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UBC Undergraduate Student Awareness of and Adherence to Canada's 24-Hour Movement Guidelines

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UBC Undergraduate Student Awareness of and Adherence to Canada's 24-Hour Movement
Guidelines



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Executive Summary

The goal of this study was to bring awareness to Canada's 24-Hour Movement Guidelines for Adults aged 18-64. A survey was conducted to determine how many undergraduate students at the University of British Columbia (UBC) Vancouver campus were aware of the 24-Hour Movement Guidelines, which pertain to daily physical activity, sleep, and sedentary behaviour. We constructed a mixed-methods survey to assess individuals' awareness of these guidelines and administered it through Qualtrics electronically via a link. The link was sent via email, text message, and posted on social media pages in order to maximize participant recruitment. The survey used convenience and snowball sampling of 87 UBC undergraduate students to collect quantitative and qualitative data. The survey consisted of open-ended and closed-ended questions, as well as a Likert scale of 1-5. Qualitative data were analyzed utilizing descriptive qualitative analysis techniques. Quantitative data were analyzed using Qualtrics and Excel.

The findings indicate that the distribution of information about the 24-Hour Movement Guidelines is more easily accessed by kinesiology students than students in other faculties. Students who did not report having a background in kinesiology were much less knowledgeable of the guidelines than those who reported having such backgrounds. In addition, the majority of students view the information in the 24-Hour Movement Guidelines as important and our findings tell us that students would prefer to learn about the 24-Hour Movement Guidelines through social media. Finally, the results also highlighted certain parts of the 24-Hour Movement Guidelines that students were not aware of, such as the importance of resistance training and limiting sedentary time.

Our research looks at how undergraduate students at UBC view the importance of the 24-Hour Movement guidelines. This study aimed to find effective ways to spread awareness of the guidelines so students can understand the benefits of reaching the health behaviour recommendations. The goal is for UBC undergraduate students to understand their current activity levels, sedentary time, and sleep as well as their knowledge of the effects of these behaviours on their health. We will discover if UBC undergraduate students are accomplishing these guidelines by asking the following questions: what levels of daily physical activity, sleep, and sedentary time do students engage in? What barriers do students face that inhibit their ability to achieve the 24-Hour Movement Guidelines through campus life, and what current or potential facilitators would aid their ability to better achieve these guidelines? What platforms will be most effective and accessible for students to learn about the guidelines?

We anticipate that these findings can be used to draw attention to parts of the population that require broader methods of communication with respect to the 24-Hour Movement Guidelines. The findings highlight the major differences in awareness based on educational backgrounds, which can be used to build better and more universal methods of distributing information about the 24-Hour Movement Guidelines to different populations. It is important to note that future research should investigate whether or not there may be additional barriers to communication that might contribute to the lack of information on these guidelines. Working towards spreading the information about the guidelines will help increase access and availability of these guidelines to populations that will benefit significantly from them.

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Overview of the 24-Hour Movement Guidelines

Physical Activity (PA)

Moderate-to-vigorous aerobic activities such that there is an accumulation of at least 150 minutes per week (Ross et al., 2020). Muscle-strengthening activities using major muscle groups at least twice a week (24-Hour Movement Guidelines, 2021a). Moderate-to-vigorous physical activity (MVPA) is defined as a level of intensity at the moderate end that is around 5 on a 1-10 scale of perceived intensity and the individual should be able to talk but not sing a song (24-Hour Movement Guidelines, 2021b). The vigorous end is defined as a perceived intensity of higher than 6 on a 1-10 scale, talking becomes difficult, and body temperature increases (24-Hour Movement Guidelines, 2021b). Light physical activity (LPA) includes standing rather than sitting and activities of daily living like household chores (Ross & Tremblay, 2020).

Sleep

Getting 7 to 9 hours of good-quality sleep regularly, with consistent bed and wake-up times (24-Hour Movement Guidelines, 2021a).

Sedentary Behavior (SB)

Sedentary behaviour refers to “any waking behaviour characterized by an energy expenditure ≤ 1.5 METs [metabolic equivalent] while in a sitting, reclining or lying posture (Saunders et al., 2020). The guidelines recommend limiting sedentary time to 8 hours or less, which includes breaking up long periods of sitting as often as possible and accumulating no more than 3 hours of recreational screen time per day.

(24-Hour Movement Guidelines, 2021a)

Introduction and Literature Review

Canada's new 24-Hour Movement Guidelines for Adults ages 18-64 are the first of their kind in the world because they balance physical activity, sleep, and sedentary behaviour and the impact of each on health (Ross et al., 2020). According to Langhammer et al., (2018), physical activity is defined as "any bodily movement produced by skeletal muscles that result in energy expenditure" (p.1). It is important to note that while exercise refers to a more structured and purposeful type of physical activity, the concept of physical activity refers to a broader idea of activity and does not necessarily have to be a form of exercise (Langhammer et al., 2018). In other words, although doing household chores and shoveling snow, for instance, are not necessarily considered types of exercise, they are certainly considered a form of physical activity. There is a plethora of evidence that suggests that physical activity is linked to several positive health outcomes including improved sleep and the prevention of premature mortality and several long-term medical conditions (Warburton & Bredin, 2017). In addition, sufficient sleep has been associated with lower stress levels, among other positive health outcomes such as increased productivity and cognition (Warburton & Bredin, 2017). College students in particular are generally at higher risk for developing sleep disorders given the nature of their environment, and this raises concerns with regard to the possible negative health outcomes due to lack of sleep, such as the increased risk of developing diabetes and cardiovascular issues (Warburton & Bredin, 2017).

The importance of combining guidelines for these behaviours into one 24-hour period is that time spent engaged in one activity takes away from time spent in another (Janssen et al., 2020). Whereas the previous guidelines focused heavily on movement and emphasized engaging in moderate-to-vigorous physical activity (MVPA) in bouts of at least 10 minutes, the new evidence-based guidelines state that any movement bout is beneficial for health (Ross &

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Tremblay, 2020). This new physical activity information greatly benefits particularly those who are “unable or unwilling to engage in MVPA bouts that are ≥ 10 min in duration” (Ross & Tremblay, 2020, p. 5). The guidelines also differ in that they now include limiting sedentary time as well as screen time, and the benefits of light physical activity (Ross & Tremblay, 2020). These new guidelines are especially important during the COVID-19 pandemic (Ross & Tremblay, 2020) as physical activity has gone down (Di Sebastiano et al., 2020) and screen time has gone up (Colley et al., 2020). Moreover, a study by Krishnan et al., (2020) found that the COVID-19 lockdown was also linked to a decrease in sleep quality and an increase in sleep deprivation. This survey showed that COVID-19 lockdown was associated with poor sleep quality, a shift in the sleep cycle to a delayed phase, sleep deprivation based on nighttime sleep, and depressive symptoms in a sizable number of the population (Krishnan et al., 2020)

Previously, results from a 2015 study of Canadian undergraduate student awareness of MoveU, a “social marketing initiative aimed at increasing moderate-to-vigorous physical activity (MVPA) among undergraduate students,” showed only 35.4% of students knew about the initiative (Scarapicchia et al., 2015, p. 299). Alarming, more than half of university students are not meeting the recommended levels of physical activity (Scarapicchia et al., 2015). Lack of awareness of these guidelines can contribute to an overall decline in the health of the general public which can result in the development of chronic diseases and illnesses (Castro et al., 2018).

Therefore, our goal is to assess awareness and uptake of Canada’s new 24-Hour Movement Guidelines at the University of British Columbia’s Vancouver campus in current undergraduate students in various faculties and explore ways to further increase their awareness. It is imperative that undergraduate students are educated in living a balanced lifestyle to improve

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short and long-term health. As kinesiology students, it is important to be engaged in health promotion so that students of all faculties are aware of the recommended guidelines.

Looking at previous research on movement guides, a study by Tomasone et al. (2020a) created and incorporated the existing Knowledge-to Action (KTA) framework and the integrated knowledge translation (iKT) approach into a movement guideline KT process. Through developing this process, they offered recommendations for future movement guideline groups to adopt to increase the ability to spread knowledge about movement and health (Tomasone et al., 2020a). The goal of this study was to develop an effective process to translate guidelines and their promotion to benefit the health of Canadians (Tomasone et al., 2020a). This study identified the prevalence of the guideline-to-practice gap within Canada and how this continues to limit Canadians' understanding and implementation of the 24-Hour Movement Guidelines (Tomasone et al., 2020a). Additionally, students from Queens University and the University of British Columbia reported more barriers than facilitators regarding not meeting the levels of health behaviours recommended by the 24-Hour Movement Guidelines (Tomasone et al., 2020a).

It is important to communicate the overarching benefits of the movement guidelines and the adverse outcomes of sedentary behaviour to students (Castro et al., 2018). A review by Saunders et al. (2020) summarized the relationship between patterns of sedentary behaviour and health outcomes associated with this behaviour. The study conducted in this review found results that pinpoint high levels of sedentary behaviour to be unfavourably associated with cognitive function, depression, function and disability, and physical health-related quality of life (Saunders et al., 2020). Beneficial outcomes of reducing sedentary time are also noted such as positive changes in body composition and acute improvements in markers of cardiometabolic risk (Saunders et al., 2020).

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In addition to reducing sedentary behaviours, Tomasone et al., (2020b) conducted research on relevant guidelines to provide for the public regarding recommendations about healthy levels of physical activity, sleep, and sedentary behaviour. Tomasone et al. (2020b) aimed to identify different avenues for those who research health and movement behaviours and those looking to advance guidelines such as Canada's 24-Hour Movement Guidelines. Tomasone et al. (2020b) considered dissemination strategies, including the production and distribution of two versions of guideline materials, a mass media campaign, and a dissemination toolkit. For implementation strategies, Tomasone et al. (2020b) considered capacity-building and scale-up strategies, which are used to enhance the integration of strategies across a variety of settings and to create a plan of action to ensure Canada's 24-Hour Movement Guidelines are fully established and considered the most up to date research available.

Additionally, Faught et al. (2020) examined optimal messaging strategies of the Canadian 24-Hour Movement Guidelines to reach adults ages 18-64 and 65+. A cross-sectional sample of Canadians were recruited aged 18 years and older (Faught et al., 2020). This study examined optimal messaging strategies across three different measures of 24-Hour Movement Guidelines: PA, SB and sleep. Previous research indicated that awareness of PA guidelines was as low as <13%, which suggests that previously used messaging strategies were not effective (Faught et al., 2020). Participants were asked to select the top three taglines, of which the most common choice was "Move More, Sit Less, Sleep Better" (Faught et al., 2020). End-users reported receiving information about the 24-Hour Guidelines mainly through online medical resources, family, friends, co-workers and physicians (Faught et al., 2020). Stakeholders raised concerns about the language being used and noted that language should be in layman's terms and technical terms should be clearly defined (Faught et al., 2020). Overall, it has been addressed that the

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guideline-to-practice gap is reflected at various levels such as policy, influencer and end-users; moving forward in this field to create less of a barrier, these factors will need to be better understood and addressed (Tomasone et al., 2020a).

Research Purpose and Questions

Our purpose is to find effective ways to convey to students the guideline's benefits through understanding their current levels of activity, sedentary time, and sleep, as well as their perceived importance of engaging in the recommended levels of health behaviours. We will accomplish this by asking: what levels of daily physical activity, sleep, and sedentary time do students engage in? What barriers do students face that inhibit their ability to achieve the 24-Hour Movement Guidelines through campus life, and what current or potential facilitators would aid their ability to better achieve these guidelines? What platforms will be most effective and accessible for students to learn about the guidelines?

Methods

Participants

Participants were eligible for inclusion in this study if they were current full or part-time undergraduate students at the UBC Vancouver campus at the time of data collection. Thus, graduate students, alumni, staff, and faculty were excluded from this survey. This population was chosen because undergraduate students make up the largest portion of the UBC community, with 47,400 undergraduate students out of 60,292 total students in the 2021-2022 year (University of British Columbia, 2021/2022). Particularly, studying this population is important because over half of university students in Canada do not meet the recommended levels of physical activity (Scarapicchia et al., 2015). Moreover, due to the novelty of these guidelines, there has been limited research conducted on this population.

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Data collection

Data were collected using convenience and snowball sampling. An electronic Qualtrics survey was used for which the link was distributed via email, Canvas announcements, Piazza, Instagram, and text messages (see survey in Appendix A). Students were recruited by asking the course instructors for KIN 321, KIN 424, BIOL 230, and FNH 355 to distribute the link to classmates which included the recruitment information found in Appendix B. Additionally, we asked peers from various faculties to participate through personal communications. The survey ran for a week to ensure a minimum of 40 respondents for a more representative sample. Before starting the survey, participants had to review and agree to a consent form (see Appendix A). Given the current circumstances regarding the COVID-19 pandemic and the precautions that are in place, an online survey was the most COVID-19 friendly data collection method as it limited in-person contact (Poonam et al., 2021). An electronic survey is also a low resource intensive method of data collection which allows for maximizing speed of data collection (Marcano Belisario et al., 2014) and is an efficient way to reach many participants and ask standardized questions (Jain, 2021).

Survey Design

The Qualtrics survey took approximately 5-10 minutes to complete. It consisted of a combination of closed and open-ended questions. The closed-ended questions were presented as Likert scales with ratings from 1-5. The combination questions were presented as multiple choice or multiple answers in which participants selected the most applicable answer(s) with an option to choose “other” and elaborate. The questions were presented in this way because this style is most efficient and valuable in collecting information and allowed for ease of demographic data collection (Schonlau et al., 2019). Additionally, the open text format of the “other” option

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allowed respondents to give accurate information without the constraints of choosing a multiple choice answer (Schonlau et al., 2019). The topics explored included sleep, sedentary time, amount of activity, the intensity of activity, resistance training, barriers and facilitators on campus, perceived importance of health behaviours, screen time, and 24-Hour Movement Guideline awareness, as well as demographic questions such as what faculty, age, ethnicity, year of education, and gender students felt represented them most accurately. Upon completing the survey, participants were given the option to be redirected to a secondary survey to enter into a draw to win a 1-year HOPR membership or a FitBit.

Data analysis

Quantitative data from the multiple-choice, multiple answers, and Likert scale questions were analyzed using Qualtrics and Microsoft Excel. Qualitative data were analyzed using descriptive qualitative analysis techniques described by Löfgren (2013), which established patterns and common themes in the answers.

Results

Demographic Data

The survey recorded 87 complete responses from undergraduate students, with an additional 12 participants with incomplete surveys that were omitted from the results. A range of faculties/schools were represented; however, kinesiology students represented the majority with 51% (see Appendix C, Table 1) of total responses. Participants ranged from years 1-5 of their undergraduate program, with the majority (44%) in fourth year (see Appendix C, Table 2). Ages ranged from 18-56, with the mean at 22 and median and mode at 21 (see Appendix C, Table 3). The majority of respondents were domestic students (91%) (see Appendix C, Table 4). Respondents varied in ethnicity but were predominantly Caucasian (see Appendix C, Table 5).

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Respondents were primarily women (76%) (see Appendix C, Table 6). Most respondents reported not having a disability or medical condition that affects their daily functioning (see Appendix C, Table 7).

Quantitative Data

From the 87 complete survey responses, we received responses to fifteen quantitative questions that provided us with data covering participants' adherence to the guidelines, participants' awareness/perceived importance of the guidelines, and identified facilitators and barriers to achieving these guidelines.

When participants were asked about their current sleep patterns, we found that the majority of participants got between 6-9 hours of sleep within a 24-hour period, with a mean result of 7.5 hours of sleep (see Appendix D, Figure 1). When asked about current minutes per week of moderate-vigorous physical activity, only 27.6% of participants reported meeting the guideline recommendation of 150 minutes/ week (see Appendix D, Figure 2) (24-Hour Movement Guidelines, 2021a). Participants were then asked on average how many minutes per day they get of low-moderate physical activity, which includes standing; the majority of participants (43.7%) reported 30-60 minutes/ day, the remainder of responses to this question are as follows: 3.5% reported less than 10 minutes/day, 14.9% reported 10-30 minutes/day, 19.5% 60-90 minutes/day, 6.9% reported 90-120minutes/day and 11.5% over 120minutes/day (see Appendix D, Figure 3). When asked on average how many times per week they complete muscle strengthening activities, 24.1% reported not completing any, 34.5% reported 1-2 times per week, 31.0% reported 3-4 times per week, 5.8% reported 4-5 times per week and 4.6% reported 5-6 times per week (see Appendix D, Figure 4).

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When participants were asked about their current sedentary behaviour, we found that 53% of the participants are getting over the recommended 3 hours of recreational screen time per day (24-Hour Movement Guidelines, 2021a); 29.9% of participants spend over 4 hours/day on recreational screen time, 23.0% reported 3-4 hours/day, 28.7% reported 2-3 hours, 15.0% reported 1-2 hours and 3.5% reported less than 1 hour (see Appendix D, Figure 5). When asked about hours/day spent sitting/ reclining, the mean was 4.5 hours/day (with participants reporting 3.45% 10+ hours/day, 13.79% 8-10hours/day, 31.03% 6-8 hours/day, 34.48% 4-6 hours/day, 12.64% 2-4 hours/day and 4.67% under 2 hours/day (see Appendix D, Figure 6).

When asked about participants' awareness of guidelines, 49.4% of participants reported “yes” to hearing about these guidelines before, in which 79% of those participants who answered “yes” were kinesiology students; of the remaining participants, 6.9% answered “maybe” and 43.7% reported “no” to awareness of guidelines (see Appendix D, Figure 7).

Participants were asked to rate the components of the 24-Hour Movement Guidelines on a Likert scale (1 being not at all important and 5 being very important). When asked how important they felt it was to reduce screen and sedentary time, 47.1% rated it a 5 on the scale, 29.9% rated it a 4, 17.2% rated it a 3, and 5.8% rated it a 2 (see Appendix D, Figure 8). When asked how important they felt it was to participate in muscle strengthening exercises at least twice a week, 46.0% rated it a 5 on the scale, 28.7% rated it a 4, 27.2% rated it a 3, and 6.9% rated it a 2, and 1.2% rated it a 1 (see Appendix D, Figure 9). When asked how important they thought engaging in 150 minutes of MVPA per week was, 64.4% rated it a 5 on the scale, 23.0% rated it a 4, 10.3% rated it a 3, and 2.3% rated it 2 (see Appendix D, Figure 10). When asked how important they thought getting 7-9 hours of sleep per day was, 69.0% rated it a 5, 23.0% rated it a 4, 6.9% rated it a 3 and 1.15% rated it a 1 (see Appendix D, Figure 11).

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Participants were then asked how important they thought overall awareness of the 24-Hour Movement Guidelines was for students, with options ranging from “not at all important” to “extremely important”: 55.2% of participants rated it “very important”, 27.6% rated it “extremely important”, 16.1% rated it “moderately important” and 1.15% rated it “slightly important” (see Appendix D, Figure 12).

Participants were then asked to address barriers and facilitators to the various aspects of achieving the recommended levels of health behaviours. When participants were asked about various barriers in relation to campus to achieving the recommended physical activity guidelines, 43.1% selected a “lack of time”, 16.6% selected “cost”, 13.8% selected “accessibility”, 10.5% selected “no partner/friend to exercise with”, 8.8% “unaware of PA options on campus” and 7.2% reported “other” in which they provided various barriers they encounter not listed as an option in the survey which will be discussed under the qualitative data section. They were then asked to report various facilitators on campus that help them to achieve enough physical activity. 25.7% selected “walking paths/ green spaces”, 19% selected “movement breaks”, 16.0% selected “lower student rates”, 12.2% selected “student residence gyms”, 11.8% selected “UBC rec activities”, 11.4% selected “bike/treadmill desks around campus” and 3.8% selected “other” in which they provided various facilitators they encounter not listed as an option in the survey.

When participants were asked about various barriers in relation to achieving the recommendations regarding sedentary time, 40.7% selected “lack of time”, 45.6% selected “long sitting periods”, 7.4% selected “unaware of PA options on campus”, 6.2% reported, “accessibility” and 0.6% selected “other”. When participants were asked about facilitators in relation to achieving the recommended levels of sedentary time, 31.3% selected “movement breaks”, 29.5% selected “walking/ green spaces”, 12.1% selected “UBC Rec Activities”, and

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1.8% selected “other”. When participants were asked about barriers to achieving the sleep guidelines 47.1% selected “heavy course load/ studying”, 29.4% selected “class schedule”, 22.6% selected “commuting,” and 6.8% selected “other”.

Finally, participants were asked their preferred method of learning about the guidelines: 73.6% said through social media, 11.5% said through email, 9.2% said through campus newsletters, and 5.75% said “other” in which they provided further information and is discussed below (see Appendix D, Figure 13).

Qualitative Data

Most multiple choice and multiple answer questions contained an “other” option and a space to elaborate on an answer. Guideline awareness responses indicated the majority of participants who know about the guidelines learned them through the kinesiology curriculum, with the most common terms being class, school, and kinesiology/kin. Common barriers on campus that limit students’ ability to achieve physical activity guidelines were weather, lacking motivation, and fears and anxieties about physical activity, including a lack of women-only spaces. The most common “other” facilitator of physical activity on campus was being part of organized sport on campus. Similarly, sport was also mentioned as a facilitator of limiting sedentary time. One participant mentioned active homework activities such as scavenger hunts as experienced in one of their biology classes. Common barriers to achieving the recommended amount of sleep were participating in sport, work, stress, and generally balancing time for sleep with life’s other demands. Lastly, the few respondents who chose “other” for preferred methods of learning about the guidelines wrote they would prefer implementation into the course content and physical signs on campus.

Discussion

Overall, undergraduate students at UBC are largely unaware of the guidelines. This finding was similar to findings from a 2015 study by Scarapicchia et al. that showed only 35.4% of Canadian undergraduate students knew about MoveU which was an initiative aimed at increasing MVPA in university students. Most of the respondents who know about the guidelines are kinesiology students (see Appendix D, Figure 7), and of that population, nearly all respondents reported learning the guidelines through the kinesiology curriculum. Thus, reaching non-kinesiology students with the message of these guidelines is critical for an increase in awareness as only a small percent of kinesiology students were unaware of them. Interestingly though, kinesiology and non-kinesiology students showed similar levels of perceived importance of guideline knowledge, as well as the importance of meeting the recommended levels of the various health behaviours (see Appendix D, Figures 8, 9, 10, 11 and 12).

Moreover, the majority of respondents do not meet the recommended levels of movement behaviours, as only 28% are achieving the weekly levels of recommended MVPA, 11% are achieving several hours of LPA per day, and 24% do no muscle strengthening activities. Common barriers were lack of time due to workload or long sitting periods due to school, lack of a partner to exercise with, and weather-related challenges which can be mitigated through movement breaks to break up sedentary time and thus also increasing daily LPA, spreading more awareness of group fitness classes or other ways to make connections with an exercise partner, and spreading awareness of indoor exercise options where the weather would not be an issue. Spreading awareness via social media as well as the use of posters on campus are discussed further in the recommendations section of this paper.

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Respondents reported their average recreational screen time as at least 2 hours per day, with only 16 responses reporting less than that. 30% reported spending 4 or more hours per day on recreational screen time. It is important to keep in mind that this is recreational screen rather than total screen time; therefore, it does not include school or work-related screen time. Moreover, a third of respondents are sedentary for 4-6 hours a day, another third for 6-8 hours a day, and 17% for more than 8 hours per day, on average.

According to Marschin & Herbert (2021), short activity breaks to shorten sedentary time related to studying could be helpful to avoid physical inactivity and sustain mental health. The breaks should comprise short and easy-implementable physical activity exercises that can be integrated into the learning context (Marschin & Herbert, 2021). UBC has started to increase the promotion of such movement breaks, especially during February which is Move UBC month that includes month-long movement challenges with the potential of prizes to win. Movement breaks are led by UBC recreation Move U Crew which can be requested to lead an exercise break to incorporate physical activity into meetings and lectures that consist of a lot of sedentary time and can be added to both in-person or online sessions (UBC Recreation, n.d.). Introducing this activity to students in faculties that would not normally be presented with movement information through courses like the kinesiology curriculum should increase awareness of movement behaviours and the 24-Hour Movement Guidelines.

It is clear that a crucial educational component is missing about why certain behaviours are important for health, seen by only half of respondents reporting that participating in muscle strengthening activities and limiting sedentary time as being important. The physical and mental beneficial effects of endurance and strength exercises are well-known and supported scientifically (Kramer, 2020 as cited in Marschin & Herbert, 2021) and need to be better

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translated to undergraduate students in a way that will be meaningful and engaging. Similarly, the detrimental health effects of a sedentary lifestyle such as “elevated risk of all-cause and cardiovascular disease mortality” (Katzmarzyk et al., 2009, p. 1004) and increased risk of depression and decreased cognitive function (Saunders et al., 2020) need to be better communicated to undergraduate students. An important aspect of this increase in major health risks is that it is dose-dependent with activity, meaning that the risks decrease with decreased sedentary time (Katzmarzyk et al., 2009).

Surprisingly, average sleep levels are sufficient, with respondents getting between 6-9 hours of daily sleep with an average of 7.5 hours. This contrasts with some of the available literature, such as Warburton & Bredin (2017) who write that college students are at a higher risk for developing sleep disorders. Hershner & Chervin (2014) also write that sleep deficiency is highly prevalent amongst university students. Additionally, Krishnan et al. (2020) found that sleep deprivation increased during the COVID-19 pandemic; however, this effect may be wearing off as the pandemic comes to an end.

Limitations

We recognize that there were limitations to how we conducted this study. The first limitation involved those who did not fully complete the survey (survey was less than 96% complete). For these participants, we removed their responses, indicating that we could have had a larger respondent rate. A second limitation is that of response bias which can occur when answers are self-reported because there can be a tendency for participants to respond with answers they believe are the most appropriate or expected, rather than being fully honest. The last and perhaps most important limitation is that we ended the survey after only a week of having it open in order to give our group time to complete the analysis. Ideally, we would obtain

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a larger sample to be more representative of UBC Vancouver undergraduate students. This would have been obtained if our survey had been open for a longer time. Receiving only 87 responses does not nearly represent the UBC Vancouver campus's very large undergraduate population, which had 47,400 undergraduate students in the 2021-2022 school year (University of British Columbia, 2021/2022). 76% of respondents were women, which may be a limitation as men and women may have different views on the 24-Hour Movement Guidelines. As well, 91% of respondents were domestic students, although UBC is a highly international school, with 26.3% of students being international (University of British Columbia, 2021/2022). Moreover, 56% of respondents were Caucasian, which does not represent the diversity of students at UBC. Lastly, the majority of respondents were kinesiology students indicating a potential bias as this may filter our results towards what undergraduate kinesiology students have learned through their curriculum. Overall, the limitations make it evident that this study was not very representative of the UBC undergraduate population and that further research on a larger scale is needed.

Recommendations

Based on the data provided from our survey and the analysis we completed, we have made four recommendations to our partner, UBC Athletics & Recreation. These recommendations are based on information collected about potential facilitators to help increase students' ability to achieve the guidelines. The recommendations we have made address short-term and long-term areas to help provide immediate and long-lasting benefits to the UBC Vancouver campus students. The short-term recommendations focus on more promotion of the guidelines and physical activity/movement options on campus, whereas our long-term suggestion recommends future research.

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First Recommendation

The first recommendation we would make to the project partner is to use social media such as Instagram, Twitter, and Tik Tok for guideline awareness. We suggest that UBC recreation (@ubcrec on Instagram, with 8078 followers (UBC Recreation, n.d.) partners with the broader university social media (such as @univeristyofbc on Instagram with 128 000 followers (University of British Columbia, n.d.)), to share infographics and short informational videos that promote the 24-Hour Movement Guidelines and share ways that individuals can become more active on campus. We would suggest the use of short video clips (reels), infographics with links to more information, and the use of social media stories to promote physical activity opportunities on campus. This way, the information can reach more than just the demographic who follows @ubcrec which are likely already active individuals. Our survey found that 73.4% of respondents would prefer to learn more about these guidelines and active opportunities through social media (see Appendix D, Figure 13).

Second Recommendation

The second recommendation we would make is to increase the use of posters and infographics about the 24-Hour Movement Guidelines in various locations across campus, such as different faculty buildings, hallways and lecture halls, the student NEST, and the various libraries. It would be beneficial if these infographics contained QR codes linked to resource websites to provide an easy, fast, and effective way for individuals to access this information. This will help spread the guidelines to a more diverse and greater population such as those who do not use social media. Due to 44% of participants being unaware of the guidelines (see Appendix D, Figure 7), multiple informative medians will be more effective in increasing awareness. Our findings showed that most participants who were aware of these guidelines

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reported that they learned about the guidelines through their course curriculum which suggests that most individuals do not know that they have access to this information outside of a specific educational setting, further increasing the guideline awareness gap. By providing information about these guidelines in more locations and delivery styles, the awareness of these guidelines will become widely available to more undergraduate students.

Third Recommendation

The third recommendation is to further promote the use of movement breaks across all faculties and continue to educate instructors on the importance of movement breaks to break up long periods of sitting during lectures. Our study found that only 31.3% of participants felt that movement breaks were a facilitator to reducing sedentary time; this number could be low because not many instructors outside of the School of Kinesiology include or encourage movement breaks in their lectures. Additionally, 45.6% of participants felt that they couldn't achieve the recommendations for sedentary time due to “long sitting periods” and 40.7% selected “lack of time”. Offering movement breaks during scheduled lecture time would help address both of these barriers that students face in reducing some of their sedentary time.

Fourth Recommendation

The fourth recommendation is for more research to be done campus-wide on students' awareness and adherence to the guidelines. This would help reach a larger diverse population to gain a better understanding of students' needs and how, in the future, the University of British Columbia's Vancouver campus can better support the overall health of their students. As our current study faced many limitations due to small sample size and lack of diversity (see Appendix C, all tables), creating an accurate sample of the UBC Vancouver campus

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undergraduate population would be beneficial in future research to ensure accurate representative results.

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Appendix A

Survey and Consent Form

Kin 464- Analysis of the 24-Hour Movement Guidelines- Group #5

CLASS PROJECT: Health Promotion and Physical Activity (KIN 464) Participant Consent Form An Evaluation of Student Awareness of and Participation in UBC's 24 Hour Movement Guidelines Group #5

Principal Investigator: Dr. Andrea Bundon (Assistant Professor, School of Kinesiology, Faculty of Education) Sessional Instructor: Dr. Negin Riazi (School of Kinesiology, Faculty of Education)

The purpose of the class project: To gather knowledge and expertise from community members of the UBC Vancouver campus on students' awareness and participation in the Canada's 24-Hour Movement Guidelines.

Study Procedures: With your permission, we are asking you to participate in a quick 5-10 minute a survey. You may only complete the survey once. With the information gathered, students will critically examine how different individuals understand or engage in health promoting activities or health promotion initiatives.

Project outcomes: The information gathered will be part of a written report for the class project. The written report will be shared with campus partners involved with the project. Summaries of findings will also be posted on the following websites. No personal information/information that could identify participants will be included in these reports or shared with campus partners.

UBC SEEDS Program Library: <https://sustain.ubc.ca/courses-degrees/alternative-credit-options/seeds-sustainability-program/seeds-sustainability-library> Potential benefits of class project: There are no explicit benefits to you by taking part in this class project. However, the survey will provide you with the opportunity to voice your opinion on your experiences with health promoting activities or initiatives in a broad sense and will provide the students with an opportunity to learn from your experiences. **Confidentiality:** Maintaining the confidentiality of the participants involved in the research is paramount, and no names of participants will be collected. At the completion of the course, all data (i.e. notes) and signed consent forms will be stored on a secure electronic drive by Drs. Riazi and Bundon. All data and consent forms will be destroyed 1 year after completion of the course. **Risks:** The risks associated with participating in this research are minimal. There are no known physical, economic, or social risks associated with participation in this study. You should know that your participation is completely voluntary and you are free to withdraw from the study and there will not be negative impacts related to your withdrawal. If you withdraw from the study, all of the information you have shared up until that point will be destroyed. **Contact for information about the study:** If you have any questions about this class project, you can contact Negin Riazi by email at negin.riazi@ubc.ca. **Research ethics complaints:** If you have any concerns or complaints about your rights as a research participant and/or your experiences while participating in this study, contact the

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Research Participant Complaint Line in the UBC Office of Research Ethics at 604-822-8598 or e-mail RSIL@ors.ubc.ca . or call toll free 1-877-822-8598. Consent: Your participation in this study is entirely voluntary and you may refuse to participate or withdraw from the study at any time.

By Clicking ‘Next’, you are consenting to participate in the study.

Q1 What year of your undergrad are you in?

- 1st year (1)
- 2nd year (2)
- 3rd year (3)
- 4th year (4)
- 5th year (5)
- 6th year (6)
- other (7) _____

Q2 What faculty/ school do you currently study in?

- Applied Science (1)
- Science (2)
- Arts (3)
- Commerce (4)
- Education (Kinesiology) (5)
- Education (Other) (13)
- Land and Food Systems (6)
- Pharma, Science (8)
- Forestry (9)
- Economics (10)
- Other (11) _____

Q3 What is your current age?

Q4 Are you a domestic or international student?

- Domestic (1)
- International (2)

Q5 What ethnicity do you identify most with? (select all that apply)

- Caucasian (1)
- Chinese (2)
- South Asian (3)
- Korean (4)
- South East Asian (5)
- Hispanic (6)
- Middle Eastern (7)
- Filipino (8)
- Japanese (9)
- Indigenous, Metis, Inuit (10)
- African, Black, Caribbean (11)
- Other (12) _____

Q6 What gender do you identify most with?

- Man (1)
- Woman (2)
- Non-binary / third gender (3)
- Two- spirit (6)
- Prefer not to say (4)

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- o Other (5) _____

Q7 Do you have any of the following disabilities that may impact your everyday functioning?

- o Physical disability (1)
- o Blind/Visually impaired (2)
- o Deaf/Hard of Hearing (3)
- o Mental Health Condition (4)
- o Neurological (learning disability, ASD, Traumatic Brain Injury, ADHD, etc.) (5)
- o Chronic Health Condition (Crohn's, HIV, etc.) (6)
- o Other (7) _____
- o I don't have a disability or ongoing medical condition (8)

Q8 On average how many hours of sleep do you get within a 24 hour period? (including napping)

Move the slider to the number that correlates with the average hours of sleep you get within a 24 Hour Period?

0 1 2 3 4 5 6 7 8 9 10 11 12

10	
----	--

Q9 On average how many minutes per **DAY** do you partake in low to moderate physical activity? (includes walking and standing)

- o less than 10 minutes (1)

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- 10-30 minutes (2)
- 30-60 minutes (3)
- 60-90 minutes (4)
- 90- 120 minutes (5)
- 120 minutes plus (6)

Q10 On average how many minutes per **WEEK** do you partake in moderate to vigorous physical activity (the feeling of your heart beating faster)? (such as running, biking, or recreational sport)

- less than 20 minutes (1)
- 20-40 minutes (2)
- 40-60minutes (3)
- 60-90 minutes (4)
- 90-120 minutes (5)
- 120-150 minutes (6)
- 150+ minutes (7)

Q11 On average how many times a **WEEK** do you partake in muscle strengthening activities?

- None (1)
- 1-2 (2)
- 3-4 (3)
- 4-5 (4)
- 5-6 (5)
- 7 (6)
- 7+ (7)

Q12 On average how many hours a **DAY** do you spend on recreational screen time?

- less than 1 hour (1)

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- 1-2 hours (2)
- 2-3 hours (3)
- 3-4 hours (4)
- 4+ hours (5)

Q13 On average how many hours a **DAY** do you spend sitting or reclining? (not including time asleep)

- less than 1 hour (1)
- 1-2 hours (2)
- 2-4 hours (3)
- 4-6 hours (4)
- 6-8 hours (5)
- 8-10 hours (6)
- 10+ hours (7)

Q14 Have you heard about the Canadian 24- hour movement guidelines are for adults aged 18-64 years?

- Yes (if so where did you hear about it?) (1)
-

- Maybe (2)
- No (3)

Q15 The Canadian 24 Hour Movement Guidelines Outlines what a healthy 24 hours includes:

Physical Activity:

- 150 minutes a week of moderate to vigorous activity
- muscle strength training at least 2 times a week

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- lots of a light physical activity through the day (such as walking and standing)

Q16 Based on the Guidelines provided on the previous page, what are some potential BARRIERS on campus you face that limit your ability to achieve the physical activity guidelines? (Choose all that apply)

- Lack of time (school, work, etc) (1)
- No partner/ friend to exercise with (2)
- Unaware of Physical Activity options on campus (3)
- Cost (4)
- Accessibility (distance, equipment availability) (5)
- Other (6) _____

Q17 Based on the Guidelines provided on the previous page, what are some potential FACILITATORS on campus that help you to achieve the physical activity guidelines? (Choose all that apply)

- Walking paths, Green spaces (1)
- Movement Breaks (2)
- Lower student rates for fitness centres/ classes (3)
- UBC Recreation Activities (Intramural's, Move UBC events, etc...) (4)
- Bike/ Treadmill Desks (available in some lectures and libraries) (5)
- Student Residence Gyms (6)
- Other (7) _____

Q18

The Canadian 24 Hour Movement Guidelines Outlines what a healthy 24 hours includes:

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Sedentary Time: - reduce sedentary time to not more than 8 hours a day - limit recreational screen time to less than 3 hours a day - break up long sitting periods as often as possible

Q19 Based on the Guidelines provided on the previous page, what are some potential BARRIERS on campus you face that limit your ability to achieve the sedentary behaviour guidelines? (Choose all that apply)

- Lack of time (school, work, etc) (1)
- Unaware of Physical Activity options on campus (3)
- Accessibility (distance, equipment availability) (5)
- Long Sitting Periods (lecture, studying, work) (8)
- Other (6) _____

Q20 Based on the Guidelines provided on the previous page, what are some potential FACILITATORS on campus that help you to achieve the sedentary behaviour guidelines? (Choose all that apply)

- Walking paths, Green spaces (1)
- Movement Breaks (2)
- UBC Recreation Activities (Intramural's, Move UBC events, etc...) (4)
- Sit Stand Desks /Biking or Treadmill Desks (available in some lectures and libraries) (7)
- Others (6) _____

Q21

The Canadian 24 Hour Movement Guidelines Outlines what a healthy 24 hours includes:

Sleep: - get 7-9 hours of good quality sleep a night on a regular basis - have consistent wake up and bed times

Q22 Based on the Guidelines provided on the previous page, what are some potential BARRIERS on campus you face that limit your ability to achieve the Sleep guidelines? (Choose all that apply)

- Class Schedule (1)
- Commuting (Transit options, parking options on campus) (2)

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- Heavy course load/ Studying (4)
- Other (3) _____

Q23 How important do you think the following are? (with 1 being not important at all and 5 being very important)

1 2 3 4 5

Reduced screen/ sedentary time ()	
Engage in muscle strengthening exercises at least twice a week ()	
Achieve at least 150 minutes of moderate to vigorous physical activity each week ()	
Maintain a healthy sleep schedule and aim for 7-9 hours of sleep a day ()	

Q24 How important do you think it is for students to be aware of these guidelines?

- Not at all important (1)
- Slightly important (2)
- Moderately important (3)
- Very important (4)
- Extremely important (5)

Q25 What method would you most likely use to learn more about the 24-Hour Movement Guidelines?

- Social Media (Instagram, Twitter, Tik Tok) (1)
- Campus News Letter (2)
- Email (3)
- Other (4) _____

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Q26 Thank you for participating in our survey!

If you would like to **enter to win** a 1-year HOPR membership or a FitBit, please continue on to this separate survey. To enter the draw, please indicate that you completed the survey for Group #5 and provide your email address. Thank you. By clicking next you will be redirected to the page to enter the draw!

Appendix B

Recruitment Material

KIN 464: Health Promotion and Physical Activity Class-based Project

Are you a current UBC Vancouver undergraduate student? We would love to hear about your daily health lifestyle!

As part of a course-based research project (KIN 464), we are conducting a study on students of the UBC Vancouver's, awareness and Participation in the 24-Hour Movement Guidelines. If you are a current undergraduate student at the UBC Vancouver campus, we would love to hear from you/for you to complete a survey. More information (https://ubc.ca1.qualtrics.com/jfe/form/SV_8uZunFFkn5TCaQ6) or email (hhanse01@student.ubc.ca).

Please note that this post is public and anyone who likes, comments or shares the link will, by doing so, be associated with the study. The Principal Investigator on this project is Dr. Andrea Bundon (andrea.bundon@ubc.ca) and Dr. Negin Riazi (negin.riazi@ubc.ca) is the sessional instructor for the course.

Instagram Recruitment

THE CANADIAN 24-HOUR MOVEMENT GUIDELINES



**UBC VANCOUVER
UNDERGRADUATE
STUDENTS!**

Only takes 5-10
minutes!

[https://ubc.ca1.qualtrics.com/jfe/form/
SV_8uZunFFkn5TCaQ6](https://ubc.ca1.qualtrics.com/jfe/form/SV_8uZunFFkn5TCaQ6)

We would really appreciate your time to fill out our survey about UBC students' awareness of these guidelines so we can work to improve students' overall well-being on campus!

Appendix C

Tables

Table 1. Student distribution across faculties

FACULTY/SCHOOL	% OF STUDENTS
Applied Science	2
Science	16
Arts	16
Commerce	3
Education (Kinesiology)	51
Education (other)	1
Land and Food Systems	7
Pharma. Sciences	0
Forestry	0
Economics	1
Other	1
TOTAL STUDENTS = 87	

Note: The data shows Kinesiology with 49% and Other with 3%, adjusted to reflect that 2 of the “other” answers listed Kinesiology.

Table 2. Distribution across years of study

YEAR OF UNDERGRAD	% OF STUDENTS
1	9
2	17
3	20
4	44
5	9
6	0
Other	1

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Table 3. Distribution of ages

Age range	Mean	Median	Mode
18-56	21.94	21	21

Table 4. Domestic and international students

% DOMESTIC	% INTERNATIONAL
91	9

Table 5. Distribution across ethnicities

ETHNICITY	% OF STUDENTS
Caucasian	56
Chinese	18
South Asian	9
Korean	0
Southeast Asian	5
Hispanic	0
Middle Eastern	0
Filipino	1
Japanese	1
Indigenous, Metis, Inuit	2
African, Black, Caribbean	2
Other	5

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Table 6. Gender distribution

GENDER	% OF STUDENTS
Man	24
Woman	76
Non-binary	0
Two-spirit	0
Other	0
Prefer not to say	0

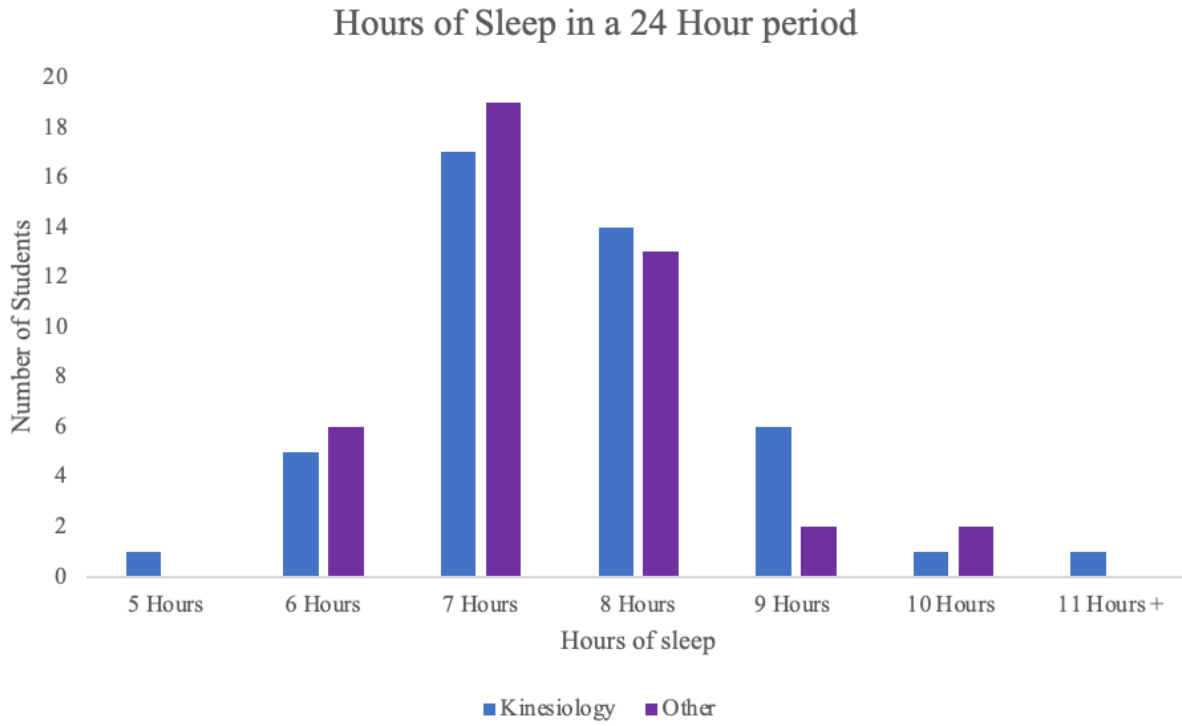
Table 7. Disabilities that may impact everyday function

DISABILITY/MEDICAL CONDITION	% OF STUDENTS
Physical disability	1
Blind/Visually impaired	0
Deaf/Hard of hearing	1
Mental health condition	14
Neurological	7
Chronic health condition	2
Other	3
None	71

Appendix D

Figures

Figure 1.



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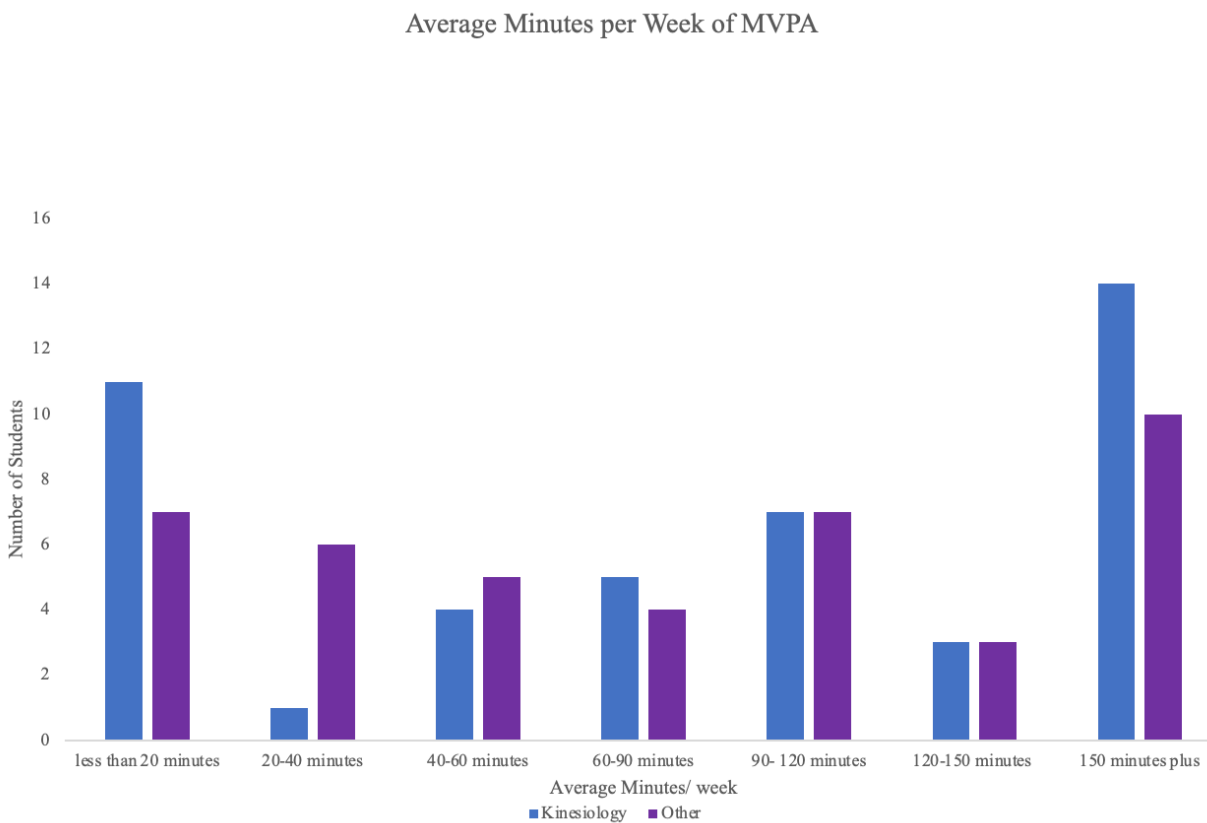
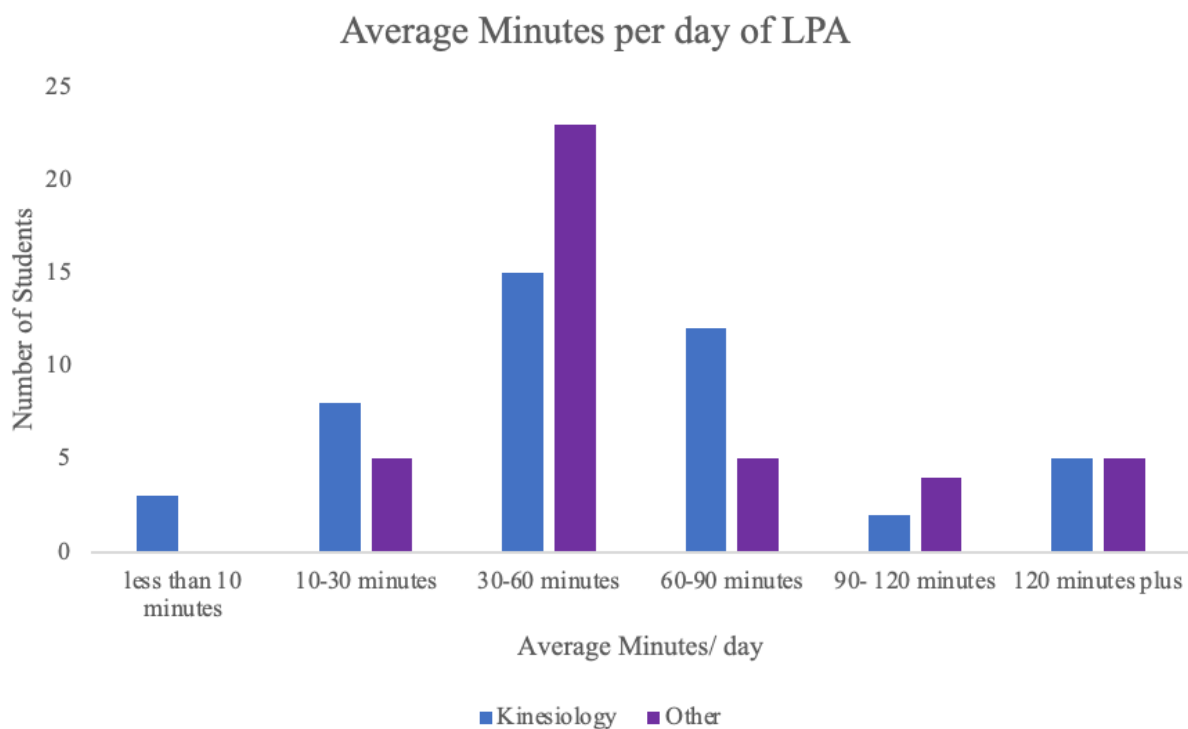
Figure 2.**Figure 3.**

Figure 4.

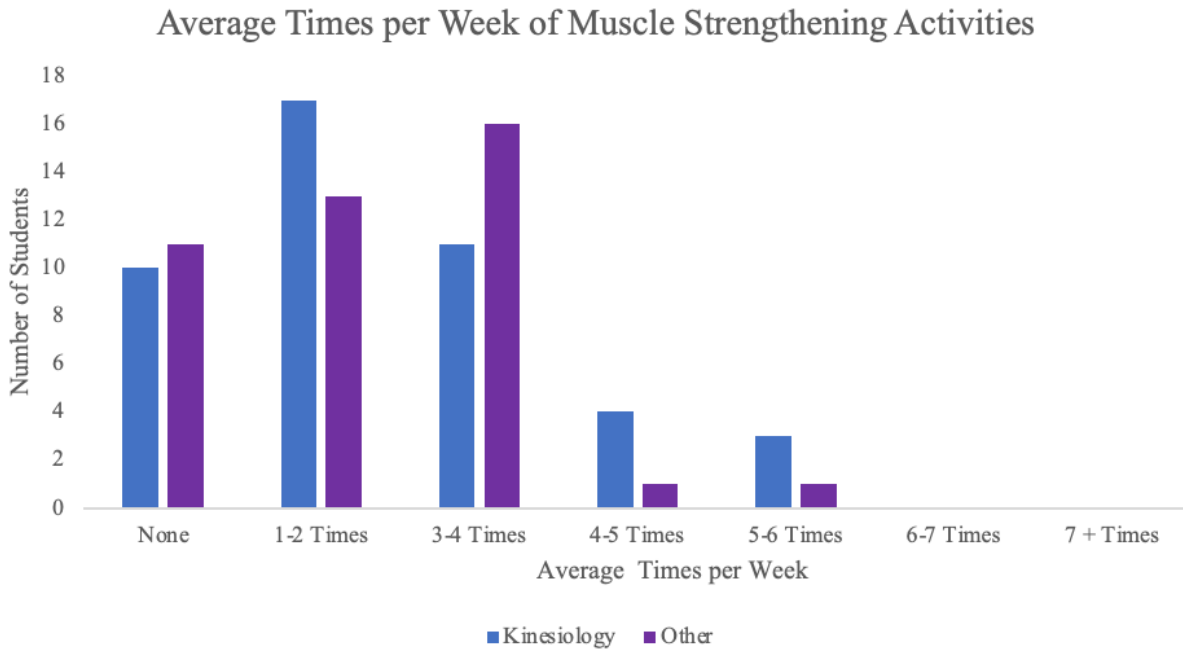
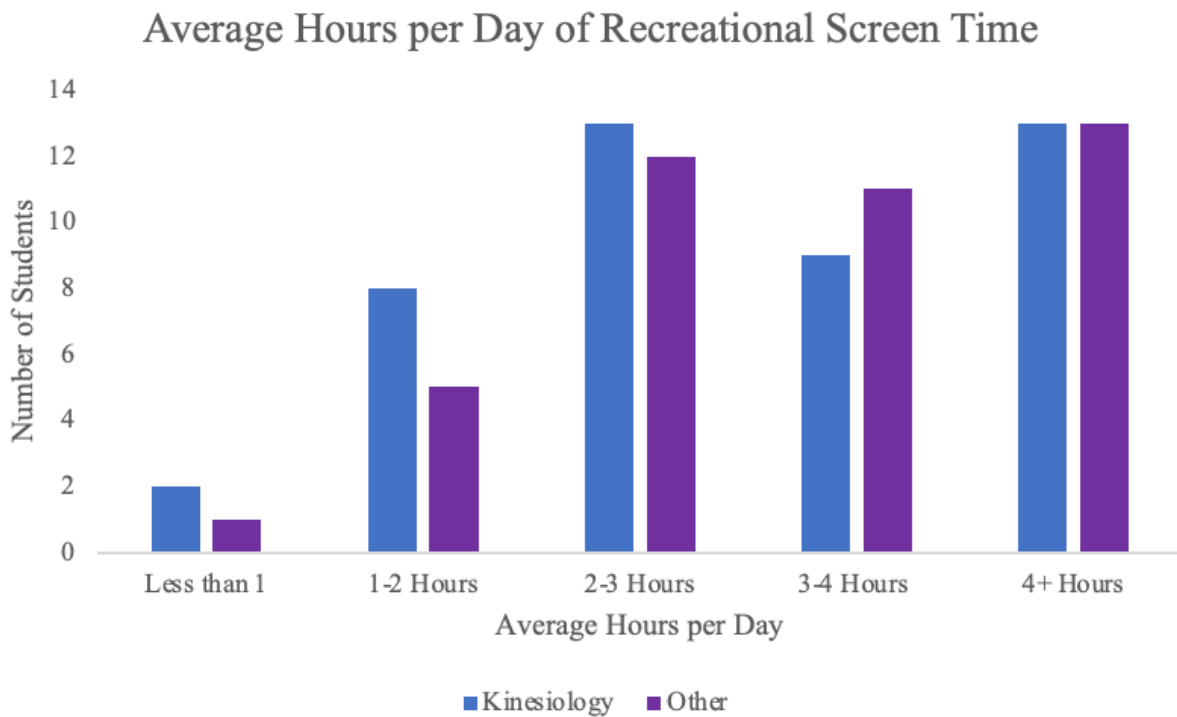


Figure 5.



UBC STUDENT AWARENESS OF MOVEMENT GUIDELINES

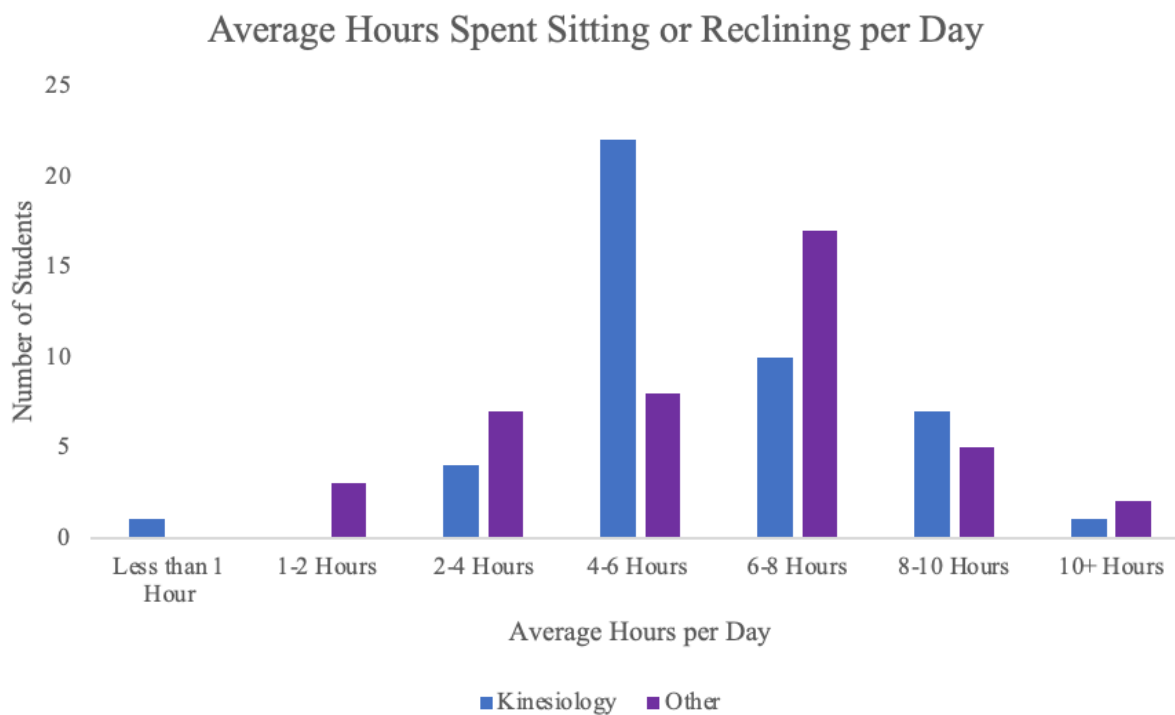
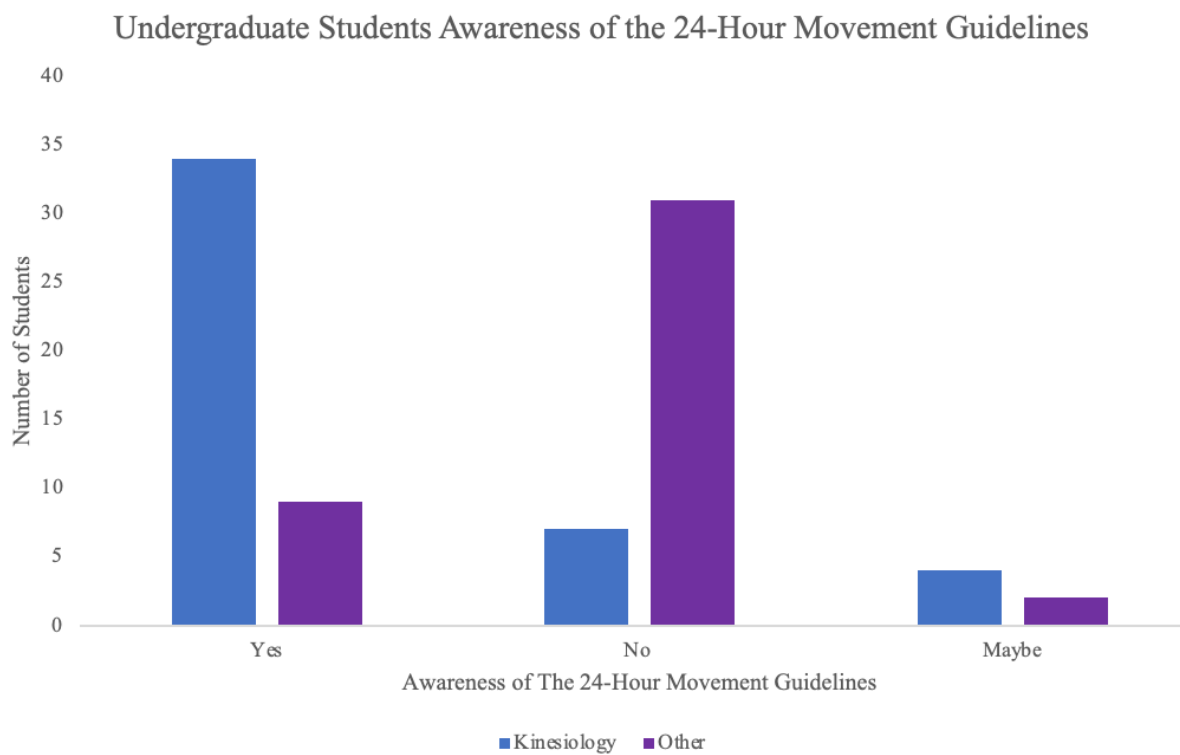
Figure 6.**Figure 7.**

Figure 8.

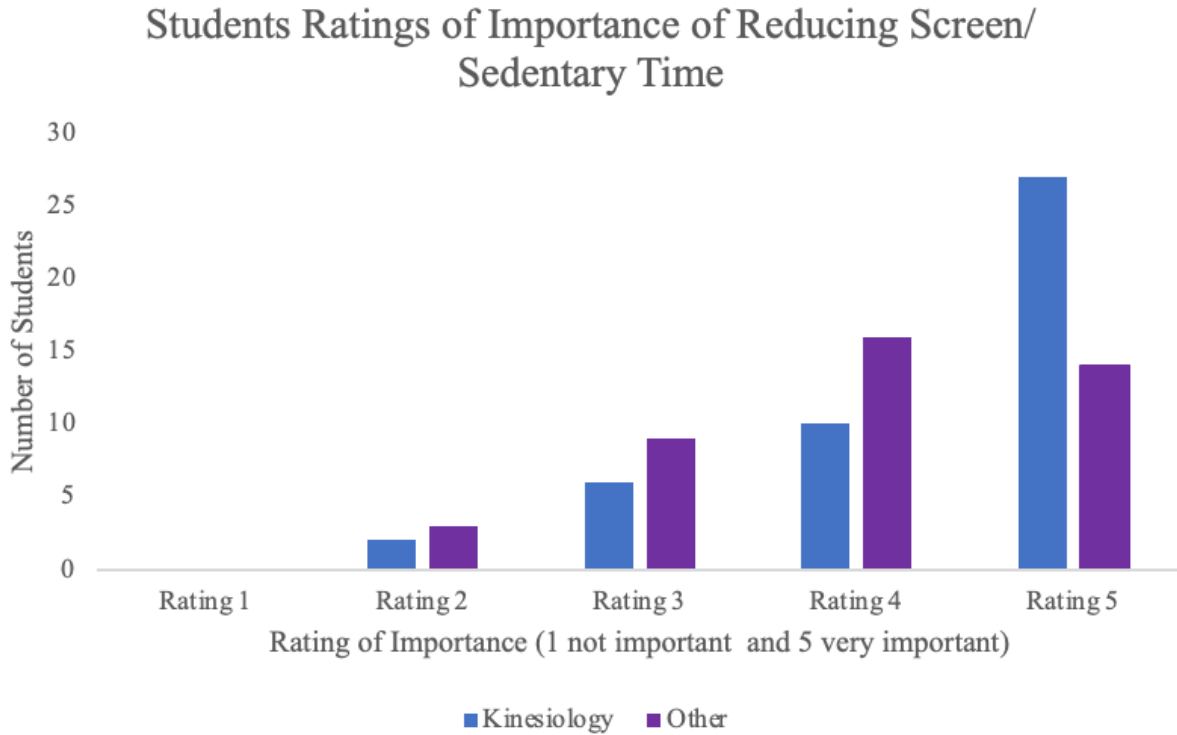


Figure 9.

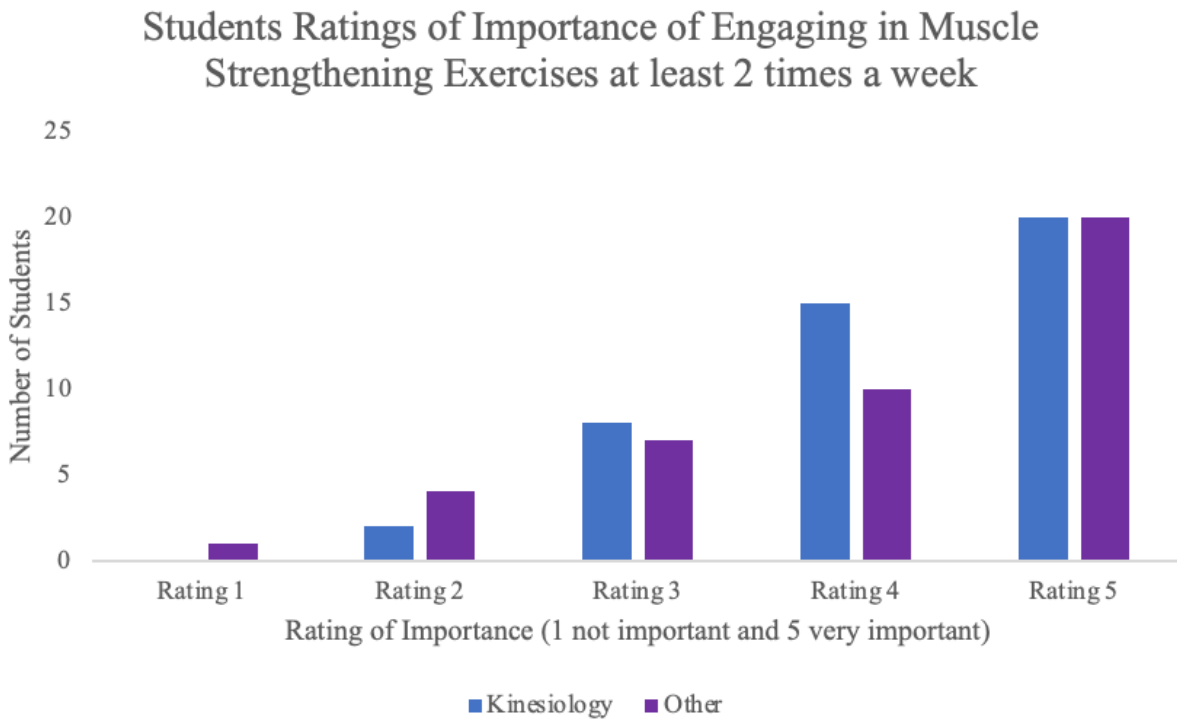


Figure 10.

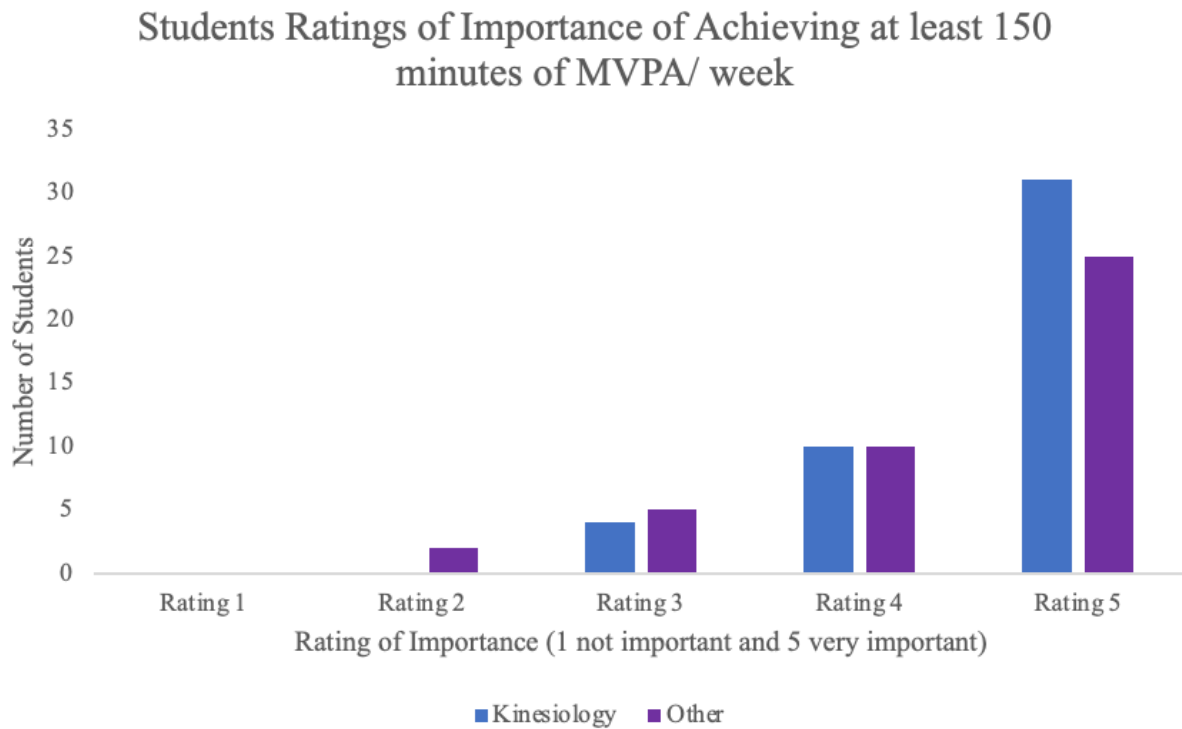


Figure 11.

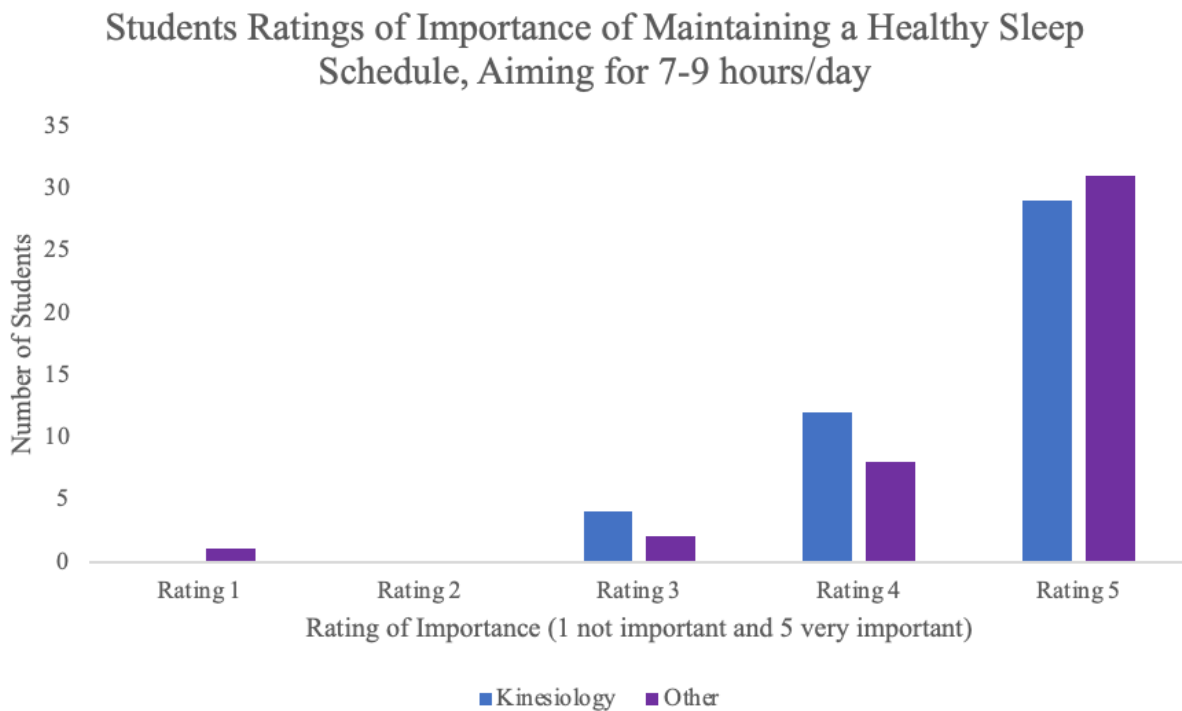


Figure 12.

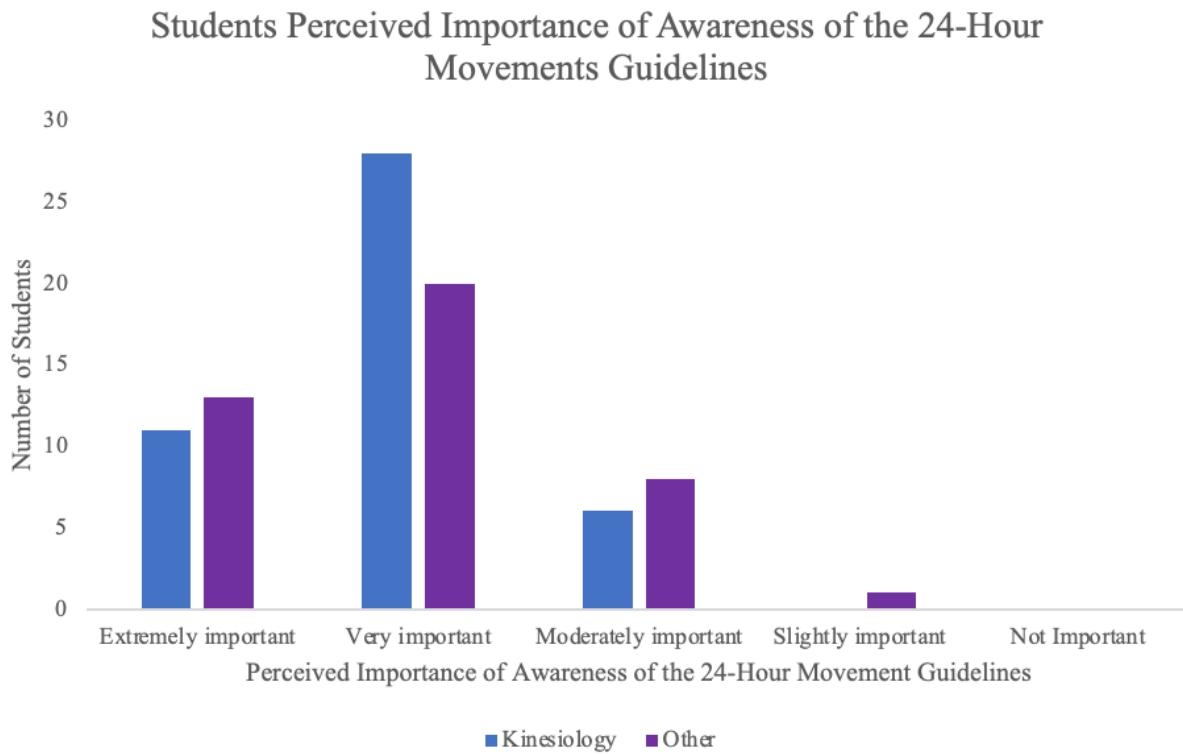


Figure 13.

Preferred Method to Learn about the 24 Hour Movement Guidelines

