Personal, Family, and Peer Correlates of General and Sport Physical Activity among African American, Latino, and White Girls

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Keywords

Physical Activity; Ethnicity; Girls; Support; Barriers

Cover Page Footnote

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This study examined associations between personal, family, and peer variables on objectively measured physical activity (PA), and sports participation, of African American, Latino, and white girls. Specific variables included barriers efficacy, parent PA, parent support of PA, the home exercise environment, friends' PA, and friends' support of PA. The sample comprised 372 girls (mean age = 12.03 years; *SD* = 1.81; *n* = 128 African American, *n* = 120 Latino, and *n* = 124 white). Data were analyzed using multiple-sample structural equation models (by ethnicity), controlling for age, household income, body mass index, and physical development. Girls' moderate to vigorous PA (MVPA) was positively related to friends' support for all groups, and to parent PA only for African American girls. For sports, greater parental support related to more participation across ethnic/racial groups, whereas friends' support was important only for African American girls. Age and physical development were negatively related to MVPA, and higher income was associated with greater sports participation. Numerous significant correlations emerged between the independent variables, with some differences across racial/ethnic groups. Findings highlight the role of parent and friends' support for both MVPA and sports participation of early adolescent girls, as well as the importance of determining PA correlates among different ethnic/racial subgroups

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INTRODUCTION

Despite current recommendations that school-age youth participate in 60 minutes or more of moderate to vigorous physical activity (MVPA) per day (Barr-Anderson et al., 2007; CDC, 2013; Strong et al., 2005), many children do not meet these guidelines (Godin et al., 2005; Guthold et al., 2010). In addition, physical activity (PA) typically declines during adolescence (Duncan et al., 2007; Kahn et al., 2008; Sallia, Prochaska, & Taylor, 2000), which makes the period from late elementary school through the middle school years of particular interest. It is also a period in which PA participation has been somewhat underexplored (Zarrett et al., 2009)—especially among subgroups at high risk for obesity and lower levels of PA, namely, girls and minorities (Gordon-Larsen et al., 2004; Whitt-Glover et al., 2009; Zarrett et al.).

In general, girls of all ages engage in less PA and fewer sports than boys (Hobin et al., 2012), and there is evidence to suggest that PA patterns differ by ethnicity as well as gender (CDC, 2013; Pate et al., 2007). Research exploring ethnic differences is lacking in all aspects of youth PA (Azzarito & Solmon, 2006)—most studies in this area have been conducted with mostly white samples—especially during early adolescence (Zarrett et al.), and few studies have used objective measures of PA (e.g., accelerometers). Relatively little is known about ethnic differences in relationships between personal, family, and peer factors with PA.

Even data on levels of PA across African American, Latino, and white girls are inconclusive. Self-reports of PA have indicated that African American and Latino youth have significantly less PA than white youth (Taylor & Lou, 2011). However, recent studies using objective measures of youth PA (e.g., accelerometers) show that African American and Mexican American children ages 6–19 years were more likely to meet recommended PA levels than white children (Taylor & Lou), and Whitt-Glover et al. (2009) reported that achievement of PA recommendations was significantly higher among non-Hispanic Blacks compared to non-Hispanic whites in the 6- to 11-year-old age group.

In addition, few studies have examined correlates of different types of PA across subgroups (Heitzler et al., 2006). About 44 million U.S. boys and girls aged 5–18 years participate in organized sport activities each year (National Council of Youth Sports, 2008). It may be that different factors affect sports participation versus more general PA, and these factors could vary across ethnic subgroups. To address some of these research gaps, the current study drew on a multi-ethnic sample of early adolescent girls to examine associations of potentially important personal, family, and peer factors with objectively measured (accelerometer) MVPA, and sports participation of African American, Latino, and white girls.

Barriers Self-Efficacy

Central to Bandura's (1986, 1997) Social Cognitive Theory (SCT) is the notion of self-efficacy, or personal belief in one's ability to execute actions to satisfy specific situational demands. Efficacy expectations influence choice, effort, and persistence (Bandura, 1986; McAuley & Mihalko, 1998), and may relate to specific tasks, or to impediments, barriers, or challenges to successful behavior (barriers self-efficacy). Self-efficacy beliefs in general have been shown to influence girls' PA (Allison, Dwyer, & Makin, 1999; Duncan, Duncan, & Strycker, 2005; Motl et al., 2002; Roesch et al., 2009).

Barriers self-efficacy reflects confidence in one's ability to engage in PA given various obstacles to PA participation (Trost et al., 2003). Prominent barriers to adolescent PA include lack of time, schoolwork conflicts, other interests, being too tired, lack of facilities, and the weather (Berry, Naylor, & Wharf-Higgins, 2005). Prior research has established relationships between barriers self-efficacy and youth PA (Annesi, 2006; Duncan et al., 2007; Trost et al., 2003; Wu, Pender, & Noureddine, 2003). However, few studies have examined the relationship between efficacy and PA across youth from different ethnic groups, and findings have been equivocal. Trost et al. (2002) found that PA was strongly related to efficacy in white and African American youth, yet others (Ward et al., 2006; Whitt-Glover et al., 2009) have reported that social–cognitive variables, such as self-efficacy, might be most highly related to PA in white girls and less relevant to non-white youth. We are not aware of any studies to date that have specifically examined the relationship of barriers self-efficacy to early adolescent girls' MVPA and sports participation across African American, Latino, and white subgroups.

Family and Home Factors

The family and home environment has been consistently shown to relate to youth PA (Kuo et al., 2009; Trost et al., 1999; Welk, Wood, & Morss, 2003). Physically active parents tend to have more physically active children, and to be more supportive and involved in their children's PA efforts (Sallis et al., 2002; Welk et al.). Parent and family support has been identified as a key factor affecting youth PA (Beets et al., 2006; Duncan et al., 2002). Parents can support youth PA by providing information and encouragement, discussing activity, sharing in PA, providing transport, and giving other tangible aid (Duncan et al., 2005; Heitzler et al.; Kuo et al., 2007). In one of very few studies exploring relationships between parents' and adolescents' PA in different racial or ethnic groups, McGuire et al. (2002) found that parents' reported encouragement was positively related to all girls' PA.

Aspects of the home's physical environment also may be related to PA. Cross-sectional studies have demonstrated relationships between home exercise equipment and adult PA (Evenson et al., 2006; Gorin et al., 2011; Jakicic et al., 1997; Sallis et al., 1997), but few studies have explored the impact of the home exercise environment on PA among youth from different ethnic groups.

Peer Factors

As children age, they spend more time with friends compared to family. Friends' PA is consistently related to youth PA (Beets et al.; Voorhees et al., 2005). Dunton et al. (2007) and Rusby et al. (2014) found that higher levels of exercise were reported with friends, outdoors, and at school. In addition, peers are a potentially key source of support for adolescent PA and for PA efficacy beliefs (Duncan et al., 2005; Duncan et al., 2007). Peer support may serve a number of different functions (e.g., social integration in PA, emotional support, informational support, tangible aid, reassurance of worth), which may help bolster a youth's PA efficacy beliefs and assist in overcoming perceived barriers to PA participation. Despite their potential importance, little is known about how peer factors relate to youth PA, especially among girls and across different ethnic groups.

The purpose of the present study was to examine associations between personal, family, and peer factors with MVPA and sports participation of African American, Latino, and white girls. Specifically, the objectives were to determine: (a) the relations between perceived barriers efficacy, parent PA, parent support of PA, the home exercise environment, friends' PA, and friends' support of PA on girls' MVPA and sports participation; (b) the extent to which the personal, family, and peer variables are related to each other; (c) whether relations differ for MVPA versus sports participation; and (d) whether relations differ across African American, Latino, and white early adolescent girls.

METHODS

Participants and Procedures

Data are from the first year of a study of 372 African American (n = 128), Latino (n = 120), and white (n = 124) girls residing in a Northwestern U.S. metropolitan area. Families having a 10-, 12-, or 14-year-old girl were randomly recruited using telephone, door-to-door, and word-of-mouth methods. Of eligible families, 67.8% agreed to participate. The target girl and a parent completed surveys in their home. Girls younger than 12 years of age were administered the survey as an interview. Spanish-language surveys were provided for Spanish-speaking participants. Survey visits lasted about 30–75 minutes. Participants completed surveys in private, away from other family members, to enhance confidentiality. For 7 days, girls were asked to wear a GT3X+ ActiGraph accelerometer device on an elastic band around their waist provided

by the project for 24 hours a day (except in water). Girls were paid $50 to complete the entire assessment; parents were paid $30. This study was approved by an Institutional Review Board. All adult participants gave informed written consent and all girls gave informed written assent prior to study participation.

The mean age of the girls was 12.06 years (*SD* = 1.69). The annual household income for the sample was 30% <$20,000, 40% from $20,000–$60,000, and 30% >$60,000. Mean body mass index (BMI) was 23.16 (*SD* = 7.65) kg/m^2.

Measures

***Youth PA*.** MVPA was measured from objective accelerometer-generated data. Percent of time in which the girl engaged in combined moderate and vigorous activity was calculated. Child-specific cut points, derived from Freedson et al. (2005), were used to determine intensity of activity using ActiLife5 software. Accelerometry is accepted as a reliable and valid method for measuring PA in population-based studies of free-living individuals (Colley et al., 2011; Mathews et al., 2008; Troiano et al., 2008; Trost et al., 2011). In the present study, compliance for wearing the device was moderately high, with 89% of girls providing at least 5 days of valid data. Valid days of accelerometer use ranged from 0–7 (mean = 5.66 days [*SD* = 1.18]).

A sports PA latent factor represented girls' participation in organized sports, and was indicated by three variables: two youth survey items and one parent survey item. Girls were asked, "In the past year, how often did you go to or take part in an organized sports activity?" Responses ranged from 1 (not at all) to 6 (at least twice a week). Parents were asked the same question about their daughters. In addition, girls indicated the number of sports teams on which they participated in the past year, from a list of 18 possible sports (e.g., basketball, soccer, volleyball). Answers were summed to reflect the total number of sports teams. The latent variable approach offers an efficient and appropriate way to combine several variables into one factor for analysis. The use of a latent variable approach to analyses is also advantageous because it accounts for measurement error and the analysis of disattenuated parameter estimates between groups, and increases power without the need to increase sample size or obtain a larger effect size (Duncan, Duncan, & Strycker, 2006). Thus, the three sport-related variables were combined within the latent variable structural equation modeling analysis to form the latent factor outcome variable representing sports participation.

The MVPA variable and the sports latent factor were not independent, in that the accelerometer measure reflected all MVPA, including sports, and the sports factor represented only organized sports participation. The present study investigated both types of PA in order to examine their potentially different relationships with personal, family, and peer factors. Analyses revealed that the two measures were somewhat correlated, $r = .161$ ($p < .01$).

PA correlates.

***Barriers efficacy*.** The present study adapted a measure of barriers self-efficacy based on prior measures (Duncan et al., 2007; McAuley & Mihalko). Youth participants were asked, "How confident are you that you can do physical activities even when faced with any of the following obstacles?" Items included: "The weather is bad," "It is hard to get transportation to the activity location," and "I feel tired." Responses for 19 items were on a five-point scale ranging from 1 (not confident at all) to 5 (completely confident), and were averaged to create a total score. Reliability was $\alpha = .91$.

Parent PA. PA among parents and other household adults was assessed with four items adapted from the Behavioral Risk Factor Surveillance System (BRFSS) (CDC, 2010). Parents were asked two questions, about themselves and about other adults in the household: "In a

typical week, on how many days are you [other adults in your household] physically active for a total of at least 30 minutes per day?" Girls were asked two similar questions about the typical PA of their parent in the study and other adults in the household. Responses ranged from 0 to 7 days. Parents' and girls' responses were averaged to create a variable reflecting parent PA.

Parent support for PA. Similar to items used in other studies (Duncan et al., 2005; Sallis et al., 2002), girls were asked the extent to which the parent in the study and other adults in the household provided different types of support for PA. Six support items were included: "Encourage you to do physical activities," "Offer to do physical activities with you," "Do a physical activity with you," "Watch you take part in physical activities," "Talk with you about physical activity," and "Provide transportation so you can go to a place where you can do physical activities." Questions asked how often during a typical week each person did these things; responses were on a five-point scale ranging from 1 (never) to 5 (very often). The six items were averaged to create a total support variable separately for parent and for other adults in the household; these two variables were averaged to create a variable representing parental support. Reliabilities were $\alpha = .83$ for support from the parent in the study and $\alpha = .85$ for support from other adults in the household.

Home exercise environment. The Exercise Environment Questionnaire (Gorin et al.) was used to assess the amount and type of exercise equipment available in the home. Parents were asked to note whether various sports, recreation, and exercise equipment were present in their homes (0 = no, 1 = yes). This instrument has high test–retest and inter-rater reliability between adults within the home (Gorin et al.). Slight item changes/adaptations were made based on input from the study's African American and Latino consultants to increase relevance for non-white participants. Responses of 28 items were summed to produce a total score.

Friends' PA. Friends' PA was assessed with one item adapted from the BRFSS (CDC, 2010). Girls were asked: "In a typical week, on how many days are your best friends physically active for a total of at least 60 minutes per day?" Responses ranged from 0 to 7 days.

Friends' support for PA. PA support from friends was measured in the same way as PA support from parents/adults in the household, described above. The item, "Provide transportation so you can go to a place where you can do physical activities" was explained to participants to mean transportation provided by friends or friends' parents/relatives. Reliability was $\alpha = .86$.

Demographic variables**.** Age, family income per capita (family income measured in six categories, divided by number of family members), BMI, and physical development were included to control for their possible relationships with MVPA, sports participation, and hypothesized PA correlates. Girls' height and weight were measured by trained Research Assistants on calibrated scales (LifeSource Pro-Fit UC-321) and stadiometers (Seca model 217). BMI was calculated using the Centers for Disease Control and Prevention's online BMI Calculator for Child and Teen, which accounts for age and sex, and is recommended for ages 2–20. This calculator provides the BMI and corresponding BMI-for-age percentile on a CDC BMI-for-age growth chart, which is the accepted method for calculating BMI for children and teens (Mei et al., 2002). Physical maturation was assessed with four items adapted from Petersen et al. (1988): three items in which girls were asked to describe their growth in body hair, skin changes, and growth in breasts, ranging from 1 (not yet begun to change) to 4 (this change seems completed), and one question asking girls whether they had begun menstruation (0 = no, 1 = yes; recoded to 1 = no and 4 = yes). The four items were averaged to represent overall physical development.

Analyses

Structural equation modeling (SEM) was employed to examine the relationships of personal, family, and peer variables with MVPA and the sports latent factor. Based on prior research, relationships between age, household income, BMI, and physical development with MVPA and sports participation (Bradley et al., 2000; CDC, 2013; Duncan et al., 2007; Santos, Esculcas, & Mota, 2004; Taylor & Lou, 2011; Whitt-Glover et al., 2009) were controlled for in the analyses. The sports factor and MVPA were specified to covary; personal, family, and peer variables were covaried with each other; and age, family income, BMI, and physical development were specified as control variables. To determine whether differences existed across the three ethnic groups, multiple-group (by ethnicity) SEM was employed. Multiple-group analyses permit simultaneous evaluation of results across multiple populations (Bentler, 2005; Duncan et al., 2006). In this study, the analyses tested for significant differences by ethnic group in regression parameters, covariances, and means and variances. Models were estimated using Mplus software (version 6.1) (Muthén & Muthén, 1998–2011).

RESULTS

Model Specification

Figure 1 illustrates the model in which personal, family, and peer variables were hypothesized to be related to MVPA and sports participation.

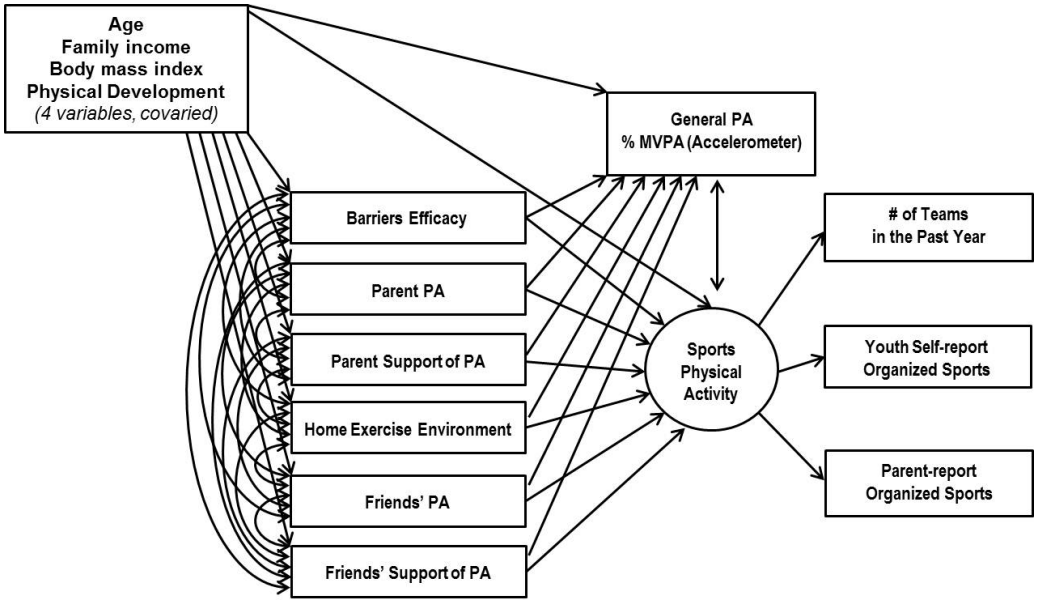

Figure 1. Illustration of the model in which personal, family, and peer variables are hypothesized to influence MVPA and sports participation. The multiple-group model employed in this study estimated regression parameters, covariances, and means and variances—and tested for significant differences in these estimates—across African American, Latino, and white subgroups.

Means and standard deviations for all the observed variables used in the model are shown in Table 1. These statistics indicated no significant differences across ethnic group in means for age, physical development, self- and parent-reported sports activity, or support from friends for PA. However, there were significant ethnic differences in mean values for most of the other

variables in the model. Compared to Latino and white girls, African American girls on average had significantly greater BMI, had spent more time engaged in MVPA, had participated in more sports teams over the past year, and had friends reporting fewer days/week engaged in PA. Latino girls reported significantly lower adult PA and adult PA support than African American and white girls. White girls reported the highest income, the highest PA barriers efficacy, and the most conducive home exercise environment, followed by African American and Latino girls.

Table 1
Descriptive Statistics of Observed Variables in the Models

African American Mean (SD)	Latino Mean (SD)	White Mean (SD)	
Age (years)	12.03 (1.81)	12.04 (1.64)	12.10 (1.61)
Income per capita	.75 (.46)	.66 (.49)	**1.08 (.45)**
Body mass index (kg/m^2)	**24.62 (6.47)**	22.38 (4.85)	22.40 (10.36)
Physical development	2.58 (.78)	2.44 (.88)	2.56 (.94)
% time engaged in MVPA	**6.84 (3.48)**	5.89 (3.25)	5.90 (3.06)
# sports teams past year	**1.69 (1.46)**	1.05 (1.53)	1.22 (1.30)
Self-report sports activity	3.55 (2.00)	2.43 (1.86)	3.65 (2.16)
Parent-report sports activity	3.63 (2.01)	2.47 (2.02)	3.65 (2.07)
PA barriers efficacy	**3.52 (.94)**	**3.35 (.83)**	**3.66 (.89)**
Household adult PA (days/wk)	3.67 (1.57)	**3.21 (1.48)**	3.59 (1.51)
Household adult PA support	3.25 (.72)	**2.99 (.69)**	3.19 (.64)
Home exercise environment	**11.42 (4.79)**	**9.50 (5.36)**	**15.25 (4.29)**
Friends' PA (days/wk)	**4.82 (1.86)**	5.07 (1.87)	5.09 (1.71)
Friends' PA support	2.90 (1.01)	2.81 (1.03)	2.76 (.91)

Note. Means in **bold** type signify a significant difference between that group and the other groups.

As shown in Figure 1, the sports latent factor comprised three items (# sports teams in the past year, self-reported sports activity, parent-reported sports activity—shown in Table 1) described in the Measures section. To set the scaling for the latent sports factor, the loading of one variable (# sports teams in the past year) was set at 1. A preliminary multiple-sample (three-group-by-ethnicity) model without covariates (unconditional model) showed that the survey items loaded significantly on the sports latent factor ($p <$. 001), making the factor a viable and reliable outcome in the model, along with the outcome of accelerometer-measured MVPA. This model also revealed significant differences across ethnic groups for the mean of the sports participation latent factor (African American girls significantly higher than Latino and white girls). Other significant differences in mean levels of variables in this model mirrored those in Table 1. African American girls had a significantly higher mean for the sports participation latent factor, MVPA, and BMI, and a significantly lower mean for friends' PA. White girls had the highest PA barriers efficacy and home exercise environment mean. The means for parental PA and support were significantly lower for Latino girls. White families had a significantly higher mean income than the other two groups.

Next, a conditional model was specified that incorporated regression and correlations. Initially, constraints were placed across the three ethnic groups requiring equality of parameter estimates for the coefficients, covariances, means, and variances of all variables. Model fitting procedures for the hypothesized fully constrained model yielded the following fit indices: $\chi^2(358) = 665.324$, $p < .001$, Comparative Fit Index (CFI) = .786, Tucker–Lewis Index (TLI) = .757, and Root Mean Square Error of Approximation (RMSEA) = .083. The observed variables had significant loadings on the sports latent factor. Results of the Modification Indices in Mplus revealed that there were a number of constraints across groups that, if relaxed, would result in a significant chi-square decrease. The models were rerun, removing each appropriate constraint one at a time until no further relaxed constraints would improve model fit.

Final Model Results

Fit. Fit indices for the final full model (with significant cross-group constraints relaxed) were: $\chi^2(233) = 220.838$, $p = .706$, CFI = 1.000, TLI = 1.017, and RMSEA = .000.

Regression effects. As shown in Table 2, parental support was positively associated with sports participation for all girls. Friends' support was significantly positively related to MVPA for all girls, and significantly positively related to sports participation for African American girls only. Parental PA was related to MVPA, but only for African American girls. Income was significantly positively related to sports participation, parent support for PA, and the home exercise environment for all girls, and to barriers efficacy for white girls only. Age and physical development were negatively related to MVPA for all girls. Among African American girls only, physical development was positively related to the home exercise environment.

Table 2
Significant Regression Effects and Differences across Ethnic Groups in the Final Model

		African American	Latino	White
Income	→ Sports	.242*	.242*	.242*
	→ Parent support	.200*	.200*	.200*
	→ Home ex. environ.	2.377**	2.377**	2.377**
	→ Barriers efficacy	.003	.003	**.277***
Age	→ MVPA	-1.036**	-1.036**	-1.036**
Physi. devel.	→ MVPA	-.672*	-.672*	-.672*
	→ Home ex. environ.	**.407**	-.203	-.203
Parent support	→ Sports	.565**	.565**	.565**
Parent PA	→ MVPA	**.301***	.075	.075
Friends' supp.	→ Sports	**.296****	.095	.095
	→ MVPA	.284*	.284*	.284*

Note. Effects denoted by * and ** are significant at $p < .05$ and $p < .001$, respectively. Effects in **bold** type denote a significant difference between that group and other groups (equality constraint relaxed).

Correlations. Significant correlations and ethnic differences are presented in Table 3. For all girls, greater barriers efficacy was significantly associated with more parental PA. There was a significant and positive relationship between barriers efficacy and parental support, but

only for African American and white girls. For white girls only, barriers efficacy was significantly positively associated with friends' support. Across ethnic groups, there were significant and positive relations between parental PA, and parental support, the home exercise environment, friends' PA, and friends' support. Also, for all girls, greater parental support was related to a more conducive home exercise environment, more friends' PA, and more friends' support—and the relation between parental support and friends' support was significantly stronger among white girls. Friends' PA and friends' support were positively related across all three ethnic groups. Age, income, BMI, and physical development were interrelated. For all groups, older girls had greater BMI and physical development, and higher income was associated with greater physical development and lower BMI. BMI and physical development were positively related, but only for African American and white girls.

Table 3
Significant Covariances, Correlations, and Group Differences in the Final Model

		African American Corr	Latino Corr	White Corr
Age with:	BMI	.161**	.262**	.124**
	Physical dev.	.617**	.732**	.732**
Income with:	BMI	-.143*	-.195*	-.093*
	Physical dev.	.155*	.155*	.155*
BMI with:	Physical dev.	.293**	**.154**	.190**
Barriers efficacy with:	Parent PA	.132*	.159*	.159*
	Parent support	.289**	**.063**	.346**
	Friend support	.041	.049	**.377****
Parent PA with:	Parent support	.366**	.366**	.366**
	Home ex. envir.	.100*	.100*	.121*
	Friends' PA	.263**	.263**	.263**
	Friends' support	.128*	.128*	.128*
Parent support with:	Home ex. envir.	.163*	.163*	.196*
	Friends' PA	.217**	.217**	.217**
	Friends' support	.301*	.301**	**.506****
Friends' PA with:	Friends' support	.366**	.366**	.366**

Note. Covariances/correlations denoted by * and ** are significant at $p < .05$ and $p < .001$, respectively. Effects in **bold** type denote a significant difference between that group and other groups (equality constraint relaxed).

DISCUSSION

Researchers, such as Whitt-Glover et al. (2009), have advocated for more studies examining PA influences by ethnic group and gender. In response, the present study examined the associations of personal (barriers efficacy), family and home (parental PA, parental support, home exercise environment), and peer (friends' PA, friends' support) factors on MVPA and sports participation across African American, Latino, and white girls.

In general, parental and friends' support were significantly related to girls' MVPA and sports participation, supporting prior research (Beets et al.; Duncan et al., 2005; Heitzler et al.). However, differences emerged across ethnic groups. Greater support from friends was consistently related to more MVPA across ethnic groups, but for sports participation the relationship was significant only for African American girls. African American girls also had the highest mean levels of sports participation. It may be that participation in sports plays a greater role in early adolescent African American girls' overall PA, compared to Latino and white girls, and support from peers is of particular import to sports participation in this subgroup. These findings suggest that programs attempting to engage African American girls in sports activities might be most successful if they make provisions for peer involvement.

Parental support, on the other hand, was positively associated with sports participation across all three subgroups. Girls with greater perceived parent support participated in more sports. This finding is in line with prior research with similar age groups (Heitzler et al.), including studies of ethnically diverse adolescents (McGuire et al.). Parental support may be particularly important for sports participation because youth sports often require not only emotional (e.g., encouragement, discussion) support, but also investment and tangible support (e.g., time, transportation, fees) from parents compared to more general or lifestyle PA. Pfeiffer et al. (2006) found that girls who played sports in eighth and ninth grades were more likely to be physically active than nonparticipants over time. These findings highlight the need to continue to explore the role sports participation can play in keeping adolescent girls active.

Researchers have stressed the importance of parents as positive role models for their children by being active themselves (e.g., Sallis et al., 2002; Tergerson & King, 2002; Welk et al.). However, in the current study, parent PA was related to MVPA only for African American girls. More research is needed to verify whether parent PA is a particularly salient correlate of PA for African American girls, more so than for other ethnic groups.

Higher income was associated in this study with greater sports participation across all groups, as in prior research (Gordon-Larsen et al., 2000; Voorhees et al., 2009), and this result is not surprising given the costs associated with most organized youth sports. Higher income also was related to greater parental support for PA and to a more favorable home exercise environment. These relationships were consistent across African American, Latino, and white subgroups. Parents with higher incomes, regardless of ethnic group, may have more flexible time and resources that allow them to provide more support—and to purchase PA-related home items. It may be that parents who are better able to afford the costs associated with youth sports participation are subsequently more likely to watch their children being physically active, talk with their children about PA, and provide transportation to activities. While the subgroup of white girls had the highest mean income level, it was African American girls who had the highest sports participation. This suggests that the relationship between income and sports participation is might be influenced by other factors (interactional or mediational) that are not captured in this study.

It is unclear from this cross-sectional data why higher income was associated with greater barriers efficacy for only white girls. White girls also had the greatest barriers efficacy of all three groups, and research has shown that actual PA barriers vary significantly by socioeconomic status and race (Powell et al., 2007). Or this result might be related to more diversity in socioeconomic status among white families, suggesting a socioeconomic status threshold that affects the relationship between income and barriers efficacy. As in prior research (Bradley et al.,

2000; Gordon-Larsen et al., 2004; Whitt-Glover et al., 2009), older and more physically developed girls in this study had less MVPA than younger and less physically developed girls.

Some researchers have argued that social–cognitive variables, such as self-efficacy, tend to be more strongly correlated with PA in white compared to other ethnic samples (Barr-Anderson et al.; McGuire et al.; Ward et al.). In contrast to prior research (Duncan et al., 2007), barriers efficacy in this study was not a significant correlate of MVPA or sports participation for any ethnic subgroup. However, barriers efficacy was significantly related to other covariates. Greater barriers efficacy was associated with more parental PA across all girls, and greater perceived parental support for African American and white girls. Also, for white girls, greater barriers efficacy was related to more perceived friends' support. This suggests that barriers efficacy may have an indirect effect on MVPA and sports participation through its association with other variables, especially for white girls.

Across all groups, girls who had more physically active parents also reported greater parental support for PA, had a more favorable home exercise environment, and reported higher levels of friends' PA and support. Friends' PA and support were positively related to each other, and African American, Latino and white girls who perceived greater parental support also had a more conducive home exercise environment and reported more friends' PA and support. The relation between parental support and friends' support was significantly stronger among white girls, although significant and positive for all three groups. The positive correlations across personal, family, and peer covariates suggest that increasing any of these perceptions, behaviors, or environments could potentially result in an increase in some, if not all, of the others. For example, increasing the PA of parents of African American, Latino, and white girls, and/or their level of support for their child's PA, is likely to have a beneficial effect on the PA of the child. Thus, public health policies and programs that address both youth and adult physical activity, and even promote parent-child or family physical activities, might be advisable.

The personal, family, and peer covariates of PA and sports participation were examined while controlling for age, income, BMI, and physical development. As discussed earlier, income was related to sports participation, and age and physical development to MVPA; however, BMI was not related to either MVPA or sports. This result supports prior research of similar age youth, in which BMI was unrelated to PA levels (Hesketh et al., 2008; Voorhees et al., 2009). There were significant interrelationships among the control variables: BMI and physical development were higher in older compared to younger girls, and, similar to prior research (Voorhees et al., 2009), girls from higher-income families had greater physical development and lower BMI. BMI and physical development were positively related, as might be expected, but only for African American and white girls.

Significant mean differences in PA emerged across ethnic groups. African American girls had significantly higher sports participation and MVPA than Latino and white girls. While these data for African American children run counter to self-report data showing that African American youth are less active than white youth (Taylor & Lou), researchers suggest that some self-report measures might not adequately capture the types of activity in which racial or ethnic minority people engage, thus resulting in an underestimation of their activity levels. This highlights the importance of using multiple assessment measures to capture PA among ethnically diverse populations. It also has been suggested that African Americans may have increased their activity in response to the recent national focus on preventing obesity in high-risk populations (Taylor & Lou). Clearly, further research is needed among diverse ethnic youth in order to replicate and explicate these findings.

The current study had several limitations, including the use of cross-sectional data, which did not permit directional or causal testing of the effects of the personal, family, and peer covariates on MVPA and sports participation. Only the first year of data were used in this multi-year study because longitudinal data were not yet available; future studies are needed to document relations among these variables over time. The analyses controlled for age, household income, BMI, and physical development, but there may be other factors that should be controlled for in future studies. In addition, the covariates analyzed represent only a few of many covariates potentially important to adolescent girls' PA. Examples of other potentially important covariates include family structure, sibling influences, and neighborhood environment. It also is possible that the covariates exert themselves in a more interactive rather than direct manner, which was not tested here. The measure of sports participation was limited to self- and parent-reports, and did not include an objective measure. The measure of MVPA and the sports latent factor were not completely distinct; the two measures were not highly correlated (r = .161) but are limited because one used only survey data and the other only objective data. Further, the findings of this study are not generalizable to other ethnic groups not included in the sample. Strengths of the study include the use of an objective measure of PA (accelerometers), multiple informants (youth and parents), multiple measurement methods (surveys, accelerometers, objective height and weight), and a latent factor for sports participation; the randomly recruited sample; and an analytical model that examined statistically significant similarities and differences across African American, Latino, and white girls.

Overall, findings from this study highlight the importance of parental PA, parental support, and peer support to early adolescent African American, Latino, and white girls' MVPA and sports participation. Increases in parent PA, and parent and peer support may help to reduce health disparities among African American and Latino girls. Community programs could focus on involving parents and girls in activities together. In addition, because sport is an established social institution within Western society, the impact of peers is of potentially great importance (Weiss & Stuntz, 2004). Researchers have recommended emphasizing the social benefits of PA to adolescent females, in particular, to encourage their PA participation (Tergerson & King). Results of this study showed differences across ethnic group in that support from peers was significantly related to MVPA for African American, Latino, and white girls, but was only related to sports participation in the African American subgroup, indicating that peer involvement and support might be especially important for programs aimed at increasing African American girls' participation in sports. The results of this study also clearly point to the role that parental support plays, particularly in the sports participation of early adolescent African American, Latino, and white girls. Because income was significantly associated with sports participation for all subgroups, the provision of low-cost sports programming may be essential in helping to increase sports participation across economically diverse youth of all ethnicities.

Future research on youth PA should continue to include objective assessment of PA, as well as assessment of sports participation separately to other types of PA, in order to better understand the key correlates of different types of PA participation across ethnic and gender subgroups. Future research also should investigate the vast array of potential factors (e.g., demographic, personal, family, peer, school, and neighborhood) that might relate not only to overall PA levels, but also to different types of PA across different subgroups. A better understanding of PA participation patterns across and within population subgroups holds promise for helping researchers and practitioners target public health efforts to increase PA levels among groups most at risk for low activity and obesity (Whitt-Glover et al., 2007).

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