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Individual and Instructional Determinants of Student Engagement in Physical Education

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Abstract

This study was conducted to identify student characteristics and instructional factors that impact student engagement in physical education (PE). Data were derived from the systematic observation of 124 sessions taught by 31 physical educators and the administration of health and PE engagement questionnaires to 2,018 students in grades 5–8. Physical activity was directly affected by student engagement and perceived competence in PE and indirectly affected by students' body image through its association with PE engagement. Multilevel analyses revealed that the proportion of class time devoted to game play was negatively associated with student engagement in PE. Although less frequently used during PE sessions, skill practice was positively associated with student engagement and inactive instruction was negatively associated with student engagement. These effects were particularly pronounced among students with poor competence beliefs. Implications for PE instructional practice and future research are presented.

Keywords

body image; competence beliefs; self worth; instructional strategies; game play; skill practice

Schools are uniquely positioned to address the epidemic of physical inactivity among children because they touch the lives of practically every American and can powerfully affect the development and reinforcement of norms that govern children's behavior (Davis & Bauman, 2008; Haywood, 1991; U.S. Census Bureau, 2005). Physical education (PE) programs that provide opportunities for physical activity and promote the development of physical activity knowledge, skills, and confidence are essential components of health-promoting school environments (National Association for Sport and Physical Education [NASPE], 2004; Ntoumanis, 2005; Sallis & McKenzie, 1991).

Despite recent advances in state policies that support PE programs (Kann, Brener & Wechsler, 2007), many schools still struggle to provide the frequency and intensity of PE and physical activity opportunities recommended by *Healthy People 2010* (U.S. Department of Health and Human Services, 2000). These recommendations stipulate that children and adolescents should participate in daily PE and be physically active for at least 50% of PE class time. Although policies can dictate the amount of time allotted for PE, students' physical activity levels are functions of both environmental factors and student characteristics. For example, the amount of PE class time devoted to management (e.g., taking role, transitioning between activities), affects the duration and intensity of students' in-class physical activity (Simons-Morton, Taylor, Snider & Huang, 1993). At the student level, engagement in PE is an important determinant of students' activity levels during class (Fairclough & Stratton, 2005; Ntoumanis, 2005; Standage, Duda & Ntoumanis, 2003), as well as their participation in physical activity outside of school (Ntoumanis, 2005).

Student engagement has long been accepted in education research as a primary facilitator of school success (Fredricks, Blumenfeld & Paris, 2004). Student engagement is composed of behavioral, affective, and cognitive indicators of students' investment in and connections to their academic environment (Furlong & Christenson, 2008). In physical education, engaged students persist in active and effortful attempts to master the knowledge and skills they encounter and exhibit a preference for and enjoyment of physical activity (Craig, Goldberg, & Dietz, 1996; Gao, 2009; Chen & Shen, 2004). Although student engagement is sometimes measured using observational procedures (e.g., time student exhibits on-task behavior), it is more commonly assessed through students' reports of their internally-experienced interest, enjoyment, preferences, and expenditure of cognitive and physical effort (Gao, 2009). Preliminary evidence suggests that student engagement in PE is positively associated with participation in class- and leisure-time physical activity (Ntoumanis, 2001), however further research is needed to identify facilitators of PE engagement and to better understand the mechanisms through which these facilitators exert their effects.

Facilitators of Student Engagement in Physical Education

In the past decade, there has been a surge of interest in student engagement, in part because the concept has been increasingly recognized as a way to ameliorate academic failure and school dropout (Fredricks et al., 2004; National Research Council and the Institute of Medicine, 2004). For school reform efforts to enhance student engagement, it is necessary to identify amenable student, school, and classroom characteristics that operate dynamically to promote or undermine the quality of engagement over time (Furlong & Christenson, 2008). Thus, a logical step toward developing effective physical activity-promoting interventions in schools is to identify student- and classroom-level factors that predict engagement in PE.

Student-Level Facilitators of Engagement in PE

As predicted by self-determination theory (Ryan & Deci, 2000), students' perceived competence in physical activity, the degree to which they feel competent in physical movement, exercise, and sport, plays a critical role in predicting engagement in both in-class and out-of-class physical activity (Chanal, Marsh, Sarrazin & Bois, 2005; Marsh, Papaioannou & Theodorakis, 2006; Ntoumanis, 2001; Sproule, Wang, Morgan, McNeill & McMorris, 2007). In longitudinal studies, this relation has been shown to be reciprocal such that prior feelings of competence in physical activity affects subsequent physical activity behavior, and prior behavior affects subsequent perceived competence (Chanal et al., 2005; Marsh et al., 2006). Body image, a related but conceptually distinct domain of self-concept, is also a positive correlate of PE engagement and physical activity levels (Kohl & Hobbs, 1998). Defined as confidence in one's own physique, body attractiveness, and physical appearance, body image is most commonly considered a positive outcome of physical activity (Kohl & Hobbs, 1998). Relatively less research has focused on body image as a determinant of engagement in PE. One notable exception is Hassandra and colleague's (2003) qualitative analysis which revealed that student perceptions about their body or physical appearance, particularly having an "athletic body" was an important contributor to their participation in PE.

Instructional Facilitators of Student Engagement in PE

Achievement goal theory contrasts perceived competence and other behavioral, cognitive, and affective consequences of mastery- versus performance-oriented class climates (Ames & Archer, 1988; Dweck & Elliott, 1983). Mastery climates support hard work, learning, cooperation, task mastery, and consider students an integral part of learning. In contrast, performance climates foster normative comparisons, focus on interpersonal competition, and often allow for the punishment of mistakes (Standage, Duda & Ntoumanis, 2003). Prior

research conducted in PE settings indicates that mastery climates are better than performance climates at encouraging student engagement in PE activities (Ames & Archer, 1988; Ntoumanis, Pensgaard, Martin & Pipe, 2004). Within PE, student motivation may be increased by mastery climates that encourage students to define success as personal gain achieved through hard work and a desire to learn, feel satisfied when they develop new skills, and view mistakes as part of the learning process (Standage et al., 2003). Thus, activities focused on skill development may enhance student engagement in PE, whereas overreliance on competitive activities that encourage normative comparisons may decrease motivation among students, particularly among those with lower perceived competence.

The Current Study

The purpose of the current study is to identify student characteristics and instructional factors that operate independently or interact with each other to predict student engagement in PE. We hypothesized that perceived competence in PE and body image would be positively associated with PE engagement, which in turn, would positively predict student physical activity levels. In accordance with achievement goal theory, we expected that class contexts characterized by frequent opportunities for students to be actively involved in skill development through noncompetitive play and practice would positively predict student engagement. Further, we expected that perceived competence and body image would moderate the effects of competitive game play on student engagement in PE such that game play would be positively associated with engagement among students with positive perceived competence and body image, but negatively associated with engagement among students with negative competence and body image beliefs.

Methods

Participants

Student participants were 2,018 students in grades 5–8 who participated in *Project Healthy Pathways*, a study of relations between child health and school performance. Students were recruited from regular education classrooms in 11 elementary schools, 10 middle schools, and 1 school serving children in kindergarten through 8th grade in Maryland and West Virginia. Informed parental consent was obtained for 72.3% of students eligible to participate and 98.7% of students with parental consent completed the student questionnaire. Lesson content was assessed for 31 physical educators who taught participating students. All PE teachers employed at the participating schools agreed to take part in the study. Descriptive information for student and teacher participants is presented in Table 1.

Measures

System for Observing Fitness Instruction Time (SOFIT)—The SOFIT, a reliable and valid observational tool was used to assess the percent of PE class time devoted to various curricular activities (McKenzie, Sallis & Nader, 1991; Rowe, Schuldheisz & Van der Mars, 1997). Eleven observers completed 8 hr of classroom SOFIT training and video analysis, 4 hr of field practice, and certification assessments (McKenzie et al., 2001). The SOFIT was administered during four randomly selected PE class sessions for each participating teacher. During each class, observers coded lesson content using a momentary time sampling procedure (10-s observe, 10-s record intervals; Fairclough & Stratton, 2005; McKenzie, Prochaska, Sallis & LaMaster, 2004). Intervals were coded as *inactive instruction* (focus is on student knowledge acquisition related to physical education, not their active engagement); *physical fitness* (activities whose major purpose is to alter the physical state of the individual in terms of cardiovascular endurance, strength, or flexibility); *skill practice* (practice of skills with the primary goal of skill development); *game play*

(application of skills in a game or competitive setting); and *class management* (students not intended to be involved in PE content, e.g., during transitioning, selecting equipment, taking attendance, during breaks). The percentage of intervals devoted to the activity types were calculated for each class session and averaged across teachers' four observed class sessions. Twenty-three (18.5%) of the 124 SOFIT observations conducted with participating teachers were administered simultaneously by two independent observers yielding an interrater reliability of .90, which is consistent with the recommended level (McKenzie et al., 1995).

Perceived Competence in Physical Education—Students' perceived competence in PE was determined by their response to a single item: "Some kids perform better in one subject than in another. For example, you might do better in math than in reading. Compared to other kids in your class, how good are you in physical education?" Students responded to the question using a 5-point Likert scale with the following response options: poor, fair, good, very good, excellent.

Body Image—Students completed the Healthy Pathways Child-Report Body Image Scale, a validated measure comprised of three questions (Bevans, Riley & Forrest, 2010): (1) How often do you really like the way you look?; (2) Thinking about the past 4 weeks, have you felt jealous of the way other girls and boys look?; and (3) Thinking about the past 4 weeks, have you felt like changing something about your body? Students responded to the questions using a 5-point Likert scale with the following response options: never, almost never, sometimes, almost always, always. All items were coded so that higher values indicated more positive body image. A scale score was calculated by averaging the items.

Student Engagement in Physical Education—Students completed a PE engagement scale comprised of 3 questions, which were based on previously developed measures of student engagement (e.g., Resnick et al., 1997), but modified for the PE context: (1) In the past 4 weeks, how often did you try your best during physical education class?; (2) In the past 4 weeks, how often did you look forward to physical education class?; and (3) In the past 4 weeks, how often did you exercise hard enough to start sweating and breathing hard during physical education class? Students responded to the questions using a 5-point Likert scale with the following response options: never, almost never, sometimes, almost always, always. A scale score was calculated by averaging the items.

Physical Activity—Students' participation in leisure-time physical activity during the 4 weeks prior to completing the questionnaire was assessed with four items from the Healthy Pathways Child-Report Physical Activity Scale (Bevans et al., 2010): (1) In the past 4 weeks, how often did you play active games or sports?; (2) In the past 4 weeks, how often did you run hard when you played or did sports?; (3) In the past 4 weeks, how often did you play hard enough to start sweating and breathing hard?; and (4) In the past 4 weeks, how often did you do exercises to strengthen or tone your muscles, such as push-ups, sit-ups, or weight-lifting? Students responded to the questions using a 5-point Likert scale with the following response options: no days, very few days, some days, almost every day, every day. A scale score was calculated by averaging the items.

Parent Reported Weight and Health Status Information—A subset of parents (n = 1,216; 60.3%) provided information about the child's height and weight, which were used to calculate body mass index (BMI). Students were classified as overweight if their BMI exceeded the 95th percentile for their gender and age. Students were also classified as having a special health care need based on parents' responses to the Children with Special Health Care Needs Screener (CSHCN), a noncategorical measure of long-term health problems that increase a child's need for medical care (Bethell, Read, Stein, Blumberg,

Wells & Newacheck, 2002). Students overweight and health statuses were used in analyses to assess the construct validity of student-report assessment tools.

Procedures

Students in 13 out of 22 participating schools completed their questionnaires on their school's desktop computers using a web-based audio computer-assisted self-administered questionnaire. In the remaining 9 schools, limitations of the school system's internet server prohibited the web-based collection of data. In these schools, students completed their questionnaire using paper and pencil. Students in 5th grade completed the paper and pencil questionnaire as a survey administrator read the questions aloud. Students in grades 6–8 completed the survey by reading the items silently. All data collection was monitored by research staff and a school staff member. Parents provided family demographic information, students' height and weight, and an assessment of students' special health care need status through completion of a questionnaire which was mailed to their home and returned directly to the researchers in a postage-paid envelope. Informed parental consent and child assent, which provided assurance of student privacy and confidentiality, were obtained for all student participants. All teachers who participated in the study provided written informed consent. Study procedures were approved by the local Institutional Review Boards at the Children's Hospital of Philadelphia and the Johns Hopkins Bloomberg School of Public Health.

Analyses

The psychometric properties of student-reported items and scales were evaluated. To assess the dimensionality of the body image, engagement in PE, and physical activity items, a three-factor confirmatory factor analysis (CFA) was conducted using the M*plus* 5.2 statistical package and a maximum likelihood estimation procedure (Muthén & Muthén, 1997–2007). Thereafter, estimates of internal consistency reliability (Cronbach's alpha) were calculated for each scale. Construct validity was assessed by comparing scores on the body image, student engagement, and physical activity scales and the perceived competence item between gender, grade level, weight status, and special health care need status subgroups using SAS 12.2 proc GLM. Based on prior research, girls, older students, overweight students, and students with a special health care need were expected to report lower body image, perceived competence in PE, engagement in PE, and physical activity (Lajunen, Keski-Rahkonen, Pulkkinen, Rose, Rissanen & Kaprio, 2009).

Hypothesized relations among student-level variables were tested using structural equation modeling *(SEM)* performed using *Mplus* version 5.2 and a maximum likelihood estimation procedure (Muthén & Muthén, 1997–2007). Following procedures identified by Hambleton (1997), engagement in PE was evaluated as a mediator within the relation between perceived competence in PE and physical activity as well as within the relation between body image and physical activity. First, a model was fit in which the direct effects of perceived competence and body image on physical activity were tested. A second model was fit to the data to test associations between perceived competence and engagement, body image and engagement, and engagement and physical activity. Third, the mediating effects of engagement were evaluated by comparing the fit of the mediation model (Figure 1) under two conditions: (1) when the perceived competence → physical activity and body image → physical activity associations were constrained to zero; and (2) when these associations are not constrained. Mediation was indicated if the second condition failed to improve fit of the model over the first condition as evidenced by a significance test on the basis of the difference between the two model chi-squares (Hambleton, 1997).

Next, the effects of class content on student engagement, both directly and through their interactions with student perceived competence and body image were assessed. Initially, a series of teacher-level correlations and descriptive statistics were computed using aggregated student data (average responses of each teacher's students) to explore relations among class content, body image, perceived competence in PE, PE engagement, and physical activity. Thereafter, multilevel modeling techniques were applied because the hypothesized predictor variables operate at different levels (student and teacher levels) and were expected to interact across levels to predict PE engagement. An unconditional one-way random effects ANOVA model was applied to decompose the between-student and between-teacher variability in student PE engagement. It was determined that 5.7% of student engagement in PE was attributable to differences between teachers. The covariance parameter estimate underlying this value was statistically significant ($p < .0001$), indicating that the between-teacher variation is consequential and permits explanation (Raudenbush & Bryk, 2002). Thus, three hierarchical linear models were tested to determine and explain the relative proportion of student engagement in PE associated with within-teacher and between-teachers variation. In model 1, we assessed the within-teacher contributions of perceived competence and body image on PE engagement. In model 2, we considered intercepts-as-outcomes to assess the between-teachers contributions of class content on student engagement in PE. In model 3, we considered slopes as outcomes to assess the degree to which class content moderated the effects of students' perceived competence and body image on PE engagement (cross-level interaction models). Statistically significant cross-level interactions were interpreted by plotting simple regression lines for high (+1 *SD*) and low (−1 *SD*) values of the moderator variables (Aiken & West, 1991). All multilevel models were conducted with SAS 12.2 following Singer's (1998) recommendations.

Results

Psychometric Analyses

A three factor model that specified constituent items for the body image, engagement in PE, and physical activity scales adequately fit for the data (CFI= 0.965, TLI= 0.924, RMSEA= 0.052, SRMR= 0.049). All items had moderate to large factor loadings (≥ .60) and were locally independent within scales (residual correlations ≤ .20). Consistent with the CFA results, estimated internal consistency reliability coefficients were adequate (.70 for body image; .72 for engagement in PE; .83 for physical activity). Wilks's Lambda multivariate test of overall differences by gender, grade level, weight status, and health status support the construct validity of the scales and perceived competence item [$F(3, 1133) = 31.9$, $p < .0001$]. Univariate between-subjects tests and estimated least squares means showed that as expected, girls, older students, overweight students, and students with a special health care need had poorer perceived competence in PE [$F(7,1143) = 17.3$, eta-squared = .10, $p < .0001$)], poorer body image [$F(7,1143) = 4.3$, eta-squared = .03, $p < .001$)], and were less engaged in PE [$F(7,1143) = 22.1$, eta-squared = .12, $p < .0001$)], and less physically active [$F(7,1143) = 22.2$, eta-squared = .12, $p < .0001$)]. Taken together, psychometric analyses support the reliability and validity of the student-report assessment tool used in this current study.

Student-Level Predictors of Student Engagement in PE and Physical Activity Levels

Results of the first and second *SEM* analysis models revealed significant direct effects among variables in the mediation model. In the first model, both perceived competence and body image had direct effects on physical activity (CFI = .947; TLI = .928; RMSEA = .065), with standardized path coefficients of .30 ($p < .0001$) and .11 ($p < .0001$), respectively. The second model adequately fit the data (CFI = .958; TLI = .943; RMSEA = .058) and revealed statistically significant associations between perceived competence and engagement in PE (.

57, $p < .0001$), body image and engagement in PE (.09, $p < .01$), and engagement in PE and physical activity (.37, $p < .0001$). The role of PE engagement in the effects of perceived competence and body image on physical activity were evaluated by comparing the goodness-of-fit chi-square values for the constrained ($X^2 = 292.90$, DF = 41, $p < .0001$) and unconstrained ($X^2 = 342.78$, DF = 39, $p < .0001$) models, revealing significant meditational effects. Mediation effects were also evidenced by reductions in the perceived competence → physical activity and body image → physical activity associations when student engagement in PE was added to the model. Standardized path coefficients for the final mediation model are presented in Figure 1.

Class Content Predictors of Student Engagement in PE

As shown in Table 2, the greatest proportion of PE class time was devoted to game play (42.3%), followed by class management (23.1%) and fitness (22.0%). Teachers spent relatively less class time on inactive instruction (3.7%) and skill practice (6.7%). The proportion of PE class time devoted to game play was inversely related to time spent on all other activities. Despite its prevalence, the amount of time devoted to game play was negatively related to perceived competence in PE, body image, and student engagement in PE. In contrast, although significantly less time was devoted to skill practice, the proportion of class time devoted to developing physical skills was positively associated with PE engagement.

Table 3 summarizes multilevel modeling results for student engagement in PE. Student engagement scores were transformed *(M = 100, SD = 20)* to ease interpretation of the unstandardized regression coefficients and cross-level interaction plots. Student-level covariates were group mean centered, and teacher-level covariates were grand mean centered to allow for separation of between-teacher and within-teacher components from the total variation in student engagement. This approach explicitly accounts for the fact that students are clustered within teachers (Paccagnella, 2006).

Student Effects

The “student only” models assessed the extent to which variation in students’ PE engagement was explained by their perceived competence and body image. This model accounted for 26.4% of the within-teacher variance in student PE engagement. Consistent with the *SEM* model, perceived competence was a powerful predictor of student engagement in PE. Although statistically significant, body image was only modestly related to student engagement levels.

Class Content Effects

The “class content only” model assessed the extent to which variation in students’ PE engagement was explained by the proportion of class time devoted to various activities. This model accounted for 24.1% of the between-teacher variance in student engagement in PE. Consistent with bivariate correlations, the proportion of class time devoted to game play was inversely related to student engagement in PE. In addition, the amount of time spent on inactive instruction was associated with engagement levels.

Multilevel Interaction Effects

The “student and class content” model assessed the extent to which the percentage of class time devoted to various activities moderated the effects of students’ perceived competence and body image on their engagement in PE. This model accounted for 14.2% of the within-teacher variance and 25.5% of the between-teacher variance in student PE engagement.

Estimates of interaction effects indicated that the relation between perceived competence and engagement in PE differed depending on the proportion of class time devoted to both inactive instruction and skill practice. Plots of the significant 2-way interactions revealed that relative to students with lower perceived competence, those with greater perceived competence were more engaged in PE and their levels of engagement were basically unchanged by class content. However, among students with lower perceived competence, inactive instruction was associated with reduced engagement and skill practice was associated with improved engagement (Figures 2 and 3).

Discussion

Second only to families, schools are the most powerful systems for the establishment of a physically active lifestyle among children, and therefore across the lifespan. Student engagement has been increasingly recognized as essential to the success of educational programs including PE. Indeed, the current study supports prior research which indicates that engagement in PE enhances the frequency and intensity of student physical activity (Ntoumanis, 2001). Given this association, activity-promoting PE programs should be developed with consideration to the student, school, and classroom characteristics that strengthen or weaken student engagement in PE over time. In doing so, it is essential to distinguish between student- and system-level facilitators of PE engagement (Furlong & Christenson, 2008).

At the student level, understanding how individual characteristics influence student engagement guides identification of students in need of engagement- and activity-promoting interventions. In the current study, perceived competence in PE was found to positively predict physical activity levels, both directly and through its relation with PE engagement. Enhanced body image positively influences physical activity levels by increasing students' engagement in PE. Thus, interventions should target students with poor competence and body image beliefs and focus on ameliorating these negative ideations. Prior research indicates that students' self concept and competence beliefs in PE are enhanced through the praise and encouragement of teachers and classmates and opportunities to participate in physical activities without evaluative judgment (Hein & Hagger, 2007; Marsh & Peart, 1988). It is recommended that teachers adopt a mastery-oriented motivational climate in which students are encouraged to define success in terms of effort and personal gain, rather their performance relative to that of other students (Standage et al., 2003).

At the system level, understanding how contextual factors influence student engagement guides the selection of efficacious instructional strategies (Furlong & Christenson, 2008). Contrary to the core assumptions of sport/game-based curricula (Pellegrini & Smith, 1998), the current study indicates that overreliance on game play can have negative effects on student engagement in PE, perhaps through the creation of a performance-oriented learning environment in which students focus on interpersonal competition and view success more in terms of winning and less in terms of improving one's personal best (Standage et al., 2003). Contrary to hypotheses, overreliance on game play had detrimental effects on PE engagement regardless of students' perceived competence or body image. The role of game play in facilitating the development of a performance-oriented class context that undermines student engagement requires further exploration including detailed evaluations of the type of game and the manner in which games are played. It is expected that games that comply with NASPE (2004) recommendations for appropriate activities (e.g., small team sizes, de-emphasizing winning, minimal time "sitting out") are less detrimental to student engagement.

Consistent with recommendations for promoting a mastery-oriented learning environment (NASPE, 2004), the proportion of class time devoted to skill practice was positively associated with engagement among students with low perceived competence. However, it was unrelated to engagement among students with high competence beliefs. Although spending a greater amount of time on skill practice does not equalize levels of PE engagement between students with high and low competence beliefs, it contributes to a narrowing of the gap in the engagement levels. This finding is consistent with competence motivation theory (Harter, 1981), which purports that students develop competence through engagement in mastery tasks (e.g., skill practice in PE), which facilitates perceived competence and ultimately motivation to participate in instructional activities. Thus, skill practice during PE class may improve students' actual or perceived ability to execute physical activities, thereby enhancing the frequency and intensity of their physical activity by improving their perceived competence (Barnett, van Beurden, Morgan, Brooks & Beard, 2009). Unfortunately however, most teachers spent only a fraction of class time on skill practice {M = 6.7% of PE sessions). It is recommended that PE teachers allocate a much larger proportion of time and resources to skill practice as a means of creating a mastery climate to enhance student engagement and activity levels.

In contrast to the effects of skill practice on student engagement in PE, the proportion of class time devoted to inactive instruction was associated with lower levels of engagement even though teachers in the current study only devoted 3.7% of class time to these activities. The negative effect of inactive instruction on student engagement was especially pronounced among students with low competence beliefs. Inactive instruction may be perceived as less appealing to students and may reduce the amount of class time available for skill practice. Indeed, NASPE recommends that physical educators, particularly those at the elementary level, design lessons in which students have adequate opportunities to practice physical skills with direct and constructive feedback from the teacher (Van der Mars, Vogler, Darst & Cusimano, 1994).

Several limitations of this study merit discussion. Most notably, the measurement of perceived competence using a single item is a significant weakness. Future research should use more comprehensive measures of students' perceived competence in PE to assess its impact on student outcomes, both directly and through its interactions with instructional PE practices. This study was conducted with a sample of upper elementary and middle school students from rural/small towns, but otherwise sociodemographically diverse communities. Further replication of this model with other age groups and target populations is warranted, especially given evidence of decreased student engagement in PE among older students. Finally, this study focused on physical activity, but there are many other desirable PE outcomes that may be enhanced by student engagement in PE including competency in movement forms, understanding the benefits of physical activity, and enjoying physical activities (NASPE, 2004).

Undoubtedly, adequate exposure to high-intensity PE is an effective contributor to healthy lifestyle among children and across the lifespan. The present study suggests that students' engagement in PE is an important target for physical activity-promoting interventions. Specific PE instructional strategies (e.g., reducing game play and increasing skill practice) are likely to increase student engagement and program effects can be enhanced by tailoring PE opportunities to further engage students with low competency beliefs and poor body image.

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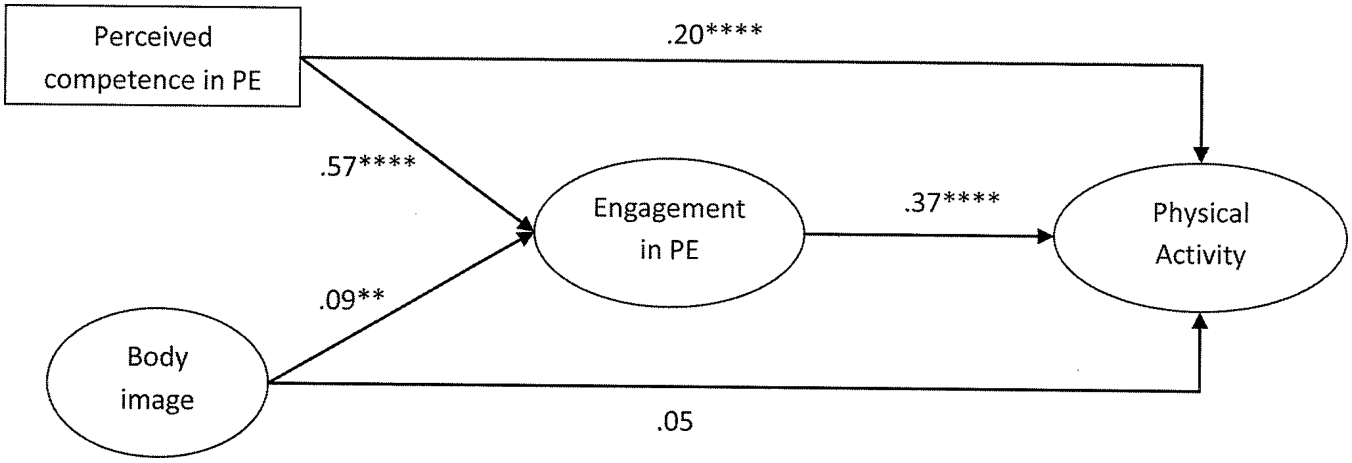

Figure 1.

Structural equation model of relations among student perceived competence in PE, body image, engagement in PE, and physical activity levels Note: Standardized path coefficients for final model, CFI = .958; TLI = .943; RMSEA = .058; ** $p < .01$, **** $p < .0001$.

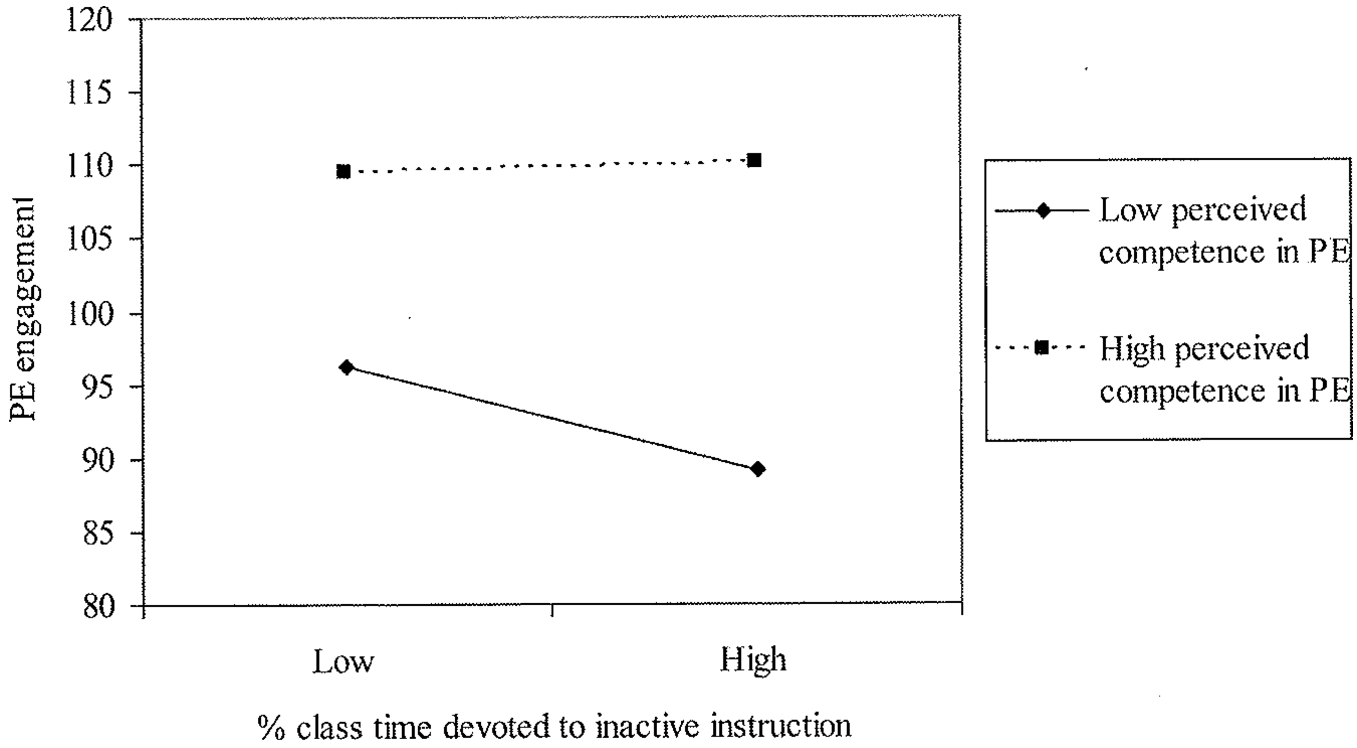

Figure 2.
The effects of perceived competence in PE and the proportion of class time devoted to inactive instruction predicting student engagement in PE

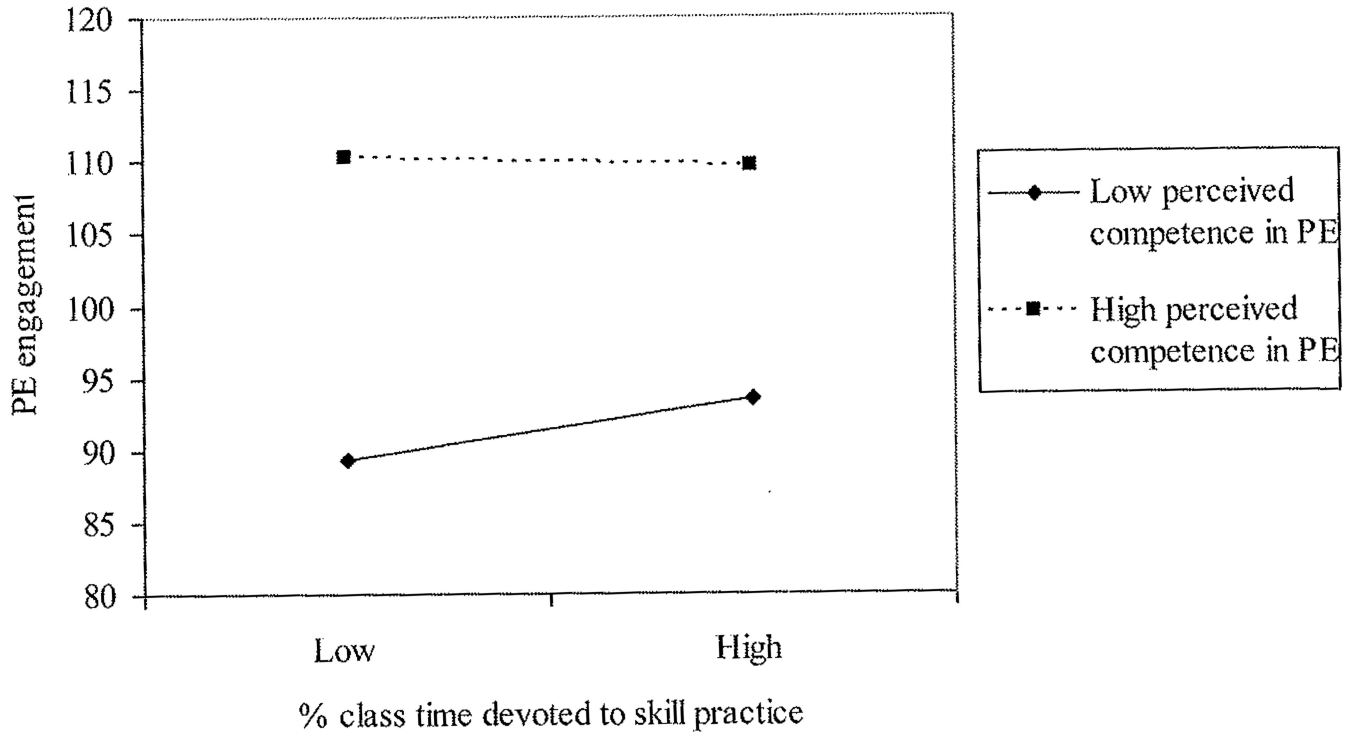

Figure 3.
The effects of perceived competence in PE and the proportion of class time devoted to skill practice predicting student engagement in PE

Table 1

Student and Teacher Characteristics

	5th graders, *n* = 351 (17.4%)	**6th graders, *n* = 547 (27.1%)**	**7th graders, *n* = 565 (28.0%)**	**8th graders, *n* = 555 (27.5%)**	**Total *N* = 2018**
Student characteristics					
Age, *M (SD)*	10.4 (0.5)	11.6 (0.6)	12.6 (0.6)	13.5 (0.5)	12.2 (1.2)
Gender, (%)					
Male	45.8	49.4	46.5	48.7	48.1
Female	54.2	50.6	53.6	51.4	51.9
Race/ethnicity, (%)					
White	73.4	82.6	83.5	76.2	79.2
African American	27.8	17.4	15.2	23.8	19.7
Other race					1.2
Hispanic	5.4	6.4	5.9	6.4	5.9
Poverty, (%)					
Above poverty line	74.6	83.2	78.7	80.9	79.3
Below poverty line	25.4	16.8	21.3	19.1	20.7
	Elementary & PreK-8, *n* = 21 (67.7%)		Middle, *n* = 10 (32.3%)		Total, *N* =31
Teacher characteristics					
Years of experience, *M (SD)*	12.2 (10.6)		14.9 (12.4)		13.3 (11.3)
Gender, n (%)					
Male	44.4		57.9		50.0
Female	55.6		42.1		50.0
Teacher certification, n (%)					
Certified	96.3		100.0		97.8
Not certified	3.7		0.0		2.2

Note: Poverty thresholds based on U.S. Census Bureau Statistics for 2006.

Table 2

Descriptive Statistics and Correlations among Lesson Content, Student Characteristics, and Student Outcomes Aggregated by Teacher ($N = 31$)

Variables	1	2	3	4	5	6	7	8	9
Lesson content (% time)									
1. Inactive instruction	—								
2. Physical fitness	.00	—							
3. Skill practice	.36**	−.07	—						
4. Game play	−.43**	−.63****	−.53**	—					
5. Class management	.36*	.00	.30*	−.60****	—				
Student characteristics									
6. Perceived competence in PE	.19	.22	.26	−.37*	.02	—			
7. Body image	.02	.36*	.23	−.40*	.09	70****	—		
Student outcomes									
8. Student engagement in PE	−.02	.11	.38*	−.36*	.18	.65****	.67****	—	
9. Physical activity	−.23	−.06	.23	−.10	−.10	.13	.23	.46**	—
Mean	3.72	21.95	6.68	42.25	23.14	3.88	4.00	4.27	3.90
SD	4.18	14.77	8.74	23.95	11.14	0.24	0.20	0.20	0.19
Minimum	0.00	0.00	0.00	0.00	4.60	3.53	3.69	3.95	3.33
Maximum	18.54	68.44	27.67	90.29	53.66	4.46	4.41	4.73	4.28

Notes:

* $p<.05$;

** $p<.01$;

*** $p<.001$;

**** $p<.0001$.

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Table 3

Multilevel Models Predicting Student Engagement in Physical Education

	Student engagement in PE		
Variables	**Student only (Model 1)**	**Class content only (Model 2)**	**Student & class content (Model 3)**
Intercept terms			
Reference intercept (% class time)	100.85	100.88	100.89
Inactive instruction		−.5910**	−.5806**
Fitness		−.1376	−.1253
Skill practice		.1168	.1199
Game play		−.2014*	−.1878*
Class management		.0112	.0108
Slope terms			
Perceived competence in PE[a]	9.3693****		9.2808****
Body image[b]	1.0015*		1.0686*
Perceived competence in PE × inactive instruction			.4429***
Perceived competence in PE × fitness			.0443
Perceived competence in PE × skills practice			−.1766*
Perceived competence in PE × game play			.0542
Perceived competence in PE × class management			.0027
Body image × inactive instruction			−.0210
Body image × fitness			−.0106
Body image × skills practice			−.0133
Body image × game play			−.0203
Body image × class management			−.0009

Notes: Unstandardized regression coefficients; continuous class content variables were centered at the grand mean and student-level variables were group mean centered (within teacher-group);

* $p<.05$;

** $p<.0l$;

*** $p<.001$;

**** $p<.0001$

[a] Perceived competence in PE ($M = 3.84$; $SD = 0.98$; range: 1–5);

[b] Body image ($M = 3.96$; $SD = 0.90$; range: 1–5).