

Journal of Applied Research on Children: Informing Policy for Children at Risk

Volume 1

Issue 1 *Latino Children*

Article 3

2010

Physical Activity in Latino Children: Research and Its Implications

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Recommended Citation

Olvera, Norma Ph.D.; Kellam, Stephanie F.; Menefee, Kara; Lee, Jay; and Smith, Dennis W. (2010) "Physical Activity in Latino Children: Research and Its Implications," *Journal of Applied Research on Children: Informing Policy for Children at Risk*: Vol. 1: Iss. 1, Article 3.

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Physical Activity in Latino Children: Research and Its Implications

Acknowledgements

We would like to acknowledge the Robert Wood Johnson Foundation, Salud America! for their support during the preparation of this manuscript.

INTRODUCTION

A common idiom reassures us that, “*What you don't know can't hurt you.*” For years, the knowledge-behavior gap in the area of physical activity and children has loomed large, with corresponding childhood obesity and morbidity rates skyrocketing, particularly, among Latino children.* “*What we didn't know has hurt Latino children.*” Relevant research regarding Latino children's physical activity patterns and the factors that influence such patterns will increase awareness among health educators, practitioners, and policy makers, and help in developing strategies to enable Latino children adopt an active lifestyle. To accomplish this, we must understand:

- Obesity rates in children, including Latino children
- The link between obesity and physical activity
- Physical activity patterns among Latino children
- Cultural and socio-environmental factors that contribute to the physical activity levels of Latino children

PREVALENCE OF OVERWEIGHT AMONG CHILDREN AND ADOLESCENTS

Body mass index (BMI), defined as weight in kilograms divided by height in meters squared (kg/m^2), is commonly used to determine obesity status in children. Cutoff criteria are based on the 2000 CDC BMI-for-age-sex-growth charts for the United States. Based on present recommendations, children with BMI values at or above the 95th percentile of the age and sex-specific growth charts are categorized as obese. This 95th cutoff point is different from previous years where children at or above this cutoff were labeled overweight. Currently, the cutoff point for overweight is at or above the 85th percentile.¹

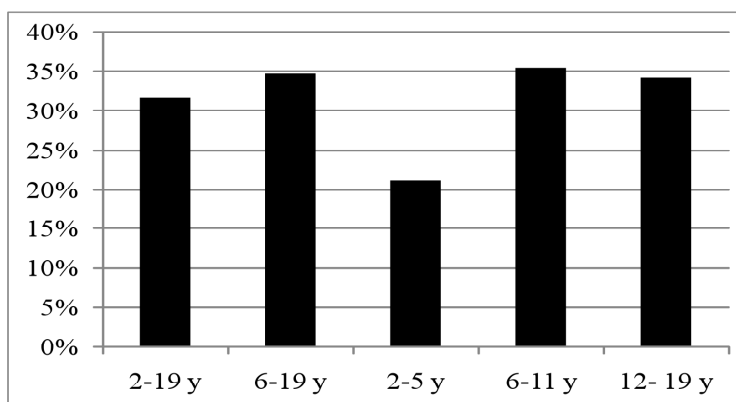
According to the National Health and Nutrition Examination Survey (NHANES), childhood obesity has more than tripled among children and adolescents (from 5% to 17%) between the survey periods 1976-80 and 2007-2008.²⁻³ As shown in Figure 1, current estimates indicate that 32% of children and adolescents (ages 2-19 yrs) are overweight (BMI \geq 85 percentile for age-and-gender).³

* Note: The Latino, Hispanic, and Mexican-American terms will be used interchangeably across the entire manuscript to refer to children of Spanish speaking origin and to maintain the original ethnic affiliation terminology used in cited articles.

RACE/ETHNIC DISPARITIES IN OVERWEIGHT AMONG CHILDREN AND ADOLESCENTS

While the obesity epidemic is affecting all children; it is accentuated in minority children.³ From 1999-2004, there has been a significant difference in overweight prevalence between racial/ethnic groups in both children and adolescents.⁴

Figure 1. Prevalence of high BMI in US children and adolescents aged 2 through 19 years by age ($\geq 85^{\text{th}}$ percentile)



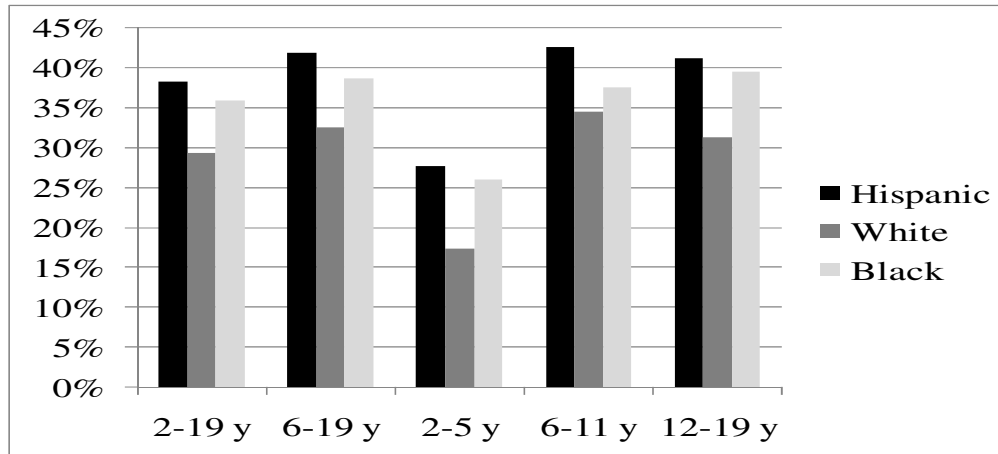
As shown in Figure 2, among children and adolescents, 38% of Hispanics aged of 2 to 19 years were overweight compared with 29% of their non-Hispanic white counterparts of the same age. Obesity rates are highest among Hispanic boys and non-Hispanic black girls. Hispanic boys (ages 6-19 years) had a higher rate of being overweight than non-Hispanic white boys or non-Hispanic black boys. Non-Hispanic black and Hispanic girls (ages 6-19 years) were more likely to be overweight than non-Hispanic white girls.³

OBESITY AND PHYSICAL ACTIVITY

A sedentary lifestyle contributes greatly to the obesity epidemic among children and adolescents.⁵⁻⁶ The US Health and Human Services Department recommends that children and adolescents engage in at least 60 minutes (1 hour) or more of physical activity each day, preferably in moderate-to-vigorous physical activity (MVPA) to obtain health benefits.⁷ However, according to 2006 estimates, nearly two-thirds of youth do not meet these recommendations. Troiano et al.,⁸ using a national sample, reported that only 42% of children ages 6-11 years achieved at least 60 minutes of MVPA daily. Gender differences were observed in this study with 48% of boys and 35% of girls reaching the recommended dosage.

The rate of children and adolescents achieving 60 minutes of MVPA daily decreased severely as they aged with only 12% of boys and 3% of girls (ages 12-15 years) achieving this goal.

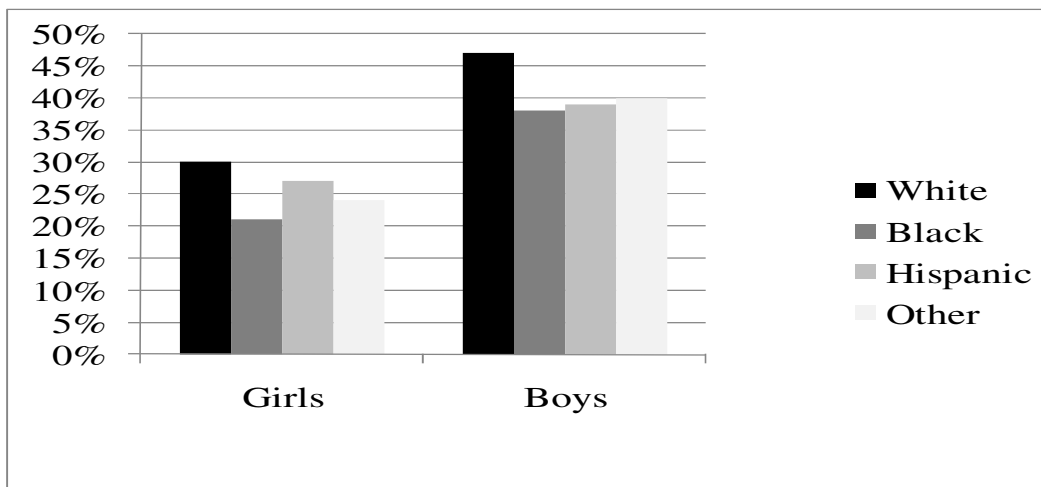
Figure 2. Prevalence of high BMI in US children and adolescents aged 2 through 19 years by Age, Race/Ethnicity ($\geq 85^{\text{th}}$ percentile)



RACIAL/ETHNIC DISPARITIES IN PHYSICAL ACTIVITY

As shown in Figure 3, a national sample of Hispanic and non-Hispanic black youth reported lower levels of physical activity than their white counterparts—approximately 30% reported being active for at least 60 minutes in moderate physical activity five days a week.⁹

Figure 3. Percentage of children who are active for 60 minutes five days a week



Ethnic differences in physical activity appeared to begin in early childhood, around the age of four. Latino preschoolers spent less time engaging in moderate-to-vigorous physical activity; consequently, expending fewer calories compared with white preschoolers.¹⁰ These patterns persisted later in childhood and adolescence.¹¹⁻¹² Non-Hispanic white children reported more bouts of vigorous physical activity each week than Mexican American children.¹³ In another study, Mexican American boys (ages 6-8 years) reported to have lower levels of active play than non-Hispanic white boys.⁵

In a large sample of 897 Hispanic children in Texas, Butte et al.,¹⁴ reported that the percentage of children engaging in at least one hour of physical activity per day declined from 87% in 4-8 year olds to only 37% in 12-19 year olds. Gender and weight status also influence physical activity levels among Latino children. Mexican American boys stay more active than girls over time.¹⁴ The lowest levels of physical activity were reported among Hispanic (27%) and non-Hispanic black girls (21%) compared to their male counterparts.¹⁵ After controlling for age and gender, overweight children are more likely to have lower levels of physical activity than their non-overweight counterparts.¹⁶ Whitt-Glover et al.,¹⁷ found that among overweight Mexican American children only 33% met MVPA guidelines compared to 47% of normal weight Mexican American children. However, by adolescence (ages 12-15 years) only 9% of overweight children reached MVPA guidelines. Similarly, Butte et al.,¹⁴ found that compared to normal weight children, overweight Latino children, particularly, overweight Latino girls had the lowest rates of MVPA. These findings suggest that developing physical interventions designed for Latino children, particularly, overweight adolescent girls should be a health priority.

SPORT PARTICIPATION

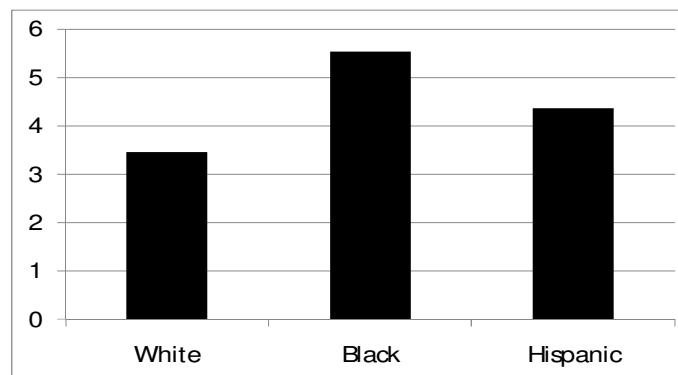
In 2002, the CDC conducted the Youth Media Campaign Longitudinal Survey, a nationally representative survey of children aged 9-13 years and their parents. Results from this survey indicated that 62% of children aged 9-13 years did not participate in any organized physical activity during their nonschool hours and that 23% did not engage in any free-time physical activity. Hispanic children (26%) were less likely than their non-Hispanic white counterparts (47%) to have participated in any type of organized physical activity in the past seven days.¹⁵ Similar ethnic differences in sport participation were reported by Singh et al.,¹⁸ who noted that 33% of Hispanic children compared to 64% for non-Hispanic white had participated in sports in the past 12 months. Pate et al.,¹⁹ using data from the 1997 Centers for Disease Control and Prevention Youth

Risk Behavior Survey, reported that 53% of Hispanic high school students participated in sports compared to 65% of their white counterparts. Gender differences in sports participation have been observed with Latino children. Latino girls have reported lower involvement in sport activities than Latino boys.²⁰ It is possible that factors such as socioeconomic status and conflicting obligations within Latino families such as evening jobs and child care may be influencing Latino children's sport participation.

SEDENTARY BEHAVIOR

According to the American Academic of Pediatrics (AAP) Committee on Public Education (2001),²¹ youth should engage in ≤ 2 hours per day of TV and video viewing, as well as computer/video game use. Thirty-seven percent of children in the United States spend three or more hours a day in screen time; thus, not meeting the AAP screen time recommendation. Hispanic children are likely to spend more hours in screen time than white children as shown in Figure 4.⁸ Similar results were reported by Stovitz²² who found that Hispanic boys and girls watched significantly more hours of television than their non-Hispanic white counterparts. Gordon-Larsen, Nelson, & Popkin²³ examined screen time among Hispanic adolescents, and observed that 66% did not meet AAP recommendations.

Figure 4. Daily Average Screen Time in Hours for Youth (ages 8-18)



CONTRIBUTORS TO PHYSICAL ACTIVITY LEVELS IN LATINO CHILDREN

From a socio-ecological model, physical activity levels among Latino children may be due to several cultural, social, and environmental factors.²⁴

CULTURAL FACTORS

Due to the fact a large number of Latino children come from immigrant Mexican families (accounting for 5.1 million),²⁵ the role of acculturation on Latino children and adolescent's physical activity warrants examination. Acculturation typically refers to the psychological and social changes experienced by immigrants and their descendents, as they adapt to the social and cultural context of the host country.²⁶⁻²⁷ For the most part, measures of acculturation have emphasized the person's movement from the culture of origin towards greater involvement with the host or dominant culture.²⁷ Among Latinos in the US, the degree of involvement with American culture has been measured primarily in terms of English language acquisition and usage, preference for ethnicity of friends and associates, preference for Spanish versus English media, and frequency of participation in cultural practices.²⁷⁻²⁹

Few studies have examined the relation of acculturation to physical activity among Latino children and adolescents despite the large number of them being immigrant descents. Findings from these studies have yielded mixed results.³⁰⁻³² Using data from the National Longitudinal Study of Adolescent Health, Gordon-Larsen et al.,³³ reported that relative to their US born peers, first-generation Mexican American and Cuban adolescents (7th to 12th graders) watched significantly less TV and videos, but also reported fewer weekly bouts of low intensity physical activity. Similarly, Singh et al.,¹⁸ reported lower levels of sports participation and higher levels of inactivity among immigrant Hispanic children with foreign-born parents. In another study,³⁴ Hispanic girls who spoke primarily English with parents were generally between 1.25 and 2.58 times more likely to participate in physical activity across grade levels as compared to Spanish speaking Hispanic girls, with the largest differences found for school sports in 8th grade girls. In contrast, Unger et al.,³² found that among Hispanic and Asian American students, higher levels of acculturation in the sixth grade (assessed in terms of US preference regarding friends, media, foods, and activities) predicted lower frequency of self-reported physical activity in the seventh grade. Carvajal et al.,³⁰ reported no association between cultural orientation (Anglo versus Latino) and self-reports of having engaged or not engaged in physical activity during the previous five days among 6th and 7th grade Hispanic students. Overall, findings on the relationship between physical activity and acculturation in Latino children have yielded mixed results.

SOCIO-ENVIRONMENTAL FACTORS

It is now documented that environments that people build and inhabit provide potential opportunities and barriers to engaging in physically active lifestyles.³⁵⁻³⁶ Objective measures such as density, land use mix, street connectivity, sidewalks, lighting, bike facilities, and access to recreational facilities such as parks and trails are shown to be associated with physical activity among adults.³⁷⁻⁴⁰ A few perception variables such as visual quality, safety, convenience, and perceived quality of pedestrian amenities are also determined to be related to physical activity though not consistently.⁴¹⁻⁴³ For example, findings of existing studies examining pathways in close proximity to the home have been found to have a positive association with physical activity in some instances while showing no association with physical activity in others.⁴⁴⁻⁴⁵ Perceptions of neighborhood crime and gangs have been found to have both a negative association and a lack of association with physical activity.⁴⁶⁻⁴⁷ Similarly, the self-reported presence of street lighting has produced both positive and no association with activity using self-report measures and objectively defined geographic information system measures.^{44,46,48-49} When focusing on children, parents represent a key ecological component in exploring youth risk behaviors.⁵⁰ There is an emerging body of research on the relationship between parental influences and physical activity in white children.⁵¹⁻⁵² Important variables include parental sex role, perceptions, and support, including access to physical activity locations by providing transportation.⁵³⁻⁵⁴ Welk, Wood, and Morss⁵⁵ examined the extent to which parental influences predicted children's (grades to 3 to 6; 68% Caucasian) physical activity involvement. Findings indicated that, consistent with expectations, children's perceptions of parental support and involvement in physical activity predicted children's self-reported physical activity. Empirical research also suggests that as children get older peer influences on physical activity also become stronger.⁵⁶⁻⁵⁸ Generally, findings indicate that positive parental influences include being active role models, prompting, encouraging, providing opportunities, and enabling lifestyle physical activity and sport participation (e.g., organizing, transporting, and involvement).

To our knowledge, however, scarce research has been conducted on the parental influence on Latino children's physical activity patterns. In a study by Ornelas, Perreira, and Ayala,⁵⁹ family cohesion, parent-child communication, and parental engagement were positively predictive of MVPA in Latino adolescents. The same authors also reported that self-esteem was a mediator of physical activity in both boys and girls,

whereas, depression was found to be a mediator in boys. In addition, other issues that co-vary with parental influence include age, gender, generational effects (e.g., first-born, first or second generation, one or both parents U.S. born), poverty, and highest education-level of either parent. Parental monitoring for activity and parental use of praise for children being active were positively related to Latino children's physical activity.⁶⁰ Additionally, there are studies that examine Latino parental influence on physical activity as a corollary issue to other topics such as smoking. However, few studies have examined direct parental influence on physical activity of children and even fewer studies specifically involved Latino families.⁶¹

POVERTY

Children represent a disproportionate share of the poor in the United States; they are 25 percent of the total population, but 35 percent of the poor population. In 2007, 14.1 million children under 18 years of age, or 19.0 percent, were poor. The poverty rate for children also varies substantially by ethnicity. In 2007, the poverty rate of Latino children was 31% compared to 11% for non-Hispanic white children.⁶² It is argued that poverty might limit accessibility to facilities conducive to recreational or leisure time physical activity (e.g., health clubs and gyms) and to safe neighborhood and outdoor play areas as well as increased traffic-related problems and stray dogs.⁶³⁻⁶⁵ Martinez et al.,⁶⁵ also found that Latina women identified physical activity knowledge (e.g., knowledge about benefits of regular physical activity and recommended physical activity dosage to improve fitness), child care, time management, and advocacy skills as facilitators of physical activity. The authors concluded that a church-based multilevel intervention may be optimal for promoting physical activity and facilitating environmental changes in Latino families.

In order to bridge the gap in what we know about Latino children's physical activity, the Robert Wood Johnson foundation funded a study called *Urban Hispanic Perceptions of Environment and Activity among Kids (UH PEAK)* in 2008.⁶⁶ The study, conducted in five predominately urban, Latino elementary schools located in the East End neighborhood in Houston, Texas, was designed to investigate how the perceptions of the surrounding environment (neighborhood, parks, and schools) affect 132 Hispanic mothers (mostly of Mexican ancestry) and their 10-11 year old child's physical activity levels. Following is a summary of select data from this study.

WHAT DO LATINO CHILDREN LIKE TO DO IN TERMS OF PHYSICAL ACTIVITY?

In the early 1960's a study of school children's health interests was conducted by authors Byler, Lewis, and Totman.⁶⁷ They summed their findings by simply stating, "teach (them) what (they) want to know." The following Tables 1 and 2 present the physical activity preferences of the UH PEAK children segregated by sex and their designated most liked and least liked activities. The girls gave support for non-team based activities such as tag, catch, running or jogging, and trampolines. In contrast, boys liked team concept activities like kickball and soccer, as well as individual activities (catch, tag, running or jogging). Both boys and girls liked playgrounds. Three team activities were among the "least liked" by girls (hockey, football, and cheerleading); boys did not like rhythmic activities like dance, ice skating, and hopscotch.

Table 1. UH PEAK Girl's Most Liked and Least Liked Activities

Variables	N	Yes (%)	No (%)	Not Sure(%)
Most Liked				
1. Playgrounds	71	61 (85.9)	5 (7.0)	5 (7.0)
2. Trampolines	70	60 (85.7)	4 (5.7)	6 (8.6)
3. Jumping rope	71	59 (83.1)	4 (5.2)	8 (11.3)
4. Swimming	71	56 (78.9)	4 (5.6)	11 (15.5)
5. Running or jogging	71	55 (77.5)	3 (4.2)	13 (18.3)
5. Tag or chase	71	55 (77.5)	4 (5.6)	12 (16.9)
5. Catch	71	55 (77.5)	6 (8.5)	10 (14.1)
Least Liked				
1. Hockey	71	8 (11.3)	44 (62.0)	19 (26.8)
2. Cheerleading/drill team	71	22 (31.0)	32 (41.6)	17 (23.9)
3. Football	71	20 (26.0)	30 (42.3)	21 (29.6)
4. Hiking	71	24 (33.8)	29 (40.8)	18 (25.4)
5. Yoga	70	15 (21.4)	28 (40.0)	27 (38.6)

Table 2. UH PEAK Boy's Most Liked and Least Liked Activities

Variables	N	Yes (%)	No (%)	Not Sure (%)
Most Liked				
1. Kickball	50	45 (90.0)	0 (0.0)	5 (10.0)
2. Catch	51	45 (88.2)	2 (3.9)	4 (7.8)
3. Playgrounds	51	42 (82.4)	3 (5.9)	6 (11.8)
4. Tag or chase	51	41 (80.4)	3 (5.9)	7 (13.7)
5. Running or jogging	51	40 (78.4)	2 (3.9)	9 (17.6)
5. Soccer	51	40 (78.4)	6 (11.8)	5 (9.8)
5. Trampolines	51	40 (78.4)	7 (13.7)	4 (7.8)
Least Liked				
1. Cheerleading/drill team	51	3 (5.5)	44 (86.3)	4 (7.8)
2. Yoga	51	4 (7.8)	34 (66.7)	13 (25.5)
3. Hopscotch	51	11 (21.6)	32 (62.7)	8 (15.7)
4. Dance	50	11 (22.0)	26 (52.0)	13 (26.0)
5. Ice skating	51	18 (35.3)	25 (49.0)	8 (15.7)

WHAT DO LATINO CHILDREN INTEND TO DO WHEN PHYSICALLY ACTIVE?

The physical activity intentions in the following seven days of the UH PEAK children are shown in Figures 5 and 6. More than 50% of the girls intended to participate in 13 out of 33 (39%) of the listed activities within the next week, including basketball, bicycling, soccer, dance, jumping rope, kickball, running or jogging, swimming, tag or chase, volleyball, walking, catch, trampoline, and playground. The girls most commonly indicated physical activity intentions included jumping rope, running or jogging, tag or chase, walking, catch, and playground. More than 70% of the girls responded that they intended to do these activities in the next week. More than 50% of the boys indicated their preferences to participate in 30% (10/33) of the listed activities in the next week, including basketball, bicycling, soccer, kickball, running or jogging, tag or chase, walking, catch, trampoline, and playground. The most common physical activity intentions of boys included kickball, walking, and catch. Eighty percent or more of the boys endorsed participation in these weekly activities. Several significant ($p < .05$ and $p < .01$) differences were noted between girls and boys physical activity intentions across the 33 listed options. A higher proportion of girls significantly ($p < .01$) intended to be

physically active in four activities compared to boys: dance ($\chi^2(1, N = 126) = 14.242$), jumping rope ($\chi^2(1, N = 126) = 12.080$), volleyball ($\chi^2(1, N = 127) = 10.146$), and hopscotch ($\chi^2(1, N = 127) = 8.469$). A higher proportion of boys significantly ($p < .05$ and $p < .01$) intended to be physically active in four activities compared to girls: soccer ($\chi^2(1, N = 127) = 4.010$, $p < .05$), football ($\chi^2(1, N = 127) = 5.245$, $p < .05$), hockey ($\chi^2(1, N = 127) = 3.953$, $p < .05$), and kickball ($\chi^2(1, N = 126) = 7.542$, $p < .01$). Cheerleading and yoga were among the least intended activities for both groups.

WHAT ARE LATINO CHILDREN DOING?

Participants' physical activity levels are summarized in Table 3 and Table 4 for children and mothers, respectively. Significant differences between children and mothers were found at moderate physical activity ($p < 0.0001$), vigorous physical activity ($p < 0.0001$), MVPA ($p < 0.0001$), and daily MVPA ($p < 0.0001$) using accelerometry (e.g., motion analyzer) as an objective measure of physical activity. Specifically, children had higher physical

Figure 5. UH PEAK Girl's Intentions to Be Physically Active in the Following Activities in the Next 7 Days.

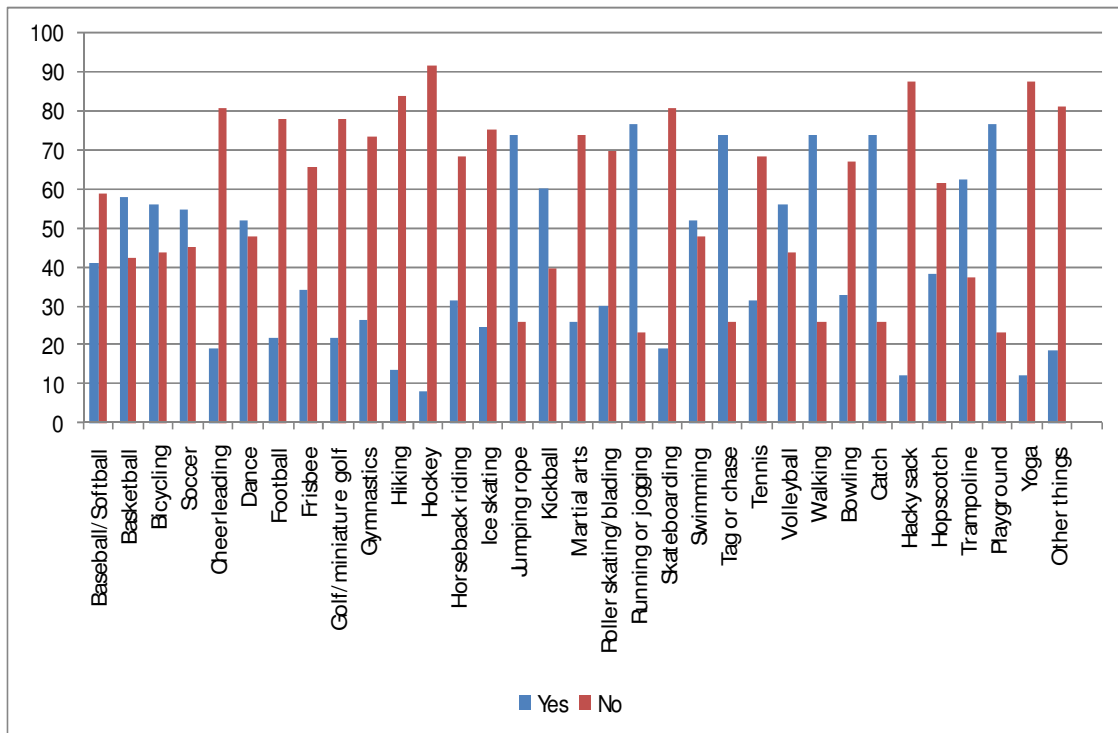
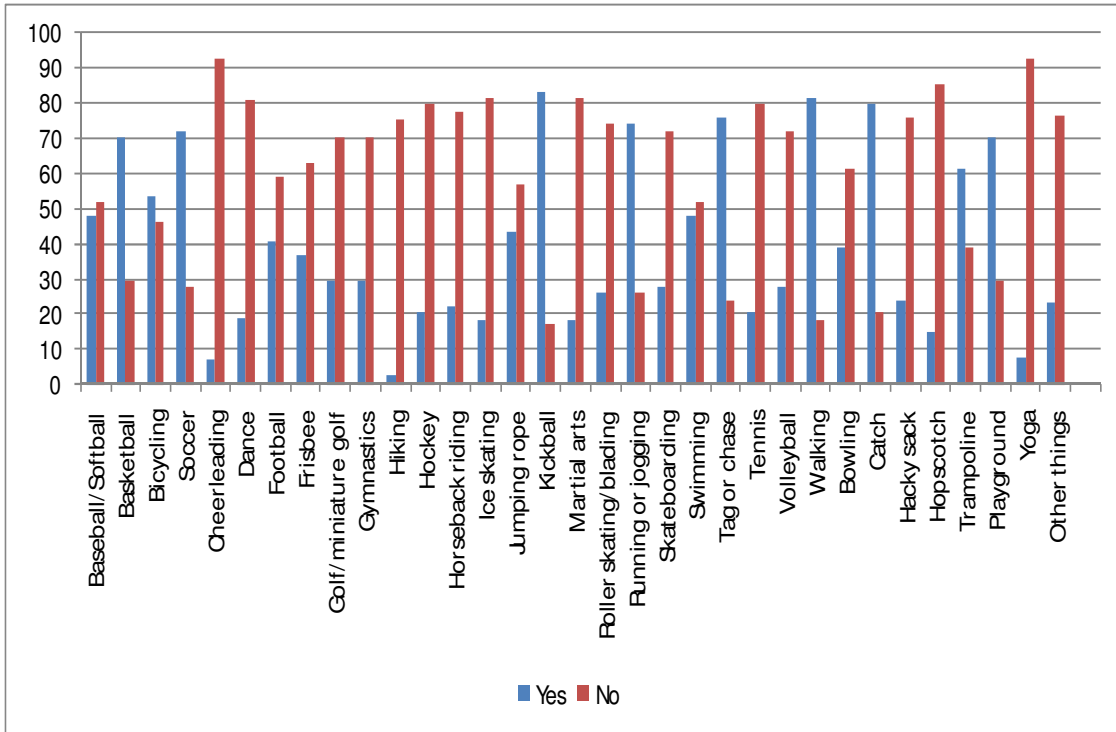


FIGURE 6. Boy's Intentions to Be Physically Active in the Following Activities in the Next 7 Days.



activity levels than their mothers. Significant correlations between maternal and child's physical activity levels were observed in terms of number of effective accelerometer wearing days ($R^2 = 0.35$, $p < 0.0001$), moderate physical activity ($R^2 = 0.13$, $p = 0.0097$), vigorous physical activity ($R^2 = 0.08$, $p = 0.0345$), MVPA ($R^2 = 0.17$, $p = 0.0026$). These findings indicate that mothers who are active are likely to have active children suggesting the important modeling role that mothers might have in promoting physical activity.

Table 3. UH PEAK Children's Physical Activity Levels (Accelerometer Data)

	Number of effective wearing days	Weekly Minutes				Daily Minutes MVPA
		Light	Moderate	Vigorous	MVPA	
M(SD)	5.82 (2.08)	1563.16 (803.74)	231.18 (135.23)	52.50 (60.32)	283.67 (181.12)	49.12 (26.64)
Median	7	1565.0	225.0	26.0	277.0	47.0
Range	1-7	77.0-3600.0	16.0-593.0	0-291.0	18.0-762.0	5.0-113.0

Table 4. UH PEAK Maternal Physical Activity Levels

	Number of effective wearing days	Weekly Minutes				Daily Minutes MVPA
		Light	Moderate	Vigorous	MVPA	
Mean(SD)	5.63 (2.20)	1593.73 (939.0)	111.48 (111.57)	6.48 (16.77)	117.96 (120.7)	20.76 (18.11)
Median	6.5	1681.0	71.5	0	72.5	14.5
Range	0-8	0-3510.0	0-572.0	0-79.0	0-573.0	1-82.0

WHERE/WHEN ARE LATINO CHILDREN PHYSICALLY ACTIVE?

Children's self-reported physical activity patterns in ordinary locations are provided in Table 5. At first glance, the "Home" and "PE Class" locations were reported as common places for physical activity. However, in grouping the responses "Never" and "Sometimes" and "Often" with "Always" and conducting Chi-square tests, the results provided additional insights. Latino children indicated they are more physically active at home ($\chi^2(1, N = 132) = 6.818, p = .009$) compared with being inactive at home. They are also physically active in green spaces by their homes ($\chi^2(1, N = 132) = 17.445, p = .000$). However, they are significantly ($p < .05$) inactive at the following locations: church ($\chi^2(1, N = 132) = 25.485, p = .000$), health club ($\chi^2(1, N = 132) = 75.758, p = .000$), and YMCA ($\chi^2(1, N = 132) = 91.667, p = .000$). School physical education and parks were not significant ($p > .05$) locations for physical activity. In other measures, recess was also a common event in which the UH PEAK children engaged in physical activity while lunch time was not. Latino children also indicated walking to/from the school, a park, and a friend's house on a fairly regular

basis. Similarly, Latino mothers stated that they actually walked with their child at least once a week. Sixty-nine percent of children said that they do like bicycling, 7% reported that they do not like it, and 24% indicated that they were not sure. Approximately 70% of children stated that they have bicycled at least once a week in the past seven days. However, only 9% reported bicycling to/from school. In contrast, 43% indicated bicycling to/from the park, 36% stated bicycling to/from a friend’s house, and 29% stated bicycling to/from a store in the past seven days. Participants did not indicate receiving any bike safety education. We also found that disparities exist between mothers’ and children’s perceived environmental factors associated with bicycling. Mothers were more likely to perceive that it was dangerous to walk or bike in the neighborhood due to too much traffic, cars going too fast, and lack of signals compared to their children.

Table 5. Frequencies of Ordinary Locations related to Latino Children’s Physical Activity

Variables	N	Never	Sometimes	Often	Always
How often are you typically active in ...?					
Your home/apartment, street, front/back yard	132	2 (1.5%)	49 (37.1%)	39 (29.5%)	42 (31.8%)
Your school PE class	132	2 (1.5%)	54 (40.9%)	33 (25.0%)	43 (32.6%)
Your church facility	132	43 (32.6%)	52 (39.4%)	24 (18.2%)	13 (9.8%)
A park	132	4 (3.0%)	59 (44.7%)	32 (24.2%)	37 (28.0%)
A health club	132	99 (75.0%)	17 (12.9%)	8 (6.1%)	8 (6.1%)
A YMCA	132	108 (81.8%)	13 (9.8%)	8 (6.1%)	3 (2.3%)
A playground or green space in an apartment complex	132	55 (41.7%)	35 (26.5%)	21 (15.9%)	21 (15.9%)

INTERVENTIONS

Due to the fact that there is a dearth of physical activity interventions conducted with Latino children, in this section we have decided to include interventions with at least one physical activity or fitness component involving minority children. As shown in Table 6, 14 interventions were identified. Of those 14 interventions, eight interventions involved Latino children. Most of the interventions were conducted in school settings as after-school programs. Only two interventions were conducted during the summer with high levels of participation. Overall, results from these interventions have yielded mixed results. Approximately, half of the interventions reported significant increases in physical activity or physical fitness levels. Despite the important role that parents play in the promotion of physical activity, only three interventions with Latino children have had

parental involvement. Two of those interventions involved the promotion of healthy eating and physical activity that resulted in increasing aerobic fitness or MVPA and decreasing several adiposity indicators (e.g., BMI, waist circumference).⁶⁸⁻⁶⁹ In addition, the BOUNCE (Behavior, Opportunities Uniting Nutrition, Counseling, and Exercise) summer intervention has provided valuable information about the type of physical activities that elicited the highest percentage of MVPA in overweight Latino girls which included traditional fitness (e.g., steps aerobics) and culturally-appropriate dances (e.g., Rumba fitness).⁷⁰

Table 6. Physical Activity and Physical Fitness Interventions Involving Minority Children

Source (Author, Year)	Sample Size & Characteristics and Setting	Study Design	Focus of Intervention	Variables	Significant PA, BC, and Fitness Outcomes
Baranowski et al., 2003 ⁷¹	35 African-American females, 8-10 years	RCT, One intervention and one control group	12-week summer program (physical activity and internet based program)	MVPA BMI WC BF%	No Significant Results
Barbeau et al., 2007 ⁷²	201 African American females, ages 8-12 years	Intervention and control groups	10-month after-school-based physical activity program	BC CVF MVPA	BF% (-) VAT % (-) BMD (+) CVF (+) MVPA (+) (p=0.05)
Beech et al., 2003 ⁷³	60 African-American females, ages 8-10 years	3 Groups: 1) control, 2) child-targeted, 3) parent-targeted	12-week community based intervention	MVPA BMI WC BF%	No Significant Results
Coleman et al., 2005 ⁷⁴	896, 3 rd graders (mostly Hispanic)	An untreated, matched control group design	3 year school-based program (El Paso)	BC AF MVPA	No Significant Results

			CATCH)		
Fitzgibbon et al., 2006 ⁷⁵	401, 3-5 year old preschoolers, mostly Latino	RCT, one experimental and one control group	14-week school-based physical activity and diet program with parental involvement	BMI PA	No Significant Results
Frenn et al., 2005 ⁷⁶	103, 12-14 year olds, mostly Hispanic and African American	Quasi-experimental with one intervention and one control group	8 computer-based sessions (3 focused on physical activity)	Self-reported MVPA	MVPA (+) (p=0.05)
Gorely et al., 2009 ⁷⁷	250 Hispanic (mostly Mex.-Am.) 5 th -6 th graders	Quasi-experimental One-group pre-post	12-week school based Aerobic exercise	Overweight \geq 95 th Wt-for-ht MVPA	MVPA (+) (p=0.05)
Hoelscher et al., 2010 ⁷⁸	1107, 4 th grade students 66% Hispanic 14% African American 20% white	Serial cross-sectional Comparing two interventions CATCH-Basic Plus and CATCH Basic Plus + Community	3-year school-based interventions	BMI PA Diet	Overweight rate reduction (-3.1% and -8.2%) Reduction of sedentary behavior
Olvera et al., 2010 ⁶⁸	37- Latino and African American parent-daughter (9-14 years old) dyads	Quasi-experimental with one-group pre-post intervention	3-week family-based healthy lifestyle summer program	BMI WC BF% AF MVPA	BMI (-) WC(-) AF (+) MVPA (+) p=0.05 No significant changes in BF%
Olvera et al.,	46 Latino mother-	Quasi-experimental	12-week family-and	BMI AF	AF (+) p=0.05

2010 ⁶⁹	daughter (7-13 years old) dyads	with one intervention and one control group	community-based exercise, nutrition, and counseling	MVPA Diet	No significant changes in BMI or MVPA
Pate et al., 2003 ⁷⁹	436, 5 th graders, mostly African-American	Quasi-experimental with one intervention and one control group	18-month school-based physical activity intervention	PA	No Significant Results
Robinson et al., 2003 ⁸⁰	61 African-American females ages 8-10 years	Intervention and "placebo" control group	12-week community-based dance intervention	MVPA BMI WC	No Significant Results
Story et al., 2003 ⁸¹	45 African-American females, 8-10 years	Intervention and control groups	12-week after-school based physical activity program	MVPA BF%	No Significant Results
Wilson et al., 2005 ⁸²	48, 10-12 year old students, mostly African American	Experimental and control groups	4-week school based physical activity program	MVPA	MVPA (+) (p=0.05)

Abbreviations

MVPA: Moderate to Vigorous Physical Activity
 PA: Physical Activity
 AF: Aerobic Fitness
 BC: Body Composition
 WHR: Waist-to-Hip Ratio
 BF%: Body Fat Percent

VPA: Vigorous Physical Activity
 CVF: Cardiovascular Fitness
 BMD: Bone Mineral Density
 BMI: Body Mass Index
 WC: Waist Circumference
 VAT%: Visceral Adipose Tissue Percent

RECOMMENDATIONS FOR RESEARCHERS, PRACTITIONERS AND POLICY MAKERS
 As outlined in the physical activity recommendations of first lady Michelle Obama's *Let's Move* program,⁸³ the solutions to positively impacting socio-cultural, environmental, and behavioral components rest with comprehensive systems approaches. Based on our research and review of related literature, the following recommendations are suggested for researchers, practitioners, and policy makers. Hopefully, these individual

points will be applied and integrated within a broad framework and used in combinations to develop multi-component, coordinated approaches to enhancing physical activity among Latino youth.

Recommendations for researchers

- Most of the research has used cross-sectional designs. More longitudinal studies are needed to determine the effect of individual, social, and environmental factors on physical activity or fitness in Latino children across time.
- Studies examining certain cultural, social, and environmental factors on physical activity in Latino children have yielded some conflicting findings. In part, one reason for this may be due to the aforementioned cross-sectional designs. However another reason may be related to the use of different instruments and methods to measure correlates and determinants of physical activity. Thus, more work is needed to validate instruments or use other methods (accelerometry) to determine physical activity.
- Increase research into the effects of culture on overweight and physical activity among Latino children, especially with regard to gender, language, diet, and social opportunities.
- Future work should examine how to intervene effectively among Latino children with different acculturation levels and familial factors. The role of parents—both their past and current roles—may be important factors that influence how parenting styles, and attitudes affect physical activity outcomes.
- Increase research efforts on developing, implementing, and evaluating the effectiveness of physical activity interventions. Research efforts should involve family members, peers, and community and environmental issues within Latino community and include a variety of settings (e.g., school, home, community).
- Investigate the effects of "screen-time" and other forms of sedentarism that may compete for physical activity choices in Latino children.
- Test innovative solutions to reduce sedentary behavior in Latino children by using digital technologies such as Nintendo WiiFit™ or Dance Dance Revolution.

Recommendations for practitioners

- Increase opportunities for sport participation through childhood and adolescence. Special focus should be placed on efforts encouraging sport participation among middle school youth. Desirable and preferred

activities include soccer, baseball, and basketball for boys and recreational activity opportunities for girls.

- Encourage participation in organized aerobic programs, such as step aerobics and dancing to promote MVPA in overweight Latino girls.
- Develop interventions that include family member participation, including parents and siblings. Schedule physical activity programs during after-school hours or when schools are not in session.
- Offer interventions to promote physical activity and physical fitness at home or in available community agencies or environments.

Recommendations for policy makers

- Place physical activity among minority youth as a priority item on community and city council agendas.
- Safety is a frequently perceived barrier. Thus, increasing safety in neighborhoods, parks and school, and community in general may be an important factor for increasing physical activity.
- Establishing school policies for safe biking to and from school or parks for Latino children is another way to promote physical activity in this population.
- Implement physical activity interventions during the after-school hours and the summer at schools, community centers, and churches.
- Increase awareness of community agencies and other resources for Latino families in the neighborhood that offer opportunities to be active, such as the YMCA.

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