

Investigating the Effects of School Sports on Academic and Social Outcomes

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INTRODUCTION

Sport activities organized by schools are an important component of student life in the United States. The 2010-11 High School Athletics Participation Survey conducted by the National Federation of High School Associations (NFHS, 2011) reported that approximately 55.5% of all high school students play at least one school organized sport. Previous studies that have investigated the effects of extracurricular and after school activities on student achievement have reported that participation in these types of activities helps to improve academic achievement (Bradley, Kean, Crawford, 2013; Dweyer, Sallis, Blizzard, Lazarus, & Dean, 2001; Eccles, Barber, & Stone, 2003). In light of the findings from previous studies, this study aims to investigate the descriptive characteristics of students who participate in school organized sports relative to those who do not. As previously stated, there are a wealth of benefits from participating in school sports from academics to a variety of social factors (Bradley, Kean, Crawford, 2013; Dweyer, Sallis, Blizzard, Lazarus, & Dean, 2001; Eccles, Barber, & Stone, 2003). Therefore, it is crucial that we gain an understanding about the type of students who engage in these activities, as well as those who do not.

THEORETICAL FRAMEWORK

According to Benson, Scales, Hamilton, and Sesma's (2006) youth development theory, positive youth development is enabled through relationships, contexts, and environments that nurture development. School is one of the key environments in which positive youth development can be enhanced. A growing

body of literature has investigated the positive effects of extracurricular and after school activities in the promotion of academic achievement and academic resilience (Eccles, Barber, & Stone, 2003; Peck, Roeser, Zarrett, & Eccles, 2008).

Given the benefits of participating in school organized sports, it is important to paint of picture of the type of student who does and does not get involved in those activities. Earlier research suggests that those participating in sports would tend to obtain higher GPAs than those who do not (Eccles, Barber, & Stone, 2003).

However, it is possible that there are other differences between these two groups. We hypothesize that students who participate in school organized sports will also tend to come from higher SES living arrangements, report fewer instances of being in special education, have healthier diets, be more active and perceive higher rates of family support. In addition, there may be significant differences in the gender and ethnicities of students who choose to engage in school sports and those who do not. Understanding these differences is significant because they speak to the nature of complete involvement in the whole school environment, not only that it may also highlight the inequities within groups of students with regards to their opportunities for engagement within the school. Through an exploratory investigation of a large and representative sample of students, this study will provide some insight into the nature of the relationship between students' social and demographic characteristics and their participating in school sport activities.

METHODS

Data Source and Sample

Data of this study come from the Minnesota Student Survey (MSS). The MSS was designed and administered by the Minnesota Departments of Education, Health and Human Services, Public Safety, and Corrections every three years to 6th, 9th, and 12th grade students who attend public, private and charter schools. The purpose of the survey is to monitor important trends in students' habits, participation in in-school and after-school activities, and their thoughts about positive and risky behaviors. This study entails a secondary analysis of the 2010 administration of the survey. The 9th grade students were selected for this study.

Table 1 shows descriptive statistics about demographic characteristics of the sample used in the study. The frequencies presented in Table 1 indicate that students who participate in school sports and students who do not participate differ in terms of demographic characteristics. For instance, most of the students who benefit from free-reduced lunch and have an individualized education plan (IEP) are the ones that do not participate in school sports. Also, the students who consume more vegetables and fruits during their daily diet tend to participate in school sports more frequently than those who have either none or very little fruit or vegetables.

Table 1

Measures

A total of five subscales were created using students' responses to the survey items in the MSS. These subscales were alcohol and drug use, engagement in risky

behaviors, family support, teacher and community support, and school safety. As reliability evidence, Cronbach's alpha coefficient was reported for each subscale. Table 2 presents the reliability results for the five subscales. All of the subscales showed an acceptable level of internal consistency.

Table 2

To obtain the students' scores in each subscale, the subscales were scored using the Rasch-Masters Partial Credit Model (PCM; Masters, 1982) in Winsteps 3.67 (Linacre, 2008). The PCM is a statistical model that is devised for questions with ordered response categories such as Likert-type survey items (e.g. strongly disagree, disagree, agree, and strongly disagree). Figure 1 shows an example item with four ordered response categories.

Figure 1

The PCM specifies the probability that a person chooses a response category against the other response categories in the item. After each item is scored using the PCM, a scale score can be estimated using the probabilities for each person. The PCM is particularly useful in scoring survey type of items because it places persons and items onto the same scale that helps to see how items function across different levels of ability or latent trait. The score scale usually ranges from -4 to 4. As the score gets higher, a higher amount of this trait/skill/construct is observed in the person.

Table 3 shows the correlations between the scores from the five subscales. The correlations among the subscales indicate that they function properly. For instance, the scores obtained from the negative subscales (alcohol and drug use and engagement in risky behaviors) had a negative relationship with the other measures that represent positive constructs (school safety, family support, and teacher and community support). It should be noted that for school safety, family support, and teacher and community support scales, higher scores indicate higher school safety, higher family support and higher community and teacher support whereas for alcohol and drug use and engagement in risky behaviors, higher scores indicates more alcohol and drug use and more frequent engagement in risky behaviors.

Table 3

Data Analysis

Several covariates were selected in addition to participation in school sport activities (1=YES, 0=NO). These covariates were special education status (SPED), which was determined from the question “Do you have an IEP?”; socioeconomic status (SES), which was determined from the question “Do you currently get free or reduced-priced lunch at school?”; ethnicity, which was indicator coded into separate variables for each group and included American Indian (AI), African American (AA), Latino (LA), Asian (AS), Other/Multiple ethnicities (OM) as options (white being the reference group); gender (1=Female, 0=Male); a measure of physical activity, which was based on the question “On how many of the last 7 days were you physically active for a combined total of at least 30 minutes?”; and a measure of eating habits,

which was based on the question “How many servings of fruits, fruit juices, or vegetables did you eat yesterday?”.

By using the covariates and the participation in school sports, a two-step regression analysis was carried out for the dependent variables (i.e., GPA and the scores from the five subscales). The first model included all covariates as predictors. In the second model, in addition to the covariates, participation in school sports was included as an additional predictor. R-squared change between the first and the second models was compared to obtain the unique contribution of participation in school sports after the effects of other covariates were taken into account.

RESULTS

Table 4 provides a summary of descriptive statistics for the dependent variables in this study. Also, Figure 1 shows the distribution of the dependent variables across the two levels of school sports participation (i.e. participating vs. not participating). Descriptive statistics show that the two groups tend to differ in terms of GPA, family support, and school safety. Students who participate in school sports tend to have a higher GPA, better family support, and more school safety than those who do not participate. To obtain more in-depth information regarding the difference between the two groups, multiple regression analyses were carried out using the predictors explained earlier. The results of the regression analyses were presented in Table 5.

Table 5

Figure 2

The results indicated that participation in school-based sport activities was a significant predictor for all of the outcome variables after controlling for the effects of the covariates (gender, SPED, SES, physical activity, daily diet, and ethnicity). Participation in school-based sport activities was positively related to GPA, family support, teacher and community support, and the perception of school safety. Participation in school-based sport activities was found to be negatively associated with alcohol and drug use and engagement in risky behaviors.

When examining the models presented in Table 5 changes in R-square from the regression model in Step 1 to the regression model of Step 2 for each outcome variable contains the most valuable information about the impact of participation in school sports. The models in Step 1 include all covariates but do not include the school-based sport activities variable, and the model in Step 2 included the covariates and participation in school-based sport activities. Change in R-squared between Step 1 and Step 2 indicates the unique contribution of participation in school-based sport activities for predicting the outcome variable.

The highest change in R-squared values was obtained when GPA was used as the outcome variable. 3% of the total variance in GPA was explained by participation in school-based sport activities. Considering participation in school-based sport activities is not anticipated to have a direct effect on student achievement, the impact of this predictor on GPA was fairly high. This finding implies that students who participate in sport activities at their schools tend to be

more successful than students who do not participate in such activities. The other outcome variables that participation in school sport activities was highly influential based on R-squared change were perceptions of teacher and community support (2%), and school safety (2%). These findings indicate that the students who participate in school sport activities perceive more teacher and community support and tend to agree more that school is a safe place when compared to the students who do not participate in those sport activities at school.

Although the effect of school sport activities was statistically significant for the other outcome variables, the impact of this predictor was relatively small (1% or less) based on the change in R-squared values. The results of this study show that participation in school sport activities has a strong relationship with student achievement and students' perception of school safety and teacher/community support. Participation in school sport activities did not seem to explain the variation in the measures unrelated to school.

SIGNIFICANCE

This study suggests that participation in school-organized sports can benefit students on both the academic and social levels. Students who participate in school organized sports are not only likely to have higher GPAs but also are more likely to perceive that they have teacher and community support, and that their school is a safe environment. More moderate findings suggest that these students also engage in less alcohol and drug use, less risky behaviors and perceive that they have more family support than their non-sports playing peers. Given that participation in school-organized sports provides many positive youth development outcomes,

schools should consider promoting school-organized sports and other afterschool organized activities to students. That is not to say that participation in school-organized sports will increase grades and positive youth development outcomes, but given the same context, students who participate do appear to perform at a higher level, when matched with peers.

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Appendix

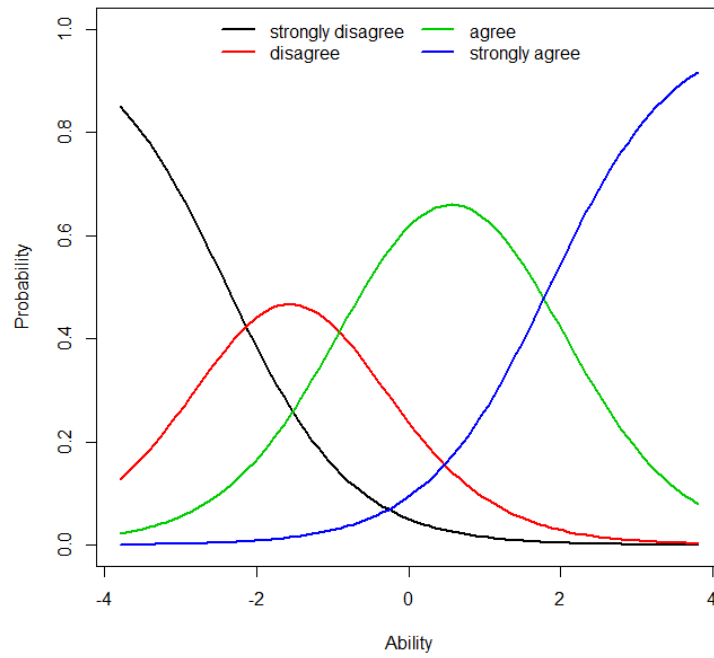


Figure 1. A hypothetical question with four ordered response categories

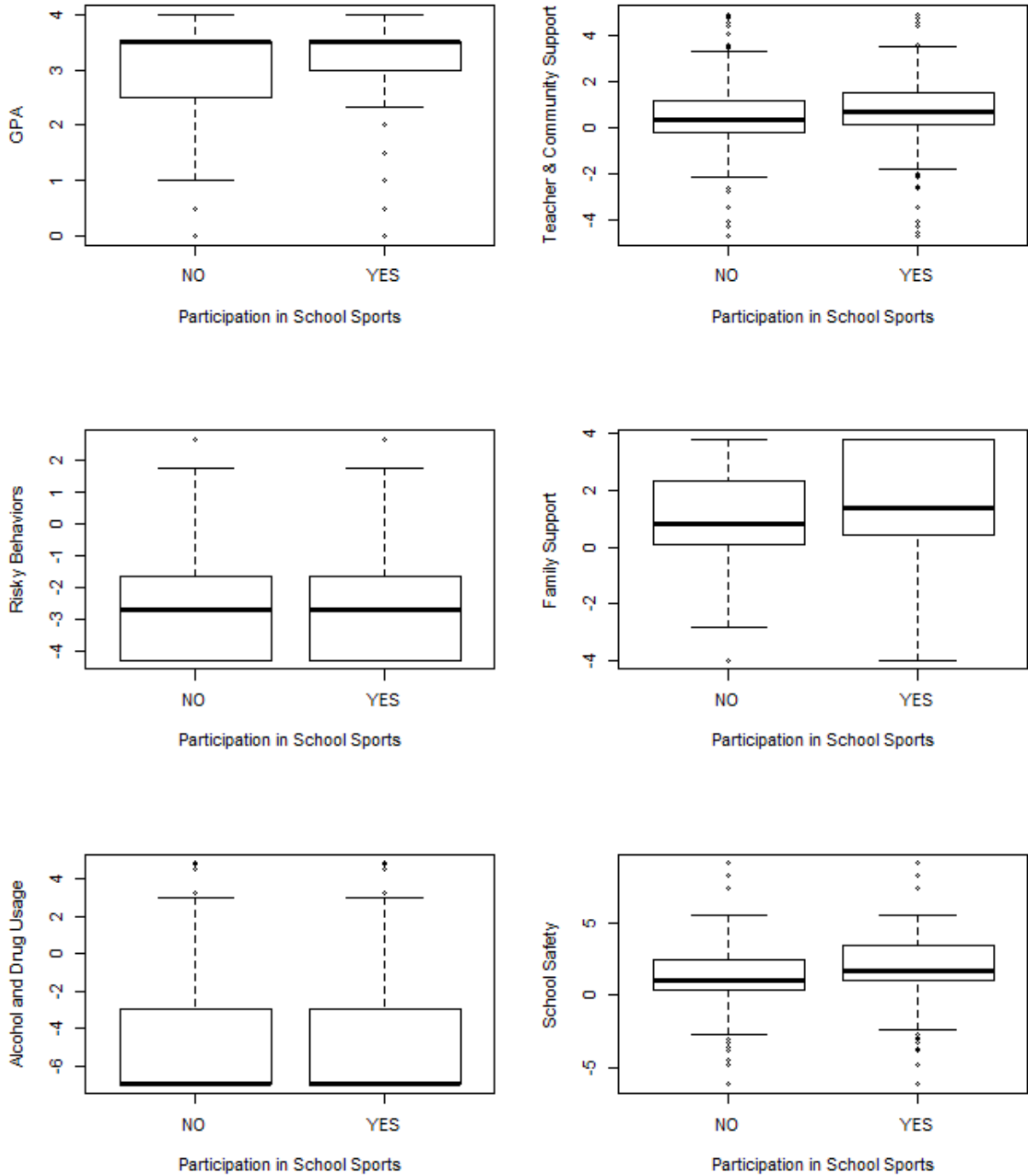


Figure 2. Box plots of the six dependent variables and the participation in school sports

Table 1

Frequencies of the covariates across the two levels of participation in school sports

| | | Participation in School Sports | | | | | |
|--|--------------------|--------------------------------|-----|-------|-----|-------|------|
| | | Yes | | No | | Total | |
| | | N | % | N | % | N | % |
| Gender | Male | 11785 | 53% | 10598 | 47% | 22383 | 100% |
| | Female | 11572 | 50% | 11423 | 50% | 22995 | 100% |
| IEP | Yes | 3374 | 44% | 4324 | 56% | 7698 | 100% |
| | No | 19052 | 53% | 16606 | 47% | 35658 | 100% |
| Free or reduced-price lunch | Yes | 4212 | 35% | 7886 | 65% | 12098 | 100% |
| | No | 18797 | 58% | 13744 | 42% | 32541 | 100% |
| Physically active days for a combined total of at least 30 minutes | 0 days | 629 | 20% | 2589 | 80% | 3218 | 100% |
| | 1 day | 616 | 23% | 2115 | 77% | 2731 | 100% |
| | 2 days | 1194 | 29% | 2919 | 71% | 4113 | 100% |
| | 3 days | 1691 | 37% | 2921 | 63% | 4612 | 100% |
| | 4 days | 2175 | 46% | 2558 | 54% | 4733 | 100% |
| | 5 days | 4910 | 57% | 3697 | 43% | 8607 | 100% |
| | 6 days | 3547 | 73% | 1310 | 27% | 4857 | 100% |
| | 7 days | 8307 | 71% | 3457 | 29% | 11764 | 100% |
| Servings of fruits, fruit juices, or vegetables eaten yesterday | 0 servings | 854 | 32% | 1780 | 68% | 2634 | 100% |
| | 1 serving | 2390 | 41% | 3424 | 59% | 5814 | 100% |
| | 2 servings | 4792 | 49% | 5021 | 51% | 9813 | 100% |
| | 3 servings | 5445 | 53% | 4836 | 47% | 10281 | 100% |
| | 4 servings | 4538 | 58% | 3233 | 42% | 7771 | 100% |
| | 5 servings | 2492 | 62% | 1513 | 38% | 4005 | 100% |
| | 6 servings | 1138 | 61% | 722 | 39% | 1860 | 100% |
| | 7 servings | 397 | 61% | 258 | 39% | 655 | 100% |
| | 8 or more servings | 832 | 56% | 648 | 44% | 1480 | 100% |

Table 2

Reliability results for the five subscales

| Subscale | N | α |
|-------------------------------|----|----------|
| Alcohol & drug use | 4 | .71 |
| Engagement in risky behaviors | 5 | .75 |
| School safety | 9 | .81 |
| Family support | 4 | .69 |
| Teacher & community support | 10 | .79 |

Note: α : Coefficient alpha; N: Number of items in the scale.

Table 3

Correlations among the six measures obtained from the PCM analysis

| | ADU | ERB | SS | FS | TCS |
|-----|-----|-----|------|------|------|
| ADU | 1 | .45 | -.18 | -.28 | -.25 |
| ERB | | 1 | -.26 | -.31 | -.31 |
| SS | | | 1 | .32 | .43 |
| FS | | | | 1 | .48 |
| TCS | | | | | 1 |

ADU: Alcohol & drug use; ERB: Engagement in risky behaviors; SS: School safety; FS: Family support; TCS: Teacher & community support.

Table 4

Descriptive statistics for the six dependent variables across two levels of participation in school sports

| | Participation in School Sports | | | | | |
|---------------------------|--------------------------------|------|-------|------|-------|------|
| | Yes | | No | | Total | |
| | Mean | SD | Mean | SD | Mean | SD |
| GPA | 3.15 | .67 | 2.72 | .95 | 2.94 | .84 |
| Teacher/Community Support | .91 | 1.27 | .43 | 1.27 | .68 | 1.29 |
| Risky Behaviors | -2.86 | 1.43 | -2.66 | 1.56 | -2.76 | 1.50 |
| Family Support | 1.79 | 1.56 | 1.17 | 1.59 | 1.49 | 1.60 |
| School Safety/Climate | 2.26 | 2.17 | 1.50 | 2.16 | 1.89 | 2.20 |
| Alcohol & Other Drug Use | -5.34 | 2.78 | -4.71 | 3.39 | -5.04 | 3.10 |

Table 5

Results from the two-step multiple regression analyses

| Predictors | Outcomes | | | | | | | | |
|--------------------|----------------|---------|-------|----------------------|---------|-------|-----------------|---------|-------|
| | GPA | | | Alcohol and Drug Use | | | Risky Behaviors | | |
| | R ² | β | S.E. | R ² | β | S.E. | R ² | β | S.E. |
| Step 1 | .16 | | | .02 | | | .05 | | |
| Gender | | 0.218 | 0.008 | | 0.032* | 0.032 | | -0.348 | 0.015 |
| SPED | | -0.217 | 0.011 | | 0.124 | 0.043 | | 0.051 | 0.021 |
| SES | | -0.345 | 0.009 | | 0.662 | 0.041 | | 0.332 | 0.019 |
| Psychical Activity | | 0.051 | 0.001 | | -0.051 | 0.007 | | -0.005* | 0.003 |
| Eating Habits | | 0.048 | 0.002 | | -0.056 | 0.009 | | -0.026 | 0.004 |
| American-Indian | | -0.459 | 0.037 | | 1.168 | 0.151 | | 0.508 | 0.071 |
| African-American | | -0.217 | 0.020 | | -0.071* | 0.082 | | 0.297 | 0.039 |
| Latino | | -0.381 | 0.017 | | 0.859 | 0.071 | | 0.432 | 0.033 |
| Asian | | 0.171 | 0.018 | | -0.444 | 0.074 | | -0.208 | 0.035 |
| Other/Multiple | | -0.203 | 0.014 | | 0.722 | 0.060 | | 0.434 | 0.028 |
| Step 2 | .19 | | | .03 | | | .05 | | |
| Gender | | 0.211 | 0.007 | | 0.046* | 0.032 | | -0.344 | 0.015 |
| SPED | | -0.205 | 0.011 | | 0.104 | 0.043 | | 0.044 | 0.021 |
| SES | | -0.309 | 0.009 | | 0.600 | 0.040 | | 0.314 | 0.019 |
| Psychical Activity | | 0.031 | 0.001 | | -0.016 | 0.008 | | 0.004* | 0.003 |
| Eating Habits | | 0.044 | 0.002 | | -0.049 | 0.009 | | -0.024 | 0.004 |
| American-Indian | | -0.441 | 0.037 | | 1.137 | 0.151 | | 0.499 | 0.071 |
| African-American | | -0.212 | 0.020 | | -0.079* | 0.082 | | 0.294 | 0.039 |
| Latino | | -0.361 | 0.017 | | 0.821 | 0.071 | | 0.421 | 0.033 |
| Asian | | 0.208 | 0.018 | | -0.508 | 0.074 | | -0.227 | 0.035 |
| Other/Multiple | | -0.188 | 0.014 | | 0.696 | 0.059 | | 0.426 | 0.028 |
| School Sports | | 0.261 | 0.008 | | -0.451 | 0.035 | | -0.131 | 0.016 |

NOTE: All values are statistically significant unless otherwise marked by * which denotes cases where $p > .05$

Table 5 (Continued)

Results from the two-step multiple regression analyses

| Predictors | Outcomes | | | | | | | | |
|--------------------|-----------------------------|---------|-------|----------------|---------|-------|----------------|---------|-------|
| | Teacher & Community Support | | | Family Support | | | School Safety | | |
| | R ² | β | S.E. | R ² | β | S.E. | R ² | β | S.E. |
| Step 1 | .05 | | | .09 | | | .04 | | |
| Gender | | 0.188 | 0.013 | | -0.115 | 0.016 | | -0.055 | 0.022 |
| SPED | | 0.139 | 0.017 | | -0.064 | 0.022 | | -0.168 | 0.031 |
| SES | | -0.231 | 0.016 | | -0.525 | 0.020 | | -0.407 | 0.028 |
| Psychical Activity | | 0.076 | 0.003 | | 0.086 | 0.003 | | 0.106 | 0.005 |
| Eating Habits | | 0.070 | 0.003 | | 0.079 | 0.004 | | 0.046 | 0.006 |
| American-Indian | | -0.427 | 0.062 | | -0.664 | 0.076 | | -0.650 | 0.106 |
| African-American | | 0.009* | 0.033 | | -0.317 | 0.041 | | -0.429 | 0.058 |
| Latino | | -0.159 | 0.029 | | -0.318 | 0.036 | | -0.380 | 0.050 |
| Asian | | -0.082 | 0.031 | | -0.564 | 0.037 | | -0.448 | 0.051 |
| Other/Multiple | | -0.374 | 0.024 | | -0.594 | 0.030 | | -0.601 | 0.042 |
| Step 2 | .07 | | | .10 | | | .06 | | |
| Gender | | 0.178 | 0.013 | | -0.125 | 0.016 | | -0.071 | 0.022 |
| SPED | | 0.154 | 0.017 | | -0.048 | 0.021 | | -0.145 | 0.031 |
| SES | | -0.185 | 0.016 | | -0.478 | 0.020 | | -0.335 | 0.028 |
| Psychical Activity | | 0.051 | 0.003 | | 0.060 | 0.004 | | 0.066 | 0.005 |
| Eating Habits | | 0.065 | 0.003 | | 0.073 | 0.004 | | 0.039 | 0.006 |
| American-Indian | | -0.403 | 0.061 | | -0.639 | 0.075 | | -0.613 | 0.105 |
| African-American | | 0.015* | 0.033 | | -0.310 | 0.041 | | -0.419 | 0.057 |
| Latino | | -0.131 | 0.028 | | -0.289 | 0.035 | | -0.336 | 0.049 |
| Asian | | -0.035* | 0.030 | | -0.515 | 0.037 | | -0.372 | 0.051 |
| Other/Multiple | | -0.355 | 0.024 | | -0.574 | 0.029 | | -0.571 | 0.041 |
| School Sports | | 0.329 | 0.014 | | 0.347 | 0.017 | | 0.525 | 0.024 |

NOTE: All values are statistically significant unless otherwise marked by * which denotes cases where $p > .05$