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Physical Activity and Academic Success: Links on a University Campus

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Abstract

The purpose of this study was to determine whether student GPA correlated with physical activity level on a rural Texas university campus. Study participants (*n*=918) consisted of two groups: control group (non-exercisers; *n*=407) and experimental group (exercisers; *n*=412). Academic success was not correlated with physical activity for GPAs and exercise habits; however, GPAs of those who were on a scheduled workout routine were higher than those who belonged to the control group.

> *In order for man to succeed in life, God provided him with two means, education and physical activity. Not separately, one for the soul and the other for the body, but for the two together. With these two means, man can attain perfection.* (Plato, as cited in "Plato Quotable Quotes," 2014, p. 1)

The idea of the mind and the body working together to achieve success is an essential part of life. Aristotle (as cited in Brügemann & Gerds-Ploeger, 2013, p. 427) once said, "Life is movement." Both Plato and Aristotle recognized the relationship between physical activity and the mind. The examination of the connection between physical activity and cognitive function is a more recent topic of research (Koch & Hasbrouck, 2013). Connections between the brain and bodily movements comprise a popular topic of study. New brain growth and development, referred to as neurogenesis, is a product of recent studies as researchers find commonalities between brain growth/efficiency of function and increased levels of exercise. Benefits of exercise do not stop at the muscular level but integrate connections within the brain to stimulate new pathways, which inevitably speed up the learning process (Ratey, 2008).

The purpose of this study was to determine whether academic success, in terms of grade point average (GPA), correlated with physical activity on a rural Texas university campus. This study was also conducted to gather data concerning levels of physical activity compared with GPAs.

Methods

Participants

Participants were 819 students on a rural, northeast Texas university campus. All participating students gave informed consent prior to providing information on the survey. The defined population segment was composed of two different groups of students: non-exercisers (control) and exercisers (experimental). The control group (n=407) consisted of volunteers from a random mixture of upper- and lower-level classes across campus in an attempt to get a representative sample of the student population. The exercisers group (n=412) consisted of students enrolled in fitness and recreation activities (FRA) for academic credit. FRA classes were comprised of students who engaged in required, scheduled physical activities for at least two hours per week; whereas, the control group consisted mostly of those who did not have scheduled workouts.

The students who participated ranged in age from eighteen to sixty-one. The majority of participants were female (51.9%) and single/unmarried (85.7%). Married participants accounted for 8.7% of the total sample. They averaged 21.68 years old. The majority of participants (77.2%) were traditionally-aged college students. Traditionally aged college students are those who go to college directly after high school and are between the ages of eighteen and twenty-two (Strage, 2008). Of those surveyed, the majority (93.7%) were age thirty or under. Fifty-two percent of participants (n = 426) were Caucasian; 23.9% (n = 196) were African American; 12.5% (n = 102) were Hispanic; and 6.2% (n = 51) were Asian. This was a near representation of the campus, which in its entirety was 58.13% Caucasian, 18.31% African American, 7.72% Hispanic, and 7.25% Asian.

Data Collection Procedures

The following procedures were conducted for each participant. Each testing site (class) was identified, and a date and time were reserved for handing out the survey. Using the Wellness Wheel (Myers, 2000), a survey was created to collect information about academic performance, basic demographics, exercise routines, family life, importance of education to the individual, and social/emotional well-being. The survey was distributed to each of the consenting participants during the last two weeks of the spring 2012 semester and the first two months of the fall 2012 semester. After grades were finalized in May 2012 and January 2013, the researcher submitted Campus Wide Identification (CWID) numbers, retrieved from the surveys, to a previously identified success coach employed by the university. The success retrieved the finalized GPAs for the semester as well as each student's cumulative GPA. She recorded them and sent them to the primary investigator.

Data Analysis Procedures

Statistical analyses were performed using IBM Statistical Packages for the Social Sciences (SPSS) software (Version 20; 2009). Results of these tests were compared to identify relationships. All variables (age, average workout length, cumulative semester GPA, gender, marital status, number of months one has been regularly exercising, number of times one exercises per week, projected semester GPA, semester GPA, and race) were paired with each of the other and analyzed using a simple (zero-order) correlation. T-tests were used to determine group differences. Pearson product-moment correlation coefficients were used to evaluate associations between variables.

Results

Demographic Data

The means and standard deviations of all participants for average workout length; cumulative GPA; how long the participant has been regularly exercising (in months); how many times the participants exercise per week; projected semester GPA; and semester GPA were analyzed. The mean number of months one had been regularly exercising was six to twelve months. The mean number of times one exercised per week was three to four times per week. The average workout length was forty-five to sixty minutes. The overall (both groups combined) projected semester GPA was in the 3.1-3.5 range; the overall (both groups combined) semester GPA was in the 2.51-3.0 range; and the overall (both groups combined) cumulative GPA was also in the 2.51-3.0 range.

The means and standard deviations of each group of participants for age, average workout length, cumulative GPA, gender, how long the participant had been regularly exercising (in months); how many times the participants exercised per week; marital status, projected semester GPA, race, and semester GPA were also analyzed. Of the four demographic variables, three were significantly different between the two groups. The control group was more female, a year older on average, and had a higher percentage of Caucasians. The two groups were very similar on marital status, as the majority of all participants were single/unmarried. As for exercise habits and GPAs, the control group had been exercising for fewer months and exercised for less time when they did exercise, but exercised more times per week. The control group had lower projected, semester, and cumulative GPAs than the exercising group.

Correlations among Variables

The Pearson product-moment correlation coefficient was used to evaluate relationships among and the resulting magnitude of the relationship between selected variables in both groups. The correlation coefficients for all variables under analysis in both groups are presented in Table 1.

Table 1

Pearson Product-moment Correlation Coefficients for All Variables of All Participants (N=819)

	Group	Gender	Age	Race	Marital Status	Regularly exercising for __ months	Exercise __ times per week	Average workout length	Projected Semester GPA	Semester GPA	Cumulative GPA
Group	–	-.050	-.110**	-.045	.017	.006	.000	.071*	-.043	-.092*	-.013
Gender		–	.014	-.044	.038	-.196**	-.183**	-.166**	-.067	-.069	-.120**
Age			–	.088*	-.121**	-.060	-.101**	-.139**	-.074*	-.033	-.003
Race				–	.057	.043	.014	-.025	-.206**	-.193**	-.132**
Marital Status					–	.024	.013	.049	.116**	.022	.044
Regularly exercising for __ months						–	.663**	.490**	-.097**	-.043	-.005
Exercise __ times per week							–	.532**	-.101**	.002	.000
Average workout length								–	-.037	.075	.069
Projected Semester GPA									–	.532**	.570**
Semester GPA										–	.757**
Cumulative GPA											–

* Correlation was significant at the 0.05 level (2-tailed). **Correlation was significant at the 0.01 level (2-tailed).

A moderately strong correlation existed between projected semester GPA and semester GPA (0.532) and between projected semester GPA and cumulative GPA (0.570). A strong correlation existed between semester and cumulative GPA (0.757). Also, a strong correlation existed between number of months one has been regularly exercising and how many times per week (0.663). Therefore, the longer one had been exercising, the more likely the participant was to exercise multiple times per week. Many low correlations existed in the data. However, in looking for responses to the research questions presented, no significant correlations existed between: number of months one has been regularly exercising and semester or cumulative GPA; exercise times per week and semester or cumulative GPA; or average workout length and semester or cumulative GPA.

The data revealed that the experimental group had a higher GPA range than that of the control group. Both semester and cumulative GPAs for the control group were in the 2.51-3.0 range, while the experimental group GPAs fell in the 3.1-3.5 range. Both groups projected their semester GPAs in the 3.1-3.5 range. The experimental group was more accurate in predicting their actual semester GPAs. The fact that these numbers are on target adds credibility to the students' responses; the high correlation between projected semester GPA and actual semester GPA showed that the students were probably answering honestly on the survey. While the difference between the two groups in GPA is low, a significant difference did exist. Those who were scheduled to workout twice a week in FRA classes concluded the semester with a slightly higher GPA than those who were not enrolled in these courses and not encouraged to maintain the same schedule.

Discussion

Comparison with Previous Findings

The majority of previous research has revealed positive correlations between physical activity and academic success (Chomitz et al., 2009; Coe, Pivarnik, Womack, Reeves, & Malina, 2006; Datar & Sturm, 2006; Dwyer, Sallis, Blizzard, Lazarus, & Dean, 2001; Fox, Barr-Anderson, Neumark-Sztainer, & Wall, 2010; Grissom, 2005; Sibley & Etnier, 2003; Taylor, Sallis, & Needle, 1985; Tomporowski, 2003). Each of these studies differs in methods and populations tested. While correlations were not found among how long one has been regularly exercising, how many times per week one exercises, average workout length, and GPAs in this study, the experimental group's mean overall GPA was higher than that of the control. The benefits of exercise may be seen in the classroom. While exercise may not be denoted as the causation for increased GPAs among the students of the experimental group, exercise may play a role in learning.

Ratey (2008) noted the enrichments of regularly performed physical activity, especially when it is done voluntarily. The concept behind this theory was that voluntary exercise may allow researchers to study just the effects of exercise singularly, rather than the effects of exercise and the effects of stress combined when exercise is imposed upon a group. Interestingly, in this study, those who were enrolled in the FRA classes and worked out at least twice a week had higher GPAs. Much of this exercise may have been involuntary since students on this rural Texas university campus are required to take at least two hours of FRA courses as

part of their degree programs; therefore, physical activity, voluntary or involuntary, still may yield beneficial results.

Coe et al. (2006) proposed that a "threshold" of physical activity must be passed before effects are noticeable in the classroom. The intensity of the exercise must be assessed and somewhat vigorous in order for there to be an increase in academic performance. These results might explain why our differences in group GPA were low and there was not a stronger correlation between GPA and the exercise variables. The FRA courses were not designed to incorporate high-intensity workouts. Perhaps if the experimental group was taken from a population with a more rigorous exercise regime, such as collegiate athletes, the effects of exercise in the classroom would have been different.

Davis et al. (2011) analyzed results from forty-five different studies and found positive results in academic performance when exercise was implemented. The researchers used the information as a platform for educators to incorporate vigorous physical activity. Taras (2005) posited that exercise over a longer period of time that produces gains in fitness levels would be more likely to increase cognitive abilities and likely more success in the classroom. This proposition aligned with the current study because a strong correlation existed between length of workout and number of months one had been exercising. Those who had been regularly exercising for an extended period of time were more likely to be regular gym goers and spend more time on their workouts.

Dwyer et al. (2001) also revealed a significant relationship between physical activity and academic success. The researchers determined a low correlation, similar to this study. The researchers proposed that regular exercise would make a modest improvement in the classroom, noting that there is not just one factor that leads to academic success. The researchers found that all of the following contribute to success in the classroom: cardiorespiratory endurance, muscular strength, and regular physical activity. Although types of physical activity were not examined in the current study, Dywer et al. (2001) showed all types were beneficial.

Extraneous variables may have influenced the outcome of this study since it was limited to one rural Texas university campus. Therefore, these results may be only generalizable to this population. Each college campus may yield different results according to the environment. Doubt exists when surveys rely on the self-reporting method. Also, the surveying environment may have had an effect on the results. Some students may not have cared to read each question thoroughly or answer each question honestly. Students may have been in a hurry to get to their activity in class for the day and rushed through the survey. The first round of data was collected in the last two weeks of the spring 2012 semester right before finals week. This could have had adverse effects on the responses as finals increase stress in students. Stress could then have played a role in their failure to answer survey questions to the best of their abilities.

One confounding variable was found in survey answers: individuals who said they did not exercise also answered other exercise-related questions. For example, those who circled *I do not exercise* continued to answer subsequent exercise questions by stating how many times per week they exercise or how many minutes their typical workouts last. This issue could have skewed the results for the exercising variables. All classes surveyed were undergraduate classes; therefore, the study is limited to only those students.

Conclusions

A positive connection relating physical activity and academic success may be a stepping stone for improvement in the lives of college students. If this correlation exists, more efforts may be made to encourage physical activity on college campuses. Schools, with their ability to reach a large number of young people, may have influential power in fostering better, healthier habits (NCCDPHP, 2011). The continued incorporation of FRA classes into the curriculum might be beneficial to academic success. As was the case in this study, regularly scheduled exercisers not only performed better in the classroom according to their GPAs, but also were more realistic in projecting their semester GPAs. Recreation centers may promote more programs that engage students to participate. Many college campuses foster behaviors that may not be conducive to maintaining healthy lifestyles (Hales, 2009). Healthy habits may not fit into the traditional college experience. If healthier practices can be adopted at a younger age, they may be more likely to continue into adulthood. "Childhood is a key time within the lifespan to establish physical activity behaviors" (Prosser & Xiaoli, 2008, p. 11). Childhood obesity is a growing problem (CDC, 2012), but this problem does not stop in adolescence. If practicing a well-balanced, healthy way of life is adopted at the college level, students may inevitably continue this lifestyle after graduation.

References

Brügemann, J., & Gerds-Ploeger, H. (2013, October). Life is movement (Aristotle, 4th century BC). *Netherlands Heart Journal*, *21*(10), 427-428.

Centers for Disease Control and Prevention (CDC). (2012). *A growing problem: What causes childhood obesity*? Retrieved from http://www.cdc.gov/obesity/childhood/problem.html

Chomitz, V.R., Slining, M.M., McGowan, R.J., Mitchell, S.E., Dawson, G. F., & Hacker, K.A. (2009). Is there a relationship between physical fitness and academic achievement? Positive results from the public school children in the Northeastern United States. *Journal of School Health*, *79*(1), 30-37.

Coe, D.P., Pivarnik, J.M., Womack, C.J., Reeves, M.J., & Malina, R.M. (2006). Effect of physical education and activity levels on academic achievement in children. *Medicine & Science in Sports & Exercise*, *38*(8), 1515-1519.

Datar, A., & Sturm, R. (2006). Childhood overweight and elementary school outcomes. *International Journal of Obesity*, *30*(9), 1449-1460.

Davis, C.L., Tomporowski, P.D., McDowell, J.E., Austin, B.P., Miller, P.H., Yanasak, N.E., … Naglieri, J.A. (2011). Exercise improves executive function and achievement and alters brain activation in overweight children: A randomized, controlled trial. *Health Psychology*, *30*(1), 91-98.

Dwyer, T., Sallis, J.F., Blizzard, L., Lazarus, R., & Dean, K. (2001). Relation of academic performance to physical activity and fitness in children. *Pediatric Exercise Science*, *13*(3), 225-238.

Fox, C.K., Barr-Anderson, D., Neumark-Sztainer, D., & Wall, M. (2010). Physical activity and sports team participation: Associations with academic outcomes in middle school and high school students. *Journal of School Health*, *80*(1), 31-37.

Grissom, J.B. (2005). Physical fitness and academic achievement. *Journal of Exercise Physiology*, *8*(1), 11-25.

Hales, D. (2009). *An invitation to health.* Belmont, CA: Wadsworth/Cengage Learning.

Koch, C.A., & Hasbrouck, L. (2013). *Research summary: Exploring the link between physical activity, fitness and cognitive function*. Springfield, IL: Illinois Department of Public Health. Retrieved from http://www.isbe.net/EPE/pdf/reports-webinars/iphi-epetf-rpt0313.pdf

Myers, J.E. (2000). The wheel of wellness counseling for wellness: A holistic model for treatment planning. *Journal of Counseling & Development*, *78*(3), 251-267.

National Center for Chronic Disease Prevention and Health Promotion (NCCDPHP). (2011). *School health programs: Improving the health of our nation's youth*. Retrieved from http://www.cdc.gov/chronicdisease/resources/publications/aag/dash.htm

Plato quotable quotes. (2014). Retrieved from http://www.goodreads.com/quotes/737924-in-order-for-man-to-succeed-in-life-god-provided

Prosser, L., & Xiaoli, J. (2008). Relationship between school physical activity and academic performance of children. *The International Journal of Learning*, *15*(3), 11-16.

Ratey, J. (2008). *Spark: The revolutionary new science of exercise and the brain.* New York, NY: Little, Brown and Company.

Sibley, B.A., & Etnier, J.L. (2003). The relationship between physical activity and cognition in children: A meta-analysis. *Pediatric Exercise Science*, *15*(3), 243-256.

SPSS. (2011). *SPSS statistics for windows, version 20.0*. Armonk, NY: IBM Corporation.

Strage, A. (2008). Traditional and non-traditional college students' descriptions of the *ideal* professor and the *ideal* course and perceived strengths and limitations. *College Student Journal*, *42*(1), 225-231.

Taras, H. (2005). Physical activity and student performance at school. *Journal of School Health*, *75*(6), 214-218.

Taylor, C.B., Sallis, J.F., & Needle, R. (1985). The relation of physical activity and exercise to mental health. *Public Health Reports*, *100*(2), 195-202.

Tomporowski, P.D. (2003). Cognitive and behavioral responses to acute exercise in youths: A review. *Pediatric Exercise Science*, *15*(4), 348-359.