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## Relationships between sports, physical activity participation, and Phys-Ed GPA: Results and analyses from a national sample of Asian American students

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### Abstract

Relationships among sports, physical activity (PA) participation, and educational outcomes have been studied in various venues, however, used a longitudinal method with a national sample of Asian-American High-School Students (AAHSS) was barely covered. This study employed the latest National High-School Longitudinal Study data (Participants, N = 950); hierarchical regression modeling and intersectionality theory examined, analyzed, and evaluated the relationships among sports, PA participation, and the outcomes on the physical education grade point average (Phys-Ed GPA). Moreover, the demographics factors impact on the participants' Phys-Ed GPA was also analyzed and evaluated. The primary results included: 1) the female students who participate in Organized Sports had a higher Phys-Ed GPA, and that relationship was true for male students with the exception that this relationship is not statistically significant once demographic variables are added to the model. 2) Hours Spent on Extracurricular Activities had no effect on Phys-Ed GPA for both male and female students. 3) The impact of Academic Behavior was positive and robust, that is, to female and male participants, the higher the Academic Behavior the higher the Phys-Ed GPA. 4) Having Pride in one's school had a positive relationship with the Phys-Ed GPA for the female students; however, no significant effect for the male students; and etc. Our findings confirmed and reinforced the importance of participating in sports and PA in fostering positive attitude toward which resulting better Phys-Ed GPA, and other educational outcomes for the Asian-American high school students. Our investigation further explains the importance of redistributing social structures in order to create equal educational opportunities for Asian American communities and their children, all of these may provide meaningful information or a scientific basis for the policymakers to make future policy.

**Keywords:** physical activity; gender disparities; socioeconomic status; academic achievement.

### Introduction

Researchers in the field of young peoples' physical health and academic learning outcomes indicated that one of the most effective approaches to obtain the amount of physical activities (PAs) they need is to encourage the young peoples to participate in organized after school sports programs, referred to as Sports Participation (e.g., Cho et al., 2017; Rushin, 2015; Weston, et al., 2020). Researchers further pointed out that: there is a positive correlation between sports participation and academic accomplishment (e.g., Pate et al., 2016; Rushin, 2015; Weston, et al, 2020). Physical activities have been identified as an important ingredient in attaining a healthy lifestyle and higher academic achievement (e.g., Cho et al., 2017; Pate et al., 2016; Weston, et al., 2020). Pate, et al. (2016) and Weston et al. (2020) indicated that despite the contribution of PAs to adolescent health status, opportunities for adolescents to engage in PAs are limited in the US; this is particularly true for minority ethnic groups (such as the Asian American students).

Researchers indicated that there is a complex interaction of multiple factors that influences the positive effects of PAs (e.g., Hasson, 2017; Meyer et al., 2014; Rushin, 2015; Weston, et al., 2020). These factors include socioeconomic status (S.E.S.) perception of neighborhood safety, race, and gender. Being able to and engaging in physical activities (PAs), however, are affected by multiple factors. For instance, a critical factor influencing access and utilization is socioeconomic status (S.E.S.), which directly affects PAs at the resource level (Owen, et al., 2018). However, other factors related to the S.E.S. (E.g., as knowledge of the potential benefits of PAs to academic achievement (Lakes et al., 2013), access to a safe environment to engage in PAs (Meyer et al., 2014), residential area (Katzmarzyk et al., 2016), and parental household configuration (Battle & Smiley, 2018) also play a critical role in the type, frequency, duration, and intensity of PAs available to children and adolescents. Moreover, those researchers concluded that despite findings from previous researches showed that Sports Participation and higher PAs levels were associated with better Academic Accomplishment among adolescents, it remains unclear whether those correlations were due to the criteria for sports team participation (mainly because to be enrolled in a school sports team, students are required to maintain certain academic grades) or the ability to engage in relatively higher daily Physical Activity amount (Weston, et al., 2020). Obviously questions

such as the relationship between the Sports engagement, PAsParticipation, and Academic Performances at the adolescents level are not clear and need to be further examined.

To address the issues indicated above, our study would focus on how the sports and PAs participation associate with the Phys-Ed GPAs of the participants; furthermore, we would investigate how the related factors, such as socioeconomic status, perception of safety, gender, and residential status on their sports and PAs participation and Phys-Ed GPAs. In brief, the primary purposes of this study were to: identify the current status of Asian American high-school students' sport and PAs participation associate with their Phys-Ed GPA; find out how those related factors impact their sports and PAs participation and Phys-Ed GPAs; and provide meaningful recommendations for the policymakers to developing structural interventions that might improve the educational environment for the Asian-American communities.

**Features of Asian Americans.** In the U. S., Asian Americans were identified as one of the many minority ethnic groups; however, with regard to the present topic, such investigation might have been done in other minority ethnic groups, but for the Asian Americans, this kind of investigation is barely conducted (Chang, 2017; Liu & Xie 2016). Chang (2017) conducted a study that was close to the scope of the present study. In his study, Chang (2017) employed the 'Intersectionality' as the theoretical framework; his participants were from Asian American communities. Some key findings from his studywere: 1) Asian Americans consist of approximately 20 million people in the U.S. or about 5% of the total population. 2) Approximately 20% or 4 million are at primary or secondary school age, but more than 1.1 million are at college or university age. 3) Asian-American includes people who have ethnic backgrounds in South Asia (e.g., Bangladesh, India, Pakistan, and Sri Lanka), Southeast Asia (e.g., Cambodia, the Philippines, Thailand, and Vietnam), and East Asia (e.g., China, Japan, Korea, and Taiwan). 4) Asian-American" is a combination term used to categorize a very diverse, heterogeneous, and transnational set of populations; as a result, Asian-Americans as an ethnic group presented various challenges in education, and related research (e.g., educational policy) in the U.S. (Chang, 2017).Moreover, concerning the notions of intersectionality and transnationalism related to the Asian-American, Chang (2017) indicated, "Asian Americans are characterized as the Model Minority or the oppressed minority persistently, the relevance of such static binaries, however, has increasingly been challenged as the Asian American populations and migrations continue to diversify and increase (p. 1)."

**Asian Americans and Their Education Status.** There are many similarities and differences in the characteristics of Intersectionality among Asian Americans, African Americans, and Latinx populations. Research studies focused on the Asian American population are significantly less in number when compared to other minority ethnic groups; therefore, in addition to identifying the most recent study results from the Asian American population, this paper utilized the methodologies and findings from the other ethnic groups as a reference whenever relative discussion and analyses are needed.Hsin and Xie (2014) combined data from two nationally representative longitudinal surveys to compare Asian American and White-American students in their educational trajectories from kindergarten through high school. Based on their study "Explaining Asian Americans' academic advantage over whites". The investigators illustrated that: Asian Americans' academic advantage can be attributed to three elements. Element one is socio-demographic characteristics; element two is the ability to execute what has to be done; element three is academic effort, measured through characteristics such as attentiveness and work ethic. Moreover, they found that the educational advantage of Asian Americans couldbe mainly attributed to Asian students investing greater academic effort, and not to advantages in tested cognitive abilities or socio-demographics. Further, they pointed out that the gap in academic effort between Asian Americans and white Americans can be attributed to the following: (a) cultural differences in beliefs regarding the connection between effort and achievement; (b) the immigration status of their family; and (c) the potential psychological and social costs associated with Asian American achievement success (Hsin & Xie, 2014).

With regard to Asian American students' superior academic performance, Zhou and Lee (2014) stated that this phenomenon has been reported on various occasions and in different journals; however, these results have not yet been widely accepted nor explained. The investigators analyzed two nationally representative cohort longitudinal surveys (these surveys compared Asian American students and White American students in their academic outcome records from kindergarten through high school). They concurred with the three factors indicated by Hsin and Xie (2014).

Liu and Xie (2016) adopted a different strategy, that is, an interactive approach, to examine the role of culture and S.E.S. in explaining Asian American students' academic achievement. The Education Longitudinal Study (2002) was employed as the baseline data to test the proposition that the cultural orientation of Asian American families was different from the White American families in ways of mediating the effects of family S.E.S. on children's academic achievement. Their major findings were: (1) The positive effects of S.E.S. on academic achievement are stronger among White students than among Asian Americans; (2) the association of family's S.E.S. with behaviors and attitudes is weaker among Asian Americans than among Whites (p. 210). Liu and Xie (2016) explained that Asian American students' behaviors and attitudes are less influenced by their family on the S.E.S. than those of White American students' are and this difference helps generate Asian American students' higher academic achievement, which enables them to counteract the effects of SES. This is particularly evident in lower incomes family.

**Physical Activity and Gender.** Studies on the role of gender on behavior (e.g., Battle & Smiley 2018; Katzmarzyk et al., 2016; Papas, 2019) suggest that academic achievement should be evaluated from a perspective that acknowledges the female experience. Intersectionality theory (e.g., Browne & Battle, 2018) posits that an individual can face multiple sources of oppression related to multiple poles of identity, for example, gender, race, and age. In particular, Katzmarzyk et al.'s (2016) analysis of the 2016 United States Report Card on Physical Activity for Children and Youth found gender differences related to the indicator of Organized Sport Participation. They found that 54.0% of high school students participated on at least one sports team, with significant gender differences (males 59.6% compared to 48.5% of females). Hoelscher et al.'s (2009) analysis of the 2000–2002 School Physical Activity and Nutrition (SPAN) Survey indicated significant differences in participation by gender. Female sports participation declined in the 4th, 8th, and 11th grades (48.1%, 45.5%, 44.7%, respectively); in contrast, their male counterparts increased their participation as they progressed in those grades (51.9%, 54.6, and 55.3%).

Not all investigators have reported similar results regarding the influence of S.E.S., race, and gender on physical activity. In an investigation of differences in self-reported sport participation between genders, ethnic groups, grades, and socioeconomic status, Pharr and Lough (2014) reported that Black female students presented higher participation scores in sports activities than anticipated; likewise, White female students participated less than expected. Simultaneously, Black male students participated more in sports activities than their White counterparts. Unfortunately, there was no information regarding the participation of Asian American female students' in sports.

**Physical Activity and Safe Environment.** The results of multiple research projects (suggest the existence of a complex relationship between physical activity and safety in the environment (E.g., Katzmarzyk, et al., 2016; Papas, 2019; Weston, et al., 2020). Neighborhood safety, race, and gender contributed to the results, i.e., low socioeconomic status was associated with increased safety concerns. Furthermore, safety concerns were negatively associated with physical activity, i.e. the greater the level of concern for safety, the lower the level of self-reported health. In the final model, the mean scores for socioeconomic status were higher for Whites than their non-White counterparts and for males than females. Also, higher socioeconomic status was associated with greater perception of neighborhood safety, and perception of safety was associated with greater physical activity (Weston, et al., 2020).

**The Theory of Intersectionality.** This theory identified the ways in which race, gender, and class intersected, and creating unique experiences for minorities in American society. Specifically, this theory conveyed and illustrated the ways in which oppression occurred among specific races, genders, and social classes. Over the last three decades, many researchers have investigated gender differences in health, education, and other issues (e.g., Bermúdez et al., 2011; Kiehne, 2016; Weston, et al., 2020). For example, Bermúdez et al. (2011) examined the importance of recognizing Mexican-Origin feminism and its relevance to Intersectionality theory. They described and illustrated that the primary reasons for incorporating Mexican-Origin American feminism into family research are to elucidate the strengths within the Mexican-Origin American community highlight women's experiences, and better understand the sources of their empowerment (Bermúdez et al., 2011). Weston, et al. (2020) examined how to recognize African-American or Black students' relevance to the Intersectionality theory. Their findings further emphasized or reinforced the importance of participating in sports, and extracurricular activities in fostering positive educational outcomes among Black students, as well as black males and females nationally (Weston, et al., 2020). Weston, et al. (2020) also made meaningful recommendations for the parents, community leaders, teachers, school administrators, and policymakers to regard implement strategies to optimize the benefits of Physical Activity to Black adolescents.

From a different perspective, Kiehne (2016) indicated that nativism, an aspect of the Intersectionality Approach, played a critical role for Asian American communities. However, it is important to understand that the Intersectionality Approach is born out of the lack of attention to gender identity. Brown and Battle (2018) suggested that because 'Intersectionality Theory' provides a broader theoretical perspective that situates race, class, and gender as a new field of intersection studies, it has attracted the attention of many researchers worldwide. Multiple SES and geographical locations are experienced simultaneously, and are mutually reinforcing; therefore, all things must be considered together rather than independently (Browne & Battle, 2018). These social factors are not always equal but are mutually impactful in relation to one another while serving as the basis for anti-discrimination and low-class prospects (Browne & Battle, 2018). Moreover, Browne and Battle (2018) pointed out that this theoretical framework provides a powerful tool for analyzing the social, economic, and educational status of various ethnic groups including Asian Americans.

## Methods

The data for this research came from the National High School Longitudinal Study (NHSLs, 2009), which the National Centre for Educational Statistics (NCES), a primary federal entity for collecting and analyzing data related to education, designed. The baseline survey was administered to 9th-grade students in 2009, and the sample size included 944 schools with over 23,000 students and their parents, school counselors, administrators, and teachers. The survey sampled public, private, and Catholic schools and randomly selected 9th-grade students from within each school. As a result, the sample size of Asian-American students was 950 (N = 950). Then, the

follow-ups began in 2012 when the majority of the students would be in the 11th grade. In 2013, high school transcripts were collected. Finally, the last follow-up occurred in 2016, when most students were three years into their post-secondary education phase, in which many students were either in college, employed, or had never attended college.

**Dependent variable.** *Physical Education GPA* is a variable indicative of a student's GPA for Personal Health and Physical education courses (simplified as *Phys-Ed GPA*). Courses include traditional subjects such as gym classes that are largely physical activity-based, as well as courses tailored towards physical education, such as learning about exercise and nutrition. Grade point average for this variable is reported on a 4.0 scale, with 4.0 being the highest, and 0 being the lowest. However, in this data set the lowest GPA reported is 0.25. A group of researchers employing a meta-analytic strategy analyzed 26 studies that investigated physical activity and academic achievement among 10,295 students 4–14 years of age (Álvarez-Bueno et al., 2017). The researchers found that PAs positively influenced several aspects of academic achievement, including mathematics-related skills, reading, and composite scores. Similar findings were reported by Fox et al. (2010), who investigated the influence of PAs and school sport participation on GPA using self-report data drawn from surveys given to 4,746 middle and high school students participating in Project Eating Among Teens (EAT). The researchers reported a positive association for both sport participation and PAs on GPA. Fox et al. (2010) pointed out that they were unable to untangle the influence of academic requirements for sports participation upon GPA from the influence of PAs upon GPA; hence, our study utilized the participants' GPA in Personal Health and Physical Education class as the dependent variable.

**Independent variables.** *Sports Participation* is a dummy variable reflecting whether a student participated in organized sports outside of school (1 = yes, 0 = no). This measurement strategy has been used consistently in investigation of the mental and physical benefits of physical activity (Super et al., 2018, Weston et al., 2020). *Hours Spent on Extracurricular Activities* is a dummy variable reflecting the number of hours a student spends on extracurricular activity on a typical school day. *Academic Behavior* is a composite variable taking the average of the following questions: "Indicate your times in class without homework in the last 6 months of school? Indicate your times in class without notetaking supplies in the last 6 months of school? Indicate your times in class without books/reading material in the last 6 months of school?" These variables were all originally coded 1-5, 1 = never, 2 = 1-2 times, 3 = 3-6 times, 4 = 7-9 times, 5 = 10 or more times. Once these variables were combined and averaged together, the Cronbach's alpha = 0.07; further, the coding was reversed, so that higher numbers would be reflective of better academic behavior. This was done for ease of analysis. *Feels Safe at School* is a dummy variable that investigates whether a student feels safe in school or not (1 = yes, 0 = no). *School Pride* is a dummy variable that investigates whether a student is proud to be a part of his/her school or not (1 = yes, 0 = no). *Gender* is a variable indicating student's sex, (1 = female, 0 = male). The importance of viewing gender differences and potential gender stereotyping has gained increased recognition among health professionals (Battle & Smiley, 2018). *Urbanicity* is recoded into a series of dummy variables that reflect the school's urbanicity. Separately included are City (1 for the City, 0 for all else), Town (1 for Town, 0 for all else), and Rural (1 for Rural and 0 for all else), with suburban being the reference category. *South* is a dummy variable indicating whether the school's region is in the south or not (1 = south, 0 = another region).

*S.E.S.* is a standardized variable reflecting socioeconomic status, which is a combination of income, education, and occupational prestige. This approach to quantifying S.E.S. has been used by investigations of other national samples (United States Department of Education, Institute of Education Sciences, 2016). *Born in the U.S.A.* is a dummy variable that investigates whether or not a student is born in the U.S.A. or not (1 = Born in the U.S.A., U.S. Territory or Puerto Rico, 0 = another country). *Two-Parent Household* is a dummy variable indicating whether or not a student lives in any kind of two-parent household (1 = any 2-parent configuration, 0 = other). The role of a two-parent family household has come under increased scrutiny, particularly as it has been applied to families of color (Browne & Battle, 2018; Weston et al., 2020). Specifically, we were seeking for the answers that related to the 11 independent variables (as described above). The following are our null hypotheses: (1) No significant differences exist in cognitive function or *Phys-Ed GPA* between the Asian American high school students who participated in 'organized after school sports' or not. (2) No significant differences exist in different related factors (including gender, urbanicity, region, S.E.S. born in the US, and parent households) with regard to their *Sports Participation* and *Phys-Ed GPA*. (3) No significant differences exist in cognitive function or *Phys-Ed GPA* of Asian American high-school students between males and females.

To overcome the limitations of those previous studies, in regard to the size of sampling, duration of the investigation, and data analysis techniques, this paper (1) utilized the data from the National High School Longitudinal Study (NHSLs) - by the National Center for Educational Statistics, a primary federal entity for collecting and analyzing data related to education in the United States. This data set possesses the largest sample size relative to the topic of Asian American high school student research. (2) Employed more variables' or relative factors in the study (i.e., 11 meaningful variables; these variables are counted as the most extensive information collection for this topic ever). And (3) adopted the 'OLS Regression' technique for determining different models for the participants was the first attempt on this particular topic. In brief, the expectations for this study were to: a) provide clear findings or statements on the current status of Asian American high-school students' *Sport Participation* and their *Phys-Ed GPA*; b) provide meaningful suggestions for the policymakers

utilizing the intersectionality perspective as a theoretical guideline; c) develop structural interventions that might affect structural racism and other related factors; and d) improve the educational conditions or environment of Asian American communities.

**Models.** In order to investigate the effect of participation in sports, physical activity, and Phys-Ed GPA; four models were employed for male students, four models were used for female students as well, resulting in eight total models. The first domain of Extracurricular activities only included participated in organized after-school sports (the main independent variable) and Hours spent on extracurricular activities. The second domain included Academic behavior. The third model is a series of School attitude variables including feels safe at school and school pride. The fourth model introduces Demographic variables such as gender, urbanicity, region, S.E.S., born in the U.S., and two-parent households.

**Results**

Table 1 presented a summary of the means, standard deviations, and other descriptive statistics for the dependent and independent variables.

**Table 1.** Means, Standard Deviations, Ranges and Description of Variables for Asian American High School Students (Listwise *n* = 950)

Variables	Mean	S.D.	Range	Description: HSLs Variable NAME & Label
Phys Ed GPA	3.70	0.56	0.25-4.0	<i>Dependent Variable</i> X3 GPA: Physical Education
Participated in Sports	0.45	0.50	0-1	<i>Extracurricular Activities</i> S2 F02D Participated in organized sports outside of school since fall 2009
Hours Spent on Extracurricular Activities	2.28	1.26	1-6	S1 E15D Hours spent on extracurricular activities on typical schooldays
Academic Behavior	3.52	0.52	0-4	<i>Academic Behavior</i> Mean of items: from S2A17C to S2A17G ‘Composite, e.g S2A17E Times in class without books/reading material in last 6 months of school’ (alpha = 0.7)
Feels Safe at School	0.94	0.24	0-1	<i>School Attitudes</i> Recode of ‘S1 E01A 9th grader feels safe at school’ to 1=agree, 0=Disagree
School Pride	0.89	0.32	0-1	Recode of ‘S1 E01B 9th grader is proud to be part of his/her school’ to 1= agree, 0 = disagree
Gender	0.50	.50	0-1	<i>Demographics</i> Recode of ‘X1 Student’s Sex’ to 1=Female, 0=Male.
Urbanicity or Suburban City	0.30	0.46	0-1	X1 School locale (urbanicity)
Town	0.08	0.26	0-1	X1 School locale (urbanicity)
Rural	0.22	0.41	0-1	X1 School locale (urbanicity)
South	0.39	0.49	0-1	X1 School Geographic Region 1=South, 0=Other
Socioeconomic Status (S.E.S.)	0.50	0.49	-1.75-2.88	X1 Socio-economic status composite
Born in U.S.A.	0.62	0.49	0-1	P1 B17 Whether student was born in the U.S.
Two Parent Household	0.87	0.34	0-1	Recode of ‘X1 P1-P2 relationship pattern’ to 1 = all two parent households, 0 = Other

**Multivariate Relationships.** Ultimately eight models were analyzed, i.e., four models were for male students, and the other four models were for female students (details were presented in table 2).

**Table 2.** The OLS Regression on Personal Health and Physical Education Grades for Asian American High School Students (N = 950).

Predictor Variables	Male (n = 461)				Female (n = 489)			
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
<i>Extracurricular Activities</i>	0.14*	0.16**	0.16**	0.10	0.18***	0.17***	0.16**	0.13**
Participated in Organized Sports	(0.06)	(0.06)	(0.06)	(0.06)	(0.05)	(0.05)	(0.05)	(0.05)
Hours spent on Extracurricular activities	0.00	0.00	0.00	0.00	0.02	0.02	0.02	0.02
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
<i>Academic Behavior</i>	---	0.24***	0.24***	0.24***	---	0.17***	0.16***	0.18***
Academic Behavior		(0.05)	(0.05)	(0.05)		(0.06)	(0.06)	(0.06)
<i>School Attitudes</i>	---	---	0.220	0.20	---	---	0.09	0.04
Feels Safe	(0.12)	(0.12)					(0.11)	(0.11)
School Pride	---	---	0.05	0.08	---	---	0.18*	0.17*
	(0.10)	(0.10)			(0.07)	(0.07)		
<i>Demographics</i>	---	---	---	0.11	---	---	---	---
Urbanicity (Suburban) City	(0.07)						-0.03	(0.05)

Town	---	---	---	0.08	---	---	---	0.03
	(0.11)							(0.09)
Rural	---	---	---	0.07	-----	---	---	-0.01
	(0.07)				(0.06)			
South	---	---	---	0.11	---	---	---	0.09*
	(0.06)							(0.05)
Socioeconomic Status	---	---	---	0.12***	-----	---	---	0.11***
	(0.03)				(0.03)			
Born in U.S.A	---	---	---	0.02	---	---	---	0.00
	(0.06)				(0.05)			
Two Parent Household	---	---	---	0.09*	---	---	---	-0.04
	(0.09)				(0.07)			
Constant	3.591	2.768	2.610	2.364	3.608	2.989	2.815	2.755
Adjusted R <sup>2</sup>	0.009	0.062	0.065	0.115	0.032	0.049	0.061	0.086

\* $p < .05$  \*\* $p < .01$  \*\*\* $p < .001$

Table 2 shows that the female students who participate in Organized Sports had a higher Phys-Ed GPA (see models 5-8), and that relationship was also true for male students (see models 1-3) with the exception that this relationship is no longer statistically significant once demographic variables are added to the model (see model 4). Hours Spent on Extracurricular Activities, however, had no effect on Phys-Ed GPA for both male and female students. The impact of Academic Behavior is positive and robust such that the higher the Academic Behavior the higher the Phys-Ed GPA across all models (see model 2-4 and model 6-8). Having Pride in one's school had a positive relationship with the Phys-Ed GPA (see models 7-8) for the female students; however, there was no significant effect for the male students (see model 4). Asian American female students in the south had a higher Phys-Ed GPA than male students not in the south (see model 8) but no such effect for Asian American Male students (see model 4). The impact of S.E.S. is positive and robust, such that the higher the SES the higher the Phys-Ed GPA for both male and female Asian American students (models 4 and 8). The male students in two-parent households tended to have a higher Phys-Ed GPA than their counterparts in single-parent homes (see model 4), and no such effect was seen for the female students (see model 8).

### Discussion

Our investigation results indicated that Participated in Sports (PAs), Hours spent on extracurricular, S.E.S., and other related factors (Urbanicity, Regionally, and Born in the U.S.), school attitudes (Feels safe in school and School pride), and Gender influenced GPA in personal health and physical education. Additionally, the results of the analyses corroborated the complex interaction of these factors with participation in Sports, PAs. Furthermore, our findings demonstrated significant differences in perception of school attitudes (feels safe in school, school pride, and the urbanicity variables) by gender, a result that can be better understood through the prism of intersectionality theory. More discussions on these findings were presented below:

1) *The Related Factors that Had a Significant Impact.* The following six factors had a significant impact on the participants' Sports Participation, Physical Activity amount, and Phys-Ed GPA. Each of these factors is reviewed below: 1) Hours Spent on Extracurricular Activities. Clearly, in the variable of Academic Behavior, all male and female participants demonstrated a consistent positive relationship between Sports Participation and Phys-Ed GPA. That is, the better the Academic Behavior, the higher the Phys-Ed GPA. This result reflected that the schools in this national survey had been effective in modeling or fostering their students' attitudes toward physical education courses (involved engagement in medium to vigorous physical activity daily, participation in after-school sports, etc.). Churchill (2018) stated that attitude makes a big difference, defining attitude as "our response to people, places, things, or events in life. It can be referred to as a person's viewpoint, mind-sets, beliefs, etc. Attitude towards people, places, things, or situations determines the choices that we make." (p. 1). Our findings in this particular variable reflected and verified the definitions and findings by Churchill (2018) and Hsin and Xie (2014).

2) *Academic Behavior* All male and female participants in this variable demonstrated a consistently positive relationship between their *Sports Participation* and *Phys-Ed GPA*. That is, the better *Academic Behavior* the higher score in the *Phys-Ed GPA*. This result reflected that the schools within this data set had very effectively fostered or educated their students' attitudes toward physical education courses (involved regularly engage in medium to vigorous PA, and after school sports, etc.).

3) *School Pride.* This variable reflects a student who is either proud or not proud of his or her school. The finding of this variable from the present study is positive and significant for female students, but that is not the case for the male students (see table 2, models 7-8 and models 3-4). We believe this finding is logical and consistent with the public's expectations. When Asian American female high school students, are the pride of their schools they would be more likely to participate in their schools' after school sports programs or teams, as well as the physical activity programs; however, if they are not so proud of their schools, or they feel that environment was not so safe, they would not want to participate in their schools' sports programs, or teams, or the physical activities. In contrast, Asian American male students' participation in the after-school sports

programs or teams is dependent upon their talent level and interest in participating in those activities. After all, boys and girls at this age level (15-17 years old) demonstrate some differences in making this kind of decision: girls have more consideration for their safety and whether or not the environment is good for them to join sports teams and engage in the physical activities they would prefer. Within these considerations, the factors of pride in their school matter more than their male counterparts. In brief, having pride in one's school for the female students had a positive relationship with the Phys-Ed GPA (see table 2, models 3-4); however, this factor had no effect for the male students (see table 2, models 3-4). This phenomenon is typically true in Asian American communities (Chang, 2017; Churchill, 2018; Hsin & Xie, 2014).

4) *South Region or Non-South Region*. The results for female students who came from the south region, indicated a higher Phys-Ed GPA than their counterparts who did not from the south region (see model 8). However this feature was not true for male students (see model 4), that was, no significant difference between male students who were from the south region or not from the south region regard to their Phys-Ed GPA. The reasons behind this phenomenon remain unclear; it might relate to the sampling size and the cities where the survey took place.

5) *Socioeconomic-Status (S.E.S.)*. As to the impact of *S.E.S.*, our findings were positive and robust, that is, the higher the *S.E.S.* the more students reported participating in organized after-school sports programs and achieved a higher Phys-Ed GPA across two models (Model 4 for male students and Model 8 for female students). This finding is consistent with the findings from those previous studies (Chang, 2017; Churchill, 2018; Hsin & Xie, 2014). Super et al., (2018). These previous research findings have one thing in common, that is, this relationship is positive and solid: the higher the *S.E.S.* the more students participated in after-school sports programs and achieved a better GPA.

6) *Types of Parent Households*. With regard to the Two-parent Household, our findings are partially consistent with the previous studies (e. g., Chang, 2017; Churchill, 2018; Hsin & Xie, 2014; Weston et al., 2020). The studies found that Parental configuration matters; Two-parents households had more time and better conditions to support their children's participation in after school sports programs, in comparison to One-parent household. Findings from our study in Model 4 (for male students) supported those previous studies' conclusions, but our findings in Model 8 (for female students) are inconsistent with previous findings. This means that even though the female students in our study were from Two-parent Households, they did not have a higher GPA. This particular difference or inconsistency may relate to Asian cultural tradition: children's education is always a family's first priority whether a Two-parents household or a One-parents household (e. g., Chang, 2017; Churchill, 2018; Weston et al., 2020).

*The Related Factors that Had No Significant Impact*. Data exhibited in Table 2 that those Asian high-school students who live in City, Town, or Rural, and Born in the U.S. or Not born in the U.S. did not reach significant differences level among their scores in each of these variables or factors. In other words, regardless of residential status or country of birth their current living and educational environments have enabled the male and female Asian high-school students who participated in this national survey to engage in similar levels of participation e in organized sports and to obtain similar educational experience in Phys-Ed courses. However, there are also some inconsistencies between our findings in these related factors and the findings from the reports by those previous researchers. As exhibited in Table 2, the results of this investigation partially supported our second hypothesis of "No significant differences exist in different related factors (including Gender, Urbanicity, Region, S.E.S., Born in the US, and Parent households) with regard to their Sports Participation and Phys-Ed GPA." Again, in Table 2, participants who live in City, Town, or Rural, and Born in the U.S. or Not born in the U.S. had no significant differences in the scores for each of these variables; therefore, this part of the hypothesis was true. On the other hand, with regard to the other variables or factors (including From the South or Not from the South; the S.E.S.; and the Two-Parent Household or Single-Parent Household did reach a significant level among these Asian American high-students, which means that the hypothesis of no difference was rejected.

The results of this study have confirmed that except for male students in model 4 (see Table 2), all male and female Asian American students who participated in Organized after school sports earned higher scores in their Phys-Ed GPA than those students who did not participate in those Organized after school sports. However, the influence of Hours spent on Extracurricular Physical Activity was not evident for male and female students, that is, these male and female Asian American students who spent their time on Extracurricular physical activity did not earn a significantly higher score in their Phys-Ed GPA.

Moreover, Overton (2002) in his earlier study examined 131 high schools sponsored sports teams in North Carolina, and found that students who participated in sports teams achieved higher mean GPAs; and the student-athletes mean testing scores in two major academic courses were significantly higher than those who did not participate in school-sponsored sports teams.

As to why the male students "did not obtain a higher Phys-Ed GPA" in model 4 (see Table 2), this finding was consistent with the findings reported by Rushin (2015); he stated that in order to maximize academic achievement, school sports/athletic teams' faculty and staff must improve their professional qualifications in the preparation of the male student-athletes. Additionally, school administrators must monitor/mentor coaches, teachers, and tutors more effectively so that they can provide better education/service for those male student-athletes.



Additionally, female students who participated in organized after-school sports exhibited a higher Phys-Ed GPA (see Table 2, models 5-8). These findings are consistent with results reported by Donnelly and Lambourne (2011). These researchers found that female students who participated in organized after-school sports demonstrated better academic performance. Therefore, based on the results described above, the first research hypothesis “No significant differences exist in cognitive function or Phys-Ed GPA between the Asian American high school students who participated in Organized after school sports or not.” was rejected (see Table 2, model 5-8, and model 1-3).

**Conclusions.**

Based on the above data presented, analyzed, and discussed, the present study came out with the following points: (1) Asian American students who participated in organized after-school sports achieved a higher Phys-Ed GPA. (2) No significant impact on the Phys-Ed GPA from the Asian American high school students' Hours spent on extracurricular activities, this conclusion is suitable for both male and female Asian American high school students. (3) Asian American female students had greater levels of participation in organized after-school sports than their male counterparts. Thus, these female students achieved a significantly higher Phys-Ed GPA than those of male students. (4) Overall, for Asian American high-school students, the S.E.S. had a positive impact on their educational outcomes, that is, the higher the SES, the more Sports participation, and the higher score in Phys-Ed GPA. (5) The types of parent families did have an impact on the Asian American high-school students' Phys-Ed GPA, but male students in Two-Parent Households achieved a significantly higher Phys-Ed GPA than their female counterparts.

*What this article added?* Our findings are similar to those of previous studies (e.g., Browne & Battle, 2018; Super et al., 2018). Their main point of view was that Asian American’s families, communities, and quality of education are formed by social forces including public policy, neoliberalism, culture, and structural discrimination resulting in disparate racial and gender education and unequal distribution of resources which have negatively impacted Asian American students’ families and communities, and adversely shaped the educational attainment of these Asian American students. Our findings supported the findings of these previous researchers who indicated and illustrated the role of social forces, the larger political economy, and the structural discrimination in shaping household class structure. These social factors also strengthen the contention that household structure can be a poor proxy for educational outcomes of Asian children; rather, cultural capital and S.E.S. may exert a greater impact on educational outcomes (e.g., Browne & Battle, 2018; Super et al., 2018).

On the other hand, researchers have pointed out that the S.E.S. was more crucial in influencing children’s educational outcomes than the household structure (E.g., Super et al., 2018; Weston et al., 2020). Although their studies were conducted in different ethnic groups, we speculate that, as a minority ethnic group, the Asian American experience is similar to those different ethnic groups, in some degree; hence, their findings are meaningful and can be a helpful reference to the Asian American family and students. Our investigation helps to further explain the importance of redistributing social structures in order to create equal opportunity for Asian American communities and their children. At the same time, multiple studies have identified variables that influence educational achievements such as residential segregation, peer influence, school funding, teachers' quality, home environment, and challenging curriculum (e.g., Super et al., 2018; Weston et al., 2020); however, the data about these matters are not great enough, hence, further studies are needed.

Finally, let's with aid of the idea by Pate et al., (2016), make the following suggestions: First, legislators are encouraged to reexamine their budget and to allocate sufficient funds to support enriched physical activity programs in the schools, and community-based programs. Second, these tasks should become a part of the legislators' missions, while parents, community leaders, teachers, and administrators who need to serve as catalysts and executors. Third, these tasks require the development and utilization of advocacy, even litigation expertise. Fourth, addressing the scarcity of resources for program development is particularly necessary for lower socioeconomic status communities (i.e., minority communities) where the built environment. Fifth, The National Physical Activity Plan Alliance (2018) has offered a starting point for interested stakeholders.

Administrators are cautioned to demonstrate cultural competence in the development and implementation of the physical activity program. Moreover, teachers and administrators must address the barriers to participation the plan that would face when implemented, such as class exemptions/substitutions for individual students for reasons that include religious beliefs, and early graduation (i.e., National Association for Sport and Physical Education & American Heart Association, 2012). Lastly, one more thing that needs to point out is: school location is a matter because the neighborhoods or communities surrounding the places in which kids living is the basic conditions for them to participate in sports and physical activity, legislators and administrators need make better efforts to establish such basic conditions for our kids.

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