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Physical activity patterns among Minnesota Somali adolescents

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Abstract

Background—Little is known about the physical activity patterns of Somali adolescents. This study compared time spent in moderate-to-vigorous physical activity (MVPA) and participation in specific physical activities among Somali, other Non-Hispanic black and white adolescents.

Methods—A subsample of 1,268 adolescents (mean age= 14.6) who completed surveys as part of the EAT 2010 (Eating and Activity in Teens) study was included in analyses. Gender-stratified linear and logistic regressions, controlling for body mass index and demographic characteristics, were conducted to estimate mean weekly hours of self-reported MVPA and mean weekly hours and prevalence of engagement in each of 26 physical activities assessed by ethnic/racial group.

Results—Somali girls had lower mean MVPA hours than their peers; however, no differences were found for Somali boys. Involvement in most activities was similar for Somali and other groups, but some differences were observed. For example, Somali youth were more likely to play soccer than their same-sex other black peers (boys: 52.4% vs. 20.4%; girls: 34.6% vs. 14.6%; p<. 05). Somali girls also engaged in more hours per week of soccer than their black or white peers.

Conclusions—Activities for which Somali youth indicated higher involvement may be particularly relevant for culturally-tailored physical activity programming.

Keywords

adolescent; health disparities; health promotion; physical activity

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Introduction

Less than half of all United States (U.S.) adolescents ages 12-18 meet the recommendation included in the 2008 Physical Activity Guidelines for Americans[1] to participate in at least 60 minutes of daily moderate-to-vigorous physical activity (MVPA).[2] Black adolescents, particularly girls, are less active than their white peers. Among 9th and 12th graders in the U.S., participation in at least 60 minutes of physical activity all seven days in the past week was reported by 16% of black girls compared to 19% of white girls, 37% of black boys, and 38% of white boys.[2] Furthermore, immigrants and refugees in high-income nations tend to have lower physical activity levels than the non-immigrant population.[3,4] The high rates of, and disparities in, inactivity are of public health concern given the many potential physical and psychosocial benefits of active living,[5,6] and because adolescence is a critical time for establishing lasting health behaviors.[7] Physical inactivity among ethnic minority and immigrant groups compared with non-Hispanic whites may contribute to disparities in obesity[8] and many chronic health conditions later in life, such as hypertension and heart disease.[9,10]

Little is known about the physical activity patterns of adolescents of black ethnic sub-populations in the U.S. In particular, no published studies report on Somali adolescents' levels of physical activity. Only a few qualitative studies in the U.S.[11-14] and one in the U.K.[15] have explored the types of physical activities in which Somali adolescents participated or hoped to participate. In all five studies, understanding participation (i.e., any/none involvement) in specific physical activities was only a small component and time spent engaging in specific activities was not assessed. This lack of information is problematic given the U.S. is home to about 110,000 Somalis,[16] and such information is imperative for the development of culturally appropriate physical activity programming and policy. Although they have a small presence nationally, Somalis are a growing immigrant population in the U.S.[17] They are also the fourth largest immigrant group in Minnesota,[17] with an estimated 32,500 Somali residents.[16] The state therefore provides an important context for understanding Somali adolescents' physical activity behaviors. Existing health behavior surveillance mechanisms typically do not ask about immigration status or specific ethnic or nationality groups.[18] Instead, Somali adolescents are grouped with black teens from Ethiopia (a neighboring country to Somalia), other East African countries, and U.S.-born African Americans into a broader black and/or African American category that may mask any differences between these population subgroups.

Clinicians, researchers and public health practitioners who work with Somali youth are left to draw from the literature that does exist, for adolescents in general, and ethnic minority boys and girls in particular. However, the black adolescent sub-population of Somali adolescents experience cultural and religious nuances and norms that may vary from those experienced by the broader black racial designation.[19] A better understanding of the physical activity behaviors of Somali youth is important for informing culturally-tailored intervention development.

The limited qualitative research that exists regarding the types of physical activity in which Somali adolescents participate suggests they engage in a wide range of physical activities.

Somali youth described participating in commonly recognized fitness activities like running and team sports, but also described non-traditional activities such as informal play and household chores as contributing to their physical activity.[11-15] While the adolescents participated in a wide array of physical activities, their participation levels were limited due to several barriers. Specifically, Somali girls discussed that religious and cultural norms regarding covering the body, heightened physical and psychological safety concerns for females in outdoor spaces, and cultural and religious tensions over the appropriateness of females being active (especially in regard to playing sports) limited their participation in physical activities.[12,13] In contrast, boys discussed attending local gyms and participating in sport and daily activity with fewer barriers.[14,15] These findings highlight the need for further research exploring a wide variety of activities, as well as quantitative physical activity levels, in this population.

The aim of this study, then, is to assess the levels and types of physical activity among a population-based sample of Somali and other non-Hispanic black and white adolescents living in Minnesota. To the authors' knowledge this is the first quantitative study to explore Somali adolescents' physical activity patterns and allow us to directly compare and contrast ethnic/racial groups. Based on previous research regarding Somali youths' various activities and barriers to activity[11-15] it was hypothesized: 1) Somali boys would have similar *MVPA levels* as other black and white boys; and Somali girls would have lower *MVPA levels* than both other black and white girls; 2) There would be few differences in the *types of physical activities* in which Somali boys engaged in comparison to their other black and white male peers; however, there would be significant differences in the *types of physical activities* among girls with Somalis participating in more indoor, exercise activities than outdoor and sport activities; and 3) Somali boys would engage in similar hours per week of specific types of physical activities as other black and white boys; Somali girls would participate in fewer hours per week of specific types of physical activities than both other black and white girls. Understanding the similar and unique physical activity behavior of both Somali adolescent boys and girls is imperative for clinicians, researchers, and public health practitioners working with this population in order to inform culturally-tailored care, interventions, and policies that lead to the best possible health outcomes.

Methods

Study Design

Data for the analysis were drawn from EAT 2010 (Eating and Activity in Teens), a population-based study designed to investigate physical activity, dietary intake, weight control behaviors, weight status and factors associated with these outcomes in adolescents. The adolescents in the study population were from 20 public middle schools and high schools in the Minneapolis/St. Paul metropolitan area of Minnesota, which serve socioeconomically and ethnically/racially diverse communities. The current study includes a subsample of 1,268 participants (45% of total sample) in EAT 2010 who were Somali (8.8%), other non-Hispanic black (50.7%), and non-Hispanic white (40.5%).

Trained research staff administered the EAT 2010 survey and a supplemental physical activity survey in school classrooms and measured adolescents' height and weight during

the 2009-2010 academic year. All study procedures were approved by the University of Minnesota's Institutional Review Board Human Subjects Committee and by the research boards of the participating school districts. Adolescents were given the opportunity to assent only if their parent/guardian did not return a signed consent form indicating their refusal to have their child participate. Additional details of the EAT 2010 study design have been described elsewhere.[20,21]

Measures

MVPA Levels—A modified version of the Leisure Time Exercise Questionnaire[22] was used to measure participants' MVPA levels (weekly hours of MVPA). Students were provided with brief definitions and examples of vigorous and moderate exercises, and were asked to report for a usual week how many hours they spent engaged in each intensity of physical activity. Six response options ranged from none to 6+ hours a week. Total hours of MVPA were calculated by summing hours of vigorous and moderate physical activity (test-retest r= 0.73).

Participation and time spent in types of physical activities—Participation in 26 physical activities was assessed using the supplemental EAT 2010 Physical Activity survey, which was modified from an existing instrument.[23] The survey assessed transportation-related activity (i.e., walking and biking to get to places), activities done for fitness and exercise (e.g., running/jogging, swimming), sports (e.g., soccer/rugby, basketball), and active play (e.g., skateboarding, playing outdoors). For each activity, participants were asked (yes/no) if they engaged in the activity any time in the past year outside of physical education class. If participants indicated "yes," they were directed to report how much time was spent per week in that activity, separately for each season. Seven response categories ranged from none to 10+ hr/wk. Time spent in each activity for each season was calculated using the midpoint of the chosen response option (or 12 hr/wk for the highest option) and averaged across all seasons (test-retest r= 0.64).

Demographics—Study participants self-reported their sex, age, grade level, ethnicity/race, U.S. nativity, and socioeconomic status (SES) on the EAT 2010 survey. Ethnicity/race was assessed with two survey items. The first item assessed race: "Do you think of yourself as … (you may choose more than one) 1) white, 2) black or African American, 3) Hispanic or Latino, 4) Asian American, 5) Native Hawaiian or Pacific Islander, 6) American Indian or Native American, and 7) Other" (test-retest agreement= 98-100%). The second item referred to specific ethnicities: "Is your background any of the following?" Response categories included "Hmong, Cambodian, Vietnamese, Laotian, Somali, Ethiopian, Other, and none of the above" (test-retest agreement= 92%). The sample was restricted to participants who did not indicate Hispanic ethnicity and who indicated their race was either white or black or African American (referred to as black in this study) or indicated "Somali" in response to "Other" race; the black group was divided into those identifying as Somali versus not. Participants (n= 7) indicating a race or ethnicity associated with the countries of Ethiopia, Eritrea and Togo were excluded in order to focus on the needs of Somali youth specifically, and to avoid categorizing other East African immigrants with a more general sample of black adolescents. Nativity was assessed with one survey item. Students were asked "Were

you born in the U.S.?" Response options were, "1) Yes and 2) No: In what country?" (test-retest agreement= 99%).

SES was categorized in quintiles, which were determined primarily using parental educational level defined by the higher level of either parent.[24] An algorithm was developed to include family eligibility for public assistance, eligibility for free or reduced-price school meals, and parental employment status, based on Classification and Regression Trees.[25] This approach was used to reduce missingness and avoid misclassifying participants as high SES (based on education levels) if they reported the other indicators of low SES (test-retest r= 0.90).[26]

Weight status—Trained research staff measured participants' height and weight using standardized equipment and procedures.[27] Body mass index (BMI) was calculated according to the following formula: weight in kg/(height in m^2). Sex- and age-specific cutoff points based on reference data from the Centers for Disease Control and Prevention growth tables were used to classify respondents as not overweight (BMI <85th percentile), overweight (BMI ≥85th to <95th percentile), or obese (BMI ≥95th percentile).[28]

Statistical Analyses

Descriptive statistics were calculated to summarize the demographic characteristics of the sample. We used gender-stratified linear regression models to estimate mean weekly hours of MVPA and mean weekly hours of engagement in each specific activity by ethnic/racial group. We used logistic regression models to estimate prevalences of engaging in each specific activity by ethnic/racial group. All models were adjusted for age, SES, U.S. nativity, and BMI. School was included in the models as a random effect to control for possible intracluster correlation of responses from students in the same school. A 95% confidence level was used to interpret the statistical significance of probability tests. All analyses were conducted using the Statistical Analysis System (SAS), version 9.3.

Results

Characteristics of the Sample

This sample was approximately equally distributed by gender (51% female) and had a mean age of 14.6 years (SD=2.1); 41.6% were in middle school (6th-8th grades) and 58.4% were in high school (9th-12th grades). The majority of the total sample was born in the U.S., while the majority of Somali participants were immigrants who were not born in the U.S. Of the total sample, about half of the participants were low to low-middle SES and one-third were overweight or obese. The breakdown of all demographic characteristics across the three ethnic/racial groups represented in the sample is shown in Table 1.

MVPA Levels

Boys' mean weekly hours of MVPA did not differ significantly by ethnicity/race (Somali= 7.3, black= 7.1, white= 7.8). Mean hours per week of leisure time MVPA were significantly lower among Somali girls as compared to white girls (3.8 versus 6.2, p= .042); mean hours

of MVPA were also lower among Somali than other black girls (5.2), but this difference was not statistically significant (p= .285).

Participation and Time Spent in Types of Physical Activities

For the majority of physical activities assessed here, participation and time spent in activity were similar across ethnic/racial groups for boys and girls. Among boys, the prevalence of engaging in the specific physical activities was the same across ethnic/racial groups for 17 out of 26 activities (Table 2). Of the nine activities found to differ, the only activity where Somali boys participated at a significantly lower rate than their peers was walking for transportation (Somali= 78.2% versus black= 90.7%, p= .002; Somali= 78.2% versus white= 90.3%, p= .032). Somali boys participated at a significantly greater prevalence than their peers for the other eight specific types of activities: swimming, dancing/aerobics, soccer/rugby, basketball, volleyball, football, cross-country skiing, and martial arts/karate/wrestling.

Among boys who reported engaging in each physical activity, they did so at a similar number of hours per week for 18 of the 26 activities regardless of ethnicity/race. The eight activities where there were significant differences in terms of the time spent participating by Somali boys compared to their black and/or white peers included walking/hiking; running/jogging; dancing/aerobics; basketball; ice, field, street hockey/lacrosse; tennis/other racquet sports; cross-country skiing; and martial arts/karate/wrestling (Table 3). For the majority of these activities (7 out of 8) Somali boys participated in fewer hours per week of activity than black and/or white boys.

Among girls, the prevalence of engaging in the specific physical activities was the same across ethnic/racial groups for 20 of the 26 activities (Table 2). Of the six activities found to differ, the only activity in which Somali girls were more likely to participate was soccer/rugby compared to black girls (34.6% versus 14.6%, p= .008). Otherwise, Somali girls were less likely to engage in the other five activities: hard work outdoors, dancing/aerobics, ice, field, street hockey/lacrosse, downhill skiing/snowboarding, and crew/kayaking/canoeing/rowing.

Among girls who engaged in each specific activity, they did so at a similar number of hours per week for 23 out of 26 activities regardless of ethnicity/race. A significant difference in hours of participation was found only for three activities: soccer/rugby, basketball and crew/kayaking/canoeing/rowing (Table 3). For soccer/rugby and basketball, Somali girls engaged in significantly more hours per week of each activity than their black or white peers.

Discussion

Findings indicate that, in general, physical activity behaviors of Somali youth were comparable to those of other non-Hispanic black and white adolescents. However, notable exceptions to this overall pattern suggest that Somali adolescents may lag behind other groups in some activity involvement, particularly among girls. These findings are in line with the extant literature indicating girls' physical activity participation is lower for ethnic/racial minority and immigrant girls than for their white female counterparts.[2-4]

Somali adolescents, particularly girls, may face a variety of unique cultural barriers to their physical activity participation, due to the complex intersections of ethnicity/race, social class, gender and culture. Previous studies indicated that gendered-responsibilities (e.g., housework); lack of accessible, affordable equipment and other resources; lack of safe spaces designated for girls to be active; and gender-based cultural beliefs (e.g., girls should not interact with or be watched by males while participating in sports, clothing restrictions to maintain modesty in public) were barriers to activity among Somali girls.[11-15] Specifically, previous research by Thul and LaVoi[12] indicated such gender and cultural barriers impeded Somali girls' physical activity participation particularly with regard to participation in more body-revealing physical activities (e.g., swimming), as well as activities in open, public and outdoor spaces.[13]

Select differences in activity involvement may suggest strategies to further engage Somali youth in physical activity. For example, relatively high involvement in soccer among Somali youth may be due to soccer's popularity in Somalia,[29] and that community soccer programs are particularly strong in the neighborhoods where the present study was conducted. Honing in on the characteristics that make these activities popular among Somali adolescents is an important area for future research in order to promote not only these activities, but activities with similar features to reach a broader group of Somali youth.

Identifying activities in which Somali adolescents participate less than their peers may also be instructive. For example, Somali boys' relatively low participation in walking for transportation may be due to the status associated with cars in this community,[30] or potentially to living in less safe neighborhoods.[13] Similarly, Somali girls' lower participation in outdoor activities, swimming and gymnastics/cheerleading may stem from parental safety concerns for their daughters in open, outdoor spaces, as well as religious and cultural norms of privacy and modesty in women's dress.[11-13]

Future studies exploring the potential reasons for lower participation among Somali boys and girls in these activities are needed in order to understand if the activities—and those with similar features—are not culturally appropriate; if they are appropriate but other factors impact participation; or if they could be appropriate if culturally tailored (e.g., Somali girls wearing less revealing clothing in swimming or gymnastics or taking place in female-only private spaces or single-sex physical activity programs). Single-sex physical and sport activities for girls may help to reduce disparities in participation for Somali girls due to modesty, while also benefiting all ethnic/racial groups by making participation more comfortable for non-Somali girls who are modest for other reasons. Several girl-only programs and physical activity interventions, such as *New Moves*,[31] *Lifestyle Education for Activity Program*,[32] and *Trial of Activity for Adolescent Girls*,[33] have had a positive impact on the physical activity participation of adolescent girls from a variety of ethnic/racial backgrounds and could be implemented more broadly.

While Somali boys were as likely as those in other groups to engage in a variety of specific activities, in some cases (i.e., tennis) they spent significantly fewer hours/week in those activities. These findings show the importance of obtaining frequency measurements in addition to yes/no participation information to understand the full picture of physical activity

behaviors. The findings also suggest that high involvement with a physical activity like tennis (e.g., joining a competitive tennis team that practices 4 nights/week versus playing more leisurely on a community tennis court) may be limited for Somali boys due to the significant expense and lack of accessibility of competitive teams.[11,14]

Among girls who participated in specific activities, there were very few differences in activity time across the three ethnic/racial groups. This finding suggests that once Somali girls take advantage of the opportunity to engage in activities, they participate at similar levels to other girls. Hence, access – including nearby availability of low cost activity spaces or programming–appears to be a key factor in especially Somali girls' physical activity participation. This finding is in line with research indicating financial concerns and lack of access are two of the most prominent barriers to Somali girls' physical activity participation.[11-15] Future research is needed to explore if access issues are a key mechanism at play in this study.

Strengths and Limitations

Study strengths include a comprehensive assessment of specific physical activities and a population-based sample recruited through public schools. Also, this is the first quantitative study to assess Somali adolescents' physical activity patterns uniquely from other non-Hispanic black and white adolescents. A study limitation is that the data were collected in only one Midwest state. Another limitation is the relatively small sample of Somali youth (n= 112), which may have contributed to a lack of power to detect statistical significance for apparent differences in specific activities between Somali youth and other groups. Finally, although a large number of physical activities were measured in the EAT 2010 Activity Survey, it focused primarily on leisure-time activities. The survey did not include other movement activities like indoor housework (e.g., vacuuming, sweeping) that may be particularly relevant for Somali girls, who are expected to take on traditional home-making roles in adolescence.[13]

Conclusions

Understanding Somali adolescents' physical activity patterns is imperative for informing culturally tailored programs and policies for Somali adolescents, so that they may have the opportunity to participate in and reap the many benefits of activity. For instance, developing the option of accessible, female-only physical activity programs that are respectful of Somali cultural values (e.g. modesty in dress) may help reduce cultural barriers and alleviate disparities in physical activity. Thus, school-level and community-level policies that support girls-only physical education curriculum and girls-only facilities for activity may be of particular importance. Furthermore, activities for which Somali youth showed higher participation, such as soccer, may be particularly relevant for including in future physical activity recommendations and programming for Somali adolescents—as long as potential barriers like accessibility and affordability are addressed. These findings provide a starting point for discussions with community members, health care providers and youth serving organizations working with this population. Continued research into specific activities, and barriers and facilitators to activity involvement will further inform clinical recommendations, physical activity programs and interventions, and policies.

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Table 1

Descriptive Characteristics of the Sample

	Somali (N= 112)	Other Black (N= 642)	White (N= 514)	Total (N= 1268)
Age (mean)	15.5	14.6	14.5	14.6
	%	%	%	%
Sex				
Male	51.8	45.8	52.9	49.2
Female	48.2	54.2	47.1	50.8
Socioeconomic Status (SES)				
Low	51.4	41.6	14.0	31.0
Low-Middle	20.2	24.0	16.9	20.7
Middle	16.5	18.3	19.3	18.5
Upper-Middle	8.3	11.9	29.5	18.9
High	3.7	4.2	20.4	10.9
Nativity				
Born in U.S.	18.9	94.8	98.4	89.6
Not Born in U.S.	81.1	5.2	1.6	10.4
Weight Status[1]				
Not Overweight	65.5	56.4	69.6	62.6
Overweight	18.2	22.6	14.5	18.9
Obese	16.4	21.0	15.9	18.5

[1]Respondents were classified according to sex- and age-specific cut-off points as not overweight (BMI <85th percentile), overweight (BMI ≥85th to <95th percentile), or obese (BMI ≥95th percentile).

Table 2

Adjusted Prevalences of Engaging in Specific Types of Physical Activity by Ethnicity/Race and Gender

Physical Activities	Boys			Girls		
	Somali	**Other Black**	**White**	**Somali**	**Other Black**	**White**
	%	%	%	%	%	%
Transportation						
Walking	78.2[a]	90.7[b]	90.3[b]	91.0	88.2	91.8
Biking	81.5	66.2	77.3	44.9[ab]	39.0[a]	65.1[b]
Fitness and exercise						
Walking/Hiking	67.5[ab]	50.4[a]	63.6[b]	72.0[ab]	58.9[a]	81.3[b]
Biking	63.8[ab]	54.1[a]	66.9[b]	46.0[ab]	37.5[a]	63.6[b]
Hard Work Outdoors	73.9[ab]	69.3[a]	81.7[b]	46.8[a]	48.5[a]	69.8[b]
Running/Jogging	77.7	65.5	64.7	52.3[ab]	64.8[a]	72.6[b]
Swimming	73.2[a]	57.2[b]	71.8[a]	67.7[ab]	62.6[a]	80.4[b]
Yoga/Pilates	10.9[ab]	6.0[a]	2.3[b]	23.9	14.8	20.3
Strength Training	87.6[ab]	82.0[a]	71.8[b]	63.9	54.8	55.2
Circuit Training/Cardio	29.7	34.0	29.9	27.5	25.7	28.5
Dancing/Aerobics	34.2[a]	23.3[a]	5.0[b]	31.3[a]	61.1[b]	48.8[a]
Sports						
Gymnastics/Cheerleading	3.8	7.4	2.9	3.1	17.0	18.5
Soccer/Rugby	52.4[a]	20.4[b]	34.3[a]	34.6[a]	14.6[b]	39.7[a]
Baseball/Softball	32.4[ab]	29.5[a]	43.5[b]	20.3[ab]	20.0[a]	36.3[b]
Basketball	88.5[a]	82.0[a]	43.1[b]	43.5[ab]	55.1[a]	22.8[b]
Volleyball	27.1[a]	11.5[b]	10.4[b]	29.8	29.3	34.6
Football	86.0[a]	73.4[a]	44.5[b]	21.7	20.6	18.4
Ice, Field, Street Hockey/Lacrosse	20.3[ab]	8.6[a]	22.1[b]	2.6[a]	3.3[a]	17.3[b]
Tennis/Other Racquet Sports	22.9	25.0	29.1	31.2[ab]	19.9[a]	33.1[b]
Cross-Country Skiing	15.3[a]	4.1[b]	6.6[b]	6.6[ab]	2.5[a]	8.4[b]
Downhill Skiing/Snowboarding	26.5[ab]	14.0[a]	33.4[b]	7.6[a]	8.7[a]	21.6[b]
Crew/Kayaking/Canoeing/Rowing	24.1[ab]	12.7[a]	21.7[b]	1.9[a]	7.9[b]	23.9[c]
Martial Arts/Karate/Wrestling	39.0[a]	21.3[b]	11.1[c]	7.0	7.1	10.6
Active Play						
Rollerblading-Skating/Ice Skating	30.6	29.5	37.0	57.7	43.6	52.8
Skateboarding	25.6	21.0	21.6	6.9[ab]	7.2[a]	17.1[b]
Playing Outdoors	52.4	56.8	61.0	64.4[ab]	67.3[a]	76.8[b]

Note: Comparisons are done separately for boys and girls. Significant differences in prevalence of doing each activity across ethnic/racial groups are indicated by different letters. Ethnic/racial group means that have different letters within a row (a, b) are significantly different from one another at p-value < .05. If they share the same letter, they are not significantly different. No letter indicates no differences.

*Analysis controlled for age, nativity, socioeconomic status, body mass index, and school random effect.

Table 3

Adjusted Mean Hours per Week of Engaging in Types of Physical Activity by Ethnicity/Race and Gender

Physical Activities	Boys			Girls		
	Somali	Other Black	White	Somali	Other Black	White
Transportation						
Walking	3.0	3.6	3.6	3.6[ab]	3.6[a]	3.1[b]
Biking	2.6	2.9	3.0	3.2	2.3	2.1
Fitness and exercise						
Walking/Hiking	1.5[a]	2.6[ab]	2.5[b]	1.5	2.5	2.3
Biking	2.1	2.3	2.9	2.2	2.0	2.0
Hard Work Outdoors	2.9	2.2	2.4	1.5	1.8	1.8
Running/Jogging	1.5[a]	2.7[b]	2.7[b]	2.7	2.3	1.9
Swimming	1.7	2.0	2.0	1.7	2.3	2.2
Yoga/Pilates	2.3	1.9	1.7	1.8	1.3	1.5
Strength Training	2.2	2.8	2.4	1.9	1.9	1.5
Circuit Training/Cardio	1.8	2.3	1.8	1.4	1.6	1.3
Dancing/Aerobics	1.2[a]	2.9[b]	1.0[a]	2.5[ab]	3.5[a]	2.4[b]
Sports						
Gymnastics/Cheerleading	4.4	3.0	1.3	2.8	3.9	3.0
Soccer/Rugby	3.3	3.0	2.5	3.6[a]	1.9[b]	2.5[a]
Baseball/Softball	3.0[ab]	2.1[a]	3.3[b]	2.5	2.2	2.2
Basketball	5.8[a]	4.6[a]	2.3[b]	3.3[a]	3.3[a]	1.8[b]
Volleyball	1.3	1.6	1.3	2.2	2.7	2.1
Football	3.9	3.8	3.0	3.2	2.0	1.7
Ice, Field, Street Hockey/Lacrosse	1.2[a]	3.1[b]	2.7[b]	1.5	3.5	2.1
Tennis/Other Racquet Sports	1.1[a]	2.3[b]	2.0[ab]	1.7	1.9	1.7
Cross-Country Skiing	.66[a]	1.8[b]	1.9[b]	1.8	1.8	1.4
Downhill Skiing/Snowboarding	1.3	2.0	1.7	2.7	1.6	1.6
Crew/Kayaking/Canoeing/Rowing	1.2[ab]	1.3[a]	1.9[b]	.13[a]	1.6[b]	1.6[b]
Martial Arts/Karate/Wrestling	.40[a]	2.5[b]	3.9[c]	3.4	1.6	1.6
Active Play						
Rollerblading-Skating/Ice Skating	1.8	2.0	2.2	2.1	1.9	1.8
Skateboarding	1.7	2.8	3.0	3.5	2.0	2.0
Playing Outdoors	2.2	2.6	2.7	3.1	2.8	2.4

Note: The adjusted mean hours per week of engaging in types of physical activity was calculated only among those who participated in a given activity at all. Comparisons are done separately for boys and girls. Significant differences in the mean hours across ethnic/racial groups are indicated by different letters. Ethnic/racial group means that have different letters within a row (a, b) are significantly different from one another at p-value < .05. If they share the same letter, they are not significantly different. No letter indicates no differences.

*Analysis controlled for age, nativity, socioeconomic status, body mass index, and school random effect.