

2014

An Examination of the Effects of Type of Sport Participation on Weight Classification and Academic Achievement: Academic Persistence as a Predictor

Faye C. Tabor
fctabor@live.com

Follow this and additional works at: <http://via.library.depaul.edu/depaul-disc>

 Part of the [Psychology Commons](#)

Acknowledgements

Jocelyn Smith Carter/Department of Psychology; Summer/2013; fctabor@live.com

Recommended Citation

Tabor, Faye C. (2014) "An Examination of the Effects of Type of Sport Participation on Weight Classification and Academic Achievement: Academic Persistence as a Predictor," *DePaul Discoveries*: Vol. 3: Iss. 1, Article 16.
Available at: <http://via.library.depaul.edu/depaul-disc/vol3/iss1/16>

This Article is brought to you for free and open access by the College of Science and Health at Via Sapientiae. It has been accepted for inclusion in DePaul Discoveries by an authorized administrator of Via Sapientiae. For more information, please contact mbernal2@depaul.edu, wsulliv6@depaul.edu.

An Examination of the Effects of Type of Sport Participation on Weight Classification and Academic Achievement: Academic Persistence as a Predictor

Faye Tabor*

Department of Psychology

ABSTRACT This study evaluated effectiveness of a soccer intervention for reducing obesity and increasing academic performance in low-income elementary school children by analyzing data regarding sport participation, academic performance, classroom behavior, and BMI using ANOVAS and Chi-Squared tests. While the intervention did not directly affect weight classification or academic performance, the type of sport(s) students participated in did. Team sport players had significantly higher weights and fared the worst academically, followed by those who played individual sports. Non-athletes fared the best. The type of sport a child played influenced academic persistence, which influenced academic performance.

INTRODUCTION

Currently, obesity and academic underachievement are prominent issues pertaining to youth in the United States, especially those who live in low-income areas. Studies have found that obese youth often perform less well academically than their normal weight peers. These differences exist both in the

early grades and in adolescence, in teacher assigned grades and in standardized test scores in math and reading (Clark, Slate & Viglietti, 2009; Li & O'Connell, 2012). Studies have found that cardiovascular physical activity improves function in the frontoparietal network, which includes the parts of the brain that are activated during reading comprehension or when solving math problems (Hillman, Erickson, Kramer, 2008). From this, researchers have proposed that cardiovascular physical activity can increase academic performance by way of improving brain function in areas related to

* Faculty Advisor: Dr. Jocelyn Carter
Department of Psychology
Research Completed in Summre 2013
Author Contact: fctabor@live.com

academics. To reduce obesity and improve academic performance, numerous physical activity interventions have been created. One study found that enrollment in a physical education class was unrelated to teacher-assigned grades, but students who met the Healthy People 2010 vigorous physical activity guidelines outside of school had significantly higher grades than those who engaged in moderate levels of physical activity or no physical activity outside of school (Coe, Pivarnik, Womack, Reeves, & Malina, 2006). This provides support for the idea that cardiovascular exercise can improve brain function to increase academic achievement. Another study focused more specifically on the types of physical activities students were involved in outside of school, and found that students who participated in rowing, the only individual sport studied, had significantly higher standardized test scores than those who participated in a team sport or no sport at all (Bradley, Keane, & Crawford, 2013). This may be because individual sports typically require physical activity to be sustained over a longer period of time in contrast to the start-and-stop nature of many team sports. A third study, found that low-income elementary school children who participated in a school-based obesity prevention program that included a physical activity component reduced their BMI percentiles and had significantly higher math scores than students in a control school (Howie and Pate, 2012). This was one of few studies that examined the effects of both obesity and physical activity levels on academic performance.

The current study was developed from these findings. The goal of this study is to clarify the relationships between weight classification, physical activity and academic performance for low-income elementary school students. Specifically, this study sought to determine whether weight status independently predicted levels of academic achievement, or if the relationship between weight classification and academic performance was a function of the physical activity level of students at each weight classification. If a relationship does emerge between weight classification, physical activity,

and academic achievement, this study will explore some possible explanations for these findings. This study will examine the effects of both a soccer-based obesity prevention program offered at low-income elementary schools, and the effect of student sport participation outside of the school program to determine which, if either of these activities, can reduce weight or increase academic achievement.

METHODS

PARTICIPANTS

Participants in the current study consist of a subset of youth from four Chicago Public Schools in low-income areas. Approximately 48.1% of students participated in a CLOCC Urban Initiatives soccer intervention ($n=62$), and 51.9% of students did not ($n = 67$) for a total of 129 participants. The study took place over two years, during which participants were in grades 3 and 4. The sample consisted of participants of both sexes. 58.1% identified as female, and 41.2% identified as male. Out of the available racial categories, 59.8% of students identified as Black or African American, 37.4% identified as Hispanic or Latino, and 2.8% as other. Prior to the intervention, 50% of participants were classified as being of normal weight, 19.8% of participants were classified as being overweight, and 31.2% of participants were classified as being obese.

MEASURES

Weight classification was assessed by measuring participants' height and weight at school and using those measurements to calculate the students' BMI. BMI scores were used to classify students as being of normal weight, overweight, or obese according to standards set by the National Institute of Health and the Center for Disease Control in conjunction with the World Health Organization.

Types of sports the participants played were assessed using a child behavior checklist in which parents answered questions asking them to list three sports or extracurricular activities their child participates in (Achenbach and Roscerola, 2001). The activities were coded as being team sports (i.e. soccer, baseball, football,

etc.) individual sports (i.e. biking, swimming, skateboarding etc.) or no sports if the activities the parent listed were not athletic. If a participant was reported to play at least one team sport, he or she was classified as playing a team sport. Additionally, the ratio of individual to team sports was calculated for those who participated in both kinds of activities.

Academic performance was assessed using a teacher report form consisting of questions such as “how would you rank this student’s achievement in math” with the options “far below grade level”, “somewhat below grade level”, “at grade level”, “somewhat above grade level”, and “far above grade level” (Achenbach and Roscerola, 2001). An overall academic rating was calculated by averaging the rankings of individual subject areas. Classroom behavior was also assessed using a teacher report form consisting of questions such as “student fails to finish things that he or she starts,” with the options, “not true”, “sometimes or somewhat true” and “very often or often true.”.

RESULTS

ANOVAs were used to examine the effect of the soccer intervention on T2 weight classification. The soccer intervention had a non-significant effect on weight classification at T2. ANOVAs were also run to determine if there was an interaction effect between gender and the intervention or ethnicity and the intervention on T2 weight classification. Neither of these interactions was significant. However, gender did have a significant main effect on T1 weight classification ($p < .01$). A Chi-Square test was run as a follow-up, which showed that boys were more likely to be obese than girls. The type of sport the child participated in also had a significant main effect on T1 weight classification ($p < .05$). A Chi-Square test showed that children who played team sports were more likely to be obese than children who played individual sports. Additionally, there was a significant interaction between gender, type of sport participation, and T1 weight classification ($p < .05$).

ANOVAs were also run to examine the effect of intervention status on academic performance at T2. The results were non-

significant. ANOVAs were run to determine if there was an interaction effect between gender and the intervention or ethnicity and the intervention on academic performance at T2. Neither of these interactions was significant. Neither weight classification, nor gender had a significant effect on academic performance. Additionally, teacher reports on the students’ ability to concentrate, work ethic, and learning were not significantly related to academic performance. However, teacher reports on students’ ability to finish what he or she starts were significantly related to overall academic performance ($p < .01$), math achievement ($p < .01$) and reading achievement ($p < .01$). Post-Hoc tests revealed that there are significant differences in academic achievement between those who “never” fail to finish what they start and those who both “sometimes” and “very often” fail to finish what they start. Chi-Square tests reveal that those who “never” fail to finish what they start earn significantly higher academic ratings than those who “sometimes” or “very often” fail to finish what they start.

ANOVAs also showed that type of sport also had a significant effect on T1 teacher ratings of math ($p < .05$) and reading achievement ($p < .05$). Post-Hoc tests found that significant differences in math and reading achievement were between those who did not participate in any sports, and those who participated in team sports. The differences between “no sport” and “individual sport” and “individual sport” and “team sport” were not significant. The effect of type of sport on overall academic performance is trending towards significant ($p = .052$). Chi-Square tests revealed a linear trend in academic performance in which students who participated in team sports fared worst in all areas of academics and students who did not participate in sports fared the best. Those who participated in individual sports achieved at levels in between those of team sport participants and those who did not participate in any sports.

Additional tests were run to determine why team sport participation led to lower academic performance. ANOVAs found that parent reports on the amount of time the participant spent playing sports and how good

the participant was at their respective sports were not significant in predicting academic performance in any of the three categories. Weight classification did not significantly predict academic performance either. However, the type of sport in which a student participated significantly predicted the degree in which he or she failed to finish what he or she starts ($p < .05$). Post-hoc tests revealed a significant difference between participants in individual sports and team sports. Chi-Square analysis showed a linear relationship between type of sport participation and academic performance with those participating in no sports more likely to “never” fail to finish what they start and those in team sports more likely to “very often” fail to finish what they start. Therefore, it appears that both type of sport participation and the ability to finish what they start affect students’ academic performance independently at T1. It also appears that type of sport participation affects a student’s ability to finish what he or she starts, which in turn affects academic performance. These results were not significant at T2.

DISCUSSION

Some of the findings in this study were different from what previous literature suggests. Contrary to Clark, Slate & Viglietti and Li & O’Connell’s study, weight classification did not predict lower academic performance. In fact, there was no relationship between weight classification and any dimension of academic performance in our study.

In addition, the soccer-based obesity prevention program used in this study did not lead to significantly lower weight classification or improve academic performance. This outcome contradicted Howie and Pate’s (2012) study in which the obesity prevention intervention both significantly reduced student’s BMI scores and led to increased math performance. In the current study, it is possible that the non-significant decrease in weight is due to the measure of weight classification used. Howie and Pate’s study measured reduction in BMI scores whereas this study measured changes in weight classification from obese to overweight or overweight to normal weight.

Furthermore, in this study, students who did not participate in sports did better academically than those who played individual or team sports. This finding differs from that found by Bradley, Keane, and Crawford’s study in (2013) in which students who played individual sports were more successful academically than those who played individual or team sports. This also contradicts what Hillman, Erickson, and Kramer would have predicted from their 2008 research. However, in both the current study and the previously mentioned study, those who played individual sports fared better academically than those who played team sports. The difference may be due to the age of participants. Bradley et. al., studied students in their final years of secondary school, while this study examined elementary school students (2013). In secondary schools, there is usually a minimum GPA requirement that a student must meet in order to be eligible to play a sport, but such qualifications do not typically apply to elementary school students.

Differing findings on the amount of physical activity and academic performance occurred as well. Although this study did not measure the intensity of physical activity as measured by Coe et. al., (2006) or Hillman et.al.,(2008) in which more vigorous physical activity was found to lead to better academic outcomes; frequency of sport participation was used as a similar assessment and was found to be unrelated to academic outcomes. The opposing results may be due to different types of measurement, frequency versus intensity. Quite possibly, students who play individual sports are also engaged in more vigorous physical activity than those in team sports. If that were the case, it would be possible to infer that the current study and Coe’s study did agree. However, further research would need to be done to verify that idea.

This exploratory study also sought to determine why not participating in a sport led to better academic outcomes than either individual or team sport participation. By analyzing some classroom behavior variables from the teacher report forms, it was found that a student’s ability to finish what he or she starts predicts academic achievement and the type of sport a child

participated in predicted his or her ability to finish what he or she starts. One study found that neither individual nor team sport participation were related to persistence in academic settings, but that students involved in the arts were more persistent in academic challenges (Metsäpelto & Pulkkinen, 2012). This study most similarly illustrates the finding in the current study that academic persistence relates to academic outcomes and that the type of extracurricular activity in which a student participates influences his or her academic persistence. Although the current study did not examine the effects of arts participation on academic outcomes, it is possible that those who did not participate in athletic activities, who also were most likely to finish what they start, may have participated in arts activities that the study did not account for. This seems to suggest that in this particular inner-city elementary school population, sport participation did not directly contribute to academic outcomes. Further research needs to be done in this area.

There are several limitations to this study. First, there was a small sample size of 129 participants. Within this sample, not every participant had complete data, reducing the sample size further. Additionally, many relevant variables were not assessed. For instance, the amount of time spent in vigorous physical activity may have predicted to both weight classification and academic performance, but was not studied explicitly. Finally, the measurement used to measure weight, classification as opposed to BMI scores, may have resulted in the study being less sensitive to changes in participants' weight during the intervention. To address these limitations, further research should include other relevant variables related to sport participation and physical activity as well as weight classification and academic performance. Further research should also use more sensitive measures for changes in weight. Another possible direction would be look at other classroom behavior variables that influence academics and may be influenced by extracurricular involvement. In addition, future studies could include a wider variety of extracurricular activities and examine

their effects on weight classification and academic performance.

REFERENCES

- Achenbach, T. (2011). Child Behavior Checklist. In J. Kreutzer, J. DeLuca & B. Caplan (Eds.), *Encyclopedia of Clinical Neuropsychology* (pp. 546-552): Springer New York.
- Bradley, J., Keane, F., & Crawford, S. (2013). School Sport and Academic Achievement. *Journal of School Health, 83*(1), 8-13. doi: 10.1111/j.1746-1561.2012.00741.x
- Clark, D., Slate, J. R., & Viglietti, G. C. (2009). Children's Weight and Academic Performance in Elementary School: Cause for Concern? *Analyses of Social Issues and Public Policy, 9*(1), 185-204. doi: 10.1111/j.1530-2415.2009.01186.x
- 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. doi: 10.1249/1501.mss.0000227537.0000213175.0000227531b.
- Hillman, C. H., Erickson, K. I., & Kramer, A. F. (2008). Be smart, exercise your heart: exercise effects on brain and cognition. *Nature Reviews Neuroscience, 9*(1), 58-65.
- Howie, E. K., & Pate, R. R. (2012). Physical activity and academic achievement in children: A historical perspective. *Journal of Sport and Health Science, 1*(3), 160-169. doi: <http://dx.doi.org/10.1016/j.jshs.2012.09.003>
- Li, J., & O'Connell, A. A. (2012). Obesity, High-Calorie Food Intake, and Academic Achievement Trends Among U.S. School Children. *The Journal of Educational Research, 105*(6), 391-403. doi: 10.1080/00220671.2011.646359
- Metsäpelto, R.-L., & Pulkkinen, L. (2012). Socioemotional behavior and school

achievement in relation to
extracurricular activity participation in
middle childhood. *Scandinavian Journal
of Educational Research*, 56(2), 167-
182. doi:
10.1080/00313831.2011.581681