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Predicting student involvement in campus recreation programs

Nicole Grabowski
James Madison University

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Predicting Student Involvement in Campus Recreation Programs

An Honors Program Project Presented to
the Faculty of the Undergraduate
College of Health and Behavioral Studies
James Madison University

In Partial Fulfillment of the Requirements
for the Degree of Bachelor of Science

by Nicole Rose Grabowski

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Accepted by the faculty of the Department of Kinesiology, James Madison University, in partial fulfillment of the requirements for the Honors Program.

FACULTY COMMITTEE:

HONORS PROGRAM APPROVAL:

Project Advisor: Kent Todd, Ph.D.
Professor, Kinesiology

Bradley R. Newcomer, Ph.D.,
Director, Honors Program

Reader: Greg Young, Ph.D., CC-AASP
Assistant Professor, Kinesiology

Reader: Julia Wallace Carr, Ed.D.
Associate Professor, Sport & Recreation
Management

Dedication

This Honors Thesis is dedicated to the Kinesiology Department and Dr. Todd with his previous research on James Madison University Recreation Center. It is also dedicated to the administration at UREC who can use this research to help increase student's use of UREC facilities.

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Special thanks to Dr. Todd for his previous research and all of his guidance on my honors thesis.

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Abstract

Purpose: To identify factors that predict the frequency of campus recreation (CR) use at a 4-year, public university in the mid-Atlantic region.

Methods: Students were given an online survey to collect a variety of student lifestyle and health information, including campus residency status, gender, year, height, weight, academic discipline, semester credit hour enrollment, and job hours per week during the semester. Analysis participants ($n = 1561$) were divided into two subsets, one with 90% of the subjects, and one with 10% of the subjects. A stepwise multiple regression analysis was performed on the 90% subset with the predictor variables. Two regression equations were generated, one for predicting CR access in minutes per semester and the other for predicting access in days per semester. The 10% subset of participants was then used to cross validate the regression equations using a Pearson Product Moment correlation and a T test for paired comparisons.

Results: An individual's academic discipline ($t = -4.788$, $p = 0.000$) and gender ($t = 2.329$, $p = 0.020$) were significant predictors of CR minutes per semester ($r^2 = 0.036$). The CR days per semester were significantly predicted ($r^2 = 0.049$) by an individual's academic discipline ($t = -4.805$, $p = .000$), gender ($t = -2.211$, $p = .027$), job hours per week ($t = -2.338$, $p = .020$), and campus residency ($t = -2.385$, $p = .017$). In the cross validation group, actual CR minutes per semester and predicted minutes per semester were significantly correlated ($r = 0.164$, $p = 0.035$) and CR reported and predicted CR days per semester were significantly correlated ($r = 0.328$, $p = 0.002$). There were no significant differences ($p > 0.05$) between the actual and predicted values within the cross validation group.

Conclusion: Academic discipline and gender were found to be significant predictors of CR access in minutes per semester, while academic discipline, gender, job hours per week, and campus residency were shown to be significant predictors of CR use in days per semester. The usefulness of these variables as predictors is limited, as indicated by the low R^2 . CR administrators can use these predictors in order to develop effective ways to increase student participation.

Chapter I: Introduction

According to Astin, student involvement refers to the physical and psychological energy that students invest in the college experience. This involvement may be exhibited by a student's engagement in academics, participation in extracurricular activities, or even interaction with college faculty. Astin claims that the greater a student's involvement, the greater the amount of student learning and personal development (1). If involvement is key to student success, then college administrations should be encouraging this involvement to promote these potential gains among their students.

One particular aspect of student involvement that has shown to have a significant impact on student life is participation in campus recreation (CR) (4, 8, 10). Most universities have some form of CR and use the facility as a selling point for student enrollment. CR is often a center of social interaction that promotes overall physical and mental wellbeing.

In a study by Watson, users of campus recreation reported that the facility helped them feel more at home on campus (64.4%), facilitated making friends (41.4%), and increased the quality of student life on campus (78.4%) (10). Other studies have shown a variety of benefits that result from student use of CR facilities. Todd et al. reported that a student's GPA, physical activity, and other health indices were favorably associated with CR programs. There were significant benefits for the users compared to the nonusers (8). In 2001, Haines found that 75 percent of the students within a survey group benefited from CR in the following categories: feeling of physical well-being, sense of accomplishment, fitness, physical strength, and stress reduction (4). However, even with all of these benefits, not all students take advantage of the access to these facilities. Watson showed that 87.7% of the non-users of CR wanted to use the facility but did not do so due to a variety of obstacles that limited time and access (10).

One obstacle to CR use is off campus residency status. Whether the students live on or off campus impacts their ability to access CR facilities. According to Watson, non-users (80.3%) were more likely than users (63.8) to live off-campus. Similarly, in a survey of 2,500 students at a southeastern university Henchy found that 5% of on-campus students reported that they never use the CR facilities as compared to 25% of off-campus students (5). Many off-campus housing complexes have gym facilities of their own, which may deter students from using on-campus facilities. This shows that proximity to campus may be a factor in determining student's use of CR facilities. This barrier may be particularly relevant to upperclassmen since many universities provide freshman with on campus housing, but limit the availability of campus housing to others.

Campus residency status may further interact with age and class year as obstacles to campus recreation use. In one study, Driskell surveyed university students in an introductory nutrition course and found a correlation between class year of the student and physical activity. The researchers found higher percentages of lower-level (45.6%) than upper-level (28.6%) students that reported walking more than 31 minutes daily. In addition, 42% of upper-level and 47.8% of lower-level students reported typically participating in other aerobic activities at least three times weekly, and 48.2% of lower-level and 36.4% of upper-level students typically performed other aerobic activities more than 31 minutes daily. Driskell suggested that the differences were attributable to the fact that more lower-level than upper-level students live in dormitories and may have easier access to on-campus recreation centers (2). Since mean student age increases with increased class year, similar patterns should be expected in terms of age as a barrier. Though any differences may also be due to a combination of factors such as enrollment in a greater number of credit hours, increased work obligations, and likelihood of living in off-

campus housing.

Another influence on frequency of student use of CR facilities is gender. Watson found that males were significantly more likely to exercise for four or more hours per week than females (10); and, Henchy found that female students (25%) were more likely to respond that they have never used CR facilities or programs when compared to male students (12%). Both of these studies show that gender is a determinant of CR use, claiming that men use CR facilities at greater frequencies as compared to women. These data are consistent with data from the Surgeon General's Report on Physical Activity. In that report it was found that males (26.6%, 21.5% and 18.1% respectively) ages 18 and up participated in regular sustained physical activity (5 \geq times per week for 30 \geq minutes per occasion) at greater rates than women (20.7%, 18.9%, and 14.8% respectively). According to the National Health Interview Survey, men (20%) ages 18 and up participate in strength activities at greater rates than women (8.8%) (9). Although the researchers do not attempt to explain the discrepancy in the data, the greater CR use seen among male students is consistent with population data that shows that males are generally more active than females.

Academic discipline or major can also be a barrier to student's CR use. For example, in 2002, Huddleston found that Physical Education majors exercised at a significantly higher intensity than did students majoring in Health and Leisure. Physical Education majors also reported higher scores for fun/enjoyment as the reason of involvement. The emphasis on exercise and physical activity within the curriculum and the student's passion for their area of study, may account for the more intense involvement of Physical Education students (6). Although this study did not explore frequency of CR access, similar patterns for an increase in facility access may be expected for majors promoting physical activity. Majors that study health related topics and

explore the importance of physical activity would be expected to use CR more as compared to other majors who don't focus on these topics. Since students choose majors based on their interests, they may be more likely to hold beliefs that are consistent with their major (6).

Use of CR can be linked to the number of credit hours students take per semester and the number of hours they work per week throughout the semester. In a 2009 study by Greaney, students reported that time constraints associated with being a student make it difficult to obtain or prepare healthy meals, and to exercise. When these students were asked what would help them become more active, a majority reported that they would need more time, since academic commitments and work obligations make physical activity difficult (3). Based on this study, the limited time availability associated with increased involvement in academics and work obligations, result in decreased use of campus recreation. Additionally, the importance placed on work and educational obligations may reflect an overriding value system that places greater importance on work, rather than physical activity (3). Therefore, as credit hours and work hours increase, students have less free time allotted to other activities such as physical fitness. Although these are two separate barriers, they both contribute to a lack of available time to use CR facilities.

Lastly, body mass index (BMI), specifically the psychological impact of an increased BMI, can result in a barrier to student's level of physical activity. Nelson performed a study at a large Midwestern university with 50 full-time freshman and sophomore students who mentioned that using the campus recreation center is challenging because it is an intimidating place for those who don't regularly exercise. Other students reported that they felt too intimidated to participate (7). Furthermore, those with an increased BMI are more likely to be unaccustomed to recreational facilities and might not be familiar with the facilities equipment, thus contributing to

increased intimidation. In addition, they were more likely to be insecure about their weight and lacked the confidence to participate in CR opportunities.

There are a multitude of factors that have the potential to influence the frequency of CR use. While some of these factors that limit involvement are controllable for the student, some of them are not. Identifying these influencing factors is an important step for the CR administrators in the promotion of increased student involvement and high levels of physical activity. In addition, if an individual student has a better understanding of what aspects of their lives are influencing their CR use, they can better focus on the controllable aspects that can promote their increased involvement. Nelson concluded it best in saying that students, faculty, staff, and administrators can work together to make meaningful changes within the university environment (7). By making successful changes within student's immediate environment that focus on controllable factors, universities can successfully promote the benefits of student involvement by increasing frequency of access to CR.

Purpose

The purpose of this study is to use an existing data set to identify factors that predict the frequency of campus recreation use at 4-year, public university in the mid-Atlantic region.

Need for the Study

This data can be of value to administrators that oversee the operations of CR facilities. By identifying factors that present barriers or foster student access and/or use of CR facilities, program directors and coordinators may be better prepared to develop effective ways to increase student participation. If CR administrators understand common factors that influence CR use,

then they can help create successful marketing plans for students in order to help with their goal of the promotion of physical activity.

Hypothesis

Frequency of CR use can be predicted by campus residency status, gender, year of enrollment, BMI, academic discipline, semester credit hour enrollment, and work hours per week during the semester.

Limitations

This analysis was gathered from an existing data set therefore, there may be other factors that influence student frequency of university recreation facilities that are not available in the data set. In addition, this information is specific to students at the institution in question. These students may have different predictors as compared to other students at other universities. Lastly, some of the self-reported data gathered from the subjects was assumed to be accurate.

Definitions

The predictor variables in the study include, campus residency status, gender, year, BMI, academic discipline, credit hours per semester, and work hours per semester. A definition for each of these variables and how numerical values were assigned is provided below:

- 1) Campus residency status was determined by whether the student lived on campus (resident) or in off campus housing (non-resident) when the data was collected.

Residents were assigned a value of 1 and non-residents were assigned a value of 2.

- 2) Year of enrollment was measured as the number of years an individual had been a student at the university at the time the data was collected. Values were rounded to the nearest whole number.
- 3) BMI was calculated from the students' self-reported height and weight and reported in kg/m^2 . These values have been shown to significantly correlate with and not to significantly deviate from values gathered in a laboratory setting (8).
- 4) Academic disciplines will be graded by the level of emphasis on physical activity and health content embedded in the programs curriculum. Kinesiology was assigned a value of 1, Health and Nursing were assigned a value of 2 and other majors were assigned a value of 3.
- 5) Credit hours were recorded as the total credit hours the student was enrolled at the time of the data collection. This data was obtained from the university registrar.
- 6) Work hours were recorded as self-reported number of hours worked per week.
- 7) CR access was reported as the number of times the facility was accessed per semester and as the total number of minutes the student utilized the CR facility during the semester. The CR facility contains a card swipe system that records the number of times a student enters into the facility throughout the semester as well as the amount of time the student spends in the facility each day.

Ch II: Methodology

Participants

Participants included all enrolled students at a 4-year, public university in the Mid-Atlantic region. Participants were solicited through their campus email where a link was provided to the online questionnaire. This internet-based survey was accessible to all students at the university.

Data Collection

The survey was conducted on WebSurveyor and was used to collect a variety of student lifestyle and health information. The following data was collected from the online questionnaire: campus residency status, gender, year, height, weight, academic discipline, semester credit hour enrollment, and work hours per week during the semester. In addition, data regarding frequency of CR access was collected from the CR facility card swipe system. BMI was calculated from the self reported height and weight, then the validity and reliability of this method of self reported BMI data with these subjects was confirmed in a laboratory setting (8). All procedures were approved by the university's Institutional Review Board.

Statistical Analysis

The analysis was initiated by identifying a list of possible predictors of CR use. This began with a discussion of possible predictors available in the existing data set followed by a correlational analysis of potential predictors with data representing CR use (i.e., number of times CR was accessed during the semester and total minutes spent in the CR facility during the semester). The participants', CR use in minutes per semester was significantly correlated with

academic discipline ($r=-0.138$, $p=0.000$) campus residency status ($r=-0.069$, $p=0.006$), job hours per week ($r=-0.083$, $p=0.016$), and BMI ($r=-0.052$, $p=0.041$). Gender also tended to be correlated with CR use in total minutes per semester ($r=-0.047$, $p=0.064$). CR use in days per week was significantly correlated to academic discipline ($r=-0.129$, $p=0.000$), campus residency ($r=-0.129$, $p=0.000$), job hours ($r=-0.124$, $p=0.000$), BMI ($r=-0.066$, $p=0.010$), credit hours ($r=0.054$, $p=0.033$), and age ($r=-0.101$, $p=0.000$). It was also found that gender is significantly correlated to academic discipline ($r=-0.056$, $p=0.028$) and that campus residency and age were significantly correlated ($r=0.584$, $p=0.000$). All of these variables were available for the formulation of the regression equations.

Prior to regression analysis participants ($n = 1561$) were divided into two subsets, one with 90% of the subjects, and one with 10% of the subjects. The 90% subset was used to generate the regression equations, while the 10% subset was used as a cross validation group to evaluate the predictive quality of the regression equations.

A stepwise multiple regression analysis was performed on the 90% subset with the previously identified. Predictor variables without a numerical value were assigned a value in order to generate the equation (e.g., campus residency status; 1 = on campus, 2 = off campus). Academic discipline was also given a numerical value based on how much the curriculum concentrated on physical fitness and overall wellness. Three groups were created, group 1 which was Kinesiology majors (physical activity and fitness related), group 2 which was Health Sciences, Nursing, and Occupational Therapy (moderately related to physical activity and fitness), and group 3 which was non health related majors (not health related). Two regression equations were generated. One was for predicting CR access in minutes per semester and the

other predicted CR access in days per semester. In the 90% subset 735 participants had all of the data points needed to generate the regression equations.

Final regression formulas and the corresponding R^2 values are reported. The alpha limit for variable entry into the regression equation was set at $p < 0.05$ and removal was set at $p < 0.10$. These are the default limits set by the SPSS software.

The validation group, 10% subset of participants, was then used to determine the accuracy of the regression equations in predicting the CR use in minutes and days per semester. The validation subset had 165 participants for the regression equation predicting minutes per semester. The subset for the equation for predicting days per semester had 88 participants due to the fact that a large number of data points for job hours (a significant predictor) were missing. The predicted values, for both minutes and days per semester, were compared to actual values to test the strength of the relationship using a Pearson Product Moment correlation. In order to test for significant differences between predicted and actual values a T test for paired comparisons was used. A $p > 0.05$ was used to determine significant differences.

Chapter III: Manuscript

Introduction

According to Astin, student involvement refers to the physical and psychological energy that students invest in the college experience. He claims that the greater a student's involvement, the greater the amount of student learning and personal development (1). If involvement is key to student success, then college administrations should be encouraging this involvement to promote personal growth among their students.

One particular aspect of student involvement that has shown to have a significant impact on student life is participation in campus recreation (CR) (16). CR is often a center of social interaction that promotes overall physical and mental wellbeing. Studies have shown a variety of benefits that result from student use of CR facilities such as improved feeling of physical wellbeing, sense of accomplishment, fitness, physical strength, and stress reduction (7).

However, even with all of these benefits, not all students take advantage of the access to these facilities. Whether students live on or off campus impacts their ability to access CR facilities. According to Watson, non-users (80.3%) were more likely than users (63.8%) to live off-campus (16). Also, campus residency status may further interact with class year as obstacles to CR use. In one study, Driskell found higher percentages of lower-level (45.6%) than upper-level (28.6%) students that reported walking more than 31 minutes daily, suggesting that more lower-level students live in dormitories and may have easier access to on-campus recreation centers (2).

Gender may also influence CR use. Watson found that males were significantly more likely to exercise for four or more hours per week than females (16); and, Henchy found that female students (25%) were more likely to respond that they have never used CR facilities or

programs when compared to male students (12%) (8). Both of these studies show that gender is a determinant of CR use, claiming that men use CR facilities at greater frequencies as compared to women.

Academic discipline or major can also be an influence on a student's CR use. Students that major in disciplines that emphasize the importance of physical activity (e.g., Kinesiology and Exercise Science) would be expected to use CR more as compared to other majors who focus less on these topics. For example, in 2002, Huddleston found that Physical Education majors exercised at a significantly higher intensity than did students majoring in Health and Leisure. Since students choose majors based on their interests, they may be more likely to hold beliefs that are consistent with their major (9). Also, a student's number of credit hours and the number of job hours may be linked to CR use. In a 2009 Greaney study, when students were asked what would help them become more active, a majority reported that they would need more time, since academic commitments and work obligations make physical activity difficult (5). Therefore, as credit hours and work hours increase, students have less free time allotted to other activities such as physical fitness.

Lastly, body mass index (BMI), specifically the psychological impact of an increased BMI, can result in a barrier to student's level of physical activity. Nelson found that students using the campus recreation center find it challenging because it is an intimidating place for those who don't regularly exercise. (11). Those with an increased BMI are more likely to be insecure about their weight and lack the confidence to participate in CR opportunities.

There are a variety of factors that have the potential to influence the frequency of CR use. Having the ability to predict who is likely and not likely to use CR facilities based on these factors is an important step for the CR administrators in the promotion of increased student

involvement. By identifying those who are not likely to use these facilities, targeted efforts can be made to increase these students' levels physical activity. By making successful changes within student's immediate environment that focus on controllable factors, universities can help students overcome barriers and successfully promote the benefits of student involvement by increasing frequency of access to CR.

Methodology

Participants

Participants included all enrolled students at a 4-year, public university in the Mid-Atlantic region. Participants were solicited through their campus email where a link was provided to the online questionnaire. This internet-based survey was accessible to all students at the university.

Data Collection

The survey was conducted on WebSurveyor and was used to collect a variety of student lifestyle and health information. The following data was collected from the online questionnaire: campus residency status, gender, year, height, weight, academic discipline, semester credit hour enrollment, and work hours per week during the semester. In addition, data regarding frequency of CR access was collected from the CR facility card swipe system. BMI was calculated from the self reported height and weight, then the validity and reliability of this method of self reported BMI data with these subjects was confirmed in a laboratory setting (15). All procedures were approved by the university's Institutional Review Board.

Statistical Analysis

The analysis was initiated by identifying a list of possible predictors of CR use. This began with a discussion of possible predictors available in the existing data set followed by a correlational analysis of potential predictors with data representing CR use (i.e., number of times CR was accessed during the semester and total minutes spent in the CR facility during the semester). The participants', CR use in minutes per semester was significantly correlated with academic discipline ($p=0.000$, $r=-0.138$) campus residency status ($p=0.006$, $r=-0.069$), job hours per week ($p=0.016$, $r=-0.083$), and BMI ($p=0.041$, $r=-0.052$). Gender also tended to be correlated with CR use in total minutes per semester ($p=0.064$, $r=-0.064$). CR use in days per week was significantly correlated to academic discipline ($p=0.000$, $r=-0.129$), campus residency ($p=0.000$, $r=-0.129$), job hours ($p=0.000$, $r=-0.124$), BMI ($p=0.010$, $r=-0.066$), credit hours ($p=0.033$, $r=0.054$), and age ($p=0.000$, $r=-0.101$). It was also found that gender is significantly correlated to academic discipline ($p=0.028$, $r=-0.056$) and that campus residency and age were significantly correlated ($p=0.000$, $r=0.584$). All of these variables were available for the formulation of the regression equations.

Prior to regression analysis participants ($n = 1561$) were divided into two subsets, one with 90% of the subjects, and one with 10% of the subjects. The 90% subset was used to generate the regression equations, while the 10% subset was used as a cross validation group to evaluate the predictive quality of the regression equations. However, a few subject categories contained slight deviations within the 90% and 10% distribution. For example, subjects in the ADI grouping for major category had a 69% and 31% distribution.

A stepwise multiple regression analysis was performed on the 90% subset with the previously identified. Predictor variables without a numerical value were assigned a value in

order to generate the equation (e.g., campus residency status; 1 = on campus, 2 = off campus). Academic discipline was also given a numerical value based on how much the curriculum concentrated on physical fitness and overall wellness. Three groups were created, group 1 which was kinesiology majors (physical activity and fitness related), group 2 which was Health Sciences, Nursing, and Occupational Therapy (moderately related to physical activity and fitness), and group 3 which was non health related majors (not health related). Two regression equations were generated. One was for predicting CR access in minutes per semester and the other predicted CR access in days per semester. In the 90% subset 735 participants had all of the data points needed to generate the regression equations.

Final regression formulas and the corresponding R^2 values are reported. The alpha limit for variable entry into the regression equation was set at $p < 0.05$ and removal was set at $p < 0.10$. These are the default limits set by the SPSS software.

The validation group, 10% subset of participants, was then used to determine the accuracy of the regression equations in predicting the CR use in minutes and days per semester. The validation subset had 165 participants for the regression equation predicting minutes per semester. The subset for the equation for predicting days per semester had 88 participants due to the fact that a large number of data points for job hours (a significant predictor) were missing. The predicted values, for both minutes and days per semester, were compared to actual values to test the strength of the relationship using a Pearson Product Moment correlation. In order to test for significant differences between predicted and actual values a T test for paired comparisons was used. A $p > 0.05$ was used to determine significant differences.

Results

A total of 1,561 participants were used to determine what variables were related to CR use. Once the data was split into the two subsets, 735 participants (90% subset) were used to generate the two regression equations. For the two equations, one equation predicted CR use in minutes per semester and the other predicted CR use in days per semester.

An individual's academic discipline ($t = -4.788$, $p = 0.000$) and gender ($t = 2.329$, $p = 0.020$) were significant predictors of CR minutes per semester ($r^2 = 0.036$). The predictor equation was as follows:

$$y = 4262.54 - 802.14 (\text{Major}) - 406.2 (\text{Gender})$$

The CR days per semester were significantly predicted ($r^2 = 0.049$) by an individual's academic discipline ($t = -4.805$, $p = .000$), gender ($t = -2.211$, $p = .027$), job hours per week ($t = -2.338$, $p = .020$), and campus residency ($t = -2.385$, $p = .017$). This was represented by the equation:

$$y = 48.42 - 6.38 (\text{Major}) - 3.59 (\text{Gender}) - 0.20 (\text{Job Hours}) - 3.81 (\text{On/Off campus})$$

A cross-validation group was then used to determine the accuracy of the regression equations in predicting the CR use in minutes and days per semester. Actual CR minutes per semester and predicted minutes per semester were significantly correlated ($r = 0.164$, $p = 0.035$). The reported CR minutes had a mean of 1319.4 ± 2154.3 minutes and the predicted CR minutes had a mean of 1424.4 ± 543.62 minutes. This same process was repeated with CR days per semester, with reported means of 16.18 ± 2.5 days and predicted days of 17.2 ± 6.35 days. Again CR reported and predicted CR days per semester were significantly correlated ($r = 0.328$, $p = 0.002$). Actual and predicted values for CR minutes per semester ($t = -0.632$, $p = 0.528$) and days per semester ($t = -0.431$, $p = 0.668$) were not significantly different.

Discussion

Two regression equations were computed to estimate student CR use in total minutes per semester as well as days per semester. Academic discipline and gender significantly predicted CR use in minutes and days per semester; while, job hours and campus residency status also predicted CR use in days per semester

Students who were Kinesiology majors used CR the most, followed by Health Sciences, Nursing, and Occupational Therapy, and then followed by all other majors, indicating that those students with more health and exercise based curriculum tend to use CR more. It is plausible that this relationship is due to a greater inherent interest and motivation to participate in physical activity is greater among students who chose to major in Kinesiology and other programs that integrate health and fitness related content into the curriculum. According to Frank, physical activity levels among medical students are higher than those of their peers of similar ages. In this study 61% of medical students met CDC physical activity recommendations, whereas only 57% of 18 to 24 year olds and 50% of 25 to 34 year olds met these recommendations (4). The data suggest that academic programs that support the importance of meeting physical activity guidelines may influence the levels of physical activity among students enrolled in the program.

As predicted, in the present study men tended to use CR more than women (e.g. men: 18.2 ± 21.2 days per semester; women: 16.6 ± 19.7 days). This may be associated with societal expectations or a gender specific inclination among the males to be more active (14). In 2010, Salvatore and associates found that women were less comfortable and feel more self-conscious in a fitness setting when compared to men. These authors proposed that this might be due to a perception of societal expectations among women that causes them to avoid particular exercises

such as weightlifting (14). This supports the pattern of fewer women using recreational facilities, especially if studies have found that they are not utilizing all of the fitness equipment.

In addition to academic discipline and gender, job hours and campus residency were also found to be predictors of CR use in days per semester. There could be a few potential reasons why job hours predicted CR use in days per semester and not minutes per semester. It is plausible that while a job may limit the number of days one can exercise, they may compensate by spending a longer time working out on the days that they use CR facilities. In addition, this pattern may be due to the fact that job hours interact with other variables (e.g., credit hours of enrollment) included in the formulation of the equation for predicting CR minutes per semester, thus diluting the predictive power of job hours. For campus residency status, those living off campus may be utilizing fitness centers that are sometimes available at their housing complexes as opposed to using CR facilities.

Several variables failed to predict CR use. Among these BMI may not be a predictor because CR facilities are used by students who are fit as well as those who are unfit. Years of enrollment at the university may not have had a significant predictive value because physical activity patterns among college students tend to be consistent from one year to the next. According to Racette and colleagues, the exercise habits of college students did not significantly change from freshman to senior year. For example, during freshman year 59% of the students participated in aerobic exercise regularly, 45% did regular strengthening exercises, and 31% stretched regularly. By senior year, only the percentage of stretching had dropped significantly (12). Lastly, while credit hours were significantly correlated with the CR use in days per semester, it was not predictive of either of the outcomes. One plausible explanation may be that credit hour enrollment interacted with job hours and once job hours was added to the equation

credit hour enrollment no longer made a significant contribution to predicting minutes or days of CR use per semester.

Although several significant predictors of CR use were identified from the variables available for analysis in this study, the statistical outcomes suggest that numerous other factors may have a significant impact on how much student use CR facilities. For example, the standard error of the estimate for minutes per semester was ± 2073 minutes and the standard error of the estimate for days per semester was ± 20.2 days. Both standard errors of the estimate are large showing that there is much variation within the data. Also the R-squared for the equations for estimating CR use in minutes per semester ($r^2 = .036$) and days per semester ($r^2 = .049$) were low, further indicating that other variables impact how much a student uses CR facilities. For example, for students living off campus, access to a vehicle or other modes of transportation and proximity to campus may be determinants of CR use. The following discussion suggests a variety of psycho-social factors which may influence CR use, that were not a primary focus of this investigation.

In comparison to this study, previous studies have explored how well specific psychological variables predict physical activity. In one study student satisfaction with physical activity experiences and their level of involvement in group fitness classes, club sports and recreational sports predicted physical activity after graduation (3). Such data support the importance of efforts directed toward increasing student use of CR facilities. In addition, Gu explored the impact of social and internal variables on physical activity levels. Group cohesion was an influential factor in female participation in physical activity, thus suggesting that going with a group of people or with a partner could be a relevant factor in determining CR use (6).

Rovniak measured the predictive value of various social cognitive factors on physical activity. These researchers found that self-efficacy had the greatest effect on physical activity as subjects with high self-efficacy were more likely to make time for exercise and were more resistant to relapse. Social support also helped contribute to self-efficacy. (13). According to Leslie et al., male and female college aged students with low levels of friend and family support had lower activity levels. These researchers also found that males and females had less physical activity if they did not enjoy the activity (10). In contrast to the present study, Leslie et al. also found that among men, age was inversely associated with activity levels, and that employed female students had higher activity levels than females that did not have jobs (10). These contrasting data suggest that further research that assesses gender specific differences is needed.

According to Nelson et al., various factors including negative experiences using college facilities, weather, and lack of social support or motivation present barriers to physical activity. They also found that time management, prioritization, and stress can negatively impact student's physical activity (11). Nelson et al. suggested that healthy behaviors may become less important when compared to other commitments like schoolwork, jobs, and social obligations. Compared to other studies, including the present one, Nelson et al. showed the benefits of using focus groups and one-on-one interviews to provide a more detailed insight into college life and the numerous factors that may affect a student's everyday decisions (11). The variety of psychosocial data reviewed here suggest that some of these types of variables may serve as powerful predictors of CR use and should be incorporated into future research.

One limitation of the current study is that the analysis was performed on an existing data set; therefore, as highlighted above, there may be other factors that influence the frequency of student use at CR facilities that were not available in the data set. In addition, there is no

information regarding how students used their time when they were using the campus recreation facility. Further clarification is not provided in the student surveys. However, the predictor variables used in the present study are similar to those used by others, further confirming their relevance to CR use. Furthermore, the variables used in this study are some of the most accessible that have meaningful predictive value.

Another limit to this study was a low number of participants (N=88) in the validation group used to compute predictions for CR use in days per semester. The potential subject pool for this equation was reduced by more than 50% because of missing data for the variable “job hours”. In contrast, more participants had data points for the regression equation representing minutes per semester (N=165). Although the absence of data for “job hours” may represent individuals that did not have jobs, this cannot be universally assumed so subjects missing this data point were eliminated from the validation group.

Lastly, this study is specific to students attending a single university. These students may have different barriers to CR use as compared to other students at other universities. For example, most students in this study would have moved off campus after their freshman year; and, living off campus may interact with other variables that determine CR use. For instance, a lot of off campus student housing facilities have fitness facilities for student use, which may supplement or replace CR use. In addition, transportation may be a factor in whether students can get to and from campus. If students do not have cars then they have to rely on public transportation, which may be less accessible. The local culture of the university should also be considered. Anecdotally, the university that was the focus of the present study offers many opportunities for students to engage in physical activity, including clubs, organizations, or

through activities organized by the CR program. Therefore, it may be difficult to compare this data to other universities that do not have similar resources or facilities.

An important question that is not addressed in the present study is whether CR is actually changing student behavior. CR is a service and resource provided to the students that they might not have had otherwise. Therefore, it's important to look at whether its use is facilitating behavior change and promoting healthier habits or whether CR facility access accommodates existing behaviors. The data showing that student use of CR facilities is related to academic discipline may show otherwise. Specifically, students in the health and wellness related majors tended to use CR more than non-health related majors whether the outcome is reported in total minutes per semester or days per semester. When students choose a major it is usually based on an inherent interest and therefore only further promote their previous pursuits. Often an individual's interests represent their value system. Therefore, if students are choosing classes that support exercise and overall wellness, they usually place great importance on engaging in related behaviors. So if CR is simply accommodating existing behavior, changes in the way CR programs are promoted could be made so that CR program managers reach out to less active students.

As such, future research should include updated data on the student population of the university in question and data collection should involve a greater focus on psychosocial influences on physical activity. The data surrounding psychological influences may include emotions and feelings about exercise, social aspects of exercise, perceptions of campus recreation facility use, and perceived barriers to physical activity. Also, further research could be done on how individual's levels of self-efficacy influence their physical activity. This data could be collected in a survey format or further explored in focus groups like previous studies have

done. This in combination with an updated data set would provide a larger picture of what influences CR use for college students. Furthermore, a larger study can be done which can compare CR use among different college locations. This could show whether campus cultures or geographical locations influence PA and CR use. By determining a variety of factors that influence CR use, administrators that oversee the operations of CR facilities may be better prepared to develop effective ways to increase student participation.

In conclusion, the purpose of this study was to identify factors that predict the frequency of campus recreation use at a 4-year, public university in the mid-Atlantic region. Regression analysis indicated that academic discipline and gender were found to be significant predictors of CR access in minutes per semester, while academic discipline, gender, job hours, and campus residency were shown to be significant predictors of CR use in days per semester. The usefulness of these variables as predictors are limited, as indicated by the low R^2 . Future research should focus on identifying other predictors (e.g. psychosocial factors) that would be equally or more powerful at predicting CR use.

Tables

Table 1. Crosstabulation of Major and Data Groupings

	Analysis Group	
	Regression Group	Cross Validation Group
ADI	33 (69%)	15 (31%)
ADII	58 (83%)	12 (17%)
ADIII	685 (92%)	61 (9%)

* Data Presented as the number of subjects within the category (percent of row total). This data excludes subjects that did not report job hours.

Table 2. Crosstabulation of Sex and Data Groupings

	Analysis Group	
	Regression Group	Cross Validation Group
Male	226 (90%)	26 (10%)
Female	519 (89%)	62 (11%)

* Data Presented as the number of subjects within the category (percent of row total). This data excludes subjects that did not report job hours.

Table 3. Crosstabulation of Campus Residency Status and Data Groupings

	Analysis Group	
	Regression Group	Cross Validation Group
On campus	299 (92%)	26 (8%)
Off campus	449 (88%)	62 (12%)

* Data Presented as the number of subjects within the category (percent of row total). This data excludes subjects that did not report job hours.

Table 4. Crosstabulation of Job Hours and Data Groupings

	Analysis Group	
	Regression Group	Cross Validation Group
0 Job Hours	213 (91%)	21 (9%)
> 0 and < 5 Hours	21 (91%)	2 (9%)
≥ 5 and < 10 Hours	100 (90%)	11 (10%)
≥ 10 and < 20 Hours	276 (90%)	32 (10%)
≥ 20 Hours	139 (86%)	22 (14%)

* Data Presented as the number of subjects within the category (percent of row total). This data excludes subjects that did not report job hours.

Table 5. Crosstabulation of CR use in Days per semester and Data Groupings

	Analysis Group	
	Regression Group	Cross Validation Group
0 CR Days	145 (88%)	19 (12%)
> 0 and < 15 Days	336 (90%)	38 (10%)
≥ 15 and < 30 Days	114 (87%)	17 (13%)
≥ 30 Days	154 (92%)	14 (8%)

* Data Presented as the number of subjects within the category (percent of row total). This data excludes subjects that did not report job hours.

30 Days would represent approximately CR use twice a week.

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Appendices

JMU UnPlugged

WELCOME TO JMU UNPLUGGED

This survey is designed for use on a **17 inch, or larger, monitor**. It will be difficult to answer some of the questions on a smaller monitor.

The survey contains **5 questionnaires**, and takes about **30 minutes** to complete.

You will have to agree to the conditions specified on the next page in order to complete the survey. Thank you.

Next Page	1833	0,	903
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JMU UnPlugged

JMU Unplugged (Informed Consent)

Purpose: The purpose of this project is to study electronic media use and wellness behaviors among college students.

Participant Responsibility: We are asking undergraduate students between the ages of 18 and 25 years to participate in this survey. It is estimated that it will take you 30 minutes to answer the survey. The survey contains 5 questionnaires including: DEMOGRAPHIC INFORMATION, ELECTRONIC MEDIA ACCESS, ELECTRONIC MEDIA USE, PHYSICAL ACTIVITY and FOOD FREQUENCY. Your responsibility is to truthfully answer all questions, although you may skip a question (JAC card number and email address are required) if you do not know the answer or find the question to be too personal in nature.

JAC Card Data: The researchers have been given permission to ask the Office of Residence Life will access student JAC card data to determine where students are dining and how often they have checked into the University Recreation Center.

Semester Grades and Overall GPA: The researchers have been given permission to ask the University Registrar to provide each subject's semester grades (for the semester in which you participate in the study) and overall GPA.

Benefits: Information obtained from this study is important for assessing the impact of electronic media on health and wellness behaviors.

Confidentiality & Risks: Every reasonable attempt will be made to keep the data and results confidential. Any hard copies of data will be kept secured in a locked cabinet in a locked office. At the conclusion of the study, all information that can be used to match respondents to their answers will be destroyed. There is a slight risk that confidential information may be obtained by someone gaining unauthorized access to the electronic data.

Reporting Procedures: Group results may be presented at professional conferences (e.g., American College of Sports Medicine Annual Meeting) or published in academic journals.

Giving of Consent: I have read this consent form and I understand what is being requested of me as a participant in this study. I understand that my participation is entirely voluntary. I also understand that I may withdraw from this study at any time without penalty. I freely consent to participate. And, I have been given satisfactory answers to my questions.

Inquiries: If you have any questions about the survey, please contact Dr. M. Kent Todd at 568-3947 (toddmk@jmu.edu). For questions about your rights as a research subject, you

may contact the chair of JMU's Institutional Review Board (IRB). Dr. David Cockley, (540) 568-2834, cocklede@jmu.edu.

- I AGREE to participate in this study
- I DO NOT AGREE to participate in this study (If you select this option the program will terminate.)

[Next Page](#)

Bottom of Form

JMU UnPlugged

DEMOGRAPHIC INFORMATION

(Page 1 of 4)

Student ID/JAC #

required field

Format: 999999999

Last name

First name

Gender

- Male
- Female

Date of birth (**Please use the format specified.**)

Format: YYYY-MM-DD

JMU UnPlugged

DEMOGRAPHIC INFORMATION

(Page 2 of 4)

Total number of years at JMU as a student

Did you transfer to JMU?

Yes No

Do you live on-campus?

Yes No

If you live on campus, please enter the name of the residence hall.

Do you have a roommate?

Yes No

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DEMOGRAPHIC INFORMATION

(Page 3 of 4)

What are your credit hours for the current semester?

What is your major (or anticipated major)?

How many campus Activities, Groups or Clubs do you participate in (e.g., fraternities, sororities, intramurals, sport clubs, SGA, religious organizations, residence hall programs, etc.)?

If you have a job while enrolled in classes, how many hours do you work each week?

JMU UnPlugged

DEMOGRAPHIC INFORMATION

(Page 4 of 4)

Height (inches)

Weight (lbs)

Weight one year ago (lbs)

How many cigarettes, cigars or pipes you smoke each day?

- 0 1 to 2 3 to 5 6 to 9 10 to 19 20 to 39 40 or more

How would you rate your overall health?

- Excellent Very good Good Fair Poor

JMU UnPlugged

ELECTRONIC MEDIA ACCESS

(Page 1 of 1)

Do you have (or have access to) a:

	Yes	No
Television in your room at your permanent home?	<input type="radio"/>	<input type="radio"/>
Television in your residence hall bedroom or apartment bedroom?	<input type="radio"/>	<input type="radio"/>
Television in your residence hall suite or apartment living room?	<input type="radio"/>	<input type="radio"/>
DVD/VCR attached to the television?	<input type="radio"/>	<input type="radio"/>
Video games attached to your television?	<input type="radio"/>	<input type="radio"/>
Hand-held video games that you use?	<input type="radio"/>	<input type="radio"/>
Computer in your apartment, residence hall or suite?	<input type="radio"/>	<input type="radio"/>

Check **all** that you have on or with your computer.

- Internet Access
- High-Speed Internet
- Cable connected to Internet
- Instant Messenger
- Email
- Computer Games

How many channels do you receive on the television that you use the most?

How many email accounts do you have?

JMU UnPlugged

ELECTRONIC MEDIA USE

(Page 1 of 6)

I typically have _____ IM conversations happening at one time:

0
 1
 2
 3-5
 5-7
 More than 7

I communicate with **JMU** friends using:

	Not at all	Rarely	Sometimes	Frequently	All the time
Mail	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Phone	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cell phone	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Email	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instant messaging (IM)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

I communicate with friends from **home** using:

	Not at all	Rarely	Sometimes	Frequently	All the time
Mail	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Phone	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cell phone	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Email	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Instant messaging (IM)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

JMU UnPlugged

ELECTRONIC MEDIA USE

(Page 2 of 6)

Estimate as closely as you can the AVERAGE NUMBER OF HOURS AND MINUTES PER DAY that you use the following types of electronic media. For example, if you watch TV for 3.5 hours on Saturday and Sunday, but not on any other day, enter 1 hour per day. You may use fractions. Please estimate carefully.

Television (example 1.5 hour/day)	<input type="text"/>
DVD/VHS	<input type="text"/>
Non-internet computer use	<input type="text"/>
General internet use	<input type="text"/>
Email	<input type="text"/>
Instant messaging (IM)	<input type="text"/>
MySpace/Facebook	<input type="text"/>
Blogging	<input type="text"/>
Video gaming	<input type="text"/>
Other electronic media	<input type="text"/>

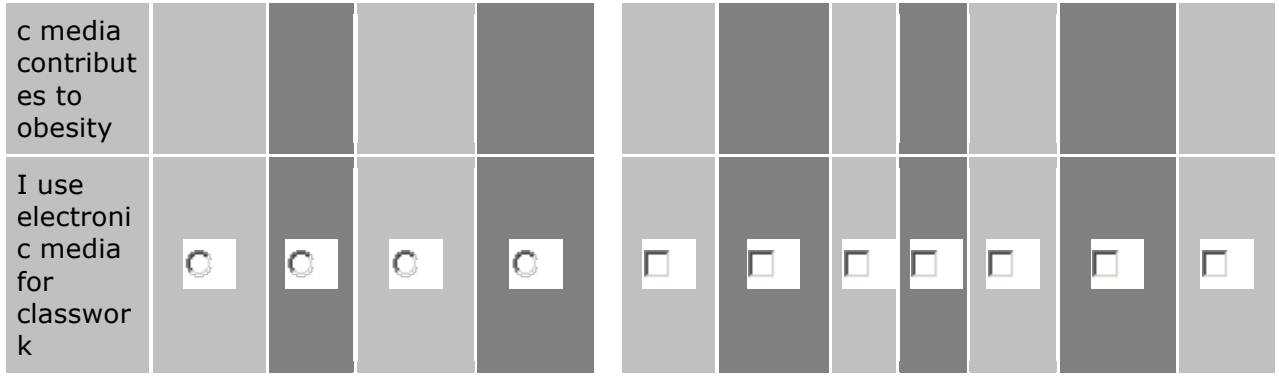
JMU UnPlugged

ELECTRONIC MEDIA USE

(Page 3 of 6)

Please check the response in the columns on the left that best describes how you feel about the statement. Then select all the items on the right that you feel that way about.

	Select one:				This statement is true for: (Select all that apply)						
	Strongly Agree	Agree	Disagree	Strongly Disagree	TV & Videos	Internet	IM	E-mail	Face-book My Space etc.	Blogg ing	Video Gam es
Electroni c media enhance s my college experie nce	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My friendshi ps are more satisfyi ng because I use electroni c media	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My ability to use electroni c media will help me succeed after college	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I am concerne d that electroni	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



JMU UnPlugged

ELECTRONIC MEDIA USE

(Page 4 of 6)

	Select one:				This statement is true for: (Select all that apply)						
	Strongly Agree	Agree	Disagree	Strongly Disagree	TV & Videos	Internet	IM	E-mail	Face - book My Space etc.	Blogg ing	Video Gam es
It would be difficult for me if I did not have electronic media	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I get better grades because I use electronic media	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I feel like something is missing if I cannot use electronic media	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Electronic media makes it easier to discuss important issues	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

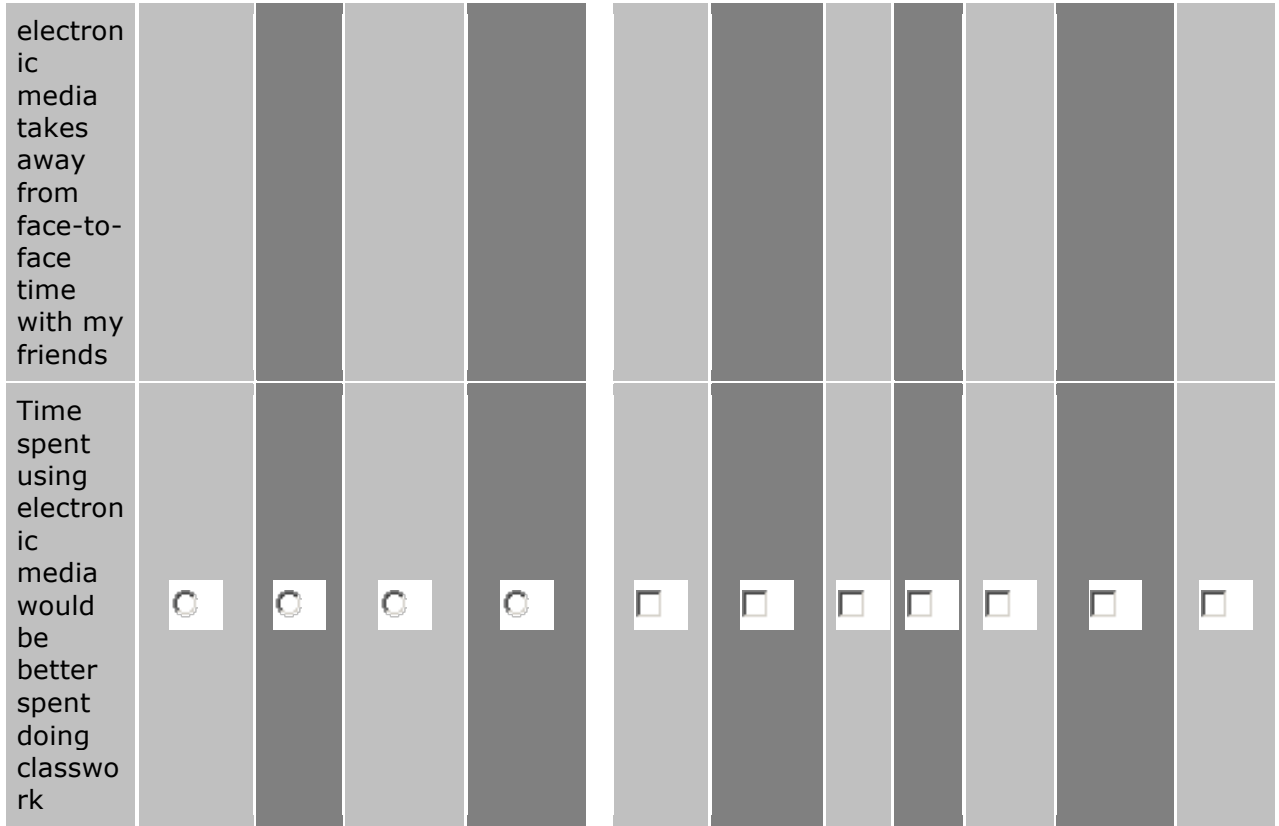
with friends											
I go out of my way just to use electronic media											
Electronic media contributes to inactivity											

JMU UnPlugged

ELECTRONIC MEDIA USE

(Page 5 of 6)

	Select one:				This statement is true for: (Select all that apply)						
	Strongly Agree	Agree	Disagree	Strongly Disagree	TV & Videos	Internet	IM	E-mail	Face - book My Space etc.	Blogg ing	Video Gam es
Time spent using electronic media is satisfying	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I would prefer to use electronic media than to go to a campus event	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
It would be difficult for me if I could not use electronic media	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Time spent using	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



JMU UnPlugged

ELECTRONIC MEDIA USE

(Page 6 of 6)

	Select one:				This statement is true for: (Select all that apply)						
	Strongly Agree	Agree	Disagree	Strongly Disagree	TV & Videos	Internet	IM	E-mail	Face- book My Space etc.	Blogg ing	Video Gam es
Electronic media helps me appreciate those who are different than me	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I would stop using electronic media if I thought it was bad for my health	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I use electronic media at home as much as I do at college	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I am concerned that electronic media	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

contributes to violence											
If I really need to concentrate on something, I turn off electronic media	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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INTERNATIONAL PHYSICAL ACTIVITY QUESTIONNAIRE

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We are interested in finding out about the kinds of physical activities that people do as part of their everyday lives. The questions will ask you about the time you spent being physically active in the **last 7 days**. Please answer each question even if you do not consider yourself to be an active person.

Please think about the activities you do at work, as part of your house and yard work, to get from place to place, and in your spare time for recreation, exercise or sport.

Think about all the **vigorous** activities that you did in the **last 7 days**. **Vigorous** physical activities refer to activities that take hard physical effort and make you breathe much harder than normal. Think only about those physical activities that you did for at least 10 minutes at a time. During the last 7 days, on how many days did you do vigorous physical activities like heavy lifting, digging, aerobics, or fast bicycling?

days per week

Place an "x" in the box if you did no vigorous physical activities

Format: x

How much time did you usually spend doing vigorous physical activities on one of those days?

hours per day

minutes per day

Don't know/Not sure

Format: x

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Think about all the **moderate** activities that you did in the **last 7 days**. **Moderate** activities refer to activities that take moderate physical effort and make you breathe somewhat harder than normal. Think only about those physical activities that you did for at least 10 minutes at a time. During the last 7 days, on how many days did you do moderate physical activities like carrying light loads, bicycling at a regular pace, or doubles tennis? Do not include walking.

days per week

Place an "x" in the box if you did no moderate physical activities

Format: x

How much time did you usually spend doing moderate physical activities on one of those days?

hours per day

minutes per day

Don't know/Not sure

Format: x

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Think about the time you spent **walking** in the **last 7 days**. This includes at work and at home, walking to travel from place to place, and any other walking that you might do solely for recreation, sport, exercise, or leisure. During the last 7 days, on how many days did you walk for at least 10 minutes at a time?

days per week

Place and "x" in the box if you did not walk

Format: x

How much time did you usually spend walking on one of those days?

hours per day

minutes per day

Don't know/Not sure

Format: x

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The last question in this part is about the time you spent **sitting** on weekdays during the **last 7 days**. Include time spent at work, at home, while doing course work and during leisure time. This may include time spent sitting at a desk, visiting friends, reading, or sitting or lying down to watch television. During the last 7 days, how much time did you spend sitting on a week day?

hours per day

minutes per day

Don't know/Not sure

Format: x

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FOOD FREQUENCY QUESTIONNAIRE

(Final Questionnaire: Page 1 of 4)

Please think about what you usually ate or drank during the past month, that is, the past 30 days.

Please read each question carefully and:

- Report how many times per day, week, or month you ate each food.
- Choose the best answer for each question.
- Mark only one response for each question.

	Never	1-3 times last month	1-2 times per week	3-4 times per week	5-6 times per week	1 time per day	2 times per day	3 times per day	4 or more times per day
How many times per day, week, or month did you usually eat cold cereals?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How many times per day, week, or month did you use milk, either to drink or on cereal?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

What kind of milk did you usually use? (Pick the one you used most often).

- Whole milk
- 2% fat
- 1% fat
- 1/2% fat
- Non-fat or skim
- DID NOT DRINK MILK IN THE PAST MONTH

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FOOD FREQUENCY QUESTIONNAIRE

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	Never	1-3 times last month	1-2 times per week	3-4 times per week	5-6 times per week	1 time per day	2 times per day	3 times per day	4 or more times per day
How many times per day, week, or month did you usually eat bacon or sausage, not including low fat, light, or turkey varieties?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How often did you eat hot dogs made of beef or pork?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How often did you eat whole grain bread including toast, rolls, and in sandwiches? Whole grain breads include whole wheat, rye, oatmeal, and pumpernickel.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How often did you drink 100% fruit juice such as orange, grapefruit, apple, and grape juices? Do not count fruit drinks such as Kool-Aid, lemonade, cranberry juice cocktail, Hi-C, and Tang.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How often do you eat fruit? Count fresh, frozen, or canned fruit. Do not count juices.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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FOOD FREQUENCY QUESTIONNAIRE

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	Never	1-3 times last month	1-2 times per week	3-4 times per week	5-6 times per week	1 time per day	2 times per day	3 times per day	4 or more times per day
How often do you use regular fat salad dressing or mayonnaise, including on salad and sandwiches? Do not include low-fat, light, or diet dressings.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How often did you eat lettuce or green leafy salad, with or without other vegetables?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How often did you eat French fries, home fries, or hash brown potatoes?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How often did you eat other white potatoes? Count baked potatoes, boiled potatoes, mashed potatoes, and potato salad. Do not include yams or sweet potatoes.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How often did you eat cooked dried beans, such as refried beans, baked beans, bean soup, and pork and beans?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

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FOOD FREQUENCY QUESTIONNAIRE

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	Never	1-3 times last month	1-2 times per week	3-4 times per week	5-6 times per week	1 time per day	2 times per day	3 times per day	4 or more times per day
How often did you usually eat other vegetables? COUNT: Any form of vegetable - raw, cooked, canned, or frozen. DO NOT COUNT: Lettuce salads - White potatoes - Cooked dried beans - Rice	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How many times per day, week, or month did you usually eat any kind of pasta? Count spaghetti, noodles, macaroni and cheese, pasta salad, rice noodles, soba, and other kinds of pasta.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How often did you eat peanuts, walnuts, seeds, or other nuts? Do not include peanut butter.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
How often did you eat regular fat potato chips, tortilla chips, or corn chips? Do not include low-fat chips.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>