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The Effects of Physical Activity Education on Exercise Self-Efficacy and Physical Activity: A Comparison Study Between Exercise Science and Physical Education Teacher Education

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Abstract

Physical education is becoming increasingly important in the U.S. as obesity rates climb to over a third of the population. Physical activity and exercise self-efficacy levels may be tied to the amount of knowledge of physical activity a person receives. The two populations in this study are exercise science (EXSCI) and physical education teacher education (PETE) students at the University of Arkansas. A total of 132 individuals participated in the study (63 EXSCI students and 69 PETE students). The Global Physical Activity Questionnaire (GPAQ) which measures physical fitness and the exercise self-efficacy questionnaire were distributed to each participant. Scores analyzed with SPSS to detect statistically significant differences between the populations. There was not a statistically significant difference between populations for exercise self-efficacy scores with a difference of only 2.40. There was a difference in GPAQ Total scores between the populations with a value less than the set statistically significant value of $p \leq .05$. It was found that PETE students engage in more total physical activity than EXSCI students. A possible reason for the difference in physical activity levels between the populations is PETE students perform more physical activity during their academic classes. PETE students are required to enroll in 37 hours of activity-based curriculum whereas EXSCI students are only required to enroll in three hours of activity based curriculum. This conclusion is supported by the GPAQ Work section (which includes physical activity performed in school) in which PETE students as a whole reported over double the amount of physical activity than EXSCI students. This study could be strengthened by conducting more research to measure physical fitness levels by testing each participant in the lab. This would provide a significant comparison between physical activity levels and physical fitness levels.

The Effects of Physical Activity Education on Exercise Self-Efficacy and Physical Activity: A Comparison Study Between Exercise Science and Physical Education Teacher Education Students

With obesity rates on the rise, it is more important than ever for people to get active and stay active. According to the Centers for Disease Control and Prevention (CDC) (2011), about one-third of adults in the United States are considered obese. This rate is only expected to increase from 32% of men in 2008 to 52% in 2030 and from 35% of women in 2008 to between 45% and 52% in 2030 (Hellmich, 2011). Obesity can lead to health risks such as type 2 diabetes, cardiovascular disease, coronary heart disease, certain types of cancer, hypertension, dyslipidemia, stroke, liver and gallbladder disease, sleep apnea, osteoarthritis, and gynecological problems (CDC, 2011). All of these risks either significantly hinder the life of an individual or can even cause death.

Eating habits and caloric intake are factors in obesity but another important component is a sedentary lifestyle. No matter how young or old, people get in the habit of remaining sedentary. Whether it is sitting in class for hours or sitting in front of a desk at work all day, these patterns of inactivity are hard to break in the U.S. because “we are surrounded by an environment that promotes a sedentary lifestyle” (Hellmich, 2011, p. 1). Often times people are physically able to exercise but do not have the motivation or the confidence in their ability to properly exercise. With countless muscles to work and areas to tone, tighten, and strengthen, it can be hard to discern which exercise will be most effective. This task can be overwhelming and instead of just choosing an activity in which to partake, people give up and choose inactivity. Individuals may hire a trainer to help them stick to an exercise plan. Personal trainers offer an important component of working out that overwhelms most individuals; the regimen of a

plethora of exercises and a set number of repetitions for each exercise. This eases the mind of clients because they do not have to decide which exercises would be best suited for them. If this unknown factor is taken away by understanding the body, knowing the different muscle groups and exercises to strengthen those areas, then maybe people would be more inclined to take the initiative, be confident, and participate in a self-made exercise program.

Having more knowledge about the body may lead to an increased exercise self-efficacy. Albert Bandura defines self-efficacy as "people's beliefs about their capabilities to produce designated levels of performance that exercise influence over events that affect their lives" (1994, p. 71). Self-efficacy can be applied to many different areas and tasks including exercise. When it is applied to exercise it is the belief in one's ability to perform tasks related to fitness and exercise. This is known as exercise self-efficacy and will be one of the key variables explored in this project. There are several research studies that have shown a correlation between exercise self-efficacy and physical activity including adherence to exercise programs.

In essence, information may be a huge component in a person's efforts to stay physically fit. Physical fitness is defined by the American College of Sports Medicine as "a set of attributes or characteristics that people have or achieve that relates to the ability to perform physical activity" (Thompson, Gordon, & Pescatello, 2010, p. 2). There are five components of health-related physical fitness that include cardiovascular endurance, muscular endurance, muscular strength, body composition, and flexibility. Cardiovascular endurance is "the ability of the circulatory and respiratory system to supply oxygen during sustained physical activity" (Thompson, 2010, p. 3). Muscular endurance is "the ability of the muscle to continue to perform without fatigue" (p. 3). Muscular strength is "the ability of muscle to exert force" (p. 3). Body composition is "the relative amounts of muscle, fat, bone, and other vital parts of the body" (p.

3). Flexibility is "the range of motion available at a joint" (p. 3). Physical fitness levels could potentially be affected by basic knowledge of fitness concepts. It may be useful to learn the major muscles in the body, where they are located, the function of each and basic exercises to strengthen each of the muscle groups. It may also be helpful to know the certain risks associated with a sedentary lifestyle. If there is a possibility that having more information about the body and how to properly exercise could have an affect on normally sedentary individuals, then college students at the University of Arkansas studying exercise science (EXSCI) and physical education teacher education (PETE) would be ideal populations to study.

Some questions may arise from studying these populations. Is there a difference between fitness levels of EXSCI students and PETE students? These questions are important because although many studies have proven that knowledge of physical activity does help people who are sedentary, there is not much information pertaining to which kind of education is more effective. By looking at these two populations, we can compare two different styles of learning and two different curricula to see if these factors make a difference in physical fitness.

The curriculum for these two majors at the University of Arkansas is very different although two kinesiology classes overlap. The curriculum for EXSCI is more science-based than the curriculum for PETE. It includes courses like Human Physiology, Human Anatomy, Chemistry I and II and Physics I and II which are not required for PETE students. PETE students and EXSCI students share a similar general curriculum that includes English, history, social science, communications, math and fine arts courses. Where these two majors differ is in the program requirements. PETE students are enrolled in courses that are centered on teaching a certain movement or activity. These courses include Teaching Fitness, Teaching Stunts/Tumbling and Teaching Rhythms. Each of the previously mentioned courses include

teaching the student a particular skill and how to teach that same skill. It is also required that PETE students take and pass the Praxis I and II before graduating. Usually this major is chosen by students who are interested in teaching exercise to others. On the other hand, many students majoring in EXSCI plan to attend a graduate or specialty school such as physical therapy, occupational therapy or medical school after earning an undergraduate degree. These students are required to take kinesiology courses that deal with fitness testing and health care for all populations. Specific courses for this major include Laboratory Techniques, Exercise Applications for Special Populations, and Analytical Basis of Movement. The differences in the programs for these two majors may make a difference in the physical activity levels and the exercise self-efficacy levels of the students.

Literature Review

Downs and Ashton (2011) discuss physical activity among college students and the importance of maintaining activity in the transition from high school to college. According to the article, the period of time when teens enter college is the most crucial time to maintain physical activity to predict a healthy lifestyle later in life. In a study performed in Canada, it was shown that there was a steady and significant decrease in vigorous physical activity (VPA) levels from high school to college. The study showed that "66% reported adequate VPA in their last two months of high school but only 44% reported adequate VPA in their first two months of college" (Bray & Born, 2004, p. 181). Physical activity, especially vigorous physical activity, is crucial in student's physical well-being, healthy eating habits and mental health which is important to maintain throughout the college years and beyond.

Similarly Bray and Born conducted an intervention program among university seniors. Interventions in this population are important because "frequency of doing vigorous exercises

three or more times a week declines 6.2 % for men and 7.3 % for women" from high school to college (Sallis, Calfas, Alcaraz & Gehrman, 1999, p. 1). The intervention program was aimed to promote and sustain physical activity throughout the college years and into adulthood. Out of 338 students, 168 were given the control program which was knowledge-based, and the other 170 were given the intervention program which emphasized "behavior change skills in weekly lectures and peer-led labs" which taught students physical activities that they could perform on their own (p. 4). Researchers also examined self-efficacy through a 12-item survey that asked questions about exercise and had participants rank on a scale of 1 (not at all confident) to 5 (extremely confident). At the end of the intervention, measurements were taken to assess five physical activity outcomes: "1) Total physical activity in leisure time, 2) vigorous activity in leisure time, 3) moderate activity in leisure time, 4) strengthening exercise, and 5) flexibility exercise" (p. 6). Men showed no intervention effects at the end of the study, and women showed significant intervention effects on three of the five outcomes including total physical activity during leisure, strengthening exercises and flexibility exercises. There was a positive change in self-efficacy for resisting relapse in both genders (Sallis, Calfas, Nichols, Sarkin & Johnson, 1999). Gender differences were assessed because the data would have been obscured on possible positive outcomes otherwise.

The same group of researchers at San Diego State University did a two-year follow up study to the Project GRAD study conducted in 1999 to determine if the intervention program had a long-term effect. The subjects of the study were assessed via phone interviews and mailed materials. Most of the participants were contacted with "over 95% of all follow-up calls completed" (Calfas et al., 2000, p. 29). There was not a statistically significant intervention effect in any of the five physical activity outcomes after two years for either men or women. It

was concluded that the intervention did not have a long-term effect on the participants.

Another study examined the effect of physical education programs administered to college-age students. Brynteson and Adams conducted a study that examined the attitudes and fitness levels of alumni from four different colleges (1993). Each college had a different physical education activity (PEA) based program that required various numbers of physical education based credit hours. The purpose of the study was to determine if alumni who enrolled in more PEA courses participated in more physical activity after six to nine years out of college than those alumni with less PEA courses. The alumni from the colleges that required the most physical education courses showed significantly more positive attitudes toward exercise than the alumni from the other two colleges. These alumni were also "found to exercise more frequently and to place more value on exercise" than the alumni from the colleges with less physical activity courses (p. 210).

Haworth, Young, and Thornton (2009) explored the relationship between exercise knowledge and an individual's self-efficacy and exercise behaviors. There were 41 participants in the study, one control group and one receiving a four-week exercise education program. The results showed that the individuals that received the exercise education program had a higher self-efficacy than those that did not participate in the program. The increase in self-efficacy remained the same even after a 12-month period showing what most other studies have not, that an exercise education program has long term effects on self-efficacy. However, unlike most other studies, a correlation did not exist between self-efficacy and exercise. This may be due to the short duration of the program. Overall, the program had a positive affect on exercise confidence and the participants reported that the study was beneficial.

Going on the basis of the saying “practice what you preach,” Stout, Gunderson, and Bell (2011) explored the fitness levels of physical education majors and exercise science majors by comparing the two using the President’s Challenge Test. Exercise science majors’ averages were higher in three out of four tests including sit-ups, push-ups, and the sit and reach. Meanwhile, physical education majors outperformed exercise science majors in the one mile run test. When the total number of steps taken was examined physical education majors showed more physical activity than exercise science majors. Regardless of the differences between the two majors, Stout found that students in both majors were good examples of “students that take their majors seriously and really do ‘practice what they preach’ when it comes to being physically fit.” (p. 17)

Similarly Ng (2003) found the same results as Haworth, Young, and Thornton and delved into Bandura’s theory of self-efficacy. There was one control group and one group that received a 10-week class designed to increase students’ leisure activities. The results showed that there were no significant changes in the workout habits of the students after the program. However, this could be due to the short duration of the program, the dependence on self-reported fitness levels, and certain exercise barriers that the students encountered including class schedule and a heavy emphasis on grades. These factors most likely contributed to the lack of significance of the study and it may be more successful if repeated with a longer intervention program.

Continuing with the importance of exercise self-efficacy, Bui, Kemp, and Howlett delved into Bandura’s theory of self-efficacy more in depth. In order to take the actions necessary to produce a certain outcome one must believe that he or she is capable of executing the action. Possessing self-efficacy can “positively impact behavioral change and influence the amount of effort expended in pursuing a goal” (Bui et al., 2011 p. 2). An increase in self-efficacy may be a predictor of physical activity levels. Van Der Roest and Kleiner suggest that this may have to do

with motivation levels that accompany exercise self-efficacy. They state, "in essence, self efficacy is a measure of confidence which is directly tied to motivation" (Van Der Roest & Kleiner, 2011, p. 27). An increased motivation to participate in physical activity may help individuals achieve their workout goals. When these goals are challenged by certain obstacles, those with higher confidence are more likely to persevere to achieve their goals (Bui et al., 2011). These articles show that self-efficacy is important in motivating a person to exercise and preventing relapse during the exercise program. Bui et al. lastly emphasized that one way to increase self-efficacy could be through marketing to help educate and promote health-related events and programs that would encourage physical activity.

Unlike the other studies, which were conducted over a shorter period of time, Manios, Kafatos and Mamalakis' study (1998) created an intervention program for first graders that continued for three years. The intervention included two 45-minute physical education classes per week using methods like modeling habits through story telling or role playing, monitoring one's own behavior and displaying posters to reinforce key messages. The treatment group was informed of the different components of fitness consisting of endurance, strength, flexibility and balance and which exercises improve each area. The results revealed a significant increase in physical activity as well as a decrease in body fat in children who received the treatment. Another similar study conducted at Stanford University showed that an "enjoyable elementary physical education program predicted adherence to a supervised running program in adult men" (Dishman, Sallis & Orenstein, 1984, p. 162). Although there could be other factors at play, a correlation between exercise education programs and adherence to physical activity exists.

The impact an exercise program has on exercise self-efficacy and in turn on exercise adherence was further explored by Annesi (2011). Participants in the study consisted of men and

women in the severely obese category according to the body mass index. The program included "6 one-on-one meetings of 45 to 60 minutes each, during a span of 26 weeks" in which an exercise plan was laid out for each individual and self-regulatory instructions were provided (p. 24). Measurements of progress were taken using The Exercise Self-Efficacy Scale10, The Weight Efficacy Lifestyle Questionnaire, and The Godin Leisure-Time Exercise Questionnaire. Statistically significant improvements in all areas over the span of 26 weeks were detected. Because of the resulting improvement in mood, self-regulation, and self-efficacy, Annesi suggested that "exercise's association with weight loss was better explained through such psychological, rather than physiological (ie, caloric expenditure), pathways" (p. 26). This suggests that adherence to an exercise routine is a cycle that starts with learning how to exercise which leads to an increase in self-efficacy giving one the confidence to continue that exercise program. McAuley et al. (2011) found similar results. A 12-month intervention study was conducted on older adults who were introduced to self-regulatory and self-efficacy strategies during their exercise education intervention. There was a direct effect that resulted between adherence and efficacy leading to the conclusion that "higher levels of executive function and use of self-regulatory strategies at the start of an exercise program enhance beliefs in exercise capabilities, which in turn leads to greater adherence" (p. 289).

Sol, van der Graaf, van Petersen, and Visseren (2011) studied self-efficacy levels and its link to exercise adherence. The purpose of the study was to determine if self-efficacy was linked to cardiovascular lifestyle in patients with chronic disease. The participants in this study were diagnosed with various vascular diseases. Self-efficacy was measured with a survey to find a baseline and then was measured again after a year. The results show that improved self-efficacy is linked with adherence to physical activity. Sol et al. concluded that in patients with chronic

illness, an increase in self-efficacy was "associated with an improvement in cardiovascular lifestyle, namely, more exercise" (p. 5). This demonstrates the same principles as in Annesi and McAuley's studies but with a different population.

Boyle, Mattern, Lassiter and Ritzler (2011) examined the effects of an intervention program on a sample of college students. There were 178 students that participated in the study for a duration of one semester of the academic school year. The intervention program focused on a variety of health topics and was facilitated with the help of health science students. The study consisted of one experimental and one control group and focusing on those participants that reported being inactive before the start of the intervention program. Physical fitness and exercise self-efficacy were measured, along with several other factors of fitness, at the beginning of the semester and again at the end of the semester. Both physical activity and exercise self-efficacy were measured using surveys of self-reported frequency, duration of exercise and confidence in one's ability to perform exercise. The results showed that the study was most effective for inactive women. When compared to the control group, the experimental inactive female participants demonstrated an increase in physical activity and energy expenditure and a decrease in body fat. Overall the study concluded that "although effect sizes for intervention impact are small to moderate, this study demonstrated that a course-based, peer education PA intervention… is effective at improving PA and levels of physical fitness" (p. 528).

Research Questions

1.) Are students majoring in exercise science more physically active than students majoring in physical education teacher education?

Hypothesis: Students majoring in exercise science will be more physically active than students majoring in physical education teacher education.

2.) Do exercise science students have higher exercise self-efficacy when compared to physical education teacher education students?

Hypothesis: Exercise science students have higher exercise self-efficacy than physical education teacher education students.

3.) Are individuals with higher exercise self-efficacy more physically active than individuals with lower exercise self-efficacy?

Hypothesis: Individuals with higher exercise self-efficacy will be more physically active than individuals with lower exercise self-efficacy.

Methodology

A survey was the best method for finding an answer to these questions. Two surveys were used to assess the variables in this research study. The first survey was used to assess physical activity and the second survey was used to assess exercise self-efficacy.

Survey 1

The survey used to assess individuals' level of physical fitness was the Global Physical Activity Questionnaire (GPAQ). This questionnaire is reliable and valid in measuring the amount of physical activity or inactivity an individual performs. According to the article *Development of the World Health Organization Global Physical Activity Questionnaire (GPAQ)* in the Journal of Public Health, the GPAQ "was validated in nine countries" and "around 50 developing countries are now using GPAQ for physical activity data collection" (Armstrong & Bull, 2006, p.66). The questionnaire includes questions about sports, fitness activities and recreational activities. The following is an example of a question on the GPAQ: "How much time do you spend doing vigorous-intensity sports, fitness or recreational activities on a typical day?" (p.4) There is also a question designed for assessing sedentary lifestyle that is as follows:

"How much time do you usually spend sitting or reclining on a typical day?" (p.5) There are four different sections that inquire about the amount of time spent on physical activity. These sections include GPAQ Work (for activity that takes place at work or school), GPAQ Travel (for activity that occurs getting to and from places), GPAQ Recreation (for activities that take place in a student's free time), and GPAQ sedentary (for anytime a student spends time sitting down). Overall, this questionnaire was necessary and useful in assessing each individual's level of physical activity to be able to estimate his or her physical fitness.

Survey 2

The survey that was used to assess each individual's level of exercise self-efficacy was the Exercise Self-Efficacy Questionnaire. This questionnaire contains 26 statements that delve into the different possible mind states while exercising and the amount of confidence that is present when considering physical activity. Each statement on the questionnaire is ranked on a scale from 1 to 4 starting with 1 being "Very Sure" to 4 being " Not at all Sure" (Exercise Self-Efficacy, p.1). An example of some of the statements on the questionnaire are, "Exercise when you are feeling down or depressed" (p.2), "There is very little I can do to make up for the physical losses that come with age" (p.3) and " I am confident in my ability to do an exercise routine" (p.4). This questionnaire was valuable in determining each individual's level of exercise self-efficacy.

The surveys were distributed to upper level EXSCI students and upper level PETE students and the two populations were compared to see if there was a scientifically significant difference shown in the results. Both surveys were given to each student that participated in the research study. On the front of the survey packet each student filled out his or her academic standing (freshman, sophomore, etc.), gender, and major. The surveys were distributed in classes with the

professor's consent.

Once the surveys were distributed, the results were compared. The data was examined to determine if there was a correlation between physical activity and exercise self-efficacy. Then the data for the two populations (EXSCI majors and PETE majors) were compared to determine if there was a significant difference in the results between them for both exercise self-efficacy and levels of physical fitness.

Results

The values for exercise self-efficacy, GPAQ Work, GPAQ Travel, GPAQ Recreation, GPAQ Sedentary and GPAQ Total were calculated for each individual in the study. The calculated values were entered into Statistical Package for the Social Sciences (SPSS) to determine significant differences between the independent variables and the dependent variables (EXSCI and PETE students). Originally there were 71 EXSCI participants and 73 PETE participants. A box plot was used to check for any outliers within the data. Outliers are any values that lie an abnormal distance from the other values in a sample from a population. The box plot uses the median and the upper and lower quartiles (the 25^{th} and 75^{th} percentile) to determine any outliers. Any values outside these boundaries were removed under the assumption that they represented faulty data. A total of 12 participants, eight EXSCI participants and four PETE participants, were removed from the data to decrease the variability of the results. The final number of participants for each population was 63 EXSCI students and 69 PETE students. The three variables that were examined between populations for statistical differences were exercise self-efficacy, GPAQ Total, and GPAQ Sedentary scores. GPAQ Work, GPAQ Travel, GPAQ Recreation, and GPAQ Total scores were recorded in units of MET•minutes/week. A MET describes the metabolic cost of physical activity and is a measure

of a person's energy expenditure. One MET is equivalent to a person's energy expenditure at rest. When totaling each section of the GPAQ, the number of minutes spent doing moderate-intensity activity is multiplied times 4 METS meaning that this type of physical activity requires four times the energy expenditure that is required at rest. The same principle applies to vigorous-intensity activity except minutes are multiplied by 8 METS because it requires eight times the energy expenditure that is required at rest. Both of these individual values are then divided by the number of days per week the individual participates in the activity.

Exercise Self-Efficacy

The mean for exercise self-efficacy scores was 54.73 for EXSCI students and 52.33 for PETE students. The lowest score that a person could receive on the survey was 26 and the highest score was 114. The average amount of exercise self-efficacy is equal to a score of 70. Low scores indicate a higher degree of exercise self-efficacy. An Independent Samples Test was performed on the data and the t-test for Equality of Means was examined. After looking at the statistical (2-tailed) calculations, there was not a statistically significant difference between the two populations. The mean difference between the two populations was only 2.40. Data calculated from Exercise Self-Efficacy section and the GPAQ Total were analyzed by SPSS to see if there was a correlation between the two values. There was a statistically significant negative correlation of -0.32 between the two variables among EXSCI students. There was no correlation between the two variables for PETE students.

GPAQ Total

The mean for GPAQ Total scores (GPAQ Work + GPAQ Travel + GPAQ Recreation) was 5225.71 MET•min/wk for EXSCI students and 9765.14 MET•min/wk for PETE students. The higher the reported score, the more physically active the individual. The t-test for Equality

of Means was performed within the Independent Samples Test and the values were analyzed for statistically significant differences. The results recorded a value $p \leq .05$ indicating that there is a statistically significant difference between the two populations for GPAQ Total values. It is indicated that PETE students had a higher GPAQ Total value than EXSCI students with a mean difference of 4539.431 MET•min/wk. Figure 1 shows the comparison of GPAQ Total scores between EXSCI and PETE students. As noted previously PETE students display a significantly greater GPAQ Total score than EXSCI students.

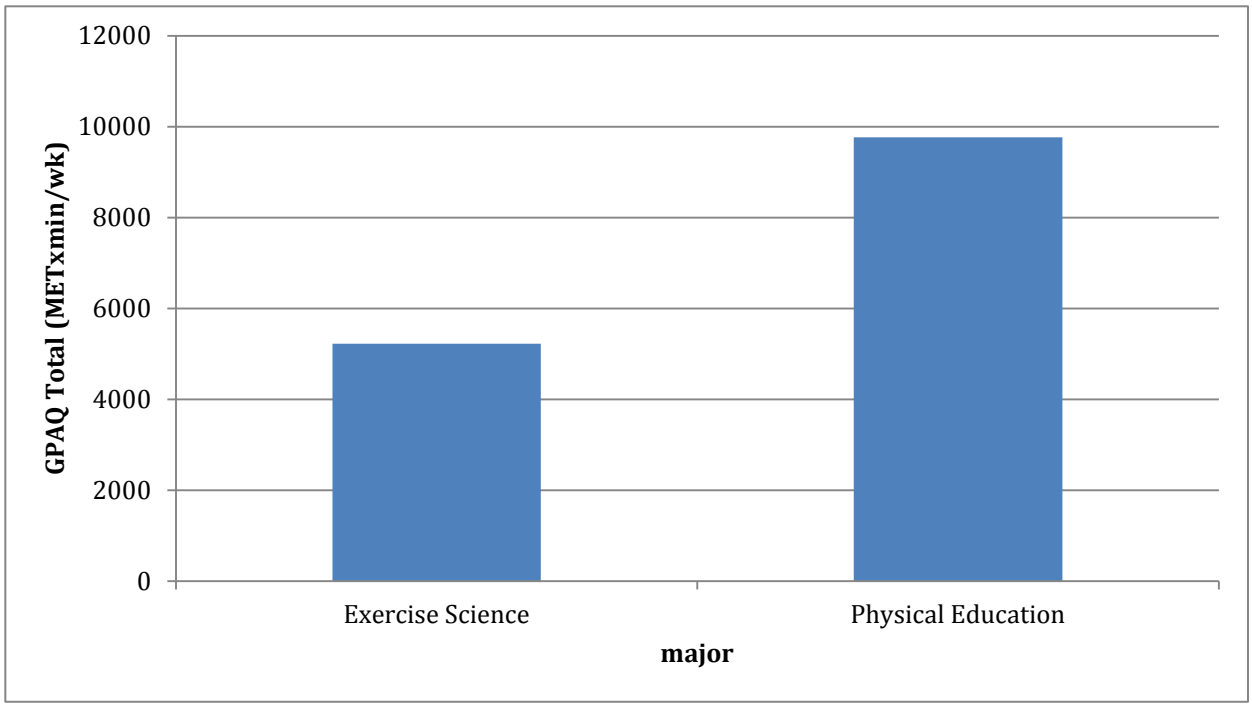

Figure 1: Comparison of GPAQ Total Scores of Exercise Science and Physical Education Teacher Education Students

GPAQ Sedentary

The mean for reported GPAQ Sedentary scores was 268.57 min/day for EXSCI students and 208.26 min/day for PETE students. An Independent Samples T-Test was administered from the data. The results revealed a value below the set statistically significant value of $p \leq .05$ for

both populations. The difference between these two populations was statistically significant and indicates that EXSCI students have higher values for sedentary behavior. The mean difference between the two populations is 60.311 min/day.

GPAQ Classification

One variable that was not run through SPSS was the GPAQ Classification Score. There are different levels of physical activity assigned by the GPAQ creators that consist of low, moderate and high physical activity levels. To be placed in the high category, an individual must have a GPAQ Total of greater than or equal to 3000 MET•min/wk. To be placed in the moderate category, an individual must have a GPAQ Total ranging from 600-2999 MET•min/wk. To be placed in the low category, an individual must have a GPAQ Total below 600 MET•min/wk. These categories were assigned to each individual that participated in the study based on their GPAQ Total. Of the 63 EXSCI students, 41 (65.1%) were in the high category, 18 (28.6%) were in the moderate category and four (6.3%) were in the low category. Of the 69 PETE students, 59 (85.5%) were in the high category, 8 (11.6%) were in the moderate category and two (2.9%) were in the low category.

Gender

There was no statistically significant difference between genders when looking at the variables of physical activity and exercise self-efficacy. Therefore, it was not taken into consideration in this study.

Discussion of Hypotheses

Hypothesis 1

The first hypothesis stated that students majoring in EXSCI will be more physically fit than students majoring in PETE. Through data collection and statistical review, this study

showed that PETE majors are more physically active than EXSCI majors. Therefore, this hypothesis is rejected.

Hypothesis 2

The second hypothesis stated that EXSCI students have higher exercise self-efficacy than PETE students. The results of the study show that there is not a statistically significant difference in exercise self-efficacy levels between EXSCI students and PETE students. Therefore, this hypothesis is rejected.

Hypothesis 3

The third hypothesis stated that individuals with higher exercise self-efficacy will be more physically active than individuals with lower exercise self-efficacy. This last hypothesis is a little more challenging to accept or reject. Out of 132 total students surveyed, 126 were classified as having moderate or high activity levels according to the GPAQ survey. Only 6 students were classified as having low activity. The average exercise self-efficacy score for those six students was 64.17. This number is still below the average value for the Exercise Self-Efficacy Survey. The average exercise self-efficacy score for students having moderate activity is 55.88. The average exercise self-efficacy score for students having high activity is 52.21. There is not a large difference between these reported scores for exercise self-efficacy. The next step is to examine the correlation values. As stated above in the results section, there was a negative correlation between exercise self-efficacy scores and GPAQ Total scores for EXSCI students. It can be inferred from this data that as the GPAQ Total scores increased, the exercise self-efficacy scores decreased. This is consistent with the hypothesis because as exercise self-efficacy scores decreased (meaning individuals with higher exercise self-efficacy) GPAQ Total scores or overall physical fitness scores increased. On the other hand, there was no correlation

between these two variables for PETE students, and the hypothesis was not consistent in this case. The hypothesis is accepted for EXSCI students and the hypothesis is rejected for PETE students. The reason there is no correlation in the population of PETE students is examined in the next section.

Discussion of Results

The results of the study show that PETE students are more physically active than EXSCI students. There are some possible reasons for this conclusion. The first possible reason is that PETE students usually participate in physical activity during class. Because the focus of the curriculum is to provide knowledge of physical activity, the students will participate in and teach one another certain activities that will be used later. For example, a PETE course requires students be in the gym once a week doing 50 minutes of moderate to intense activities that can be used in the classroom. PETE students are required to take 37 hours of courses that include some type of movement or physical activity. Conversely, EXSCI students are required to take 16-31 hours of science courses, and the curriculum only requires a 3 hour course that incorporates physical activity. This difference is demonstrated in the data collected and the values reported for the GPAQ Work section. This section of the GPAQ includes any physical activity (moderate and vigorous intensity) done while at work or at school. Although some of these hours may be earned at work, the striking difference in values recorded for this section suggests that the difference is due to physical activity in class. The total score for all EXSCI students in the GPAQ Work section is 120,670 MET•min/wk. The average GPAQ Work score for each EXSCI students taken from the previous number is 1,915 MET•min/wk. This value is more than doubled for PETE students. The total score for all PETE students in the GPAQ Work section is 343,120 MET•min/wk. The average GPAQ Work score for each PETE student is 4,973

MET•min/wk. This huge difference in values indicates that this is the area where physical activity between these populations is the most significant. When the numbers were analyzed there was a statistically significant difference less than the set value of $p \leq .05$. When the other two sections were analyzed, the results show that there was not a statistically significant difference in the GPAQ Travel scores, but there was a statistically significant difference less than the set value of $p \leq .05$ for the GPAQ Recreation scores. Although the GPAQ Work and GPAQ Recreation sections both show a statistically significant difference, the GPAQ Work section demonstrates the largest difference in reported values.

This conclusion that PETE majors participate in more physical activity during class is further supported by the results of the correlation analysis between exercise self-efficacy levels and GPAQ Total scores. It was expected that there would be a correlation between these two variables in both populations, but it only appeared in the EXSCI population. The reason the PETE population does not show a correlation may be the result of an increase in recorded values in the GPAQ Work section. The physical activity performed in class is required and not entirely voluntary or self-motivated. A student with a low exercise self-efficacy may still report a high amount of physical activity because of the activities performed in class thus throwing off the correlation between the two variables. On the other hand, because EXSCI students do not perform as much physical activity in class, a correlation resulted between the two variables because the physical activity performed is self-motivated.

Another possible reason PETE students are more physically fit may have to do with the type of education about physical activity they are exposed to in class. Because the curriculum is designed to teach students how to teach others, it may be more effective in promoting individual physical fitness. Students that are kinesthetic learners may greatly benefit from the hands-on

approach to teaching. Sometimes when information is internalized and taught to others, it is better understood by the person teaching the information. PETE majors learn activities that promote physical activity and are many times required to create activities or teach activities to their classmates. This direct exposure to physical activities may give PETE students more knowledge of various ways to apply that knowledge to their exercise program. On the other hand, EXSCI students do not focus as much on activities to promote physical fitness, but instead the curriculum is focused on treating all kinds of populations as exercise professionals.

There were some errors or problems within the study that may have affected the results. On the GPAQ Work section of the GPAQ survey there was a question that stated "How much time do you spend doing moderate-intensity activities as part of your work/school?" Due to a typing error the last portion of the question was left off, and the question should have ended with the phrase "on a typical day." This error could have led to individuals reporting the number of hours of activity in a given week thus inflating the number of hours per day. The error was not corrected during the distribution of the surveys to ensure consistency throughout all participants. All values were calculated as if it was reported as physical activity per day. Another potential source of error with this study is using surveys because they are self-reported. Individuals may overestimate or underestimate their amount of physical activity, sedentary behavior, or level of confidence in their ability to exercise. This could lead to inaccurate results. There were also three sophomore PETE students participating in the study. This study was intended to examine upper level, meaning junior and senior, EXSCI and PETE students, so the inclusion of a few sophomores may have affected the end results slightly. In addition, several individuals did not report their classification and could have been lower level students.

This study could be improved by asking the students specifically how much time they spend doing physical activity in school and comparing those values to ensure that those numbers are reflecting only physical activity in school and not at work. A larger population of individuals may also produce more accurate results. This study can also be improved by measuring the actual physical fitness of each individual involved in the study. The GPAQ survey reports the amount of physical activity that a person participates in on a daily basis, which suggests that individuals with more physical activity are more physically fit, but this is not always necessarily true. Some individuals may also be inflating the amount of time they spend participating in physical activity, making their physical fitness assessment artificially higher. By testing each individual in all the areas of physical fitness including cardiovascular endurance, muscular strength, muscular endurance, flexibility and body composition, an accurate determination of physical fitness can be assessed and compared between the two populations. This would involve more time consuming methods and more involvement from the participants.

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