therapy among young males , which is ascribed to nonverbal and metaphorical processes inherent in art therapy.<sup>41</sup>

A more recent review investigated the effect of art therapy interventions for work-related stress and found that art therapy has some beneficial impact on occupational stress.<sup>42</sup> Although the included target population in this review was limited to health workers, the results are of great interest. Art making and art viewing were the two most commonly used interventions in this study. Increasing levels of work-stress contribute to inter-personal conflicts and fragmentation of staff cohesion. Interventions supporting relational processes, such as art therapy that enables one to see another person's point of view, may reduce work-stress. Overall, within the included studies in this review, there was a general agreement that the power of images is healing, as participants express relief at discovering a high level of commonality among themselves when sharing the meaning of the art work.

Guided imagery and visually transforming artwork are examples of stress-relieving techniques investigated to reduce levels of stress among health care professionals who deal with death and illness everyday.<sup>43</sup> A randomized clinical trial explored ways of transforming stress related to visual images for health care professionals who were exposed to stressful images in their work. Such transformation of work-related images was conducted using changes of compositional elements such as shape, color, size and texture – through harnessing the power of creativity and imagination to transform an image that is drawn or imagined. Furthermore, their subjective discomfort level was found to be reduced by visually transforming the images.

### *Community gardening*

Active interaction with plants can reduce physiological and psychological stress compared with mental work.<sup>44</sup> Studies have shown that gardening, due to its combination of exercise and contact with nature, would be more effective in promoting stress relief than a control activity such as an indoor reading task.<sup>45</sup>

An interventional study randomized 30 healthy individuals into two activities of outdoor gardening or indoor reading for 30 minutes to investigate the impact of stress-relieving effect of gardening.<sup>45</sup> Two major outcomes were measured: salivary cortisol levels and self-reported mood. An artificial mental stress was first produced via a computer program. Both gardening and reading led to a decrease in the cortisol level. Such hormonal reductions were significantly stronger in the gardening group. Positive mood was fully restored after gardening, but further deteriorated during reading. These results offered the first experimental evidence that gardening can promote relief from acute stress.

Community work involving gardening in particular has been found to be therapeutic.<sup>46</sup> Work related stress has been effectively alleviated by nature-based stress management interventions.<sup>47</sup> A multidisciplinary team<sup>6</sup> led a group of women enrolled in the course to run 20 sessions of gardening skills in Sweden. Participants were followed for 12 months. The level of stress measured through self-rated burnout, somatic symptoms and sleep quality declined. Moreover, the participants' self-rated work ability increased and a great change from long to short sick leave was observed.<sup>47</sup> The mechanism by which stress was released among the

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<sup>6</sup> The team consisted of a psychotherapist, a gardener, an occupational therapist and a biologist.



participants was described in the qualitative portion of this study. The positive effects found for burnout and work ability were attributed to the use of nature for stress recovery, sensory experiences and physical activities associated with the course.

The beneficial effects of gardening on stress and well-being are also studied in a rather large sample (n=2783) of randomly selected employee working in the health industry in Sweden.<sup>25</sup> The study reported better work ability when light physical activity (defined as walking, bicycling and gardening) was reported using the self-report instrument work ability index.

UBC's evaluation report of the HWIP (2015), a qualitative research project, identified barriers to continuing with gardening activity, namely creating a traditional medicinal herb garden for staff in a clinic at one of UBC sites (See page 11, Reasons for not continuing).<sup>7</sup> One of these barriers was opposition over access to a key area for growing herbs, while another barrier was reported as a conflict with departmental policy regarding handling and distributing money.

If UBC staff are to benefit from the positive effect of gardening to reduce stress, these barriers should be addressed, first. It is recommended that along with encouraging staff to engage in gardening activities, the infrastructure for such planning be foreseen.

### *Health challenges and competition*

The workplace is an ideal environment to implement wellness programs because those working in one place have similar working hours, conditions and work environment. Here is a list of a few successful programs in workplaces with different focuses.

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<sup>7</sup> For more information on the evaluation report, please contact Miranda Massie.

A 12- to 16-week wellness competition was introduced in a hospital setting to encourage staff to engage in physical activity.<sup>48</sup> Staff participation was encouraged by incentive-based rewards and group participation. The program successfully sustained physical activity among staff for three consecutive years. The study showed positive effects of exercise on health, burnout, and job satisfaction.

A study in New Zealand implemented a 10-week wellness challenge.<sup>49</sup> Staff completed a health screening and assessment prior to starting the program. The screening included measures of body composition, blood pressure, blood lipids and glucose. Intervention included a 30-minute daily physical activity and a nutritional program (intake of at least 3 servings of fruit per day and water intake of 1 liter per day). A significant decline was reported in biometric and biological measures as follows: decrease in total cholesterol (5.37mmol prior to intervention versus 5.17mmol/ post intervention,  $P=0.018$ ), systolic (142mmHg pre versus 139mmHg post  $P=0.024$ ) and diastolic (86mmHg pre versus 81mmHg post,  $P<0.001$ ) blood pressure, weight (79.3kg pre versus 78.4kg post,  $P<0.001$ ), girth (95cm pre versus 94cm post,  $P=0.008$ ), fat mass (27.6kg pre versus 27.05kg post,  $P=0.019$ ) and body mass index (28.6kg/m<sup>2</sup> pre versus 28.1kg/m<sup>2</sup> post,  $P<0.001$ ).

A study in the US looked into the impact of a Seventh Day Adventist Wellness Challenge program focusing on the healing power of God and the importance of developing a sense of spirituality in conjunction with the promotion of good health.<sup>50</sup> The intervention was a 21-day wellness intervention including advice on changes in behaviors related to cigarette smoking, alcohol use, eating patterns, exercise, water consumption, rest, relaxation, and time spent outdoors. Pre- and post-program clinical and laboratory tests were measured for 165 participants including blood

pressure, weight, glucose levels, and cholesterol. Statistically significant differences between pre- and post-intervention outcomes were reported for all the above-mentioned health indicators. Moreover, self-health improvements measured by a pre-and post- survey response confirmed an increase in participants' willingness to improve their lifestyle behaviors for a greater quality of life.

Interestingly, team-based interventions seem to be effective in creating a healthier work place. For instance, a 12-week team-based weight-loss campaign in the United States of America among 409 police officers led to a significant loss of weight (mean percent mass loss of 3%).<sup>51</sup>

#### Conclusion

The fact sheets listed above were used to support HWIP and to develop self-sustainability programs for UBC departments. A comprehensive literature review suggests that yoga, bicycling, aerobic exercises, art/craft /creative activities, community gardening, and health challenges and competitions will all improve health and reduce stress at work. This document provides scientific evidence for running such programs at UBC. To successfully implement these programs, it is recommended that

1. Using the information provided in this report, UBC employees be informed about the value of such programs to improve willingness and increase participation rates
2. Based on both the fact sheets quoted in current report and the result of qualitative study, HWIP evaluation program conducted last year, a comprehensive plan be prepared to address both physical and mental health programs. Such plans should be communicated with each department to negotiate common grounds for implementation

policies, finding proper infrastructure, identifying barriers and managing a sufficient budget.

Chapter 2. Development and evaluation of stress model for workplace experience survey

Workplace Experience Surveys (WES) have been conducted in both UBC campuses (Vancouver and Okanagan) three times; the most recent was conducted in November 2014. The survey intended to use both quantitative and qualitative approaches to obtain feedback from faculty and staff about their workplace experience. These results were then compared with the previous WES conducted in 2011. Trends, areas of strength and areas of opportunity for UBC staff and faculty as well as individual faculties/departments and employee groups were also discussed in the report.<sup>8</sup> An important part of the WES addresses stress among faculty and staff. The objective of the current report is to study the previous WES in order to improve the survey in addressing stress levels. The survey is to be compared with other tools identifying stress in the workplace based on occupational stress models, and improve the questionnaire so that it can be evolved to a more efficient tool to identify stress at work. To achieve these goals, we assigned specific objectives as follows:

#### Objectives

- To explore relevant databases (e.g. Medline, PubMed, EMBASE, Gray literature) to identify studies about current “occupational stress models”.
- To detect questions used in the WES that most closely fit occupational stress models, obtain analysis from the WES based on occupational stress models, and study outputs
- To study outputs from previous WES analysis to understand the main sources of stress that were self-reported for both staff and faculty cohorts.

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<sup>8</sup> For more information see  
<http://focusonpeople.ubc.ca/wp-content/uploads/2014-WES-Town-Hall-Presentation-VAN.pdf>

- To recommend questions and outcome assessment tools to put forward for the next WES.

#### Project deliverables

- A database of relevant literature using Mendeley software
- A report summarizing evidence regarding “workplace stress models”, and outcomes from analysis from WES responses
- A list of questionnaires addressing stress in the workplace specifically among faculty and university staff
- A recommended list of questions to measure workplace stress to be added to the next WES.

#### Method

##### Literature search

Similar to the first part of this project, a search strategy was developed using MeSH terms in MEDLINE (OvidSP) as well as relevant keywords. The author consulted with a specialist librarian at Woodward Library (Ms. Ursula Ellis) for the proper choice of databases and search strategy plan. Consultation was also provided by an esteemed professor of Occupational Health in the School of Population and Public Health, Prof. Dr. Mieke Koehoorn, about commonly used occupational models.

Subject headings explored in OvidSP included “work-stress”, “occupational stress”, “workplace stress”, “workload”, and “job satisfaction”. Synonym mapping, and scope notes in MEDLINE were used to identify the appropriate subject headings. All the relevant words (e.g. stress),

phrases (e.g. stress, psychological) and a combination were used. All possible synonyms (e.g. suffering vs. stress), alternate terminologies (e.g. workplace vs. workforce), variant word endings (stress vs. stresses) were also adopted. No alternate spellings were required. Boolean logic was used to combine concepts and drop irrelevant articles.

Then, the following broader MeSH terms were added to the search depending on the intervention under study: questionnaire, checklist, Karasek model, demand and control model, Siegrist model, effort and reward model or management of stress work or Whitehall, and university setting, faculty, staff. Keywords adopted from other search strategies of relevant studies were added to the current search.

The search for relevant publications was carried out in two stages; the first focused on identification of systematic reviews and/or meta-analyses, the second on original studies. The original search was conducted in November 2015 (going back until January 2008) and then updated to the end of February 2016. The most recent and relevant articles were included. The following databases were searched from: MEDLINE, Cochrane Central Register of Controlled Trials, EMBASE, CINAHL, PSCYINFO and Google Scholar. Searches were completed via OvidSP, and EBSCO. The search strategy was saved in Ovid in order to replicate the search.

### Reference management

Stress at work leads to adverse health outcomes.<sup>5,8,52</sup> It is therefore imperative to ensure that levels of stress are measured in the work environment based on scientific evidence on a regular basis. Moreover, stress-reduced interventions in the workplace would be improved by implementing well-informed evidence supported by theoretical models.<sup>53</sup>

The objective of this review was to identify the occupational stress models that best fit the WES<sup>54</sup> questionnaire. From the literature review of articles published from 2008 onwards, several articles were found that described the occupational stress models.

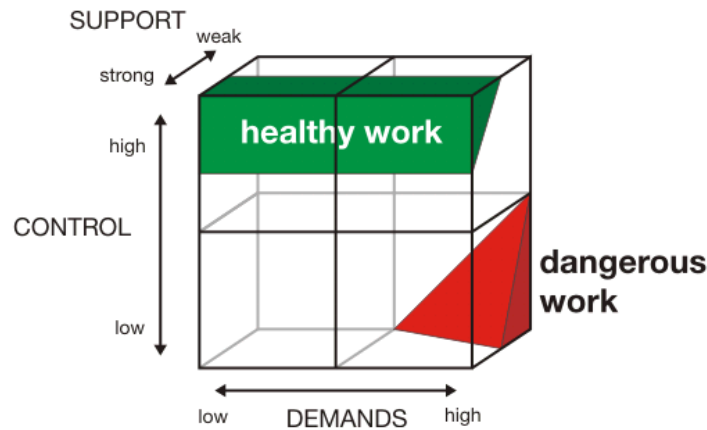
Two major occupational stress models are commonly referred to in the literature:

1. Demand-control model
2. Effort-reward imbalance model

The two models are complementary. The former model, introduced by Karasek et al.<sup>55</sup> in 1990, had a great impact on the theoretical and practical aspects of research related to occupational stress. The “demand” component measures *quantitative and conflicting demands of work* while the “control” piece denotes *decision authority and skill utilization over a job*. High “demand” and little “control” will lead to stress in the work environment which in turn can cause ill-health.

A third component was added to this model by Jahnsen & Hall 8 years later which incorporated “social support”. Low social support, high demand and low control would cause more stress which adversely impacts employees’ health (Figure 2). Note that strong social support will alleviate the pressure from the imbalanced stress and demand situation.





*Figure 2 Karasek's demand-control model*

There have been various disapprovals of Karasek's model, most of which stem from the lack of precision in its formulation.<sup>56</sup>

Below are some of the main critical points relevant to the inadequacy of this model.

- The notion of control is not clear: does it refer to objective control over the work situation, or to the person's subjective feeling that his job could be modified, or to a general belief concerning how far important outcomes are controllable?
- The measurement of the social support component appears inconsistent. Some studies have focused on social interaction, while others have included items on caring and help, or companionship.
- Karasek's approach to control focuses on objective task characteristics, and does not include personal coping. And yet, variations in personal responses to similar situations can be important.

To compensate for the lack of perfection in Karasek’s model, the effort-reward imbalance model was introduced by Siegrist in 1996.<sup>2</sup> Basically, the model claims that imbalance between an employee’s *effort* and the *reward* that he/she receives from the employer can potentially cause stress (Figure 3). Rewards distributed by the employer include “money”, “appreciation”, and “career prospects”. A lack of balance between effort and reward may lead to emotional distress which inevitably impacts health. Employees often use a coping mechanism, namely “over-commitment”, to appeal for employers’ approval and appreciation. Siegrist hypothesized that the coping phenomenon cause further emotional exhaustion which may exacerbate the negative aspect of the effort-reward imbalance.

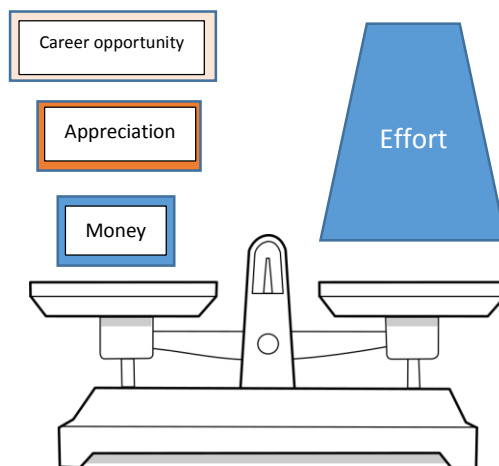


Figure 3 The Siegrist’s effort-reward model

A narrative review of observational studies (12 cross-sectional, 2 case-controls and 3 cohorts) was done to confirm the efficacy of the effort-reward imbalance model as a tool assessing a stressful workplace.<sup>57</sup> There were several limitations that would minimize the reliability of findings from the review, including the presence of many cross-sectional studies that would not

permit conclusions on the causal relationship between stress and effort-reward imbalances.

Other study design limitations were inclusive of recall bias, which is inherited in study designs such as case-control/retrospective cohort studies, and small sample size. Also, the authors were not able to quantitatively analyze the data due to the diversity of outcomes.

Despite these limitations, the effort-reward imbalance model was found to be

- a) predictive of a relationship between adverse health outcomes (e.g. cardiovascular disease and mortality) and work stress,
- b) applicable to a wide range of occupations and populations with diverse socio-demographic characteristics, and
- c) synergistic with the job demand-control model.

Successful intervention can be based on an effort-reward model so that the effectiveness and feasibility of the intervention can be assessed.

The difference between the two models lies in the fact that Karasek's model (demand-control) emphasizes task-level control, while Siegrist's model (effort-reward) focuses on rewards given to employees. Nevertheless, there are limitations associated with both Karasek's and Siegrist's models.

Kain and colleagues looked at the pros and cons of these models and came up with an improved version of an occupational stress model named the "Job demands-resources" model (Figure 4).<sup>58</sup>

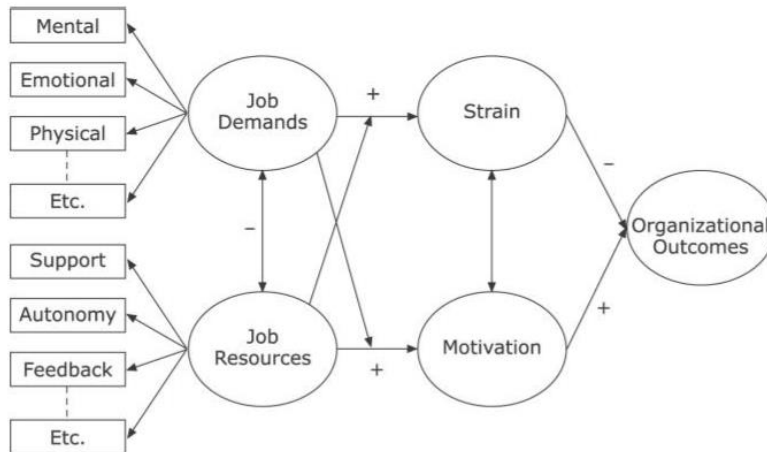


Figure 4 The Job demands-resources model

Job demands refer to those physical, psychological, social, or organizational aspects of the job that need constant physical and/or psychological effort or skills; these elements are associated with psychological costs. Job resources refer to those mental physical, psychological, social, or organizational aspects of the job that either function in achieving work goals, reduce job demands and the associated physiological and psychological costs, or stimulate personal growth, learning, and development.

Although job demands are not necessarily negative, they may turn into job stressors. This entails high effort from which the employee may not be sufficiently recuperate, leading to more stress. In such cases, job resources will potentially motivate employees to effectively reduce stress.

In addition, the job resources are connected with task-level resources such as autonomy, feedback, and task significance.

Which WES question fits with which model for faculty?

The WES questionnaire has measured different aspects of occupational stress levels. The following items are found in the Faculty WES Questionnaire (See the accompanying Excel file to identify the model that most closely fit with the item listed below; [2016 2 2 Copy of Themes.xlsx](#)).<sup>9</sup>

There are three models that can somewhat identify the occupational stress models (Figure 5):

- Demand-Control=DC (Underscore font);
- Effort-Reward=ER (*Italic font*),
- Job demand-resources model=DR (**Bold font**)

Figure 5 identifies major themes of the WES that are compatible with the described stress models.

●	<b>Attraction &amp; Retention (DR)</b>
●	<u>Leadership &amp; Strategy (ER)</u>
●	<i>Unit Culture (ER)</i>
●	<u>Engagement (DC)</u>
●	<u>Inclusion (DC)</u>
●	<u>Equity (DC)</u>
●	<u>Unit Head (DC)</u>
●	<u>Collaboration (DC)</u>
●	<i>Total Compensation &amp; Professional Development (ER)</i>
●	<b>Health &amp; Wellbeing (DR and ER)</b>
●	<b>Faculty Support (DR)</b>
●	<i>Faculty Tenure &amp; Promotion (ER)</i>

Figure 5 Font coded attribution of WES to occupational stress models for faculty.

<sup>9</sup> To access the full excel file, previous WES and related reports, please contact Tanja Maier or see <http://focusonpeople.ubc.ca/workplace-experiences-survey/>

As shown in Figure 5, parts of the WES relate to the demand-control model. A breakdown of these items are shown in *Table 2*.

Table 2 Which parts of the WES relate to the control-demand model for faculty?

Themes for Faculty	C=Control, S=support, D=Demand, ?=NA)
<b>Attraction &amp; Retention</b>	?
UBC is successful in: <b>attracting the best staff.</b>	?
UBC is successful in: <b>retaining the best staff.</b> NEW	?
UBC is successful in: <b>retaining the best faculty.</b> NEW	?
UBC is successful in: <b>attracting the best faculty.</b>	?
<b>Leadership &amp; Strategy</b>	C
UBC's senior leaders communicate a clear, strategic vision of the future direction of the University.	C
I have confidence in UBC's senior leadership. NEW	C
I believe that UBC's senior leaders will take meaningful action on the issues identified in this survey.	C
I understand the relationship between my individual objective and UBC's objective.	C
I am satisfied with the opportunities for learning available to me at UBC (e.g., professional development funds, workshops, tuition waivers, leadership programs).	S
<b>Unit Culture</b>	?
I feel comfortable in raising issues around my mental health and wellbeing that impact my work, with my supervisor/head. NEW	S
My unit is a place where I feel I can comfortably raise personal and/or family responsibilities that impact my work.	S
I feel well-informed about my unit's priorities.	C
I receive recognition for my accomplishments at work.	?
I feel involved in decisions that affect me in my day-to-day work.	C

Themes for Faculty	C=Control, S=support, D=Demand, ?=NA)
<b>Engagement</b>	?
My work gives me a feeling of personal fulfillment.	?
I feel proud to work for UBC.	?
I would recommend UBC as a good place to work.	?
I would recommend UBC to prospective students.	?
I am confident I can achieve my career objectives at UBC.	C
I feel a sense of belonging to the larger UBC community. NEW	C
My colleagues treat me with respect.	?
Overall, how satisfied are you with your current role/job at UBC?	?
<b>Inclusion</b>	Lack of C
Over the past 2-3 years, I have felt excluded in my unit due to my: <b>sexual orientation</b> .	Lack of C
Over the past 2-3 years, I have felt excluded in my unit due to my: <b>gender identity or expression</b> . NEW	Lack of C
Over the past 2-3 years, I have felt excluded in my unit due to my: <b>religious affiliation</b> . NEW	Lack of C
Over the past 2-3 years, I have felt excluded in my unit due to my: <b>disability (visible or invisible)</b> . NEW	Lack of C
Over the past 2-3 years, I have felt excluded in my unit due to my: <b>ethnic or cultural origin (including race and aboriginal status)</b> . NEW	Lack of C
Over the past 2-3 years, I have felt excluded in my unit due to my: <b>sex (male/female)</b> . NEW	Lack of C
Over the past 2-3 years, I have felt excluded in my unit due to my: <b>age</b> . NEW	Lack of C
<b>Equity</b>	Lack of C
Over the past 2-3 years, I have been treated unfairly in my unit due to my: <b>sexual orientation</b> .	Lack of C
Over the past 2-3 years, I have been treated unfairly in my unit due to my: <b>gender identity or expression</b> . NEW	Lack of C
Over the past 2-3 years, I have been treated unfairly in my unit due to my: <b>religious affiliation</b> .	Lack of C
Over the past 2-3 years, I have been treated unfairly in my unit due to my: <b>disability (visible or invisible)</b> .	Lack of C

Themes for Faculty	C=Control, S=support, D=Demand, ?=NA)
Over the past 2-3 years, I have been treated unfairly in my unit due to my: <b>ethnic or cultural origin (including race and aboriginal status).</b>	Lack of C
Over the past 2-3 years, I have been treated unfairly in my unit due to my: <b>age.</b>	Lack of C
Over the past 2-3 years, I have been treated unfairly in my unit due to my: <b>sex (male/female).</b>	Lack of C
<b>Unit Head</b>	?
My immediate head/manager: <b>encourages open and honest two-way communication.</b>	C/S
My immediate head/manager: <b>treats people fairly.</b>	C/S
My immediate head/manager: <b>is accessible.</b>	C
My immediate head/manager: <b>supports my training and development needs.</b>	?
My performance is assessed fairly.	?
<b>Collaboration</b>	
I have opportunities to collaborate with: <b>colleagues outside UBC.</b> NEW	C/S
I have opportunities to collaborate with: <b>colleagues/co-workers across UBC.</b> NEW	C/S
I have opportunities to collaborate with: <b>other members of my unit.</b> NEW	C/S
<b>Total Compensation &amp; Professional Development</b>	?
I believe that my pay at UBC is as good as or better than the pay offered by other similar institutions.	?
I believe that the benefits at UBC are as good as or better than the benefits offered by other similar institutions.	?
I believe hiring decisions (promotions, transfers and appointments) are made fairly at UBC. (Only applies to certain Faculty groups)	?
<b>Health &amp; Wellbeing</b>	C
I know how and where to access services or educational programs to address my mental health and wellbeing when required. NEW	C
I have access to UBC's provisions or time for personal needs (e.g. childcare) when required. NEW	C/S



Themes for Faculty	C=Control, S=support, D=Demand, ?=NA)
I know how to take action should I observe or experience bullying, harassment or violence at UBC. NEW	C/S
I feel physically safe in my work environment. NEW	C
My unit does what it can to make my personal/family obligations and a career compatible.	C
<b>Faculty Support</b>	S
I am satisfied with the resources that UBC provides to support my: <b>educational leadership.</b> NEW	S
I am satisfied with the resources that UBC provides to support my: <b>teaching.</b> NEW	S
I am satisfied with the resources that UBC provides to support my: <b>research.</b> NEW	D
I have to be more productive than some of my colleagues to receive the same recognition and reward as a scholar. NEW	S
At work, I have the tools (e.g., technology, equipment, materials) required to perform my work.	C
I have ready access to the information I require to perform my work.	C
I have enough time to deal with student requests for help.	D
I received adequate orientation when joining UBC. NEW	S/C
<b>Faculty Tenure &amp; Promotion</b>	?
Please rate the clarity of the following aspects of earning tenure or promotion: <b>the criteria.</b> NEW	?
Please rate the clarity of the following aspects of earning tenure or promotion: <b>the process.</b> NEW	?
Please rate the clarity of the following aspects of earning tenure or promotion: <b>the body of evidence required.</b> NEW	?
I believe decisions are made fairly in the following areas: <b>tenure.</b> NEW	?
I believe decisions are made fairly in the following areas: <b>promotion.</b> NEW	?
I believe decisions are made fairly in the following areas: <b>re-appointments.</b> NEW	?

Themes for Faculty	C=Control, S=support, D=Demand, ?=NA)
I believe decisions are made fairly in the following areas: <b>leadership appointments</b> . NEW	?
<b>Academic Excellence</b>	C
I am able to meet expectations related to: <b>service</b> . NEW	D/C
I am able to meet expectations related to: <b>teaching</b> . NEW	D/C
I am able to meet expectations related to: <b>research</b> . NEW	D/C

As shown in Table 2, some questions do not fit with any portion of the control-demand model, while others questions are compatible with two different aspects of the stress models (e.g. Control and demand or control and support).

#### The main sources of concern for faculty

Results from “verbatim comments” or narrative discussion of the UBC workplace experience survey (WES) in 2014 were also studied. A part of the WES was dedicated to the health and wellbeing theme. The content included statements that relate to safety, work and personal responsibilities, compatibility, and accessing relevant health and wellness service programs. The report indicates that:

- “Overall the Health & Wellbeing theme is performing fairly well with faculty. Most faculty members state that they feel safe in their work environment and know what to do if they observe bullying in the workplace. There is less agreement from faculty on knowing how to access the provisions or time for personal needs and making personal and work obligations compatible in their work units.
- There are three areas in which faculty at the Okanagan is in less agreement than those working in Vancouver: feel physically (less) safe in your work environment, (do not) know how to take action should I observe bullying in the workplace, and (not sure about the statement) my unit does what it can to make personal/family obligations and a career compatible.
- Sessional faculty members are less likely to state that they have access to UBC’s provisions or time for personal needs when required.”

“WES report2014\_slide 130”

The items specified above were studied as factors indicating stress in and outside the workplace.

A specific question in the WES asks about sources of stress. The result are presented in Table 3.

**Table 3** What are the major sources of stress for faculty?

	UBC FACULTY OVERALL	VANCOUVER	OKANAGAN
Workload	40	40	38
Securing funding for research	27	27	30
Departmental or campus politics	19	19	23
Research productivity	17	17	19
Lack of resources	15	15	14
Job security/Secured funding for my position	14	15	5
Teaching responsibilities	14	13	22
Self-imposed high expectations	13	14	6
Competing priorities	13	13	11
Committee and/or administrative responsibilities	13	12	17
Lack of communication	12	11	16
Organizational change	10	10	14
Managing a research group	9	9	10
Managing employees	6	6	5
Review/promotion process	6	5	8
Interpersonal conflict	6	5	6
Changes in technology	6	6	6

Note: Select all that apply, up to three. % Selected. Responses with < 6% not shown

As shown in Table 3, workload and secure funding for research purposes are the two most important sources of stress for faculty members. Exploring the items, within the “verbatim comments” of WES question, finding better financial support for graduate students is indicated as an important source of stress. The report reads:

“... Provide better university financial support for graduate students ..., and a big source of stress is figuring out how to fund students who are essential for research productivity.

[UBCV]” slide 176

Workload, specifically teaching load, was also named as a main source of stress. An example of a verbatim statement is as follows:

“I feel extremely overworked compared to other institutions, both with teaching and administration and lack of recognition of my research. Increase salaries each year at least with the inflation, rather than the ongoing 0 and delays with months of negotiations. ....

More transparency in teaching loads within the department; more consultation by upper-level administrators of views of faculty in my department. [UBCV]”

“WES presentation, slide 176”

Feeling overwhelmed with workload and a lack of financial support for research advancement are two main reasons for stress among faculty members, which may lead to adverse consequences. One of these consequences is not feeling content with their professional status, which in turn could lead to migration to other academic institutions. In the past 3 years, 38% of faculty indicated that they have actively searched for a job outside UBC (slide 165). When faculty were asked what were the reasons for searching for jobs, more than 40% named three major reasons:

1. To improve my opportunity for career advancement (55%)
2. To increase salary (47%)
3. To find a more supportive work environment (44%)

Twenty nine percent replied “to reduce stress”.

### Which WES question fits with which model for staff?

The WES contains a combination of elements from the three work stress models discussed above. The following figure shows a font-coded description of how much each part of the WES relates to which model for staff members. For instance, the color red relates to Demand-Control (DC) model; four sections of the WES are found to be related to this model, as shown in Figure 6.

- Demand-Control=DC (underline);
- Effort-Reward=ER (*italic font*),
- Job demand-resources model=DR (**Bold font**)

●	<b>Attraction &amp; Retention</b>
●	<u>Leadership &amp; Strategy</u>
●	<i>Unit Culture</i>
●	<i>Engagement</i>
●	<u>Inclusion</u>
●	<u>Equity</u>
●	<u>Unit Head</u>
●	<u>Collaboration</u>
●	<i>Total Compensation &amp; Professional Development</i>
●	<u>Health &amp; Wellbeing</u>
●	<b>Support &amp; Resources</b>

Figure 6 Font coded attribution of WES to occupational stress models for staff

A more detailed description of items fitting in the demand-control-support group is shown in Table 4.

Table 4 Which part of the WES relates to the demand-control model for staff?

Themes for Staff	C=Control, S=support, D=Demand, ?=NA)
<b>Attraction &amp; Retention</b>	
UBC is successful in: <b>attracting the best staff.</b>	?
UBC is successful in: <b>retaining the best staff.</b> NEW	?
UBC is successful in: <b>retaining the best faculty.</b> NEW	?
UBC is successful in: <b>attracting the best faculty.</b>	?
<b>Leadership &amp; Strategy</b>	C
UBC's senior leaders communicate a clear, strategic vision of the future direction of the University.	C
I have confidence in UBC's senior leadership. NEW	C
I believe that UBC's senior leaders will take meaningful action on the issues identified in this survey.	C
<b>Unit Culture</b>	?
I feel comfortable in raising issues around my mental health and wellbeing that impact my work, with my supervisor/head. NEW	S
My unit is a place where I feel I can comfortably raise personal and/or family responsibilities that impact my work.	S
I receive recognition for my accomplishments at work.	?
I feel involved in decisions that affect me in my day-to-day work.	C
<b>Engagement</b>	?
My work gives me a feeling of personal fulfillment.	?
I feel proud to work for UBC.	?
I would recommend UBC as a good place to work.	?

Themes for Staff	C=Control, S=support, D=Demand, ?=NA)
I would recommend UBC to prospective students.	?
I am confident I can achieve my career objectives at UBC.	C
I feel a sense of belonging to the larger UBC community. NEW	C
I understand the relationship between my individual objective and UBC's objective.	?
Overall, how satisfied are you with your current role/job at UBC?	?
<b>Inclusion</b>	Lack of C
Over the past 2-3 years, I have felt excluded in my unit due to my: <b>sexual orientation</b> .	Lack of C
Over the past 2-3 years, I have felt excluded in my unit due to my: <b>gender identity or expression</b> . NEW	Lack of C
Over the past 2-3 years, I have felt excluded in my unit due to my: <b>religious affiliation</b> . NEW	Lack of C
Over the past 2-3 years, I have felt excluded in my unit due to my: <b>disability (visible or invisible)</b> . NEW	Lack of C
Over the past 2-3 years, I have felt excluded in my unit due to my: <b>ethnic or cultural origin (including race and aboriginal status)</b> . NEW	Lack of C
Over the past 2-3 years, I have felt excluded in my unit due to my: <b>sex (male/female)</b> . NEW	Lack of C
Over the past 2-3 years, I have felt excluded in my unit due to my: <b>age</b> . NEW	Lack of C
<b>Equity</b>	Lack of C
Over the past 2-3 years, I have been treated unfairly in my unit due to my: <b>sexual orientation</b> .	Lack of C
Over the past 2-3 years, I have been treated unfairly in my unit due to my: <b>gender identity or expression</b> . NEW	Lack of C
Over the past 2-3 years, I have been treated unfairly in my unit due to my: <b>religious affiliation</b> .	Lack of C
Over the past 2-3 years, I have been treated unfairly in my unit due to my: <b>disability (visible or invisible)</b> .	Lack of C
Over the past 2-3 years, I have been treated unfairly in my unit due to my: <b>ethnic or cultural origin (including race and aboriginal status)</b> .	Lack of C
Over the past 2-3 years, I have been treated unfairly in my unit due to my: <b>age</b> .	Lack of C
Over the past 2-3 years, I have been treated unfairly in my unit due to my: <b>sex (male/female)</b> .	Lack of C



Themes for Staff	C=Control, S=support, D=Demand, ?=NA)
<b>Unit Head</b>	?
My immediate head/manager: <b>encourages open and honest two-way communication.</b>	C/S
My immediate head/manager: <b>treats people fairly.</b>	C/S
My immediate head/manager: <b>is accessible.</b>	C
My immediate head/manager: <b>takes effective action on work-related matters.</b>	?
My immediate head/manager: <b>gives me regular, informal feedback on my performance throughout the year.</b>	C
My immediate head/manager: <b>gives me the freedom to use my own judgment to complete my work.</b> NEW	C
My immediate head/manager: <b>supports my training and development needs.</b>	S
My performance is assessed fairly.	?
<b>Collaboration</b>	?
I have opportunities to collaborate with: <b>colleagues outside UBC.</b> NEW	C/S
I have opportunities to collaborate with: <b>colleagues/co-workers across UBC.</b> NEW	C/S
I have opportunities to collaborate with: <b>other members of my unit.</b> NEW	C/S
<b>Total Compensation &amp; Professional Development</b>	?
I believe that my pay at UBC is as good as or better than the pay offered by other similar institutions.	?
I believe that the benefits at UBC are as good as or better than the benefits offered by other similar institutions.	?
I am satisfied with the opportunities for learning available to me at UBC (e.g., professional development funds, workshops, tuition waivers, leadership programs).	?
<b>Health &amp; Wellbeing</b>	C/S
I know how and where to access services or educational programs to address my mental health and wellbeing when required. NEW	C
I have access to UBC's provisions or time for personal needs (e.g. childcare) when required. NEW	C/S

Themes for Staff	C=Control, S=support, D=Demand, ?=NA)
I know how to take action should I observe or experience bullying, harassment or violence at UBC. NEW	C/S
<b>Support &amp; Resources</b>	?
At work, I have the tools (e.g., technology, equipment, materials) required to perform my work.	C
I have ready access to the information I require to perform my work.	C
I have enough time to deal with student requests for help.	D
I received adequate orientation when joining UBC. NEW	D
I feel physically safe in my work environment. NEW	C
My unit does what it can to make my personal/family obligations and a career compatible.	D/C/S
My colleagues treat me with respect.	S
I believe hiring decisions (promotions, transfers and appointments) are made fairly at UBC.	?
I feel well-informed about my unit's priorities.	C

## The main sources of self-reported stress for staff

According to Figure 7, the main three sources of stress for staff are workload (43%), lack of communication (29%), and organizational change (28%).

	UBC STAFF OVERALL	VANCOUVER	OKANAGAN
Workload	43	43	41
Lack of communications	29	28	33
Organizational change	28	28	30
Departmental or campus politics	21	21	19
Competing priorities	20	20	20
Lack of resources	16	16	12
Self-imposed high expectations	15	15	15
Job security/Secured funding for my position	15	15	14
Manager's expectations	14	15	13
Managing employees	9	10	4
Interpersonal conflict	8	8	9
Changes in technology	7	7	8
Competing fiscal/budgetary responsibilities	7	7	5
Timing of departmental meetings and functions	6	6	5
Acquiring new skills	6	6	8
No source of stress at work	5	5	7

*Figure 7 Sources of stress for Staff at UBC*

## Conclusion

Studying the WES (2014), it is clear that the questions are not compatible with one occupational stress model (e.g. Control-demand or Effort-reward model) but rather a combination of stress models. We studied the available questionnaires in the literature, based on which we were able to add relevant questions to the current WES to enrich its capacity to measure stress based on tested occupational models.

## Chapter 3. Recommended study proposal

The following study design and methodology is proposed for future Workplace Experience surveys (WES) at UBC. Abiding by the methodology described below will allow potential biases to be avoided. The proposal also takes epidemiological concepts such as study design, sampling technique, etc. into consideration, which will further improve the quality of future surveys.

### Target population

Faculty, research faculty, administration and service staff

### Method of data collection

The survey can be conducted using an online survey or a direct approach. The direct approach has been shown to ensure a higher response rate.

*Online survey:* An online survey will be designed including standard questions to measure occupational stress. The survey will be held on a UBC server for a period of 6 to 8 weeks. Faculty and staff will be invited to answer the questions. Participation will be voluntary and anonymous. Participants will be given an opportunity to ask for additional information via e-mail or an online inquiry. A telephone number will also be provided for the faculty/staff who prefer to communicate directly with those administering the survey or who would like further information.

*Direct approach:* Each participant will be asked to join the study on an individual basis. A 10-minute informational interview will be booked with the participants. Information such as the study objective and the condition of study anonymity will be provided. Participants' concerns/questions about the survey will be answered in person. If the person in question

agrees to participate in the study, he or she will be provided with the evaluation instruments to be filled out and returned to the address indicated on the prepared envelope (the HR address) via the UBC internal mail system.

*Training:* Survey administrators will be hired to conduct various stages of the study. For instance, Human Resources may hire graduate students who are funded by UBC. Students will be selected via interview. A briefing session will be held to inform the students about the survey's objective, the population of interest, the study sample (e.g. the size and composition of the sample, and the sampling technique utilized), distribution of the survey, and troubleshooting difficulties or incidents that could arise during data collection.

#### Sampling technique

A list of staff/faculty email addresses will be provided. Three methods of sampling are feasible:

1. Total sampling: collecting data from the entire community of staff/faculty
2. Random sampling: collecting information from a random sample of staff/faculty
3. Multistage random cluster sampling: collecting data from a random sample of each cluster (e.g. School) proportional to the number of staff/faculty members in each cluster

If the response rate is expected to be less than a third of the whole population, the first method is recommended. The second method will be more desirable if a higher rate of response is expected. In this case, a longer questionnaire can be sent out which will be more reliable. The third method is the optimal method of sampling, as the survey will be sent to clusters (e.g. Schools) on multiple occasions to ensure everyone replies. Each participant is selected randomly from within a cluster (e.g. from the School of Medicine). Samples from each school will be

assigned proportionally to ensure representation of the cluster. A higher rate of responses is expected as the survey is distributed, lobbied for and inquired into by the head of the School, following discussion with the participants about the importance of participation in the survey to fully represent the school. Participants will then be stratified to two populations of faculty and staff.

#### Questionnaire\_ Part 1

The first part of questionnaire will include socio-demographic characteristics of participants and occupational data. Potential information in this section will be as follows (Table 5):

*Table 5 List of questions for the static part of future WES questionnaires*

Variable name	Variable type	Measure/Levels	Analytical plan	Note
Gender	Categorical	Male/Female/Would not like to disclose	Frequency/percentage	
Age	Continuous	Year	Mean/Standard deviation/Description	
Education	Categorical	BSc/MSc/PhD/MD/Specialist/Others	Frequency/percentage	Others will include items relevant to medical doctors/health professionals with various degree
Position	Categorical	Instructor/Associate professor/Assistant professor/Professor/Adjunct professor Research associate Staff	Frequency/percentage	
Campus	Categorical	Vancouver/Okanagan	Frequency/percentage	
VP and Faculty portfolio	Categorical	All faculties at UBC to be listed here. Example: School of Medicine	Frequency/percentage	

Variable name	Variable type	Measure/Levels	Analytical plan	Note
Total work experience	Continuous	Year	Mean/Standard deviation/Description	
Years of service at UBC	Continuous	Year	Mean/Standard deviation/Description	
Total number of working hours per week	Continuous	Hours	Mean/Standard deviation/Description	
Total number of hours working overtime, if applicable	Continuous	Hours	Mean/Standard deviation/Description	
Civil status	Categorical	Single/Married or living with a partner/Divorced or separated/Widowed	Frequency/percentage	
Number of children, if applicable	Categorical	One/two/three/more/Not applicable	Frequency/percentage	

Questionnaire\_ Part 2

Questionnaire\_ Part 2

Questionnaires measuring work stress

To find suitable questionnaires from the literature, a thorough literature review was conducted. We found that a large group of standardized questionnaires has been designed for the control-demand model<sup>59</sup> and the validity of these tools has been tested.<sup>60</sup> However, specific domains of the work-stress model for a university setting should be identified for our purpose.

A study of university teachers used a 37-item questionnaire to measure work stress and its relation with gender and academic position.<sup>61</sup> The Questionnaire of Exposure to Stress at Work for University Teaching Staff was validated through a PhD dissertation project. The respondents had to score each item on a 6-point scale. The items were organized in 6 groups and contained the following questions:

1. Material/technical working conditions (reliability index Cronbach's alpha=0.89); six items, such as "Impossibility to purchase high-quality research equipment" and "Inadequate technical equipment for research or teaching".
2. Work with students (Cronbach's alpha=0.82); six items, such as "Lack of interest and motivation in students" and "Poor student achievement".
3. Interpersonal relationships in the workplace (Cronbach's alpha=0.88); eight items, such as "Supervisors have too much power to influence one's career" and "No help or support from the mentor".



4. Workload (Cronbach's alpha=0.86); seven items, such as "General lack of time for research" and "Work - life imbalance".

5. Work organization (Cronbach's alpha=0.75); five items, such as "Too many meetings" and "Membership in too many committees and other bodies".

6. Social recognition and status (Cronbach's alpha=0.75), a source of stress related to the insufficient state funding of science; five items, such as "Lack of government incentive for science", "Lower university salaries in relation to other colleagues of the same profession"

Another study working with 193 university professors at the University of Seville used an "Occupational Stress Scale" to identify stress levels among academic members.<sup>62</sup> The scale evaluated stressful aspects of occupational activities; the items consisted of 49 statements with seven response options each. The items included several groups:

- occupational overload (understood as having too much to do in little time),
- conflict of role (refers to demands contrary to the wishes and responsibilities of the employee),
- over-qualification (refers to one's belief that he or she is more qualified or capable than what is required to perform one's work), and
- incompetence (feeling incapable of successfully carrying out one's job)

The validity of this questionnaire was tested in the same publication. It is recommended that parts of this questionnaire be adopted for the next WES at UBC.

The study also used the Maslach Burnout Inventory (MBI)<sup>63</sup> containing 22 items that measure certain feelings and attitudes at work. These feelings assesses the three dimensions of occupational stress syndrome for professionals who work directly with people: emotional exhaustion, depersonalization and decreased personal accomplishment. Furthermore, a third questionnaire, the 15-item Magallanes Stress Scale (EMEST)<sup>64</sup> was used to measure physiological alterations commonly accepted as “stress reactions,” or symptoms of stress.. The validity score for all of these three scales were above Cronbach’s reliability indices of 0.7, which is an acceptable number and identifies reliability of these scales. Other questionnaires that can be used in part or in whole are listed in Table 6. These questionnaires will not be discussed in detail, as they are not entirely based on a single stress model but rather on a combination of models, or they are independent of any of the stress models defined in this report.

Table 6 Questionnaires used in the literature

Author, year	Questionnaire name	Number of questions	Validated, reliability index Cronbach's alpha	Target population	Theme/Note
Slišković, 2011 <sup>61</sup>	Exposure to Stress at Work (Appendix 1)	37	Yes, average 0.8	University teachers	<ol style="list-style-type: none"> <li>1. Material/technical working conditions</li> <li>2. Work with students</li> <li>3. Interpersonal relationships in the workplace</li> <li>4. Workload</li> <li>5. Work organization</li> <li>6. Social recognition and status</li> </ol>
Avargues Navarro, 2010 <sup>62</sup>	Occupational Stress Scale (Appendix 2)	49	No	University professors	<ol style="list-style-type: none"> <li>1. Occupational overload: understood as having too much to do in little time</li> <li>2. Conflict of role: refers to demands contrary to the wishes and responsibilities of the employee</li> <li>3. Over qualification: refers to one's belief that he or she is more qualified or capable than what is required to perform one's work</li> <li>4. Incompetence: feeling incapable of successfully carrying out one's job</li> <li>5. lack of or scarcity of resources</li> </ol>
	The Maslach Burnout Inventory (M.B.I.)	22	0.90,0.79,0.71 for each theme	University professors	<p>This inventory measures the severity of stress</p> <p>To estimate the frequency, ranging from "Never" to "Every day", with which one experiences certain feelings and attitudes at work. These feelings coincide with the</p>

Author, year	Questionnaire name	Number of questions	Validated, reliability index Cronbach's alpha	Target population	Theme/Note
					three dimensions of occupational stress syndrome for professionals who work directly with people: <ol style="list-style-type: none"> <li>1. emotional exhaustion,</li> <li>2. depersonalization and</li> <li>3. decreased personal accomplishment</li> </ol>
	The Labour Scale of Stress Magallanes Stress Scale.	15	0.82	University professors	This scale measures the severity of stress. Each item refers to a "minor" functional alteration. The person being evaluated reports how frequently this has occurred over the last two months, from 0 = "Never" to 3 = "Often". Separately, none of these alterations would indicate stress, but their accumulation combined with a high frequency of occurrence could be interpreted as a sign that the individual is under stress. This test evaluates physiological alterations commonly accepted as "stress reactions," or symptoms of stress.
Siegrist, 2009 <sup>65</sup>	Effort-reward imbalance questionnaire (ERIQ) Used the reduced version (ERI). See Appendix 3	23	0.7	Employed men and women participating in the longitudinal Socio-Economic Panel	Three dimensions: <ol style="list-style-type: none"> <li>1. extrinsic effort (measured by 6 items),</li> <li>2. extrinsic reward (measured by 11 items)</li> <li>3. Over-commitment (measured by 6 items).</li> </ol>

Author, year	Questionnaire name	Number of questions	Validated, reliability index Cronbach's alpha	Target population	Theme/Note
Sveinsdóttir, 2006 <sup>66</sup>	Occupational Stress Scale (SOSS). See Appendix 4	28	0.8	Nurses	Instrument measures factors related to sources of general occupational stress in nursing by asking how frequently a certain factor causes stress at work. The possible responses are never (1), rarely (2), sometimes (3), frequently (4), and always (5)
Jong, 2000 <sup>67</sup>	Demand-control model questionnaire. This is an older tool so no full questionnaire is listed.	Workload > 8 items Physical demand > 7 items Emotional demand > 4 items Job control > 10 items Emotional exhaustion > 4 items Psychosomatic health complaints > 10 items	No	Workers from five human service sectors: health care, transport, banks/insurance, retail trade, and warehouse	Workload (8-item scale) including time pressure and high complexity. An example item is: "In the unit where I work, work is carried out under pressure of time." <ul style="list-style-type: none"> <li>Physical demands (7-item scale) The items measure factors such as carrying heavy loads, constrained standing, stooping deeply, and carrying shoulder high. For instance, "In my work, I have to carry shoulder high for a long time."</li> <li>Emotional demands (4-item scale) that contained items about aggressive and awkward clients or patients, and social problems like human suffering. An example is: "In my work, I am confronted with aggressive clients."</li> <li>Job control (10 items) measured the worker's opportunities to determine multiple facets of task elements, like</li> </ul>

Author, year	Questionnaire name	Number of questions	Validated, reliability index Cronbach's alpha	Target population	Theme/Note
		Job satisfaction> 1 item only  Job challenge> 1 item only			<p>method of working, pace of work, work goals, amount of work, working hours, and work evaluation. For instance, "The opportunity that the work offers to determine the method of working yourself."</p> <p>Emotional exhaustion and psychosomatic health complaints.</p> <ul style="list-style-type: none"> <li>• Emotional exhaustion was measured by means of four items of the Dutch version of the Maslach Burnout Inventory. This instrument is particularly suitable for use in human service work (Maslach, 1998). The scale was scored on a 5-point scale, ranging from 1 (never) to 5 (always). An example item is: "I feel emotionally drained from my work."</li> <li>• Psychosomatic health complaints were measured by 10 specific items dealing with all kinds of complaints. This scale was scored on a 3-point scale: 1 (no), 2 (seldom), 3 (yes). For instance, "Are you troubled by headaches in the last six months?"</li> <li>• Job satisfaction was assessed by a single item (i.e., "I am satisfied with my present job") that was scored on a 5-</li> </ul>

Author, year	Questionnaire name	Number of questions	Validated, reliability index Cronbach's alpha	Target population	Theme/Note
					point rating scale, ranging from 1 (strongly disagree) to 5 (fully agree)
Alves, 2004 <sup>68</sup>	Short version of Job stress scale (Demand, control, support), See Appendix 5	17	Yes, Demand:0.72 Control:0.63 Support:0.86	Technical-administrative staff of a Rio de Janeiro university	Three subsections: Demand Control Support
Akiomi, 2014 <sup>69</sup>	A short version of the New Brief Job Stress Questionnaire (New BJSQ), See Appendix 6. Questionnaire is in Japanese.	23 (long version contained 103 items)	Yes:0.50	Occupational health staff and personnel/labor staff  National representative sample of Japanese employees	22 higher-priority scales from 30 scales of the standard version were chosen. These were “emotional demands”, “role conflict”, and “work-self balance (negative)” classified as “job demands” (three scales); “role clarity” and “career opportunity” classified as “task-level job resources” (two scales); “monetary/status reward”, “esteem reward”, “job security”, “leadership”, “interactional justice”, “workplace where people complement each other”, and “workplace where mistakes are acceptable” classified as “workgroup-level job resources” (seven scales); “trust with management”, “preparedness for change”, “respect for individuals”, “fair personnel evaluation”, “diversity”, “career development”, and “work-self balance (positive)” classified as “organizational-level job resources” (seven scales); and “workplace harassment”,

Author, year	Questionnaire name	Number of questions	Validated, reliability index Cronbach's alpha	Target population	Theme/Note
					<p>“workplace social capital”, and “work engagement” classified as “outcomes” (three scales). For “workplace harassment” and “workplace social capital”, they were initially classified as “job demands” and “workgroup-level job resources”, respectively. To see the subcategories, see Appendix 6.</p>
Catano, 2007 <sup>70</sup>	Occupational Stress Among Canadian University Academic Staff	-	Yes	56 universities where the faculty association was a member of the Canadian Association of University Teachers (CAUT).	The seven stress outcome measures were Job Satisfaction, Affective Commitment, Health & Safety at Work, Positive Well-Being, Physical Health Questionnaire, General Health Questionnaire, and Use of medication. See Appendix 7.
Kinman, 2013 <sup>1</sup>	A survey of stress and well-being among staff in higher education; see Appendix 8	49	No		<p>Demands, control, peer support, managerial support, relationships, role, change.</p> <p>‘Demands’ includes workload, pace of work and working hours; ‘Control’ measures levels of autonomy over working methods, as well as pacing and timing; ‘Peer support’ encompasses the degree of help and respect received from colleagues; ‘Managerial support’ reflects supportive behaviors from line managers and the</p>



Author, year	Questionnaire name	Number of questions	Validated, reliability index Cronbach's alpha	Target population	Theme/Note
					organization itself, such as availability of feedback and encouragement; 'Relationships' assesses levels of conflict within the workplace including bullying behavior and harassment; 'Role' examines levels of role clarity and the extent to which employees believe that their work fits into the overall aims of the organization; 'Change' reflects how well organizational changes are managed and communicated.
Author, year	Questionnaire name	Number of questions	Validated, reliability index Cronbach's alpha	Target population	Themes/Notes
Slišković, 2011 <sup>61</sup>	Exposure to Stress at Work (Appendix 1)	37	Yes, average 0.8	University teachers	7. Material/technical working conditions 8. Work with students 9. Interpersonal relationships in the workplace 10. Workload 11. Work organization 12. Social recognition and status
Avargues Navarro, 2010 <sup>62</sup>	Occupational Stress Scale (Appendix 2)	49	No	University professors	6. Occupational overload: understood as having too much to do in little time 7. Conflict of role: this refers to demands contrary to the wishes and responsibilities of the employee

Author, year	Questionnaire name	Number of questions	Validated, reliability index Cronbach's alpha	Target population	Theme/Note
					8. Over qualification: refers to one's belief that he or she is more qualified or capable than what is required to perform one's work 9. Incompetence: or feeling incapable of successfully carrying out one's job 10. lack of or scarcity of resources
	The Maslach Burnout Inventory (M.B.I.)	22	0.90,0.79,0.71 for each theme	University professors	This inventory measures the severity of stress To estimate the frequency, ranging from "Never" to "Every day" with which one experiences certain feelings and attitudes at work. These feelings coincide with the three dimensions of occupational stress syndrome for professionals who work directly with people: <ul style="list-style-type: none"> <li>4. emotional exhaustion,</li> <li>5. depersonalization and</li> <li>6. decreased personal accomplishment</li> </ul>
	The Labour Scale of Stress Magallanes Stress Scale.	15	0.82	University professors	This scale measures the severity of stress Each item refers to a "minor" functional alteration. The person being evaluated reports how frequently this has occurred over the last two months, from 0 = "Never" to 3 = "Often". Separately, none of these alterations would indicate stress, but their accumulation combined with a high frequency of occurrence could be

Author, year	Questionnaire name	Number of questions	Validated, reliability index Cronbach's alpha	Target population	Theme/Note
					interpreted as a sign that the individual is under stress. This test evaluates physiological alterations commonly accepted as "stress reactions," or symptoms of stress.
Siegrist, 2009 <sup>65</sup>	Effort-reward imbalance questionnaire (ERIQ) Used the reduced version (ERI). See Appendix 3	23	0.7	Employed men and women participating in the longitudinal Socio-Economic Panel	Three dimensions: 4. extrinsic effort (measured by 6 items), 5. extrinsic reward (measured by 11 items) 6. Over- commitment (measured by 6 items). Based
Sveinsdóttir, 2006 <sup>66</sup>	Occupational Stress Scale (SOSS). See Appendix 4	28	0.8	Nurses	Instrument measures factors related to sources of general occupational stress in nursing by asking how frequently a certain factor causes stress at work. The possible responses are, never (1), rarely (2), sometimes (3), frequently (4), and always (5)
Jong, 2000 <sup>67</sup>	Demand-control model questionnaire. This is an older tool so no full questionnaire is listed.	Workload > 8 items  Physical demand > 7 items  Emotional demand > 4 items	No	Workers from five human service sectors: health care, transport, bank/insurance, retail trade, and warehouse	Workload ( 8-item scale) including time pressure and high complexity. An example item is: "In the unit where I work, work is carried out under pressure of time." <ul style="list-style-type: none"> <li>Physical demands (7-item scale)</li> </ul> The items measure aspects such as carrying heavy loads, constrained standing, stooping deeply, and carrying shoulder high. For

Author, year	Questionnaire name	Number of questions	Validated, reliability index Cronbach's alpha	Target population	Theme/Note
		Job control > 10 items  Emotional exhaustion > 4 items  Psychosomatic health complaints > 10 items  Job satisfaction > 1 item only  Job challenge > 1 item only			<p>instance, "In my work, I have to carry shoulder high for a long time."</p> <ul style="list-style-type: none"> <li>Emotional demands (4-item scale) that contained items about aggressive and awkward clients or patients, and social problems like human suffering. An example is: "In my work, I am confronted with aggressive clients."</li> <li>Job control (10 items) and measured the worker's opportunities to determine multiple facets of task elements, like method of working, pace of work, work goals, amount of work, working hours, and work evaluation. For instance, "The opportunity that the work offers to determine the method of working yourself."</li> </ul> <p>Emotional exhaustion and psychosomatic health complaints.</p> <ul style="list-style-type: none"> <li>Emotional exhaustion was measured by means of four items of the Dutch version of the Maslach Burnout Inventory. This instrument is particularly suitable for use in human service work (Maslach, 1998). The scale was scored on a 5-point scale, ranging from 1 (never) to 5 (always). An example item is: "I feel emotionally drained from my work."</li> </ul>

Author, year	Questionnaire name	Number of questions	Validated, reliability index Cronbach's alpha	Target population	Theme/Note
					<ul style="list-style-type: none"> <li>• Psychosomatic health complaints were measured by 10 specific items dealing with all kinds of complaints. This scale was scored on a 3- point scale: 1 (no), 2 (seldom),3(yes). For instance, “Are you troubled by headaches in the last six months?”</li> <li>• Job satisfaction was assessed by a single item (i.e., “I am satisfied with my present job”) that was scored on a 5- point rating scale, ranging from 1 (strongly disagree) to 5(fully agree)</li> </ul>
Alves, 2004 <sup>68</sup>	Look up Table 4: Short version of Job stress scale (Demand, control, support), See Appendix 5	17	Yes, Demand:0.72 Control:0.63 Support:0.86	technical-administrative staff of a Rio de Janeiro university	Three subsections: Demand Control Support
Akiomi, 2014 <sup>69</sup>	A short version of the New Brief Job Stress Questionnaire (New BJSQ), See Appendix 6 Questionnaire is in Japanese language	23 (long version contained 103 items)	Yes:0.50	occupational health staffs and personnel/labor staffs  National representative sample of Japanese employee	22 higher-priority scales from 30 scales of the standard version were chosen. These were “emotional demands”, “role conflict”, and “work-self balance (negative)” classified as “job demands” (three scales); “role clarity” and “career opportunity” classified as “task-level job resources” resources” (two scales); “monetary/status reward”, “esteem reward”, “job security”, “leadership”, “interactional justice”,

Author, year	Questionnaire name	Number of questions	Validated, reliability index Cronbach's alpha	Target population	Theme/Note
					<p>“workplace where people complement each other”, and “workplace where mistakes are acceptable” classified as “workgroup-level job resources” (seven scales); “trust with management”, “preparedness for change”, “respect for individuals”, “fair personnel evaluation”, “diversity”, “career development”, and “work-self balance (positive)” classified as “organizational-level job resources” (seven scales); and “workplace harassment”, “workplace social capital”, and “work engagement” classified as “outcomes” (three scales). For “workplace harassment” and “workplace social capital”, they were initially classified as “job demands” and “workgroup-level job resources”, respectively. To see the subcategories see Appendix 6</p>
Catano, 2007 <sup>70</sup>	<p>Occupational Stress Among Canadian University Academic Staff</p> <p>Inquired from author to send the questionnaire</p>	-	Yes	56 universities where the faculty association was a member of Canadian Association of University Teachers (CAUT). (CAUT)	The seven stress outcome measures were: Job Satisfaction, Affective Commitment, Health & Safety at Work, Positive Well-Being, Physical Health Questionnaire, General Health Questionnaire, and Use of medication. See Appendix 7

Author, year	Questionnaire name	Number of questions	Validated, reliability index Cronbach's alpha	Target population	Theme/Note
Kinman, 2013 <sup>1</sup>	A survey of stress and well-being among staff in higher education; see Appendix 8	49	No		<p>Demands, control, peer support, managerial support, relationships, role, change</p> <p>Demands includes workload, pace of work and working hours; Control measures levels of autonomy over working methods, as well as pacing and timing; Peer support encompasses the degree of help and respect received from colleagues; Managerial support reflects supportive behaviors from line managers and the organization itself, such as availability of feedback and encouragement; Relationships assesses levels of conflict within the workplace including bullying behavior and harassment; Role examines levels of role clarity and the extent to which employees believe that their work fits into the overall aims of the organization; Change reflects how well organizational changes are managed and communicated.</p>

## Validity assessment

If the validated standard questionnaires are used, there is no need to validate our study questions.

However, if parts of the validated questionnaire are used for this survey, the face validity of the questionnaire at hand should be assessed. This will be done by principal component analysis followed by a Varimax rotation to aid the evaluation of the construct validity of the instrument. Cronbach's alpha score of higher than 0.7 will be acceptable for further analysis of the questionnaire.

## Data analysis

Data will be entered in a prepared spreadsheet and analyzed using SPSS Statistics for Windows (Version 22.0. Armonk, NY: IBM Corp.) A p value of less than 0.05 will be considered significant.

A simple description of categorical and continuous variables under study will be provided. Then, a bivariate analysis will be conducted. When categorical variables are confronted, the Chi-square test will be used. Student's t-test will be used when confronting a two-level categorical variable with a continuous variable. The role of exposures to stressors will be assessed using a one-way analysis of variance, followed by LSD post-hoc tests. Correlation between two continuous variables will be tested with the Pearson test.

Multiple regression models will then be employed to investigate the best predictor of stress among participants. The maximum likelihood estimation technique will be adopted to compare various models to obtain the most parsimonious model that best describes the role of confounders, modifiers, mediators and predictive terms in the model.

If this proposal is employed, it may be proven difficult to change the WES totally. Replacing the WES with a new survey might not be practical because a comparative approach with questions asked in previous years will not be possible if a new questionnaire is used. Nevertheless, since the current WES



lacks comprehensiveness and does not follow a single stress model, a more conservative approach may be undertaken for conducting the next survey. It is possible to add some questions to the WES balancing between uses of stress models and providing for a comprehensive and manageable survey, taking into account a limited number of questions.

#### Chapter 4. From the literature, which questions are suitable to be added to WES?

To answer this question, we attempted to critically appraise the questionnaires found in the literature. We observed the following challenges doing so:

The description of themes in the published papers often do not match with the actual questions asked.

There is no categorization of themes on some of the questionnaires.

Questions of the same theme are mixed with other questions, adding to the complexity of the questionnaire design.

Often, similar questions are repeated in the same questionnaire.

Questionnaires are not comprehensively measuring all aspects of concerns for faculty/staff.

Acknowledging the above limitations, a detailed description of each questionnaire recommended for the next WES is listed below.

##### Exposure to Stress at Work Questionnaire

This 37-item questionnaire is used in the university setting for faculty members only. Themes are not categorized in the questionnaire. However, the following themes are found: workload, unit culture, time, support, student, and leadership. These themes are also found in the WES (see Table 7 for a comparison between themes found in the questionnaires). WES lacks the “time” and “student” themes. Faculty have brought up the challenges regarding time in their narrative/verbal responses. It is therefore recommended to adopt the “Time” theme of this questionnaire and add it to the next WES. The following questions can be incorporated:

## Time

### *Faculty*

- General lack of time for research, publication
- Lack of time to comply with obligations (e.g. too many meetings)
- Lack of time to trace professional developments in the field
- Lack of time to efficiently communicate with students and monitor their progress

### *Staff*

- I have enough time to finish my work (Cronbach's alpha=0.692)<sup>62</sup>

### Occupational Stress Scale

This questionnaire contains 38 questions including themes such as time, workload, academic excellence, support, and collaboration. Similar to the “Exposure to stress at work” questionnaire, there is no specific categorization. The items that match the WES are check-marked in Table 7.

This questionnaire also contains the element of time (Cronbach's alpha=0.692<sup>62</sup>). The same authors have used two questionnaires to measure severity of stress, including a)The Maslach Burnout Inventory and b)The Labor Scale of Stress (Magallanes Stress Scale)<sup>62</sup>. These will not be discussed here as we are not interested in measuring the severity of stress.

### Effort-Reward Imbalance Questionnaire

This questionnaire is a reduced version of a longer questionnaire (ERI; Appendix 3).<sup>65</sup> It includes items related to engagement, compensation, resources, financial support, time, and academic excellence. These items are marked on Table 7. An interesting theme arises in this tool which

relates to how staff are able to create a balance between life and work. It is recommended to add another section to the WES including the following question(s):

Balance between life and work

- As soon as I get up in the morning I start thinking about work problems
- When I get home, I can easily relax and “switch off” work
- People close to me say I sacrifice too much for my job
- Work rarely lets me go, it is still on my mind when I go to bed
- If I postpone something that I was supposed to do today I’ll have trouble sleeping at night

Table 7 Comparing themes between WES and other questionnaires

WES	Exposure to Stress at Work Questionnaire ( Appendix 1) <sup>61</sup>	Occupational Stress Scale (Appendix 2) <sup>62</sup>	Effort-reward imbalance questionnaire (Appendix 3) <sup>17</sup>
Theme	workload, unit culture, time, support, student, and leadership	occupational overload, conflict of role, over-qualification, incompetence, lack of or scarcity of resources	
Attraction & Retention	-	-	-
Leadership & Strategy	X		
Unit Culture	X		X
Engagement		X	
Inclusion			
Equity			
Unit Head	X		
Collaboration (for Staff only)		X	
Total Compensation & Professional Development		X	X
Health & Wellbeing			
Support & Resources	X	X	X
Faculty Tenure & Promotion (for Faculty only)		X	X
Academic Excellence (for faculty only)		X	X
Time (recommended)		X	X

WES	Occupational Stress Scale (Appendix 4)	Job stress scale (Demand, control, support; Appendix 55)	Brief Job Stress Questionnaire ( Appendix 66)
Theme	Sources of general occupational stress in nursing	Demand Control Support	Demand, resources, outcomes
Attraction & Retention			
Leadership & Strategy	X		X
Unit Culture/Diversity			X
Engagement			X
Inclusion			
Equity/Harassment			X
Unit Head			X
Collaboration (for Staff only)			
Total Compensation & Professional Development			
Health & Wellbeing			
Support & Resources	X	X	X
Faculty Tenure & Promotion (for Faculty only)			X
Academic Excellence (for faculty only)			
Time (recommended)	X	X	
Ethics	X		
Demand*		X	X

\*Demand questions:

Do you have to work very fast?

Do you have to work very intensively?

Does your work demand too much effort?

Does your work often involve conflicting demands?

### Occupational Stress Scale

This questionnaire contains the following themes: leadership & strategy, support & resources, time, and ethics. The current WES does not contain issues surrounding ethics. It is recommended to add a section that addresses the ethics of working with data, dealing with students and colleagues, and representing professional attributes of a faculty in regards to publications issues (e.g. shadow authorship, etc.).

### Job stress scale

This scale is based on a demand-control-support model and contains the following themes:

Support & resources, time, and demand. The following questions address the theme of demand:

- Do you have to work very fast?
- Do you have to work very intensively?
- Does your work demand too much effort?
- Does your work often involve conflicting demands?

### Brief Job Stress Questionnaire

This questionnaire contains questions addressing the following themes: Leadership & strategy, unit culture/diversity, engagement, equity/harassment, unit head, support & resources, faculty tenure & promotion, and demand. This questionnaire most closely matches the WES as compared to the other questionnaires introduced above. It is based on a demand-resources-outcome model.

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## Appendices

### *Appendix 1 Exposure to Stress at Work*

The following items represent potential sources of stress in the work of university teachers.

Please evaluate the extent to which each one is present in your work.

For each item please tick the appropriate number on the 6-point scale. The numbers have the following meanings:

1= this does not describe my job at all

2 = this mainly does not describe my job

3= this only sometimes describes my job

4= this generally describes my job

5= this largely describes my job

6 = this perfectly describes my job

1. Stunted social life because of excessive job demands.
2. The absence of any protection system in case of a bad relationship with a supervisor.
3. General lack of time for research.
4. Inadequate technical equipment for research or teaching.

5. Doing work that you love on lower quality level due to the general lack of time.
6. The superiors insufficiently appreciate your work.
7. Superiors have too much power to influence one's career.
8. Resistance to innovation in scientific work.
9. You are left to yourself in scientific work because of the lack of co-workers and / or support.
10. Lack of understanding by students.
11. Lack of interest and motivation in students.
12. You feel exploited by a superior or co-workers.
13. Poor student achievement.
14. Negative impact of the Bologna reforms on the quality of work.
15. The need for all-day-time work to comply with numerous obligations.
16. Inadequate conditions for conducting research.
17. Deteriorating quality of new students' generations.
18. Inability to purchase computer programs that are used in scientific and educational work.
19. Lack of time to trace scientific developments in the field.
20. Insufficient financial support for postgraduate studies by the State or institutions in charge.

21. No help or support from the supervisor.
22. The lack of time to write the qualification and other papers.
23. Poor quality of non-teaching staff at the university.
24. Too many meetings.
25. Lack of feedback from students.
26. Inappropriate ratio or percentages of administrative versus teaching staff.
27. Lack of government incentive for science.
28. The need for publishing in a foreign language.
29. Too long a period from preparation to the publication of the scientific paper because of disputed reviews.
30. Impossibility of purchasing high-quality research equipment.
31. Lack of technical and information support.
32. Work - life imbalance.
33. Publication of scientific papers and participation in conferences exclusively on formal grounds.
34. Lower university salaries in relation to other colleagues of the same profession.
35. Membership in too many committees and other bodies
36. Organizational weaknesses of university / faculty.
37. Inadequate equipment in laboratories.

FACTORS:

Material/technical working conditions: items 4, 16, 18, 30, 31, 37

Work with students: items 10, 11, 13, 14, 17, 25

Interpersonal relationships in the workplace: items 2, 6, 7, 8, 9, 12, 21,33

Workload: items 1, 3, 5, 15, 19, 22, 32

Work organisation: items 23, 24, 26, 35, 36

Social recognition and status: items 20, 27, 28, 29, 34

Appendix 2 Occupational Stress Scale

*Matrix of rotated components*

	<sup>(1)</sup> OI α=.902	<sup>(2)</sup> RA α=.836	<sup>(3)</sup> CR α=.859	<sup>(4)</sup> C α=.787	<sup>(5)</sup> Oq α=.654	<sup>(6)</sup> LR α=.817
49. I would need more time in order to complete my assigned tasks	.809					
3. I have an excess of work	.796					
13. I should stay late at the office to finish all of my assigned work	.789					
8. I do not have enough time to do all the tasks demanded of me	.767					
42. I am sometimes assigned a lot of work to do in a limited time.	.750					
23. I am sometimes assigned a lot of tasks to do at once	.720					
33. The excess of work does not allow me any time to rest	.713					
18. I have enough time to finish all my work	.692					
46. Sometimes I have to bring work home to be able to finish all the tasks assigned me	.598					
34. I would need help from specialized personnel to efficiently complete some of my work	.460					
12. I have to do things one way that should be done differently and under different conditions	.413					
4. I have difficulty with the work I am assigned	.380					
19. I sometimes have to make a great effort to complete my work	.360					
6. I do not know the criteria by which I will be evaluated for a promotion or a raise		.737				
41. No one explains how my work will be evaluated		.692				
21. The objectives and goals of my work are unclear		.668				
1. I do not know what possibilities or opportunities there are for me to move ahead or ascend in the hierarchy		.646				
45. I do not have the necessary information about the objectives and results of my work		.632				
29. I do not know how to improve my achievement at work		.545				
11. I do not have information about how to develop my abilities in order to be successful at my job		.502				
16. I do not know what is expected of me in my work		.481				
26. I know exactly what is expected of me at work		.389				
35. I am sometimes asked to do things against my better judgment			.802			
32. I am sometimes asked to behave in a way at work that is against my moral judgment			.723			
37. I sometimes have to modify my behavior so that it is compatible with the demands of an individual or group			.629			
7. It sometimes happens that two or more people expect things of me that are contradictory			.607			
27. The things I do are smiled upon by some, but not by others			.605			
17. I sometimes find myself in situations in which contradictory behaviors are demanded of me			.603			
36. I sometimes receive orders from my supervisors that are not clear			.598			
31. I am not provided with the information I need to correctly do my job			.470			
2. I work with two or more groups that act very differently						
14. In some circumstances, I do not think I am fully capable of doing my job				.712		

40. When important problems arise at work, I know how to resolve them efficiently	.639
48. I complete the tasks I am assigned with great ease	.604
47. I sometimes think I should have a lower-level job than the one I have	.589
9. I sometimes do not know how to complete the tasks I must do	.577
20. I think I am sufficiently qualified and capable to have a higher-level job	-.576
39. I make mistakes easily while doing my work	.500
24. I sometimes find myself worried about the specialization my job requires of me	.448
43. In some circumstances, I need help to be able to complete my work	.379
5. My abilities and knowledge base are much greater than what is required to perform my job	.658
15. The work I do does not achieve any of my objectives or aspirations	.635
44. The tasks I do are below my level of ability	.530
10. I am sufficiently capable to be assigned a job with greater responsibility	.510
25. I consider my job to be rather easy and monotonous	.478
30. My job is in accordance with my personal values	.461
28. I do not have the technical materials necessary to perform my job	.718
22. The resources I have access to do not correspond to the level of responsibility that my job requires	.698
38. I am not given the personnel resources necessary to perform my job	.625

(1) Overload=OI; (2) Role ambiguity=RA; (3) Conflict of role=CR; (4) Competence=C; (5) Overqualification=Oq; (6) Lack of resources=LR.

Appendix 3 Reduced version of Effort-Reward Imbalance Questionnaire

**Table 5** The following items refer to your present occupation. For each of the following statements, please indicate whether you strongly agree, agree, disagree or strongly disagree. Thank you for answering all statements!

		Strongly agree	Agree	Disagree	Strongly disagree
ERI1	I have constant time pressure due to a heavy work load	1	2	3	4
ERI2	I have many interruptions and disturbances while performing my job	1	2	3	4
ERI3	Over the past few years, my job has become more and more demanding	1	2	3	4
ERI4	I receive the respect I deserve from my superior or a respective relevant person	1	2	3	4
ERI5	My job promotion prospects are poor	1	2	3	4
ERI6	I have experienced or I expect to experience an undesirable change in my work situation	1	2	3	4
ERI7	My job security is poor	1	2	3	4
ERI8	Considering all my efforts and achievements, I receive the respect and prestige I deserve at work	1	2	3	4
ERI9	Considering all my efforts and achievements, my job promotion prospects are adequate	1	2	3	4
ERI10	Considering all my efforts and achievements, my salary/income is adequate	1	2	3	4
OC1	I get easily overwhelmed by time pressures at work	1	2	3	4
OC2	As soon as I get up in the morning I start thinking about work problems	1	2	3	4
OC3	When I get home, I can easily relax and 'switch off' work	1	2	3	4
OC4	People close to me say I sacrifice too much for my job	1	2	3	4
OC5	Work rarely lets me go, it is still on my mind when I go to bed	1	2	3	4
OC6	If I postpone something that I was supposed to do today I'll have trouble sleeping at night	1	2	3	4



*Appendix 4 Occupational Stress Scale*

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Home life with a partner who is also pursuing a career  
Insufficient resources to work with  
Having too little work to do  
Lack of career prospects  
Rules and regulations  
Being undervalued  
Inadequate feedback on performance  
Relationships with supervisor  
Monotonous/repetitive work  
Too much or too little variety in work  
Relationships with patients  
Relationships with family and visitors  
Relationships with co-workers  
Managing or supervising others  
Controlling changes at work  
Insufficient consultation and communication  
Morale and organizational climate  
Unclear responsibilities  
Resistance to change  
Inadequate or poor quality of training  
Implications of mistakes made  
Lack of security at workplace  
Having too much work to do  
Equipment  
Not being able to "switch off" at home  
Ethical issues  
Frequent changes in work schedule  
Factors I cannot control

*Appendix 5 Short version of Job Stress Scale*

Questionnaire about **Demands, Control and Support**

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**Demands (D)** Often. Sometimes. Seldom. Never/almost never

- D1. Do you have to work very fast?
- D2. Do you have to work very intensively?
- D3. Does your work demand too much effort?
- D4. Do you have enough time to do everything?
- D5. Does your work often involve conflicting demands?

**Control (C)** Often. Sometimes. Seldom. Never/almost never

- C1. Do you have the possibility of learning new things through your work?
- C2. Does your work demand a high level of skill or expertise?
- C3. Does your job require you to take the initiative?
- C4. Do you have to do the same thing over and over again?
- C5. Do you have a choice in deciding HOW you do your work?
- C6. Do you have a choice in deciding WHAT you do at work?

**Support (A)** Strongly agree. Mildly agree. Mildly disagree. Strongly disagree

- A1. There is a calm and pleasant atmosphere where I work.
  - A2. We get on well with each other where I work.
  - A3. My co-workers support me.
  - A4. The others understand if I have a bad day.
  - A5. I get on well with my supervisors.
  - A6. I enjoy working with my co-workers.
- 

\*Cedida por Töres Theorell

Appendix 6 A short version of the New Brief Job Stress Questionnaire

**Table 1. Averages (and standard deviations [SDs]), correlation with a standard version, and one-year test-retest of the short version of the New BJSQ obtained from a nationally representative survey of employees of Japan in 2010/2011 †**

Scales ‡	No. of items	Average (SD)	Correlation with a standard version (Polycholic correlation coefficient) <i>n</i> =1,606–1,626	One-year test-retest (Pearson correlation coefficient) <i>n</i> =385–389
<b>Job demands</b>				
1. Emotional demands	1	2.66 (0.96)	0.962***	0.566***
2. Role conflict	1	2.87 (0.93)	0.916***	0.549***
3. Work-self balance (negative)	1	2.83 (0.89)	0.976***	0.576***
<b>Task-level job resources</b>				
4. Role clarity	1	3.41 (0.63)	0.819***	0.343***
5. Career opportunity	1	2.62 (0.94)	0.947***	0.623***
<b>Workgroup-level job resources</b>				
6. Monetary/status reward	1	2.25 (0.92)	0.956***	0.633***
7. Esteem reward	1	2.59 (0.80)	0.960***	0.551***
8. Job security	1	2.84 (1.02)	0.870***	0.620***
9. Leadership	1	2.25 (0.92)	0.930***	0.549***
10. Interactional justice	1	2.65 (0.86)	0.974***	0.516***
11. Workplace where people compliment each other	1	2.59 (0.91)	0.987***	0.546***
12. Workplace where mistakes are acceptable	1	2.45 (0.85)	0.957***	0.562***
<b>Organizational-level job resources</b>				
13. Trust with management	1	2.58 (0.81)	0.948***	0.553***
14. Preparedness for change	1	2.35 (0.86)	0.913***	0.439***
15. Respect for individuals	1	2.14 (0.82)	0.939***	0.587***
16. Fair personnel evaluation	1	2.04 (0.86)	0.935***	0.524***
17. Diversity	1	2.72 (0.87)	0.831***	0.515***
18. Career development	1	2.23 (0.87)	0.899***	0.613***
19. Work-self balance (positive)	1	2.07 (0.87)	0.960***	0.578***
<b>Outcomes</b>				
20. Workplace harassment	1	3.70 (0.63)	0.941***	0.428***
21. Workplace social capital	1	2.66 (0.77)	0.959***	0.509***
22. Work engagement	2	2.52 (0.77)	SS	0.664***

\*\*\*  $p < 0.001$ . † The number of respondents varied from 1,606 to 1,628 because of missing values. ‡ Each scale (or item) score was converted so that the higher score indicates better state and ranges from 1 to 4. See text for more details on scoring. SS: Same items as a standard version.

Note: This questionnaire is available in Japanese. Translated version has been requested from the author.

*Appendix 7 –Canadian questionnaire for faculty*

**Domains:**

**Job Satisfaction** is the degree to which the respondents are satisfied with different aspects of their jobs at their institutions. This measure asked seven questions developed for a study of faculty job satisfaction.<sup>71</sup> It included questions about satisfaction with workload, job security, advancement, and salary and benefits, among others. These items were measured with five-point scales with values ranging from 1 =very dissatisfied to 5 = very satisfied. Internal consistency for the scale was  $\alpha = .78$

**Affective Commitment** is the degree to which the respondents feel emotionally attached to their institutions; for example, “I would be very happy to spend the rest of my career at this institution.” We used eight items developed by Allan and Meyer<sup>72</sup> to measure affective commitment. Internal consistency for the scale was  $\alpha = .89$

The following three scales were measured with 7-point scales where 1=Not at All, 2-Rarely, 3 = Once in a while, 4 = Some of the time, 5 = Fairly often, 6 =Often, and 7 = All of the time.

**Positive Well-Being** is the degree to which respondents felt they experienced positive emotional states over the previous 12-month period; that is the degree to which they were cheerful, enthusiastic, and so forth (Hess, Kelloway, &Francis, 2005).<sup>73</sup> Internal consistency for this 6-item scale was  $\alpha = .96$ .

**Physical strain** was measured using the 8-item Physical Health Questionnaire (PHQ; Schat, Kelloway, & Desmarais, 2005),<sup>73</sup> which assessed the degree to which respondents experienced minor physical health symptoms; for example, “During the last 12 months have you gotten a headache when there was a lot of pressure on you to get things done?” Internal consistency for the scale was  $\alpha = .82$ .

**Psychological strain** was assessed using the General Health Questionnaire (GHQ; Banks, Clegg, Jackson, Kemp, Stafford, & Wall, 1980),<sup>73</sup> a standardized measure of health that is used to assess the effects of stress on an individual’s mental health; for example, “During the last 12 months have you lost much sleep from worry?” Internal consistency for this 12-item scale was  $\alpha = .89$ .

**Health and Safety at Work** and **Medication** scales were also included in the survey. These measures were developed by the authors to assess the degree to which the respondents believed their environment was a safe place to work, and their use of medication, respectively. These measures were not effective in differentiating any of the participants; therefore, to simplify our presentation we do not report any data from these two measures.

*Appendix 8- A survey of stress and well-being among staff in higher education (1<sup>st</sup> page out of 6)*

## QUESTIONNAIRE

<b>1</b>	I am clear what is expected of me at work	Never <input type="checkbox"/> 1	Seldom <input type="checkbox"/> 2	Sometimes <input type="checkbox"/> 3	Often <input type="checkbox"/> 4	Always <input type="checkbox"/> 5
<b>2</b>	I can decide when to take a break	Never <input type="checkbox"/> 1	Seldom <input type="checkbox"/> 2	Sometimes <input type="checkbox"/> 3	Often <input type="checkbox"/> 4	Always <input type="checkbox"/> 5
<b>3</b>	Different groups at work demand things of me that are hard to combine	Never <input type="checkbox"/> 5	Seldom <input type="checkbox"/> 4	Sometimes <input type="checkbox"/> 3	Often <input type="checkbox"/> 2	Always <input type="checkbox"/> 1
<b>4</b>	I know how to go about getting my job done	Never <input type="checkbox"/> 1	Seldom <input type="checkbox"/> 2	Sometimes <input type="checkbox"/> 3	Often <input type="checkbox"/> 4	Always <input type="checkbox"/> 5
<b>5</b>	I am subject to personal harassment at work (see definition in introduction)	Never <input type="checkbox"/> 5	Seldom <input type="checkbox"/> 4	Sometimes <input type="checkbox"/> 3	Often <input type="checkbox"/> 2	Always <input type="checkbox"/> 1
<b>6</b>	I have unachievable deadlines	Never <input type="checkbox"/> 1	Seldom <input type="checkbox"/> 2	Sometimes <input type="checkbox"/> 3	Often <input type="checkbox"/> 4	Always <input type="checkbox"/> 5
<b>7</b>	If work gets difficult, my colleagues will help me	Never <input type="checkbox"/> 1	Seldom <input type="checkbox"/> 2	Sometimes <input type="checkbox"/> 3	Often <input type="checkbox"/> 4	Always <input type="checkbox"/> 5
<b>8</b>	I am given supportive feedback on the work I do	Never <input type="checkbox"/> 1	Seldom <input type="checkbox"/> 2	Sometimes <input type="checkbox"/> 3	Often <input type="checkbox"/> 4	Always <input type="checkbox"/> 5
<b>9</b>	I have to work very intensively	Never <input type="checkbox"/> 5	Seldom <input type="checkbox"/> 4	Sometimes <input type="checkbox"/> 3	Often <input type="checkbox"/> 2	Always <input type="checkbox"/> 1
<b>10</b>	I have a say in my own work speed	Never <input type="checkbox"/> 1	Seldom <input type="checkbox"/> 2	Sometimes <input type="checkbox"/> 3	Often <input type="checkbox"/> 4	Always <input type="checkbox"/> 5
<b>11</b>	I am clear what my duties and responsibilities are	Never <input type="checkbox"/> 1	Seldom <input type="checkbox"/> 2	Sometimes <input type="checkbox"/> 3	Often <input type="checkbox"/> 4	Always <input type="checkbox"/> 5
<b>12</b>	I have to neglect some tasks because I have too much to do	Never <input type="checkbox"/> 5	Seldom <input type="checkbox"/> 4	Sometimes <input type="checkbox"/> 3	Often <input type="checkbox"/> 2	Always <input type="checkbox"/> 1

