University of British Columbia

Social Ecological Economic Development Studies (SEEDS) Sustainability Program

Student Research Report

University Student Perspectives on Movement Breaks in the Classroom

Prepared by: Lydia Bellis, Andres Garza, Paul Min, Elke Peterson, Roozbeh Charlie Shojaei

Prepared for:

Course Code: KIN 464

University of British Columbia

Date: 13 April 2021

Assignment #3 – Final Project

University Student Perspectives on Movement Breaks in the Classroom

Lydia Bellis

Andres Garza

Paul Min

Elke Peterson

Roozbeh Charlie Shojaei

University of British Columbia

KIN 464 – Health Promotion and Physical Activity

Dr. Andrea Bundon

April 13th, 2021

Executive Summary

Prolonged sedentary behavior is positively associated with increased risk for chronic conditions such as cardiovascular disease and diabetes even after adjustments are made for moderate to vigorous physical activity (MVPA). Existing research has demonstrated that engaging in small bouts of movement/physical activity during the day decreases the risk of various chronic conditions. Additionally, movement breaks have been shown to have physical and mental benefits including decreasing physical discomfort in the workplace, increasing attention, and improving performance in classroom settings. The purpose of this research paper was to explore the perspectives of students on movement breaks in university classrooms with the intention of formulating recommendations to improve the experience and format of movement breaks in the future.

Specifically, this paper examines student perspectives on the value of movement breaks during class time, the types of movement breaks preferred by students, potential subjective benefits experienced from movement breaks, and the effects of online versus in-person lecture formats on the perceived importance of movement breaks during scheduled lectures. To explore these questions a survey was designed using Qualtrics software and a sample of students (N=67) was recruited from the population of current undergraduate students at the University of British Columbia (UBC). Study participants were recruited by student researchers via a post on the UBC Kinesiology website and announcements made in undergraduate classes on Canvas and Zoom. Collected data was quantitatively analyzed using Qualtrics in order to identify trends in survey responses.

Results of the descriptive quantitative analysis showed that the majority of study participants felt that movement breaks should be implemented more frequently and consistently during lectures and that most participants reported feeling and performing better in class after participating in movement breaks. Students also indicated a preference for more static, slower-paced movement breaks or self-guided breaks over dynamic, faster-paced movement breaks, and emphasized the importance of movement breaks in classes 120+ minutes in length. The majority of students also indicated that movement breaks are either more important in online lecture formats than in-person classes, or that movement breaks are important regardless of whether classes are online or in person.

The following four actionable recommendations were designed based on the results of data analysis: 1) movement breaks should be implemented more frequently and consistently during lectures at UBC, 2) movement breaks should be prioritized in classes that are 120+ minutes in length, 3) self-guided or slower-paced movement breaks should be prioritized over faster-paced movement breaks, and 4) ongoing initiative should be taken to ensure students participating in online courses are given the opportunity to interrupt sedentary time with movement breaks scheduled during lectures. Long-term, it is recommended that campus partners engage in ongoing collaboration with relevant stakeholders to design guidelines for the implementation of regularly scheduled movement breaks campus wide.

Study limitations include a relatively small sample size, an over-representation of Kinesiology in the study sample, and a lack of data gathered from 1st year students. Further research on this topic is recommended to determine potential barriers and solutions to the implementation of regularly scheduled movement breaks in university classrooms.

Literature Review

The negative influence of sedentary behaviour on health outcomes is extensively documented in available literature. For example, as demonstrated by Rezende et al. (2014) through systematic review, there is "strong evidence of a relationship" (p. 5) between sedentary behaviour, all cause-mortality, and the most prevalent non-communicable lifestyle diseases including both fatal and non-fatal cardiovascular disease, type 2 diabetes, metabolic syndrome, and certain types of cancer. While discussing sedentary behaviour, it is important to note that sedentary behaviours themselves are *conceptually distinct* from physical inactivity; while the latter term most often refers to an insufficient amount of moderate-to-vigorous physical activity (MVPA) relative to public health guidelines, sedentary behaviours are operationally defined as "activities that involve energy expenditure at the level of 1.0-1.5 metabolic equivalent units" (Edwardson et al., 2012, p. 1), and that are engaged in while sitting, reclining, or laying down.

Clarifying the conceptual differences between physical inactivity and sedentary behaviour is significant when discussing health implications because current research on the topic suggests that there may be an independent association between sedentary behaviours and increased risk of mortality and disease even *after* adjustment for potential confounding factors like MVPA (Dempsey et al., 2020). Essentially, while it appears that MVPA might mitigate the negative impacts of sedentary behaviour on a sliding scale (with greater amounts of MVPA resulting in less detrimental effects) it also appears that sedentary behaviour should be assessed as an independent risk factor, and that interventions and recommendations designed to improve population health should be concerned with reducing overall time spent sedentary during waking hours (Rezende et al., 2014).

In light of the negative health risks associated with sedentary behaviour it makes sense that brief movement breaks (small bouts of movement/physical activity) implemented during an

individual's daily routines could and should be used to provide respite from extended periods of sedentary behaviour; these movement breaks could serve to positively influence health specifically by decreasing the risks associated with long periods of uninterrupted sitting. In fact, current research on the topic indicates that regular physical activity breaks are more effective at decreasing levels of postprandial glucose and insulin than continuous physical activity combined with prolonged sedentary behavior (Peddie et al., 2013). This suggests that breaking up sedentary behaviors with brief bouts of physical activity independent of daily or weekly MVPA could be an important mechanism for decreasing risk of conditions like cardiovascular disease and type 2 diabetes (Peddie et al., 2013; Dempsey et al., 2016).

Experimental evidence exists to support the hypothesis that movement break interventions can have a positive influence on health outcomes. Specifically, Winkler et al. (2018) targeted desk-based employees with a movement break intervention that encouraged standing and movement throughout the day in order to reduce time spent sitting. In line with previous research (Peddie et al., 2013; Dempsey et al., 2016), this study found an association between breaking up sedentary behaviour and reduced cardio-metabolic risk. In addition, Winkler et al. (2018) also measured various other factors within 1 year of the intervention and found reduced blood pressure and improved body composition, as well as reduced levels of fasting triglycerides, HDL cholesterol and insulin in the study participants. These findings help demonstrate support for the idea that movement breaks can help achieve reduction of sedentary behaviour, and consequently can result in improved health outcomes for those who participate in movement break interventions.

While considering the potential of movement break interventions for improving physical health, it is also important to consider potential cognitive and emotional benefits. For instance,

research conducted in workplace environments has demonstrated that not only did movement breaks decrease workers' physical discomfort but also improved workers' performance and sense of *well-being* (Balci & Aghazadeh, 2004). Specifically, Henning et al. (2010) found that measures of productivity and eye, leg and foot comfort increased when computer operators took short breaks that included stretching exercises. In addition, Balci and Aghazadeh (2004) found that movement breaks improved performance on a data entry task and reduced discomfort experienced throughout the completion of the task. Both studies discussed above share the following commonality: short breaks from operating a computer lead to performance improvements in subsequent computer tasks.

Given the global shift to online learning that has occurred since the onset of the COVID-19 pandemic, it seems that interventions designed to improve well-being for computer-users may be of particular importance. For university students specifically this issue remains critical, as it has been shown that university students reportedly engage in significantly higher levels of sedentary time when compared to the general young adult population (Castro et al., 2020). On average, it has been suggested that university students will spend *7.29 hours of time sedentary per day* - a number which rises to 9.82 hours if measured using an accelerometer. This level of accumulation of sedentary time has been unequivocally "associated with increased risk for detrimental health outcomes" (Castro et al., 2020, p. 1) which begs the question—are movement breaks implemented during class time an effective mechanism for reducing sedentary time, and do university students feel that these breaks are beneficial on a physical, cognitive, and emotional level?

Current research on movement breaks in university classrooms does not provide a clear consensus on the effects of movement breaks on student well-being, focus, academic

performance, or physical health. However, research does exist to suggest that movement breaks may have positive impacts on attention during lecture. According to multiple studies, the tendency of university students to stay focused during a lecture declines as the lecture continues, which leads to decreases in memory performance (Bunce, Flens, & Neiles, 2010; Wammes, Seli, Cheyne, Boucher, & Smilek, 2016). To address this, Fenesi et al. (2018) launched a study that examined the impact of exercise breaks on university students. This study randomly divided 77 undergraduate students into three groups: an exercise break group, a non-exercise break group, and a no breaks group. The *exercise break group* performed an exercise break: 50-second calisthenic exercises separated by a 10-second break. The *non-exercise break* group played a visual-matching computer game, and the *no breaks group* had to sit through a lecture without any breaks. The students' heart rate (HR) was measured, and it was found that the *exercise break group's* HR was much higher than the other groups' following the intervention. Furthermore, the students completed a comprehension test in which the *exercise break group* had significantly higher scores. This study showed that physiological arousal increased with exercise breaks, and that these exercise breaks significantly increased students' on-task attention and memory for lecture material.

While the study discussed above suggests that movement breaks may be physiologically and cognitively beneficial for university students, a study on movement breaks by Hayes (2020) showed that while some university students found regular in-class exercise breaks to be a positive experience, others found them to be negative and distracting. Consequently, it seems that while addressing the potential physiological and cognitive benefits of movement breaks remains an ongoing discussion, it is equally important to consider how students might subjectively feel and respond to the implementation of movement breaks during class time.

Given that little research currently exists on the overall perspectives of students on movement breaks in university classrooms, the purpose of our proposed study is to explore student perspectives on the implementation of movement breaks during scheduled class time. Due to the COVID-19 pandemic, which has necessitated the transition of in-person classes to online platforms for students across the globe, our research also addresses opinions and perspectives on movement breaks offered during online classes. Our study was designed specifically to address the following research questions: 1) do university students feel that movement breaks are a valuable use of class time? 2) do university students feel that movement breaks contribute positively to their focus, physical comfort, and overall sense of well-being? 3) what type of activities would university students prefer to engage in during movement breaks? and 4) how can formats or models of movement breaks currently in use be adapted or improved to better meet the needs and preferences of students and faculty?

Methods & Rationale

Our research is focused specifically on students at the University of British Columbia (UBC). Guided movement breaks at UBC generally consist of five minutes of varied types of physical activity (which include dancing, yoga, stretching, and any other type of anaerobic or aerobic exercise designed to increase HR, mobility, and strength) and are implemented during scheduled lectures. In order to address the research questions outlined above a survey (Appendix B) was utilized to collect data from a sample of the current UBC undergraduate population. A survey was selected as the method of data collection as it allowed information on student perspectives to be gathered from a large sample of students with relative ease—in comparison to interviews, surveys are able to reach a greater number of individual members of the identified

population (Jones, Baxter, & Khanduja, 2013) and the use of a survey allowed us to generate a clearer image of how the UBC student body overall feels about movement breaks.

The survey began with demographic questions that asked students to identify their faculty, year level, and gender identity (Appendix B, questions 2-4). These questions were designed to determine whether these factors might influence student's perspectives on movement breaks. Questions 5 and 6 (Appendix B) provided a definition for movement breaks and were designed to determine whether students had participated in movement breaks before, and in what classes they had previously participated. Questions 7-12 (Appendix B) were Likert-type questions used to quantitatively measure personality traits, character, and attitudes (Boone & Boone, 2012). These 6 questions were designed to gather information on how students felt subjectively about movement breaks, and addressed whether movement breaks were considered a valuable use of class time, whether they alleviate physical discomfort, whether they improve focus, whether they contribute to engagement with healthy behaviour outside the classroom, and whether students would appreciate more frequent and consistent implementation of movement breaks during class time. Questions 13 and 14 (Appendix B) concerned the format of movement breaks and inquired about preferred timing of implementation and preferred types of activities. Question 15 (Appendix B) addressed the relevance of movement breaks in online courses relative to those conducted during in-person lectures. The information gathered from questions 1-15 were supplemented by a written-in response (Question 16, Appendix B) which inquired about likes, dislikes and further recommendations on how to improve and implement movement breaks in the future.

Data collection for the survey closed on April 5th, 2021. Data was collected and recorded via Qualtrics—a survey tool approved by UBC that complies with the BC Freedom of

Information and Protection of Privacy Act (University of British Columbia, 2021). Responses were primarily analyzed using reports generated by Qualtrics. Descriptive statistics were utilized to summarize trends in our survey responses, and reported statistics included measures of mean, median, and mode to indicate central tendency as well as standard deviation and range to indicate variance in. Recommendations were formulated based on the trends identified through descriptive statistical analysis, as well as on the content of open-ended responses provided by study participants in question 16 (Appendix B).

Our inclusion criteria specified that any consenting undergraduate students enrolled at UBC during the period of the study were eligible to participate, and our aim was to recruit a minimum of 40 participants. UBC undergraduate students were invited to participate regardless of whether or not they had any experiences with movement breaks previously, as this allowed us to better understand whether a smaller or larger percentage of students in the sample had previously engaged in movement breaks. Our sampling frame included undergraduate students recruited via a research poster uploaded to the UBC Kinesiology website, and through announcements made in the classes in which we (the student researchers) were enrolled. In order to recruit study participants from classes each student researcher contacted our professors by email, provided a recruitment poster, and asked professors to make an announcement about our study via Canvas or Zoom. An anonymous Qualtrics survey link was provided in these announcements which ensured that no identifying information from study participants would be required to complete the survey. Since our population was defined as current UBC undergraduate students, any non-current students were excluded from the study. Participants who completed the survey were compensated with an entry to a prize draw to receive either a Fitbit or a $25 CAD gift card to the UBC bookstore or food services.

Results and Discussion

A total of 67 participants completed the survey. The reported year level of participants ranged from second to ≥fifth year (0% 1st year; 25.76% 2nd year; 37.88% 3rd year; 21.21% 4th year; 15.15% ≥5th year) with the majority of participants being women (65.15% women; 33.33% men; 1.52% preferred not to say). The faculty/major that study participants reported with the greatest frequency was Kinesiology (89.55%), with the remaining 10.44% of participants reporting other faculties/majors (1.49% Civil Engineering; 1.49% Computer Engineering; 1.49% Food, Nutrition, and Health; 1.49% Nursing; 4.48% did not specify). The large number of Kinesiology students represented in this sample likely occurred as a result of the sampling frame, as study participants were primarily recruited by student researchers from their own undergraduate courses and many of these courses were administered by the school of Kinesiology. Of the total 67 participants, 37 (56.92%) reported previously participating in a guided movement break during class-time at UBC, while the remaining 28 participants (43.08%) reported that they had not previously participated in guided movement breaks.

As previously stated, this study was designed to provide insight into four main research questions with the hope that the information gathered can be used to help inform campus policies and initiatives surrounding movement breaks in the future. The first of these research questions was the following: are movement breaks perceived by students as a valuable use of class time? Given the volume of content that many professors have to work through during a course or a single class the value of a movement break may be debated at the administrative and faculty level, however, the students in our study voiced overwhelming support for the notion that movement breaks are a valuable use of time. Question 8 (Appendix B) asked students whether they considered movement breaks to be a valuable use of class time, and a total of 76.57% of students either “strongly” agreed (42.19%) or “somewhat” agreed (34.38%) that movement

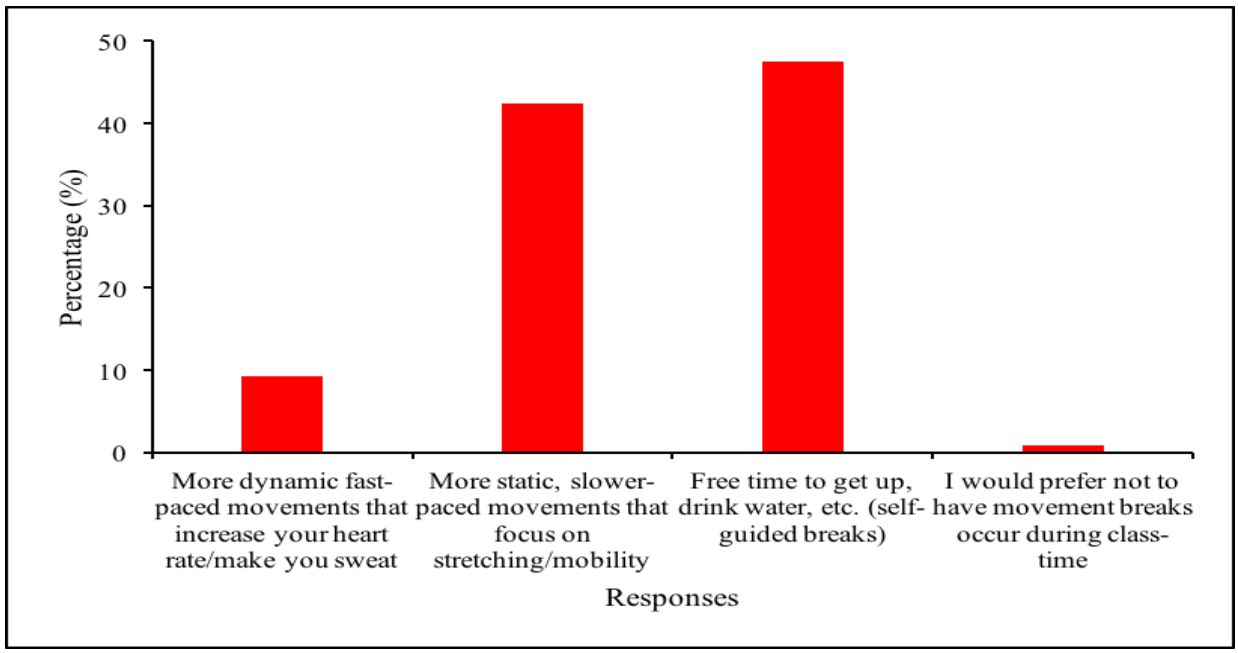
breaks are valuable. While a further 10.94% of participants neither agreed nor disagreed with the given statement, only 6 of our 67 participants (9.38%) “somewhat” disagreed that movement breaks are a valuable use of class time, and only 2 of the 67 participants (3.13%) “strongly” disagreed with the statement. Responses to question 13 (Appendix B) provided further insight into the value that university students place on movement breaks; 41.27% of students strongly agreed that movement breaks should be implemented more frequently and consistently during lectures, while a further 33.33% somewhat agreed with the given statement. Overall, these results suggest that a majority of students feel movement breaks are a valuable use of class time, and that most students would appreciate greater frequency and consistency of scheduled breaks during lectures. Gender identity and year level were not found to have a relevant influence on the value placed on movement breaks by students.

While movement breaks in general were regarded as valuable by the majority of our sample a significant amount of variance existed in the types of movement breaks and activities preferred by study participants. When asked about the types of movement breaks that students preferred (Question 15, Appendix B), 42.37% of students indicated a preference for movement breaks that were slower-paced and focused on stretching and mobility; 47.46% of students preferred self-guided breaks (which include getting out of their chairs, drinking water, or just having a break from the class) and 9.32% of respondents preferred faster-paced movement breaks designed to increase your heart rate. Only 0.85% of students preferred not to have movement breaks scheduled during class time at all (Figure 1). Interestingly, among the students that either strongly agreed or somewhat agreed that movement breaks helped them focus more in class or helped improve their overall sense of well-being, there was little discernible difference

between the preference for self-guided breaks versus breaks that focus on stretching and mobility (Figure 2).

Figure 1.

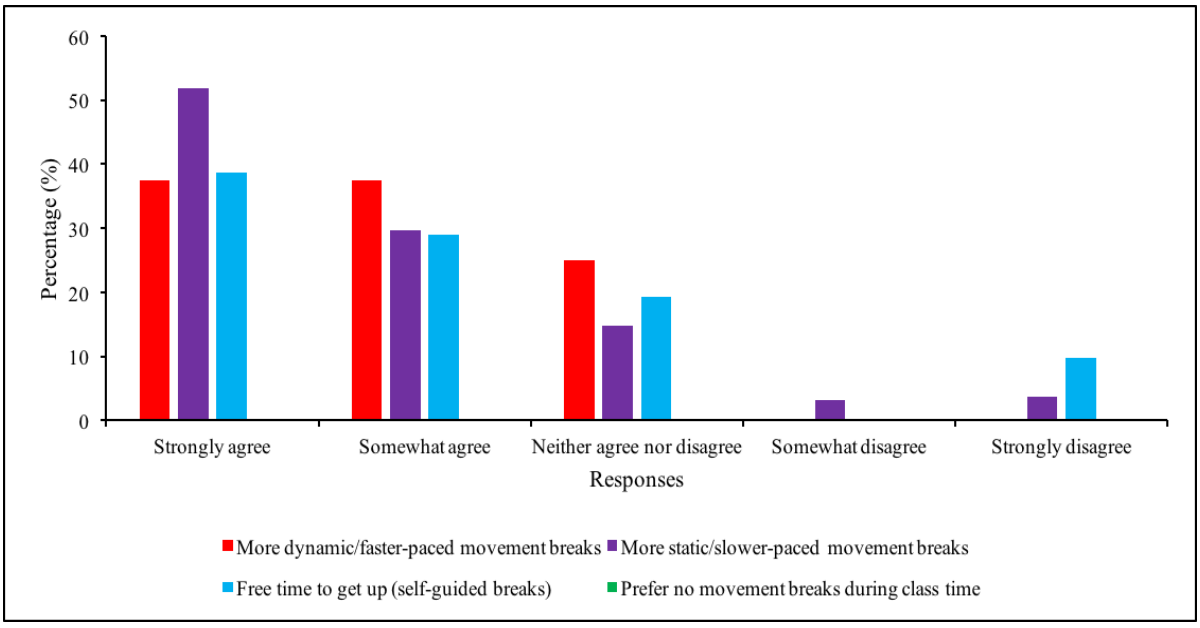
Preference On Types of Movement Breaks



*Note***.** Responses to question 15 in the survey: Q15 - I feel that movement breaks should include the following (select all that apply). The x-axis shows the different options students could have chosen (more dynamic fast-paced movements that increase heart rate, more slower-paced movements that focus on stretching/mobility, free time for self-guided breaks, or would not prefer to have movement breaks during class time) as an answer and the y-axis is the percent of students who chose that response. Out of all the responses (n=118), 9.32% of students preferred more dynamic, faster-paced movement breaks that increase your heart rate/make you sweat, 42.37% of students preferred more static, slower-paced movement breaks that focus on stretching/mobility, 47.46% of students preferred free time to get up to conduct their own self-guided break, and 0.85% preferred not to have movement breaks occur during class time. These results suggest that whether the students favor some sort of break being provided in class and prefer that movement break either be a slower-paced movement break focusing on mobility/stretching or a self-guided break.

Figure 2

Preference On The Types Of Movement Breaks When Factoring In Perceived Benefits To Overall Well-Being Due To Movement Breaks



Note. Responses to question 11 in the survey split by responses to question 15: Q11 - I feel that participating in a movement break improves my overall sense of well-being during a lecture; Q15 - I feel that movement breaks should include the following (select all that apply). The x-axis shows the different options students could have chosen (strongly agree, somewhat agree, neither agree nor disagree, somewhat disagree and strongly disagree) when asked about their overall sense of well-being and the y-axis is the percent of students that chose that response. The different coloured bars represent the different percentages of students that answered whether they preferred faster paced movement breaks (red), slower-paced movement breaks (purple), self-guided breaks (blue), or preferred no break (green). Students were grouped depending on their answers to the question of if they felt their overall well-being improved because of movement breaks. Of the 29 students that strongly agreed with movement breaks providing an overall sense of well-being, 3 (10.34%) preferred more dynamic, faster-paced movement breaks that raise your heart rate, 14 (48.28%) preferred slower-paced static movement breaks, 12 (41.38%) preferred self-guided breaks such as getting free time to get up or get a drink. Of the 20 students that somewhat agreed that movement breaks provided an overall sense of well-being, 3 (15%) preferred a more dynamic, faster-paced

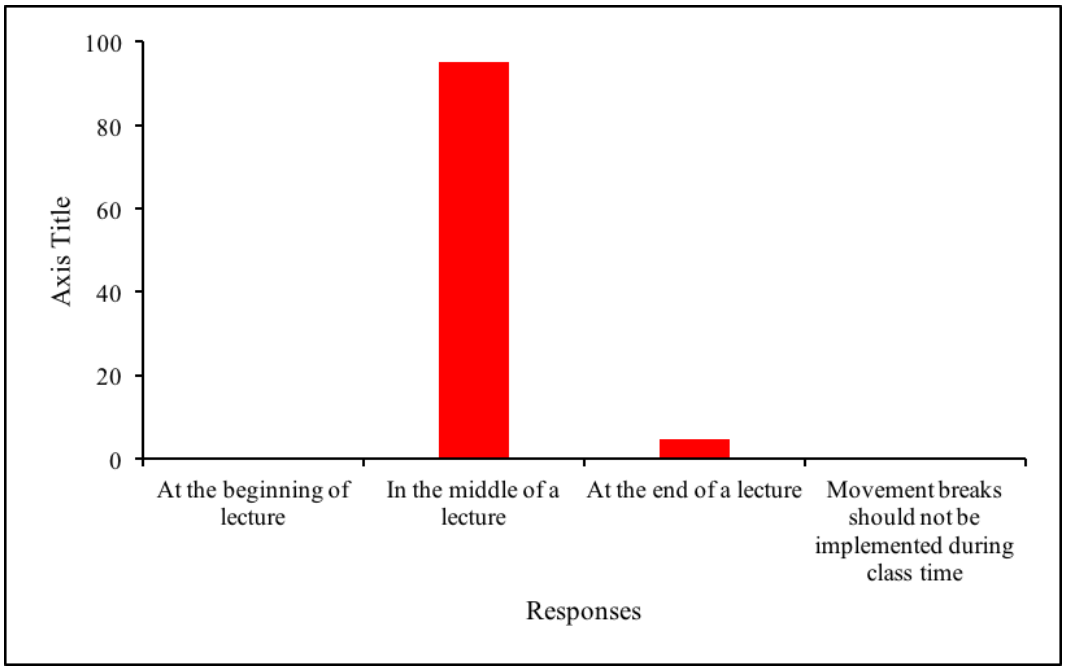
movement break, 8 (40%) preferred slower movement breaks focusing on mobility/stretching and 9 (45%) preferred self-guided breaks. Of the 12 students that neither agreed nor disagreed that movement breaks provided an overall sense of well-being, 2 (16.67%) preferred a more dynamic, faster-paced movement break, 4 (33.33%) preferred slower movement breaks focusing on mobility/stretching and 6 (50%) preferred self-guided breaks. One student who somewhat disagreed that movement breaks provide an overall sense of well-being would rather have a self-guided break during class. Of the 4 students who strongly disagreed that movement breaks provided an overall sense of well-being, 3 (75%) preferred self-guided breaks while 1 (25%) preferred movement breaks that focused more on mobility/stretching. These results suggest that regardless of the sense of overall well-being that movement breaks provide, students vastly prefer either a slower static movement break focusing on stretching/mobility or some sort of self-guided break. Interestingly there is not a significant difference between which of these two types of breaks are preferred, even if students agreed that movement breaks contributed to their overall sense of well-being.

Survey responses also provided further insights into the format of movement breaks preferred by students. Based on responses to question 16 (Appendix B) regardless of the type of break offered, 95.16% of respondents indicated a preference for movements breaks scheduled during the ***middle of the lecture***. Only 4.84% of students indicated that they would prefer the break to occur at the end of a lecture, and ***0%*** of respondents indicated they would like to begin scheduled lectures with movement breaks (Figure 3). An additional key piece of information gathered concerning the format and design of movement breaks was that the majority of students only considered movement breaks to be beneficial in classes that are ***120 minutes or longer in length***. Students were able to select multiple responses when asked about the length of classes wherein movement breaks are considered to be beneficial, however, only 15.08% of students indicated that movement breaks are beneficial in classes that are 50 minutes long (Figure 4). While we did not inquire specifically why students did not find movement breaks in 50 minutes to be beneficial, certain open-ended responses indicated that breaks can sometimes be distracting and may detract from course content (Appendix B Question 18). Overall, these results suggest

that professors and administrators may want to avoid scheduling movement breaks in 50-minute lectures and should instead focus their efforts on facilitating breaks for students in lectures that are 120 minutes or longer. These results also suggest that students preferred to be given the option of either slower-paced, mobility focused movement breaks or simply given the opportunity for self-guided breaks. Open-ended responses indicating a desire for self-guided breaks was common; many students simply expressed their desire for opportunities to get out of their chairs and move around to help refocus, while other open-ended responses indicated that having the option to pick between a guided break or self-guided break would be the best solution (Appendix B Question 18).

Figure 3

Preference On Timing of Movement Breaks

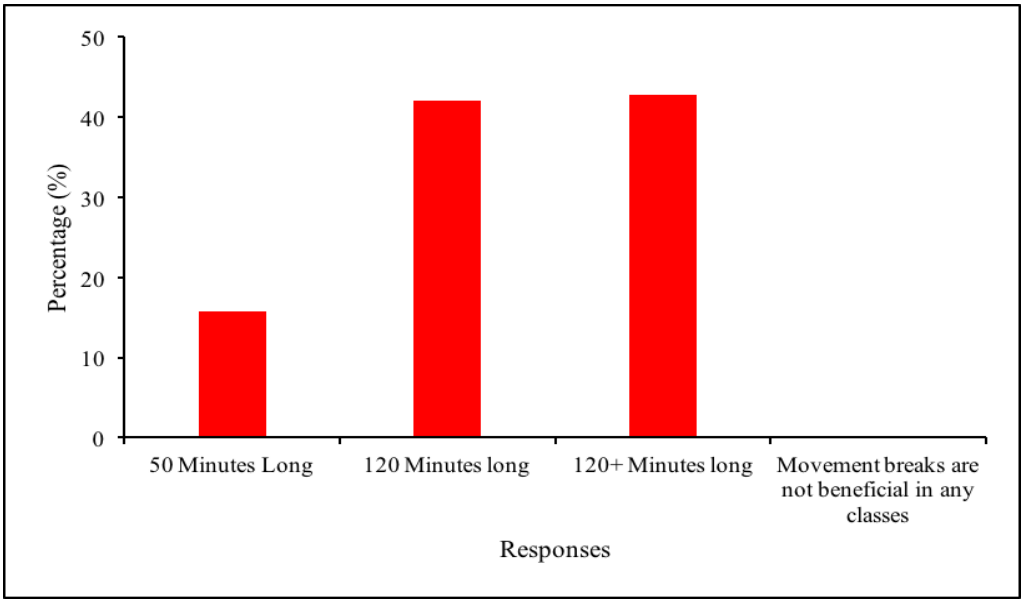


Note. Responses to question 16 in the survey: Q16 - I would prefer movement breaks to be implemented: The x-axis shows the different types of responses that the students could choose from. The y-axis shows the percentage of students who chose the specific option shown on the x-axis. Of the students who responded to this question in the

survey (n=62), 0% preferred movement breaks to be implemented at the beginning of lecture, 95.16% of students preferred movement breaks to be included in the middle of the lecture, 4.84% of students answered that they would rather have movement breaks at the end of lecture and 0% of students thought movement breaks should not be implemented during class time. These results suggest that the vast majority of students prefer movement breaks or some sort of break to be had during the middle of a lecture.

Figure 4.

Preferred Length of Classes To Implement Movement Breaks In



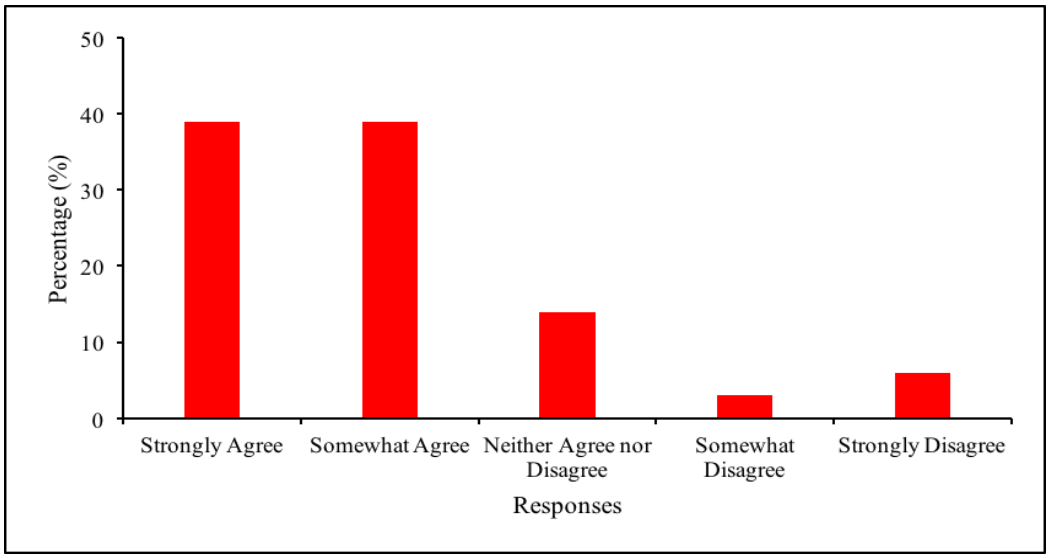
Note. Responses to question 14 of the survey: Q14 - I feel that movement breaks would be beneficial in all classes that are (select all that apply). The x-axis shows the different types of responses the students could select from. The y-axis shows the percentage of students who chose the specific option shown on the x-axis. Of the 67 student who responsed, there were 126 responses. Of the 126 responses, 15.08% preferred movement breaks in classes 50 minutes or longer, 42.06% of students preferred movement breaks in classes that were 120 minutes longer and 42.86% of students preferred movement breaks in classes that were longer than 120 minutes. These results suggest that the majority of students would prefer movement breaks to happen in classes that are longer.

Questions 9 to 12 (Appendix B) were answered only by students who had previously participated in movement breaks and the results showed the following trends: students who participated in movement breaks reported improved focus, feeling better (Figure 5; Figure 6),

and an improvement in overall sense of well being during lecture time (Figure 7). Specifically, a total of 78% of participants agreed that movement breaks helped them focus on class material, 67% of participants agreed that movement breaks help alleviate physical discomfort, and 71% of participants agreed that movement breaks improved their overall sense of well-being. Furthermore, 60% of participants agreed that movement breaks contribute to engagement in healthy behaviours outside the classroom, suggesting that the benefits of movement breaks extend beyond the classroom and positively influence other aspects of student life. The survey results are in line with the research summarized in the literature review suggesting that short activity breaks can reduce physical discomfort (Appendix B Question 10) and improve focus and performance (Appendix B Question 9). Furthermore, relatively few participants (ranging from 8% to 16% depending on the question) either somewhat or strongly disagreed with any of the statements given in questions 9-12 (Figure 5; Figure 6; Figure 7). No significant trends were observed in questions 9-12 regarding gender identity and year level. Overall, results clearly indicate that the majority of study participants derived benefits from movement breaks.

Figure 5

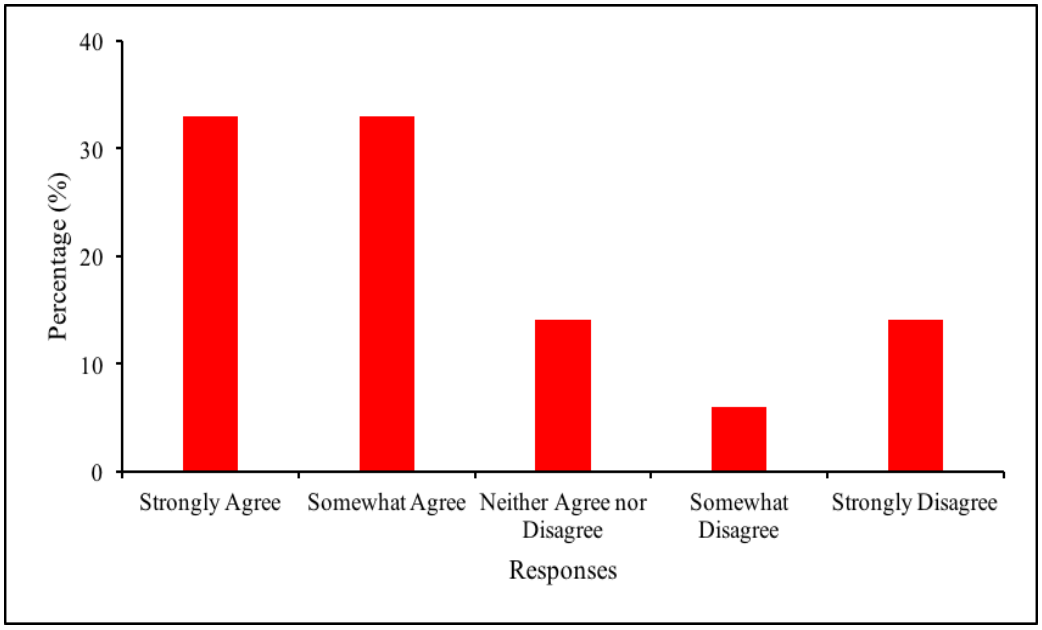
Perceived Ability To Focus In Lecture After Movement Break



Note. Responses to question 9 in the survey: Q9 - I feel more able to focus on lecture material after participating in a movement break. The x-axis shows the different types of responses that the students could choose from. The y-axis shows the percentage of students who chose the specific option shown on the x-axis. Only those students who participated in movement breaks previously answered this question. In total there were 36 students who responded to this question. Of the responses by students, 39% strongly agreed, 39% somewhat agreed, 14% neither agreed nor disagreed, 3% somewhat disagreed and 6% strongly disagreed. These results suggest that movement breaks improve respondents' ability to focus during lecture.

Figure 6

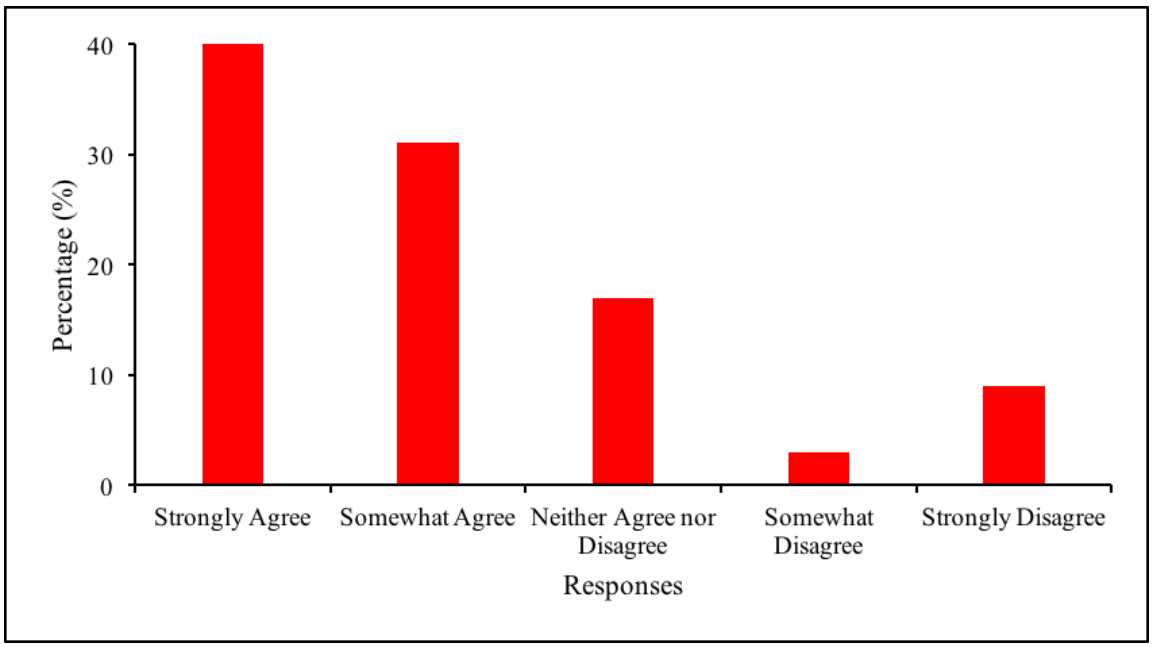
Perceived Alleviation of Physical Discomfort After Movement Break



Note. Responses to question 10 in the survey: Q10 - I feel some alleviation of physical discomfort after participating in a movement break. The x-axis shows the different types of responses that the students could choose from. The y-axis shows the percentage of students who chose the specific option shown on the x-axis. Only those students who participated in movement breaks previously answered this question. In total there were 36 students who responded to this question. Of the student responses, 33% strongly agreed, 33% somewhat agreed, 14% neither agreed nor disagreed, 6% somewhat disagreed, and 14% strongly disagreed. These results suggest that movement breaks alleviate some of respondents' physical discomfort.

Figure 7

Movement Break Influence on Sense of Wellbeing



Note. Responses to question 11 in the survey: Q11 - I feel that participating in a movement break improves my overall sense of well-being during a lecture. The x-axis shows the different types of responses that the students could choose from. The y-axis shows the percentage of students who chose the specific option shown on the x-axis. Only those students who participated in movement breaks previously answered this question. In total there were 35 students who responded to this question. Of the student responses, 40% strongly agreed, 31% somewhat agreed, 17% neither agreed nor disagreed, 3% somewhat disagreed, and 9% strongly disagreed. These results suggest that movement breaks improve respondent overall sense of well-being.

Given that that spread of COVID-19 over the past academic year (2020-2021) has necessitated the transition of lecture formats from physical to online environments, it seemed particularly important to explore how perspectives and experiences of movement breaks might differ between online and physical settings. Existing research on sedentary behaviour during the pandemic has revealed that many people have seen increases in sedentary behaviour since the onset of COVID-19 (Bates et al., 2020; Sañudo, Fennell & Sánchez-Oliver, 2020) and data

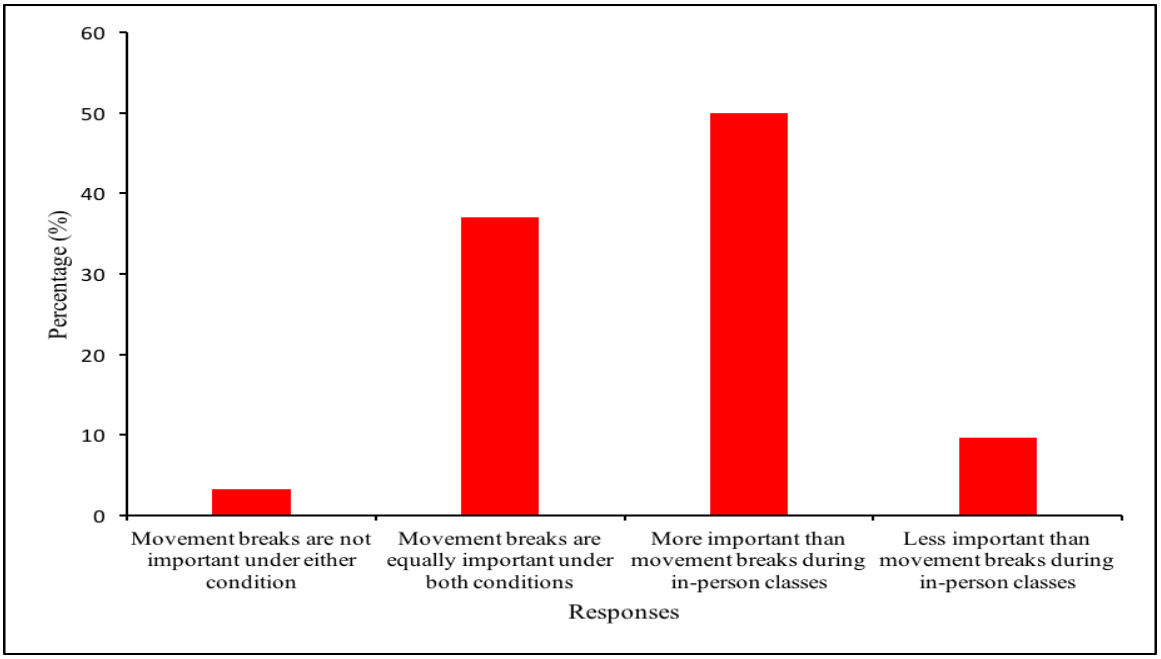
collected from our study seems to reflect the increased need for movement opportunities for those who are now working and learning from home (Figure 8). In fact, 51.67% of our study sample felt that given the shift to online lectures necessitated by COVID-19, movement breaks are now ***more important*** than they were during in-person classes. While a further 35% of respondents felt that movement breaks are equally important in both online and in-person settings, only 10% felt they are now less important, and only 3.33% respondents felt that movement breaks are not important under either circumstance. When the responses to this question (question 17, Appendix B) were analyzed relative to demographic information provided at the beginning of the survey, neither gender nor year level seemed to impact the nature of given responses.

The importance of movement breaks during online lecture formats was also spoken to by study participants in their open-ended responses. For instance, one study participant noted that it is helpful to have an opportunity to move during online classes, as this may break up the class and allow students to refocus. Another student response provided a perspective that speaks to why movement breaks may be more important during the online lectures, making the point that in the current online environment there are no longer walks between classes on the UBC campus where students get the opportunity to get additional steps. Therefore, implementing movement breaks into longer classes in the online environment may be an important mechanism through which recoup the incidental physical activity that students have lost through enrollment in online courses. Additionally, a quote taken from a survey response proposes a simple way in which movement breaks may be successfully implemented, specifically within the online learning environment necessitated by COVID-19: “I think when the professor is sharing their screen (on zoom) and is playing a guided stretch or movement video, it encourages the rest of the class to

follow along whether their camera is on or off." (Appendix B Question 18). In summary, it seems that online learning may have reduced the amount that students are able to get up and move during their school days, and movement breaks may be a simple solution to reducing the amount of sedentary time that students are obliged to engage in while participating in online learning.

Figure 8.

Movement Breaks in Online Lectures



Note. Responses to question 17 in the survey: Q17 - Since the transition to online lectures necessitated by COVID-19, I feel that movement breaks may be. The x-axis shows the different types of responses that the students could choose from. The y-axis shows the percentage of students who chose the specific option shown on the x-axis. Of the 67 students who took the survey, 62 responded to this question. Of the responses, 3.23% of students thought movement breaks were not important under either condition, 37.10% of students thought movement breaks were equally important under both conditions, 50.00% of students thought online movement breaks were more important than in-person classes and 9.68% thought online movement breaks were less important than movement breaks during in-person classes. These results suggest that most students believe movement breaks are equally or more important with the transition to online lectures.

Recommendations & Conclusion

Based on the results of data analysis four immediately actionable recommendations and one long-term recommendation were identified. Firstly, the majority of students agreed that movement breaks should be implemented more frequently and consistently; therefore, we recommend that initiative be taken to promote the implementation of movement breaks as part of regular class schedules across campus. Secondly, because the majority of students expressed that movement breaks are most valuable in classes that are 120 or 120+ minutes in length, it is recommended that movement breaks should be prioritized in longer classes, and that resources currently spent conducting movement breaks in 50 minute classes should be reallocated; it is also highly recommended that any scheduled movement breaks be implemented in the middle of class, and not at the beginning or end of lectures. Thirdly, students showed a preference for self-guided movement breaks or slow-paced movement breaks that focus on mobility/stretching. This suggests that students may be less inclined to participate in faster-paced breaks, and it is recommended that the types of activities offered in guided breaks reflect the preference for slower, mobility-focused breaks. Finally, a majority of students expressed that movement breaks are more important during online lectures than they are during in-person lectures. Therefore, we recommend that campus partners prioritize the development of guidelines and resources that support the implementation of movement breaks in online lectures.

While the recommendations outlined above represent actions that can be taken over the short-term, the ongoing promotion of campus health initiatives remains an important mechanism through which the health and well-being of UBC students can be supported and improved. Ultimately, it is recommended that ongoing efforts are made to collaborate with stakeholders within the UBC community to work towards the prioritization of movement breaks within

classes at UBC. Specifically, in the long-term we recommend that MoveUBC work with UBC program administrators and UBC professors to implement a policy outlining mandatory guidelines for movement breaks in classes that are 120 or more minutes in length. The development of this type of policy not only reflects the needs and perspectives of students as outlined in this study, but also reflects the stated values of UBC. As one participant wrote, "UBC preaches this ideal that it believes in our well-being yet makes us [sic] sit for up to 2 hours and 50 minutes at a time with sometimes no break. I would love to see movement breaks implemented across all faculties." (Appendix B)

Limitations

While this study provides relevant insight into the perspectives of UBC students on movement breaks during both in-person and online lectures, there are some identifiable limitations to the study design that indicate a need for future research in this area. The first of these limitations was the relatively small sample size (N=67) of the study, which was comprised almost entirely of Kinesiology students (89.55%). The homogenous nature of our sample greatly limits the ability to generalize our findings to the UBC population at large, given that Kinesiology students represent a specific subset of the UBC population and may have qualities and perspectives that differ from students in other faculties. In addition to this, we did not receive any responses from 1st year students and further research is needed to explore the perspectives of this demographic. While our data did not indicate that year level affected the types of responses given to survey questions, it is possible that the experiences of movement breaks in first year courses may be different than those experienced in upper years.

Despite these identified limitations, the data collected in this study also highlights important avenues for future research. For instance, because our data indicated that students

considered movement breaks to be more important during online lectures than in-person lectures, further research should be conducted to better understand how the transition to online lectures necessitated by COVID-19 has affected students' health and wellness. It is possible that qualitative methods could be used to shed further light on the behaviours, needs, and experiences of students participating in online classes. Additionally, because our study only collected data from students, future research in this area should focus on identifying barriers to the implementation of movement breaks at the faculty and administrative level. The ongoing promotion of health initiatives and the potential implementation of regularly scheduled movement breaks in lectures across campus will require the efforts and cooperation of professors and administrators. Moreover, the formulation of effective strategies for implementing consistent movement breaks in classroom settings will require effort and input from stakeholders at multiple levels.

References

Balci, R., & Aghazadeh, F. (2004). Effects of exercise breaks on performance, muscular load, and perceived discomfort in data entry and cognitive tasks. *Computer & Industrial Engineering, 46*(3), 399-411. https://doi.org/10.1016/j.cie.2004.01.003

Bates, L. C., Zieff, G., Stanford, K., Moore, J. B., Kerr, Z. Y., Hanson, E. D., Gibbs, B. B., Kline, C. E., & Stoner, L. (2020). COVID-19 impact on behaviors across the 24-hour day in children and adolescents: Physical activity, sedentary behavior, and sleep. *Children, 7*(9), 139. doi: 10.3390/children7090138

Boone, H. N. & Boone, D. A. (2012). Analyzing Likert data. *Journal of Extension, 50*(2), Article 2TOT2.

Bunce, D. M., Flens, E. A., & Neiles, K. Y. (2010). How long can students pay attention in class? A study of student attention decline using clickers. *Journal of Chemical Education*, *87*(12), 1438-1443. https://doi.org/10.1021/ed100409p

Castro, O., Bennie, J., Vergeer, I., Bosselut, G., & Biddle, S.J.H. (2020). How Sedentary Are University Students? A Systematic Review and Meta-Analysis. *Prevention Science* 21, 332–343. https://doi.org/10.1007/s11121-020-01093-8

Dempsey, P.C., Biddle, S.J.H., Buman, M.P., Chastin, S., Ekelund, U., Friedenreich, C.M., Katzmarzyk, P.T., Leitzmann, M.F., Stamatakis, E., van der Ploeg, H.P., Willumsen, J., & Bull, F. (2020). New global guidelines on sedentary behaviour and health for adults: broadening the behavioural targets. *Internal Journal of Behavioral Nutrition and Physical Activity,* 17, 151. https://doi.org/10.1186/s12966-020-01044-0

Dempsey, P.C., Owen, N., Yates, T.E., Kingwell, B.A., & Dunstan, D.W. (2016). Sitting less and moving more: Improved glycaemic control for type 2 diabetes prevention and

management. *Current Diabetes Reports, 16*, 358-366. doi: 10.1007/s11892-016-0797-4

Edwardson C.L., Gorely T., Davies M.J., Gray L.J., Khunti K., Wilmot, E.G., Yates, T., & Biddle, S.J. (2012). Association of Sedentary Behaviour with Metabolic Syndrome: A Meta-Analysis. *PloS One*, 7(4): e34916. https://doi.org/10.1371/journal.pone.0034916

Egger. F., Conzelmann, A., & Schmidt, M. (2018). The effect of acute cognitively engaging physical activity breaks on children's executive functions: Too much of a good thing? *Psychology of Sport and Exercise*. *36*, 178-186. https://doi.org/10.1016/j.psychsport.2018.02.014

Egger, F., Benzing, V., Conzelmann, A., & Schmidt, M. (2019). Boost your brain, while having a break! The effects of long-term cognitively engaging physical activity breaks on children's executive functions and academic achievement. *PloS One, 14*(3): e0212482. https://doi.org/10.1371/journal.pone.0212482

Fedewa, A.L., Ahn, S., Erwin, H., & Davis, C. (2015). A randomized controlled design investigating the effects of classroom-based physical activity on children's fluid intelligence and achievement. *School Psychology International, 36*(2), 135-153. doi: 10.1177/0143034314565424

Fedewa, A.L., Fettrow, E., Erwin, H., Ahn, S., & Farook, M. (2018). Academic-Based and Aerobic-Only Movement Breaks: Are There Differential Effects on Physical Activity and Achievement? *Research Quarterly for Exercise and Sport*, *89*(2), 153-163. https://doi.org/10.1080/02701367.2018.1431602

Fenesi, B., Lucibello, K., Kim, J. A., & Heisz, J. J. (2018). Sweat so you don't forget: Exercise breaks during a university lecture increase on-task attention and learning. *Journal of Applied Research in Memory and Cognition*, *7*(2), 261-269.

https://doi.org/10.1016/j.jarmac.2018.01.012

Hayes, S. M. (2020). Sweat so you don't forget: Establishing the feasibility of exercise breaks during university lectures. doi: 10.31234/osf.io/xgz7w.

Henning, R.A., Jacques, P., Kissel, G.V., Sullivan, A.B., & Alteras-Webb**,** S.M. (2021). Frequent short rest breaks from computer work: effects on productivity and well-being at two field sites. *The International Journal of Research and Practice in Human Factors and Ergonomics, 40*(1), 78-91. https://doi.org/10.1080/001401397188396

Jones, T. L., Baxter, M. A. J., & Khanduja, V. (2013). A quick guide to survey research. *The Annals of The Royal College of Surgeons of England*, *95*(1), 5-7. doi: 10.1308/003588413X13511609956372

Peddie, M.C., Bone, J.L., Rehrer, N.J., Skeaff, C.M., Gray, A.R., & Perry, T.L. (2013). Breaking prolonged sitting reduces postprandial glycemia in healthy, normal-weight adults: a randomized crossover trial. *The American Journal of Clinical Nutrition, 98*(2), 358-366. https://doi-org.ezproxy.library.ubc.ca/10.3945/ajcn.112.051763

Rezende L.F.M.d., Rodrigues Lopes M., Rey-López J.P., Matsudo V.K.R., & Luiz O.d.C. (2014). Sedentary Behavior and Health Outcomes: An Overview of Systematic Reviews. *PloS One 9*(8): e105620. https://doi.org/10.1371/journal.pone.0105620

Sañudo, B., Fennell, C., & Sánchez-Oliver, A. J. (2020) Objectively-assessed physical activity, sedentary behavior, smartphone use, and sleep patterns pre- and during-COVID-19 quarantine in young adults from Spain. *Sustainability, 12*(15), 5890. doi: 10.3390/su12155890

UBC Centre for Teaching, Learning and Technology Equity and Inclusion Office. (2019). *Equity and inclusion in data collection: General guidelines on asking for demographic*

information.

University of British Columbia. (2021). *Health Promotion and Physical Activity*. KIN 464, 001.

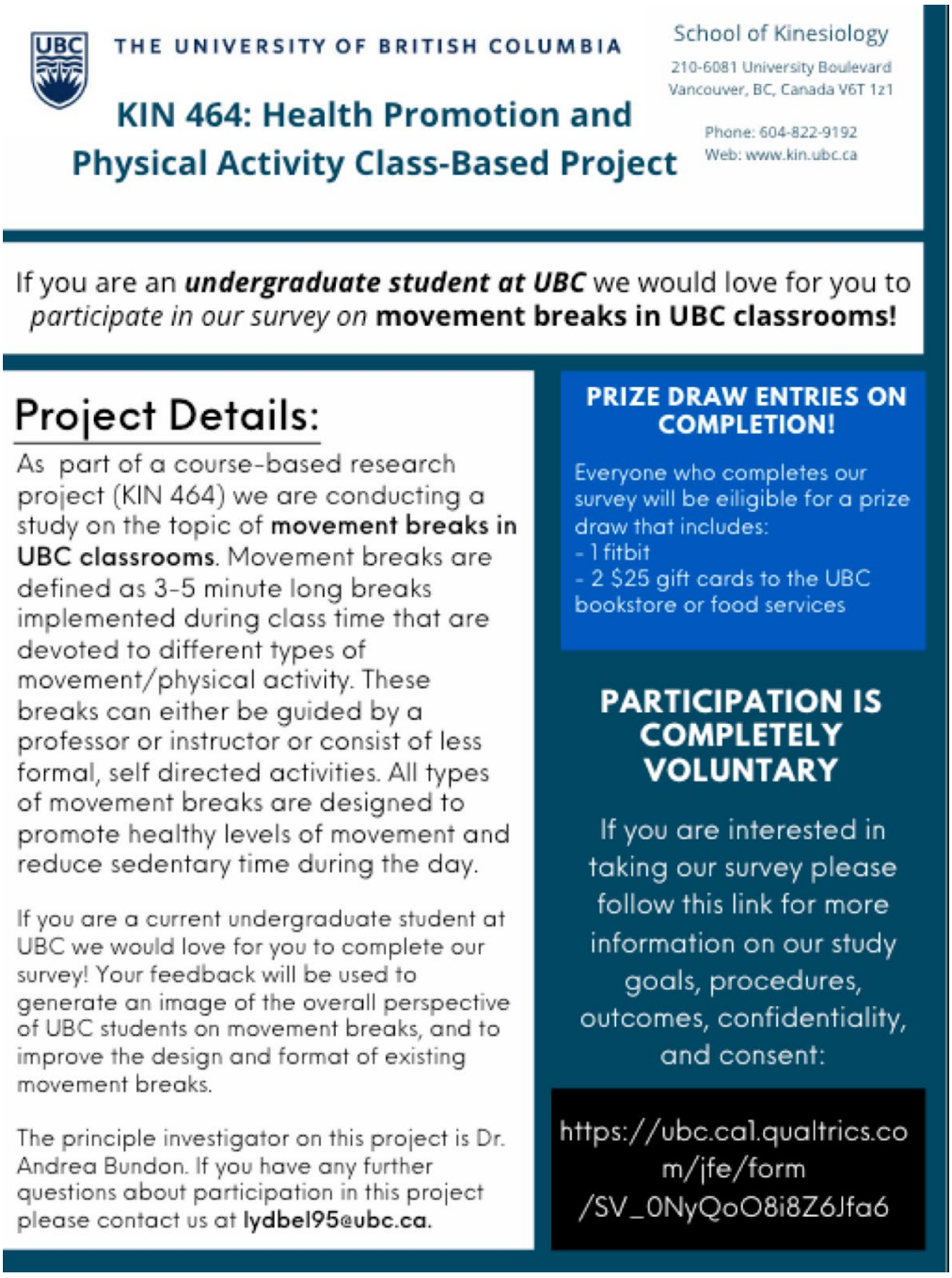
Wammes, J. D., Seli, P., Cheyne, J. A., Boucher, P. O., & Smilek, D. (2016). Mind wandering during lectures II: Relation to academic performance. *Scholarship of Teaching and Learning in Psychology*, *2*(1), 33. https://doi.org/10.1037/stl0000055

Winkler, E.A.H., Chastin, S., Eakin, E.G., Owen, N., LaMontagne, A.D., Moodie, M., Dempsey, P.C., Kingwell, B.A., Dunstan, D.W., & Healy, G.N. (2018). Cardio-metabolic impact of changing sitting, standing, and stepping in the workplace. *Medicine and Science in Sports and Exercise, 50*(3), 516-524. doi: 10.1249/MSS.0000000000001453

Appendix A

Recruitment Poster Link: https://www.canva.com/design/DAEY-O3fYTY/L1xKKh-1NxSX7QXPvx8Dxw/view?utm_content=DAEY-O3fYTY&utm_campaign=designshare&utm_medium=link&utm_source=publishsharelink

Recruitment Poster:



Appendix B

Survey Link: https://ubc.ca1.qualtrics.com/jfe/form/SV_0NyQoO8i8Z6Jfa6

Survey Questions:

1) Are you a student currently enrolled in an undergraduate program at UBC?
    a. Yes
    b. No

2) Please indicate your faculty/major:
    a. [insert text]

3) Please indicate your current year level:
    a. 1st year
    b. 2nd year
    c. 3rd year
    d. 4th year
    e. 5th + year

4) If you are comfortable to do so, please indicate your gender identity:
    a. Man
    b. Woman
    c. Non-binary/third gender
    d. Two-spirit
    e. Other
    f. Prefer not to say

5) Guided movement breaks are defined as 3-5-minute-long breaks during a lecture session that are devoted to different types of movement/physical activity. Guided movement breaks are led by an instructor, professor, or student who directs the class in performing movement activities. Have you previously participated in a guided movement break during class-time at UBC?
    a. Yes
    b. No

6) Please indicate in which class (or multiple classes) you have previously participated in guided movement breaks:
    a. [insert text]

Please rate your level of agreeance with the following statements:

7) I feel that movement breaks are a valuable use of class time.
    a. Strongly Agree
    b. Somewhat Agree
    c. Neither Agree nor Disagree
    d. Somewhat Disagree
    e. Strongly Disagree

8) I feel more able to focus on lecture material after participating in a movement break.*
    a. Strongly Agree
    b. Somewhat Agree
    c. Neither Agree nor Disagree
    d. Somewhat Disagree
    e. Strongly Disagree

9) I feel some alleviation of physical discomfort after participating in a movement break.*
    a. Strongly Agree
    b. Somewhat Agree
    c. Neither Agree nor Disagree
    d. Somewhat Disagree
    e. Strongly Disagree

10) I feel that participating in a movement break improves my overall sense of well-being during a lecture.*
    a. Strongly Agree
    b. Somewhat Agree
    c. Neither Agree nor Disagree
    d. Somewhat Disagree
    e. Strongly Disagree

11) I feel that movement breaks contribute to engagement in healthy behaviour outside the classroom.*
    a. Strongly Agree
    b. Somewhat Agree
    c. Neither Agree nor Disagree
    d. Somewhat Disagree
    e. Strongly Disagree

12) I would like to see movement breaks implemented more frequently and consistently during lectures.
    a. Strongly Agree
    b. Somewhat Agree
    c. Neither Agree nor Disagree
    d. Somewhat Disagree
    e. Strongly Disagree

13) I feel that movement breaks would be beneficial in all classes that are (select all that apply):
    a. 50 minutes
    b. 120 minutes
    c. 120+minutes
    d. Movement breaks are not beneficial in any classes

14) I feel that movement breaks should include the following (select all that apply):
    a. More dynamic, fast-paced movements that increase your heart rate/make you sweat
    b. More static, slower paced movements that focus on stretching/mobility
    c. Free time to get up, drink water, etc. (self-guided breaks)
    d. You would prefer not to have movement breaks occur during class-time

15) I would prefer movement breaks to be implemented:
    a. At the beginning of a lecture
    b. In the middle of a lecture
    c. At the end of a lecture
    d. Movement breaks should not be implemented during class time

16) Since the transition to online lectures necessitated by COVID-19, I feel that movement breaks may be:
    a. More important than movement breaks during in-person classes
    b. Less important than movement breaks during in-person classes
    c. Movement breaks are equally important under both conditions
    d. Movement breaks are not important under either condition

18) Please include any additional thoughts or suggestions you may have on how to improve the implementation and experience of movement breaks in lectures at UBC.

*questions only answered by participants who answered yes to question 5 (having previously participated in a movement break)

Responses to question 18:

- "Allows student to have better focus in lectures and implementing them as a mandatory standing for 2min would even be beneficial"
- "encouragement from professors for a five minute brake to walk around and at least move a little in the middle of the class."
- "I could see them being nice in long classes but I've only had them in ~45 minute lectures which seems like they use up too much class time to be worth the benefits."
- "I feel movement breaks can be a distraction in 50 min classes but I find they are really helpful in classes longer than 120 min."
- "I think that having to opportunity to get up and walk around is always welcomed especially in 90 minute to 3 hour lectures. I don't feel like a guided movement break is necessary."
- "I think that keeping it fun and not too serious with music or videos makes it more engaging as well as making it clear that there is no judgement and people are free to not participate"

- "I think that the idea of movement breaks are great but my concern is application. There will be people who do not want to participate and may think of this break as a waste of their time and money given that it would be occurring during lecture. The other concern comes from the feasibility of having that time when there are professors who have packed their lecture time with information and would still go past what time they have. I think an important question or something along these lines that should be asked in a survey like this would be to ask what is the likeliness that you would participate in a guided movement break."

- "I think they are so important..UBC preaches this ideal that it believes in our wellbeing yet makes up sit for up to 2 hours and 50 minutes at a time with sometimes no break. I would love to see movement breaks implemented across all faculties."