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# Urban High-School Girls' Sense of Relatedness and Their Engagement in Physical Education

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A sense of relatedness is individuals' views about themselves as connected to others and worthy of love and respect from others. Using the Self-System Model of Motivational Development as the framework, this study was designed to examine associations of urban high-school girls' relatedness toward teachers and peers with their behavioral and emotional engagements in physical education. Participants ( $N = 184$ , ages 15–18) completed questionnaires assessing relevant psychological and behavioral constructs while their teachers also completed corresponding measures during classes. Regression analyses revealed that relatedness toward teachers and peers had direct and interactive roles in both behavioral and emotional engagements. Although relatedness to teachers was the most pronounced predictor, feeling related to peers might have an added effect for the students who did not feel connected. The findings support that nurturing quality relationships between and among both teachers and peers may hold promise for enhancing learning.

**Keywords:** perceived autonomy, behavioral engagement, emotional engagement

Motivation researchers have described the idea of relatedness from many theoretical perspectives, such as social cognitive views of motivation (Weiner, 1990), relationship representations (Ryan, Stiller, & Lynch, 1994), and perceived social support (Wentzel, 1997). Basically, core component of the idea is that individuals have an innate desire of being connected; a history of repeated and interpersonal interactions will construct general expectations about the nature of the self in relationships (Andersen, Chen, & Carter, 2000). In education, researchers have explored the impact of relatedness in classrooms and schools (e.g., Wentzel, McNamara, & Caldwell, 2004). Relatedness as measured by school climate, quality of teacher-student relationships, feelings of belonging, caring, inclusion, acceptance, importance, and interpersonal support, have been found to predict motivation and

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learning, including goal orientation, self-efficacy, engagement, and academic performance in school (Furrer & Skinner, 2003).

Compared with research on students' underlying beliefs, capacities, and autonomy (e.g., Shen, McCaughtry, & Martin, 2007; Shen, McCaughtry, Martin, & Fahlman, 2009), the importance of interpersonal affiliation or relatedness has not been fully recognized in physical education. Researchers have only recently begun to examine the role of relatedness in motivation. For example, Cox, Duncheon, and McDavid (2009) examined teacher and peer relationship variables with junior high physical education students' motivation and affective responses. Shen, Li, Sun, and Rukavina (2010) explored the relationship between high-school students' amotivation and relatedness to teachers. It is supported that feeling related to important social partners can influence motivation/amotivation and lead to enjoyment.

Despite these initial findings, further investigation of relatedness or interpersonal affiliation in physical education is undoubtedly necessary. There are two pressing research questions that need answering. First, is there a direct effect of a sense of relatedness on motivational behaviors (e.g., engagement, disaffection, etc) in physical education? Previous studies in physical education have often considered relatedness as an antecedent of motivation (e.g., Standage, Duda, & Ntoumanis, 2005; Ntoumanis, 2005) but have rarely addressed its direct association with the behaviors. Second, is there a unique effect of relatedness to different social partners (e.g., teachers, peers, etc)? Although different social partners may play different roles in a social context where students are situated (Osterman, 2000), the unique function of different social partners has been unknown in physical education. With these concerns in mind, we designed this study using the Self-System Model of Motivational Development as the framework to further explore the associations between relatedness and engagement.

## **Self-System Model of Motivational Development**

Theorists in the Self-System Model of Motivational Development (SSMMD) suggest that self-system processes are essential for learning and achievement (Furrer & Skinner, 2003; Skinner, Furrer, Marchand, & Kindermann, 2008). Self-system processes are relatively stable personal resources developed over time in response to interactions with the social context; they are organized around individuals' basic needs for competence, autonomy, and relatedness. Competence is the need to experience satisfaction in exercising and extending one's capabilities, as people seem to seek out challenges that are optimal for their level of development (Deci & Ryan, 2000). Autonomy is the need to experience one's behavior as self-endorsed or volitional (Deci & Ryan, 2000). The extent to which an individual experiences autonomy or feel pressured in classes (perceived autonomy) is related to the quality of learning (Skinner et al., 2008). Finally, relatedness concerns the need to seek and develop secure and connected relationships with others. A sense of relatedness is the extent to which an individual "views about the self as lovable (or unworthy of love) and about the social world as trustworthy (or hostile)" (Furrer & Skinner, 2003; p. 148).

Within the SSMMD, engagement is posited as a key motivational behavior in education. Skinner et al. (2008) stressed that engagement is an important learning outcome in its own right and associated with performance and students' long-term

learning achievement. In addition, engagement serves as an important social signal eliciting supportive reciprocal reactions. Skinner et al. conceptualized engagement as students' active, goal-directed, persistent, and focused interactions with learning tasks. They combine both behavioral (e.g., effort, attention) and emotional (e.g., enjoyment, interest) dimensions.

Importantly, the SSMMD emphasizes that the self-system processes mediate the relationship between context and motivational behaviors. Within the SSMMD, self-system processes are proximal predictors of engagement. There are four basic higher order constructs: context, self-system processes, behavior or action, and outcomes. Contextual features influence how individuals feel about themselves (i.e., self-system processes), which in turn predicts motivational behaviors and outcomes. For example, a supportive classroom context can promote students' self-system processes, such as perceived autonomy and a sense of relatedness. The enhanced self-system processes may improve their engagement in class and consequently, lead to positive learning outcomes.

## Relatedness Toward Teachers and Peers

According to the SSMMD, a sense of relatedness, along with other important self-system processes (i.e., perceived autonomy and competence), is the basis for the prediction, interpretation, and response of social exchanges. Different self-system processes are interrelated but have their own rights in motivation. Individuals strive for connection with others, and being connected to others influences cognition, affect, and behavior (Anderson et al., 2000). There is a long history of study on relatedness under a variety of labels.

For example, Wentzel (1997) examined the quality of teacher-child relationships, as framed by the construct of "pedagogical caring," in middle-school students' motivation. Teachers' pedagogical caring is characterized as utilizing democratic interaction styles, developing expectations for student behavior in light of individual differences, and modeling a caring attitude toward their own work. The results showed that students' perception of their teachers' pedagogical caring predicted their pursuit of social goals and academic effort. Similarly, Furrer and Skinner (2003) and Skinner et al. (2008) found that elementary students' perceived relatedness to teachers predicted changes in classroom engagement over school years and contributed to their academic performance.

In addition to the teacher-student relationship, researchers have also demonstrated that students' social connections with peers enhance their motivation in class. Steinberg, Dornbusch, and Brown (1992) stressed that "peers are the most potent influence on their (students') day-to-day behaviors in school (e.g., how much time they spend on homework, if they enjoy coming to school each day, how they behave in the classroom)" (p. 727). Wentzel and Watkins (2002) examined the relationship between peer support and learning in middle school. They found that students who perceived their peers as being supportive and caring were more likely to engage in the positive aspects of school life, to pursue academic and social goals, and to earn higher grades than students who did not perceived such positive peer relationships. Furrer and Skinner (2003) echoed this finding and revealed that students' sense of relatedness to peers contributed to their engagement, especially emotional engagement.

## Purpose of This Study

As a preliminary study of the SSMMMD in physical education, this study was focused on the associations between relatedness and behavioral and emotional engagements. Specifically, we sought to address the research question of how students' relatedness toward teachers and peers predicted urban high-school girls' behavioral and emotional engagements in physical education. According to the SSMMMD, it was hypothesized that relatedness toward teachers and peers would show unique effects on the engagements over and above perceived autonomy in physical education. In addition, with previous findings that relatedness to different social partners may function interactively (Furrer & Skinner, 2003), it was hypothesized that there would be an interaction between the relatedness toward the two social partners: teachers and peers, in physical education. Feeling of relatedness to both teachers and peers might combine to influence the engagements.

Because of few convenient locations to be active, such as gymnasias and parks, in urban inner cities, school physical education is possible to be the only structured opportunity for most urban adolescents to learn the knowledge and skills necessary for participation in a variety of physical activities and exercises. However, urban physical education has its challenges. High poverty rates, broad ethnic diversity, and increased violence challenge teachers' efforts to implement quality programs (McCaughtry, Barnard, Martin, Shen, & Kulinna, 2006). Compared with boys, urban female adolescents are more likely to report negative attitudes and intentions toward physical education (Koca & Demirhan, 2004) and become overweight and obese (Ogden, Carroll, Curtin, Lamb, & Flegal, 2010). Needless to say, it is important that physical educators work through those challenges and enhance urban female adolescents' participation in physical education. To date, there are very few studies on a sense of relatedness and its connection with engagement in urban, predominately African-American high school physical education contexts. Effort in this line may enhance our understanding of the role of relatedness and help validate the efficacy of the self-system model of motivation development in physical education.

## Method

### Participants and Setting

Student participants were 184 high school girls (*Mean* = 15.1 years, age range: 14–17 years) enrolled in three public high schools from a large urban inner-city school district in the Midwestern United States, where most students come from low to lower middle socioeconomic background. Over 95% of the students identified their ethnicity as African American and approximately 83% of the students were in 9th or 10th grades. Based on U. S. Census Bureau (2008), the school district is facing the greatest economic depression and the highest dropout rates in the United States.

There was one-credit requirement in physical education and health in the schools. Students had physical education classes every other day throughout the semester with a 90-min rotating block schedule. The number of students in each class ranged from 33 to 41. Teacher participants were three (1 male, 2 females) physical education teachers from the three high schools. One male and one female

were White/Caucasian, while another female teacher was Black/African American. All three teachers were experienced, having accumulated between 16–25 years of teaching physical education in the urban, inner city district. The curriculum at all three schools blended a personal conditioning-fitness based approach with large-side team sports taught using a multiactivity format.

## Procedures and Measures

Permission to conduct the study was obtained before the investigation from the university review board, the school district, the participants, and their parents. Data collection was conducted at regular physical education classes during the second half of a fall semester. A data collection team including one graduate research assistant and two undergraduate students was trained to administer surveys. At the beginning of a class, the data collection team was responsible for distributing pencils and all scales. To diminish students' tendency to give socially desirable responses, one data collector read aloud to students that their responses would not affect their grades and their teachers would not have access to their individual responses. There were "no right or wrong answers" and filling out the survey was voluntary that they could withdraw at any time they wanted. During data collection, data collectors circulated among the students to help those having difficulty. The students completed the surveys in approximately 20 min. While students were being tested, teachers were not present; for the most part, they filled out their questionnaires in their offices.

**Relatedness.** Relatedness to teachers and relatedness to peers in physical education were assessed using the eight-item self-report relatedness scale (Furrer & Skinner, 2003). The wording of the items was adapted to be applicable to physical education classes. The assessment addressed students' sense of belonging or relatedness to teachers and peers in physical education. For each item, the stem was as follows: "When I am with my physical education teacher (peers, etc.)." The same items for both teacher and peers were contained: "I feel accepted," "I feel like someone special," "I feel ignored" (reverse coded), and "I feel unimportant" (reverse coded). Responses were indicated on a 7-point Likert scale anchored by 1 (never) and 7 (always). Furrer and Skinner (2003) revealed that the scale has high internal consistency ( $\alpha = .79$  and  $.81$  for relatedness to teachers and peers, respectively).

To further validate this measure, we conducted both Exploratory and Confirmatory Factor Analyses. The results supported the two-factor structure (factors of relatedness to teachers and relatedness to peers accounted for 68% of the total variance in the data) with adequate model goodness of fit indices (e.g., CFI =  $.95$ , SRMR =  $.05$ , RMSEA =  $.05$ , and the 90% confidence intervals of RMSEA =  $.04$ – $.06$ ). Cronbach alphas for the relatedness to teachers and relatedness to peers in this study were  $.85$  and  $.83$ , respectively.

**Perceived Autonomy in Physical Education.** Consistent with Skinner et al. (2008), a perceived locus of causality questionnaire adapted from Ryan and Connell (1989) was used to assess students' perceived autonomy in physical education. In terms of the degrees of autonomy in physical education, each of the four fundamental motivators (i.e., external, introjected, identified, and intrinsic) was measured with three items. Each item followed the stem "I take part in physical education..."

Example items are “because PE is fun” (intrinsic motivation), “because PE is important to me” (identified regulation), “because I want the teacher to think I am a good student” (introjected regulation), and “because I will get in trouble if I do not” (external regulation).

Consistent with the purpose of this study, we created three relative autonomy indexes (RAI) by weighting each item in accordance with its underlying level of autonomy. Specifically, all three intrinsic items were given a weight of +2, followed by the items representing identified regulation, which were all given a weight of +1. The items reflecting introjected regulation were given a weight of -1, and the items reflecting external regulation were given a weight of -2 (Deci & Ryan, 2000). Each RAI was computed as:  $\text{Index} = (2 \times \text{Intrinsic}) + (\text{Identified}) - (\text{Introjected}) - (2 \times \text{External})$ . Overall autonomy was measured by calculating the mean of the three RAIs. This method of creating composite indicators has been used in previous research (e.g., Ntoumanis, 2005; Shen et al., 2009). Higher scores on this index reflect higher levels of perceived autonomy.

**Engagement: Teacher Reports.** The teacher-report engagement questionnaire (Skinner et al., 2008) was used to measure teachers’ perception of student behavioral and emotional engagement in physical education. The teachers completed this questionnaire on every participant in their classes. There are two subscales. The behavioral scale has 5 items addressing teachers’ perceptions of students’ effort, attention, and persistence during classes. Examples of items include “This student tries hard to do well in my class” and “When this student is in my class, he/she listens very carefully.” The emotional scale has 5 items addressing teachers’ perceptions of students’ emotional involvement during classes. Examples of items include “When we work on something in class, this student appears interested.” And “This student appears to have fun in my class.” Responses were indicated on a 7-point Likert scale anchored by 1 (not at all true) and 7 (very true). In Furrer and Skinner (2003), the internal consistency coefficient alphas were .94 and .89 for behavioral and emotional scales respectively. Compared with students’ self-reports, teachers’ evaluations were more likely to be objective (Skinner et al., 2008).

**Engagement: Student Reports.** Mirroring the teacher-report engagement questionnaire, students reported on their own behavioral and emotional engagement in physical education. This scale was adapted from the Skinner et al. (2008) student-report engagement questionnaire. Like the teacher report, the 5-item behavioral scale addressed students’ perceptions of their effort, attention, and persistence in physical education classes. Examples of items include “in PE class, I work as hard as I can” and “When I am in PE class, I listen to the teacher very carefully.” The 5-item emotional scale was designed to measure students’ emotional involvement during classes. Examples of items include “When I am in PE class, I feel good” and “PE class is fun.” Responses were indicated on a 7-point Likert scale anchored by 1 (not at all) and 7 (very much). Skinner et al. (2008) revealed high internal consistency ( $\alpha \geq .71$ ) for both scales.

Similar to the relatedness measure, Exploratory and Confirmatory Factor Analyses were conducted for both teacher-report and student-report engagement questionnaires. Identical to Skinner et al.’s (2008) construct structure, the two-factor solution in both questionnaires accounted for more than 75% of the total variance in data. Results of the Confirmatory factor analyses yielded adequate model goodness

**Table 1 Descriptive Statistics and Internal Consistency for Each Measure (N = 184)**

Variable	<i>M</i>	<i>SD</i>	Range	Skewness	Kurtosis	$\alpha$
Relatedness to teacher	4.61	1.85	1–7	-.47	-.88	.85
Relatedness to peer	4.54	1.74	1–7	-.24	-1.03	.83
External regulation	2.39	1.92	1–7	1.16	.79	.88
Introjected regulation	2.05	1.42	1–7	1.14	1.31	.85
Identified regulation	3.40	1.71	1–7	.23	-.97	.79
Intrinsic motivation	4.49	1.89	1–7	-.22	-.94	.90
Behavioral engagement (student report)	5.30	1.49	1–7	-.98	.22	.84
Emotional engagement (student report)	4.82	1.55	1–7	-.64	-.28	.87
Behavioral engagement (teacher report)	4.61	1.98	1–7	-.67	-.84	.96
Emotional engagement (teacher report)	3.45	1.48	1–7	.10	-1.05	.97

of fit indices (CFI > .96, SRMR < .04, RMSEA < .04, and the 90% confidence intervals of RMSEA ranged from .03 to .06) in the hypothesized models. High Cronbach alphas (see Table 1) provided further validation support for the internal consistency of subscale items of the instruments used.

## Data Analysis

In a preliminary analysis, all data were subjected to descriptive analyses and statistical assumption tests. Confirmatory Factor Analyses were conducted to validate the instruments. Reliability of the questionnaire data were examined using Cronbach's (1951) approach for internal consistency. Means, standard deviations, and Pearson correlations were calculated. To address the research question of the association between students' feeling of relatedness and engagement, we conducted a series of hierarchical regression analyses to examine the extent to which students' relatedness to teachers and peers predict their engagement in physical education.

## Results

### Descriptive Statistics

Descriptive statistics and alpha coefficients for all measures are presented in Table 1. As shown, alpha coefficients ranged from .83 to .97, indicating acceptable reliability for these measures. By checking Skewness and Kurtosis indices, we found that all scores were overall normally distributed.

Results of the correlation analyses were reported in Table 2. In concert with our predictions, a correlation was found between relatedness to teachers and

**Table 2 Correlations Among Variables (N = 184)**

Variable	2	3	4	5	6	7
1. Relatedness to teacher	.30**	.36**	.45**	.48**	.37**	.43**
2. Relatedness to peer	—	.11	.27**	.31**	.07	.20**
3. Perceived Autonomy		—	.25**	.52**	.18*	.58**
4. Behavioral engagement (student report)			—	.69**	.31**	.49**
5. Emotional engagement (student report)				—	.29**	.61**
6. Behavioral engagement (teacher report)					—	.22**
7. Emotional engagement (teacher report)						—

Note. \*\*  $p < .01$ , \*  $p < .05$ .

relatedness to peers. In addition, there were significant correlations ranging from weak to moderate among teacher- and self-reports of student's behavioral and emotional engagements. Compared with behavioral engagement, students' perceived autonomy had stronger correlations with their emotional engagement from both teacher- and self-reports. Relatedness to peers was not correlated with either perceived autonomy or teacher-report student behavioral engagement.

### Associations Between Relatedness and Engagement

To answer the research question of the associations between relatedness and engagement, four hierarchical regression analyses were conducted with the behavioral and emotional features of engagement, as reported by students and teachers as dependent variables. The predictor variables were, in order of entry, age, perceived autonomy, and relatedness to teachers and peers. Age was entered first as a possible confounding factor. Perceived autonomy was entered second as a controlling variable to examine if the feeling of relatedness could predict the engagements over and above the effect of perceived autonomy. Finally, to examine if there was an interaction between the feeling of relatedness to both teachers and peers, we created an interactive term by multiplying relatedness to teachers with relatedness to peers. The interactive term was added in the final step of the four hierarchical regression analyses. Based on Aiken and West (1991) and Vlachopoulos and Karageorghis (2005), the predictor variables were centered initially (i.e., put in a deviation score form so that their means are zero) before the analyses to avoid possible multicollinearity in the regression equations with interaction terms.

For all regression analyses, tolerance indices were high (more than .89) and variance inflation factor (VIF) indices were low (less than 1.11), indicating that the assumption of noncollinearity for the regression model using below .10 for tolerance indices and above 10 for VIF as cutoff scores was not violated (Cohen, Cohen, West, & Aiken, 2003). As shown in Tables 3 and 4, results support the importance of relatedness in students' engagement. Relatedness toward teachers

**Table 3 Regression Analyses Results for Relatedness to Teacher and Peer (Student Report)**

Student Engagement (Student Report)						
Predictor Variables	Behavioral			Emotional		
	$\Delta R^2$	$\Delta F$	B	$\Delta R^2$	$\Delta F$	B
Step 1	.06	5.20		.28	32.38	
Age			.11			.16
Perceived Autonomy			.29**			.56**
Step 2	.17	17.81		.13	17.85	
Teacher			.58**			.46**
Peer			.18			.26**
Step 3	.09	20.26		.01	2.46	
Teacher X Peer			-.39**			-.13

Note. B values represent standardized values as they are calculated based on standardized (z) scores. \*\*  $p < .01$ , \*  $p < .05$ .

**Table 4 Regression Analyses Results for Relatedness to Teacher and Peer (Teacher Report)**

Student Engagement (Teacher Report)						
Predictor Variables	Behavioral			Emotional		
	$\Delta R^2$	$\Delta F$	B	$\Delta R^2$	$\Delta F$	B
Step 1	.05	4.49		.34	42.96	
Age			.14			.10
Perceived Autonomy			.22*			.58**
Step 2	.10	9.43		.06	8.73	
Teacher			.69**			.37**
Peer			-.10			.10
Step 3	.00	.58		.01	3.82	
Teacher X Peer			-.10			-.15

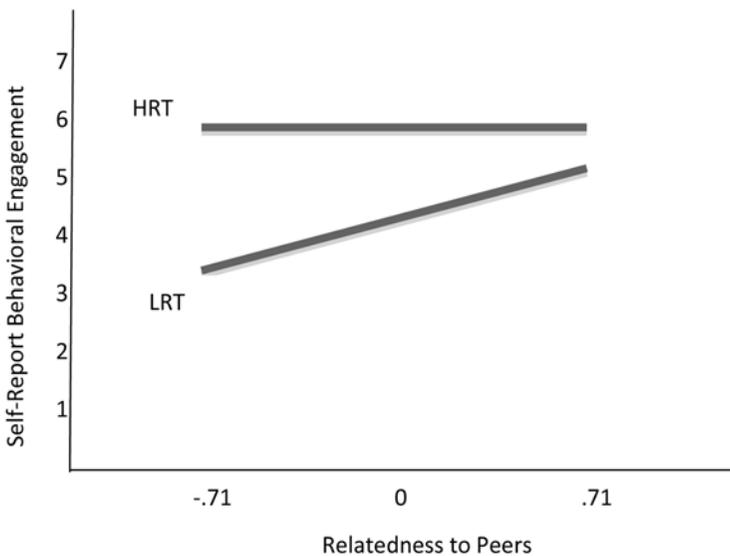
Note. B values represent standardized values as they are calculated based on standardized (z) scores. \*\*  $p < .01$ , \*  $p < .05$ .

and peers demonstrated unique contribution to behavioral and emotional engagements. Particularly, relatedness to teachers was the strongest predictor of student behavioral engagement for both teacher- and self-reports. With perceived autonomy as a covariate, relatedness toward teachers and peers still significantly predicted the self-report student emotional engagement.

Finally, after controlling for main effects, the interactive effect between relatedness to teachers and relatedness to peers still predicted significant variance in self-report student behavioral engagement ( $\Delta R^2 = .09$ ;  $p < .01$ ). For the condition of low relatedness to teachers combined with low relatedness to peers, scores of self-report student behavioral engagement were significantly lower in contrast to the condition combining low relatedness to teachers with high relatedness to peers. In other words, for the students who did not relate to teachers the higher the relatedness to peers the greater the engagement. However, for the condition of high relatedness to teachers, levels of relatedness to peers had limited impact on self-report student behavioral engagement (see Figure 1 for the interaction). There were no significant interactive effects on student emotional engagement reported by either teachers or student themselves.

## Discussion

Consistent with research in education (e.g., Skinner et al., 2008; Wentzel & Looney, 2007), our findings support that urban high school girls' sense of relatedness plays an important role in their motivation in physical education. Based on the Self-System



**Figure 1** — Interaction between Relatedness to Teachers and Relatedness to Peers on Self-Reported Behavioral Engagement. Note: HRT=High Relatedness to Teachers; LRT=Low Relatedness to Teachers. The value of .71 represents one standard deviation unit for the variable of relatedness to peers.

Model of Motivational Development (Skinner et al., 2008), a sense of relatedness is one of key self-system processes that individuals develop over time in response to interactions with the social context. Higher sense of relatedness led to greater emotional and behavioral engagement in physical education, as reported by both self- and teacher-ratings. Importantly, the girls' sense of relatedness made a unique contribution to their engagement over and above the effects of perceived autonomy, a strong resource of the self-system processes. Girls who were high on relatedness were more likely to show enthusiastic participation and exert effort in activities. In contrast, girls who felt unimportant or rejected by teachers and peers were more likely to become bored and alienated from engagement in physical education. In addition, it is likely that there is a complex interplay between their relationships with teachers and peers.

These findings enhance our understanding of the relationship between relatedness to teachers and peers in physical education. The correlation between feelings of relatedness to teachers and peers indicate that they are interrelated and work together for developing a significant sense of relatedness. Nevertheless, the independent predictive roles of relatedness to teachers and peers in teacher- and self-reports of students' emotional and behavioral engagement in the regression analyses demonstrated that teachers and peers could exert unique influence on students' motivational behavior in physical education. To some extent, relatedness to specific partners might be exerting their effects on somewhat different features (Furrer & Skinner, 2003).

Relatedness to teachers was found to be the most pronounced predictor in this study. Feelings of relatedness toward teachers significantly predicted students' engagement, reported by both their own and their teachers. Compared with their counterparts who perceived lower levels of relatedness, girls who felt important and appreciated by teachers were more likely to report that their involvement in activities were interesting and fun and they felt happy and comfortable in physical education. They were also more likely to exert effort, pay attention to, and persist in learning activities. It is indicated that teachers' caring, recognition, and realization may have evident and direct effect on students' motivational behaviors (Wentzel & Looney, 2007). Elliot, McGregor, and Thrash (2002) suggested that psychological needs facilitate both impulsive and reflective behaviors. Impulsiveness means automatic or spontaneous behavior without conscious processing of information, while reflective process is deliberative and effortful approaches to action. As a self-system process that individuals construct over time in responses to interactions with the social context, feeling of relatedness may energize impulsive engagement in physical education.

Peers play a role in students' school participation and completion (Wentzel, McNamara, & Caldwell, 2004). An important finding from this study was the unique effect of relatedness to peers on self-report emotional engagement, although also significantly predicted by perceived autonomy and relatedness to teachers. The loss of relatedness to peers, even when relatedness to teachers was high, could affect students' emotional experiences in physical education. In other words, girls who are rejected by their peers and experience loneliness and isolation were more likely to report being disaffected from learning activities in physical education. This result was consistent with Furrer and Skinner (2003) who also found that relatedness to peers was associated with students' emotional engagement in classes.

However, after the effects of perceived autonomy and relatedness to teachers were controlled, relatedness to peers made no unique contribution to both teacher- and self-report behavioral engagements. The influence of peers on learning behaviors, such as effort, attention, and persistence, seemed to function not directly, but via the mediation of other motivation factors. Importantly, the interaction between students' relatedness to teachers and to peers had a significant effect on self-report student behavioral engagement. Students' feeling of relatedness toward peers moderated the effects of relatedness to teachers on the behavioral engagement. Specifically, students with low feelings of relatedness toward teachers had significantly higher behavioral engagement in physical education if they perceived themselves as being accepted and recognized by their peers. This finding suggests that peers providing recognition and realization in physical education are critical for students who had low feeling of relatedness toward teachers. To some extent, there is an added effect of relatedness toward peers on engagement. In other words, compared with their counterparts with satisfying relationships with teachers, students who had low feeling of relatedness to teachers need more peers support for their effort, attention, and persistence in physical education.

In contrast, the performance of students high in relatedness to teachers was not affected by their perceptions of relatedness toward peers. The loss of relatedness to peers did not have serious consequences for their self-report behavioral engagement. Girls who experienced satisfying relationships with teachers were able to compensate for poor peer relationships in physical education. Overall, the finding supports Goodenow's study (1993) that teachers have the most consistently substantial influence on adolescents' value and expectancies in school and actual learning engagement.

## Limitations

Limitations in this study need to be recognized. First, a sense of relatedness is developed through a broad social context. In addition to physical education teachers and peers, other important social partners, such as parents and friends, may also have potential influences on students' perceived relatedness development in physical education. In addition, because this study was sponsored by a research grant on women, we did not collect data with boys'. With possible gender differences in motivation in physical education, future studies on gender role in relatedness are needed. Second, although measures of self- and teacher-report engagement in cross-sectional designs may be adequate proxy measures of future results, our motivational outcome measures lacked a time sequence. In the future, a prospective design is recommended. Third, because the primary focus of this study was on the association between relatedness, autonomy, and engagement, we did not include the construct of competence in our analyses. Future researchers may take competence into consideration to further understand the SSMMD in physical education. Fourth, researchers should also investigate broad outcomes in physical education. Knowledge and skill acquisition, objective physical activity levels, and after-school activities are suggested to better understand the impact of relatedness. Finally, education is a progressive process, which depends upon interactions among teachers, curriculum, and students. Future study should take teachers' variables (e.g., teachers' value orientation, teaching efficacy, teaching styles, etc) and the curriculum variables into consideration.

## Implication for Practice

This research suggests that a priority in teaching physical education is for teachers to foment quality relationships between and among both teachers and peers. Physical educators may develop close relationships with students through qualities such as warmth, caring, sensitivity, dedication of attention and time, emotional availability, and developing a positive learning environment for students' interactions (Owen & Ennis, 2005). Further analysis should explore how girls achieve a sense of connectedness to different social partners and how teachers can facilitate this process in physical education.

Our findings clearly demonstrate that a sense of relatedness to important social partners, especially teachers, strongly impact urban female adolescents' effort, attention, enthusiasm, interest, and happiness in physical education. Based on Goldstein (1999), physical education can be considered a "relational zone" in which the interpersonal character of the zone of proximal development closely resembles a caring encounter. Teachers' "pedagogical caring" (Wentzel, 1997) within the zone plays a significant role in students' affective, cognitive, and psychomotor development. Taken together, we argue that feeling connected and important is not just a by-product of physical education. A sense of belonging or relatedness makes an integral contribution to students' growth. As Owens and Ennis (2005) stressed,

"The need for creating relationships with students so that they feel cared for and can then care for themselves, each other, and the content has never been more evident. As teacher educators, it should no longer be assumed or left up to luck that our students, future teachers themselves, realize the significance of care, understand the dynamics of caring relationships and environments, and approach their teaching and their students with care." (p. 421)

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