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Correlates of Physical Activity in Black, Hispanic and White Middle School Girls

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Abstract

Background—A need exists to better understand multilevel influences on physical activity among diverse samples of girls. This study examined correlates of moderate-to-vigorous physical activity (MVPA) among adolescent girls from different racial/ethnic backgrounds.

Methods—1,180 6th grade girls (24.5% black, 15.7% Hispanic and 59.8% white) completed a supervised self-administered questionnaire that measured hypothesized correlates of PA. MVPA data were collected for six days using the ActiGraph accelerometer. Hierarchical regression analysis was used to examine correlates of PA in each racial/ethnic group.

Results—Hispanic girls (n=185) engaged in 21.7 minutes of MVPA per day, black girls (n=289), 19.5 minutes and white girls (n=706), 22.8 minutes. Perceived transportation barriers (+; p=0.010) were significantly and positively related to MVPA for Hispanic girls. For black girls, Body Mass Index (BMI) (−; p=0.005) and social support from friends (+; p=0.006) were significant correlates of MVPA. For white girls, BMI (−; p <0.001), barriers (−; p=0.012), social support from friends (+; p=0.010), participation in school sports (+; p=0.009), and community sports (+; p=0.025) were significant correlates of MVPA. Explained variance ranged from 30 to 35%.

Conclusions—Correlates of MVPA varied by racial/ethnic groups. Effective interventions in ethnically diverse populations may require culturally tailored strategies.

Keywords

Black; Hispanic; white; race/ethnicity analysis; accelerometry

Introduction

Engaging in regular physical activity is beneficial to the health and well-being of children and adolescents.[1] Despite the well-known benefits of physical activity,[2] many youth fail to meet current physical activity guidelines. According to the 2005 Youth Risk Behavior Surveillance Survey, only 35.8% of high school students (9^{th} –12^{th} grade) met the recommended standard of engaging in at least 60 minutes of moderate intensity physical activity on most days of the week, preferably daily.[3] Physical activity levels are lower in girls than boys, with 27.8 % of girls versus 43.8 % of boys meeting that guideline.[4] Moreover, the prevalence of physical activity is lowest in girls from racial and ethnic minority groups. Only 26% of Hispanic girls and 21.3% of black girls meet the recommended guideline, compared to 30.2% of white girls. [5] Because a sharp decline in physical activity occurs during adolescence, particularly in girls, [6] it is essential to develop programs that promote physical activity during this critical period.

In order to determine why racial/ethnic populations exhibit different physical activity patterns, it is important to investigate the psychosocial and environmental correlates that influence physical activity. A review of published research on the correlates of physical activity among children and adolescents conducted by Sallis, et al. (2000) identified several factors that were consistently associated with physical activity among children (ages 4–12), including a healthy diet, intention to be active, parental overweight status, perceived barriers, physical activity preferences, previous physical activity, program/facility access, male gender, and time spent outdoors.[7] Although a number of studies have included minorities, few have both examined the correlates of physical activity by race/ethnicity and included black, Hispanic and white adolescent girls. One study found differences in psychosocial and physical environmental variables between 8^{th} grade white and black girls.[8] In addition, these studies have relied on self-report measures of PA, which have been shown to have limited validity, particularly among children.[9, 10]

In order to understand the differences in physical activity behavior between girls from different racial/ethnic groups, it is important to examine the factors that influence physical activity in diverse samples of adolescent girls. Understanding these differences and the factors that underlie them can aid in the design of more effective, culturally competent interventions to increase physical activity, prevent weight gain, and eliminate health disparities. Accordingly, the purpose of this study was to examine the psychosocial and environmental correlates of moderate-to-vigorous physical activity (MVPA) and vigorous physical activity (VPA) among black, Hispanic and white adolescent girls. This study was guided by a social-ecological model of health behavior.[11]

Methods

Study Design

The Trial of Activity in Adolescent Girls (TAAG) was a multi-center group-randomized trial sponsored by the National Heart, Lung, and Blood Institute (NHLBI).[12, 13] The primary aim of TAAG was to determine whether interventions that link schools to community organizations reduce the age-related decline in moderate-to-vigorous physical activity (MVPA) in middle school girls. TAAG was a collaborative study involving six field centers (University of Arizona, San Diego State University, Tulane University, University of Minnesota, University of Maryland, and University of South Carolina), the coordinating center at the University of

North Carolina, and the NHLBI. Data for the current cross-sectional investigation were collected as part of the baseline assessment administered to 6th grade girls who participated in the TAAG study. Data presented in this report were collected before schools were randomized to intervention or control groups.

Participants

Data collection methods were approved by the institutional review board at each participating university, including the coordinating center Each girl's parent or guardian. provided written informed consent, and all girls provided written assent prior to data collection. The targeted sample was 80% of a randomly selected group of 60 students at each of the six schools at each field center (48 girls × 36 schools = 1728 participants). The field centers exceeded the recruitment goal and a total of 2198 girls (30.6% black, 14.1% Hispanic and 55.3% white) participated in the data collection. Girls who had missing accelerometer data were deleted, and a total of 1366 girls (26.1% black, 16.2% Hispanic and 57.8% white; BMI=20.8±4.9; median MVPA=21.7) remained. After deletions for missing values for demographic and personal/behavioral variables (n=23), and intrapersonal (n=73), intrapersonal (n=72), and community/environmental (n=18) variables, 1180 girls remained for data analysis (24.5% black, 15.7% Hispanic and 59.8% white; BMI=20.7±4.8; median MVPA=21.9).

Measures

Physical Activity

Moderate-to-vigorous physical activity (MVPA) and vigorous physical activity (VPA) were measured using the MTI ActiGraph (formerly Computer Sciences and Applications) uniaxial accelerometer. Each participant wore the monitor for seven days, except at night while sleeping or during any water activity (e.g., bathing, swimming). Although each participant wore the monitor for seven days, data were collected for six days. The accelerometer was attached to a belt that was worn around the waist, with the accelerometer positioned on the participant's right hip. Accelerometer counts were recorded in 30-second time increments to appropriately reflect the activity level of adolescents. Accelerometer readings were processed using methods similar to those reported by Puyau et al.[14] Readings above 1500 counts per half minute were treated as MVPA[15] and counts above 2600 per half minutes were treated as VPA In the event that there were missing activity data, values were replaced via imputation based on the Expectation Maximization (EM) algorithm, which was developed by the TAAG investigators.[16]

Body Mass Index (BMI)

Trained data collectors assessed height and weight according to standardized procedures. All height and weight measures were taken with shoes off and the participant wearing light clothing. Height was measured two times to the nearest 0.1 cm using a portable stadiometer (Shorr Productions; Olney, MD). Weight was measured two times to the nearest 0.1 kg using a portable digital scale (Seca 880; Hanover, MD). If the two measures were ≥ 1.0 cm or 0.5 kg apart, a second set of two measures was taken. The average of each of the two measures was used to calculate BMI by dividing weight (kilograms) by height (meters) squared.

Questionnaire

A self-administered survey instrument, using a paper and pencil format, was administered in a classroom setting, during one 40–45-minute class period. The questionnaire was administered by trained data collectors who provided initial instruction, were available to answer questions, and oversaw the overall procedures of administration. The instrument included sections designed to measure hypothesized determinants of physical activity in youth, including

demographic information. Constructs from the questionnaire were organized into four blocks: personal/behavioral, intrapersonal, interpersonal and environmental factors. These categories were created in accordance with the social ecological framework guiding the TAAG intervention.[17] Descriptions of the variables created to reflect each construct are presented in Table 1. The variables had acceptable consistency (Cronbach's alpha ranging from 0.67 to 0.90) and test-retest reliability (0.56 to 0.78).

Personal and Behavioral Variables

Variables included in the personal and behavior block were: Age (years), Self-Reported Free/Reduced Lunch (yes, no, or don't know/missing), and scale scores reflecting the girl's participation in community sports, school sports, and physical activity classes/lessons outside of the school. Two of these scales, School Sports and Community Sports, were computed as the sum of a checklist (0=no; 1=yes) of 15 sports teams (including "other") that a girl could have participated in during the past year at school or outside of school (one checklist for each). The other scale, Sports and Activity Participation, was computed as the sum of 18 physical activity classes/lessons (including "other") that a girl could have participated in during the past year, outside of school.

Intrapersonal Variables

Measures included in the block of intrapersonal variables included perceived barriers to physical activity, perceived benefits of physical activity, enjoyment of physical activity, and self-efficacy for physical activity. The Perceived Barriers to PA scale was modified from the Amherst Health and Activity Study[18] and was computed as the average of 10 statements answered using a 5-point never-very often (1-5) scale; barrier statements included reasons that could keep a person from being physically active (e.g., bad weather, lack of time, lack of knowledge, not liking to sweat, embarrassment). The Perceived Benefits of PA scale was adapted both from the Benefits scale used in the Amherst Study[19] and the Attitude Questionnaire,[20] and was computed as the average of 9 statements answered using a 5-point disagree-agree (1-5) scale; benefit statements included positive outcomes from being physically active (e.g., spend time with friends, keep in shape, put in good mood, be fun, look better, feel good about self).

The Enjoyment of Physical Activity scale was computed as the average of responses on a 5-point disagree-agree (1-5) scale for 7 statements related inversely to "enjoyment" of PA.[21] The items reflect negative feelings experienced when being physically active (e.g., feel bored, dislike being active, feel frustrated, have no fun, not interesting, depressing, rather be doing something else), which were reverse scored so that higher scale scores reflected more positive feelings or "enjoyment" while being physically active.

The Self-Efficacy for PA scale was measured with a subset of items from a previously validated scale[22] found to form a reliable factor with 8 items.[20] The scale was computed as the average of 8 statements, answered using a 5-point disagree-agree (1-5) scale that reflected a girl's confidence in her ability to find ways to be physically active on most days (e.g., I can be physically active during my free time on most days even if it is very hot or cold outside).

Interpersonal Variables

Measures included in the block of interpersonal variables were two social support scales (family support and friend support) and two school climate scales (teacher-related and boy-related) regarding girls' physical activity.

Social Support

The parent and peer social support scales were originally developed for the Amherst Health and Activity Study.[23] For the TAAG study, five items were averaged to form the Family Support scale (family members encouraged PA; did PA with girl; provided transportation for PA; watched girl do PA; and told girl she's doing well in PA). Three items were averaged to form the Friend Support scale (friends encouraged girl's PA; friends do PA with girl; friends tell girl she's doing well in PA). All the social support items were answered using a 5-point scale (none, once, sometimes, almost every day, or every day).

School climate

In a TAAG pilot study, Birnbaum, et al.[24] used confirmatory factor analysis to develop two scales that assess perceived school climate related to girls' physical activity: (a) perceptions about teachers' behavior (Teacher Climate) and (b) perceptions about boys' behavior (Boy Climate) in relation to girls' PA. Items were answered using a 5-point agree-disagree scale (1 = disagree a lot, 5 = agree a lot), and responses were recoded so that higher scale scores indicated a more "positive climate" for girls' PA. Two items were averaged to form the Teacher Climate scale (i.e., "PE teachers act like they think it is more important for boys to be physically active than girls;" and "most other teachers act like they think it is more important for boys to be physically active than girls"). Three items were averaged to form the Boy Climate scale (i.e., "boys make rude comments around girls who are being physically active;" "being physically active around boys makes me uncomfortable;" "boys stare too much at girls who are being physically active").

Community/Environmental Variables—Measures included in the block of Community/Environmental variables were: (a) School-level Socio-Economic Status, as indicated by the percent of children enrolled in the school who receive free/reduced lunch, and (b) Perceived Transportation Barriers related to participating in after-school activities (e.g., getting home afterwards from school, getting to an activity somewhere other than school, and getting home from an activity somewhere other than school). These questions were created specifically for the TAAG study. Girls rated after-school transportation difficulty on a 4-point rating scale (not at all difficult, somewhat difficult, very difficult, impossible), and the scale score was the mean of the three items.

Statistical Analysis

Means and standard deviations were calculated for the physical activity, personal and behavioral, intrapersonal, interpersonal and community/environmental variables by race/ethnic group. In addition, mixed model ANOVA was performed to determine whether there were differences among the three racial/ethnic groups. Since both MVPA and VPA were skewed, data for these variables were log transformed for all analyses. Product moment correlations were calculated between potential PA correlates and MVPA and VPA by race/ethnic group. Correlations between potential correlates were assessed and indicated that multicollinearity was not an issue. Differences in the magnitudes of the correlation coefficients between either MVPA or VPA and the various personal, intrapersonal, interpersonal, and community/environmental variables for the three groups were compared using a test of homogeneity among two or more correlation coefficents.[25] Essentially, the weighted sum of squares of the z-values corresponding to correlation coefficients were calculated.

Personal and potential PA variables that were bivariately correlated with MVPA or VPA ($p<0.10$) were added in blocks to models separately for each race/ethnic group. After addition of each block of variables (personal, intrapersonal, interpersonal, then community/environmental), a mixed model concordance correlation coefficient corresponding to an R^2

was calculated.[26] The four blocks were entered into regressions in a standard order for each racial/ethnic group. Personal variables were entered first to adjust for non-modifiable correlates, so the models indicated whether other variables explained variance above that explained by demographics. Age, BMI and self-reported free or reduced lunch were controlled for among the three groups. Intrapersonal variables were entered second since many interventions focus on changing psychological mediators. Interpersonal variables were entered third because few interventions have focused on modifying family and other social mediators, and community/environmental variables were entered last. Variables that entered into regressions remained in the model throughout the addition of each block. Significance was set at the 0.05 level. Unstandardized beta coefficients and p-values are presented for the last model. Since MVPA and VPA were log transformed for the analyses, the beta coefficients can be interpreted as percent change in the dependent variable. Proc Mixed in SAS (version 9.1) was used to adjust for group clustering. Girls were nested within schools and schools were nested within the study site. Schools nested in the site were treated as a random variable.

Results

The means and standard deviations for demographic variables and other study variables and the percentages of self-reported free/reduced lunch and school socioeconomic status are presented in Table 2 for each of the three racial/ethnic groups. Since the means of the MVPA and VPA levels were skewed, median values were calculated. The median value for MVPA was 19.5 minutes per day for black girls, 21.7 minutes per day for Hispanic girls, and 22.8 minutes per day for white girls. For VPA, the median value was 4.2 minutes for black girls, 4.5 minutes for Hispanic girls, and 4.7 for white girls. Results from the mixed model ANOVA indicated significant differences among the three racial/ethnic groups. White girls had the lowest means for BMI, self-reported free or reduced lunch, and home alone, and were statistically different than black or Hispanic girls. They also had the highest mean of enjoyment of physical activity and self-efficacy and were statistically different than black or Hispanic girls. For the variable school socioeconomic status the differences between the three racial/ethnic groups were statistically significant, with white girls attending schools with a lower percent of students receiving free/reduced lunch, and Black girls attending schools with the highest percent.

Table 3 shows the correlation coefficients of MVPA and VPA and 16 potential correlates for each racial/ethnic group. Factors that were significantly related among Hispanic girls for both levels of PA were self-efficacy (+), family support (+), and friend support (+). Perceived transportation barriers (+) was significant for MVPA only, and school sports (+) and enjoyment of physical activity (+) were significant for VPA only. Among black girls, age (−), BMI (−), and social support from friends (+) were significant for both levels of physical activity. School climate from boys (−) was significant for MVPA and family support (+) and school climate from teachers (−) were significant for VPA. Factors that were not significantly related to MVPA and VPA for white girls included age, perceived benefits, school climate for boys, home alone, and school climate for teachers. The race comparison analysis (Table 3) indicated that there were significant differences between whites and the other two racial/ethnic groups for various personal factors (community sports, school sports, sports/activity participation history, and age), perceived barriers, and transportation barriers. Table 4 shows the results of the regression analyses for MVPA and VPA. Personal variables explained from 13% to 27% of the variance in the models. For Hispanic girls, after the four blocks of variables were added, perceived transportation barriers was significantly related to MVPA. For black girls, BMI and social support from friends were significant. For white girls, BMI, community sports, schools sports, barriers, and social support from friends were significant. Explained variance for MVPA ranged from 30.2% to 34.6%. For VPA, age, BMI, social support from friends and school climate (teachers) were significant for black girls. For white girls, BMI, barriers, and social

support from friends were significant. Explained variance for VPA ranged from 26.3% to 30.4%.

Discussion

Identifying correlates of physical activity among subgroups of adolescent girls in the same study is important because such information could inform intervention efforts. The present study is unique because it used the same measures and protocols to compare multiple correlates of PA, which included personal, intrapersonal, interpersonal and community/environmental correlates among black, Hispanic and white adolescent girls. In addition, we used accelerometry to assess MVPA and VPA levels. To our knowledge, this is the first study to analyze the same correlates among three racial/ethnic groups using an objective measure of physical activity. One of the most notable results was that different correlates were significantly related to MVPA and VPA across the three racial/ethnic groups. In bivariate analyses significant variables were found in all categories of correlates (personal/behavioral, intrapersonal, interpersonal, community/environment), supporting an interpretation that physical activity among adolescent girls is a complex behavior determined by multiple factors. This finding also supports an ecological model of behavior that conceives behavioral influences from personal, social and environmental factors. Only “friend support” was consistently associated with physical activity in all subgroups and for both MVPA and VPA. This implies that social support/social modeling interventions may be very important for promoting physical activity among all subgroups of girls in this age group. Few variables were significant in multivariate analyses and no single factor was significant in all subgroups. The implication is that interventions must target variables from all categories to achieve behavior change and may need to target specific variables in different race/ethnic groups.

The relationship between body weight variables and physical activity was different among subgroups of girls. Among black and white girls, BMI had an inverse relationship with both MVPA and VPA; however no relationship was observed for Hispanic girls. Biddle et al. conducted a systematic review of correlates among adolescent girls and found that increased BMI was negatively related to PA with a small effect size.[27] Unlike the present study, none of the articles reviewed by Biddle et al. used an objective physical activity measure. A recent TAAG study examined the relationships of body composition (both fat and fat-free mass components) with objectively measured physical activity. The study found significant inverse relationships with fat mass and fat free mass and MVPA and VPA.[28]

In the multivariate analyses, social support from friends was significant among black and white girls for MVPA and VPA; it was significant for all subgroups in bivariate analyses. Previous reviews of correlates of physical activity among adolescents[27, 29] have found that the literature on social support from friends or peers is inconclusive. Reasons for the inconsistent findings include lack of reliability and validity of measures, different measures of physical activity,[30] and the lack of clarity in defining and measuring the constructs of social support.[31] Prochaska et al. conducted a study to determine if the association between social support and physical activity varied when different methods of assessing physical activity in adolescents were used. The study found that the relationship between self-reported physical activity and peer support was significant, while the association between objective monitoring (accelerometer) of physical activity and peer support from friends was not significant.[32] The extent to which the school climate supports girls’ being physically active also may be important. School climate includes the physical environment (adequate facilities), social systems (interpersonal relationships that are respectful of gender differences and social development), cultural standards and gender role expectations (values and norms that support a physically active lifestyle for girls), and aggregated characteristics of the members of the school community (the prevalence of PA among girls in the school). Among black girls, school climate and social

support from friends predicted vigorous physical activity, yet girls in this subgroup rated their school climate to be least supportive (Table 2). This finding suggests that interventions should encourage friends being active together and adult support of a physically active lifestyle for this subgroup of girls.

Compared to white girls in TAAG, Hispanic girls were less likely to participate in classes or sports teams outside of school and more likely to report transportation barriers. In fact, in the regression analyses, perceived transportation barriers were the only significant predictor of MVPA for Hispanic girls. Perceived difficultly of obtaining transportation was associated with higher levels of physical activity. In a previous TAAG analysis, walking for transportation before and after school was examined and, although no significant differences in frequency were noted by race/ethnicity, Hispanic girls reported the highest percentage of walking for transportation before and after school.[33] This may indicate that Hispanic girls are receiving their PA by walking for transportation to and from school or engaging in other forms of physical activities while at home, such as household chores. Brownson et al. described the patterns of physical activity among a diverse sample of women, and found that housework activity was the most common source of activity among Hispanic women.[34] Hispanic girls in the present study also reported the lowest levels of community sports and sport/activity participation history. Perceived transportation barriers may affect Hispanic girls' ability to access school-based and community-based physical activity opportunities. Instrumental support from adults is important since most youth need adult assistance to participate (e.g., fees, equipment, transportation). This population specific profile indicates that interventions that target MVPA in this population must address transportation barriers and instrumental support.

This investigation has several limitations, including the cross-sectional design of the study, which precluded inferring causal relationships between correlates and physical activity behavior. Another limitation was the comparison of self-reported correlates to an objective measure of physical activity. Previous studies that examined physical activity correlates have found the associations to vary depending on the instrument used to assess physical activity.[35–37] Correlates identified in studies that used objective measure of PA have been found to be weaker or even nonsignificant compared to studies that used self-reported measures. One possible reason for the higher levels of variance or stronger associations between determinant variables and self-reported physical activity may be shared method variance.[37, 38] Future studies examining correlates of physical activity should consider using both self-reported and objective measures of physical activity. Despite this limitation, the findings of this study contribute new information to the literature regarding correlates of physical activity among adolescents.

An additional limitation of the study was that no data were collected on the country of origin or level of acculturation among Hispanic girls. This limits the generalizability of the results. Health behavior differences exist between Hispanics/Latinos born in the United States and those who are foreign-born, and these differences may affect physical activity levels. Moreover, Hispanics and other minority groups are not homogeneous and differences may exist among Hispanic groups born in the United States. Gordon-Larsen et al. found that among Cuban and Mexican adolescents, inactivity and low levels of physical activity increased with generation of US residence.[39] Future studies should take into consideration the country of origin and acculturation status, and include a large sample of Hispanics.

Based on the results of this study, several conclusions and recommendations can be made regarding the psychosocial and environmental correlates of physical activity in adolescent girls. Although there is a significant amount of literature on the correlates of physical activity in adolescent girls, few studies include a diverse sample and conduct race/ethnicity analyses. Race/ethnicity analyses will allow meaningful conclusions to be made about the relationship

between variables and physical activity among different populations. In addition, the differences in correlates that were significantly related to activity levels among the three racial/ethnic groups suggest a need to develop culturally tailored physical activity programs that provide a range of extracurricular and community activities that meet the interests and needs of various populations of adolescent girls.

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Table 1

Description of correlates of adolescent physical activity

Variable	Operational Definition	No. Items/[Range]	Cronbach's alpha	Test-retest reliability	References
INTRAPERSONAL					
Perceived Barriers	Perceived Barriers; 1=Never, 5=Very often	10 [1,5]	0.79	0.77	Sallis (2002)[40] Motl (2000)[20]
Perceived Benefits	Perceived Benefits; 1=Disagree a lot, 5=Agree a lot	9 [1,5]	0.80	0.64	Sallis (2002)[41] Motl (2000)[20]
Enjoyment of Physical Activity	Enjoyment of Physical Activity; 1=Disagree a lot, 5= Agree a lot; reverse scoring of "unenjoyable" feelings when active	7 [1,5]	0.90	0.73	Motl (2001)[42]
Self-efficacy	Self-efficacy; 1=Disagree a lot, 5 Agree a lot	8 [1,5]	0.80	0.78	Saunders (1997)[22] Motl (2000)[20]
INTERPERSONAL					
Family Support	Family support; 1=None, = Every day 5	5 [1,5]	0.81	n/a	Sallis (2002)[43]
Friend Support	Social support from friends; 1= None, 5=Every day	3 [1,5]	0.79	n/a	Sallis (2002)[44]
Teacher Climate at School	Teachers' behaviors "positive" for girls' PA; 1=Disagree a lot, 5=Agree a lot; Reverse scored so higher values indicate more positive climate for girls' PA	2 [1,5]	0.81	0.59	Birnbaum (2005)[45]
Boy Climate at School	Boys' behaviors "positive" for girls' PA; 1=Disagree a lot, 5=Agree a lot; Reverse scored so higher values indicate more positive climate for girls' PA	3 [1,5]	0.67	0.56	Birnbaum(2005)[46]
COMMUNITY/ENVIRONMENTAL					
Perceived Transportation Barriers	Difficulty level in obtaining transportation home from after-school activities (at school and in a location other than school), and vice versa; 1=Not at all difficult, 4=Impossible	3 [1,4]	0.73	n/a	n/a

Table 2

Characteristics by Race

	HISPANIC n= 185	BLACK n=289	WHITE n=706	P-Value
Variable	**Mean (SD)/%**	**Mean (SD)/%**	**Mean (SD)/%**	
Personal and Behavioral Factors				
Age	11.9 (0.5)	12.1 (0.7)	11.9 (0.4)	0.070
BMI[a]	22.3 (5.6)	22.1 (5.5)	19.7 (4.0)	<0.001
Self Reported Free/Reduced Lunch[a]	62.1%	67.8%	20.7%	<0.001
Community Sports	1.8 (2.6)	2.5 (3.0)	2.1 (1.7)	0.140
School Sports	0.9 (1.4)	1.0 (1.8)	0.9 (1.5)	0.450
Sports/Activity Participation History[b]	1.6 (2.1)	2.3 (2.7)	2.1 (1.8)	0.020
Intrapersonal				
Perceived Barriers[c]	20.5 (6.8)	21.0 (6.5)	19.6 (5.9)	0.020
Perceived Benefits[d]	37.3 (6.2)	35.1 (7.1)	37.1 (5.7)	0.010
Enjoyment of Physical Activity[e]	29.2 (6.6)	29.3 (6.1)	31.2 (5.1)	<0.001
Self-efficacy[e]	28.3 (7.0)	28.3 (6.6)	30.5 (5.9)	<0.001
Interpersonal				
Family Support[e]	16.0 (4.3)	16.2 (4.7)	17.7 (4.2)	0.001
Friend Support	9.2 (3.1)	8.7 (3.1)	9.2 (2.6)	0.070
School Climate (Boys)[e]	9.0 (3.4)	8.9 (3.5)	10.6 (3.1)	0.001
School Climate (Teachers)[e]	7.9 (2.3)	7.3 (2.7)	8.1 (2.2)	0.003
Community/Environment/				
Perceived Transportation Barriers	5.2 (2.0)	5.0 (2.0)	5.0 (1.7)	0.290
School Socio Economic Status[f]	54.6%	60.6%	21.4%	<0.001
Could have added Section N (access to recreational facilities)				
Activity Levels (accelerometer)				
MVPA minutes per day				0.100
Median	21.7	19.5	22.8	
10th Percentile	11.1	10.1	12.6	
90th Percentile	40.1	39.7	41.3	
VPA minutes per day				0.230
Median	4.5	4.2	4.7	
10th Percentile	1.9	1.7	1.7	
90th Percentile	10. 6	12.1	11.7	

Note. SD=Standard Deviation

[a] White girls < Black or Hispanic girls

[b] Hispanic girls < White or Black girls

[c] White girls < Black girls

[d] Black girls < White or Hispanic girls

[e] White girls > than Black or Hispanic girls

[f] All race groups differ

Table 3

Pearson Correlation Coefficients for Log Transformed MVPA[a] or VPA[b] with Personal and Behavioral, Intrapersonal, Interpersonal, and Community/ Enviornment Characteristics

	HISPANIC n=185		BLACK n=289		WHITE n=706		RACE COMPARISON (p-value)						
Variables	**MVPA**	**VPA**	**MVPA**	**VPA**	**MVPA**	**VPA**	**MVPA**				**VPA**		
								RACE				**RACE**	
Personal and Behavioral Factors								**W/B**	**W/H**	**H/B**		**W/B**	**W/H**	**H/B**
Age	−0.02	−0.10	−0.13 *	−0.15 **	0.03	0.01	no				yes*	0.02	0.18	0.59
BMI	−0.02	−0.09	−0.16 **	−0.17 **	−0.16***	−0.19***	no				no			
Community Sports	−0.01	0.08	0.01	0.03	0.17***	0.13***	yes*	0.02	0.03	0.83	no			
School Sports	0.11	0.13†	−0.07	−0.05	0.20***	0.16***	yes**	<0.001	0.27	0.06	yes*	<0.01	0.71	0.06
Sports/Activity Participation History	−0.08	−0.01	−0.01	0.02	0.16***	0.14***	yes**	0.01	<0.01	0.46	no			
Intrapersonal														
Perceived Barriers	<0.01	−0.08	−0.03	−0.01	−0.16***	−0.18***	yes*	0.06	0.04	0.67	yes*			
Perceived Benefits	0.05	−0.01	0.05	0.09	0.05	0.06	no				no			
Enjoyment of Physical Activity	0.10	0.17*	−0.03	−0.04	0.07†	0.09*	no				no			
Self Efficacy	0.17*	0.16*	<0.01	0.02	0.12***	0.11**	no				no			
Interpersonal														
Family Support	0.16*	0.22**	0.07	0.11†	0.15***	0.15***	no				no			
Friend Support	0.19**	0.20**	0.13*	0.13*	0.17 ***	0.15***	no				no			
School Climate (Boys)	−0.08	−0.01	−0.10†	−0.07	<0.01	<0.01	no				no			
School Climate (Teachers)	0.04	0.10	−0.09	−0.11†	0.01	−0.02	no				no			
Community/Environment														
Perceived Transportation Barriers	0.13†	0.07	0.08	0.04	−0.08*	−0.10**	yes*	0.02	0.01	0.59	yes*	0.05	0.04	0.75
School Socio Economic Status	−0.09	−0.11	−0.04	−0.02	−0.11**	−0.10**	no				no			

Note.

[a] moderate-to-vigorous physical activity;

[b] vigorous physical activity; W=White; H=Hispanic; B=Black

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* $P < 0.05$;

** $P<0.01$;

*** $P<0.001$;

† $P<0.10$

Table 4

Regression Analyses for Log Transformed MVPA[a] and VPA[b] assessed by the ActiGraph Monitor

	Hispanic n=185				Black n=289				White n=706			
Variables	**MVPA**		**VPA**		**MVPA**		**VPA**		**MVPA**		**VPA**	
	b	**P**	***b***	**P**	***b***	**P**	***b***	**P**	***b***	**P**	***b***	**P**
Personal and Behavioral												
Age (y)	−0.025	0.758	−0.076	0.463	−0.054	0.256	−0.139	**0.039**	0.063	0.167	0.061	0.393
BMI (kg/m^2)	<0.001	0.951	−0.005	0.568	−0.015	**0.005**	−0.022	**0.005**	−0.016	<**0.001**	−0.031	<**0.0001**
Self-Reported Free/Reduced Lunch												
Don't Know/Missing	0.127	0.286	0.172	0.259	−0.086	0.444	−0.201	0.207	0.018	0.754	0.028	0.760
No	0.013	0.875	0.084	0.418	−0.009	0.906	0.034	0.742	0.087	0.052	0.109	0.126
Community Sports	—		—		—		—		0.033	0.025	0.037	0.102
School Sports	—		0.049	0.135	—		—		0.033	0.009	0.035	0.069
Sports/Activity Participation History	—		—		—		—		0.004	0.787	0.016	0.473
Concordance correlation coefficient	.207		.129		.270		.205		.256		.267	
Intrapersonal												
Barriers	—		—		—		—		−0.009	0.012	−0.016	0.006
Benefits	—		—		—		—		-		—	
Enjoyment of Physical Activity	—		0.008	0.318	—		—		−0.004	0.367	−0.004	0.572
Self Efficacy	0.006	0.240	0.004	0.583	—		—		<0.001	0.926	−0.003	0.579
Concordance correlation coefficent	.241		..187						.287		.290	
Interpersonal												
Family Support	0.008	0.418	0.020	0.150	—		0.007	0.532	−0.001	0.879	0.005	0.573
Friend Support	0.027	0.061	0.027	0.135	0.026	0.006	0.034	0.031	0.020	0.010	0.026	0.037
School Climate (Boys)	—		—		−0.016	0.064	—		—		—	
School Climate (Teachers)	—		—		—		−0.034	0.030	—		—	
Concordance correlation coefficient	.278		.263		.325		.266		.300		.303	
Community/Environment												
Perceived Transportation Barriers	0.047	0.010	—		—		—		−0.003	0.747	−0.011	0.492
School Level Free Reduced Lunch	—		—		—		—		<0.001	0.764	−0.001	0.522

	Hispanic n=185				Black n=289				White n=706			
Variables	**MVPA**		**VPA**		**MVPA**		**VPA**		**MVPA**		**VPA**	
	b	**P**	***b***	**P**	***b***	**P**	***b***	**P**	***b***	**P**	***b***	**P**
Total Mixed Model Concordance Correlation Coefficient	0.346		0.263		0.325		0.266		0.302		0.304	

Note.

[a] moderate-to-vigorous physical activity;

[b] vigorous physical activity; *b*=beta; P=p-value; Referent Group = Yes;

— Variable not entered, P>0.10 from Pearson Correlations; Items in Bold are Significant, P <0.05