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Social Ecological Economic Development Studies (SEEDS) Sustainability Program

Student Research Report

UBC Athletics and Recreation: Move More Learn More for First Year Students

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UBC Athletics and Recreation: Move More Learn More for First Year Students

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Table of Contents

	Page Number
1. Executive Summary	2
2. Introduction	3
3. Literature Review	3
Gaps in Literature.....	5
4. Methods	7
a. Study Design.....	7
b. Participants.....	7
c. Procedures.....	8
d. Data Collection.....	10
e. Data Analysis.....	12
5. Results	12
a. Demographic Summary.....	12
b. Participant Baseline Physical Activity.....	13
c. Perceptions and Barriers of Physical Activity.....	14
6. Discussion	14
Limitations and Implications for Future Research.....	18
7. Recommendations - “RADICAL”	21
a. [1] Program Structure and Scheduling - <i>RAD</i>	21
b. [2] Program and Health Promotion and Integration - <i>I</i>	22
c. [3] Student Accessibility and Retainment - <i>CAL</i>	23
8. Conclusion	24
9. References	26
10. Appendices	34
a. Appendix A.....	34
b. Appendix B.....	42
c. Appendix C.....	49
d. Appendix D.....	63

Executive Summary

This study was conducted in partnership with the University of British Columbia (UBC) Athletics and Recreation's *Move More Learn More (MMLM)* program to aid in developing on-campus physical activity programming for first year students. The study purpose was to identify key barriers and motivators of physical activity engagement amongst a variety of first-year demographic cohorts to gain insight on how the MMLM program could be more convenient and marketable to a wider range of individuals. Recent literature highlights the heightened vulnerabilities of first year students to experience significantly large decreases of physical activity which predisposes these individuals to negative health outcomes in the future (Bray & Born, 2004; Thomas et al., 2019). Due to COVID-19 restrictions, MMLM currently runs a variety of online physical activity and health education classes specifically for Asian female-identifying UBC students (UBC, 2021a). With the planned "return to on-campus instruction and increased levels of on-campus research activity" in the fall, in-person first-year physical activity programming can become a reality (UBC, 2021b). Because of the drastic changes in lifestyle as a result of the COVID-19 pandemic, individuals may be reflecting on their past and current physical activity engagements. Therefore, our survey focused on asking questions regarding intrinsic and extrinsic factors surrounding physical activity behaviours.

Our study surveyed a total of 44 participants who identified as one of the following: incoming first years from high school, first years transferring from another institution, current first years, or incoming first years from a gap year. Questions were presented in multiple-choice formats and likert-type scales. Through the analysis, it was found that the most cited perceived barriers against physical activity participation were (in descending order): lack of time, lack of motivation, and self consciousness. Interestingly, "lack of friends" was not perceived by participants to be a significant barrier which may indicate a shift from socially-driven to health-driven physical activity as a result of the pandemic (and social distancing practices). Meanwhile, students acknowledged and agreed with many positive motivators for exercise such as mental health benefits, long-term health benefits, and appreciation for an active lifestyle. In conjunction with other survey findings, our research team produced three recommendations of key guidelines - RAD-I-CAL (Recurring/Adjustable/Duration, Integration, Cost/Accessibility/Longevity) - for the MMLM program to consider in the development of their novel program tailored for first-year students.

Our study brings primary insight from the target population of MMLM's future program but it is not without its limitations. These limitations include a small sample size, strictly quantitative survey, and reporting bias. Although these limitations may create threats to external validity, our results and recommendations serve as a foundation for future research that UBC Athletics and Recreation can implement into their first-year specific physical activity programs in the future. We hope that this study will contribute to the active and ongoing health promotion initiatives at UBC to better inform and definitively engage incoming students with physical activity and healthy long-term practices.

Introduction

The concept of health, which involves a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity (World Health Organization (WHO), 2021a), has been a mainstay in health promotion and physical activity (PA) for decades (Raphael, 2008). The *Move More Learn More* (MMLM) program at the University of British Columbia (UBC) Vancouver campus initially focused on delivery of PA and health education targetted towards Asian women (UBC, 2021a). Currently, MMLM looks to create PA programming for first year and incoming students to broaden their target population. PA has recently gained traction as a method to promote holistic well-being in many first year university students (Thomas et al., 2019). However, despite the increase in interest, time spent participating in PA has not increased. These findings have been revealed by relevant studies that have identified a significant reduction of PA in both male and female Canadian students during their first year in university (Bray & Born, 2004; Ecker & Hampton, 2015; Thomas et al., 2019).

The purpose of this study is to understand the barriers and subjective experiences of incoming and first year students through the use of surveys, for which responses can be used to identify key strategies to optimize accessibility, appeal, and convenience of PA programs conducted by MMLM at UBC. Multiple systematic reviews have been conducted in an attempt to evaluate the impact of PA on student's self-efficacy, self-esteem, quality of life (QOL), and psychological well-being (Bray & Born, 2004; Joseph et al., 2013; Serrano et al., 2015).

Literature Review

The recommended physical activity guidelines for adults is at least 150 minutes of moderate intensity aerobic PA or at least seventy-five minutes of vigorous-intensity PA throughout the week (WHO, 2021b). Aerobic exercise can be described as any activity that can

be sustained for more than a few minutes while the heart, lungs, and muscles work over time (WHO, 2021b). Moderate-intensity PA requires an average amount of effort and a noticeable increase of heart rate (WHO, 2018). Meanwhile, vigorous-intensity PA requires a large amount of effort and causes rapid breathing and a substantial acceleration in heart rate (Haskell et al., 2007; WHO, 2018). Current findings suggest that PA has numerous benefits, including decreased risk of heart disease, improved QOL, lower links to anxiety and depression, and reduced decline in incidences of long-term illness (Bray & Born, 2004; Haskell et al., 2007). Siefken et al. (2019) found that individuals who meet the WHO recommendations of PA (moderate-intensity PA 150 minutes per week (WHO, 2021b)) showed reduced symptoms of depression and anxiety. Despite these benefits, only thirty-eight percent of first year Canadian University students were meeting the WHO recommendations for moderate-intensity and vigorous-intensity of exercise, and fifty-six percent of students did not participate in adequate PA during university in 2019 (Sevil et al., 2018; Thomas et al., 2019).

Both incoming and first year university students have reported the transition from high school to post secondary as a taxing experience (Elffers & Oort, 2012; Thomas et al., 2019). While a transition can offer a fresh start for some individuals, it is a difficult period as students need to integrate into a new social and academic environment (Elffers & Oort, 2012; Sevil et al., 2018). In a study conducted by Ecker & Hampton (2015), students reported that the lack of motivation and the stresses associated with transitioning to university life can serve as barriers to partaking in regular PA. Moreover, interpersonal factors such as peer influence and body image; along with structural factors influence the frequency in which university students participate in PA (Thomas et al., 2019). The persistence of PA in first-year students throughout their post-secondary education is imperative to their long term health, as habits developed during this

time are generally maintained throughout the lifespan and are predictive of later health outcomes (Thomas et al., 2019).

Compared with high school students, university students showed significantly less PA levels and intrinsic motivation (Sevil et al., 2018) and only one third of students who were active in high school remained active in university (Bray & Born, 2004). Intrinsically motivated students engage in activities for the purpose of pleasure, enjoyment, and interest (Sevil et al., 2018); whereas extrinsically motivated students engage in activities for external purposes, such as to receive rewards or to avoid punishment (Sevil et al., 2018). Additionally, amotivation is represented by the absence of either intrinsic or extrinsic motivation (Sevil et al., 2018). Sevil et al. (2018) found that amotivation increased across the transition from high school to university, making it more difficult for students to reach the recommended levels of moderate-to vigorous PA. Moreover, PA and motivation have a bidirectional interaction - students who comply with PA recommendations are found to have higher intrinsic motivation, and those with higher intrinsic motivation will be more likely to seek out active behaviors (Serrano et al., 2015; Sevil et al., 2018). University students have been shown to participate in more PA when it is requested or facilitated by an organization (Sun et al., 2017), in particular, the participation in intramural sport remains constant throughout the year (Thomas et al., 2019). Furthermore, it is suggested that university coordinated PA may be more effective for engaging students, as students are more focused on intrinsic (competence-mastery) factors of motivation, rather than the extrinsic (stimulus-avoidance) factors that come with PA in high school settings (Cooper et al., 2012).

Gaps in the Literature

Although current literature vastly supports the benefits of PA among first year university students, there is limited evidence comparing male and female PA levels, behaviors, and barriers

(Thomas et al., 2019). Males have generally reported greater frequency, duration, and intensity when engaging in PA, however, there is insufficient understanding on the reasons why this may be (Ecker & Hampton, 2015). Furthermore, exploring the changes of PA and how its barriers change across the academic year would help in analyzing the overall reductions in PA (Thomas et al., 2019). Multiple systematic reviews have concluded that marginalized populations are less likely to participate in PA essentially increasing the prevalence of negative health outcomes (Frederick et al., 2020; Ironside et al., 2020; Martin, 2013), thus further research is needed to identify the barriers that these individuals face. Discrimination against physical appearances is a prevalent barrier in society (Macdonald et al., 2009), as such, an ongoing focus on marginalized populations was applied to our study.

LGBTQ+ students have less positive perceptions of all aspects of PA compared to their non-LGBTQ+ counterparts (Frederick et al., 2020). Moreover, Frederick et al. (2020) found a negative correlation between PA and stress, where increases in PA decreased stress associated with body norms, stereotypes and homophobia within the LGBTQ+ community. Additionally, Ironside et al. (2020) found that Indigenous individuals who are more physically active have greater feelings of cultural connectedness, including relations to spirituality, traditions, and exploration. Individuals with disabilities who participate in PA have heightened perceptions of independence and personal success (Martin, 2013). Despite clear evidence of the advantages of PA for minority groups, further research detailing the specific needs would be beneficial for the development of more inclusive programs catered to these individuals.

Methods

Study Design

An online survey was chosen as the method of data collection to support the MMLM program at UBC. The usage of a web-based survey facilitates the inclusion of a more diverse range of participants without geographical constraint (Dillman et al., 2014). Online surveys have become a staple way of survey distribution given its ease of use, flexibility, and minimal pressure on the respondent's end (Dillman et al., 2014). Additionally, Harwell (n.d.) highlights that surveys can be useful in generating data from a small sample that can be generalized to a larger population. The post-positivist philosophical worldview that underlies the study compliments the quantitative approach that has been chosen. This framework will allow researchers to gain an objective understanding of first year students' perceptions of PA. The findings from this study will be beneficial in recognizing the priorities when designing appealing PA programs for future first year student populations.

Participants

The theoretical population in this study will be incoming and first year students at UBC. The persistence of PA in first-year students throughout their post-secondary education is imperative to their long term health, as habits developed during this time are generally maintained throughout the lifespan and are predictive of later health outcomes (Thomas et al., 2019); therefore this cohort will be studied. The inclusion of older adults would be undesirable because older age often leads to different patterns of PA (Keating et al., 2005) which may result in differences in perceived barriers and motives. Therefore, it is crucial to study the adverse perceptions of PA and educate this cohort through health promotion strategies (Thomas et al., 2019). Moreover, this age period is a critical period for overall cognitive, and socioemotional

development where absence of PA will negatively impact the well-being and academic performance in adolescents (Archer & Garcia, 2014).

Incoming and first year university students have reported the transition from high school to post secondary as a taxing experience (Elffers & Oort, 2012; Thomas et al., 2019). While a transition can offer a fresh start for some individuals, it is a difficult period as students must integrate into a new social and academic environment (Elffers & Oort, 2012; Sevil et al., 2018). Holmes and Rahe (1967) developed a Social Readjustment Rating Scale (SRRS) exploring the relationships between stressful life events and physical illness (Gadzella, 1994). Based on the SRSS, the beginning or end of school is within the top twenty stressful events an individual may experience in their lifetime, along with divorce, death, and prison (Scully et al, 2000). Chronic exposure to stressful events rated high on the SRRS are positively correlated with an increased risk of cardiovascular disease, thromboembolic stroke, hypertension, type 2 diabetes, osteoporosis, obesity, along with anxiety and depression (Haskell et al., 2007).

The survey will not discriminate between sub-populations of first year students, as the goal of the study is to understand how MMLM can create an inclusive and welcoming PA program for all.

Procedures

An online survey has been formulated using Qualtrics which will serve as the method of data collection. The survey consists of thirty-two questions that provide insight on first year and incoming students' perceptions of PA. Questions asked in the survey will cover a variety of perspectives and motivations over varying answer formats. Demographic questions regarding topics such as the respondents' age and sex are important for researchers to analyse the differences amongst pre-existing cohorts within the sample, and to discern whether the results

are generalizable to the population or for comparison to related research (Hughes et al., 2016). Questions regarding the respondents' baseline PA in aerobic, resistance, and flexibility-related exercise, as well as their perception of PA will be inquired through self-reporting scales, multiple choice and likert scale questions. Self-reporting scales were chosen to allow participants to best reflect their approximate engagement levels in PA. Additionally, five point likert scale questions were implemented into the survey in order to understand the perceptions of participants in greater depth without hindering the ability to differentiate between the varying degrees of responses (Xu & Leung, 2018).

The survey will be promoted through word-of-mouth and social media platforms such as Facebook, Messenger, Instagram, targeting up to 100 current and incoming first-year students at UBC. Upon beginning the survey, participants will be prompted to fill out a consent form detailing the research purpose, procedures, project outcomes, potential risks or benefits, and other ethical concerns pertaining to privacy. Due to the prevalence of social media and the broad inclusion criteria of the study, the recruitment target will be 100 unique participants. The survey will remain open until the maximum number of participants have contributed to the study, or until April 1st, 2021. If the number of participants does not reach the minimum target of forty students, the survey will remain open until the minimum requirement has been met.

Following the data collection phase, the data will be analyzed using descriptive statistical analyses. Analyses based on measures of central tendency and variability can be derived from the survey responses, and used to compare the differences in perceptions of PA between cohorts. The objective of analysing and interpreting data is to reveal trends that exist in the target population. Survey questions allow participants to express barriers associated with current PA programming - such as cost and comfortability. These trends can allow us to identify the

downfalls of current PA programs; as well as how future programs can be tailored towards the future target population.

Data Collection

A survey will be used to assess participant PA levels: (1) Baseline Physical Activity Questionnaire (BPAQ) , (2) Perception of Physical Activity (PPA), and (3) Motivations Behind Engaging in Physical Activity (MBEA).

The BPAQ will be used to collect information on the intensity, frequency, and duration of aerobic, resistance, and flexibility training that the participants engaged in. The questionnaire asks about how often students participated in certain activities that varied in frequency over the past week by selecting one of the following options: “0 days”, “1 day”, “2 days”, “3 days”, “4 days”, “5 days”, “6 days”, and “7 days”. Participants are also asked to indicate the duration of one bout as one of the following: “0-15 minutes”, “15-30 minutes”, “30-45 minutes”, “45-60 minutes”, and “60 minutes or more”. Activities of aerobic exercise includes walking, running, biking, swimming, elliptical, and stairmaster; resistance exercise includes free weights, weight machines, body weight, and resistance bands; and flexibility exercise includes stretching, yoga, tai chi, and pilates. Responses from this section allow for the ability to determine if the cohort of participants are within typical PA ranges found in previous studies, and further allows us to determine associations between activity level and activity type. Moreover, self-report measures, specifically surveys, targeting sedentary populations are likely to experience floor effects in which the lowest score available is too high for some participants (Tudor-Locke & Myers, 2001). Taking this into consideration, the lower limit of this section of the questionnaire is set to zero, with no defined upper limit. All responses from this questionnaire will be captured in a data collection sheet and compared using descriptive statistical analyses.

The PPA will be used to measure the general perceptions of PA among incoming and first-year students. This questionnaire is designed to measure participants' general perceptions of PA prior to starting post-secondary or retrospectively at the start of post-secondary. The questionnaire is separated into two sections. The first section examines perception of PA in university and prior to university. The participants are provided with a five-point scale: 1 being negative perceptions ranging from "very uncomfortable", "I hate it" to "highly unlikely", whereas 5 consists of positive perceptions ranging from "very comfortable", "I love it" to "highly likely" respectively. Participants are asked to select the response that best describes their usual habits. The second section examines the perceived barriers of PA. Participants are first asked which barriers affect their current participation in PA, then whether the barriers will affect their ability to participate in PA in post-secondary. Participants are provided with a five-point scale: 1 being "highly unlikely" and 5 being "highly likely".

The MBEA is used to examine the motives to PA as well as overall PA behaviors. The questionnaire consists of four parts. The motives of PA defined by the questionnaire includes enjoyment reasons, health and medical reasons, engagement-based reasons, and interpersonal reasons. Enjoyment reasons of participating in PA includes being active, doing something one is good at, feeling alert during the day, and feeling less guilt when indulging in cravings. Moreover, health and medical reasons, including exercising to alleviate pain, keep health and avoiding illness, receiving life-long benefits, and positive benefits to one's mental health and ability to destress. Engagement-based reasons include partaking in PA due to its opportunity for social interaction or a way to meet new people, wanting to challenge oneself, to get out of the house, and because they may have someone to exercise with. Lastly, interpersonal reasons include the boosting of energy levels, increased feelings of relatedness, increased feelings of control,

increased self-esteem and positive body image, happiness, weight maintenance, and weight loss. Each factor is measured on a five-point scale, from 1 being “strongly agree” to motives behind PA and 5 being being a “strongly disagree” to motives behind PA. The responses from the MBEA will provide insight about which category of motivations are valued the highest by the target population. Using these insights, recommendations can be made about how MLMM can shift the priorities and purposes of PA programs to appeal to the target population.

Data Analysis

The quantitative results derived from the survey process will be obtained through the Qualtrics database, where raw data will be compiled. To illustrate the findings that were collected from the participants, descriptive statistical analysis will be generated using the JASP program. Using descriptive statistics based on measures of central tendency and variance, graphs will be produced to aid visualization and enhance the interpretation of data. The use of descriptive statistics are advantageous in determining normality of data and to understand statistical trends (Ho & Yu, 2015). This form of analysis will provide a clear overview of the data to allow researchers to numerically evaluate the relationships between the data collected regarding PA behaviours and attitudes among the sample population (Ho & Yu, 2015). Using these measures, UBC Athletics and Recreation can tailor their programs to better suit the specific needs and concerns described by the survey questions to create programming that better encompasses a diverse range of first year students.

Results

Demographic Summary

Our survey collected the demographic characteristics of 44 (n=44) participants (see Appendix B). Participants in this sample were on average 18.07 years of age ($1 < 20$ years), with

29 participants (64.4%) in first year, 12 (26.7%) incoming first years from high school, 1 (2.2%) incoming first year from a gap year, and 3 (6.7%) incoming first years from another institution or faculty (See Table B.1.). Most participants identified as cisgender, with 24 (54.5%) females and 19 (43.2%) males (See Table B.2.). However, 2.3% of the participants did not disclose their biological sex (See Table B.2.). Moreover, 37 (77.8%) of participants identified as heterosexual/straight, with the remaining 23.2% identifying as either, bisexual, asexual, pansexual, or questioning (See Table B.3.). A majority of the participants were single (81.8%), 4.5% were dating casually, and 13.6% were in a monogamous relationship (See Table B.6). Lastly, 31.1% of participants were employed, compared to 20.0% being unemployed (See Table B.4.).

Participant Baseline Physical Activity

From our survey responses, the average aerobic exercise was 190.2 minutes/week, with 59.6% of participants exercising for at least 30 minutes during each session (See Table C.1., C.7.). The majority (81.8%) of students were engaging in moderate-vigorous intensity PA (See Table C.1.). The most common methods of aerobic exercise included walking (62.7%) and running (51.2%) (Figure C.1). For those engaging in resistance exercise (63.4%), the average resistance exercise was 146.5 minutes/week, with the majority using free weights (81.3%) and body weight (73.6%) (See Table C.7.; Figure C.3). However, it was found that 16.1% of the sample did not engage in resistance exercise at all (See Table C.4.). It was also found that 40.9% of participants did not engage in flexibility-related exercise, with 47.7% engaging in stretching for an average of 43.3 minutes per week (See Table C.5; Figure C.2). 82.9% of engaging participants also reported that each flexibility-related exercise session was between 0-15 minutes (See Table C.5.).

Perceptions and Barriers of Physical Activity

When examining data regarding perception of PA, 82.1% of participants claimed that they either liked or loved PA, with 0.0% of the sample disliking or hating PA (See Figure D.3.). Participants engaged in PA for reasons associated with being active (90.0%), maintaining good health (85.0%), destressing or benefiting mental health (80.0%) receiving life-long health benefits (75.0%), and to get out of the house (75%) (See Figs D.5., D.6., D.7.). Additionally, participants rated exercise as helpful in increasing self esteem and positive body image (87.5%), being happy (85%), and maintaining weight (77.5%) (See Figure D.8.). It was found that 80% of participants were most comfortable exercising in a private space in solitude, while 72.5% of participants were either comfortable or very comfortable exercising with friends in both recreational and formal PA settings (See Figure D.9.). Participants expressed most interest in UBC workout spaces such as the ARC or Birdcoop (70.0%) and intramurals (65.0%), while 72.5% of participants expressed disinterest in the UBC Aquatics venue (See Figure D.4.). In addition, participants listed having the lack of time (87.5%) as the biggest barrier to PA engagement, followed by lack of motivation (57.5%) (See Figs D.1., D.2.). Interestingly, having a lack of friends to exercise with was not a barrier to PA engagement, with 72.5% of participants rating lack of friends as being a (highly) unlikely barrier to PA (See Figure D.2.).

Discussion

In the present study we used a prospective design to gain an understanding of PA intention, behavior, and perceived barriers of PA during students' transition from highschool to university. The main purpose of this study was to identify the barriers and subjective experiences of incoming and first year students in order to identify key strategies to optimize accessibility, appeal, and convenience of PA programs conducted by MMLM at UBC. In addition, we

investigated current PA behavior as an additional predictor of students' perceptions of PA levels in university. Overall, the findings supported an idea that students' current PA activity levels were associated with perceived barriers in post secondary. Current behaviors accounted for significant explained variance in predicting both barriers and experiences.

According to WHO (2021b), the recommended PA guidelines for adults is at least 150 minutes of moderate intensity aerobic PA or at least seventy-five minutes of vigorous-intensity PA throughout the week. Based on our analysis of current PA level, we have divided students into 2 groups- students who meet the PA guidelines versus students who do not meet the PA guidelines. Our results indicated that only 59.6% of participants engaged in the recommended levels of aerobic PA per day (thirty minutes or more), whereas 40.4% of participants were not meeting the recommended PA guidelines (WHO, 2021b) (See Table C.1.). The differences of current PA levels between these two groups is a significant predictor of PA during the first semester of university (Kwan et al., 2019). These findings suggest that MMLM may need to consider a holistic approach in order to provide equal opportunities of PA in students' university experience.

The overall findings of our study were congruent with many other studies that have found time to be a strong predictor of PA in university (Thomas et al., 2019). However, our findings suggest that a lack of friends was a significant, but comparatively weaker barrier affecting participants. For participants who are currently not meeting the recommended PA guidelines, lack of friends (4.8%) and lack of physical competence (14.3%) were significantly greater perceived barriers compared to those who are engaging in recommended PA (See Figure D.11.). On the contrary, cost (19.0%) and lack of motivation (35.7%) were substantially stronger barriers among participants who are currently meeting PA guidelines (See Figure D.12.).

However, time and self-esteem barriers were found to be similarly perceived among the students who are currently meeting the recommended PA levels and students who are not meeting recommended levels; with time rated as 38.1% and 45.2%, and self-consciousness rated at 16.7% and 21.4% respectively (See Figs D.11. and D.12.). Berry et al. (2018) found that exercise for young adults needs to be targeted towards them specifically. Offering PA programs in various durations throughout the week would better accommodate students with varying schedules. Moreover, programs that are tailored towards specific cohorts can reduce feelings of self-consciousness among students (Berry et al., 2018). The implementation of these recommendations would allow UBC Athletics and Recreation to gain a deeper understanding about the knowledge, perceptions, and awareness among first year university students from a spectrum of backgrounds (Berry et al., 2018). Based on these findings, we were able to elaborate on previous research on the topic, and ultimately construct recommendations based on three distinct themes.

Furthermore, Sun et al. (2017) found that university students are more likely to participate in more PA when it is requested or facilitated by an organization, such as intramural sport (Thomas et al., 2019). In contrast to those findings, the present results revealed that 65% of participants are likely to participate in intramural sports offered by UBC Athletics and Recreation (See Figs D13. and D.14.). UBC Recreation currently has competitive, recreational, and Just for Fun teams with 10 league categories available to students (UBC Recreation and Athletics, 2021). Recreational and Just for Fun leagues differ in that recreational teams are similar in all aspects of competitive teams but are played at a lower intensity and students typically have beginner to intermediate skill level in the sport. On the other hand, Just for Fun teams eliminate team structure and tiers, which creates an inclusive environment that invites

everyone to participate (UBC Recreation and Athletics, 2021.). Intramural sports provide an opportunity for students' to improve their athletic, physical and social skills; positively contribute to their education and well-being; and improve their overall self-esteem (Kanters & Forester, 1997). As Kanters & Forester (1997) suggests, hosting Intramural sport specifically for first year students at UBC will assist in overcoming many participants' perceived barriers.

On the contrary UBC Aquatics was perceived as the least popular venue, with individuals who currently meet WHO PA guidelines only 7.70% likely use the space, and 12.5% of individuals who do not meet WHO guidelines (See Figs D.13. and D.14.). Although 74% of Canadians enjoy swimming for fun and recreation (Life Saving Society, 2021), there are two significant barriers that reduce the popularity of UBC Aquatics. The first barrier is cost. A student membership at UBC Aquatics requires students to be enrolled in courses and have paid the Athletics and Recreation fee of 230.82 dollars (AMS Student Nest, 2021; UBC, 2021c). Archibald & Feldman (2008) has found the real cost of a full-time student's university education has grown substantially over the last seventy-five years. With this in mind, students' often overlook their health, in order to pursue their education (Archibald & Feldman, 2008). Moreover, self-esteem is also a contributing factor in why individuals' are not likely to use the facility. Embarrassment and self-consciousness are all factors correlated with public swimming participation (James, 2000). Body image is a big issue during adolescence and early adulthood and many university students are unhappy with their physical appearance (Pop, 2016). To reduce self consciousness some individuals had developed strategies to make themselves less visible including covering up their bodies, staying in groups, swimming at remote venues and avoiding pools altogether (James, 2000). The recommendations outlined in this section center around the idea of group membership and inclusivity. Our hope is that students will feel more comfortable

exercising around familiar cohorts (Byrne et al., 1967) and thus increase the likelihood of engagement in low popularity venues.

Lastly, the average perception of “lack of friends” being a barrier to participation in PA between the two groups was 3.6% (See Figs D.11. and D.12.). Because of the drastic changes in lifestyle, individuals may be prompted to reflect on their PA experiences, comparing their current engagement with pre-pandemic engagement. As such, a shift from socially-driven to health-driven physical activity has demonstrated to be a function of the COVID-19 pandemic (and social distancing practices) (Hemanth, 2020). Since the onset of the COVID-19 pandemic in March 2020, numerous restrictions have been placed to ensure our safety (Provincial Government of British Columbia, 2021). Currently, a maximum of 10 people are allowed to gather outdoors and many indoor PA facilities are limited (Provincial Government of British Columbia, 2021). Due to a new norm of “pandemic life” and “self-isolation”, participants’ may have become accustomed to solitude (Hemanth, 2020). It is important to consider the effects of the COVID-19 pandemic on students’ perceptions and barriers of PA.

Limitations and Implications for Future Research

Some limitations and challenges that were present throughout the course of the current study included the disadvantages to a strictly quantitative survey, reporting bias, and difficulty obtaining a significant sample size.

Quantitative Survey: Limitations

PA participation is multifactorial and includes many subjective experiences. The current study attempts to quantify many of these unique experiences through likert-type scales, which were limited to the variables identified by the research team. This may be disadvantageous as there may be many other factors or barriers resulting in the decline of PA participation in

first-years (Thomas et al., 2019). To address this limitation, a text-box was provided for any multiple-answer questions allowing for any factors that were not included in the original survey options. Questions pertaining to perceived barriers and types of exercise included the text-box as well. All participants selected variables presented in the survey, but only several participants submitted additional barriers to their PA. By taking a quantitative stance, the responses received are much more structured. Although quantitative responses are more easily organized and analysed, qualitative questionnaire and interview would provide more breadth of knowledge.

In retrospect, a mixed-method study would combine the efficiency of obtaining quantitative data, while also providing insight to unique and subjective experiences of the sample using qualitative data. The inclusion of semi-structured interviews with select participants would allow for greater interpretation of findings specific to the first-year UBC experience.

Reporting Biases

The analysis conducted on the data gathered may be influenced by response biases, where participants may answer untruthfully, subconsciously or intentionally. Reporting biases are often influenced by social desirability, where participants may respond in the most socially acceptable way. Subjects may be prone to exhibiting acquiescence - agreeing with statements regardless of their content, especially when they do not fully understand the question; and extremity - the tendency to select the most extreme response categories (Kowalski et al., 2018). To minimize social desirability, participants were informed prior to the start of the survey that response submissions would remain anonymous. To minimize the effect of acquiescence, the current study's questionnaire defined or provided examples for terminology where applicable. Lastly, the data analysis also showed signs of disinterest throughout the questionnaire, as seen when participants responded in optional text-boxes with items already provided within the original

survey. Disinterest in surveys often lead participants to respond less carefully, resorting to extremity bias, for which future studies may consider the length when designing a survey.

Small Sample Size

With 44 respondents, our sample size is very small compared to the average enrollment size of 8442 first-year students within the past five years (UBC, 2021e). As a prominent limitation of our study, our small sample size limits the ability to declare true positives, and in turn reduces the ability to make profound or justifiable claims (Faber & Fonseca, 2014).

Furthermore, a small sample size greatly impacts the external validity of the study, specifically as produced through low population validity, or the ability for a sample to be generalized to a broader population (Kowalski et al., 2018). This study may not be representative of the entire first-year population at UBC, which makes it difficult to conclude whether or not results are generalisable, or that the suggested recommendations would be effective for the population. Implications of our study may not holistically capture the needs of the broader first-year population, but should serve as a general consensus and a foundation for future research.

In addition to sampling only incoming and current first-year students, future studies could extend the inclusion criteria to all undergraduate (second- and upper-year) students, asking them to look retrospectively at their own first-year experiences. Surveying upper-year students would provide an alternative perspective from individuals who have fully experienced and reflected upon their first-year. Upper-year students have the ability to provide insight as to whether or not UBC programs have met their expectations for PA in first-year, while incoming students would only be able to provide a prospective standpoint on PA engagement. Because our questionnaire was promoted through social media and word of mouth, additional changes to promote a larger sample could include putting up posters around UBC to recruit students who do not use social

media. These considerations would better support the generalisation of findings and recommendations for PA programs tailored to first-years.

Recommendations

Our recommendations are organized under the acronym “RAD-I-CAL” which stands for “Recurring, Adjustable, Duration”, “Integration”, “Cost, Accessibility and Longevity”. These concepts are grouped under three key recommendations to improve the MMLM program’s marketability and attractiveness to first-year students.

[1] Program Structure and Scheduling - *RAD*

Referring to figure (See Figure D.1), one-third of participants cited “lack of time” to be the major perceived barrier against PA participation in their first year at university. This suggests a difficulty to fit in and make time for PA within their busy schedules. The concepts behind Recurring, Adjustable, and Duration is to offer specific classes within a given program that recur multiple times in a set time-frame - for example, a month or biweekly. Schedules of classes should be published in advance to allow students to pre-plan their PA and give them more options to attend an activity that is within their interest and availability. Respondents also showed an even distribution of their personal current exercise times for both aerobic and resistance exercise per session (See Table C.1 & C.3). Therefore we also recommend that the duration of these classes vary in duration.

Example of an offered schedule for a specific class-type:

Zumba

- Tuesday, February 2nd - 4pm to 4:45pm (45 minutes)
- Friday, February 12th - 11am to 11:30am (30 minutes)
- Wednesday February 24th - 7pm to 8pm (1 hour)

Adjustable refers to the adaptation of class content based on the duration, location, and equipment available for a given class-time. It also refers to the adjustability of class organization and structure. The majority of students perceived PA as a “way to get out of the house” and also agreed that they engaged with exercise because they like “being active” (See Figure D.5 & D.7). Because of this, MMLM should consider a balance of drop-in and membership restricted programs to accommodate both casual and more serious PA partakers.

Overall, MMLM’s current program structure offers a diverse set of classes and activities available for its members. Offering a wider range of time slots would improve the reach of the program to first year students. Future iterations and adjustments to scheduling could be guided by analysis of participant preferences and attendance data.

[2] Program and Health Promotion and Integration - I

With the literature highlighting the influential and important role of post-secondary institutions in shaping the attitudes of its students, we also recommend involving campus-life and residence stakeholders in the marketing and promotion of MMLM programs as a part of student health (Elffers & Oort, 2012). With 6% of UBC first-years living on-campus and the popularity and high-volume attendance of UBC’s Imagine Day (UBC, 2014), residence and campus-life coordinators have an invaluable opportunity to encourage first year students to take advantage of MMLM programs and adopt healthy practices from the beginning of their university careers.

We recommend MMLM to negotiate and implement a program or short-term event with UBC-Recreation and gym spaces where first-year students get exclusive access to these PA venues. This recommendation is made with consideration of Ontario Public Health’s stakeholder wheel model to identify the roles and relations of figures in the implementation of health promotion projects (Snelling & Meserve, 2016). The “Core” sector of the stakeholder wheel

would be the MMLM coordinators who are at the heart of the project; campus/residence-life workers would fall under the “Involved” sector of the stakeholder wheel of health promotion where they are frequently consulted and involved with the direct planning and implementation of the program through their advertisement and educational strategies to the first-year population. UBC exercise space coordinators (such as the ARC gym) would be part of the “Supportive” sector where they facilitate access to their spaces and provide expertise and experience to help shape the program before and during its implementation. Lastly, “Peripheral” stakeholders of this potential program would consist of other UBC staff members, particularly professors of first-year classes, and the School of Kinesiology society. It would be beneficial for these figures to be knowledgeable of this opportunity to aid in the support and spread of this first-year specific program.

This unique opportunity could act as a gateway catalyst to help first-years become familiar and more comfortable with these spaces and facilitate the students’ self-efficacy to engage within these spaces. Additionally, this “first-year only” advertisement could be an effective marketing strategy to attract and motivate these students to be involved as it uniquely pertains to their cohort.

[3] Student Accessibility and Retainment - *CAL*

Our last recommendation is concerned with building rapport with all future first-year student cohorts (and the entire future UBC community by extension) to ensure the long-term success of MMLM’s first-year tailored programs. CAL stands for Cost, Accessibility, and Longevity. With 11% of students citing “cost of exercising” as a barrier, we recommend MMLM’s program to consider free opportunities for students to partake in classes or programs (See Figs D.1. and D.2.) A balance between membership-exclusive programs and drop-in classes

is essential to appealing to the desires of students. Membership-exclusive programs may appeal to students who desire a stronger sense of obligation to participate in PA. On the contrary, free opportunities may appeal to students that prefer convenience and freedom in their engagement.

UBC prides itself on having a diverse student body (UBC Student Services, 2017). We recommend developing programs that are tailored towards people in certain cohorts such as the LGBTQ+ community or special classes for differently-abled individuals. This would increase the accessibility and available PA options for these minority groups who require more consideration and planning to create successful PA interventions (Mudge et al., 2013). Thus, investment in programs for targeted populations could help foster long-term community connections to promote longevity of MMLM first-year programs. These recommendations support the long-term goal of improving student health as they move beyond their first year at UBC.

Conclusion

Despite the small sample size and other limitations of our study, we hope that our findings provide useful insights for MMLM to consider in their future endeavours in creating physical activity programming for first-year students at UBC. We also hope that our findings can contribute to filling certain gaps in the literature regarding knowledge of barriers and motivators of physical activity.

The recommendations that were developed serve to facilitate the motivators and mitigate the barriers that participants identified. Our recommendations follow concepts identified by the acronym “RAD-I-CAL” and aim to improve: (1) program structure and scheduling, (2) health promotion and program integration, and (3) student accessibility and retainment. Future research should gather data about the experiences and reflections of students who have participated in MMLM’s first-year program. Additionally, further investigations regarding the differences in

barriers between specific cohorts can also aid in improving the success of this program. We hope that the recommendations made will be conducive to improving the physical activity engagement and health of all future first-year students and the UBC community by extension.

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Appendix A

Survey Questions

1. Which of the following categories describes you?
2. How old are you?
3. Which of the following categories describes you?(race)
4. What sex were you assigned at birth?
5. What gender do you currently identify with?
6. How would you describe your sexual identity? Select all that apply.
7. What is your relationship status?
8. What is your current employment status? Select all that apply.
9. Compared to your average physical activity, how active were you in the last week?
10. For the following questions, select the answer that best reflects your aerobic physical activity in the past week. (11-15)
11. How many days did you engage in aerobic physical activity? (e.g. running, swimming, biking)
12. On average, how hard were you exercising?
13. On average, how long was each individual session of aerobic exercise?
14. Give an approximation of your total time (hours) performing aerobic exercise in the last 7 days.
15. What type of exercise did you perform? Select all that apply.
16. For the following questions, select the answer that best reflects your engagement in resistance exercise in the past week. (17-20)
17. How many days did you engage in resistance exercise?
18. On average, how long was each individual session of resistance exercise?
19. Give an approximation of your total time (hours) performing resistance exercise in the last 7 days?
20. What type of exercise did you perform? Select all that apply.
21. For the following questions, select the answer that best reflects your engagement in flexibility-related exercise in the past week (22-24)
22. On average, how long was each individual session of flexibility-related exercise?
23. Give an approximation of your total time (hours) performing flexibility-related exercise in the last 7 days?
24. What type of exercise did you perform? Select all that apply.
25. On a scale from 1-5, how comfortable are you with exercising in the following conditions:
 - a. By yourself; in a private space
 - b. With strangers; in a formal physical activity program
 - c. With friends; in a recreational setting
 - d. With friends; in a formal physical activity setting

- e. In an outdoor public space
 - f. In an indoor public space
26. On a scale of 1-5, how much do you enjoy physical activity?
27. On a scale from 1-5, how likely are you to participate in the following physical activity venues/programs:
- a. Intramurals
 - b. Esports league
 - c. UBC aquatics
 - d. UBC workout spaces
 - e. Other UBC exercise venues
28. Which of the following barriers affect your participation in physical activity
- a. Lack of time
 - b. Cost of exercising
 - c. Lack of friends
 - d. Self-consciousness
 - e. Perceived lack of physical competency
 - f. Lack of motivation
 - g. Other
29. On a scale from 1-5, how likely do you think these barriers will affect your ability to participate in physical activity in post-secondary?
- a. Lack of time
 - b. Cost of exercising
 - c. Lack of friends
 - d. Self-consciousness
 - e. Lack of physical competence
 - f. Lack of motivation
30. I exercise because I enjoy...
- a. Being active
 - b. Doing something I am good at
 - c. Feeling alert during the day
 - d. Feeling less guilty about indulging in cravings
31. I exercise to...
- a. Alleviate pain
 - b. Keep healthy, avoid illness
 - c. Receive life-long benefits
 - d. Benefit my mental health & help de-stress
32. I exercise because...
- a. It provides me with an opportunity for social interaction or a way to meet new people
 - b. I want to be challenged

- c. I want to get out of the house
 - d. I have someone to exercise with
33. I exercise because it helps me...
- a. Boost energy levels
 - b. Feel more relatedness
 - c. Feel more incontrol of my life
 - d. Increase self-esteem and positive body image
 - e. Be happy
 - f. Maintain my weight
 - g. Lose weight
34. Do you have any other comments or feedback pertaining to your involvement in physical activity as a UBC student?

Table A. 1. Overview of participants' consent.**Frequencies for Consent**

Consent	Frequency	Percent	Valid Percent	Cumulative Percent
I consent.	44	100.000	100.000	100.000
Missing	0	0.000		
Total	44	100.000		

Consent Form

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CLASS PROJECT: Health Promotion and Physical Activity (KIN 464)**Participant Consent Form**

(Project D)(J): Move More Learn More for First Year Students

Group 8

Principal Investigator:

Dr. Andrea Bundon (Assistant Professor, School of Kinesiology, Faculty of Education)

The purpose of the class project:

To gather knowledge and expertise from community members on the physical activity (PA) experiences of first year and incoming university students. This pilot study aims to understand the barriers and subjective experiences of incoming and first year students through the use of quantitative research; with an emphasis on recognizing methods to enhance PA programs conducted by Move More Learn More (MMLM) at UBC. The secondary research questions will address the cohort differences in PA levels, behaviors, and barriers, along with the subjective experiences of incoming and first year university students. The ultimate goal is to optimize accessibility, appeal, and convenience of PA for incoming and first year university students.

Study Procedures:

With your permission, we are asking you to participate in 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>

February 22, 2021

Project ID: H17-03560

1



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Potential benefits of class project:

There are no explicit benefits to you by taking part in this class project. However, the interview 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 Dr. 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 Andrea Bundon by phone at 604-822-9168 or by email at andrea.bundon@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 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.

Subject signature: _____

Date: _____

Social Media Recruitment

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www.kin.ubc.ca**KIN 464: Health Promotion and Physical Activity Class-based Project**

(Project D)(J): Move More Learn More for First Year Students

Group 8

If you are an incoming or current first year student
at the University of British Columbia, we would
like to speak with you!

As part of a course-based research project (KIN 464), we are conducting a study to understand the barriers and subjective experiences of physical activity programs for incoming and first year students. We are looking to find ways to enhance physical activity programs conducted by Move More Learn More (MMLM) at UBC. If you are an incoming or current first year student at UBC, we would love to hear from you! For more information, please click on the following link and you will be redirected to our survey.

https://ubc.ca1.qualtrics.com/jfe/form/SV_ahE13T4LJFukZeK

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).

January 11, 2020

Project ID: H17-03560

Appendix B

Table B. 1. Overview of participants' demographics, including age and category of student.

Frequencies for Age

Which of the following categories best describes you?	Age	Frequency	Percent	Valid Percent	Cumulative Percent
First year student	16 years old	0	0.000	0.000	0.000
	17 years old	0	0.000	0.000	0.000
	18 years old	20	71.429	71.429	71.429
	19 years old	6	21.429	21.429	92.857
	20 years old	1	3.571	3.571	96.429
	Older than 20 years old	1	3.571	3.571	100.000
	Missing	0	0.000		
	Total		28	100.000	
Incoming first year student (currently in gap-year)	16 years old	0	0.000	0.000	0.000
	17 years old	0	0.000	0.000	0.000
	18 years old	0	0.000	0.000	0.000
	19 years old	0	0.000	0.000	0.000
	20 years old	1	100.000	100.000	100.000
	Older than 20 years old	0	0.000	0.000	100.000
	Missing	0	0.000		
	Total		1	100.000	
Incoming first year student (from another institution or faculty)	16 years old	0	0.000	0.000	0.000
	17 years old	1	33.333	33.333	33.333
	18 years old	1	33.333	33.333	66.667
	19 years old	0	0.000	0.000	66.667
	20 years old	1	33.333	33.333	100.000
	Older than 20 years old	0	0.000	0.000	100.000
	Missing	0	0.000		
	Total		2	100.000	

	Total	3	100.000		
Incoming first year student (in highschool)	16 years old	1	8.333	8.333	8.333
	17 years old	9	75.000	75.000	83.333
	18 years old	2	16.667	16.667	100.000
	19 years old	0	0.000	0.000	100.000
	20 years old	0	0.000	0.000	100.000
	Older than 20 years old	0	0.000	0.000	100.000
	Missing	0	0.000		
	Total	12	100.000		

Table B. 2. Overview of participants' demographics, including sex assigned at birth.**Descriptive Statistics**

	Sex at Birth		
	Female	Male	Prefer not to answer
Valid	24	19	1
Missing	0	0	0

Note. Not all values are available for *Nominal Text* variables

Table B. 3. Overview of participants' demographics, including gender identity and sexual identity.**Frequencies for Sexual Identity**

Gender Identity	Sexual Identity	Frequency	Percent	Valid Percent	Cumulative Percent
Female	Asexual	0	0.000	0.000	0.000
	Bisexual	2	8.333	8.333	8.333
	Bisexual,Heterosexual/straight,Pansexual	1	4.167	4.167	12.500
	Bisexual,Questioning	1	4.167	4.167	16.667
	Heterosexual/straight	20	83.333	83.333	100.000
	Prefer to self describe: Panromantic, sexually attracted to men only	0	0.000	0.000	100.000
	Missing	0	0.000		
	Total	24	100.000		
Male	Asexual	2	10.526	10.526	10.526
	Bisexual	2	10.526	10.526	21.053
	Bisexual,Heterosexual/straight,Pansexual	0	0.000	0.000	21.053
	Bisexual,Questioning	0	0.000	0.000	21.053
	Heterosexual/straight	14	73.684	73.684	94.737
	Prefer to self describe: Panromantic, sexually attracted to men only	1	5.263	5.263	100.000
	Missing	0	0.000		
	Total	19	100.000		
Prefer not to answer	Asexual	1	100.000	100.000	100.000
	Bisexual	0	0.000	0.000	100.000
	Bisexual,Heterosexual/straight,Pansexual	0	0.000	0.000	100.000
	Bisexual,Questioning	0	0.000	0.000	100.000
	Heterosexual/straight	0	0.000	0.000	100.000
	Prefer to self describe: Panromantic, sexually attracted to men only	0	0.000	0.000	100.000
	Missing	0	0.000		
	Total	1	100.000		

Table B. 4. Overview of participants' demographics, including employment status.**Frequencies for Employment Status**

Employment Status	Frequency Percent		Valid Percent	Cumulative Percent
Employed part-time	7	15.909	15.909	15.909
Employed part-time,Student	7	15.909	15.909	31.818
Not listed, please specify- Seasonal	1	2.273	2.273	34.091
Parental leave or other leave,Unemployed	1	2.273	2.273	36.364
Student	20	45.455	45.455	81.818
Student,Unemployed	7	15.909	15.909	97.727
Unemployed	1	2.273	2.273	100.000
Missing	0	0.000		
Total	44	100.000		

Table B. 5. Overview for participant's demographics, including race.**Frequencies for Race**

Race	Frequency	Percent	Valid Percent	Cumulative Percent
Biracial/Multiracial,East Asian,White/Caucasian	4	9.091	9.091	9.091
East Asian	22	50.000	50.000	59.091
East Asian,Middle Eastern/Central Asian	1	2.273	2.273	61.364
East Asian,Southeast Asian	1	2.273	2.273	63.636
Hispanic	1	2.273	2.273	65.909
Middle Eastern/Central Asian	1	2.273	2.273	68.182
Middle Eastern/Central Asian,South Asian,Southeast Asian	1	2.273	2.273	70.455
South Asian	5	11.364	11.364	81.818
South Asian,Southeast Asian	1	2.273	2.273	84.091
Southeast Asian	6	13.636	13.636	97.727
White/Caucasian	1	2.273	2.273	100.000
Missing	0	0.000		
Total	44	100.000		

Table B. 6. Overview for participant's demographics, including relationship status**Frequencies for Relationship Status**

Relationship Status	Frequency	Percent	Valid Percent	Cumulative Percent
Dating casually	2	4.545	4.545	4.545
In a monogamous relationship	6	13.636	13.636	18.182
Single	36	81.818	81.818	100.000
Missing	0	0.000		
Total	44	100.000		

Appendix C

Table C.1. Overview of participants' baseline physical activity levels, including aerobic activity.

Frequencies for Average Length of Session						
Resistance Exercise (days)	Average Length of Session		Intensity			
	Average Length of Session	Frequency	Percent	Intensity	Frequency	Percent
0	0 - 15	4	100	-		
	15 - 30	0	0	Mild	2	50
	30 - 45	0	0	Moderate	1	25
	45 - 60	0	0	Vigorous	0	0
	60+	0	0	I don't know/I don't remember	1	25
	Missing	0	0	Missing	0	0
	Total	4	100	Total	4	100
1	0 - 15	0	0	-		
	15 - 30	1	33.333	Mild	0	0
	30 - 45	2	66.667	Moderate	2	66.667
	45 - 60	0	0	Vigorous	1	33.333
	60+	0	0	I don't know/I don't remember	0	0
	Missing	0	0	Missing	0	0
	Total	3	100	Total	3	100
2	0 - 15	0	0	-		

	15 - 30	1	14.286	Mild	2	28.571
	30 - 45	2	28.571	Moderate	1	14.286
	45 - 60	3	42.857	Vigorous	4	57.143
	60+	1	14.286	I don't know/I don't remember	0	0
	Missing	0	0	Missing	0	0
	Total	7	100	Total	7	100
3	0 - 15	1	25	-		
	15 - 30	1	25	Mild	1	25
	30 - 45	2	50	Moderate	3	75
	45 - 60	0	0	Vigorous	0	0
	60+	0	0	I don't know/I don't remember	0	0
	Missing	0	0	Missing	0	0
	Total	4	100	Total	4	100
4	0 - 15	0	0	-		
	15 - 30	2	28.571	Mild	0	0
	30 - 45	1	14.286	Moderate	2	28.571
	45 - 60	2	28.571	Vigorous	5	71.429
	60+	2	28.571	I don't know/I don't remember	0	0
	Missing	0	0	Missing	0	0
	Total	7	100	Total	7	100

5	0 - 15	0	0	-		
	15 - 30	0	0	Mild	0	0
	30 - 45	0	0	Moderate	1	33.333
	45 - 60	2	66.667	Vigorous	0	0
				I don't know/I don't remember		
	60+	1	33.333		2	66.667
	Missing	0	0	Missing	0	0
	Total	3	100	Total	3	100
7	0 - 15	1	50	-		
	15 - 30	0	0	Mild	0	0
	30 - 45	0	0	Moderate	0	0
	45 - 60	0	0	Vigorous	2	100
				I don't know/I don't remember		
	60+	1	50		0	0
	Missing	0	0	Missing	0	0
	Total	2	100	Total	2	100

Table C.2. Overview of participants' baseline physical activity levels, total hours of aerobic activity per week.

Frequencies for Total Time (h)

Total Time (h)	Frequency	Percent	Valid Percent	Cumulative Percent
0	3	6.977	7.692	7.692
1	8	18.605	20.513	28.205
2	6	13.953	15.385	43.590
3	7	16.279	17.949	61.538
4	2	4.651	5.128	66.667
5	5	11.628	12.821	79.487
6	6	13.953	15.385	94.872
8	1	2.326	2.564	97.436
12	1	2.326	2.564	100.000
Missing	4	9.302		
Total	43	100.000		

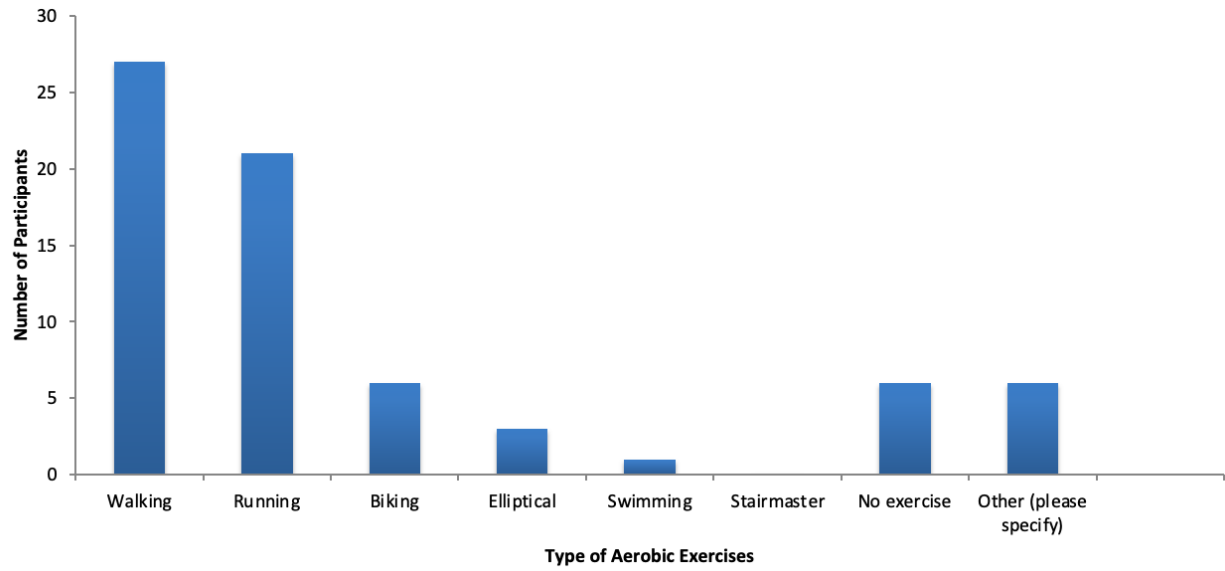


Figure C.1. Distribution participants' engagement in different aerobic exercises.

Table C.3. Overview of participants' baseline physical activity levels, including resistance activity.**Frequencies for Average Length of Session**

Resistance Exercise (days)	Average Length of Session	Frequency	Percent	Valid Percent	Cumulative Percent
0	0 - 15 mins	4	100.000	100.000	100.000
	15 - 30 mins	0	0.000	0.000	100.000
	30 - 45 mins	0	0.000	0.000	100.000
	45 - 60 mins	0	0.000	0.000	100.000
	60+ mins	0	0.000	0.000	100.000
	Missing	0	0.000		
	Total	4	100.000		
1	0 - 15 mins	0	0.000	0.000	0.000
	15 - 30 mins	1	33.333	33.333	33.333
	30 - 45 mins	2	66.667	66.667	100.000
	45 - 60 mins	0	0.000	0.000	100.000
	60+ mins	0	0.000	0.000	100.000
	Missing	0	0.000		
	Total	3	100.000		
2	0 - 15 mins	0	0.000	0.000	0.000
	15 - 30 mins	1	14.286	14.286	14.286
	30 - 45 mins	2	28.571	28.571	42.857
	45 - 60 mins	3	42.857	42.857	85.714
	60+ mins	1	14.286	14.286	100.000
	Missing	0	0.000		
	Total	7	100.000		
3	0 - 15 mins	1	25.000	25.000	25.000
	15 - 30 mins	1	25.000	25.000	50.000
	30 - 45 mins	2	50.000	50.000	100.000
	45 - 60 mins	0	0.000	0.000	100.000
	60+ mins	0	0.000	0.000	100.000
	Missing	0	0.000		
	Total	4	100.000		
4	0 - 15 mins	0	0.000	0.000	0.000
	15 - 30 mins	2	28.571	28.571	28.571
	30 - 45 mins	1	14.286	14.286	42.857

	45 - 60 mins	2	28.571	28.571	71.429
	60+ mins	2	28.571	28.571	100.000
	Missing	0	0.000		
	Total	7	100.000		
5	0 - 15 mins	0	0.000	0.000	0.000
	15 - 30 mins	0	0.000	0.000	0.000
	30 - 45 mins	0	0.000	0.000	0.000
	45 - 60 mins	2	66.667	66.667	66.667
	60+ mins	1	33.333	33.333	100.000
	Missing	0	0.000		
	Total	3	100.000		
7	0 - 15 mins	1	50.000	50.000	50.000
	15 - 30 mins	0	0.000	0.000	50.000
	30 - 45 mins	0	0.000	0.000	50.000
	45 - 60 mins	0	0.000	0.000	50.000
	60+ mins	1	50.000	50.000	100.000
	Missing	0	0.000		
	Total	2	100.000		

Table C.4. Overview of participants' baseline physical activity levels, total hours of resistance activity per week.

Frequencies for Total Time (h)				
Total Time (h)	Frequency	Percent	Valid Percent	Cumulative Percent
0	5	11.628	16.129	16.129
1	4	9.302	12.903	29.032
2	7	16.279	22.581	51.613
3	3	6.977	9.677	61.290
4	2	4.651	6.452	67.742
5	2	4.651	6.452	74.194
6	1	2.326	3.226	77.419
7	4	9.302	12.903	90.323
8	1	2.326	3.226	93.548
9	2	4.651	6.452	100.000
Missing	12	27.907		
Total	43	100.000		

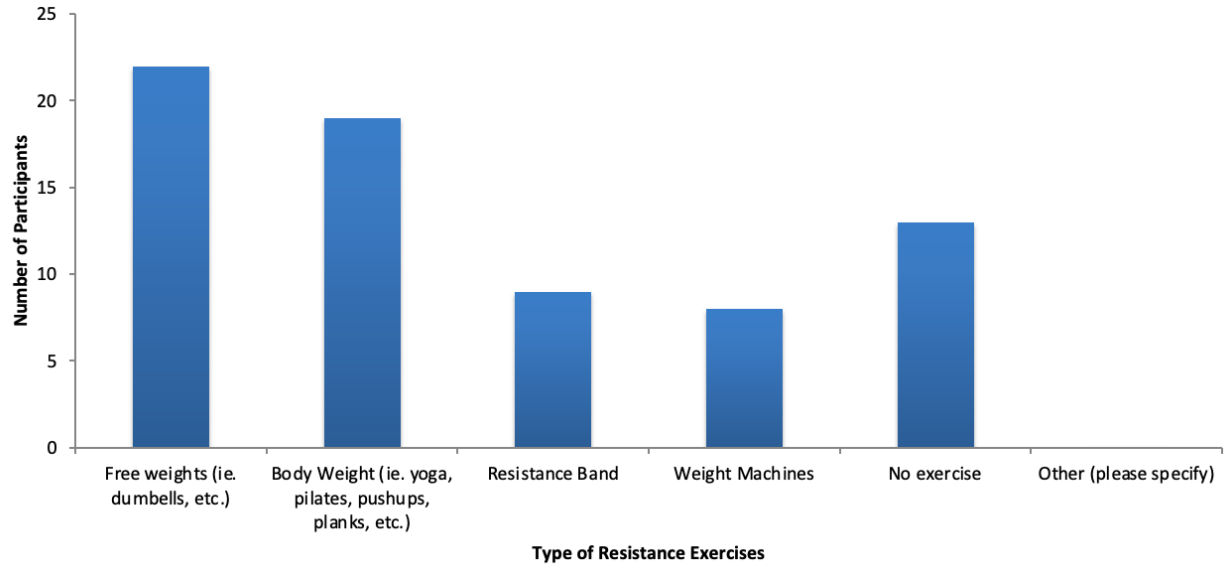


Figure C.2. Frequency distribution of participants' engagement in different resistance exercises.

Table C. 5. Overview of participants' baseline physical activity levels, including flexibility-related activity.

Frequencies for Average Length of Session

Flexibility (days)	Average Length of Session_13	Frequency	Percent	Valid Percent	Cumulative Percent
0	0 - 15 mins	5	100.000	100.000	100.000
	15 - 30 mins	0	0.000	0.000	100.000
	30 - 45 mins	0	0.000	0.000	100.000
	Missing	0	0.000		
	Total	5	100.000		
1	0 - 15 mins	4	50.000	50.000	50.000
	15 - 30 mins	2	25.000	25.000	75.000
	30 - 45 mins	2	25.000	25.000	100.000
	Missing	0	0.000		
	Total	8	100.000		
2	0 - 15 mins	4	80.000	80.000	80.000
	15 - 30 mins	1	20.000	20.000	100.000
	30 - 45 mins	0	0.000	0.000	100.000
	Missing	0	0.000		
	Total	5	100.000		
3	0 - 15 mins	2	100.000	100.000	100.000
	15 - 30 mins	0	0.000	0.000	100.000
	30 - 45 mins	0	0.000	0.000	100.000
	Missing	0	0.000		
	Total	2	100.000		
4	0 - 15 mins	1	100.000	100.000	100.000
	15 - 30 mins	0	0.000	0.000	100.000
	30 - 45 mins	0	0.000	0.000	100.000
	Missing	0	0.000		
	Total	1	100.000		
5	0 - 15 mins	3	100.000	100.000	100.000
	15 - 30 mins	0	0.000	0.000	100.000
	30 - 45 mins	0	0.000	0.000	100.000
	Missing	0	0.000		
	Total	3	100.000		
6	0 - 15 mins	1	100.000	100.000	100.000

	15 - 30 mins	0	0.000	0.000	100.000
	30 - 45 mins	0	0.000	0.000	100.000
	Missing	0	0.000		
	Total	1	100.000		
7	0 - 15 mins	0	0.000	0.000	0.000
	15 - 30 mins	1	50.000	50.000	50.000
	30 - 45 mins	1	50.000	50.000	100.000
	Missing	0	0.000		
	Total	2	100.000		

Table C.6. Overview of participants' baseline physical activity levels, including total hours of flexibility-related activity per week.

Frequencies for Total Time (h)_14

Total Time (h)_14	Frequency	Percent	Valid Percent	Cumulative Percent
0	5	11.628	20.000	20.000
1	15	34.884	60.000	80.000
2	2	4.651	8.000	88.000
3	1	2.326	4.000	92.000
4	1	2.326	4.000	96.000
5	1	2.326	4.000	100.000
Missing	18	41.860		
Total	43	100.000		

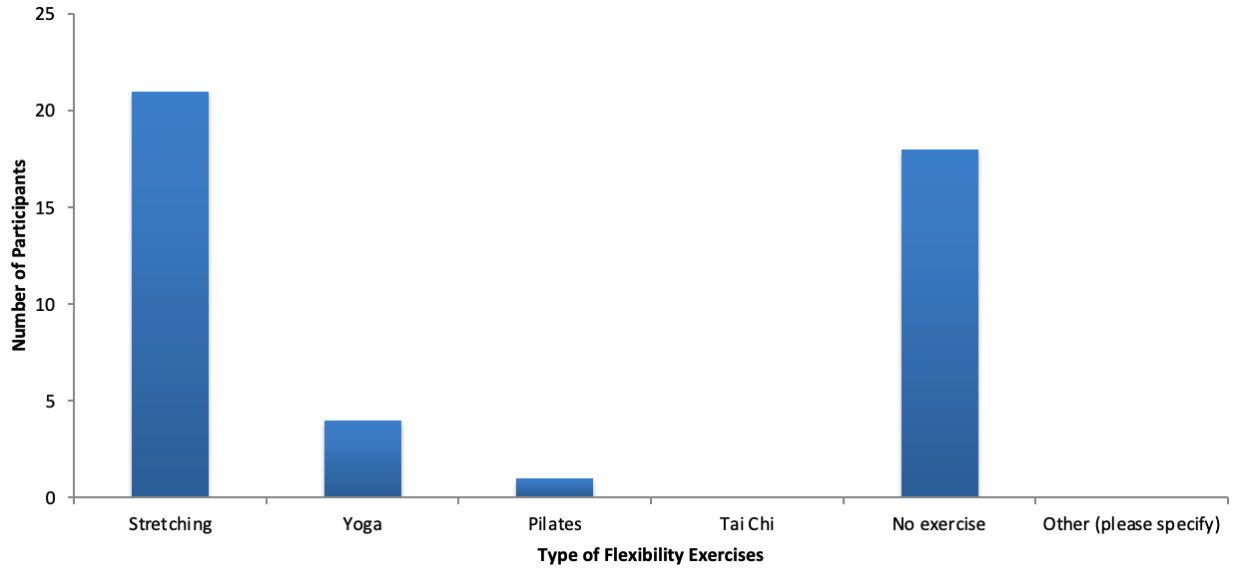


Figure C.3. Frequency distribution of participants' engagement in different flexibility-related exercises.

Table C.7. Overview of participants' baseline physical activity levels, including a summary of descriptive statistics of hours of activity per week.

Descriptive Statistics

	Total Time (h) aer	Total Time (h) res	Total Time (h) flex
Valid	39	31	25
Missing	4	12	18
Mean	3.023	2.441	0.721
Std. Deviation	2.527	2.848	1.200
Minimum	0.000	0.000	0.000
Maximum	12.000	9.000	5.000

Appendix D

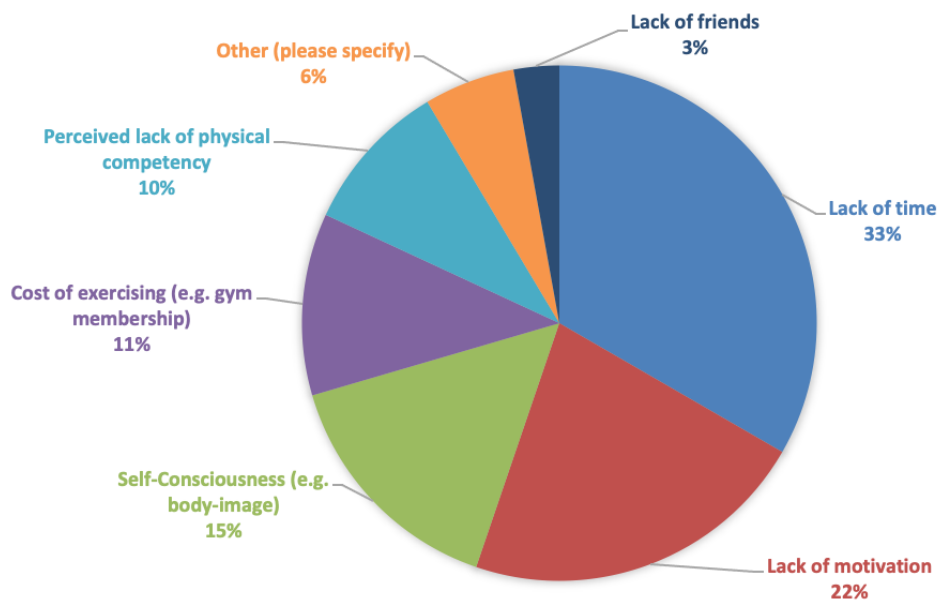


Figure D.1. Perceived barriers to physical activity engagement.

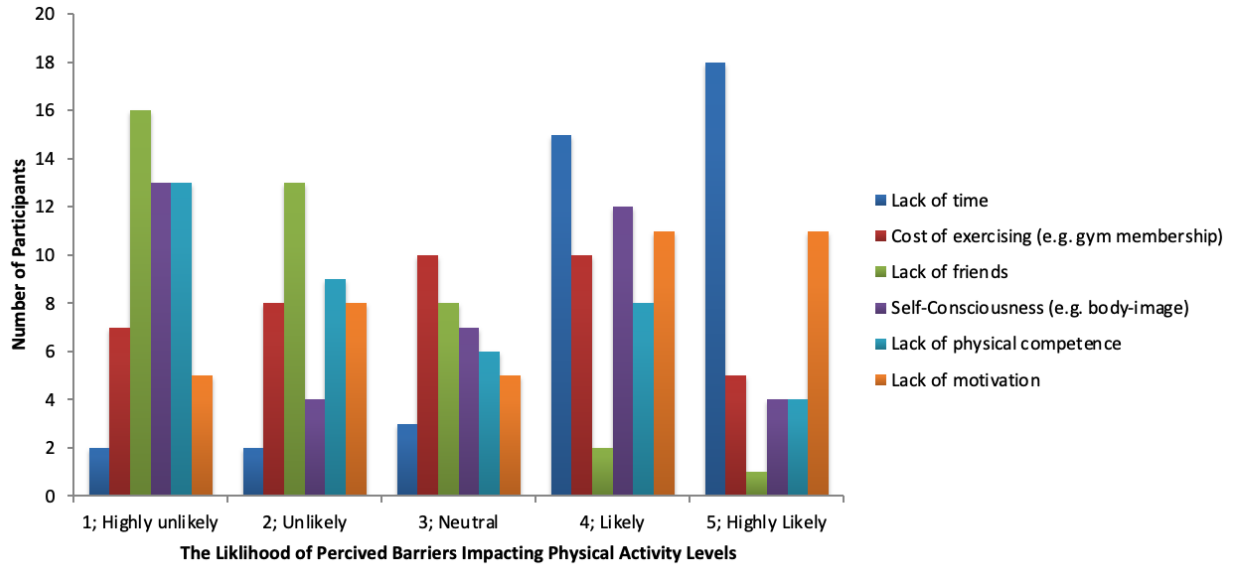


Figure D.2. Frequency distribution for respondent's perceived barriers to physical activity.

Participants responded through Likert-type scales.

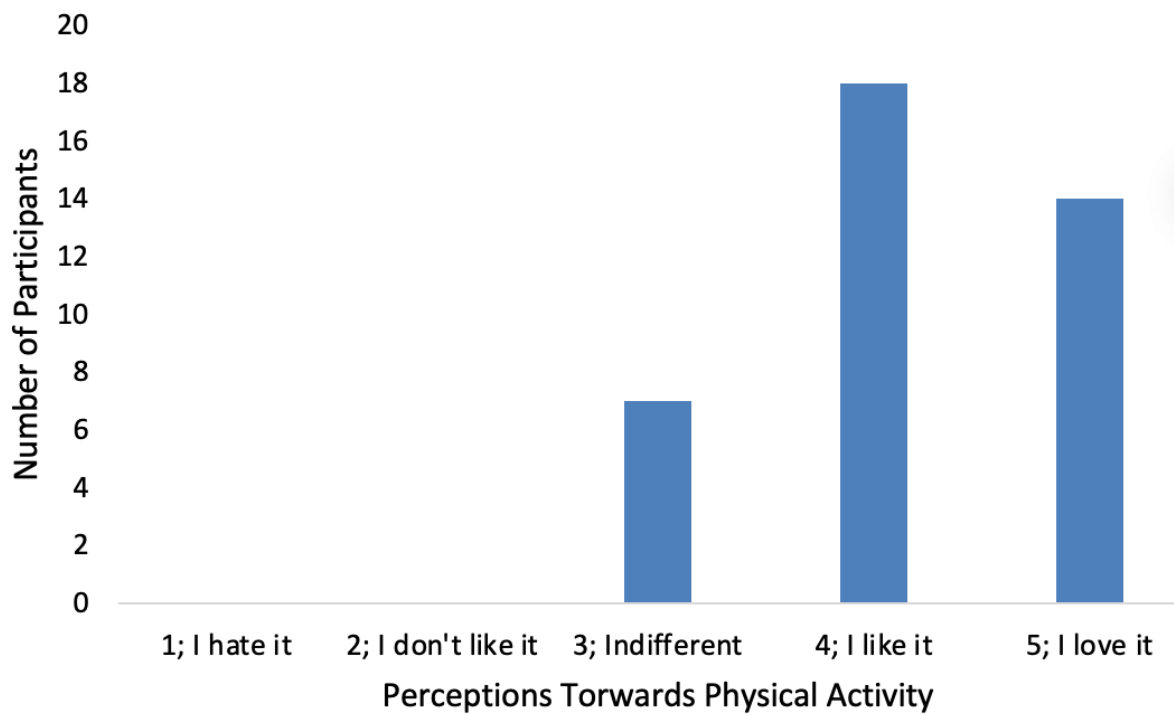


Figure D.3. Frequency distribution for participants' perception of physical activity.

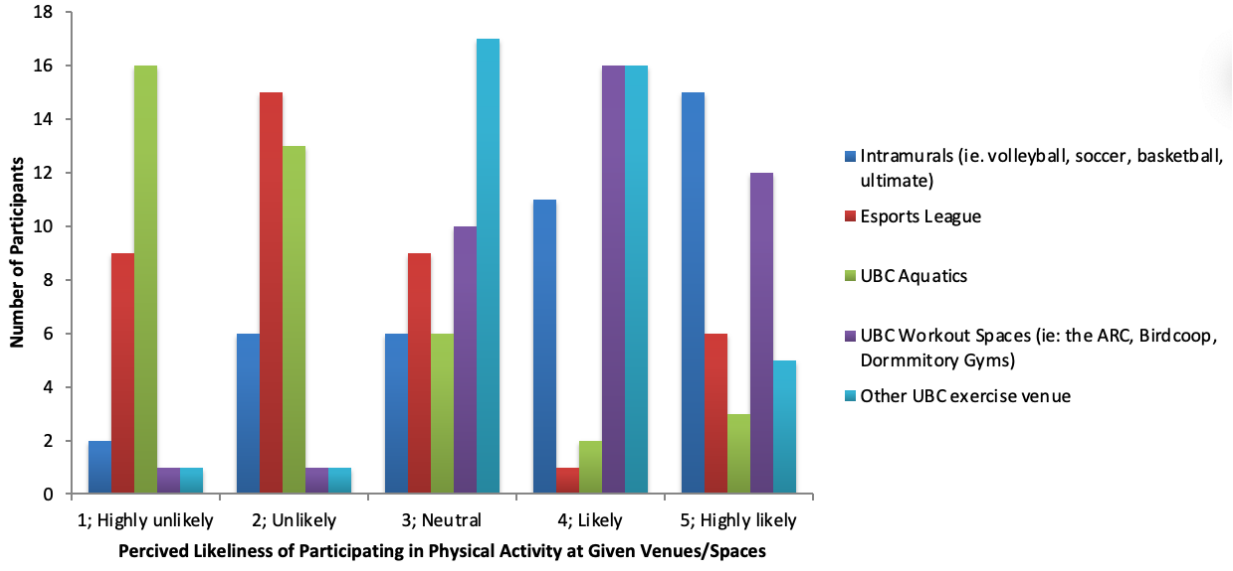


Figure D.4. Frequency distribution for likeliness of participation at UBC recreational venues.

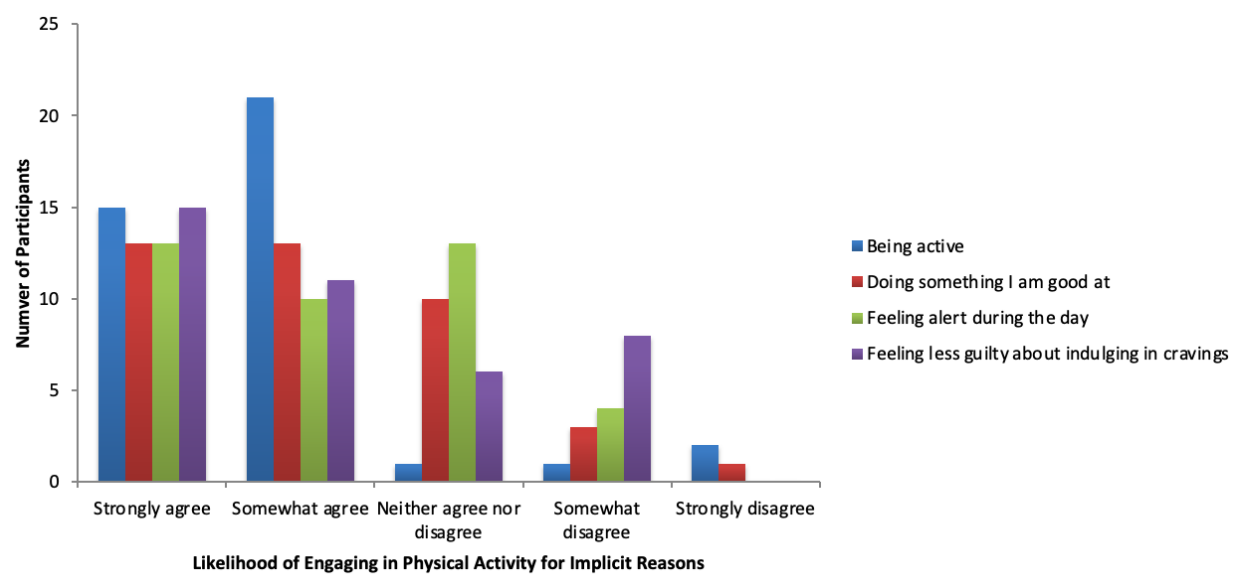


Figure D.5. Frequency distribution of reasons for engagement in physical activity for implicit reasons. Participants responded through Likert-type scales.

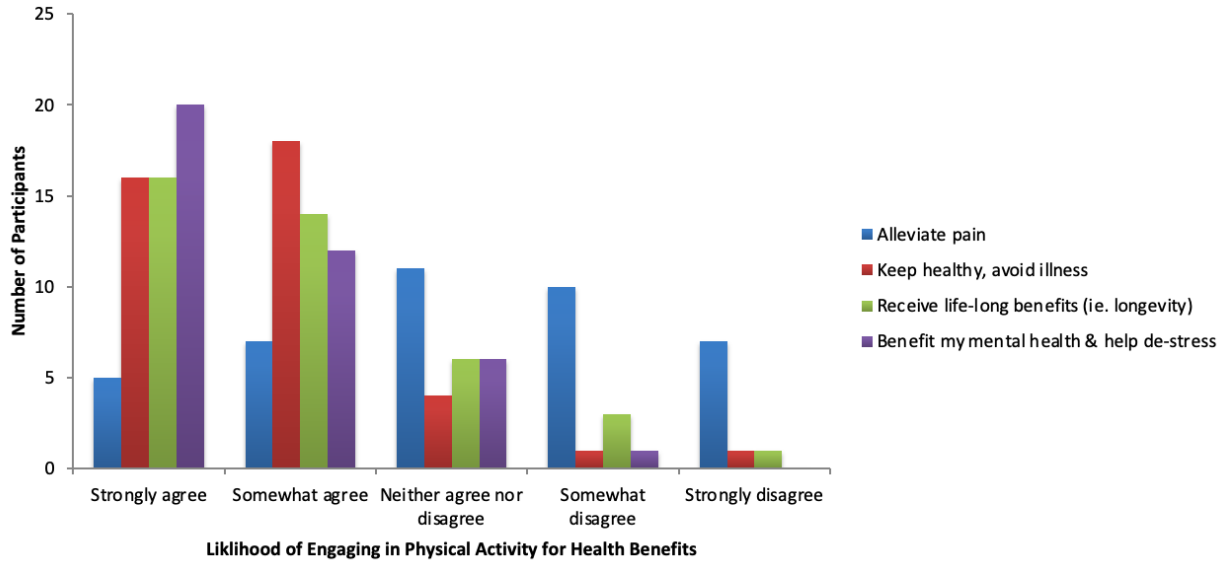


Figure D.6. Frequency distribution of reasons for engagement in physical activity for health benefits. Participants responded through Likert-type scales.

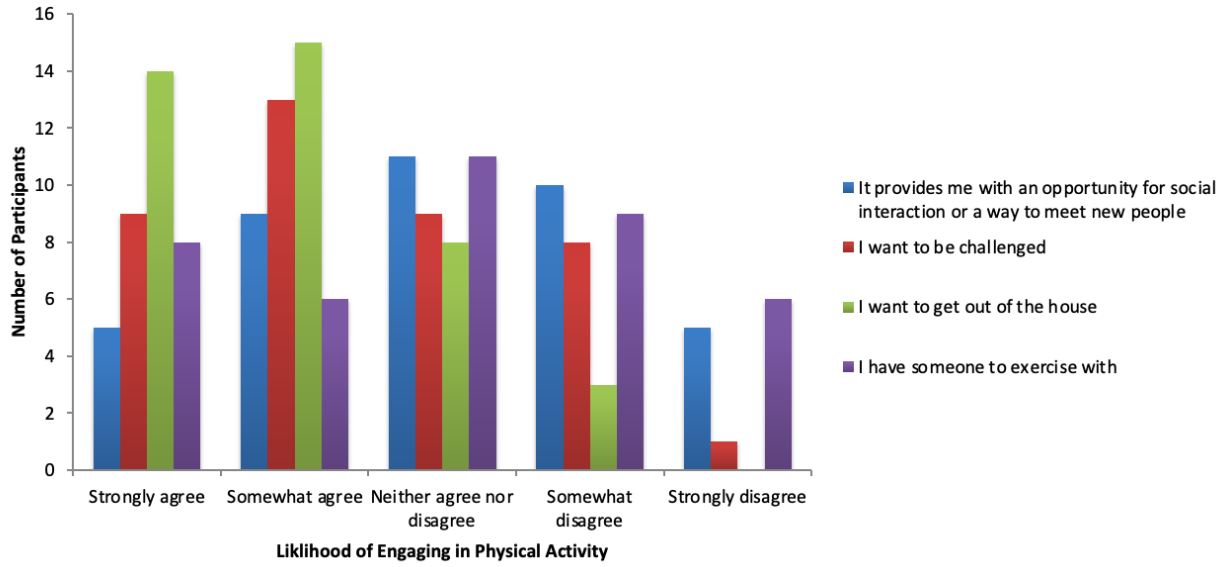


Figure D.7. Frequency distribution of reasons for engagement in physical activity. Participants responded through Likert-type scales.

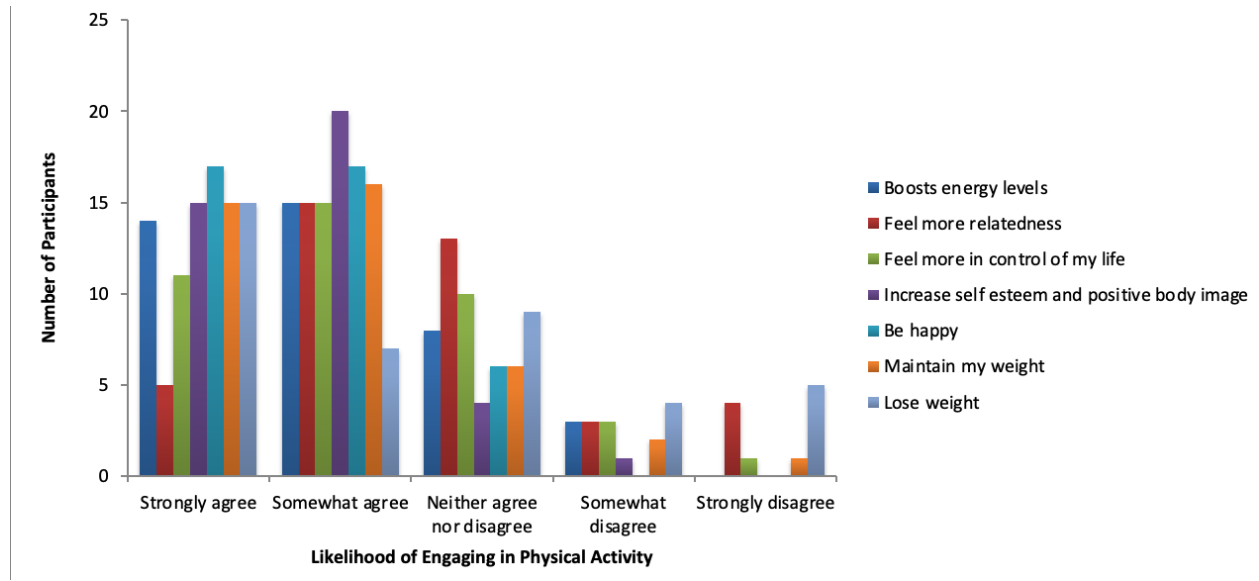


Figure D.8. Frequency distribution of reasons for engagement in physical activity. Participants responded through Likert-type scales.

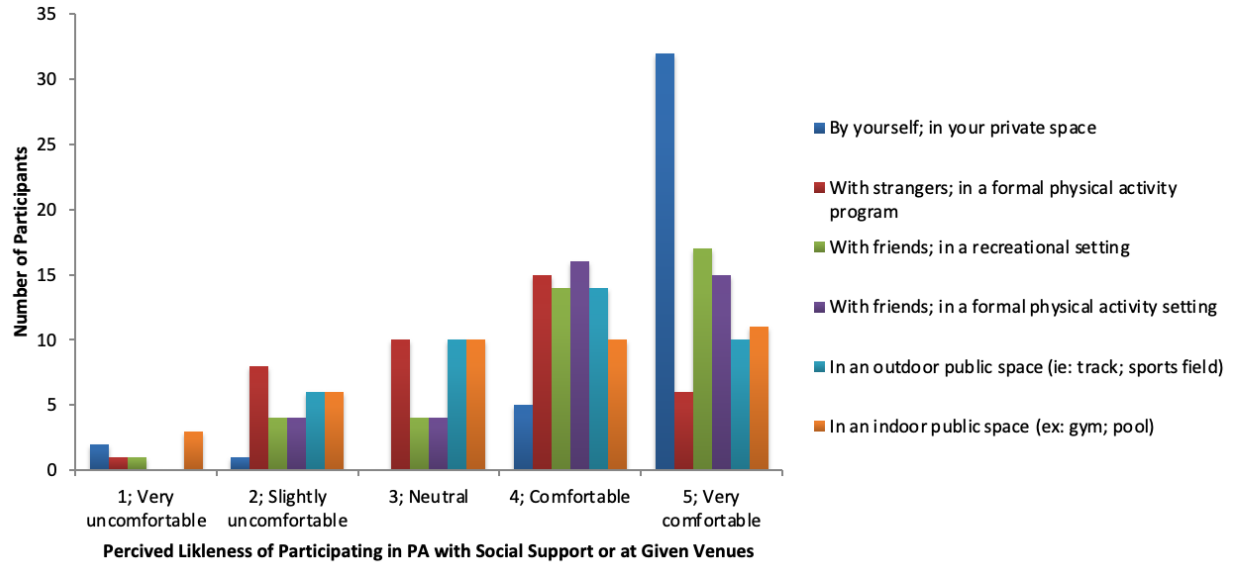


Figure D.9. Frequency distribution of participants' level of comfort exercising in different venues. Participants responded through Likert-type scales.

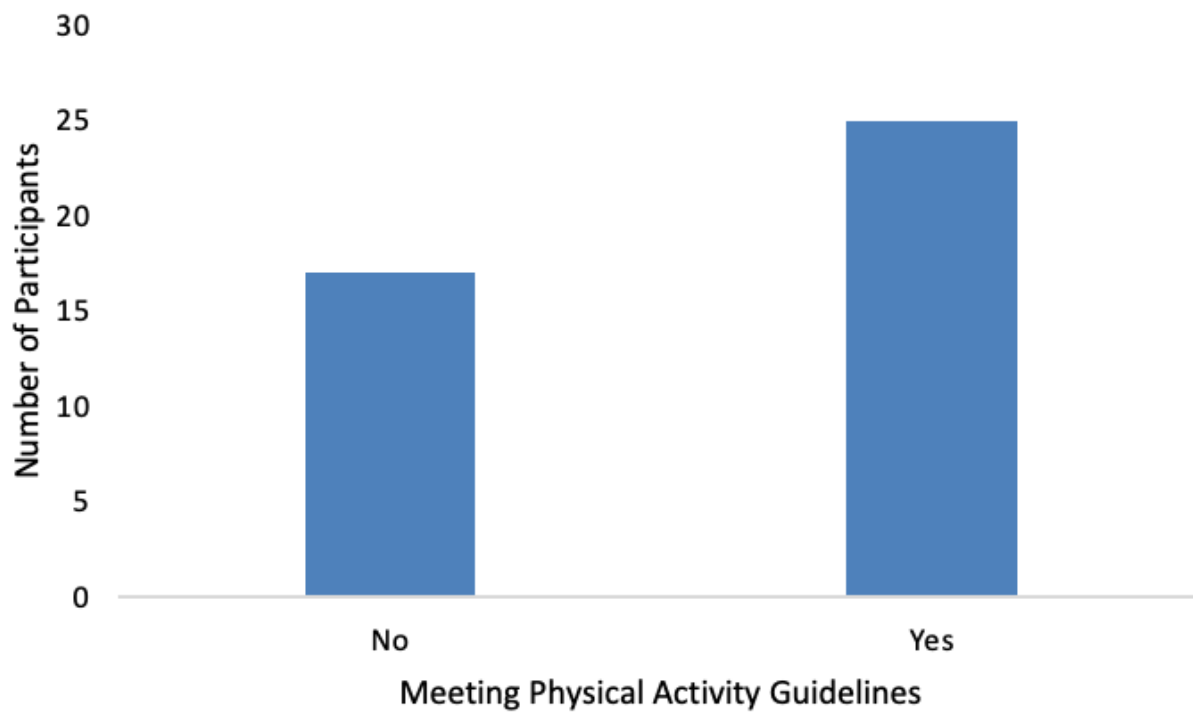


Figure D.10. Frequency distribution of participants that meet/do not meet physical activity guidelines

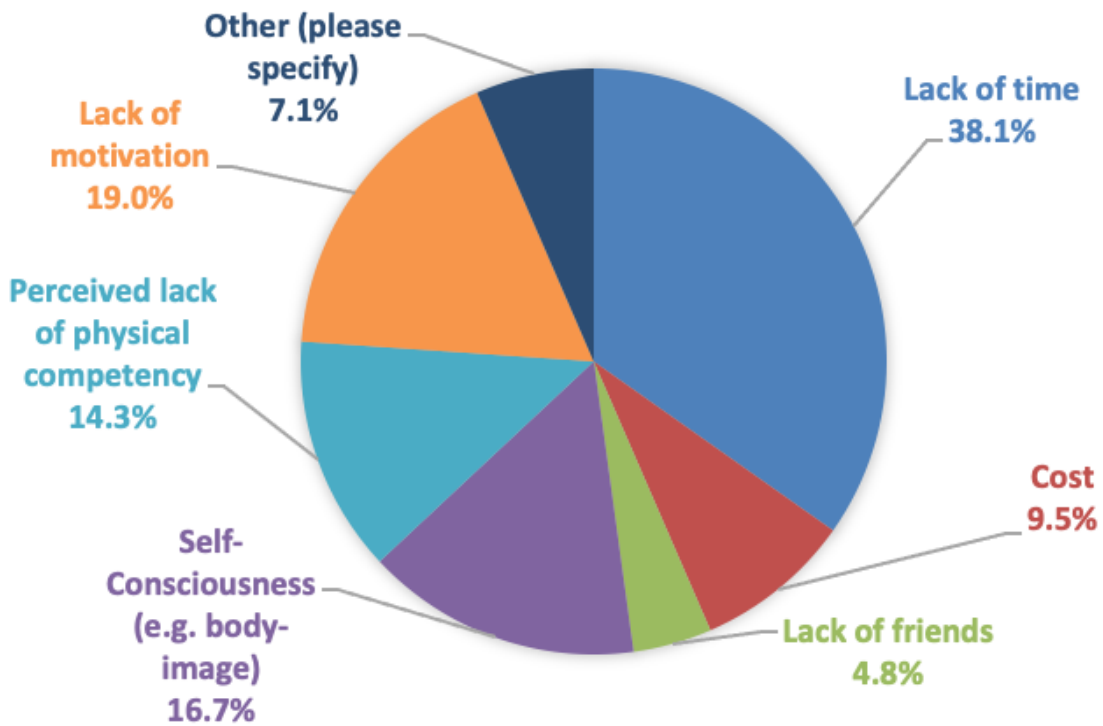


Figure D.11. Distribution of barriers of physical activity for participants that do not meet physical activity guidelines

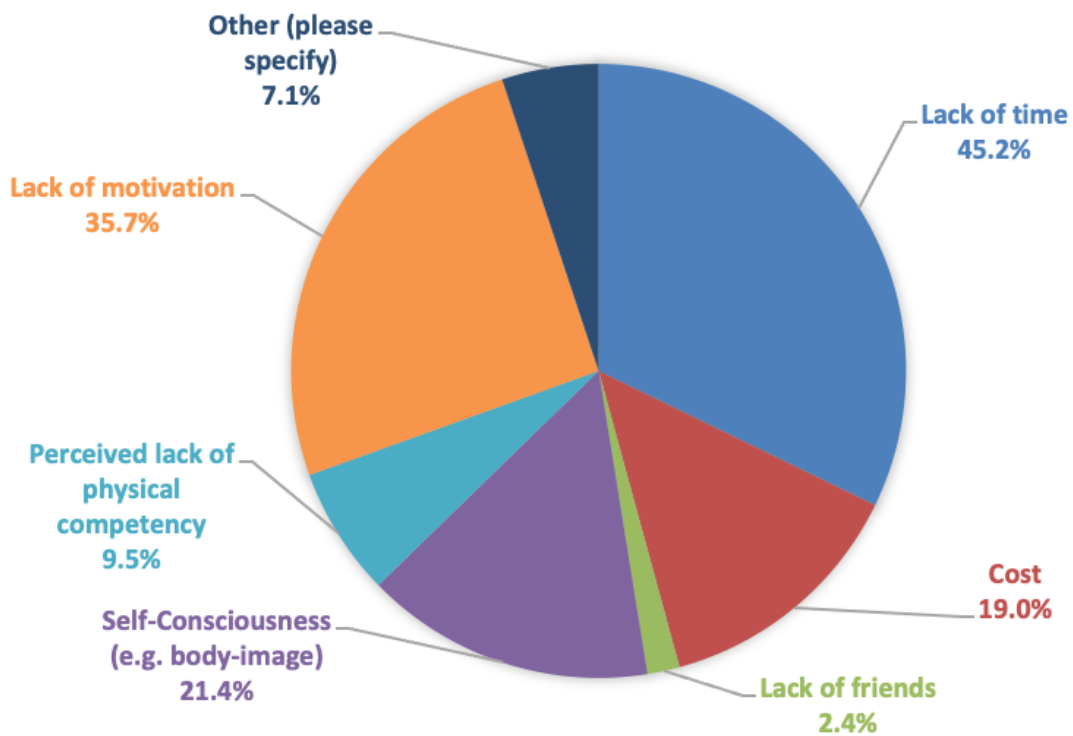


Figure D.12. Distribution of barriers of physical activity for participants that meet physical activity guidelines

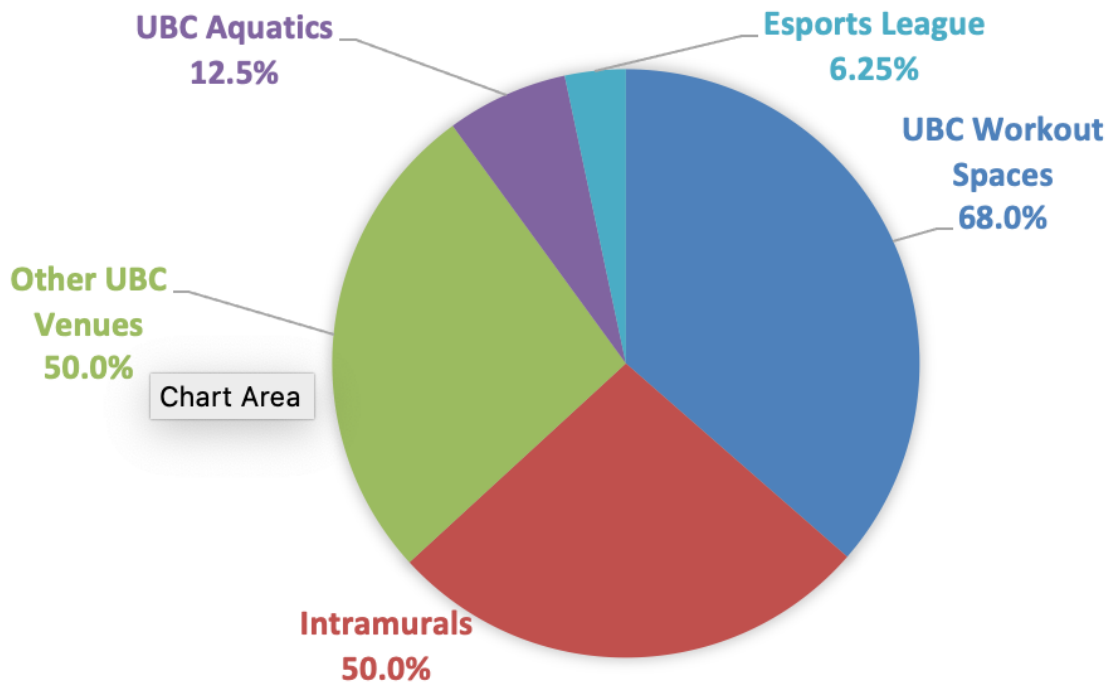


Figure D.13. Distribution of perceived popularity of UBC venues for participants that do not meet physical activity guidelines

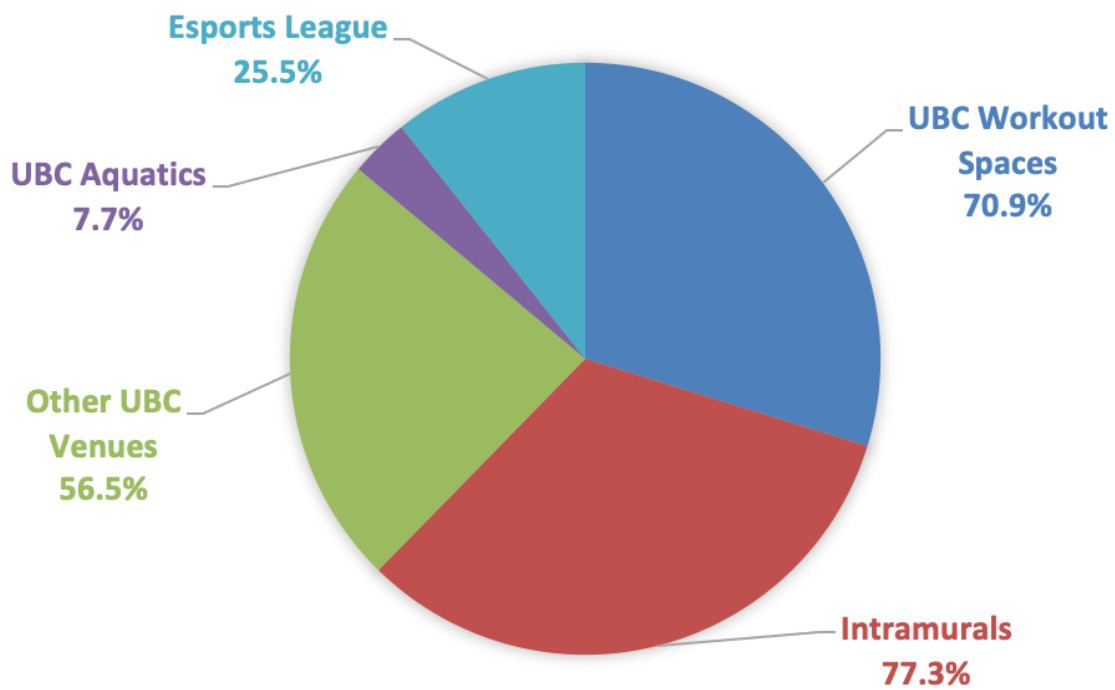


Figure D.14. Distribution of perceived popularity of UBC venues for participants that meet physical activity guidelines