Positive Deviance as a Framework for Understanding Motivations and Barriers to Exercise for University Students at Campus Recreation

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Positive Deviance as a Framework for Understanding Motivations and Barriers to Exercise for University Students at Campus Recreation

by

René Dario Herrera

A thesis submitted in partial fulfillment of the requirements for the degree of Master of Arts with a concentration in Applied Anthropology Department of Anthropology College of Arts and Sciences University of South Florida

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# TABLE OF CONTENTS

Table of Contents...................................................................................................................................... i

Index of Tables.......................................................................................................................................... iii

Abstract.................................................................................................................................................. iv

Chapter One: Introduction..................................................................................................................... 1
  Overview............................................................................................................................................... 2
  Framing................................................................................................................................................ 3
  Overview of the Following Chapters...................................................................................................... 5

Chapter Two: Literature Review........................................................................................................... 6
  Campus Recreation.............................................................................................................................. 6
  Physical Activity and Public Health Promotion................................................................................... 8
  Evo-Eco Approach............................................................................................................................. 11
  Theoretical Frameworks..................................................................................................................... 12
    Positive Deviance............................................................................................................................ 13
    Feminist Critique............................................................................................................................. 15
    Postmodern Critique of Physical Education and Human Movement............................................. 18
    The Body......................................................................................................................................... 19
  Summary............................................................................................................................................ 21

Chapter Three: Methods....................................................................................................................... 22
  Sample............................................................................................................................................... 22
  Site...................................................................................................................................................... 23
  Design............................................................................................................................................... 24
    Participant Observation.................................................................................................................... 25
    Questionnaire................................................................................................................................ 26
    Focus Groups.................................................................................................................................. 28
    Interviews...................................................................................................................................... 28
  Analysis............................................................................................................................................ 29

Chapter Four: Results............................................................................................................................ 31
  Participant Characteristics.................................................................................................................. 31
  Descriptive and Inferential Statistics.................................................................................................. 34
  Free List Response Data Analysis..................................................................................................... 36
  Participant Observation...................................................................................................................... 42
  Interview Narrative............................................................................................................................ 50
    Motivations..................................................................................................................................... 53
    Time Management........................................................................................................................... 55
Campus Rec.................................................................56
Group Fitness.............................................................58
Socialization...............................................................59
Identity.............................................................................59
Gender.............................................................................60
Focus Group Narrative..................................................61

Chapter Five: Discussion and Conclusion..........................................................63
  Discussion........................................................................63
  Limitations......................................................................66
Conclusion.............................................................................66
Future Considerations................................................................69

References.............................................................................71

Appendices..................................................................................77
  Appendix 1: Recruitment Flier..............................................78
  Appendix 2: Recruitment Flowchart......................................79
  Appendix 3: Questionnaire...................................................80
  Appendix 4: Interview Questions.........................................82
  Appendix 5: R Code.............................................................83
  Appendix 6: Expedited Approval for Initial Review...............105
  Appendix 7: Informed Consent to Participate in Research.......107
INDEX OF TABLES

Table 1: Overview of Sample Size for Each Research Method..................................................23
Table 2: USF student population enrolled Spring 2015 reported by (Cen et al. 2016)..........32
Table 3: USF Campus Recreation population Spring 2015 reported by (Cen et al. 2016)...........................................................................................................32
Table 4: Description of sample that answered the questionnaire from 13 April 2018 through 9 July 2018.................................................................33
Table 5: Pearson's Chi Square test of independence between sex and exercise frequency and sex and PE experience.................................................................34
Table 6: Welch Two Sample t-tests to compare the difference of the mean between sex and exercise intensity and sex and GPA.................................................................35
Table 7: Pearson's chi square test of independence between PE experience and exercise frequency...........................................................................................................35
Table 8: Frequency Table with Salience Scores for Motivations to Exercise (limited to first 35 rows)..............................................................................................37
Table 9: Motivations Grouped by Sex with Salience Scores (limited to ten most frequent codes)...........................................................................................................38
Table 10: Frequency Table with Salience Scores for Barriers to Exercise (limited to twenty rows).................................................................................................39
Table 11: Barriers Grouped by Sex with Salience Scores (limited to greatest salience values)..............................................................................................................40
Table 12: Frequency Table with Salience Scores for Reasons to Exercise at Campus Recreation..............................................................................................................41
Table 13: Reasons to Exercise at Campus Recreation Grouped by Sex with Salience Scores (limited to greatest salience values).................................................................42
ABSTRACT

The purpose of this thesis was to use qualitative research methodologies to better understand motivations and barriers to exercise for university students at campus recreation. The secondary purpose was to identify any correlations between physical activity habits and academic success. Ethnographic data obtained from a positive deviance sample and critically analyzed with feminist and postmodern theory could provide additional validation for campus recreation's value in positively contributing to the academic success of university students. Participant observation, questionnaire, cultural domain analysis, interview, and focus group provided qualitative data. Results indicate university students who frequent campus recreation to exercise are highly motivated to improve physical appearance, physical performance, and health. This ethnographic model, utilizing positive deviance as a sampling framework, builds upon established work in physical activity related public health research to show how a positive shared experience among university students adds value to a physical space such that the physical space, i.e. campus recreation serves as the crux of building a campus community. Further research is needed to develop and test a model whereby campus recreation can attract more students to engage in physical activity and exercise while attending university.
CHAPTER ONE: INTRODUCTION

Attending college has become a rite of passage for many people in the United States. In a report by the U.S. Bureau of Labor Statistics (Bureau of Labor Statistics 2018), “In October 2017, 66.7 percent of 2017 high school graduates age 16 to 24 were enrolled in colleges or universities.” It may be no surprise these higher education institutions have taken it upon themselves to educate students about everything from healthy relationships, effective study habits, healthy eating, and active living. The burden of educating future generations about how to live in the modern world has been, perhaps reluctantly, embraced by institutions of higher learning throughout the United States. Rather than a re-emergence of in loco parentis (Latin for, “in the place of the parent), the modern relationship holds the university as facilitator and the student as responsible adult (Philip Lee 2011). It is in this setting, where campus recreation facilitates development of patterns of active living, that I seek to ask questions about how students respond to these attempts to construct, grow, and govern bodies. I want to better explain the motivations and barriers to physical activity and exercise for university students at the University of South Florida (USF) Department of Campus Recreation.

Applying anthropology to critically evaluate and interpret how students perceive their bodies, their bodies in space, and how exercise spaces support or hinder students’ desires for physical activity and exercise can help campus recreation centers better meet university students’ needs. Anthropological research methods can explore more ethnographic detail and contribute to larger interdisciplinary questions around public health and physical education in the United States. This
time is an opportunity for anthropologists interested in physical activity health education and promotion to make a positive impact in the field.

The purpose of this study is to firstly learn more about students who exercise regularly, identify barriers and motivations to exercise, and investigate the common patterns, characteristics, and past experiences among students highly engaged with USF Campus Recreation. A secondary objective is to explore whether a relationship exists between their physical activity regimen and their success as a university student. The use of qualitative ethnographic research methods will add to the existing public health, physical education, health promotion, and exercise science research about barriers and motivations to exercise. In addition, the use of qualitative data may be beneficial to campus recreation programs that are looking at how they can begin to approach and evaluate programs offered.

**Overview**

This research intends to reveal in greater detail the motivations and barriers to exercise at USF Campus Recreation for the purpose of identifying possible strategies for future program evaluation as it pertains to reaching a greater proportion of the university student population. The sample was constructed as a purposeful sample following the rules of positive deviance. In health behavior research, positive deviance focuses attention only at those individuals who are already meeting the desired health behavior outcomes. The purpose of this sampling strategy was to identify a shared experience which, if well understood, could be applied to social marketing approaches or program design to reach others who are not meeting the desired health behavior outcome, in this case physical activity motivations for university students at USF Campus Recreation.
The qualitative methodologies used in this study are participant observation, questionnaires, focus groups, and semi-structured interviews. Qualitative data obtained from participant observation, questionnaire free lists, focus group sessions, and interviews were coded and analyzed for common themes.

Quantitative analysis was performed to identify the strength of correlations existing between past experience with physical education and current patterns of exercise and physical activity, sex and frequency or intensity of exercise, and sex and physical education experience.

**Framing**

With the trend of state legislatures foregoing adequate funding for public research universities (Klein 2015), such institutions must identify all such areas which legitimize and strengthen their position as an educational institution in a competitive capitalist environment. One such area to attract tuition dollars and student fees is in the added value that campus recreation departments bring to campus. Universities across the country are constructing increasingly lavish campus recreation centers to lure students to campus with the idea of a holistic student life, an environment not only for teaching academics but also for building character. Consequently, the cost to operate these facilities can be substantial. For example, the 2017-2018 USF Operating Budget indicates $809,759 was allotted for USF Campus Recreation (this includes salaries, benefits, temporary positions, risk management insurance, and all other expenses). Previously, $655,262 and $748,686 were allotted for the years 2016-2017 and 2015-2016, respectively (University of South Florida System 2018). What campus visit is complete without a tour and walk through of the campus recreation center? Parents, accompanying their soon to be university age children, nod approvingly when the tour guide mentions that regular visits to campus recreation will help hold off the dreaded Freshman 15. It is no surprise, because of the novelty
and excitement of the experience, the busiest times for campus recreation occur at the beginning of the semester, when students seem to have fewer class obligations and are learning just how they will find their fit in the university community this semester. The beginning of each semester is also a key time for campus recreation to hook students on the lineup of programming and their are many introductory programs offered to do just that.

Campus recreation departments themselves must be able to justify how dollars spent within their department translate to student success. There is a push to see just how much participation and engagement with campus recreation helps students be better students, and campus recreation departments are gambling that it is a winning argument to make.

From the public health perspective, it is important to reflect on how past research predicts, or fails to predict, patterns of physical activity and exercise among university students. Specifically, new research should be focused on evaluating how current health behavior change models can effectively predict health behavior change among different populations. In this case, due to the increasing educational level of the adult population, university students are the target population of this study. The best case scenario is one where university students learn and develop life-long habits of physical activity which they in turn teach to their children further improving the long term health of the population.

Exercise itself is challenging to evaluate and promote. It can be gendered. Expectations for the appearance and performance of the human body can be different depending on a person’s sex and gender, how they perceive their body, and how they perceive others perceive their body. This plays itself out in different ways on campus and in the gym. Therefore, it benefits western society to have applied anthropologists working in public health and in university administration
to question and address how inequalities are reinforced in the university and Campus Recreation setting.

**Overview Of The Following Chapters**

Chapter Two situates the context of the research within USF Campus Recreation and research related to the role of Campus Recreation departments in higher education, student success, and promoting physical activity and exercise. Positive deviance is discussed as the structure for sampling. Furthermore, feminist and postmodern theory helps to focus the critical analysis of both physical education and recreation in the United States and motivations will be seen through the lens of how the body is perceived and experienced.

Chapter Three details the research methodologies and Chapter Four reports the results of the participant observation, questionnaire, focus groups, and interviews. Chapter Five provides commentary and interpretation of the results and provides some possible next steps for continuing to evaluate Campus Recreation at USF.
CHAPTER TWO: LITERATURE REVIEW

Campus Recreation

Campus recreation is a hub of student involvement and engagement at USF. It serves as a collaborative and culturally-centered internal campus resource and program (Aguilar 2017). It represents opportunities for students to learn and to practice positive health behavior in a safe, supportive, and inclusive environment. Students who frequent campus recreation embed themselves in an informal world of peer and social networks within the campus environment, thereby influencing the construction of narrative identities to affect their lifestyle choices (Knowles, Niven, and Fawkner 2014). Campus recreation programs, which in many universities started as a way to organize intramural sports, have evolved to meet the needs of the modern university (Milton, Roth, and Fisher 2011). Most of the collegiate campus recreation programs fall under the administrative purview of divisions of student affairs (Milton, Roth, and Fisher 2011).

The following information is summarized from a document explaining the history of USF Campus Recreation (Hunter 2015). The Campus Recreation Department at the University of South Florida has followed a similar pattern of change and growth. First, the emphasis was to administer and manage sport clubs and intramural programming. The construction of an indoor gymnasium and outdoor pool in 1966 marked the beginning of a campus recreation center. Sports clubs were the focus until 1972 when USF hosted the National Intramural Recreational Sports Association national convention and eventually, in 1987, the Campus Recreation Department was established because there were many more programs, initiatives, and amenities.
In 1995, the current Campus Recreation Center was built, and has since been renovated, allowing for the department to collect additional revenue and provide additional meaningful opportunities for student learning and engagement.

Because of the business nature of universities, campus recreation departments have an interest to validate the worth of their services and programs from the context of promoting holistic student health and well-being. Not only must the public university campus recreation department seek to enrich the experience of students during their university experience, it must also support and promote students’ academic success and the success of the university. As noted in research by Brock, Carr, and Todd (2015), campus recreation proponents “attribute many positive behaviors and outcomes with student participation in the activities provided by campus recreation programs”.

However, funding campus recreation programs in a competitive environment with other auxiliary programs and services can be challenging. Declines in state funding of higher education, summarized by Klein (2015), squeeze a lean budget (University of South Florida System 2018) for campus recreation departments to operate from. The use of student fees helps offset some of the cost, though this shifts the burden unnecessarily on to students. Kelchen (2016), writes how universities rely on the “use of fees to fund auxiliary enterprises such as recreation centers, student union buildings, and athletics in order to keep up with their peers or become more prestigious.”

Evidence for improved academic success metrics can be used to validate the value of campus recreation spending. Students involved in campus recreation programs are positively associated with higher GPA (Brock, Carr, and Todd 2015; Kampf and Teske 2013; Cen et al. 2016),
increased patterns of physical activity (Brock, Carr, and Todd 2015), reduced sedentary time (Brock, Carr, and Todd 2015), and enhanced social integration (Kampf and Teske 2013). Aside from potential better performance in academics there are other benefits to students who engage in campus recreation programs. Participation in campus recreation adds to a social experience, giving opportunities to build friendships and feel part of a larger community (Hall 2006), and continue to attend university (Henchy 2013). Engagement with campus recreation can be a more robust metric for collegiate success than entrance exam scores (Kampf and Teske 2013). As a social species, human beings benefit from building community and from a holistic health perspective, society benefits if one aspect of that community is centered around recreation, active living, and healthy eating.

Physical Activity And Public Health Promotion

Popular public health messaging is focused on ensuring people meet a minimum amount of physical activity. Often, recommendations are targeted to those in urban or suburban environments and encourage participation in and usage of active transportation. Leisure time physical activity is a luxurious privilege. People who can afford to use their time to exercise or who live in areas where walking is a safe alternative to cross short distances. To have time to devote to leisure is a luxury not everyone is privy to. Recommendations for leisure time physical activity do not apply universally because some people work in physically demanding and strenuous occupations; their basic need for human movement and physical activity is satisfied. Nonetheless, a growing trend reflects in the economic value of promoting physical activity among the population and workforce (Chan Osilla et al. 2012).

The paradigm of developmental origins of health and disease (DOHAD) posits the development stages of life, prenatal, neonatal, infancy, on through early childhood and eventually on to
adulthood influences a great deal of adult health outcomes. There is already an emphasis on improving prenatal, infancy, and early childhood outcomes by addressing environmental inequalities or coaching women in best practices for promoting positive health behavior but, putting more emphasis on establishing a long term pattern of health behavior, and building environments supportive of health behavior could be more worthwhile. A significant positive impact could be made by shifting some resources and attention to set up more beneficial environments rather than only trying to help people and communities once those developmental characteristics have already been established (Bateson et al. 2004).

From the context of DOHAD, these characteristics of fetal and maternal health constrain what is possible or likely for the future health of the adult. Taking the long term approach to create the best possible environment and promote physical activity to improve health outcomes for the next two or three generations would be an invaluable investment and use of resources.

One approach to set positive characteristics of fetal and maternal health for future generations in early life is to focus on improving maternal and child health (Aizer and Currie 2014). Following the premise of developmental origins of health and disease (Barker 2012; Bateson et al. 2004), physical activity interventions can be strategically targeted as a long term plan to improve maternal and child health. Many women are already conscious of potential benefits of exercise during and after pregnancy (Barakat et al. 2015), but establishing patterns of physical activity and exercise as children and adolescents well before pregnancy is just as important (Bassuk and Manson 2010; Ahmed et al. 2012), because it may help to establish the beneficial pattern of setting positive characteristics. From a very long term population health perspective, instilling and supporting values of daily physical activity will help support birth outcomes and child
development. This project seeks to explore how to identify motivations to intrinsically motivate others in the general population.

Physical activity and exercise, when not contraindicated, has benefits for people of all sizes (Albuquerque et al. 2015). An emphasis on upstream behaviors, such as nutritional quality and increased daily patterns of physical activity, rather than downstream motivations of weight loss are helpful for the long term health of communities (Bastien et al. 2014; Knittle et al. 2018). For fitness professionals this is a familiar approach to ensure their clients’ success; emphasize establishing the behavior rather than achieving a specific weight. The upstream behavior, or lack thereof, is of great interest for public health researchers. According to Archer and Blair (2012), sedentary behavior and physical inactivity are an epidemic, a leading cause of morbidity and mortality in the world. Furthermore, Archer and Blair (2011) conclude:

“the systematic elimination of physical exertion from daily life and the concomitant rise in chronic disease and cardiovascular disease (CVD) mortality demonstrate that the primary prevention and treatment of CVD necessitate deliberate exercise and the adoption of a physically active lifestyle.”

Research on how to improve rates of physical activity is important because the American Heart Association currently recommends 30 minutes of moderate physical activity most days of the week for primary prevention of CVD and stroke (Ahmed et al. 2012), yet only about half of Americans report meeting aerobic guidelines (Katzmarzyk et al. 2017). The American Heart Association defines moderate activity as 40% to 60% of maximum capacity or the equivalent of brisk walking at 15 to 20 min/mi (Ahmed et al. 2012). In an analysis of reviews of physical activity correlates, Bauman et al. (2012), found the most consistent correlates to be: “health and intention to exercise in adults; male sex, self-efficacy and previous physical activity at all ages; and family social support in adolescents.” Some public health education and promotion campaigns in the United States address these factors by encouraging physical activity to be a
social venture (J. Walker et al. 2015), or have age specific programs for school age children or elder active adults. There are many different health behavior models, each with different strengths and weaknesses to promote health behavior.

Previous research by (Ball, Bice, and Parry 2014), on motivations to exercise for university students revealed “The top three ranked motives for exercise and recreation participants were strength and endurance, weight management, and stress management”. However, other research among female undergraduate students found the most frequent response given was for weight loss (Bulley et al. 2009). In a study of motivations to exercise for university students by Ebben and Brudzynski (2008), health and fitness were the most common themes followed by appearance and weight management. Yet, other research suggests the type of activity reflects whether the motivation is intrinsic or extrinsic. Researchers Kilpatrick, Hebert, and Bartholomew (2005), wrote, “indicate that participants were more likely to report intrinsic motives, such as enjoyment and challenge, for engaging in sport, whereas motivations for exercise were more extrinsic and focused on appearance and weight and stress management.”

**Evo-Eco Approach**

From an evolutionary and ecological perspective, humans are adapted for endurance activities, yet also adapted to rest whenever possible (Lieberman 2015). Given the complex nature of physical activity and exercise, the Evo-Eco approach to health behavior change (Aunger and Curtis 2014), is a good choice to be applied to the university campus recreation setting to promote physical activity and exercise. In explaining the Evo-Eco approach, Aunger and Curtis (2014), write, this model “emphasizes behaviour as a complex, dynamic interaction between bodies and environments. It focuses squarely on behaviour in settings and not on cognition and
self-report as the locus for proper understanding.” What is more, Aunger and Curtis (2014) provide a comprehensive explanation of the model;

“With its view of the brain as an evolved organ, not a failed computer (as in behavioural economics), the Evo–Eco approach also provides a more positive view of human capabilities; rather than trying to make use of ‘biases’, it emphasizes the behaviour-change ‘problem’ as one of channeling natural, internally generated action impulses. People are naturally active—in order to stay alive in constantly changing environments, we must explore our surroundings to keep up to date on what threats and opportunities have arisen. The Evo–Eco approach can be seen as seeking to help people harness this ‘energy’ more profitably.”

In summary, physical inactivity is a significant problem for contemporary societies resulting in excessive rates of morbidity and mortality; lifelong patterns of physical inactivity set up a poor environment for human growth and development; campus recreation programs present an opportunity to apply the Evo-Eco model to health behavior change to promote healthy habits of physical activity and healthy eating. The Evo-Eco approach to health behavior change has been applied to change hand-washing behavior in rural India (Aunger and Curtis 2014), but not yet in the context of increasing patterns of physical activity and not yet as a theoretical framework to model and pilot physical activity health promotion programs in a university setting.

**Theoretical Frameworks**

I drew predominantly from four theoretical themes when situating my research questions, to better understand the motivations and barriers to exercise for students at USF Campus Recreation, and for conducting analyses. Positive deviance established the constraints from which to draw a purposeful sample. To look at how gender shapes perception and experience of exercise, I considered feminism, or more specifically, a feminist critique of exercise as an activity or as part of an identity. To look at what influence, if any past experience with physical education may have had on shaping perceptions of and interests in exercise I approached this aspect of the problem with a postmodern critique of physical education and human movement.
And finally, it was important to see how notions of the body intertwine with values, past experience, and perceptions of exercise.

Positive Deviance

Positive deviance focuses attention on what works; the premise is to look for the solutions that already exist within the population, to explore the ethnographic detail and reveal the knowledge and experience of the successful individuals, and develop a model to apply them to the general population (Stuckey et al. 2011). Positive deviance is used to explain how an uncommon but desired behavior outcome is achieved when many others in the population or community do not perform the behavior (L. O. Walker et al. 2007). Positive deviance is an approach to learn what strategies are successful and how to disseminate those strategies to the greater population; a bottom up strategy where observations lead to broader generalizations to create a list of practices through qualitative inquiry (Stuckey et al. 2011). Designing interventions to increase patterns of physical activity and exercise based on a positive deviance approach, rather than continuing to focus on the negative deviants, has potential promise for application to public health interventions. Used in child nutrition research positive deviance directs observation to the sample of the community members who have experienced better outcomes (Marsh et al. 2004). For the purposes of this thesis, the at risk behavior is sedentarism and physical inactivity, while the beneficial practices are adhering to recommended levels of physical activity and exercise. The reason to use positive deviance is to focus attention on the behavior of students who exercise frequently and identify what their reasons are for engaging in exercise and physical activity at USF Campus Recreation. Some examples of using positive deviance to identify reasons for health behavior have been used to predict responsible alcohol use among college students (Tucker and Harris 2015), further analysis of existing public health data (L. O. Walker et al.)
2007), to improve child nutrition status (Marsh et al. 2004), to determine successful weight control practices (Stuckey et al. 2011), to understand athletic conformity and behavior (Hughes and Coakley 1991), and to identify dietary interventions compatible with reduction of cancer risk (Vossenaar et al. 2010).

The positive deviance approach is well suited in situations where the desired outcome happens infrequently. Less than half, 40%, of the student population at USF exercises at campus recreation (Cen et al. 2016). In research on how athletes conform to norms, Hughes and Coakley (1991) describe positive deviance as “living in conformity to the sport ethic” and being “a real athlete”. Furthermore, one aspect of this positive deviance perspective is to examine whether the sample drawn for this thesis project involves “excessive over conformity to the norms and values” (Hughes and Coakley 1991) of the desired health behavior and to identify any possible negative consequences due to their high engagement with USF Campus Recreation.

Positive deviance can frame how motivations and barriers to exercise are understood in the context of USF Campus Recreation. To elaborate, Hughes and Coakley (1991) write, “Being an athlete involves striving for distinction. … Breaking records is the ultimate standard of achievement to sport.” An athlete striving for distinction runs parallel to how some exercisers who engage in strength training, weight lifting, or running often refer to setting new personal records; they may seek to further set themselves apart, influenced by their athletic sporting identity to establish desired and realized patterns of behavior.

Conversely, when referring to barriers to exercise, Hughes and Coakley (1991) write, “Being an athlete involves refusing to accept limits in the pursuit of possibilities” to imply all perceived barriers to exercise are excuses and with the appropriate mindset any barrier can be overcome.
Moreover, in order to effectively use a positive deviance approach, risk factors, enablers, and behaviors must be identified (Lapping et al. 2002). Positive deviance is applied to identify the behaviors and motivations of the subgroup of students at USF who exercise frequently, three or more times each week, at campus recreation. Not every student uses USF Campus Recreation and not every student met the inclusion criteria.

The steps to identify and study the practices of successful individuals are (Stuckey et al. 2011): identify positive deviants, study the practices of those individuals in depth, test hypotheses statistically in larger representative samples, and disseminate the best practices newly identified. Positive deviance is one possible approach to sampling and building observational generalizations. Yet, it could be challenging to apply findings to a larger general population. Marsh et al. (2004), notes how, "the success of the approach rests on its ability to mobilise the community to identify role models within its midst who use uncommon, but demonstrably successful, strategies to tackle common problems." In campus recreation, given the diversity of the student population, it is challenging to identify rare factors for intrinsic motivation and then to leverage that knowledge to make some change to better support university students' needs. Designing social marketing campaigns to increase engagement with campus recreation based on model student behavior is uncertain because of the diverse student population.

Feminist Critique

Like many things in our society, exercise is gendered. The most popular sports, such as football and basketball, measured by per capita revenue, are sports featuring male bodies doing seemingly impossible feats of strength, speed, and skill. This worship goes to the extent where “the cultural adoration of those athletes who ‘perform’ masculinity for us often continues even after they have been charged with or convicted of serious crimes” (Bordo 1999). According to
Dworkin and Wachs (2009), this is a connection between some aspects of society and to hegemonic masculinity through muscular size and power, sport, and military service; men act, women appear (Bordo 1993). Azzarito and Solmon (2009), present an example of this in their research concerning gender embodied discourses in physical education. In their example to illustrate gender appropriate behavior where girls and/or boys might be encouraged and/or discouraged to engage in particular physical activities as gender appropriate Azzarito and Solmon (2009) explain:

“gendered discourses in the specific context created by the school culture might produce the social construction of jogging or walking as a physical activity that functions as a feminizing practice for girls, gendering female-appropriate behavior. In opposition to jogging or walking, the social construction of football, bounded by the gender binary, might function as a masculinizing practice, gendering male-appropriate behavior.”

When these young people find themselves in a new environment, away from home, with more independence and autonomy, this athletic identity they’ve associated with themselves may be a sense of support or it may sometimes be a source of conflict between sport and exercise and other aspects of life or identity, as a student or other competing interests, (Bennett et al. 2017). Their past experience as students in physical education classes, where they’ve undergone fitness and maybe body composition testing to affirm their athletic identities (Azzarito 2016), contributes to how they adhere to other aspects of how they perceive and act out their athletic identity, such as refusing to accept physical and mental limits (Hughes and Coakley 1991), further serving as a source of intrinsic motivation. For university students this is a negotiation between a new life as a student and also to try to achieve their goals in the gym.

Western society has made progress in recognizing the female body as athletic but many gendered norms still exist which influence patterns of physical activity for young women and girls, as well as boys and young men. To be an athlete is to embody some of the traditionally masculine cultural values and norms; norms which have been reinforced through popular culture, media,
and everyday life. Azzarito and Katzew (2010) conclude, “individuals’ identities are shaped by
dominant discourses of gender/sex, race, social class, and disability, and they reconstitute
themselves by negotiating discursive practices in their everyday lives”

For example, some women must negotiate multiple identities to pursue both idealized “bodily
appearance and shape” as part of a “successful heterosexual female identity” and having valued
bodies to perform athletic or sporting identities (Knowles, Niven, and Fawkner 2014; Bennett et
al. 2017; Azzarito 2016). Furthermore, growing up and navigating through physical education
Azzarito and Katzew (2010), show that, “young people navigate gender identities in their school
routines and learning practices, performing a wide range of femininities and masculinities in
fluid and contradictory ways.” Physical education provides the structured context of human
movement by which many young people gender themselves (Azzarito and Katzew 2010), and by
which young people’s habitus is shaped according to how “they aligned with the youth sports
settings in which they participated” (Kingsley, Spencer-Cavaliere, and Tink 2017).

On campus, the pursuit of the ideal can be stressful as students negotiate their pursuit of
academic success and increases in their exercise routines. Consequently, when taking the context
of physical education as a means to create gendered and racialized bodies, where fit and healthy
bodies are White, ethnic-minority groups might not see the value of fitness and may resist
exercise (Azzarito 2016), and not feel as interested in engaging with campus recreation. Some
behavioral and appearance related norms associated with idealized femininity, such as to work to
pursue the “lean and toned female body ideal” or to have some “desire for some body related
change” towards that feminine ideal (Bennett et al. 2017; Dworkin and Wachs 2009), are
reflected in the data collected. Campus recreation does not explicitly advocate idealized feminine
bodies but how else could we interpret the gender disparity for class attendance in some of the
group fitness classes? It seems to be a repeating pattern, where “consciously and unconsciously, girls and boys learn how to ‘do femininity’ or ‘do masculinity’ through their constant exposure to, engagement with, and consumption of media” (Azzarito and Katzew 2010).

Postmodern Critique Of Physical Education And Human Movement
As mentioned in the previous section, physical education has failed to promote lifelong habits of physical activity and exercise and instead has reinforced and recreated gendered patterns of exercise and human movement. Physical inactivity is at epidemic proportions. However, K-12 physical education experience is foundational in establishing future patterns of physical activity (Beddoes and Castelli 2017; Brustad 1997; Whitehead and Biddle 2008), and different models for physical education have gained traction in better preparing children for human movement in daily life. Around the country and across state lines there can be significant differences in not only how K-12 school physical education programs are delivered but also the identifying characteristics of the community at large. The metrics used to administer and evaluate physical education is fraught with challenges. Given the dominant emphasis of testing K-12 students, physical education “fitness testing is a gendered practice that reinforces the ‘girl/boy binary system,’ the ‘gender order,’ and gender expectations. Fitness testing, then, validates gendered representations of the body and contributes to how girls and boys come to understand fitness” (Azzarito 2016). To paraphrase, Azzarito and Katzew (2010), the emphasis on external absolute fitness norms and standards repeats the social discourses produced by the media, informing young people’s physicality, providing a narrow White hegemonic cultural context about gender and the body in physical activity contexts.

Each community and each school community will have somewhat unique values and beliefs around physical activity, shaped in part by the larger culture, and access to inclusive patterns of
activity will vary and to what extent these physical education programs promote social inclusion and exclusion (Knowles, Niven, and Fawkner 2014). Physical education recreates community values and beliefs, further racializing other ethnic-minorities to White hegemonic standards of physical activity and exercise (Azzarito 2016). When comparing schools, from urban or rural communities or from wealthy and not wealthy school districts, the environment in and around the community influences access to resources for teachers and students (Powell and Ceaser-White 2017). “Wealthier, White suburban students, for example, have many more opportunities, more choices, and greater access to fitness and physical activity activities from a very young age than do poor or minority students, who subsequently often do not see the point of fitness in their lives” (Azzarito 2016).

In the university setting, physical education is no longer a required subject. Campus recreation seeks to give students the opportunity to continue to express their innate desire for ritualized human movement. It must do this in such a way as to appear to meet the needs of the university and be inclusive of the needs of the diverse student population, further attempting to instill values and beliefs of active living, intellectualism, and critical thinking.

The Body
The human body is seen by different people in different ways. For some, “The body is a bear—a brute, capable of random, chaotic violence and aggression, but not of calculated evil” (Bordo 1993). This mind and body dualism is common in our Western society; the body is a puzzle to be solved, “In the medical model, the body of the subject is the passive tablet on which disorder is inscribed. Deciphering that inscription is usually seen as a matter of determining the ‘cause’ of the disorder” (Bordo 1993). The body is the other, threatening our composure with unbridled desire, “the body is the locus of all that threatens our attempts at control” (Bordo 1993).
Exploring how others embody or perceive their physical body and the physical bodies of others is fascinating, especially when focusing our gaze to the bodybuilder who displays a greater perceived control. Although the students included in this sample are not competing amateur or professional bodybuilders some of their interview responses mirror aspects of satisfaction with achieving a higher order of control of their bodies or their lives. Bordo (1993) summarizes this succinctly: “most strikingly, body-builders put the same emphasis on control: on feeling their life to be fundamentally out of control, and on the feeling of accomplishment derived from total mastery of the body.”

Cultural norms for maleness focus on male performance and hardness (Bordo 1999), but are not so easily applied to women because “the deliberately muscular woman disturbs dominant notions of sex, gender, and sexuality, and any discursive field that includes her risks opening up a site of contest and conflict, anxiety and ambiguity” (Schulze 1997).

The body becomes a project to be worked on and maintained. “Such individualized body projects take on the moral equivalent of the projects of the soul that were so popular in the nineteenth century” (Dworkin and Wachs 2009), while “failure to properly invest in the body is viewed as a failure to make the most of the natural” (Dworkin and Wachs 2009), and minimize unnatural manifestations. “The built body, then, is artifice, not nature. It is produced under a barbell instead of in a womb, is produced by the erotic union of metal and muscle” (Moore 1997). It is a constant drive to overcome whatever genetic or environmental shortcomings hinder the ideal body; “genetics are framed as something that should not get in the way, as diet, exercise, and the right attitude should overcome all other influences” (Dworkin and Wachs 2009).

Through this commitment to work and daily practice the body becomes the lived body, where sport and athleticism become the “source of thoughts and words that point to greater wholes, so
that: “The greater wholeness can never be fully summarized, but its impact can be somewhat felt and held through the evocative power of words”” (Allen-Collinson 2009).

Summary

Due to its role in promoting lifelong habits of promoting positive health behavior, campus recreation departments are a good choice of site to research motivations and barriers to exercise for young adults. In today's environment where higher education is administered with limited budgets universities must be able to both attract students to attend and justify the added expense of providing services and amenities to enhance the student experience.

According to the paradigm of DOHAD, establishing patterns of physical activity and exercise early in life may have positive downstream effects on health further emphasizing the importance of supporting campus recreation departments. Research supports the positive benefit exercise has for people in improving health and reducing risk of all cause mortality. Given the importance of promoting physical activity and exercise, understanding how to frame marketing messaging to motivate university students beyond addressing sport performance, weight management, and stress management could further build on the success of campus recreation departments.

Situating the theoretical research from within an Evo-Eco and positive deviance perspective forces a critical analysis of the university campus recreation department environment and what the most successful participants have identified as key environmental factors to helping them keep motivated to exercise. Like any cultural phenomenon, perceptions of exercise and people who exercise has multiple factors. Applying a feminist and postmodern critique of exercise helps to dig out and better understand patterns of gender, culture, and embodiment for university students who are highly engaged with the campus recreation department.
CHAPTER THREE: METHODS

This project used a mixed-methods design utilizing several qualitative and ethnographic research methodologies: participant observation, questionnaires, focus groups, and semi-structured interviews. Each of the different ethnographic research methodologies were selected for use to provide an example of how ethnographic research can be conducted in the context of public health education and promotion and program evaluation in a Campus Recreation setting and a physical activity and exercise context. Ethnographic data provides more detail into why university students at USF Campus Recreation are motivated or unmotivated to exercise at the three on-campus facilities and helps to clarify earlier research detailing a relationship between using the campus recreation facilities and student academic metrics such as GPA or time to graduate. Ethical approval was obtained by the University of South Florida Institutional Review Board. Pseudonyms were generated from the Random Name Generator website (“Random Name Generator,” n.d.).

Sample

Positive deviance was selected to build the inclusion criteria for sample selection because it forces researchers to investigate the most successful cases. Positive deviance has been used in previous research to identify individuals who exhibit successful or desired behavior. Positive deviance was used for this research to set the inclusion criteria; the case definition is: students who exercise frequently, four or more days, at USF Campus Recreation and who have a 3.0 GPA or higher. Qualitative data was collected from the students, informants, and their experience. Analysis and interpretation has led to conclusions and recommendations for campus recreation.
Participants and informants were recruited and selected among the student exerciser population at USF Campus Recreation. Questionnaire respondents were recruited with a flier (see Appendix 1) distributed in and around USF Campus Recreation. The positive deviance sampling strategy is a purposeful sampling strategy to ensure a high level of potential ethnographic richness and detail specific to our phenomenon of interest, engagement with USF Campus Recreation (Palinkas et al. 2015).

Lower and upper limits for inclusion criteria are defined as:

- self-reported grade point average (GPA) greater than or equal to 3.0
- self-reported weekly exercise frequency
  - moderate intensity physical activity or exercise for a minimum of thirty (30) minutes five (5) days
  - vigorous intensity physical activity or exercise for a minimum of twenty (20) minutes three (3) days
- student
  - undergraduate in second year of study or further
  - graduate
- age between 18-29
- past experience with physical activity and exercise for six (6) months or more

The following table provides an overview of the number of participants with data included in each stage of the research project.

**Table 1: Overview of Sample Size for Each Research Method**

<table>
<thead>
<tr>
<th>Stage</th>
<th>Sample Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Questionnaire</td>
<td>43</td>
</tr>
<tr>
<td>Interviews</td>
<td>9</td>
</tr>
<tr>
<td>Focus Group 1</td>
<td>4</td>
</tr>
<tr>
<td>Focus Group 2</td>
<td>4</td>
</tr>
</tbody>
</table>

**Site**

The ethnographic site was the University of South Florida Department of Campus Recreation. USF Campus Recreation has a mission to “enrich educational experience by providing opportunities that focus on the development of lifelong wellness skills for students” (USF
USF Campus Recreation was chosen as the site because the phenomenon of interest is to understand the motivations and barriers to exercise for university students at USF Campus Recreation. The facilities are used by many students and make for an excellent opportunity to evaluate using participant observation. An examination of USF Campus Recreation fitness programs provides information that administrators can use to enhance their suite of programs or possibly improve marketing to other students. The student population at USF represents a similar student population when compared to data by the National Center for Education Statistics, in 2016, 56.5% of undergraduate students in the United States were female (U.S. Department of Education 2016). As a student here myself at the University of South Florida and as a student employee with campus recreation my position places me at the intersection of participant and researcher. During this time as a student patron and employee here at USF Campus Recreation, I have established rapport with other student employees at USF Campus Recreation and many of the patrons.

**Design**

Positive deviance dictates a convenience sample of frequent exercisers. Positive deviance limits the purposeful sampling to focus primarily on the university students who are exercising frequently and have a high GPA to ensure data is collected on the meaningful phenomena of the experience at USF Campus Recreation. Participant observation provides an opportunity to collect rich ethnographic detail to describe both USF Campus Recreation and the observable patterns of behavior displayed by students. The questionnaire used provided some demographic context and ensured participants invited to attend focus groups and interviews met the sampling requirements. The questionnaires also provided free list data for further cultural domain analysis (Bernard 2011). Focus groups, with the pile sort exercise, helped to frame the free list data into
distinct groups of free list terms and phrases. Semi-structured individual interviews allowed participants the chance to tell their story and explain how or why they are motivated and what barriers they face to meeting their exercise goals as university students at USF.

Participant Observation

Participant observation was conducted from 13 April 2018 to 26 August 2018. The intent of participant observation was to gather observational qualitative data to describe the atmosphere at campus recreation. Observations were focused on identifying and describing usage patterns, discourse, experience within campus recreation, and physical occupation of space.

In my capacity as a researcher I undertook participant observation at USF Campus Recreation in several contexts; a personal trainer, co-worker, instructor, peer, and student patron. This array of situations represents both active and passive participation (Johnson, Avenarius, and Weatherford 2006). My perspective is as a cultural insider (Wanat 2008), having worked in some capacity as a fitness professional for over ten years. In this sense, I was very comfortable at a gym interacting with participants and enabling me to comfortably develop relationships with the people I would later consider to include in my sample. I began working at USF Campus Recreation as a personal trainer well before any proposed start date for data collection. This two year period gave me plenty of time to focus to cultivate relationships with student employees, professional staff, and student patrons.

Participant observation was done in collaboration with an undergraduate volunteer research assistant, Jacob Stephenson. Jacob, who volunteered to assist with the data collection, is an undergraduate student with an interest in public health epidemiology near the end of their program in Biological Health Sciences and is a certified personal trainer. In addition to helping with the focus groups, Jacob provided notes through participant observation, and assisted with
some of the interviews. Following an example by (Musante 2015), we looked at the “arrangement of physical space, how people occupy space, specific activities and movements, interactions between people, and verbal and nonverbal communications”. The research assistant was also a student at USF, a fitness professional, and a gym going patron. Field notes were made on both pen and paper as well as electronic note taking applications such as Google Keep, Simple Note, Google Drive, and gedit. Excluding taking photographs of the pile sort cards, no audio, video, or still images were recorded at any time during the data collection process. In my conversations with student patrons and student employees at USF Campus Recreation, I presented myself as a graduate student researcher interested in motivations and barriers to exercise for students at USF Campus Recreation.

Questionnaire

Following the sampling strategy of positive deviance, recruitment for the questionnaire consisted of approaching patrons around the entrance to campus recreation and distribution of the recruitment flier. Individuals who expressed interest in responding to the questionnaire and who indicated a strong interest in exercise were given the information needed to respond to the questionnaire. Fifty questionnaires were collected exclusively with the Qualtrics (Qualtrics (version December 2017) 2017), platform from 13 April 2018 through 9 July 2018. The questionnaire, administered online with the Qualtrics platform, consisted of 16 questions (see Appendix 3) to gather demographic data, exercise history and status, and free list data. The questionnaire further served to identify students for focus groups and interviews. Participants agreed to participate and were consented to the questionnaire, focus groups, and interviews via an online informed consent to participate in research presented at the start of the questionnaire. Questionnaire respondents were asked at the end of the questionnaire if they
wanted to volunteer to elect to participate in follow up focus groups and interviews. Identifying information was only collected on those that elected to participate.

A Qualtrics filter was applied to identify which responses met inclusion criteria and provided contact information to be contacted for the focus group and interview. Participants who met the inclusion criteria were contacted by phone and asked to indicate times of availability to participate in focus groups and interviews.

Data obtained from Qualtrics was exported, with no identifying information, to a plain text CSV file and stored on the USF Box account. Access to the data was limited to the research team.

Items 14, 15, and 16 of the questionnaire generated free list response data. This data was sorted, summarized, and coded into cultural domains and themes to be printed onto index cards for use in the focus group pile sort.

The purpose of the questionnaire was to gather demographic data, attitudes toward exercise and exercise history, identify informants for focus groups and interviews, and generate free list data.

Demographic data consisted of:

- age
- sex
- gender
- undergraduate or graduate student status
- year at USF
- Major or program of study
- On campus or off campus residence
- GPA

Exercise history included:

- exercise frequency
- intensity
- location
- identification of negative consequences
- rating K-12 PE experience

Free list data was generated around three domains:
motivations to exercise
• barriers to exercise
• campus recreation as the site of exercise

All questionnaire respondents were invited to volunteer for focus groups and interviews but only informants who indicated their primary site of exercise was at campus recreation and who exercised four or more days each week were invited.

Focus Groups
Two focus groups were convened each consisting of four students. Free list data was presented on pile sort cards. Informants were asked to collectively group and rank cards into distinct domains. Focus group facilitator further probed informants to discuss the reasons for why cards were grouped and rank sorted and the focus group observer took notes. I served as facilitator for the first focus group and Jacob Stephenson served as facilitator for the second. The groupings and rank order of the pile sort cards were photographed. Audio and video was not recorded during the interviews but notes were typed and analyzed for themes.

Interviews
Participants who met the inclusion criteria and indicated their desire to participate in interviews were contacted and scheduled.

In all, nine semi-structured interviews were conducted between the dates of 4 May 2018 and 24 July 2018. Interviews took between 35 and 50 minutes to complete and consisted of 8 questions with probing questions to encourage further elaboration (See Appendix 4). Content for interview questions 4, 5, and 6 were populated with free list response data from the questionnaire. The content was identified for inclusion after free list response data was coded and counted by myself. Only the three most frequently reported items for the questionnaire free list response data
were selected for inclusion in the interview questions because those appeared to be the most salient and significant, with a drastic drop off in response.

Interview question 4 asked the informant to reflect on how the motivations listed from the questionnaire might apply to their experience. Content was drawn from questionnaire item 14. The themes included were:

- aesthetics, muscles, physique
- health and wellness
- strength and endurance,

Interview question 5 asked the informant to reflect on how the barriers listed from the questionnaire might apply to their experience. Content was drawn from questionnaire item 15. The themes included were:

- class, homework, exams, and studying
- time management
- fatigue, lack of sleep, or too sore

Interview question 6 asked the informant to reflect on how the reasons to exercise at campus recreation listed from the questionnaire might apply to their experience. Content was drawn from questionnaire item 16. In this case, four themes were selected because of the frequency of responses. Themes included were:

- student fee pays for membership
- facility equipment: availability, quantity, and quality
- convenience and proximity to home, class, or work
- atmosphere with familiar people, and sense of community

Audio and video was not recorded during the interviews but notes were typed, coded, and analyzed for themes.

**Analysis**

Qualitative data was analyzed and coded for themes using ATLAS.ti software (ATLAS.ti (version 6.2), n.d.), to identify types and levels of meaningful phenomena. Free lists provided
frequency, salience, and consensus of cultural domains. and pile sort provided insight into relative importance and associations between concepts. Frequencies, proportions, means, student t-tests, and chi square tests were conducted in R. Analysis to determine saliency and frequency of free lists and pile sorts was done using R (R Core Team 2018), with the AnthroTools (Purzycki and Jamieson-Lane 2017), package installed. Interviews added ethnographic richness to the individual personal narrative, clarifying past experience with physical activity and exercise further exploring and probing how motivations were established and barriers, if any, were overcome.

Some of the responses to the questionnaire were excluded from analysis because of incomplete responses or the participants did not meet inclusion criteria.
CHAPTER FOUR: RESULTS

Participant Characteristics

Of the fifty questionnaires completed, 43 responses were included for analysis. Responses were excluded if the inclusion criteria were not met, i.e. age outside of range or frequency of exercise too infrequent. The questionnaire participants (see Table 3) had greater representation of female students (n = 26), undergraduate students (n = 30), undergraduate students in their third or fourth year of study (n = 20), students living off campus (n = 41), and students who reported exercising four or more days per week (n = 38). Table 1 summarizes the entire USF student population at the Spring 2015 semester. Table 2 summarizes the student population at USF that had frequented Campus Recreation during the same time. This data was presented at a Campus Recreation conference by (Cen et al. 2016), but did not allow for a more detailed breakdown to completely match, compare, and contrast the sample for this project, however, the participant sample does follow a similar trend in sex and undergraduate or graduate student.
Table 2: USF student population enrolled Spring 2015 reported by (Cen et al. 2016)

<table>
<thead>
<tr>
<th>Sex</th>
<th>Total (N)</th>
<th>Female Frequency (proportion)</th>
<th>Male Frequency (proportion)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Undergraduate</td>
<td>30,513 (0.724%)</td>
<td>23,179 (0.550%)</td>
<td>18,964 (0.450%)</td>
</tr>
<tr>
<td>Graduate</td>
<td>9944 (0.236%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 3: USF Campus Recreation population Spring 2015 reported by (Cen et al. 2016)

<table>
<thead>
<tr>
<th>Sex</th>
<th>Total (N)</th>
<th>Female Frequency (proportion)</th>
<th>Male Frequency (proportion)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Undergraduate</td>
<td>12,436 (0.730%)</td>
<td>9369 (0.550%)</td>
<td>7666 (0.450%)</td>
</tr>
<tr>
<td>Graduate</td>
<td>3918 (0.230%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GPA (mean)</td>
<td></td>
<td>3.15</td>
<td></td>
</tr>
<tr>
<td>Undergraduate</td>
<td></td>
<td>3.16</td>
<td></td>
</tr>
</tbody>
</table>
Table 4: Description of sample that answered the questionnaire from 13 April 2018 through 9 July 2018

<table>
<thead>
<tr>
<th></th>
<th>Total Frequency (proportion)</th>
<th>Female Frequency (proportion)</th>
<th>Male Frequency (proportion)</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>43 (1.0 %)</td>
<td>26 (0.605%)</td>
<td>17 (0.395%)</td>
</tr>
<tr>
<td>Age (mean and standard deviation)</td>
<td>22.256 SD 2.656</td>
<td>21.923 SD 2.697</td>
<td>22.765 SD 2.587</td>
</tr>
<tr>
<td>Undergraduate</td>
<td>30 (0.698%)</td>
<td>18 (0.692%)</td>
<td>12 (0.706%)</td>
</tr>
<tr>
<td>Graduate</td>
<td>13 (0.302%)</td>
<td>8 (0.308%)</td>
<td>5 (0.294%)</td>
</tr>
<tr>
<td>Year</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>First (1st) year - undergraduate</td>
<td>2 (0.047%)</td>
<td>1 (0.038%)</td>
<td>1 (0.059%)</td>
</tr>
<tr>
<td>Second (2nd) year - undergraduate</td>
<td>6 (0.140%)</td>
<td>5 (0.192%)</td>
<td>1 (0.059%)</td>
</tr>
<tr>
<td>Third (3rd) year - undergraduate</td>
<td>9 (0.209%)</td>
<td>5 (0.192%)</td>
<td>4 (0.235%)</td>
</tr>
<tr>
<td>Fourth (4th) year - undergraduate</td>
<td>11 (0.256%)</td>
<td>6 (0.231%)</td>
<td>5 (0.294%)</td>
</tr>
<tr>
<td>Graduate</td>
<td>13 (0.302%)</td>
<td>7 (0.269%)</td>
<td>6 (0.353%)</td>
</tr>
<tr>
<td>Other</td>
<td>2 (0.047%)</td>
<td>2 (0.077%)</td>
<td>0 (0.0%)</td>
</tr>
<tr>
<td>Residence On Campus</td>
<td>2 (0.047%)</td>
<td>1 (0.038%)</td>
<td>1 (0.059%)</td>
</tr>
<tr>
<td>Residence Off Campus</td>
<td>41 (0.953%)</td>
<td>25 (0.962%)</td>
<td>16 (0.941%)</td>
</tr>
<tr>
<td>GPA (mean)</td>
<td>3.502 SD 0.32</td>
<td>3.593 SD 0.29</td>
<td>3.362 SD 0.323</td>
</tr>
<tr>
<td>Exercise Frequency, in days</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Three</td>
<td>5 (0.116%)</td>
<td>5 (0.192%)</td>
<td>0 (0.0%)</td>
</tr>
<tr>
<td>Four</td>
<td>11 (0.256%)</td>
<td>7 (0.269%)</td>
<td>4 (0.235%)</td>
</tr>
<tr>
<td>Five</td>
<td>14 (0.326%)</td>
<td>8 (0.308%)</td>
<td>6 (0.353%)</td>
</tr>
<tr>
<td>Six or more</td>
<td>13 (0.302%)</td>
<td>6 (0.231%)</td>
<td>7 (0.412%)</td>
</tr>
<tr>
<td>Exercise Intensity (mean)</td>
<td>15.349 SD 1.85</td>
<td>14.769 SD 1.531</td>
<td>16.235 SD 1.985</td>
</tr>
<tr>
<td>Physical Education Experience</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Negative</td>
<td>7 (0.163%)</td>
<td>3 (0.115%)</td>
<td>4 (0.235%)</td>
</tr>
<tr>
<td>Neutral</td>
<td>14 (0.326%)</td>
<td>11 (0.423%)</td>
<td>3 (0.176%)</td>
</tr>
<tr>
<td>Positive</td>
<td>22 (0.512%)</td>
<td>12 (0.462%)</td>
<td>10 (0.588%)</td>
</tr>
<tr>
<td>Location</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Campus Rec</td>
<td>34 (0.540%)</td>
<td>20 (0.526%)</td>
<td>14 (0.560%)</td>
</tr>
<tr>
<td>... at the Fit</td>
<td>8 (0.127%)</td>
<td>4 (0.105%)</td>
<td>4 (0.160%)</td>
</tr>
<tr>
<td>... at the Well</td>
<td>7 (0.111%)</td>
<td>4 (0.105%)</td>
<td>3 (0.120%)</td>
</tr>
<tr>
<td>Other</td>
<td>14 (0.222%)</td>
<td>10 (0.263%)</td>
<td>4 (0.160%)</td>
</tr>
</tbody>
</table>
Descriptive And Inferential Statistics

Frequencies, proportions, means, standard deviation of the mean, student t-tests, chi-square tests, and accompanying confidence intervals were calculated. Although males appeared to exercise more frequently than females (i.e. at least 6 days a week, 41% vs. 23%), the difference did not achieve statistical significance, perhaps in part due to low statistical power based on the modest sample size. A similar lack of statistical difference in physical education experience was observed despite males reporting a higher rate of positive experience than females (59% vs 46%). Table 5 shows most of the students in our participant sample reported a neutral or positive experience.

Table 5: Pearson's Chi Square test of independence between sex and exercise frequency and sex and PE experience

<table>
<thead>
<tr>
<th></th>
<th>Whole Sample</th>
<th>Female</th>
<th>Male</th>
<th>Difference (χ²)</th>
<th>df</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exercise Frequency, in days</td>
<td>N=43 (1.0%)</td>
<td>n = 26 (0.605%)</td>
<td>n = 17 (0.395%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Three</td>
<td></td>
<td>5 (0.116%)</td>
<td>5 (0.192%)</td>
<td>0 (0.0%)</td>
<td>3</td>
<td>0.213</td>
</tr>
<tr>
<td>Four</td>
<td></td>
<td>11 (0.256%)</td>
<td>7 (0.269%)</td>
<td>4 (0.235%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Five</td>
<td></td>
<td>14 (0.326%)</td>
<td>8 (0.308%)</td>
<td>6 (0.353%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Six or more</td>
<td></td>
<td>13 (0.302%)</td>
<td>6 (0.231%)</td>
<td>7 (0.412%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PE Experience</td>
<td></td>
<td></td>
<td></td>
<td>3.150</td>
<td>2</td>
<td>0.207</td>
</tr>
<tr>
<td>Negative</td>
<td></td>
<td>7 (0.163%)</td>
<td>3 (0.115%)</td>
<td>4 (0.235%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neutral</td>
<td></td>
<td>14 (0.326%)</td>
<td>11 (0.423%)</td>
<td>3 (0.176%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive</td>
<td></td>
<td>22 (0.512%)</td>
<td>12 (0.462%)</td>
<td>10 (0.588%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
When comparing differences between female and male sex in exercise intensity and GPA (Table 6), the null hypothesis of no difference was rejected. That is, males reported statistically higher mean exercise intensity than females (16.2 vs 14.8, p=0.015), whereas females reported a statistically higher mean GPA (3.59 vs 3.36, p=0.02). Although no direct comparison can be made, referring back to Table 3, this sample reported a higher mean GPA than the general campus recreation population (3.502 vs. 3.15 and 3.16).

Table 6: Welch Two Sample t-tests to compare the difference of the mean between sex and exercise intensity and sex and GPA

<table>
<thead>
<tr>
<th></th>
<th>Whole Sample N = 43 (95% Confidence Interval)</th>
<th>Female n = 26 (95% Confidence Interval)</th>
<th>Male n = 17 (95% Confidence Interval)</th>
<th>Difference Welch Two Sample t-test (95% Confidence Interval)</th>
<th>df</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exercise Intensity</td>
<td>15.349 (14.779, 15.918)</td>
<td>14.769 (14.151, 15.388)</td>
<td>16.235 (15.215, 17.256)</td>
<td>-2.584 (-2.628, -0.304)</td>
<td>28.143</td>
<td>0.015</td>
</tr>
<tr>
<td>GPA</td>
<td>3.502 (3.403, 3.600)</td>
<td>3.593 (3.476, 3.710)</td>
<td>3.362 (3.196, 3.528)</td>
<td>2.389 (0.034, 0.428)</td>
<td>31.662</td>
<td>0.023</td>
</tr>
</tbody>
</table>

As seen in Table 7, exercise frequency was similar across ratings of physical education experience. Stated another way, students with negative vs. positive ratings of physical education experience had similar levels of exercise frequency.

Table 7: Pearson's chi square test of independence between PE experience and exercise frequency.

<table>
<thead>
<tr>
<th>Exercise Frequency, in days</th>
<th>Whole Sample N = 43 (1.0%)</th>
<th>PE Exp: Negative n = 7 (0.163%)</th>
<th>Neutral n = 14 (0.326%)</th>
<th>Positive n = 22 (0.512%)</th>
<th>Differen ce (χ²)</th>
<th>Df</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Three</td>
<td>5 (0.116%)</td>
<td>0 (0.0%)</td>
<td>2 (0.143%)</td>
<td>3 (0.136%)</td>
<td>3.934</td>
<td>6</td>
<td>0.686</td>
</tr>
<tr>
<td>Four</td>
<td>11 (0.256%)</td>
<td>2 (0.286%)</td>
<td>5 (0.357%)</td>
<td>4 (0.182%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Five</td>
<td>14 (0.326%)</td>
<td>2 (0.286%)</td>
<td>5 (0.357%)</td>
<td>7 (0.318%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Six or more</td>
<td>13 (0.302%)</td>
<td>3 (0.429%)</td>
<td>2 (0.143%)</td>
<td>8 (0.364%)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Free List Response Data Analysis

Among participants in this sample, the top motivator to exercise was reported as physical appearance followed by sport performance and strength and conditioning. Of the 43 calculated responses, 23 indicated looks and physical appearance as a motivator. The sum salience for this coded item is 15.03. Similarly, 21 responses indicated physical performance as a motivator with a sum salience of 12.22. Salience is an indicator of importance, and Smith’s S "takes into account both the frequency of an item and how early in each list it is mentioned and is a popular measure of item cognitive salience" (Bernard 2011). Table 8 summarizes the free list data and salience for motivations to exercise.
Table 8: Frequency Table with Salience Scores for Motivations to Exercise (limited to first 35 rows)

<table>
<thead>
<tr>
<th>Rank</th>
<th>Code</th>
<th>Freq</th>
<th>Mean Salience</th>
<th>Sum Salience</th>
<th>SmithsS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>looks, appearance, physique, aesthetics, muscularity</td>
<td>23</td>
<td>0.683</td>
<td>15.034</td>
<td>0.327</td>
</tr>
<tr>
<td>2</td>
<td>health or healthy</td>
<td>17</td>
<td>0.777</td>
<td>13.217</td>
<td>0.287</td>
</tr>
<tr>
<td>3</td>
<td>performance, strength and conditioning</td>
<td>21</td>
<td>0.643</td>
<td>12.218</td>
<td>0.266</td>
</tr>
<tr>
<td>4</td>
<td>stress relief</td>
<td>9</td>
<td>0.747</td>
<td>6.722</td>
<td>0.146</td>
</tr>
<tr>
<td>5</td>
<td>feel good</td>
<td>9</td>
<td>0.801</td>
<td>6.406</td>
<td>0.139</td>
</tr>
<tr>
<td>6</td>
<td>health and fitness</td>
<td>6</td>
<td>0.889</td>
<td>5.333</td>
<td>0.116</td>
</tr>
<tr>
<td>7</td>
<td>weight management, weight loss</td>
<td>6</td>
<td>0.694</td>
<td>4.161</td>
<td>0.090</td>
</tr>
<tr>
<td>8</td>
<td>in shape, get/stay</td>
<td>4</td>
<td>0.875</td>
<td>3.500</td>
<td>0.076</td>
</tr>
<tr>
<td>9</td>
<td>socialization</td>
<td>7</td>
<td>0.460</td>
<td>3.219</td>
<td>0.070</td>
</tr>
<tr>
<td>10</td>
<td>well being</td>
<td>3</td>
<td>0.917</td>
<td>2.750</td>
<td>0.060</td>
</tr>
<tr>
<td>11</td>
<td>self improvement</td>
<td>3</td>
<td>0.683</td>
<td>2.048</td>
<td>0.045</td>
</tr>
<tr>
<td>12</td>
<td>health, heart</td>
<td>2</td>
<td>1.000</td>
<td>2.000</td>
<td>0.043</td>
</tr>
<tr>
<td>13</td>
<td>competition</td>
<td>2</td>
<td>0.833</td>
<td>1.667</td>
<td>0.036</td>
</tr>
<tr>
<td>14</td>
<td>fun and enjoyment</td>
<td>3</td>
<td>0.528</td>
<td>1.583</td>
<td>0.034</td>
</tr>
<tr>
<td>15</td>
<td>mood,</td>
<td>2</td>
<td>0.750</td>
<td>1.500</td>
<td>0.033</td>
</tr>
<tr>
<td>16</td>
<td>happiness</td>
<td>3</td>
<td>0.418</td>
<td>1.254</td>
<td>0.027</td>
</tr>
<tr>
<td>17</td>
<td>set and achieve goals</td>
<td>2</td>
<td>0.575</td>
<td>1.150</td>
<td>0.025</td>
</tr>
<tr>
<td>18</td>
<td>energy</td>
<td>2</td>
<td>0.567</td>
<td>1.133</td>
<td>0.025</td>
</tr>
<tr>
<td>19</td>
<td>self empowerment</td>
<td>2</td>
<td>0.500</td>
<td>1.000</td>
<td>0.022</td>
</tr>
<tr>
<td>20</td>
<td>self esteem</td>
<td>2</td>
<td>0.500</td>
<td>1.000</td>
<td>0.022</td>
</tr>
<tr>
<td>21</td>
<td>gain employment</td>
<td>1</td>
<td>1.000</td>
<td>1.000</td>
<td>0.022</td>
</tr>
<tr>
<td>22</td>
<td>health, mental</td>
<td>1</td>
<td>1.000</td>
<td>1.000</td>
<td>0.022</td>
</tr>
<tr>
<td>23</td>
<td>healthy body</td>
<td>1</td>
<td>1.000</td>
<td>1.000</td>
<td>0.022</td>
</tr>
<tr>
<td>24</td>
<td>lifestyle</td>
<td>1</td>
<td>1.000</td>
<td>1.000</td>
<td>0.022</td>
</tr>
<tr>
<td>25</td>
<td>transfer of dedication and hard work</td>
<td>1</td>
<td>1.000</td>
<td>1.000</td>
<td>0.022</td>
</tr>
<tr>
<td>26</td>
<td>feel better</td>
<td>2</td>
<td>0.467</td>
<td>0.933</td>
<td>0.020</td>
</tr>
<tr>
<td>27</td>
<td>be better</td>
<td>2</td>
<td>0.458</td>
<td>0.917</td>
<td>0.020</td>
</tr>
<tr>
<td>28</td>
<td>positive body image</td>
<td>2</td>
<td>0.433</td>
<td>0.867</td>
<td>0.019</td>
</tr>
<tr>
<td>29</td>
<td>focus</td>
<td>1</td>
<td>0.750</td>
<td>0.750</td>
<td>0.016</td>
</tr>
<tr>
<td>30</td>
<td>mental health</td>
<td>2</td>
<td>0.361</td>
<td>0.722</td>
<td>0.016</td>
</tr>
<tr>
<td>31</td>
<td>challenge, challenge myself</td>
<td>2</td>
<td>0.347</td>
<td>0.694</td>
<td>0.015</td>
</tr>
<tr>
<td>32</td>
<td>health, physical</td>
<td>1</td>
<td>0.667</td>
<td>0.667</td>
<td>0.014</td>
</tr>
<tr>
<td>33</td>
<td>healthy mind</td>
<td>1</td>
<td>0.667</td>
<td>0.667</td>
<td>0.014</td>
</tr>
<tr>
<td>34</td>
<td>muscle</td>
<td>1</td>
<td>0.667</td>
<td>0.667</td>
<td>0.014</td>
</tr>
<tr>
<td>35</td>
<td>disease prevention</td>
<td>1</td>
<td>0.600</td>
<td>0.600</td>
<td>0.013</td>
</tr>
</tbody>
</table>
Table 9 shows the salience for each motivation code grouped by sex. Health or being healthy was the most salient item for females (Sum Salience = 9.05), followed by physical performance (Sum Salience = 8.3), and then physical appearance (Sum Salience = 8.23). For males, the most salient item was physical appearance (Sum Salience = 6.81), then health or being healthy (Sum Salience = 4.17), and finally health and fitness (Sum Salience = 4).

**Table 9: Motivations Grouped by Sex with Salience Scores (limited to ten most frequent codes)**

<table>
<thead>
<tr>
<th>GROUPING</th>
<th>CODE</th>
<th>Mean Salience</th>
<th>Sum Salience</th>
<th>SmithsS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>health or healthy</td>
<td>0.823</td>
<td>9.050</td>
<td>0.348</td>
</tr>
<tr>
<td></td>
<td>performance, strength and conditioning</td>
<td>0.692</td>
<td>8.302</td>
<td>0.319</td>
</tr>
<tr>
<td></td>
<td>looks, appearance, physique, aesthetics, masculinity</td>
<td>0.686</td>
<td>8.229</td>
<td>0.316</td>
</tr>
<tr>
<td></td>
<td>feel good</td>
<td>0.818</td>
<td>4.906</td>
<td>0.189</td>
</tr>
<tr>
<td></td>
<td>stress relief</td>
<td>0.883</td>
<td>4.417</td>
<td>0.170</td>
</tr>
<tr>
<td></td>
<td>weight management, weight loss</td>
<td>0.850</td>
<td>2.550</td>
<td>0.098</td>
</tr>
<tr>
<td></td>
<td>socialization</td>
<td>0.444</td>
<td>2.219</td>
<td>0.085</td>
</tr>
<tr>
<td></td>
<td>health, heart</td>
<td>1.000</td>
<td>2.000</td>
<td>0.077</td>
</tr>
<tr>
<td></td>
<td>well being</td>
<td>0.875</td>
<td>1.750</td>
<td>0.067</td>
</tr>
<tr>
<td></td>
<td>competition</td>
<td>0.833</td>
<td>1.667</td>
<td>0.064</td>
</tr>
<tr>
<td>Male</td>
<td>looks, appearance, physique, aesthetics, masculinity</td>
<td>0.681</td>
<td>6.806</td>
<td>0.340</td>
</tr>
<tr>
<td></td>
<td>health or healthy</td>
<td>0.694</td>
<td>4.167</td>
<td>0.208</td>
</tr>
<tr>
<td></td>
<td>health and fitness</td>
<td>1.000</td>
<td>4.000</td>
<td>0.200</td>
</tr>
<tr>
<td></td>
<td>performance, strength and conditioning</td>
<td>0.560</td>
<td>3.917</td>
<td>0.196</td>
</tr>
<tr>
<td></td>
<td>in shape, get/stay</td>
<td>0.875</td>
<td>3.500</td>
<td>0.175</td>
</tr>
<tr>
<td></td>
<td>stress relief</td>
<td>0.576</td>
<td>2.306</td>
<td>0.115</td>
</tr>
<tr>
<td></td>
<td>weight management, weight loss</td>
<td>0.537</td>
<td>1.611</td>
<td>0.081</td>
</tr>
<tr>
<td></td>
<td>feel good</td>
<td>0.750</td>
<td>1.500</td>
<td>0.075</td>
</tr>
<tr>
<td></td>
<td>self improvement</td>
<td>0.667</td>
<td>1.333</td>
<td>0.067</td>
</tr>
<tr>
<td></td>
<td>happiness</td>
<td>0.556</td>
<td>1.111</td>
<td>0.056</td>
</tr>
</tbody>
</table>
Table 10 displays the coded items listed as barriers to exercise. Considering our sample is made up entirely of students, it would be no surprise that academic responsibilities was the most frequent reported barrier to exercise. This was followed by time management, however, as discussed in the focus groups and interviews, the two are related.

Table 10: Frequency Table with Salience Scores for Barriers to Exercise (limited to twenty rows)

<table>
<thead>
<tr>
<th>Rank</th>
<th>Code</th>
<th>Frequency</th>
<th>Mean Salience</th>
<th>Sum Salience</th>
<th>SmithsS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>school, class, exams, study, homework</td>
<td>26</td>
<td>0.813</td>
<td>18.702</td>
<td>0.416</td>
</tr>
<tr>
<td>2</td>
<td>time management</td>
<td>16</td>
<td>0.939</td>
<td>15.024</td>
<td>0.334</td>
</tr>
<tr>
<td>3</td>
<td>work, employment</td>
<td>9</td>
<td>0.648</td>
<td>5.833</td>
<td>0.130</td>
</tr>
<tr>
<td>4</td>
<td>sleep,</td>
<td>7</td>
<td>0.449</td>
<td>3.143</td>
<td>0.070</td>
</tr>
<tr>
<td>5</td>
<td>injury, fear of injury</td>
<td>2</td>
<td>1.000</td>
<td>2.000</td>
<td>0.044</td>
</tr>
<tr>
<td>6</td>
<td>Gym geographic location</td>
<td>3</td>
<td>0.875</td>
<td>1.750</td>
<td>0.039</td>
</tr>
<tr>
<td>7</td>
<td>weather</td>
<td>2</td>
<td>0.833</td>
<td>1.667</td>
<td>0.037</td>
</tr>
<tr>
<td>8</td>
<td>social, professional, obligations</td>
<td>4</td>
<td>0.528</td>
<td>1.583</td>
<td>0.035</td>
</tr>
<tr>
<td>9</td>
<td>personal laziness</td>
<td>2</td>
<td>0.775</td>
<td>1.550</td>
<td>0.034</td>
</tr>
<tr>
<td>10</td>
<td>recovery</td>
<td>2</td>
<td>0.750</td>
<td>1.500</td>
<td>0.033</td>
</tr>
<tr>
<td>11</td>
<td>commute, transportation</td>
<td>2</td>
<td>0.750</td>
<td>1.500</td>
<td>0.033</td>
</tr>
<tr>
<td>12</td>
<td>commute, preparation</td>
<td>2</td>
<td>0.675</td>
<td>1.350</td>
<td>0.030</td>
</tr>
<tr>
<td>13</td>
<td>no motivation</td>
<td>2</td>
<td>0.625</td>
<td>1.250</td>
<td>0.028</td>
</tr>
<tr>
<td>14</td>
<td>sore</td>
<td>2</td>
<td>0.625</td>
<td>1.250</td>
<td>0.028</td>
</tr>
<tr>
<td>15</td>
<td>exhaustion, fatigue</td>
<td>2</td>
<td>0.607</td>
<td>1.214</td>
<td>0.027</td>
</tr>
<tr>
<td>16</td>
<td>gym hours of operation</td>
<td>2</td>
<td>0.500</td>
<td>1.000</td>
<td>0.022</td>
</tr>
<tr>
<td>17</td>
<td>mood</td>
<td>1</td>
<td>1.000</td>
<td>1.000</td>
<td>0.022</td>
</tr>
<tr>
<td>18</td>
<td>excuses</td>
<td>1</td>
<td>1.000</td>
<td>1.000</td>
<td>0.022</td>
</tr>
<tr>
<td>19</td>
<td>obligations, social, professional</td>
<td>1</td>
<td>1.000</td>
<td>1.000</td>
<td>0.022</td>
</tr>
<tr>
<td>20</td>
<td>obligations, social, professional, other commitments</td>
<td>1</td>
<td>1.000</td>
<td>1.000</td>
<td>0.022</td>
</tr>
</tbody>
</table>
When coded items describing barriers to exercise are grouped by sex, there were no appreciable differences; Table 11 shows academic responsibilities, followed by time management and work responsibilities as the top three responses for both male and female students.

Table 11: Barriers Grouped by Sex with Salience Scores (limited to greatest salience values)

<table>
<thead>
<tr>
<th>GROUPING</th>
<th>CODE</th>
<th>Mean Salience</th>
<th>Sum Salience</th>
<th>SmithsS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>school, class, exams, study, homework</td>
<td>0.855</td>
<td>11.119</td>
<td>0.428</td>
</tr>
<tr>
<td></td>
<td>time management</td>
<td>0.947</td>
<td>8.524</td>
<td>0.328</td>
</tr>
<tr>
<td></td>
<td>work, employment</td>
<td>0.600</td>
<td>3.000</td>
<td>0.115</td>
</tr>
<tr>
<td></td>
<td>sleep,</td>
<td>0.395</td>
<td>1.976</td>
<td>0.076</td>
</tr>
<tr>
<td></td>
<td>social, professional, obligations</td>
<td>1.000</td>
<td>1.000</td>
<td>0.038</td>
</tr>
<tr>
<td></td>
<td>mood</td>
<td>1.000</td>
<td>1.000</td>
<td>0.038</td>
</tr>
<tr>
<td></td>
<td>injury, fear of injury</td>
<td>1.000</td>
<td>1.000</td>
<td>0.038</td>
</tr>
<tr>
<td></td>
<td>excuses</td>
<td>1.000</td>
<td>1.000</td>
<td>0.038</td>
</tr>
<tr>
<td></td>
<td>commute, transportation</td>
<td>1.000</td>
<td>1.000</td>
<td>0.038</td>
</tr>
<tr>
<td></td>
<td>sore</td>
<td>1.000</td>
<td>1.000</td>
<td>0.038</td>
</tr>
<tr>
<td></td>
<td>obligations, social, professional, other commitments</td>
<td>1.000</td>
<td>1.000</td>
<td>0.038</td>
</tr>
<tr>
<td></td>
<td>none</td>
<td>1.000</td>
<td>1.000</td>
<td>0.038</td>
</tr>
<tr>
<td>Male</td>
<td>school, class, exams, study, homework</td>
<td>0.758</td>
<td>7.583</td>
<td>0.399</td>
</tr>
<tr>
<td></td>
<td>time management</td>
<td>0.929</td>
<td>6.500</td>
<td>0.342</td>
</tr>
<tr>
<td></td>
<td>work, employment</td>
<td>0.708</td>
<td>2.833</td>
<td>0.149</td>
</tr>
<tr>
<td></td>
<td>personal laziness</td>
<td>0.775</td>
<td>1.550</td>
<td>0.082</td>
</tr>
<tr>
<td></td>
<td>recovery</td>
<td>0.750</td>
<td>1.500</td>
<td>0.079</td>
</tr>
<tr>
<td></td>
<td>sleep,</td>
<td>0.583</td>
<td>1.167</td>
<td>0.061</td>
</tr>
<tr>
<td></td>
<td>Gym geographic location</td>
<td>1.000</td>
<td>1.000</td>
<td>0.053</td>
</tr>
<tr>
<td></td>
<td>no motivation</td>
<td>1.000</td>
<td>1.000</td>
<td>0.053</td>
</tr>
<tr>
<td></td>
<td>gym hours of operation</td>
<td>0.500</td>
<td>1.000</td>
<td>0.053</td>
</tr>
<tr>
<td></td>
<td>injury, fear of injury</td>
<td>1.000</td>
<td>1.000</td>
<td>0.053</td>
</tr>
<tr>
<td></td>
<td>weather</td>
<td>1.000</td>
<td>1.000</td>
<td>0.053</td>
</tr>
<tr>
<td></td>
<td>obligations, social, professional</td>
<td>1.000</td>
<td>1.000</td>
<td>0.053</td>
</tr>
</tbody>
</table>
When asked about reasons to exercise at Campus Recreation, free list data shows the top three responses are the cost, convenience, and facility. This data, shown in Table 12, reflects what was discussed in the focus groups and interviews.

Table 12: Frequency Table with Salience Scores for Reasons to Exercise at Campus Recreation

<table>
<thead>
<tr>
<th>Rank</th>
<th>Code</th>
<th>Frequency</th>
<th>Mean Salience</th>
<th>Sum Salience</th>
<th>SmithsS</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>included in fee, tuition</td>
<td>21</td>
<td>0.869</td>
<td>18.250</td>
<td>0.468</td>
</tr>
<tr>
<td>2</td>
<td>convenience</td>
<td>19</td>
<td>0.912</td>
<td>17.333</td>
<td>0.444</td>
</tr>
<tr>
<td>3</td>
<td>facility and equipment</td>
<td>14</td>
<td>0.673</td>
<td>9.417</td>
<td>0.241</td>
</tr>
<tr>
<td>4</td>
<td>atmosphere</td>
<td>7</td>
<td>0.500</td>
<td>3.500</td>
<td>0.090</td>
</tr>
<tr>
<td>5</td>
<td>work, employment</td>
<td>6</td>
<td>0.500</td>
<td>3.000</td>
<td>0.077</td>
</tr>
<tr>
<td>6</td>
<td>accessibility</td>
<td>2</td>
<td>0.833</td>
<td>1.667</td>
<td>0.043</td>
</tr>
<tr>
<td>7</td>
<td>inclusive and diverse</td>
<td>2</td>
<td>0.750</td>
<td>1.500</td>
<td>0.038</td>
</tr>
<tr>
<td>8</td>
<td>after class</td>
<td>2</td>
<td>0.500</td>
<td>1.000</td>
<td>0.026</td>
</tr>
<tr>
<td>9</td>
<td>group fitness</td>
<td>2</td>
<td>0.500</td>
<td>1.000</td>
<td>0.026</td>
</tr>
<tr>
<td>10</td>
<td>other gym is closed</td>
<td>1</td>
<td>1.000</td>
<td>1.000</td>
<td>0.026</td>
</tr>
<tr>
<td>11</td>
<td>socialization</td>
<td>1</td>
<td>1.000</td>
<td>1.000</td>
<td>0.026</td>
</tr>
</tbody>
</table>
When grouped by sex, as displayed in Table 13, the top reasons to exercise at Campus Recreation differ slightly. For female students in our sample, the cost (Sum Salience = 12.42) followed by convenience (Sum Salience = 9.33) were the top two; for males, convenience (Sum Salience = 8) then cost (Sum Salience = 5.83) were rated highest.

Table 13: Reasons to Exercise at Campus Recreation Grouped by Sex with Salience Scores (limited to greatest salience values)

<table>
<thead>
<tr>
<th>GROUPING</th>
<th>CODE</th>
<th>Mean Salience</th>
<th>Sum Salience</th>
<th>SmithsS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>included in fee, tuition</td>
<td>0.887</td>
<td>12.417</td>
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</tr>
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<td>convenience</td>
<td>0.848</td>
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<td>0.389</td>
</tr>
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<td>facility and equipment</td>
<td>0.713</td>
<td>6.417</td>
<td>0.267</td>
</tr>
<tr>
<td></td>
<td>atmosphere</td>
<td>0.528</td>
<td>3.167</td>
<td>0.132</td>
</tr>
<tr>
<td></td>
<td>work, employment</td>
<td>0.417</td>
<td>1.667</td>
<td>0.069</td>
</tr>
<tr>
<td></td>
<td>inclusive and diverse</td>
<td>0.750</td>
<td>1.500</td>
<td>0.063</td>
</tr>
<tr>
<td></td>
<td>other gym is closed</td>
<td>1.000</td>
<td>1.000</td>
<td>0.042</td>
</tr>
<tr>
<td></td>
<td>after class</td>
<td>0.500</td>
<td>1.000</td>
<td>0.042</td>
</tr>
<tr>
<td></td>
<td>group fitness</td>
<td>0.500</td>
<td>1.000</td>
<td>0.042</td>
</tr>
<tr>
<td></td>
<td>socialization</td>
<td>1.000</td>
<td>1.000</td>
<td>0.042</td>
</tr>
<tr>
<td>Male</td>
<td>convenience</td>
<td>1.000</td>
<td>8.000</td>
<td>0.533</td>
</tr>
<tr>
<td></td>
<td>included in fee, tuition</td>
<td>0.833</td>
<td>5.833</td>
<td>0.389</td>
</tr>
<tr>
<td></td>
<td>facility and equipment</td>
<td>0.600</td>
<td>3.000</td>
<td>0.200</td>
</tr>
<tr>
<td></td>
<td>work, employment</td>
<td>0.667</td>
<td>1.333</td>
<td>0.089</td>
</tr>
<tr>
<td></td>
<td>accessibility</td>
<td>1.000</td>
<td>1.000</td>
<td>0.067</td>
</tr>
</tbody>
</table>

**Participant Observation**

Campus Recreation is a large space that can accommodate many students and USF Community members, faculty and staff for example, to engage in a variety of recreational and fitness interests. Walking in through the front door of campus recreation, a person might not fully realize the enormity of the building which has several multi-purpose rooms, basketball and racquetball courts, a full size swimming pool, an indoor track, and a plethora of cardiovascular and strength training machines and equipment; there are rumors of adding a rock climbing wall. Upon entry, students must swipe their USF Student ID card to gain entry through the two turnstiles adjacent
to the welcome desk. During very busy times, such as the start of a semester and in the minutes leading up to a popular group fitness class, there can be a bit of a queue for students as they each pass through the welcome desk area. The student employees here are affiliated with the facilities aspect of Campus Recreation. This sub-department is responsible for restricting access to the facility, opening and locking doors, processing day guest passes and some other purchases, equipment checkout, and giving, when requested, an orientation and tour of the facility. Make a right past the welcome desk towards the equipment checkout window and cardiovascular equipment floor, across the walkway to oversee a portion of the strength floor. The walkway has a few pieces of cardiovascular equipment. At the equipment checkout window, Campus Recreation patrons can use their student ID to check out a variety of sport and fitness equipment such as weight lifting belts, resistance bands, racquets, balls, and cones for single day use. Passing the equipment checkout window and the student employee break room, just before arriving at the cardiovascular floor, is the strength training quick circuit. This is a semi-secluded assortment of weight stack and pin selectorized strength training machines which, if used altogether, in a circuit one after another, provide a whole body workout. At the entrance to the quick circuit section a student fitness employee will be standing at the fitness information desk. This employee is responsible for monitoring the use of the quick circuit and cardiovascular area to ensure campus recreation policies are being followed, to watch out for any injuries or medical emergencies, and to be a general resource for patrons. The cardiovascular floor has several treadmills, leg and arm cycle ergometers (stationary bicycles), elliptical, stair, rowing, and other machines. Most are positioned to face opposite of the large window and instead to the wall of television screens which usually display sports channels and Campus Recreation Marketing messages. On the right edge of the cardiovascular floor,
overlooking a section of the strength floor and facing the outdoor windows, there is a row of cardiovascular equipment. Throughout the cardiovascular floor some of the cardiovascular machines feature integrated technology which permit students to log their activity and track their progress on the free to download and use mobile phone application, mywellness. Campus Recreation fitness will have some contests to recognize and provide incentives for students who track their activity through the app. The most popular cardiovascular machines seem to be the stair climbing machines; although there are only three or four, they are often all in use.

Continuing past the cardiovascular floor, is an elevator on the right, temporary day use lockers on the left, and straight ahead a set of doors to access the east gym which features new courts and up a flight of stairs or a short ride in another elevator is the 1/12 mile indoor running track and a stretching area. Returning to the cardiovascular floor, walking down the stairs to the strength floor is a group fitness multipurpose room and another fitness information desk and student employee. In addition to monitoring the area, the student employee also takes count of how many people are using the space at designated intervals. This group fitness room is where yoga, Zumba, and other group exercise classes are held. On the strength floor there are many different pieces of equipment such as foam rollers, medicine balls, and stability balls; large machines like dual adjustable pulley units, plate loaded strength equipment, and weight stack pin selectorized machines; and free weights for instance dumbbells, barbells, kettlebells, bench press benches, and rack cages for squatting or deadlifting. The strength floor is split into three sections, one is next to the stairs leading from the cardiovascular floor and this section has mats for stretching, medicine balls, stability balls, three bench press benches, some dumbbells and kettlebells, and a full body selection of strength training machines. Walking west, opposite of where the east gym would be on the floor above, we pass the second section of the strength floor. Six squat racks and
a smaller selection of plate loaded strength training equipment is found here. Further along in this direction, approaching where the welcome desk would be on the floor above, is the third strength floor area. Most of the bench press benches are here, two dual adjustable pulley consoles, one larger adjustable cable crossover machine, dumbbells, kettlebells, day use lockers, and the third fitness information desk with student employee.

Pass this section of the strength floor, before arriving at the racquetball courts are stairs to go back up to the main floor, the group fitness cycle studio, personal training studio, stretching mats, racquetball courts, and a group fitness multi-purpose room where yoga and TRX classes are held. Back on the main floor we have access to the north gym, a multi-purpose group fitness room, and the pool. One thing you may notice, on a walk through of the fitness area is that most of the walls and group fitness studios are lined with mirrors.

All throughout the facility we will find students engaged in various activities. There are just as likely to be people playing racquetball, basketball, and badminton as there are people doing bicep curls in front of the mirror. The different areas of the facility will have different patterns of usage. There is a group of older men who will play racquetball or handball in the afternoon. The spaces in and around the group fitness classes are filled with women, seated on the benches by the entrance to the group fitness room, waiting for the doors to open to yoga, seated on the benches and standing by the entrance to the group fitness cycle studio, hoping to make it off of the wait list and into the popular class. This is especially true for yoga and the dance cardiovascular (i.e. Zumba) classes. The quick circuit area may be utilized more by women or people new to exercising because it offers more privacy than other areas of the fitness floor.

The cardiovascular and strength floors are used by a mix of people. Beginners, people new to exercise, people who have been strength training for many months or years, male and female
students. Certain times of day may push the balance of male and female students in one direction or the other. For example, the times around group fitness classes may see more female students at campus recreation.

Sometimes, for some people, their clothing is an indicator of how they want themselves to be perceived or how they want to motivate themselves. Take for example, the popularity of different sport and exercise related slogans on clothing. In our observations we noticed tops with slogans such as “dues paid”, “all kinds of gains”, “buns and guns”, “Push your limits”, and “Eat, Live, Be WELL”. These motivational slogans may be a form of subliminal encouragement when the tiring student catches their reflection in the mirror. Different sport and exercise brands such as “Bodybuilding.com”, “Gymshark”, “Nike”, “Adidas”, “Reebok”, “Under Armour”, and “Lululemon” to name a few are found here as well.

How people match and coordinate their choice of attire is also interesting. Some people make an effort to make sure everything matches. Others don’t. And other times, people will wear whatever they want. College students receive many free t shirts and many times those t shirts make their way to the gym. Some people take their expression further, by modifying their clothes; cutting the sleeves off of a t shirt. It is likely personal preference and the context of being in a public space with a specific purpose gives some students an opportunity to showcase their fitness personality and individuality.

Footwear can be another topic of study. Out of the 34, or so, people who attend each group cycle class, only a few, will have clip in cycling shoes. Specialized shoes aren’t needed to participate or enjoy the class and some instructors do not have cycling shoes as they can be expensive. Sure there are dozens of people wearing Nike brand shoes and clothing but we also noticed leisure shoe brands such as Vans, and Converse, and even casual boat shoes. The low profile minimal
casual shoe, like the Converse All Star seems to be very popular with people in this age group and at the gym this is no exception. Some people will wear Olympic weightlifting shoes, or will bring their own weightlifting belt. Again, many of these products can be expensive but they are not necessary to have a good workout. Many people use gloves to protect and cushion the palms of their hands. Some people have towels and in the cycling studio, towels are strongly recommended.

Clothing can be gendered. Students from each sex had on a variety of tops including t-shirts, tank tops, long sleeve t-shirts all made of different materials, i.e. cotton, polyester, or some blend of different fabrics. Bottoms were usually athletic shorts and exercise or track pants. The difference in gendered clothing is seen when comparing the variety of feminine cuts of clothing such as those that are more form fitting or shorts that are cut just under the gluteal fold. There were only a few instances where we noticed male students wearing exercise tights or compression bottoms or shorts that were cut at mid thigh or higher. In the cases where male students were wearing form fitting compression bottoms they were often layered under loose fitting shorts of length at or around the knee. Clothing and attire reflect both the style trends of this age group and athletic attire.

Many students take advantage of using the water fountain to fill up their bottles. The bottles range from the single use purchased at a store or vending machine to the reusable bottles given away as incentives or purchased. Many times, students will have a shaker bottle, to mix their nutrition supplements, they carry with them instead of a water bottle. A few people will have a gallon size water with them and those that do often will have added something else to the water, like a flavor or a sport nutrition supplement.
One may expect to see the strength floor, especially the bench press area, dominated by men but it seems there are many female students who practice strength training. This corresponds with a growing trend of both female empowerment and further sexual objectification of the female body. If observed for a long enough time, everywhere on the strength floor where you will find male students you will also find female students, and they will be doing similar exercises and workouts. In this setting we have found some gender parity.

Group fitness classes have a slightly different environment. It is more intimate and instructors try to create a party atmosphere with loud music and high energy. The exception to the party atmosphere is for some yoga classes which focus more on self-reflection, body awareness, and meditation. During the popular group cycle class, instructors yell out verbal motivational cues, “This is our happy hour!” and frequently shout out encouragement, “You can do more than you think!” and “If it doesn't challenge you it doesn't change you!” The group cycle studio is hot and humid, loud dance music pours out of the speakers, the lights are turned low, limiting distractions so each participant can focus on their own ride. USF Campus Recreation recently upgraded their cycle studio with new cycles which synchronize to the mywellness app. When students log in to their cycle their data is displayed on the projector screen at the front of the class. The instructor can change the display to show each individual cyclist or class averages. This is similar to how the commercial group fitness class, Orange Theory Fitness uses biofeedback to encourage patrons to get the most out of their workout. In the USF Campus Recreation group fitness cycle studio instructors will change the metrics challenging participants to hit certain marks for RPM, resistance, or power output. The most popular group cycle instructors have the best music playlists with a challenging and non-repetitive exercise program delivered with clear and enthusiastic instructions. For example, timing everything to the beat helps participants stay
focused, “3,2,1, pick it up let's go!” Campus Recreation will have special cycle events, featuring music playlists from a popular artist, like Beyoncé, or special challenges to keep students motivated and engaged throughout the semester. During one contest titled, “Let’s Move For A Better World”, I heard one person tell me, “I was about to leave but I noticed I had fallen behind in moves and I needed to get a few more in before I leave.”

The group fitness dance exercise classes, like Zumba, are most similar to group cycle. Again, it is a party atmosphere with loud music. Here the instructor must use both verbal and visual cues to help participants follow the, often challengingly complex, choreography. Keeping up with the movement is the key for the participants. Zumba instructors will often say their choreography is only a suggestion and each person can make their own dance experience but most people try to follow the choreography. The dance exercise class participants are usually women. Out of the class of 20 or 30, if there are any male students attending it will be no more than 2 or 3. This reality is reflected in the choreography. Many of the dance movements are intended to accentuate feminine patterns of movement, emphasizing fluid hip and flowing patterns of hand movement. This is highlighted even more when instructors or participants wear longer flowing clothing and bright colors to better accentuate the movement.

For many at USF Campus Recreation, group fitness classes are a social outing. Participants will show up to class with friends. It is common to see groups of women, and sometimes their one male friend, having a great time smiling, laughing, and debating where the best spot in the room will be for Zumba. Or, groups of women, in line outside of the cycle studio, waiting to be let in, all excited to have a good time riding to the beat.

Participant observation has given a detailed description of the site and sample specific context of the research, a campus recreation center at a public research university. With a critical lens,
looking for similarity and contrast according to gender, physical education, and the physical body, this research method has provided more person, place, and time information to understand and interpret responses to the questionnaire, and topics discussed in interviews and focus groups. Participant observation provided first hand experience to better empathize with how the research participants explained how they perceived themselves in the campus recreation space and in how they described their exercise activities. It is not enough to notice there are more female students in group fitness classes or that students tend to follow a repetitive pattern of exercise selection, explanations for these phenomenon must be proposed and tested.

**Interview Narrative**

The interviews followed a few different themes. We asked questions to learn more about motivations and barriers to exercise, campus recreation and group fitness, and about convenience, time management, and socialization. Responses and follow up questions revealed some insight into aspects of identity and gender.

Interviews provided insight into what motivates university students to exercise at campus recreation. Common themes discussed were in regards to sport performance and body composition. Some of the students interviewed reported regular bouts of strength training; those students would speak about how they are motivated to increase their strength in specific exercises. They mentioned exercises such as the bench press, squat, and deadlift. These three exercise are known as powerlifting exercises and their popularity among this group of students seems to reflect a perceived trend in fitness at the moment, where free weight exercises such as the squat are championed for their effectiveness in improving all around strength and physical fitness and in improving body composition. Some students mentioned motivation desire to maintain the gains. This reflects both their desire to continue to increase the weight they can lift
and also see improvements in their body composition. One interviewee spoke about how he self-identifies as a power builder. Someone who exercises as a powerlifter but also intends to translate their exercise program into something that would reflect bodybuilding. It is a combination, or a compromise, of the two disciplines. Other students would speak about the array of exercise equipment available to them. Their preference to engage in strength training and to use the weight lifting machines, in addition to free weight exercises, to perform their body building workouts shows an interest in targeting specific muscle groups and body parts for the purpose of body building. Whereas, the students who report a primary interest in powerlifting exercises seem to be more interested in how much weight they can lift, the students who put more effort into their body building themed workouts, using muscle isolating machines, seem to be more interested in making changes to their body composition and how they perceive their physical body. Some students would frequent group exercise classes; they were motivated by the encouragement provided by the instructor and the general ambiance of the group fitness class. Many students who spoke about attending group fitness classes spoke about group cycle. Group cycle provides them with a high intensity, challenging, fun, and engaging way to work on their cardiovascular fitness. Students would go as far as to say if they did not attend a group fitness class, they would not do cardiovascular training on their own. Some of these students also have friendly relationships with the group fitness instructors and are also motivated to attend group fitness class as a way to support the group fitness instructor. For a few students in this interview sample, their primary form of exercise is cardiovascular. Their interest is then not, as our powerlifting students would report, to lift as much weight as possible, but to endure. To get the most moves during a group cycle class. To run the fastest mile on the treadmill. To burn the most
calories on the stair stepper. Group fitness gives them a social experience to help them reach their goals and to connect them to other students who may also share their goals. They are motivated by feeling challenged to set new personal records.

The encouragement the group fitness cycle instructor shouts at them during class, to keep up the pace, to keep pushing, to keep the resistance turned up, is the motivation they may be lacking at that very moment because, as they explained to me, if they were not in a group fitness setting, they might not be able to self-motivate and to push themselves to get the most of their own individual cardiovascular workout. If their motivation in group fitness class is to have the most moves or burn the most calories out of everyone attending the class, having the instructor there to remind them to push helps keep up the motivation. If their motivation is to keep up with their friends in the cycles around them, even if they are at different levels, the instructor helps remind them that for the time they are in the group cycle studio, they are a community and they are all going to work together to have a positive exercise experience.

When on the strength training floor their motivation to be challenged changes slightly. If working alone, they must self-motivate. They must be their own inner voice of encouragement to finish all of the repetitions or to add more weight on to the bar or machine. When they workout with friends or workout partners, they motivate each other. Some people do not need, or like, to have a workout partner because they feel it slows them down or they don't get anything out of that experience. The physical activity experience, whether in the group fitness class or on the strength training floor is practice in self-motivation which they can translate from exercise at campus recreation to studying for an exam or to write a research paper.

The students feel safe and comfortable at campus recreation. They have friends and colleagues and classmates and other like-minded individuals all around them; they share a connection, a
common experience which further adds to the community building aspect of campus recreation for the university altogether. Although less than half of all enrolled students visit campus recreation those that do have created an oasis for themselves where they can visit each day and challenge themselves to move their bodies in ways they believe are positive and helpful. Yet, the life of a student is challenging. There are several activities that draw our attention. Class and work were discussed in the interviews as the most salient barriers to exercise and physical activity. The students' ability to manage their time and prioritize how they spend their time was how they are able to continue to meet their goals to exercise every day.

**Motivations**

Despite being listed in the free list as a top motivation, looks and physical appearance were not discussed in depth during the interviews. Many of the interviewees, who have been training for months to years, discussed how, perhaps in the beginning, their first motivation was to improve their physical appearance through exercise but over time it changed to more performance based or health goals. For example, in our interview with Cathy, she said, “In middle school, I started running. First, purely for physique, because I was self-conscious about being bigger, but later because the competition was fun.” Cathy’s mother, a personal trainer, encouraged her to run in 5K races and they did those events together. Rose had a similar perspective on identifying her motivations for exercise, “Previous consistent exercise has me shift my priority so that aesthetics is the last thing. First should be healthy; you become stronger and gain endurance.” And Lionel said, “I started out at health wellness, then strength and endurance, then maybe aesthetics. I'm getting older; don't look as good. I'm thinking more now about longevity.” But Regina, was an interviewee who did comment on physique as a motivation, “[I’m] not looking for a specific
physique but more of how I feel, to be comfortable in my own skin, and love your body, instead
of comparison with others.”

Although the desire to have their body fit a certain form is present, it is not the most important
thing for participants in this sample. Their motivations are more complex. Performance based
goals were very popular with this group of students. Marcella is a good example for this, “I train
to improve strength and get better. Health is a secondary motivation, it comes along with it, but
my goal is to get stronger. I have some things, I want to increase numbers. I think it is fun.”

Marcella’s emphasis to improve in performance reflects some of the reasons other people started
exercising in the first place. It can be motivating for some people to see the amount of weight
they can lift increase or to be able to run for longer periods of time before getting tired. Cedric
said, “People want to get better with strength and endurance. [I] was sedentary before until high
school, then started exercising with sports like soccer first, then track and football. They were
more strength based sports rather than running around. Football introduced me to weight
training, then came about to weightlifting.” Like Cathy and her mother running 5K races,
positive experiences with exercise help keep students turned on to the idea of maintaining
lifelong patterns of physical activity. When physical activity becomes a long term and ingrained
habit there are many health benefits. Jessica said, “I intentionally workout to maintain health and
wellness so it is a motivation to build strength and endurance.”

The belief that exercise improves and maintains health, and provides a variety of other benefits,
is a motivation. Cedric said, “Weightlifting and exercise improve mental health.” Flora said,
“Health and wellness prevent other disease and health issues.” For students, staying healthy can
be the key to good academic achievement and stress management. Regina said, “Exercise
reduces stress and anxiety; my stress is lower when I exercise, I am in a different head space, not
as foggy, feel happier. [Exercise] can be fun, it helps you live longer. I hope to be as active as my grandma when I'm 82 and doing Silver Sneakers.”

For some students it was more difficult to explain their motivation. Flora said, “It's not that I like exercising but I do; it's hard to start but once I start it's fine and I enjoy it. It's easier to motivate to go to The Fit then to Campus Recreation because I see less people I know at The Fit. I feel less judged when I'm at The Fit; I can show off my skills better.” Flora does enjoy exercise in the right context. And for some the exercise itself was the positive reinforcement. Cathy said, “I can achieve when I put in the work.”

Time Management
For students in this group, time management was the most reported barrier. This should not be a surprise because many students often have different roles and responsibilities. Some have a full class schedule, are employed part-time, and may have internships or volunteer responsibilities as well. Discussing time management reflects how students prioritize their time with competing interests and limited resources. Proponents of Campus Recreation can also speculate this emphasis on time management is a good thing because it helps prepare students for life beyond university where developing skills such as time management are valued by employers and can help people lead more fulfilling and stressful lives. When asked about time management Flora said, “Focused on students; someone working, outside of class, may be stressed but can handle their time management better. Being a student, it's a transition stage, more freedom; maturity plays a part in time management.” Regina said, “When class work load gets too much it is more challenging to schedule workouts but sometimes it isn't possible because of too many time constraints.” Nonetheless, the students in this group prioritize academic responsibilities higher than their own exercise goals. Cedric said, “Class and homework are a higher priority than
exercise. Responsibility to stay mentally well and focused on studying and so it takes away time from weightlifting.” Yet other students use exercise as a chance to break up the monotony of the academic day. Lionel, who spends much of his time studying in the library said, “I'll even take a break from studying and go into the [library] stacks, do push-ups, crunches, and get a workout in.” And Marcella emphasized the importance of exercise during heavy academic terms, “During finals week is more necessary to workout.” As students learn more in their classes they also gain experience managing multiple responsibilities. Time management is a skill, to be learned and applied. Cathy said, “I go to the gym 4-5 times each week or do something active. I pride myself in time management and prioritization; exercise is a priority.” Rose said, “When I'm on a consistent schedule I describe myself as balanced on equilibrium, self driven and at peace, self driven as in to have centered focus, on task at a time, at peace because you can focus on one thing, one set, one rep, whatever it is.”

Campus Rec

Convenience and cost are a factor in determining where to exercise. Jill said, “The gym is already paid for. There is a lot of equipment. Most of what I need is there.” For many of the students in our sample, if Campus Recreation was unavailable to them they would still exercise at their apartment gym or would purchase a membership elsewhere. Jessica said, “If the cost were the same [as a different gym] convenience would still be a factor. But if there were a better cycle experience [i might go elsewhere].” Cathy said, “They have a lot of resources, although I didn't utilize everything, it has a lot to offer, like group adventure trips, instructional classes, fundamentals of lifting weights, women on weights; for someone who may not have the resources or knowledge it helps bridge the gap. In a commercial gym you would have to pay for [these extra benefits and services].” These extra amenities add to the convenience factor as
Campus Recreation seems to try to reduce as many barriers to exercise as possible. Flora said, “Nice to have it paid for, and no additional monthly memberships; pretty good facility, good equipment.” Regina said, “free is attractive, why pay more money?” The location of Campus Recreation, in close proximity to students’ classes or on-campus employment was reported as very convenient for students in our sample. Jill said, “Convenient because I go after I finish with lab or class.” Cedric said, “Convenient to come here, walk to class afterward. I don't have to pack up, drive, park here. I'm already here and I can just workout.”

The students in our sample like to exercise at the three Campus Recreation locations. In our conversations, students reported the experience at Campus Recreation was mostly positive and had few negative points. Cathy said, “Campus rec is very clean, well kept, with mostly college students and limited creepy older men, like my father's age, coming to talk to me compared to at the commercial gyms, I’ve never had an awkward or weird experience. When I lived on campus I could get up and walk.” Cathy’s comment frames her perspective of Campus Recreation as a safe space. This was echoed by Cedric when he said, “some people don't feel comfortable at other gyms and there are maybe people that would harass you, but here it is not as likely because people know each other and can intervene if needed.” Being in a place with other people of a similar peer group is a motivator and adds to the positive supportive atmosphere of Campus Recreation. Jessica said, “I like it here. People my age group and other [USF Health] students.”

The quality, selection, and availability of equipment is a positive for students. Jill said, “The large number of equipment, it is mostly students my age or around my age which is nice.” Marcella said, “I like how there are power racks and cable machines.” Some students commented on the layout and features of the facility. Jill said, “There are a lot of different places in the gym: the pool, the track, basketball courts, exercise rooms, cardio floor, weight floor; it is big and feels
spread out, so we're not on top of anyone else.” But the facility is not a perfect fit for everyone.

Rose said, “Good energy, nice number of equipment but I do prefer [the outside commercial gym] Shapes because it is an all women gym and I’m more comfortable and I can remove my hijab but I don't know as many people there at Shapes.” Rose’s comment seems to say that although Campus Recreation is a great choice for her it does not completely meet her needs.

Lionel had several points of critique directed at the overall experience of Campus Recreation, “The card machine turnstile doesn't always work and the front desk people aren't always good at their job. Hire happy positive people, they don't do anything anyways. The music is too quiet, you need a special type of person that makes other people feel comfortable and creates a community of outgoing people where people like to be there.”

The recent addition in 2017 of the two satellite facilities is an added benefit for students. One opened on the USF Health area of the campus and the other in the new residence hall complex. Regina said, “There are 3 facilities so if I get bored I can try others.” Cedric said, “If you are tired of Rec you can go to The Fit or The Well. They're all different and if you wanted to change it up or are getting bored with a place.” Providing these additional options and in partnership with other campus entities, USF Health and under the USF Health and Wellness administrative umbrella.

Group Fitness

For some students group fitness is a fun and enjoyable form of exercise. This socialized group setting gives students a chance to dance or cycle for exercise and was the only form of cardiovascular training reported for some of our sample. Marcella said, “I need to go to a [group fitness] class to do cardio for a full hour.” Regina said, “Spin twice a week as my structured cardio; two days less to think about what to work out. The instructors are great, high energy,
motivation from everyone else around in the class; everybody is working towards healthy lifestyle goals. I enjoy high intensity workouts and it gives me my two days of high intensity.” Rose said, “When it comes to cardio, I love group fitness. Surrounded with high energy people, you don’t have to listen to yourself telling you to stop and quit because it is hard.” The caliber of the instructor is very important for students. Students won’t attend a boring group fitness class. Flora said, “I wouldn't do cardio on my own but I would do a cycle class if the instructor was good.” Referring back to past experience of sport and exercise, Cedric said, “Group fitness is fun, with excitement and variety, visual cues, and coaching; like mixing sport and exercise together. Also fun to be with other people and make friends with people of similar interests.” Lionel, who usually prefers to exercise by himself said, “When I’m exhausted, group fitness can push me harder. It could teach me something I don’t know.” When asked about her preference, comparing group fitness classes at the commercial gym, Shapes, Rose said, “I definitely prefer group fit at campus rec.”

Socialization
Campus Recreation as a social place was discussed. For some students this is a motivator because it connects to past positive experiences they have had with exercise. Cathy said, “As kids we were always playing in groups. I liked CrossFit when I tried that with my mom, there was camaraderie, loud music, we were outside, and sweating like crazy, and people were yelling at us to do our best, it was like I was competing with myself and I got to push my mom on the sled.”

Identity
A person’s identity influences how they prioritize their time. These students reported feeling that exercise and physical activity are a significant part of their life. They made time for it along with
all of the other things they have to do and that reflects how they see themselves as people who
move. Cathy said, “I always have been an athlete; always sports, always playing. I played sharks
and minnows on the playground as a kid. [Now] I’m an active student. You go because it's part of
your ritual, lifestyle, it's good for you. My body is forever.” Regina explicitly said exercise is
part of her identity, “Physical activity is somethings that's part of life, my body craves it, it's part
of my identity.” Cedric, who described himself with more detail, said, “I am someone who
frequently exercises; maintain but also progress. I categorize myself as a power lifter and a
bodybuilder; that is a power builder, interest in both strength and physique. But I like to do fun
things, like sport related not only weightlifting.” Active and sporting identities translate to the
type of work students seek out. Some of the participants in our interviews and focus groups work
for Campus Recreation. Jessica said, “I teach group fitness and I’m fairly active.”

Another aspect of this active sporting identity is how other students perceive them. Rose said,
“Lifestyle as well, something you take home with you, it lingers in what you choose to do
outside of the gym as well, it follows you home. Because I see and differentiate between regular
[patrons] and not. I want to be known as a person who works out there; being consistent and
recognized.”

Gender

Only a few students, all female, remarked on gendered bodies or activities. For some people
personal safety is a concern. Cathy said, “When you're a girl running and you're getting honked
at obviously it doesn't feel safe." Pursuit of idealistic gendered bodies influences how students
plan their workouts. Where students get their exercise information and what they aspire to be
influences what exercises they do. Jill said, “There are a few things I wish campus rec had more
of, like the smith machine, which is very popular with girls right now, but they'll do 8 different
exercises on one machine. But people are really nice and if they see me waiting they'll ask if I want to work in.” If group fitness tends to be a feminine space what could be the reason for that? When we asked Marcella to tell us why she thought very few men would attend group fitness classes, she said, “Group fitness [classes] are focused less on strength and males are more interested in strength or bench press, manliness, and what not, I don't know.”

Focus Group Narrative

Our focus groups were designed to have the participants group the free list terms obtained from the questionnaire into domains. When asked to group free list terms about motivations for exercise the resulting domains were summarized into the following coded themes, in alphabetical order:

- aesthetics and looks, i.e. how I see myself
- health, i.e. mental, emotional, and non-physical
- healthy, i.e. physical
- how others perceive me and how I compare with others
- self improvement, non-sport related goals, lifestyle, time management
- sport performance, i.e. strength and endurance

The discussion around grouping the free list items was similar for both groups. Motivations were perceived to be extrinsic and intrinsic, short term and long term. The participants debated on the grouping of some of the items related to health and strength. One said, “You can't see strong. How can you see a healthy body? Healthy looking or absence of disease with no organ failure?”

When asked to group free list terms about barriers to exercise the resulting domains were summarized into the following coded themes, in alphabetical order:

- access to the facility, i.e. hours of operation
- external factors with no control, i.e. professional or social obligations
- external factors with some control, i.e. excuses like not having enough time
- internal factors with some control, i.e. excuses like not feeling like working out
- time management
When asked more about barriers, this group of participants seemed to say barriers to exercise are just excuses. They said that, people say they do not have enough time but it is because exercise is not prioritized or their time is wasted doing other things.

When asked to group free list terms about campus recreation the resulting domains were summarized into the following coded themes, in alphabetical order:

- access to the facility, i.e. hours of operation, convenience, and proximity to class or work
- facility, i.e. amenities, features, and equipment
- social atmosphere, i.e. a college gym

Altogether, the focus groups provided some insight into how university students perceive their motivations in comparison to others. Their conversation around how to interpret and group the responses of their peers added to the positive deviance ethnographic model indicating the importance of physical appearance, physical performance, and health in communicating their motivations to exercise and physical activity.
Discussion

Motivations and barriers to exercise for students at USF Campus Recreation are not clearly understood. In our positive deviant sample it seems students are most motivated by a mix of improving physical performance, improving body composition, stress management, and improving their short and long term health. The students in this sample represent a subgroup of students at USF who are highly motivated to exercise and frequently engage with fitness programs at USF Campus Recreation. Yet, they face similar constraints as their peers. In managing their multiple responsibilities, as students, interns, employees, friends, and family, they have prioritized their time to ensure that on most days that they want to exercise, they do. For them, physical activity and exercise has become a regular habit or a daily ritual which helps them to have some consistency and gives them a chance to make perceived gains as they progress towards their goals. Campus Recreation becomes the place where they embody a learned practice of ritualized exercise and physical activity and show off their skills as a human mover. Over time, their investment in themselves becomes an integral part of their identity to the point where, hypothetically, if Campus Recreation was not an option, they would, at least in the short term, seek out other opportunities for exercise. Campus Recreation is the most convenient and preferred place for them. It is safe. It is fun. They have friends there. It is on campus; they can go before or after class or after they get out of their on-campus job. Campus Recreation may not have everything everyone wants but it has everything this group needs.
From the questionnaire data, no statistically significant relationship or correlation between past experience and exercise frequency was identified. Although, the free list data did generate some insight into motivations and barriers, what was identified can likely be attributed to the individual person, place, and time context of being a university student with an interest in exercise and then taking a spin at Campus Recreation. Therein lies the value of detailed ethnographic research to dig even deeper into the personal experience of university students. Campus Recreation provides the tools through which students can exercise their interests, express themselves physically, and engage their bodies in ritualized practice of human movement. Their reasons may vary but their experience is shared and together they have built a community to further support their peers in exploring habits of physical activity, exercise, and recreation.

Each of the students who participated in this research presents a public performance when they step into Campus Recreation and work out. They are putting their body on display for themselves and for others around them. In some ways, as a male student getting ready to bench press, or a female student dancing in Zumba, their body becomes a gendered performance for human movement. Consider yet, the large numbers of female participants who spoke about exercise and physical activity not exclusively to achieve some feminine body ideal but to improve physical performance and buffer against illness and poor health. If the female students in our sample felt constrained or pressured by societal limits of what women can do with their bodies then they did not express that in their responses; instead, these female students have embraced an athletic identity to push past perceived physical, mental, and societal limits in order to achieve their own goals.
Many of the students in our interview sample discussed the positive influence physical education and past experience with exercise have had in shaping their attitudes and beliefs about exercise. As children, they may have played active games and run around outside. In more structured settings they did things with their families or joined sports teams and competed in dance competitions. This exposure to different types of physical activity may have helped them to identify what they would like to do for exercise. This can be a challenge for a fitness professional; working with a client to help them identify what they enjoy doing. Not everyone wants to run in a race or pull a conventional barbell deadlift or swing a kettlebell. Different people like different things and, going back to the role of physical education, emphasis in developing basic patterns of human movement in a positive environment that supports and encourages children's curiosity to explore moving their body is more important than funneling kids into one or two sports. Public health professionals who work in physical activity health promotion understand this. However, there may not be enough of a connection between what works best to get people interested in physical activity and what is funded. Male athletes are adored for how they embody the individualistic American spirit of being self-made with hard work. The sports that showcase their abilities get a great deal of attention from media and it is those sports that our society is structured to funnel kids through.

In some cases, our participants discussed their body in terms of a separate thing to be managed or to be controlled. It may have been the way the questionnaire was worded or how the interview questions were asked but very rarely was the body presented as an obstacle. Feeling lazy or having urges to eat junk were not frequently discussed or even brought up. In the interviews and focus group conversations there were very little points made of mind body dualism. In one case, Regina spoke about how she was deeply interested in learning to be comfortable in her own skin.
and to love her body. Her language in this sense implies a dualistic nature of mind and body but also how there must be a compromise, an understanding that the body is constrained by genetic and environmental factors which the mind must accept.

Limitations

The small sample size was insufficient to detect a statistical significant relationship between all of the variables. Furthermore, demographic information such as race, ethnicity, or cultural origin was not collected and so it is hard to evaluate if an ethnically and socioeconomic diverse sample of students was selected. Although the demographics of male and female and undergraduate and graduate does match the overall campus recreation population there may have been a missed opportunity to compare how some socioeconomic metrics such as urban or rural, family income, or race and or ethnicity correlate to physical education experience and frequency of exercise. The findings from this research can be used to further evaluate the effectiveness of Campus Recreation events and programs but may not necessarily be generalized and successfully applied to improve patterns of physical activity and exercise in other adult general populations. The university is a special and niche place but it can be an insulated environment and some aspects of this environment do not directly translate to life after university. Additionally, the student population can be very diverse. Many students come from different places, backgrounds and experiences. It would be unrealistic to think any university Campus Recreation program could reach much higher levels of student engagement. And if it did, would the existing facility be sufficient to handle the volume of students?

Conclusion

This research has modeled ethnography using positive deviance to select the sample. Positive deviance focused attention on university students who were successful in their studies and in
following their exercise goals. In this regard, their shared experience as university students who frequently exercise at campus recreation, it is no surprise there were no statistically significant differences among them. However, the ethnographic data collected as a result of this research points to evidence of how their engagement with the campus recreation center has helped them to build their community of support at the University of South Florida.

The combination of individual motivations, a supportive social environment, and a convenient location serves to enable this group of university students in their pursuit of structured physical activity. In comparison to the general university student population, these students have an intense motivation for exercise; the positive deviants do not need the university campus recreation department marketing messages or special programs for motivation, they are self-motivated; they have not had a negative experience significant enough to change their behavior away from campus recreation. This sample has proactively scheduled their time to prioritize daily exercise. With their continued engagement and participation, they have become part of maintaining the supportive environment thereby reinforcing and affirming a positive experience for other university students as well.

Applying anthropology and qualitative research methods to questions of public health physical activity promotion and campus recreation program evaluation are promising. Campus Recreation proponents must continue to engage university administrations and state and federal governments in the intrinsic and long term value Campus Recreation programs have in promoting active living and healthy eating. The findings from this research conclude the possible importance of past experience in influencing current patterns of physical activity and exercise. This Campus Recreation department could reach a greater proportion of students with the right marketing mix emphasizing how well-equipped and convenient their facilities are, while keeping
in mind different students will have different needs and motivations. Campus recreation administrators may be able to use this ethnographic model to examine further the role exercise and physical activity have in affecting academic performance. As mentioned in the literature review, evidence now exists to show a connection between academic performance and utilization of campus recreation programs and services. The big take away for campus recreation administrators is to work on building the narrative around how exactly campus recreation is beneficial. The first area to start is by looking at how the social engagement and sense of community help university students feel more strongly connected to their university experience, thereby developing more confidence, and ultimately applying that to classwork. Qualitative research methods and applied anthropology can provide detailed information for use in shaping and marketing public health promotion messages. This type of segmented market research provides key insights into how best to motivate university students to identify and pursue their goals for physical activity and exercise while reducing barriers for access, i.e. increasing convenience and reducing cost. Other aspects of the experience pertain to crafting a supportive atmosphere where university students feel safe to explore patterns of physical activity and exercise they are most interested in and providing opportunities for students to learn and build their exercise self-efficacy. Group fitness is a great way to introduce students to the concepts of exercise but cultural values and norms describing gendered patterns of exercise may put some people off. In some cases, this is a plus, for example, some students prefer to exercise with students of the same sex or gender. The question is then to figure out, if this is a desired outcome, how to market group fitness classes to appeal to what motivates most people to exercise. Maybe, as examples, a possible strategy is to evaluate the feasibility of women only
classes and programs or to promote Zumba as a fun and effective cardiovascular workout for men.

Those students who have an interest in exercise and find campus recreation convenient will try it out. Although, campus recreation has a large variety of amenities some market niches are not adequately served. Students who are adamant on practicing Olympic lifting will have to go elsewhere, as this is not currently allowed at USF Campus Recreation. Likewise, students who prefer to exercise topless or bare their midriff, or have themselves recorded on video would have to find alternative locations or facilities, as USF Campus Recreation has rules about dress code and prohibits audio and video recording.

This research found students who frequently exercise at campus recreation are motivated by their desire to improve their physical performance and appearance. At times their school and work schedules may not allow them to exercise as much as they would want but because USF Campus Recreation is the most convenient option, and already paid for, they are able to exercise three or more times per week on most weeks. Amenities like the selection of strength and cardiovascular training machines and equipment and programs like group fitness cycle help students reach their exercise and wellness goals. To have even greater reach among university students, USF Campus Recreation could look at how to emphasize the quality and convenience of the facilities, paying special attention to using a mix of language which would reach students with different motivations on exercise and physical activity.

**Future Considerations**

In addition to these questions, it may have been interesting to also ask yes-no or rank type questions about barriers to exercise at campus recreation. Further research could be done on why some children transition out of physical activity behavior as they grow older. This may be good
for a photo voice project. Possible applications of this research could lead to further investigations of developmental origins of health and disease, that is, instilling habits of healthy eating and active living in a population that has yet to have children can have potentially positive benefits for future generations (Bateson et al. 2004).

Data from this project gives only a glimpse of how exactly university students are motivated by their desire to improve their physical appearance, physical performance, and physical and mental health. Future research should continue to expand and challenge ideas of how these different motivations are related to each other and reinforced in various aspects of United States culture, i.e. in commercial fitness and wellness, physical education, celebrity athletes, public health, and gender.
REFERENCES


Appendix 1: Recruitment Flier

Like to work out?
Keep your current program.

This voluntary research is being done by USF to identify barriers and motivations to exercise for students at USF. You are being asked because you may have some interest in exercise. It may take up to 3 1/2 hours of your time over 3 different visits but there will be no benefit to you.

Now recruiting participants for research.

Participants would be asked to complete a questionnaire, invited to attend a focus group, and interview.

If you:
- are a student
- have a >=3.0 GPA
- and exercise
then contact René Herrera at (802) 552-4497 or reneherrera@mail.usf.edu
USF IRB: Study - Pro00034523
Appendix 2: Recruitment Flowchart

- 50 screened with questionnaire
- Remove participants due to exclusion criteria
- 43 Included in analysis
- Invited volunteers to participate in interviews and focus groups
- 9 interviewed
- 4 Included in Focus Group 1
- 4 Included in Focus Group 2
Appendix 3: Questionnaire

Demographics

The questions in this section are for demographic information. Please answer all questions to continue.

1. What is your age? ____
2. What is your sex? ____
3. What is your gender? ____
4. Are you an undergraduate or graduate student? Select one:
   1. undergraduate
   2. graduate
   3. other ____
5. What is your year at USF? Select one:
   1. First (1st) year - undergraduate
   2. Second (2nd) year - undergraduate
   3. Third (3rd) year - undergraduate
   4. Fourth (4th) year - undergraduate
   5. Fifth (5th) year - undergraduate
   6. Graduate
   7. Other ____
6. What is your major? ____
7. Do you live on campus or off? Select one:
   1. On-campus residence
   2. Off-campus housing
   3. Other ____
8. What is your cumulative GPA? ____

Exercise Habits

The questions in this section ask about your exercise habits. Please answer all questions to continue.

9. On average, how many days each week do you engage or practice physical activity and exercise? Select one:
   1. One (1)
   2. Two (2)
   3. Three (3)
   4. Four (4)
   5. Five (5)
   6. Six (6) or more
   7. none
10. On average, how would you describe your exercise intensity? Select one:
   9 corresponds to "very light" exercise. For a healthy person, it is like walking slowly at his or her own pace for some minutes
   13 on the scale is "somewhat hard" exercise, but it still feels OK to continue.
   17 "very hard" is very strenuous. A healthy person can still go on, but they really have to push themself. It feels very heavy, and the person is very tired.
   19 on the scale is an extremely strenuous exercise level. For most people this is the most strenuous exercise they have ever experienced.
   1. 6 – no exertion at all
   2. 7
   3. 7.5 – extremely light
   4. 8
   5. 9 – very light
6. 10
7. 11 – light
8. 12
9. 13 – somewhat hard
10. 14
11. 15 – hard (heavy)
12. 16
13. 17 – very hard
14. 18
15. 19 – extremely hard
16. 20 – maximal exertion

11. Where do you usually exercise or engage in physical activity? Select all that apply:
   1. Campus Recreation
   2. Campus Recreation at the Fit
   3. Campus Recreation at the Well
   4. Other ___

12. What, if any, negative consequences have you ever had because of your practice in exercise or physical activity? ___

13. How would you rate your experience with physical education (PE) class as a K-12 student? Select one:
   1. Mostly negative
   2. Negative
   3. Neutral
   4. Positive
   5. Mostly positive

Free Lists

14. What are reasons and motivations you have to exercise? Please list everything you can think of. ___

15. Why/when would you go to campus recreation to exercise and not an off-campus private gym or club? Please list all possible reasons. ___

16. What are the things or reasons that keep you from exercising as much as you want to? Please list everything you can think of. ___

Up to this point all of the data collected has been anonymous. If you continue you will be asked to provide some identifying information.

17. Do you want to volunteer to participate in a single (one hour) focus group session and single (one hour) interview session?
   1. Yes
   2. No (terminates survey, thank you)
Appendix 4: Interview Questions

1. When you hear the words “physical activity” or “exercise” what do you think?

2. How would you describe yourself as an exerciser?

3. How do you think your past experience with physical activity and exercise has influenced your perceptions of exercise now?

4. “_” was identified as something that motivates people here to exercise, how do you think that applies to you?

5. “_” was identified as something that keeps people from exercising as much as they want; how do you think that applies to you?

6. “_” was identified as a reason to exercise at campus recreation and not elsewhere; how do you think that applies to you?

7. Why or when would you choose to exercise in a group fitness class and not on your own?

8. What are the best things about coming to exercise at Campus Recreation?
# load required packages
library("AnthroTools")
library("plyr")
library("tidyverse")
library("psych")
library("RCColorBrewer")
library("tokenizers")
library("broom")
library("stats")
library("factoextra")

# import CSV data to R
qual <- read_csv("data-raw/qualtrics_export.csv",
    col_names = TRUE)

# slice out rows
qual <- slice(qual, 3:52)

# select out columns
qual <- select(qual, 9, 18:37)

# update column names
colnames(qual) <- c("response.id",
    "age",
    "sex",
    "gender",
    "student",
    "student.other",
    "year",
    "year.other",
    "major",
    "housing",
    "housing.other",
    "gpa",
    "exercise.freq",
    "exercise.intensity",
    "location",
    "location.other",
    "negative",
    "phys.ed",
    "fl.motivations",
    "fl.campusrec",
    "fl.barriers")

# save copy to /data
write_csv(qual, "data/qualtrics_export.csv")

# and load back into R
# because this resets the columns to the correct types
qual <- read_csv("data/qualtrics_export.csv")

# drop any NA rows
qual <- drop_na(qual, age)
# Prepare data for analysis
# recode sex, gender, and maybe major
# sex
qual$sexcode <- revalue(qual$sex, c("Female"="1",
   "Female "="1",
   "female"="1",
   "female "="1",
   "F"="1",
   "Male"="2",
   "male"="2"
))

qual$sexcode <- revalue(qual$sexcode, c("1"="Female",
   "2"="Male"))

# gender
qual$gencode <- revalue(qual$gender, c("Female"="1",
   "Male"="2",
   "female"="1",
   "female "="1",
   "Female "="1",
   "F"="1",
   "male"="2",
   "male "="2",
   "Male"="2",
   "Man" = "2",
   "usually masculine" = "2"))

qual$gencode <- revalue(qual$gencode, c("1"="Female",
   "2"="Male"))

# housing
qual$house.code <- revalue(qual$housing, c("Other"="Off-campus housing"))

# qual <- select(qual, 1:2, 5:23)
# specify to inclusion criteria only
# GPA >= 3.0
# age 18 <=< 20
# exercise frequency >= 3
qual <- filter (qual, age >= 18 & age <= 29)
qual <- filter (qual, gpa >= 3)
qual <- filter (qual, exercise.freq != "One (1)")
qual <- filter (qual, exercise.freq != "Two (2)")
qual <- filter (qual, sexcode != "Heterosexual")
qual <- filter (qual, gencode != "Heterosexual")
sample <- qual

# exercise intensity recode
sample$exe.int.code <- revalue(sample$exercise.intensity, c("13 - somewhat hard"=13,
   "14"=14,
   "15 - hard (heavy)"=15,
   "16"=16,
   "17 - very hard"=17,
   "18"=18,
"19 - extremely hard"=19,
"20 - maximal exertion"=20)

# exercise frequency recode
sample$exe.freq.code <- revalue(sample$exercise.freq,
                                c("Five (5)"="c. Five (5)",
                                "Four (4)"="b. Four (4)",
                                "Six (6) or more"="d. Six (6) =<",
                                "Three (3)"="a. Three (3)"))

# student year recode
sample$year.code <- revalue(sample$year,
                            c("First (1st) year - undergraduate"="a. 1st",
                            "Second (2nd) year - undergraduate"="b. 2nd",
                            "Third (3rd) year - undergraduate"="c. 3rd",
                            "Fourth (4th) year - undergraduate"="d. 4th",
                            "Graduate"="e. Grad",
                            "Other"="f. Other"))

# student recode
sample$stu.code <- revalue(sample$student,
                           c("Undergraduate" = "a. Undergraduate",
                            "Graduate" = "b. Graduate",
                            "Other" = "b. Graduate"))

# phys ed recode
sample$pe.code5 <- revalue(sample$phys.ed,
                           c("Mostly negative" = "a. Mostly negative",
                             "Negative" = "b. Negative",
                             "Neutral" = "c. Neutral",
                             "Positive" = "d. Positive",
                             "Mostly positive" = "e. Mostly positive"))

sample$pe.code3 <- revalue(sample$phys.ed,
                           c("Mostly negative" = "a. Negative",
                             "Negative" = "a. Negative",
                             "Neutral" = "b. Neutral",
                             "Positive" = "c. Positive",
                             "Mostly positive" = "c. Positive"))

fl <- as_tibble(sample) # for later use with free list
location <- as_tibble(sample) # for later use with location
# Exercise Location
# separate rows to give accurate count
location <- separate_rows(location, location, sep = ",")
# use select to limit to variables of interest
sample <- select(sample,
                  response.id,
                  age,
                  sex,
                  sexcode,
                  gender,
                  gencode,
                  student,
                 )
stu.code,
year,
year.code,
house.code,
gpa,
exercise.freq,
exe.freq.code,
exercise.intensity,
exe.int.code,
phys.ed,
pe.code3,
pe.code5,
location)

# save sample data
write_csv(sample, "data/questionnaire_sample.csv")

# Free List analysis
# select columns for free list and copy to new table
fl <- select (fl,
response.id,
sexcode,
stu.code,
exe.freq.code,
exe.int.code,
pe.code3,
pe.code5,
fl.motivations,
fl.barriers,
fl.campusrec)

# drop any NA rows
fl <- drop_na(fl, fl.motivations,
fl.barriers,
fl.campusrec)

# copy each free list domain into unique CSV
# motivations free list
fl.motiv <- select(fl,
response.id,
sexcode,
fl.motivations)
fl.motiv <- separate_rows(fl.motiv,
fl.motivations,
sep = "; ", #change back to ";"
convert = FALSE)
fl.motiv <- separate_rows(fl.motiv,
fl.motivations,
sep = ", ",
convert = FALSE)
fl.motiv <- separate_rows(fl.motiv,
fl.motivations,
fl.motiv <- separate_rows(fl.motiv, fl.motivations, sep = "[.]", convert = FALSE)

# rename columns
fl.motiv <- rename(fl.motiv, subj = response.id, group = sexcode, code = fl.motivations)

# attempt to add 'order' column
fl.motiv <- fl.motiv %>%
  arrange(subj) %>%
  group_by(subj) %>%
  mutate(order = row_number(subj)) %>%
  arrange(subj, order)

# saved as CSV
write_csv(fl.motiv, "data/free_list_motivations.csv")

# barriers free list
fl.barr <- select(fl, response.id, sexcode, fl.barriers)

fl.barr <- separate_rows(fl.barr, fl.barriers, sep = ";", convert = FALSE)
fl.barr <- separate_rows(fl.barr, fl.barriers, sep = ", ", convert = FALSE)
fl.barr <- separate_rows(fl.barr, fl.barriers, sep = "[.]", convert = FALSE)
fl.barr <- separate_rows(fl.barr, fl.barriers, sep = " -", convert = FALSE)

# rename columns
fl.barr <- rename(fl.barr, subj = response.id, group = sexcode, code = fl.barriers)

# attempt to add 'order' column
fl.barr <- fl.barr %>%
  arrange(subj) %>%
  group_by(subj) %>%
  mutate(order = row_number(subj)) %>%
```r
arrange(subj, order)
# saved as CSV
write_csv(fl.barr, "data/free_list_barriers.csv")
# campus rec free list
fl.campusrec <- select(fl, 
  response.id, 
  sexcode, 
  fl.campusrec)
fl.campusrec <- separate_rows(fl.campusrec, fl.campusrec, sep = "; ", convert = FALSE)
fl.campusrec <- separate_rows(fl.campusrec, fl.campusrec, sep = ", ", convert = FALSE)
fl.campusrec <- separate_rows(fl.campusrec, fl.campusrec, sep = "[.]", convert = FALSE)
fl.campusrec <- separate_rows(fl.campusrec, fl.campusrec, sep = " -", convert = FALSE)

# rename columns
fl.campusrec <- rename(fl.campusrec, subj = response.id, 
  group = sexcode, 
  code = fl.campusrec)

# attempt to add 'order' column
fl.campusrec <- fl.campusrec %>%
  arrange(subj) %>%
  group_by(subj) %>%
  mutate(order = row_number(subj)) %>%
  arrange(subj, order)
# saved as CSV
write_csv(fl.campusrec, "data/free_list_campusrec.csv")

# load data
# qual <- read_csv("data/qualtrics_export.csv")
sample <- read_csv("data/questionnaire_sample.csv")

### Descriptive Statistics ###
# for table to describe entire sample
# and grouped by sex
# row totals
sample %>% tally() # total number of observations
n <- 43 # store to n
summary(sample$age) # summary statistics for entire questionnaire for age
round(SD(sample$age),3)
# use of t.test to give mean and confidence interval for mean
```
t.test(sample$age)
# summary statistics for entire questionnaire for student undergrad or grad
by.stu.code <- sample %>%
group_by(stu.code) %>%
tally() # provide frequency for each student group
by.stu.code # provide frequency for each student group
# proportion for each student group rounded to 3 decimals
round(table(sample$stu.code) / nrow(sample), 3)
# summary statistics for entire questionnaire for year in school
by.year.code <- sample %>%
group_by(year.code) %>%
tally() # provide frequency for each year group
by.year.code
# proportion for each year group rounded to 3 decimals
round(table(sample$year.code) / nrow(sample), 3)
# summary statistics for entire questionnaire for year in school
by.housing <- sample %>%
group_by(house.code) %>%
tally() # frequency for each housing group
by.housing
# proportion for each housing group rounded to 3 decimals
round(table(sample$house.code) / nrow(sample), 3)
# use of t.test to give mean and confidence interval for mean
t.test(sample$gpa)
round(SD(sample$gpa),3)
# exercise frequency
# summary statistics for entire questionnaire for exercise frequency
by.exe.freq.code <- sample %>%
group_by(exe.freq.code) %>%
tally() # provide frequency for each student group
by.exe.freq.code # provide frequency for each student group
# proportion for each student group rounded to 3 decimals
round(table(sample$exe.freq.code) / nrow(sample), 3)
# summary statistics for exercise intensity
# use of t.test to give mean and confidence interval for mean
t.test(sample$exe.int.code)
round(SD(sample$exe.int.code),3)
# summary statistics for entire questionnaire for PE experience
by.pe.code3 <- sample %>%
group_by(pe.code3) %>%
tally() # provide frequency for each PE exp group
by.pe.code3
# proportion for each PE exp group rounded to 3 decimals
round(table(sample$pe.code3) / nrow(sample), 3)
# summary statistics for entire questionnaire for location
by.location <- location %>%
group_by(location) %>%
tally() # provide frequency for each location group
round(table (location$location) / nrow(location), 3)

by.sex.table.f <- filter(sample, sexcode == "Female")
by.sex.table.f %>% tally() # total number of observations

by.stu.code.f <- by.sex.table.f %>%
  group_by(stu.code) %>%
tally() # frequency for each student group for females
by.stu.code.f

by.year.code.f <- by.sex.table.f %>%
  group_by(year.code) %>%
tally() # frequency for each year group for females
by.year.code.f

by.housing.f <- by.sex.table.f %>%
  group_by(house.code) %>%
tally() # frequency for each female house group
by.housing.f

by.exe.freq.code.f <- by.sex.table.f %>%
  group_by(exe.freq.code) %>%
tally() # frequency for each exercise freq group for females
by.exe.freq.code.f

by.pe.code3.f <- by.sex.table.f %>%
  group_by(pe.code3) %>%
tally() # frequency for each female PE Exp group
by.pe.code3.f
# proportion for each female PE Exp group rounded to 3 decimals
round(table(by.sex.table.f$pe.code3) / nrow(by.sex.table.f), 3)

# summary statistics for female location group
by.sex.table.f.l <- filter(location, sexcode == "Female")
by.location.f <- by.sex.table.f.l %>%
group_by(location) %>%
tally() # frequency for each female PE Exp group
by.location.f

# proportion for each female PE Exp group rounded to 3 decimals
round(table(by.sex.table.f.l$location) / nrow(by.sex.table.f.l), 3)

# summary statistics for male group
by.sex.table.m <- filter(sample, sexcode == "Male")
by.sex.table.m %>%
tally() # total number of observations
# use of t.test to give mean and confidence interval for mean
  t.test(by.sex.table.m$age)
  round(SD(by.sex.table.m$age),3)

# summary statistics for male group for student undergrad or grad
by.stu.code.m <- by.sex.table.m %>%
group_by(stu.code) %>%
tally() # frequency of male student group
by.stu.code.m

# proportion of male student group rounded to 3 decimals
round(table(by.sex.table.m$stu.code) / nrow(by.sex.table.m), 3)

# summary statistics for male group for year in school
by.year.code.m <- by.sex.table.m %>%
group_by(year.code) %>%
tally() # frequency of male year group
by.year.code.m

# proportion of male year group rounded to 3 decimals
round(table(by.sex.table.m$year.code) / nrow(by.sex.table.m), 3)

# summary statistics for male group for year in school
by.housing.m <- by.sex.table.m %>%
group_by(house.code) %>%
tally() # frequency of male housing group
by.housing.m

# proportion of male housing group rounded to 3 decimals
round(table(by.sex.table.m$house.code) / nrow(by.sex.table.m), 3)

# use of t.test to give mean and confidence interval for mean
t.test(by.sex.table.m$gpa)
  round(SD(by.sex.table.m$gpa),3)

# summary statistics for male group for exercise frequency
by.exe.freq.code.m <- by.sex.table.m %>%
group_by(exe.freq.code) %>%
tally() # frequency for each exercise freq group for females
by.exe.freq.code.m

# proportion for each female exercise freq group rounded to 3 decimals
round(table(by.sex.table.m$exe.freq.code) / nrow(by.sex.table.m), 3)

# use of t.test to give mean and confidence interval for mean
t.test(by.sex.table.m$exe.int.code)
round(SD(by.sex.table.m$exe.int.code),3)
# summary statistics for male PE exp group
by.pe.code3.m <- by.sex.table.m %>%
group_by(pe.code3) %>%
tally() # frequency for each male PE Exp group
by.pe.code3.m
# proportion for each male PE Exp group rounded to 3 decimals
round(table(by.sex.table.m$pe.code3) / nrow(by.sex.table.m), 3)
# summary statistics for male location group
by.location.m <- by.sex.table.m %>%
group_by(location) %>%
tally() # frequency for each female PE Exp group
by.location.m
# proportion for each female PE Exp group rounded to 3 decimals
round(table(by.location.m$location) / nrow(by.location.m), 3)
#### Difference in mean between male and female for, age, gpa, exe int ####
t.test(by.sex.table.f$age, by.sex.table.m$age)
t.test(by.sex.table.f$gpa, by.sex.table.m$gpa)
t.test(by.sex.table.f$exe.int.code, by.sex.table.m$exe.int.code)
# difference in pe exp and frequency of exercise
chisq.test(sample$exe.freq.code, sample$pe.code3)
by.pe.neg <- filter(sample, pe.code3 == "a. Negative")
by.pe.neu <- filter(sample, pe.code3 == "b. Neutral")
by.pe.pos <- filter(sample, pe.code3 == "c. Positive")
# by.pe.neg$exe.freq.code
by.pe.neg %>%
group_by(exe.freq.code) %>%
tally() # frequency for each female PE Exp group
# proportion for each female PE Exp group rounded to 3 decimals
round(table(by.pe.neg$exe.freq.code) / nrow(by.pe.neg), 3)
# by.pe.neu$exe.freq.code
by.pe.neu %>%
group_by(exe.freq.code) %>%
tally() # frequency for each female PE Exp group
# proportion for each female PE Exp group rounded to 3 decimals
round(table(by.pe.neu$exe.freq.code) / nrow(by.pe.neu), 3)
# by.pe.pos$exe.freq.code
by.pe.pos %>%
group_by(exe.freq.code) %>%
tally() # frequency for each female PE Exp group
# proportion for each female PE Exp group rounded to 3 decimals
round(table(by.pe.pos$exe.freq.code) / nrow(by.pe.pos), 3)
#### Free list analysis ####
# read and load each free list
free.list.cr <- read.csv("data/free_list_campusrec-recode.csv")
free.list.barr <- read.csv("data/free_list_barriers-recode.csv")
```r
free.list.motiv <- read.csv("data/free_list_motivations-recode.csv")
# free list motivations
# salience
fl.motiv <- CalculateSalience(free.list.motiv,
                              GROUPING = "group",
                              CODE = "code",
                              Order = "order",
                              Subj = "subj")

# salience by code
fl.motiv.s <- SalienceByCode(fl.motiv,
                              CODE = "code",
                              Subj = "subj",
                              dealWithDoubles = "MAX")

# save copy to /data
write.csv(fl.motiv.s, "data/free_list_motivations_salience.csv")

# salience by code grouped by sex
fl.motiv.s.g <- SalienceByCode(fl.motiv,
                                CODE = "code",
                                Subj = "subj",
                                GROUPING = "group",
                                dealWithDoubles = "MAX")

# save copy to /data
write.csv(fl.motiv.s.g, "data/free_list_motivations_salience_code_grouped.csv")

# free list table
fl.motiv.t <- FreeListTable(fl.motiv,
                            CODE = "code",
                            GROUPING = "group",
                            Subj = "subj",
                            tableType = "FREQUENCY")

# free list column sums
fl.motiv.freq <- as.table(sort(colSums(subset(fl.motiv.t, select = 3:57)),
                              decreasing = TRUE))
View(fl.motiv.freq)
plot(fl.motiv.freq)

# save copy to /data
write.csv(fl.motiv.freq, "data/free_list_motivation_freq_table.csv")

# combine both tables to one so frequencies and salience are on same table
fl.motiv.table.1 <- read_csv("data/free_list_motivation_freq_table.csv")
fl.motiv.table.2 <- read_csv("data/free_list_motivations_salience.csv")
fl.motiv.table <- full_join(fl.motiv.table.1,
                            fl.motiv.table.2,
                            by = c("Code" = "CODE")
                          )
fl.motiv.table <- select(fl.motiv.table,
                         Rank,
                         Code,
                         Freq,
                         MeanSalience,
                         93
```

write.csv(fl.motiv.table, "data/free_list_motivation_freq_salience_table.csv")

# free list barriers
# salience
free.list.barr <- CleanFreeList(free.list.barr,
    CODE = "code",
    Order = "order",
    Subj = "subj")

# calculate salience
fl.barr <- CalculateSalience(free.list.barr,
    GROUPING = "group",
    CODE = "code",
    Order = "order",
    Subj = "subj")

# salience by code
fl.barr.s <- SalienceByCode(fl.barr,
    CODE = "code",
    Subj = "subj",
    dealWithDoubles = "MAX")

# salience by code grouped by sex
fl.barr.s.g <- SalienceByCode(fl.barr,
    CODE = "code",
    Subj = "subj",
    GROUPING = "group",
    dealWithDoubles = "MAX")

# free list table
fl.barr.t <- FreeListTable(fl.barr,
    CODE = "code",
    GROUPING = "group",
    Subj = "subj",
    tableType = "FREQUENCY")

# free list column sums
fl.barr.freq <- as.table(sort(colSums(subset(fl.barr.t, select = 3:36)),
    decreasing = TRUE))

View(fl.barr.freq)
plot(fl.barr.freq)

# save copy to /data
write.csv(fl.barr.freq, "data/free_list_barriers_freq_table.csv")

# join both tables by code so both frequency and salience are on same table
fl.barr.table.1 <- read_csv("data/free_list_barriers_freq_table.csv")
fl.barr.table.2 <- read_csv("data/free_list_barriers_salience.csv")
fl.barr.table <- full_join(fl.barr.table.1,
fl.barr.table.2,
by = c("Var1" = "CODE")
)
fl.barr.table <- select(fl.barr.table,
X1.x,
Var1,
Freq,
MeanSalience,
SumSalience,
SmithsS)

# save copy to /data
write.csv(fl.barr.table, "data/free_list_barriers_freq_salience_table.csv")
# free list campus rec
# salience
free.list.cr <- CleanFreeList(free.list.cr,
CODE = "code",
Order = "order",
Subj = "subj")
fl.cr <- CalculateSalience(free.list.cr,
GROUPING = "group",
CODE = "code",
Order = "order",
Subj = "subj")

# salience by code
fl.cr.s <- SalienceByCode(fl.cr,
CODE = "code",
Subj = "subj",
dealWithDoubles = "MAX")

# save copy to /data
write.csv(fl.cr.s, "data/free_list_cr_salience.csv")
# salience by code grouped by sex
fl.cr.s.g <- SalienceByCode(fl.cr,
CODE = "code",
Subj = "subj",
GROUPING = "group",
dealWithDoubles = "MAX")

# save copy to /data
write.csv(fl.cr.s.g, "data/free_list_cr_salience_code_grouped.csv")
# free list table
fl.cr.t <- FreeListTable(fl.cr,
CODE = "code",
GROUPING = "group",
Subj = "subj",
tableType = "FREQUENCY")

# free list column sums
fl.cr.freq <- as.table(sort(colSums(subset(fl.cr.t, select = 3:24)),
dercreasing = TRUE))
View(fl.cr.freq)
plot(fl.cr.freq)
# save copy to /data
write.csv(fl.cr.freq, "data/free_list_cr_freq_table.csv")
# join both tables so frequency and salience are shown together
fl.cr.table.1 <- read_csv("data/free_list_cr_freq_table.csv")
fl.cr.table.2 <- read_csv("data/free_list_cr_salience.csv")
fl.cr.table <- full_join(fl.cr.table.1,
                        fl.cr.table.2,
                        by = c("Var1" = "CODE")
)
fl.cr.table <- select(fl.cr.table,
                      X1.x,
                      Var1,
                      Freq,
                      MeanSalience,
                      SumSalience,
                      SmithsS)
# save copy to /data
write.csv(fl.cr.table, "data/free_list_cr_freq_salience_table.csv")

### Relationship between sex ###
# and exercise frequency
chisq.test(sample$exe.freq.code, sample$sexcode)
# and PE experience
chisq.test(sample$pe.code3, sample$sexcode)
### Relationship between exercise frequency ###
# and GPA
chisq.test(sample$gpa, sample$exe.freq.code)
### by sex, Relationship between exercise frequency ###
# and GPA
chisq.test(by.sex.table.f$gpa, by.sex.table.f$exe.freq.code)
chisq.test(by.sex.table.m$gpa, by.sex.table.m$exe.freq.code)
### Relationship between PE Experience ###
# and exercise frequency
chisq.test(sample$exe.freq.code, sample$pe.code5)
### by sex, Relationship between PE Experience ###
# and exercise frequency
chisq.test(by.sex.table.f$exe.freq.code, by.sex.table.f$pe.code5)
chisq.test(by.sex.table.m$exe.freq.code, by.sex.table.m$pe.code5)
# Summary statistics for entire sample
# Age and GPA
hist(sample$age,
col = "gray",
main = paste("Histogram of age for entire sample"),
 xlab = paste("Age in years")) # histogram for entire questionnaire for age
boxplot(sample$age,
 horizontal = T,
main = paste("Boxplot of age for entire sample"),
 xlab = paste("Age in years")) # boxplot for entire questionnaire for age
summary(sample$gpa) # summary statistics for entire questionnaire for gpa

hist(sample$gpa, 
    col = "gray", 
    main = paste ("Histogram of GPA for entire sample"), 
    xlab = paste ("GPA")) # histogram for entire questionnaire for gpa

boxplot(sample$gpa, 
    horizontal = T, 
    main = paste ("Boxplot for GPA for entire sample"), 
    xlab = paste ("GPA")) # boxplot for entire questionnaire for gpa

# Frequencies and Proportions for Sex, Gender, Undergrad/Grad, Year, Major, Housing, Exercise Frequency, Exercise Intensity, Exercise Location, Phys Ed

# sex

sexcode.levels <- c("Female", 
                    "Male")

sexcode.var <- factor(sample$sexcode, levels = sexcode.levels)

sort(sexcode.var)

sample %>% count(sexcode, sort = TRUE) #frequencies

qual.sexcode <- table(sexcode.var)

round(prop.table(qual.sexcode), 3) # proportions

plot(sexcode.var, 
     main = paste("Frequency of Female and Male"), 
     ylab = paste("Freq"))

boxplot(sample$age ~ sexcode.var, 
         main = paste("Box plot for Age by Sex"))

boxplot(sample$gpa ~ sexcode.var, 
         main = paste("Box plot for GPA by Sex"))

# gender

gencode.levels <- c("Female", 
                    "Male")

gencode.levels <- factor(sample$gencode, levels = gencode.levels)

sort(gencode.levels)

sample %>% count(gencode, sort = TRUE) #frequencies

qual.gencode <- table(gencode.levels)

round(prop.table(qual.gencode), 3) # proportions

plot(gencode.levels, 
     main = paste("Frequency of Gender"), 
     ylab = paste("Freq"))

boxplot(sample$age ~ gencode.levels, 
         main = paste("Boxplot gender and age"))

boxplot(sample$gpa ~ gencode.levels, 
         main = paste("Boxplot gender and gpa"))

# undergrad and graduate

student.levels <- c("a. Undergraduate", 
                    "b. Graduate")

student.var <- factor(sample$stu.code, levels = student.levels)

sort(student.var)

sample %>% count(stu.code, sort = TRUE) #frequencies
qual.student <- table(student.var)
round(prop.table(qual.student), 3) # proportions
plot(student.var,
    main = paste("Frequencies of student"),
    ylab = paste("Freq"))
boxplot(sample$age ~ student.var,
    main = paste("boxplot age by student"))
boxplot(sample$gpa ~ student.var,
    main = paste("boxplot gpa by student"))

# year
year.levels <- c("First (1st) year - undergraduate",
                "Second (2nd) year - undergraduate",
                "Third (3rd) year - undergraduate",
                "Fourth (4th) year - undergraduate",
                "Fifth (5th) year - undergraduate",
                "Sixth (6th) year - undergraduate",
                "Graduate",
                "Other")
year.var <- factor(sample$year, levels = year.levels)
sort(year.var)
sample %>%
    count(year.code) # frequencies
qual.year <- table(year.var)
round(prop.table(qual.year), 3) # proportions
plot(year.var,
    main = paste("frequencies year"),
    ylab = paste("freq"))
boxplot(sample$gpa ~ year.var,
    main = paste("boxplot gpa by year"))

# Housing
#summary(sample$housing)
housing.levels <- c("On-campus residence",
                   "Off-campus housing",
                   "Other")
housing.var <- factor(sample$housing, levels = housing.levels)
sort(housing.var)
sample %>%
    count(housing, sort = TRUE) # frequencies
qual.housing <- table(housing.var)
round(prop.table(qual.housing), 3) # proportions
plot(housing.var,
    main = paste("frequencies housing"),
    ylab = paste("freq"))
boxplot(sample$gpa ~ housing.var,
    main = paste("boxplot gpa by housing"))

# Exercise Frequency
exercise.freq.levels <- c("One (1)",
                          "Two (2)",
                          "Three (3)",
                          "Four (4)",
                          "Five (5)",
                          "Six (6)",
                          "Other")
exercise.freq.var <- factor(sample$exercise, levels = exercise.freq.levels)
sort(exercise.freq.var)
sample %>%
    count(exercise, sort = TRUE) # frequencies
qual.exercise <- table(exercise.freq.var)
round(prop.table(qual.exercise), 3) # proportions
plot(exercise.freq.var,
    main = paste("frequencies exercise"),
    ylab = paste("freq"))
boxplot(sample$gpa ~ exercise.freq.var,
    main = paste("boxplot gpa by exercise"))
"Four (4)",
"Five (5)",
"Six (6) or more"

exercise.freq.var <- factor(sample$exercise.freq, levels = exercise.freq.levels)
sort(exercise.freq.var)
sample %>% count(exe.freq.code) # frequencies
qual.exercise.freq <- table(exercise.freq.var)
round(prop.table(qual.exercise.freq), 3) # proportions
plot(exercise.freq.var,
     main = paste("frequencies exercise frequency"),
     ylab = paste("freq"))
boxplot(sample$gpa ~ exercise.freq.var,
        main = paste("boxplot gpa by exercise frequency"))
boxplot(sample$age ~ exercise.freq.var,
        main = paste("boxplot age by exercise frequency"))

# Exercise Intensity

exercise.intensity.levels <- c("10",
"11",
"12",
"13 - somewhat hard",
"14",
"15 - hard (heavy)",
"16",
"17 - very hard",
"18",
"19 - extremely hard",
"20 - maximal exertion")

exercise.intensity.var <- factor(sample$exercise.intensity, levels = exercise.intensity.levels)
sort(exercise.intensity.var)
sample %>% count(exercise.intensity) # frequencies
qual.exercise.intensity <- table(exercise.intensity.var)
round(prop.table(qual.exercise.intensity), 3) # proportions
plot(exercise.intensity.var,
     main = paste("frequencies of exercise intensity"),
     ylab = paste("freq"))
boxplot(sample$gpa ~ exercise.intensity.var,
        main = paste("boxplot exercise intensity by gpa"))
boxplot(sample$age ~ exercise.intensity.var,
        main = paste("boxplot exercise intensity by age"))

# Exercise Location

# separate rows to give accurate count
location.levels <- c("Campus Recreation",
"Campus Recreation at the Fit",
"Campus Recreation at the Well",
"Other")

location.var <- factor(location$location, levels = location.levels)
sort(location.var)
location %>% count(location)  # frequencies
qual.location <- table(location.var)
round(prop.table(qual.location), 3) # proportions
plot(location.var,
    main = paste("frequencies of location"),
    ylab = paste("freq"))

# Physical Education
phys.ed.levels <- c("Mostly negative",
                    "Negative",
                    "Neutral",
                    "Positive",
                    "Mostly positive")
phys.ed.var <- factor(sample$phys.ed, levels = phys.ed.levels)
sort(phys.ed.var)
sample %>% count(pe.code5) # frequencies
qual.phys.ed <- table(phys.ed.var)
round(prop.table(qual.phys.ed), 3) # proportions
plot(phys.ed.var,
    main = paste("frequencies of phys ed"),
    ylab = paste("freq"))
boxplot(sample$gpa ~ phys.ed.var,
    main = paste("boxplot of gpa by phys ed"))
boxplot(sample$age ~ phys.ed.var,
    main = paste("boxplot of age by phys ed"))
round(tapply(sample$age, INDEX=sample$sexcode, FUN=mean),3)
round(tapply(sample$gpa, INDEX=sample$sexcode, FUN=mean),3)

# for my frequency table
by.sex <- sample %>%
    group_by(sexcode)
by.sex %>% summarise(
    age = mean(age),
    gpa = mean(gpa))

# mean of age and gpa by sex
by.sex.table.f <- filter(by.sex, sexcode == "Female")
count(by.sex, stu.code) # frequency of student by sex
round(18/(18+8), 3)
round(8/(18+8), 3)
round(12/(12+5), 3)
round(5/(12+5), 3)
count(by.sex, housing) # frequency of housing by sex
round(25/(18+8), 3)
round(1/(18+8), 3)
round(16/(12+5), 3)
round(1/(12+5), 3)
count(by.sex, year) # frequency of year by sex
round (1/26, 3)
round (5/26, 3)
round (5/26, 3)
round (6/26, 3)
round (7/26, 3)
round (2/26, 3)
round (1/17, 3)
round (1/17, 3)
round (4/17, 3)
round (5/17, 3)
round (6/17, 3)

# count(by.sex, major) # frequency of major by sex
count(by.sex, exercise.freq)

# Free List analysis
# select columns for free list and copy to new table
fl <- select(fl,
            response.id,
            sexcode,
            student,
            exercise.freq,
            exercise.intensity,
            phys.ed,
            fl.motivations,
            fl.barriers,
            fl.campusrec)

# drop any NA rows
fl <- drop_na(fl, fl.motivations,
              fl.barriers,
              fl.campusrec)

# copy each free list domain into unique CSV
# motivations free list
fl.motiv <- select(fl,
                   response.id,
                   sexcode,
                   fl.motivations)
fl.motiv <- separate_rows(fl.motiv,
                           fl.motivations,
                           sep = " ", # change back to ";"
                           convert = FALSE)
fl.motiv <- separate_rows(fl.motiv,
                           fl.motivations,
                           sep = ", ",
                           convert = FALSE)
fl.motiv <- separate_rows(fl.motiv,
                           fl.motivations,
                           sep = "- ",
                           convert = FALSE)
fl.motiv <- separate_rows(fl.motiv,
                           fl.motivations,
                           sep = "[.]",
                           convert = FALSE)
# rename columns
fl.motiv <- rename(fl.motiv, subj = response.id,  
                  group = sexcode,  
                  code = fl.motivations)
# add 'order' column
fl.motiv <- fl.motiv %>%  
          arrange(subj) %>%  
          group_by(subj) %>%  
          mutate(order = row_number(subj)) %>%  
          arrange(subj, order)
# saved as CSV
write_csv(fl.motiv, "data/free_list_motivations.csv")

# barriers free list
fl.barr <- select(fl,  
                  response.id,  
                  sexcode,  
                  fl.barriers)
fl.barr <- separate_rows(fl.barr,  
                          fl.barriers,  
                          sep = ";","",  
                          convert = FALSE)
fl.barr <- separate_rows(fl.barr,  
                          fl.barriers,  
                          sep = ",",",",  
                          convert = FALSE)
fl.barr <- separate_rows(fl.barr,  
                          fl.barriers,  
                          sep = "[.]",  
                          convert = FALSE)
fl.barr <- separate_rows(fl.barr,  
                          fl.barriers,  
                          sep = " -",  
                          convert = FALSE)
# rename columns
fl.barr <- rename(fl.barr, subj = response.id,  
                  group = sexcode,  
                  code = fl.barriers)
# add 'order' column
fl.barr <- fl.barr %>%  
          arrange(subj) %>%  
          group_by(subj) %>%  
          mutate(order = row_number(subj)) %>%  
          arrange(subj, order)
# saved as CSV
write_csv(fl.barr, "data/free_list_barriers.csv")

# campus rec free list
fl.campusrec <- select(fl,  
                       response.id,
sexcode,
fl.campusrec)
fl.campusrec <- separate_rows(fl.campusrec,
   fl.campusrec,
   sep = "; ",
   convert = FALSE)
fl.campusrec <- separate_rows(fl.campusrec,
   fl.campusrec,
   sep = ", ",
   convert = FALSE)
fl.campusrec <- separate_rows(fl.campusrec,
   fl.campusrec,
   sep = "[.]",
   convert = FALSE)
fl.campusrec <- separate_rows(fl.campusrec,
   fl.campusrec,
   sep = "- ",
   convert = FALSE)

# rename columns
fl.campusrec <- rename(fl.campusrec, subj = response.id,
   group = sexcode,
   code = fl.campusrec)

# add 'order' column
fl.campusrec <- fl.campusrec %>%
   arrange(subj) %>%
   group_by(subj) %>%
   mutate(order = row_number(subj)) %>%
   arrange(subj, order)

# saved as CSV
write_csv(fl.campusrec, "data/free_list_campusrec.csv")

# code in spreadsheet
# read coded CSV for free list salience analysis
# reloaded from CSV but this creates a new col 'x'
# fl.motiv <- read.csv("data/free_list_motivations.csv", header = TRUE)
# reloaded from CSV but this creates a new col 'x'
# fl.barr <- read.csv("data/free_list_barriers.csv", header = TRUE)
# reloaded from CSV but this creates a new col 'x'
# fl.campusrec <- read.csv("data/free_list_campusrec.csv", header = TRUE)
# salience for free list
fl.mot.sal <- CalculateSalience(fl.motiv,
   Order="order",
   Subj="subj",
   CODE="code",
   GROUPING="group", #can distinguish by sex
   Rescale=FALSE,
   Salience="salience")

# salience by code
fl.mot.sal.by.code <- SalienceByCode(fl.mot.sal,
CODE = "code",
Salience = "salience",
Subj = "subj",
dealWithDoubles = "MAX")

# View(fl.mot.sal)
# Frequency for free list
FLT <- FreeListTable (fl.mot.sal,
CODE = "code",
GROUPING = "group",
Salience = "salience",
Subj = "subj",
tableType = "FREQUENCY")

# View(FLT)
colSums(FLT)
Appendix 6: Expedited Approval For Initial Review

April 9, 2018

Rene Herrera
Epidemiology and Biostatistics
13201 Bruce B Downs Blvd
MDC56
Tampa, FL 33612

RE: Expedited Approval for Initial Review
IRB#: Pro00034523
Title: Using Mixed Method Qualitative Research to Understand Barriers and Motivations to Exercise at Campus Recreation

Study Approval Period: 4/9/2018 to 4/9/2019

Dear Ms. Herrera:

On 4/9/2018, the Institutional Review Board (IRB) reviewed and APPROVED the above application and all documents contained within, including those outlined below.

Approved Item(s):
Protocol Document(s):
IRB-protocol.docx

Consent/Assent Document(s)*:
Online with Interview/Focus Group

*Please use only the official IRB stamped informed consent/assent document(s) found under the "Attachments" tab. Please note, these consent/assent documents are valid until the consent document is amended and approved. The Online Consent form is not a stamped form.

It was the determination of the IRB that your study qualified for expedited review which includes activities that (1) present no more than minimal risk to human subjects, and (2) involve only procedures listed in one or more of the categories outlined below. The IRB may review
research through the expedited review procedure authorized by 45CFR46.110. The research proposed in this study is categorized under the following expedited review category:

(7) Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.

Your study qualifies for a waiver of the requirements for the documentation of informed consent as outlined in the federal regulations at 45CFR46.117(c) which states that an IRB may waive the requirement for the investigator to obtain a signed consent form for some or all subjects if it finds either: (1) That the only record linking the subject and the research would be the consent document and the principal risk would be potential harm resulting from a breach of confidentiality. Each subject will be asked whether the subject wants documentation linking the subject with the research, and the subject's wishes will govern; or (2) That the research presents no more than minimal risk of harm to subjects and involves no procedures for which written consent is normally required outside of the research context. (Online consent form)

As the principal investigator of this study, it is your responsibility to conduct this study in accordance with IRB policies and procedures and as approved by the IRB. Any changes to the approved research must be submitted to the IRB for review and approval via an amendment. Additionally, all unanticipated problems must be reported to the USF IRB within five (5) calendar days.

We appreciate your dedication to the ethical conduct of human subject research at the University of South Florida and your continued commitment to human research protections. If you have any questions regarding this matter, please call 813-974-5638.

Sincerely,

Mark Ruiz, PhD, Vice Chairperson
USF Institutional Review Board
Appendix 7: Informed Consent To Participate In Research

Informed Consent to Participate in Research
Information to Consider Before Taking Part in this Research Study

Pro # 00034523

Researchers at the University of South Florida (USF) study many topics. To do this, we need the help of people who agree to take part in a research study. This form tells you about this research study. We are asking you to take part in a research study that is called: Using Mixed Method Qualitative Research to Understand Barriers and Motivations to Exercise at Campus Recreation.

The person who is in charge of this research study is Rene Herrera. This person is called the Principal Investigator.

Purpose of the Study

The purpose of this study is to find out if there are any common characteristics or patterns shared between students at USF who exercise several times each week. The research will include an online questionnaire, a focus group, and an interview.

Why are you being asked to take part?

We are asking you to take part in this research study because you have indicated that you may be a student at USF who exercises at Campus Recreation very often.

Study Procedures

If you take part in this study, you will be asked to complete an online questionnaire that asks you to describe your motivations and barriers to exercise. In addition, you may be invited to attend and participate in one focus group session, and one interview session to further discuss motivations and barriers to exercise. If you choose to participate in the focus group and interview you will be asked to do both the focus group and the interview. Data collected from the questionnaire may be linked to your contact information. All data collected will be stored on USF Box. Identifying information will be de-identified prior to analysis.

Alternatives / Voluntary Participation / Withdrawal

Social Behavioral

Version # 1

Version Date 4/9/2018
You have the alternative to choose not to participate in this research study.

You should only take part in this study if you want to volunteer; you are free to participate in this research or withdraw at any time. There will be no penalty or loss of benefits you are entitled to receive if you stop taking part in this study.

**Benefits and Risks**
You will receive no benefit from this study.
This research is considered to be minimal risk.

**Compensation**
You will receive no payment or other compensation for taking part in this study.

**Privacy and Confidentiality**

We must keep your study records as confidential as possible. It is possible, although unlikely, that unauthorized individuals could gain access to your responses because you are responding online.

Certain people may need to see your study records. By law, anyone who looks at your records must keep them completely confidential. The only people who will be allowed to see these records are: Principal Investigator, Co-Investigator, the research team, The University of South Florida Institutional Review Board (IRB).

- It is possible, although unlikely, that unauthorized individuals could gain access to your responses. Confidentiality will be maintained to the degree permitted by the technology used. No guarantees can be made regarding the interception of data sent via the Internet. However, your participation in this online survey involves risks similar to a person’s everyday use of the Internet. If you complete and submit an anonymous survey and later request your data be withdrawn, this may or may not be possible as the researcher may be unable to extract anonymous data from the database.

Please be advised that although the researchers will take every precaution to maintain confidentiality of the data, the nature of focus groups prevents the researchers from guaranteeing confidentiality. The researchers would like to remind participants to respect the privacy of your fellow participants and not repeat what is said in the focus group to others.

USF Box is a cloud storage and collaboration environment. Data uploaded to USF Box is encrypted. Access is controlled through authentication and permission only for the research team.

**Contact Information**

If you have any questions about your rights as a research participant, please contact the USF IRB
at (813) 974-5638 or contact by email at RSCH-IRB@usf.edu. If you have questions regarding the research, please contact the Principal Investigator René Herrera at 802-552-4487 or reneherrera@mail.usf.edu

We may publish what we learn from this study. If we do, we will not let anyone know your name. We will not publish anything else that would let people know who you are. You can print a copy of this consent form for your records.

I freely give my consent to take part in this study. I understand that by proceeding with this survey that I am agreeing to take part in research and I am 18 years of age or older.

https://usf.az1.qualtrics.com/jfe/form/SV_3xt0fhe8ipYnoEJ