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Contribution of Athletic Identity to Child and Adolescent Physical Activity

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Abstract

Background—Identity theorists maintain that domain-specific self-concepts help explain the differential investment of people's time and effort in various activities.

Purpose—This study examined the contribution of athletic identity and three key demographic variables to physical activity and sports team participation.

Methods—Students in Grades 4–5 (*n*=391, mean age 9.9 years, range 8–13 years, collected in 2003) and Grades 7–8 (*n*=948, mean age 13.6 years, range 11–15 years, collected in 2002 and 2006) completed the 40-item Athletic Identity Questionnaire, which measures self-perceptions of athletic appearance; competence; importance of physical activity and sports; and encouragement for activity from parents, teachers, and friends. Hierarchic multiple regression analyses in 2008 assessed the effects of athletic identity, race/ethnicity group, gender, and overweight status on 7-day moderate-to-vigorous physical activity (MVPA) and organized sport team participation in each age group.

Results—In children and adolescents, the global score of athletic identity was independently, positively related to MVPA ($p<0.0001$, $p<0.0001$, respectively) and team participation ($p<0.0001$, $p<0.0001$, respectively), after controlling for demographic variables. More variance in MVPA was explained in children (23%) than in adolescents (5%), in contrast to team sports (5% in children, 15% in adolescents). In the subscale analyses, positive relationships for appearance, competence, importance, and parental encouragement persisted independent of demographic factors.

Conclusions—Results support the role of athletic self-concept in promoting physical activity and organized sport participation in children and adolescents.

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Introduction

Recent revisions in recommendations on the prevention and treatment of child and adolescent overweight continue to emphasize participation in moderate-to-vigorous physical activity (MVPA).[1] Multiple cross-sectional studies have established an inverse relationship between physical activity and overweight among adolescents and children,[2–6] and longitudinal data indicate that physical activity is protective against weight and fatness gains in youth,[7] even into adulthood.[8,9]

Obesity and chronic disease prevention efforts have begun to focus on identifying correlates of physical activity that may serve as mediating variables that can be targeted in interventions, particularly psychological constructs.[10,11] Physical self-concept and identities specific to physical activity and sports have become an important research focus,[12–14] as both outcome and mediating variables for physical activity.[15,16] Multidimensional measures of physical self-concept and athletic identity, the focus of the current study, have been significantly related to physical activity, fitness, and sport participation in multiple studies among adolescents and children.[17–20]

Although prior research on athletic identity has found positive relationships with physical activity and sports team participation in both adolescents[17] and children,[18] the influence of important demographic factors, such as gender, race/ethnicity, and overweight status, has not been considered. Consistently in the literature, studies[10] have shown that boys are more physically active than girls in both children and adolescents, and that white adolescents are more physically active than adolescents from other race/ethnicity groups. In addition, recent investigations have found important interactions of gender, race/ethnicity, and overweight in relation to both physical activity and sports team participation. For example, across four race/ethnicity groups of adolescents in the nationally representative Add Health sample, MVPA was lowest in non-Hispanic black and Hispanic girls.[21] Similarly, varsity sport participation has been low in these two groups,[22] and in overweight or obese Hispanic girls.[23] More knowledge is needed about the complex, demographic relationships with physical activity and sports team that may exist in both children and adolescents, along with a better understanding of the role that athletic identity may play in promoting physical activity behavior over and beyond the impact of fundamental demographic factors that have been linked with physical activity.

In order to clarify the relationship between self-concept and physical activity, the current study examined the association of athletic identity, as measured by the multidimensional Athletic Identity Questionnaire (AIQ),[12] with physical activity and organized sports team participation, over and above the effects of gender, race/ethnicity, and overweight status, in two age groups. It was hypothesized that the AIQ global score and its individual subscale scores would be independently and positively associated with physical activity and sports team participation in both 4th and 5th grade elementary school children and in 7th and 8th grade middle-school adolescents.

Methods

Participants

One sample of 4th and 5th grade children (mean age 9.88 years, range 8–13 years) from public elementary schools, and two samples of 7th and 8th grade adolescents (mean age 13.63 years, range 11–15 years) from public middle schools in metropolitan Houston TX, were analyzed. Children (*n*=432) were recruited for a study on parental influence and measure development.[18,24] Adolescents were recruited to develop the AIQ-Adolescent[17] (*n*=408), and as part of a longitudinal study of athletic self-concept over the transition from middle to high school (*n*=663).

Measures

Athletic identity questionnaire—The 40-item AIQ-Adolescent[17] was developed and validated in two multiethnic samples. It has a four-factor structure of athletic appearance (five items, e.g., *I look like a person who is physically fit; My body looks in shape*); competence (six items, e.g., *I have skill in several sports or physical activities; I can perform well in at least one type of physical activity*); importance of physical activity/exercise/sports (eight items, e.g., *I love to play active sports; I put a lot of effort into sports or exercise*); and encouragement from others, which consists of the three subfactors of encouragement from parents (seven items), friends (seven items), and teachers/other adults (seven items). The same seven items are used on each source of encouragement to enable comparisons across sources (e.g., *encourage me to exercise or be physically active; watch me closely and give me feedback on what I'm doing*). The measure's factor structure was supported with confirmatory factor analysis (root mean square error of approximation [RMSEA] range 0.043–0.076). AIQ factor correlations with physical activity have ranged from 0.32 to 0.61, TV watching from −0.20 to −0.50, and sports team participation from 0.20 to 0.54.

The 40-item AIQ-Child,[18] adapted from the adolescent measure, was validated in two samples of children aged 9 and 10 years (one ethnically diverse and one Hispanic sample). Confirmatory factor analysis supported the four-factor structure in each sample (RMSEA range 0.038–0.039). The AIQ-Child factors were positively related to physical activity (mean r =0.64) and fitness measured with a shuttle run (mean r =0.32), and they were negatively related to TV and computer use (mean r = −0.18) and adiposity (r = −0.32 for the appearance factor).

Past 7-day physical activity: elementary school—Children completed the Physical Activity Questionnaire for Older Children (PAQ-C)[25,26] to determine MVPA during the previous 7 days. Nine items (5-point scale) are averaged to yield an overall score from 1 to 5. The 5-point rating results in a more normal distribution of scores than is found among most measures, and it is one of few questionnaires specifically designed and validated for use in children in Grades 4–8. One-week test–retest reliability has ranged from 0.74 to 0.82. It has been related to the seven-day recall standardized interview (r =0.46, Seven-Day Physical Activity Recall [PAR][27]), the Caltrac accelerometer (r =0.39), and a step test of fitness (r =0.28)[26]. In the current subsample validity assessment (*n*=58 children), associations with the MTI (Manufacturing Technology, now ActiGraph, Pensacola FL) accelerometer were r=0.45 for MVPA, 0.12 for light activity, and −0.45 for inactive minutes during waking hours.

Past 7-day physical activity: middle school—Adolescents completed the Modifiable Activity Questionnaire for Adolescents (MAQ-A)[28] that assesses current- and past-year physical activity, weekly TV, and competitive sport team participation. The open-ended questions used for past 7-day vigorous and moderate activity were summed to yield sessions of MVPA (for vigorous: *In the last 7 days, how many sessions (20 minutes or more) of vigorous physical activity have you done? ____. Vigorous physical activity is activity that makes you breathe heavily, your heart beat very fast, and may cause you to sweat. Examples: running/jogging, fast bicycling, playing basketball, karate, playing tennis, etc.;* for moderate: *In the last 7 days, how many sessions (20 minutes or more) of moderate physical activity have you done? ____. Moderate physical activity is activity that is similar to how you feel when walking at a normal pace. Examples: walking, slow bicycling, shooting baskets, golf, playing softball, etc.*). Past-year to past-week hr/wk relation has been 0.55 for boys and 0.82 for girls, and agreement between reported sports participation and interscholastic rosters has been 100% for fall, 86% for winter, and 95% for spring.[28]

Sports team participation—Both elementary and middle-school students were asked an open-ended modification of the teams question from the MAQ-Adolescent: *In the past year (this time last year until now), on how many sports teams did you participate at a competitive level? (Such as school teams, church league, Little League baseball, YMCA teams, community leagues, etc.). _____number of teams.*

Anthropometry—Trained staff measured students' (with shoes removed) height (nearest 0.1 cm) and weight (nearest 0.1 kg) twice, using a Seca #214 Road Rod Portable Stadiometer and a Befour PS6600 Digital Scale, and averaged. BMI was calculated. BMIs for age and gender percentiles were calculated using the SAS program for the CDC growth charts, provided by the CDC. Overweight (85th percentile ≤ BMI <95th percentile) and obese (BMI ≥95th percentile) were defined using the December 2007 Expert Committee recommendations.[1]

Procedure—The IRB of Baylor College of Medicine approved the study protocol. Students provided written parental consent, and adolescents (but not children) signed the consent form. Participants were recruited at individual schools, and data were collected by the research team during health/physical education class during school. Students received a $5 movie ticket.

Statistical analysis—Hierarchic regression analyses were conducted, using the AIQ global score (Model A) and six AIQ subscale scores (Model B) as predictors, adjusting the models for gender, race/ethnicity, and BMI. Physical activity (past 7-day) and number of competitive sport teams (past year) were used as dependent variables. Statistical analyses were completed with SAS version 9.1.

Results

Participant Characteristics

Descriptive analyses were conducted on three levels of race, because the remaining students (n=42 of 433 children, n=121 of 1070 adolescents) were too ethnically diverse to yield meaningful conclusions as a fourth group. Final sample sizes were 391 children and 948 adolescents (one adolescent was deleted as a result of missing data). Demographics by age group are shown in Table 1. Chi-square analyses indicated that the gender proportions by age group were significantly different (p=0.007), with a higher percentage of girls in the adolescent group. The distribution of race/ethnicity also differed by age group (p=0.006), with a higher percentage of non-Hispanic whites in the elementary group. There were no differences in the BMI distributions (p=0.630).

Descriptive statistics and Pearson correlations for the primary variables are shown in Table 2. Moderate correlations were observed among the AIQ subscales (r =0.22–0.71), supporting their construct distinction across age groups. Examination of multicollinearity among the AIQ subscales yielded acceptable tolerance values, ranging from 0.40 to 0.70. The children had significantly higher mean scores on the appearance, competence, and importance subscales than did adolescents. However, adolescents had higher encouragement scores, relative to the younger children, with significant differences on encouragement from teachers.

Prediction of 7-Day Physical Activity

The hierarchic multiple regressions are shown in Table 3. In the baseline model for each age group, which included gender, race/ethnicity, and BMI (no interactions significant), being a girl was associated with lower physical activity relative to boys in children (β= −0.11, p=0.0280), and minority race/ethnicity was associated with lower physical activity relative to whites in adolescents (for Hispanics, β= −0.26, p<0.0001; for blacks, β= −0.13, p=0.0025). BMI was not significantly related to physical activity in either age group. The baseline demographic models explained 1% of the variance in physical activity in children, 6% in adolescents. The AIQ composite score (Model A) was positively related to physical activity in both age groups (β_1=0.486, p<0.0001; β_2=0.247, p<0.0001), accounting for about 23% and 5% (respectively) of the variance. The results for the subscale regression (Model B) showed significant, positive effects for competence (β=0.194, p=0.0017) and encouragement from parents (β=0.137, p=0.0347) in children, and for importance in adolescents (β=0.172, p=0.0064). The subscale models explained about the same variance as the composite score (23% in children, 6% in adolescents).

Prediction of Sports Team Participation

The hierarchic multiple regressions for sports teams are shown in Table 3. In the baseline models, being a girl was associated with less team participation relative to boys in children (β= −0.10, p=0.0418). Minority race/ethnicity was associated with less team participation relative to whites in both children (for Hispanics, β= −0.32, p<0.0001; for blacks, β= −0.17, p=0.0009) and adolescents (for Hispanics, β= −0.36, p<0.0001; for blacks, β= −0.19, p<0.0001). BMI was not significantly related to organized team participation in either age group. The baseline demographic models explained 10% of the variance in children, 13% in adolescents. The AIQ composite score (Model A) was positively related to team participation in both age groups (β_1=0.247, p<0.0001; β_2=0.407, p<0.0001), accounting for about 5% and 15% (respectively) of the variance. The results for the subscale regression (Model B) showed significant, positive effects for competence (β=0.130, p=0.0448) in children; and for appearance (β=0.170, p=0.0002), competence (β=0.153, p=0.0044), and importance (β=0.161, p=0.0039) in adolescents. The subscale models explained slightly more variance than the composite score (6% in children, 18% in adolescents).

Discussion

These results provide support for athletic identity as a factor related to physical activity and sports team participation, over and above three established correlates. The findings suggest two key points. First, the components that make up athletic identity operate in a collective synergy in relation to level of activity. The results imply that the combination of multiple positive self-views and perceptions of encouragement, even if some individual component contributions are small, will have a positive impact on activity, and that this occurs regardless of a child/adolescent's weight, minority status, or gender. As proposed in its theoretic framework, each component of athletic identity contributes to the synergist effect, meaning that all of the components are important in describing athletic self-concept. Secondly, some individual components seem less influenced by demographic factors than others. The subscale analyses revealed that not all of the components were individually associated with behavior, after accounting for demographics.

Athletic identity, regardless of the modeling perspective used (global score or subscales), was less strongly associated with 7-day physical activity in adolescents than in children, but more strongly associated with sports team participation in adolescents. The weaker association with physical activity in adolescents may indicate that, regardless of self-views, there are many influences on adolescent behavior, especially from peers (the encouragement from friends–physical activity correlation was 0.32 in children, 0.15 in adolescents). Another explanation, especially in light of the sports teams results, is that the weaker association reflects the different MVPA measures used in each group. Identity theory would predict a stronger, rather than weaker, association between behavior and age. A highly positive athletic identity would be expected to result in identity enactment[29] and in identity becoming more ingrained over time.[30]

Regarding the subscale analyses, competence and parental encouragement emerged as significant correlates of physical activity among children but not adolescents. The age-decline seen in the competence ratings is consistent with other studies that have found age-related declines in ability conceptions, with higher degrees of optimism among younger children.[31] Similarly, parental support may be more important in influencing activity for children, regardless of demographic factors, than for adolescents, when interest (or disinterest) in activity is likely already established and ability-inclusive community sport programs are less available. As expected, competence ratings were significantly related to team participation in both age groups, and the association strengthened with age. However, parental encouragement was not a significant factor in team membership in either age group. Compared to teachers and friends, parents did seem to be the strongest source of encouragement for sports team participation in both children and adolescents (as indicated by the Pearson correlations), but parental support did not independently contribute to team participation, after demographic factors were controlled. However, as argued above, the multiple contributions from the components that make up identity, regardless of their individual significance, are important in defining the self's attributes and role identities, and their effect on behavior.

Findings for the importance subscale also differed by age group, where importance significantly predicted both physical activity and sports team participation only in adolescents, although it approached significance in the younger children for physical activity (p=0.0825). Expectancy-value theorists have long argued that individuals tend to do tasks they positively value and avoid less-valued tasks.[32–34] With increasing age, the importance placed on activity would be expected to play a greater role in behavior, and that is exactly what was found. Placing high importance on playing sports and being active transcended the effects of gender, ethnicity, and overweight status on two measures of activity in adolescents in the current study, a time when substantial declines in activity have been documented.[35]

The current results have interesting similarities to Dishman et al.,[20] who used Marsh et al.'s[13] measure of physical self-concept in a study of 12th-grade girls. The current study also found that appearance and BMI were not related to overall physical activity in adolescents. This result was also true for children in our study. However, unlike previous findings,[20] appearance was still related to team participation after controlling for BMI. Similar to previous findings, in adolescents in the current study, the relationship of competence to sports team participation was stronger than that of competence to physical activity, but in the children, competence was more strongly related to physical activity than to team participation. This particular finding may reflect the fact that team membership is more ability-inclusive at the elementary school level (i.e., there are many community team opportunities) than in middle school. The same MVPA–sports team relationship as in previous findings was found here, in both children and adolescents (r =0.30).

In previous studies, which focused on the psychometric properties of the AIQ instrument, without control for demographics, strong, positive relationships were found between all of the AIQ factors and both physical activity and team participation. However, there were many differences in the analytic strategies used, in addition to control of demographics, which help to explain the differences in findings between those studies and the current study. Both of the previous adolescent and child AIQ measurement papers[17,18] used structural equation modeling methodology, and physical activity was used as a latent variable and defined differently.

The current study suggests that interventions that include a focus on athletic identity could be useful in increasing physical activity behaviors. It also suggests two important considerations for interventions that attempt to change athletic self-concept. First, the influence of demographics should be recognized. Effects of gender and race/ethnicity on both activity outcomes were found in our study, as in others. In the current results, the demographic variables had a stronger relationship with both types of activity in adolescents than in children, and a stronger relationship with playing sports in both age groups. The good news, however, is that, except for team participation in children, athletic identity explains as much or more of the variance in physical activity and sports team participation as the demographic variables. The influence of demographic factors on behavior and the components of athletic identity can and should be incorporated into intervention goals (e.g., sports-skill building for girls and Hispanics to increase perceived competence). Secondly, it is important to measure, and hopefully target, all six of the athletic identity subfactors, as all are integral to identity.

Strengths and Limitations

A major strength of this study was the demographically diverse sample from two age groups, with measured height and weight. The substantial number of Hispanics makes the current findings an important contribution to the literature on ethnic differences. Limitations include a lack of geographic diversity, because all participants resided in the southwestern U.S. Additionally, behavioral measures were self-reported. Different physical activity measures were used for each age group, but the measure for team sports was the same. The cross-sectional design limits conclusions regarding developmental trends between children and adolescents.

Conclusion

The results show that the way in which children and adolescents perceive themselves athletically is related to physical activity and participation in organized sports, regardless of gender, race/ethnicity group, and weight status. Athletic identity explained as much or more variance in behavior as the demographic factors in most models.

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Table 1

Participant characteristics, % unless otherwise indicated

	Grades 4 and 5 (*n*=391)	**Grades 7 and 8 (*n*=948)**
Gender		
Boys	47	39
Girls	53	61
Race/ethnicity		
Hispanic	33	43
Non-Hispanic black	13	11
Non-Hispanic white	54	46
Age (years, mean [SD])	9.88 (0.75)	13.63 (0.69)
BMI category		
Normal and underweight (BMI<85th percentile)	60	62
Overweight (85th≤BMI<95th percentile)	21	21
Obese (BMI 95th≥percentile)	19	17

Table 2

Descriptive statistics and Pearson correlations for primary study variables

	Grades 4 and 5		Grades 7 and 8									
	Range	**Mean (SD)**	**Range**	**Mean (SD)**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
ATHLETIC IDENTITY SUBSCALE[a]												
Appearance	1–5	3.41 (0.69)**	1–5	3.29 (0.72)	—	0.50	0.47	0.27	0.26	0.25	0.19	0.37
Competence	1.5–5	4.37 (0.57)***	1–5	4.23 (0.70)	0.48	—	0.71	0.41	0.32	0.29	0.26	0.42
Importance	1–5	4.07 (0.71)****	1–5	3.82 (0.82)	0.52	0.62	—	0.44	0.43	0.38	0.32	0.42
Encouragement from parents	1.3–5	3.80 (0.85)	1–5	3.83 (0.91)	0.39	0.52	0.53	—	0.41	0.45	0.15	0.25
Encouragement from friends	1–5	3.16 (1.07)	1–5	3.23 (1.04)	0.24	0.31	0.40	0.54	—	0.49	0.15	0.19
Encouragement from teachers	1–5	3.31 (1.07)**	1–5	3.49 (1.14)	0.22	0.27	0.29	0.49	0.61	—	0.14	0.22
MVPA, last 7 days												
PAQ-C[b]	1.1–4.5	2.99 (0.70)	—	—	0.29	0.40	0.37	0.39	0.32	0.31	—	—
MAQ-A[c]	—	—	0–28	7.97 (4.60)	—	—	—	—	—	—	—	0.32
Competitive sports, last year												
Number of teams[d]	0–10	1.85 (1.76)	0–11	1.81 (1.83)	0.22	0.29	0.26	0.24	0.17	0.13	0.29	—

Note: For the correlation matrix, the Pearson correlations for Grades 4–5 are on the left; those for Grades 7–8 are on the right.

[a]Higher values indicate higher levels of the attribute, with responses ranging from 1 (strongly disagree/definitely no) to 5 (strongly agree/definitely yes).

[b]Measures MVPA in past 7 days. Responses vary with the question asked, with 1–5 ranging from no activity to seven times or more, from low activity to high activity, and from none to very often.

[c]MAQ-A: Responses are open-ended and represent number of sessions (20 min or more) of moderate and vigorous physical activity (added together) in past 7 days.

[d]Teams response is open-ended and represents number of competitive sports teams in or outside of school in past year.

ANOVA results for child–adolescent group differences,

* $p<0.05$,

** $p<0.01$,

*** $p<0.001$,

**** $p<0.0001$

AIQ, Athletic Identity Questionnaire; MAQ-A, Modifiable Activity Questionnaire-Adolescent; MVPA, moderate-to-vigorous physical activity; PAQ-C, Physical Activity Questionnaire for Children

Table 3

Hierarchic regression models by age group

	Physical activity						Team participation					
	Grades 4 and 5			Grades 7 and 8			Grades 4 and 5			Grades 7 and 8		
	β	R_{adj}^2	ΔR_{adj}^2	β	R_{adj}^2	ΔR_{adj}^2	β	R_{adj}^2	ΔR_{adj}^2	β	R_{adj}^2	ΔR_{adj}^2
Baseline model	—	0.011	—	—	0.064	—	—	0.099	—	—	0.128	—
Gender	(***p*=0.0255**)	—	—	(*p*=0.4069)	—	—	(***p*=0.0444**)		—	(*p*=0.9529)	—	—
Race/ethnicity	(*p*=0.3229)	—	—	(***p*=0.0009**)	—	—	(***p*<0.0001**)		—	(***p*<0.0001**)	—	—
BMI	(*p*=0.8070)	—	—	(*p*=0.6287)	—	—	(*p*=0.9753)		—	(*p*=0.2144)		
Model A (AIQ total score)	—	0.237	0.226	—	0.116	0.052		0.116	0.052		0.282	0.154
Athletic identity	0.486 (***p*<0.0001**)	—	—	0.247 (***p*<0.0001**)	—	—	0.247 (***p*<0.0001**)		—	0.407 (***p*<0.0001**)		—
Model B (AIQ subscales)	—	0.242	0.231	—	0.126	0.062		0.155	0.056		0.307	0.179
Appearance	0.046 (*p*=0.4302)	—	—	0.025 (*p*=0.6390)	—	—	0.053 (*p*=0.3806)		—	0.170 (***p*=0.0002**)	—	—
Competence	0.194 (***p*=0.0017**)	—	—	0.081 (*p*=0.1777)	—	—	0.130 (***p*=0.0448**)		—	0.153 (***p*=0.0044**)	—	—
Importance	0.114 (*p*=0.0825)	—	—	0.172 (***p*=0.0064**)	—	—	0.067 (*p*=0.3294)		—	0.161 (***p*=0.0039**)	—	—
Encouragement from parents	0.137 (***p*=0.0347**)	—	—	−0.042 (*p*=0.3779)	—	—	0.056 (*p*=0.4107)		—	0.034 (*p*=42110.)	—	—
Encouragement from friends	0.083 (*p*=0.1806)	—	—	0.062 (*p*=0.2128)	—	—	0.062 (*p*=0.3426)		—	0.032 (*p*=0.4609)	—	—
Encouragement from teachers	0.098 (*p*=0.1010)	—	—	0.029 (*p*=0.5418)	—	—	0.000 (*p*=0.9953)		—	0.035 (*p*=0.4077)	—	—

Note: The baseline model included the following covariates: gender, race/ethnicity, and BMI. There were no significant interaction terms. Only *p*-values for each covariate effect are reported in lieu of the multiple β's present, because of the levels of the categoric variables.

Standardized regression coefficients (β) and *p*-values are shown for the continuous AIQ variables in Models A and B. Incremental adjusted R^2 for Models A and B were calculated as the difference with the baseline model.