Associations between Socio-Motivational Factors, Physical Education Activity Levels and Physical Activity Behavior among Youth

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Abstract

This study examined the relationships between established socio-motivational factors and children's physical activity levels daily and during physical education classes. A total of 307 middle school students (149 boys, 158 girls) from a suburban public school in the Southern United States participated in this study. Participants completed standardized questionnaires measuring their socio-motivational factors in the first week of data collection. Their physical activity levels in physical education class and 1-week physical activity levels were assessed in the following two weeks. Results revealed that 1) children's general physical activity enjoyment had predictive strength to their physical activity levels in physical education class, and 2) children's physical activity self-efficacy, perceived friend support and physical activity enjoyment were significant predictors of their daily physical activity levels.

Keywords: self-efficacy, social support

It is well known that regular physical activity ("the act of bodily movement that requires muscle contraction and energy expenditure"; Bouchard & Shephard, 1991, p. 3) participation has a positive effect on the prevention of chronic diseases (e.g., diabetes, cancer, cardiovascular disease, hypertension, depression, obesity, and osteoporosis) and premature death (Warburton, Nicol, & Bredin, 2006). However, many children and adolescents are not participating in the recommended levels of physical activity, which relates to a prevalence of overweight and obese school youth in the U.S. (U.S. Department of Health & Human Services [USDHHS], 1996, 2001, 2008). For instance, the obesity statistics of 2009 stated that childhood obesity rates have more than tripled since 1980 (Trust for American's Health, 2009). In addition to concerns regarding chronic diseases, overweight and obesity incidences have even led to poorer levels of academic achievement (Taras & Potts-Datema, 2005). Therefore, promoting youth's physical activity levels across the country has become a challenging task for exercise psychologists, physical educators and health practitioners.

Social cognitive theory (SCT; Bandura, 1986, 1997) provides the theoretical basis for jointly examining social, motivational, and behavioral factors related to physical activity behaviors. SCT proposes that an individual's physical activity behaviors are highly influenced by personal, social, and environmental factors. It has been widely used as a model for understanding the factors associated with physical activity behaviors in children and adolescents (Allison, Dwyer, & Makin, 1999; Gao, Lee, Solmon, & Zhang, 2009; Gao, Lodewyk, & Zhang, 2009; Keller, Fleury, Gregor-Holt, & Thompson, 1999; Martin & Kulinna, 2005; Petosa & Ruminski, 2003; Ommundsen, Page, Ku, & Copper, 2008; Sallis & Owen, 1999) and serves, therefore, as the theoretical framework for this research study aiming to jointly examine the relative predictive strengths of self-efficacy, enjoyment, and family and peer support on levels of physical activity both daily and in physical education.

Self-efficacy, the perception of one's ability to successfully perform a particular behavior, is one of the major components of SCT and most frequently regarded as the psychological correlate of adherence to physical activity (Bandura, 1986, 1997). In other words, self-efficacy has a significant influence on choice of physical activities, the effort one exerts, and the degree of persistence when facing an obstacle or failure (Bui, Kemp, & Howlett, 2011; McAuley, Lox, & Duncan, 1993; Robbins, Pender, Ronis, Kazanis, & Pis, 2004). A plethora of studies have demonstrated that self-efficacy toward physical activity is positively associated with the levels of youth's physical activity (e.g., Ommundsen et al., 2008; Ryan & Dzewaltowski, 2002; Sallis, Prochaska, & Talor, 2000; Whitt-Glover et al., 2009). For instance, Motl and his colleagues (2002) pointed out that self-efficacy was positively related to daily moderate and vigorous physical activity among black and white adolescent girls. Another research study conducted in 96 elementary schools revealed that self-efficacy had a positive association with the number of minutes of moderate and vigorous physical activity in students' daily life (Johnson et al., 2000).

Another well-established physical activity correlate within social cognitive theory is social support. This refers to the physical and emotional comfort given by family, friends, co-workers and others ("social support", n.d.). Many studies have documented that social support, especially support from family and peers, plays an important role in promoting adolescents' physical activity levels (Biddle & Goudas, 1996; Davison, 2004; Hohepa, Scragg, Schofield, Kolt, & Schaaf, 2007; Sallis et al., 2000; Stucky-Ropp & Dilorenzo, 1993). In particular, parents influenced adolescents' active participation in physical activity by providing transportation, encouragement, as well as participating in physical activity with them (Dowda, Dishman, Pfeiffer, & Pate, 2007; Biddle & Goudas, 2002; Hoefer, McKenzie, Sallis, Marshall, & Conway, 2001; McGuire, Hannan, Neumark-Sztainer, Crossrow, & Story, 2002; Saunders, Motl, Dowda, Dishman, & Pate, 2004). In terms of peer support, it has been evident that the frequency of adolescents' participation in physical activity with friends, especially in shared physical activity, has a positive association with their overall frequency of physical activity (Beets, Pitetti, & Forlaw, 2007; Voorhees et al., 2005). Moreover, other research has also yielded that social support, coupled with self-efficacy, had a significant association with students' moderate and vigorous physical activity (Biddle et al., 1996; Johnson et al., 2000; Martin & McCaughtry, 2008a).

Enjoyment, defined as a multidimensional construct that encompasses affective factors like excitement, competence, and attitude, appears to serve as an antecedent of physical activity (Crocker, Bouffard, & Gessaroli, 1995; Wankel, 1997). Two reviews have identified the strong relationship between physical activity enjoyment and physical activity behavior across a number

of studies. (Health Education Authority, 1997; Sallis et al., 2000). In a population-based study with 1,332 adults, survey respondents reporting high physical activity enjoyment also informed high levels of physical activity (Sallis, Salmon, Owen, Crawford, & Bauman, 2003). Targeting school children, DiLorenzo and his colleagues (1998) discovered that physical activity enjoyment was the only consistent predictor of physical activity levels for both boys and girls. To sum up, the previous mentioned socio-motivational factors have been shown to be positively related to children's physical activity. Therefore, their joint effect on physical activity is worthy of further investigation.

Physical education has been regarded as an important avenue to increase students' physical activity levels and to promote students' health and fitness through their active engagement in physical education class. Although a number of research studies (Levin, McKenzie, Hussey, Kelder, & Lytle, 2001; McKenzie et al., 1995, McKenzie, Marshall, Sallis, & Conway, 2000; Simons-Morton, Taylor, Snider, & Huang, 1993; Wickel & Eisenmann, 2007) have indicated that physical education cannot provide sufficient activity for students to reach the recommended level of at least 60 minutes of daily moderate and vigorous physical activity (USDHSS, 2008) or to attain the goal of 50% of class time spent in moderate and vigorous physical activity (National Association for Sport and Physical Education, 2004), it indirectly contributes considerably to students' total daily physical activity levels (Pate, O'Neill, & Mclver, 2011). It is well-documented that students enrolled in physical education are more likely to achieve the recommended level of moderate and vigorous physical activity or vigorous physical activity compared to students who are not enrolled (Gordon-Larsen, McMurray, & Popkin, 2000; Myers, Strikmiller, Webber, & Berenson, 1996; Pate, Ward, O'Neill, & Dowda, 2007; Tassitano et al., 2010). For example, Gordon-Larsen et al (2000) reports that students who participated in physical education five days per week were 2.21 times more likely to achieve the highest level of moderate and vigorous physical activity than students who did not have regular physical education class. Further, when examining differences in students' daily physical activity levels by comparing the days with and without physical education, studies have found that students were more active both in school and after school on the days they had physical education than the days they did not (Dale, Corbin, & Dale, 2000; Mallam, Metcalf, Kirkby, Voss, & Wilkin, 2003; Morgan, Beighle, & Pangrazi, 2007). Furthermore, research has also shown that active participation in physical education class has the potential to improve health (Sallis & Mckenzie, 1991).

Despite this knowledge, little is yet known about how levels of physical activity in physical education relate simultaneously to both socio-motivational factors and to daily levels of physical activity. For example, while the evidence for the predictive role of self-efficacy and perceived social support on physical activity behavior is solid, studies jointly investigating specific types of social support (family and peers) are scarce. Additionally, few studies have simultaneously provided evidence on associations between children's physical activity levels during physical education class, physical activity enjoyment, and daily physical activity levels. Therefore, the first purpose of this study was to explore the correlations among middle school (sixth to eighth grade) students' self-efficacy, enjoyment, and social support (family support and peer support) for physical activity, their physical activity levels in physical education classes and daily physical activity levels. The secondary purpose was to investigate the predictive utility of self-efficacy, enjoyment, and social support (family support and peer support) for physical activity on students' physical activity levels in physical education classes. The third and primary purpose was to examine the predictive strengths of these independent variables on their daily physical activity levels. The study embarked more specifically on testing the following three research hypotheses. First, students' social (peer and family support) and motivational (self-efficacy and enjoyment) factors are expected to be positively and significantly related. Second, these factors are expected to relate to but not predict physical activity in physical education, since the measures of those factors are framed in a general physical activity setting. Finally, children's socio-motivational factors and physical activity levels in physical education are hypothesized to predict and relate positively and significantly to 1-week physical activity levels. Uncovering these relationships will yield valuable new insight into the joint nature of socio-motivational factors and physical activity levels in both physical education and in the daily lives of adolescents.

Methods

Participants and the Research Setting

A total of 307 middle school students, who enrolled in one suburban public school in the Southern United States, participated in this study. The participants (149 boys, 158 girls) comprised of sixth (n = 101), seventh (n = 96), and eighth (n = 110) grade students ranging in age from 12 to 15 years (M age = 13.43, SD = .98). Families of the participants were either of a middle or upper-middle class socioeconomic status. The racial/ethnic backgrounds of the participants consisted of 83.1% Caucasian, 12.1% African-American, 2.8% Asian American, and 2% Hispanic American.

The students had a 90-minute physical education class on Monday, Wednesday and Friday. Students from each grade were alternatively taught by three physical education teachers who had more than 10 years' teaching experience and shared the teaching assignments. The physical education teachers took the attendance when students entered the gym. After that, students participated in warm-ups, activities, and games for approximately 60 minutes. The physical education curriculum consisted of a variety of movement and sport skills that included soccer, jogging and walking, capture the flag, as well as physical fitness. Typically in each class, the teachers first introduced the skills to be learned, followed by organizing students to practice. Finally, the teachers finished the class with a closure to the lesson. The physical education class was organized in a co-educated pattern and no choice was given to the students regarding the teaching contents.

Procedure

After the project had been approved by a University Institutional Review Board, the researchers obtained the support from the school district, the school principal, and the physical education teachers. In addition, before the start of the study, child assent forms and parental consent forms were attained from the participants and their parents/guardians, respectively. The data

collection occurred in physical education class in the gymnasium in the end of the school year and lasted three weeks. In the first week, participants were requested to answer a survey measuring physical activity self-efficacy, social support, and physical activity enjoyment in one physical education class. It took the participants approximately 15 minutes to complete the survey. In the next two weeks, each participant was fitted with a pedometer that measured his or her steps to estimate the in-class physical activity level in the physical education classes for approximately 60 minutes. Each student's step counts were measured in four physical education classes. Participants also responded to a self-reported questionnaire assessing their 1-week physical activity levels.

Measures

Demographics. Self-report information on sex, race, grade, and age was attained from the survey.

Self-efficacy. The Children's Physical Activity Confidence Scale (Norman, Sallis, & Gaskins, 2005) was used to measure participants' physical activity self-efficacy. It was a 6-question inventory and has demonstrated validity and reliability among adolescents (Norman et al.). The stem used in the survey was: "Rate how sure you are that you can do physical activity in each situation". A 5-point Likert scale, ranging from 1 = *I am sure I can't* to 5 = *I am sure I can*, was utilized for all responses. Sample questions were: (a) "do physical activity even when you feel sad or stressed"; (b) "do physical activity even when your family or friends want you to do something else"; and (c) "do physical activity even when you have a lot of schoolwork". The mean score of these six questions was used as the measure of student's physical activity self-efficacy.

Social support. Participants' perceived social support, including family and friend support, was assessed by a 13-item social support and exercise survey with acceptable validity and reliability (Sallis, Grossman, Pinski, Patterson, & Nader, 1987) in a general physical activity setting. The survey initiated with a stem: "During the past three months, my family (or members of my household) or friends…" Participants were asked to separately rate the support from family and from friends for each item like: (a) "exercised with me"; (b) "gave me helpful reminders to exercise"; and (c) "changed their schedule so we could exercise together". A 5-point Likert scale was used for the corresponding response on family and friend support (1 = *none*, 5 = *very often*). Two mean scores of the 13 items were used to analyze a student's perception of family support and friend support, respectively.

Physical activity enjoyment. The physical activity enjoyment measure consisted of a 7-item subscale of the Intrinsic Motivational Inventory that uses a 7-point Likert scale (1 = *not at all true*, 7 = *very true*) with acceptable internal consistency (• > .70) (McAuley, Duncan, & Tammen, 1989). Participants were asked to circle the number that best describes the thoughts and feelings about the present activity. Sample items included: (a) participating in physical activity is fun; (b) I would describe physical activity levels as very interesting; and (c) I enjoyed participating in physical activity very much. The mean score of the seven items were employed to analyze the students' physical activity enjoyment.

In-class physical education physical activity levels. The Yamax Digi-Walker SW-701 was used to measure students' physical activity levels in physical education class. It has shown to be one of the most accurate pedometers for measuring youth physical activity levels in a field setting with a large sample (Schneider, Crouter, Lukajic, & Bassett, 2003). Before using the pedometers, a shake test was conducted to test calibration and validate the reliability of the pedometers. Then all the pedometers were set to the appropriate stride lengths to fit the participants' ages and worn on the right side of participants' waists. Pedometer step output was expressed as steps per minute (SPM), which were calculated by dividing the total steps in class by the class time (Scruggs, Beveridge, Watson, & Clocksin, 2005).

Daily Physical activity levels. The mean of the Physical Activity Questionnaire for Children (PAQ-C; Crocker, Bailey, Faulkner, Kowalski, & McGrath, 1997) was used as a self-report measure of students' overall physical activity over the last seven days. Participants reported how many times in the previous week they participated in a wide range of physical activity behaviors such as recreational activities, sports, and other types of exercise. The measure uses a 5-point Likert scale for each of the nine items. The validity and reliability of this instrument have been established (Crocker et al.; Kowalski, Crocker, & Faulkner, 1997).

Data Analysis

Cronbach's alpha coefficients were utilized to examine the internal consistency of the self-report measures. Descriptive statistics and Pearson correlations were respectively used for sample description and correlations evaluation. Finally, based on the theory-driven nature of this study, hierarchical multiple regressions analyses were used. Specifically, a hierarchical multiple regression analysis was conducted to examine the contributive strengths of children's self-efficacy, family support, peer support, and physical activity enjoyment to their physical education physical activity levels. Another hierarchical multiple regression analysis was administered to investigate the predictive strengths of children's self-efficacy, family support, peer support, physical activity enjoyment, and physical education physical activity levels to daily physical activity levels. The orders of entering depended upon the importance in predicting the outcomes. In both analyses, physical activity self-efficacy and physical activity enjoyment were entered into the model in the first step, followed by friend support and family support being entered in the second step.

Results

Correlation Analyses

Table 1 demonstrates the descriptive statistics for the whole sample and the Pearson correlations among the variables. The descriptive statistics revealed students' moderate to high physical activity self-efficacy, physical activity enjoyment, and daily physical activity levels, and low to moderate family support and social support. In other words, all mean scores of the previously mentioned variables were above the midpoint of the self-reported measures (i.e., 3 for physical activity enjoyment). In addition, compared with pedometer steps recommendations (Scruggs, 2007), students displayed high physical education physical activity levels (68.62 steps/minute). Contrary to expectation, correlation analyses yielded that not all the variables shared significantly positive relations. For example, only physical activity enjoyment

and friend support were significantly and positively related to physical education physical activity levels (r = .21, p <.05; r = .24, p < .05, respectively). In addition, except physical education physical activity levels, children's physical activity self-efficacy, family support, friend support, and physical activity enjoyment were positively and significantly related to physical activity level (r = .25 - .28, p < .01). The results of the reliability analyses indicated that all the self-report measures were internally reliable as the Cronbach's alpha coefficients for the variables exceeded .70 (Nunnally & Nernstein, 1994).

Table 1. ***Descriptive Statistics, Internal Reliabilities, and Correlations among Variables***

Variable	1	2	3	4	5	6
1. PA self-efficacy	.82					
2. Family support	.15*	.79				
3. Friend support	.15*	.75**	.81			
4. PA enjoyment	.25**	.01	.00	.75		
5. PE-PA levels	-.00	.18	.24**	.21*		
6. Daily PA levels	.28**	.26**	.27**	.25**	.09	.78
Mean	3.84	2.29	2.22	5.24	68.62	3.54
Standard deviation	.63	1.14	1.23	1.30	17.86	.83

Notes. PA = Physical activity level; PE = Physical education.

* p < .05.

** p < .01.

Predictive Strengths of Socio-Motivational Factors on Physical Education Physical Activity Levels

As shown in Table 2, only children's physical activity enjoyment significantly predicted physical education physical activity levels (ß = .29, p < .05) and accounted for 7% of the variance. Other socio-motivational factors failed to add significant portion in the prediction.

Table 2. ***Results of Multiple Regressions on Students' PE-PA Levels***

	Predictor	β	R^2 (cum.)	*t* value
First step			.07	
	PA enjoyment	.28		2.65*
	PA self-efficacy	-.06		-.59
Second step			.15	
	PA enjoyment	.28		2.40*
	Friend support	.24		1.50
	Family support	.15		.34
	PA self-efficacy	.10		-.85

β values are standardized regression coefficients from the final stage of the regression analysis;

R^2 values are cumulative, with each incremental step adding to the variance explained.

* p < .05.

** p < .01.

Predictive Strengths of Socio-Motivational Factors on Daily Physical Activity Levels

As displayed in Table 3, in the first step, physical activity self-efficacy (ß = .23, p < .01) and physical activity enjoyment (ß = .18, p < .01) were both significant predictors of daily physical activity levels, accounting for 10% of the variance. In the second step, friend support (ß = .37, p < .01), physical activity self-efficacy (ß = .22, p < .01), and physical activity enjoyment (ß = .20, p < .01) significantly predicted daily physical activity levels and explained 22% of the variance.

Table 3. ***Results of Multiple Regressions on Students' Daily PA Levels***

	Predictor	β	R^2 (cum.)	*t* value
First step			.10	
	PA self-efficacy	.23		3.40**
	PA enjoyment	.18		2.64**
Second step			.22	
	Friend support	.37		3.52**
	PA self-efficacy	.22		3.12**
	PA enjoyment	.20		2.86**
	Family support	-.08		-.72

β values are standardized regression coefficients from the final stage of the regression analysis;

R^2 values are cumulative, with each incremental step adding to the variance explained.

* p < .05.

** p < .01.

Discussion

The primary aim of this study was to jointly examine the predictive strength of several relatively well-established socio-motivational physical activity factors (children's physical activity self-efficacy and enjoyment, family support, and friend support) on daily and physical education levels of physical activity. It was anticipated that the social, motivational, and physical activity outcome variables would statistically relate to each other and predict daily and physical education physical activity and that physical education physical activity levels would predict daily physical activity levels. Overall, the hypotheses were partially supported by the research results.

Relations among and between the motivational and social factors were as expected. There was a positive and significant relationship within the motivational factors (self-efficacy and enjoyment) and social factors (family and peer support). Low to absent relations between motivational (self-efficacy and enjoyment) and social (family and peer support) factors are also conceptually plausible because participants could be motivated (self-efficacious and enjoying physical activity) and yet not feel socially supported by peers or family. Nevertheless, these results reflect the absence of a strikingly positive profile of relations between motivational and social factors in students as espoused by social-cognitive theory (Bandura, 1986) and in relation to physical activity (Sallis et al., 2000). Hence, it may not be necessary and unlikely for adolescents

to have availing levels of all of the socio-motivational factors or of physical activity in physical education in order to be physically active in daily life.

Consistent with the first hypothesis, there were significant positive relationships within students' social factors (family and peer support) and with motivational factors (self-efficacy and enjoyment). In addition, physical activity self-efficacy related positively to family and peer support. However, the hypothesized significant relationships between physical activity enjoyment and social factors did not exist, so even without family and friend support, students can still enjoy physical activity participation (Bandura, 1986).

Physical activity enjoyment emerged as a predictor of physical education physical activity levels, which reinforces similar findings in previous studies (Kremer, Trew, & Ogle 1997; Wallhead & Buckworth 2004). The finding that physical activity self-efficacy did not correlate with or predict physical education physical activity levels is inconsistent with previous studies reporting the significant prediction of PE engagement by self efficacy (Gao, Lee, Kosma, & Solmon, 2010; Gao, Lee, Xiang, & Kosma, 2011; Gao, Newton, & Carson, 2008). A plausible explanation may be that, compared to the more general measurement of physical activity self-efficacy in this study, those previous studies assessed more physical education -specific self-efficacy and its relation to engagement in physical education. There is support in the self-efficacy literature (see Pajares, 1996 for a review) that self-efficacy for physical activity at the domain-level like physical education may differ from self-efficacy for physical activity when applied more broadly to one's lifestyle. This might similarly and partially explain why friend support also did not predict physical education physical activity levels in this study. Perhaps assessing more peer-specific factors in rather fine-grained contexts within PE such as students' perceptions of autonomy support during games instruction (Mandigo, Holt, Anderson, & Shepard, 2008) would better illuminate the predictive strength of peer support on physical activity in physical education. Some of the relationships in this study might also have been obscured by using pedometers to assess physical education physical activity levels and while employing a self-report survey to assess daily physical activity levels. There is evidence of lower associations between psychological variables and physical activity levels when objective (pedometer) measures are used to assess physical activity (Dishman, Darracott, & Lambert, 1992) since subjective measures of physical activity are often not significantly related with objective measures (Sallis et al., 1999; Wier, Jackson, & Pinkerton, 1989). When using physical education physical activity levels to predict physical activity levels, future research might also alter the sequence by measuring physical education physical activity levels first and then daily physical activity levels, because physical education physical activity levels are used to predict the daily physical activity levels.

Physical activity enjoyment also emerged as a positive contributor of daily physical activity levels corroborating related research (Moore et al., 2009; Sallis et al., 2000; Sallis et al., 2003). As expected, physical activity self-efficacy and friend support (not family support) also predicted daily physical activity levels. This echoes previous research findings that even though family support exerts a tremendous influence on children's physical activity levels during their early and middle childhood (Cleland et al., 2011; DiLorenzo et al., 1998; Dowda et al., 2011), the family's impact gradually diminishes and the peer support becomes increasingly influential on physical behavior as children enter later childhood and adolescence (Beets et al., 2007; Kirby, Levin, & Inchley, 2011; Martin & McCaughtry, 2008b). The absence of a predictive relationship between physical education physical activity and physical activity levels contradicts some previous research noting their positive relationship in children and adolescents (e.g., Pate et al., 2011; Raustorp, Boldemann, Johansson, & Martensson, 2010) while clearly supporting the related (Bailey, 2006) yet unique relationship between physical education as an academic domain and more levels of physical activity in the school (Cale & Harris, 2006) and in daily life (Sallis et al., 2000). In other words, one's motivation and physical activity levels in an educationally-oriented venture like physical education are not necessarily synonymous to levels of participation in physical activity in the school or in daily life.

There are, of course, certain cautions that must be noted in interpreting the findings of this study. First, as a cross-sectional study any cause and effect inference between variables cannot be made. Future longitudinal studies that capture temporal changes in relationships among socio-motivational factors, physical education physical activity levels and daily physical activity levels are welcomed. Second, the participants in this study were from a single school site where most of the students were of white ethnicity, and came from middle to upper socioeconomic families. Recruiting a large diversity of students from multiple schools or even other countries in future studies could expand the generalizability of these findings. Third, to achieve a more precise and consistent understanding of children's daily physical activity levels and physical education physical activity levels in future research, observation sheets, accelerometers and/or heart rate monitors could also be used to facilitate measurement validity. Those methods are also useful to describe the type, frequency, intensity, and duration of the physical activity taking place in both daily and physical education settings. Additionally, qualitative measures (i.e., interviews and focus groups) would help to triangulate the data to enable clearer insight into students' socio-motivational factors and their relation to the behavioral outcomes of physical education physical activity and daily physical activity levels in this study.

In conclusion, while acknowledging the limited transferability of this study to diverse physical education and physical activity settings, the study provides important new insight into the predictive strength of socio-motivational factors on physical education physical activity and daily physical activity levels. The study revealed a favorable predictive relationship between enjoyment and both physical activity in physical education and daily physical activity, between self-efficacy and daily physical activity, and between friend support and daily physical activity. Movement practitioners should continue to foster enjoyment, self-efficacy, and peer support by making concerted efforts to jointly engage cognitive (e.g., setting realistic goals, giving proximal and generally positive feedback), affective (e.g., sense of control and choice; fun and interesting activities), and social (e.g., safe and constructive relations) elements for students (Henderson, Glancy,

& Little, 1999; Motl et al., 2002). Moreover, the environment should be managed to fulfill children's autonomy needs during physical education and other physical activity endeavors (Mandigo et al., 2002). In line with self-efficacy theory (Bandura, 1997), practitioners might foster more optimal perceptions of competence by offering activities that are challenging but also appropriate to children's motor skill level while employing effective teaching methods and strategies to heighten their enjoyment and behavioral outcomes. Finally, physical activity settings might reduce social comparisons and build up an atmosphere of cooperation (i.e., taking on unique interdependent roles for mastery rather than overt performance) to better engage children in feelings of peer-relatedness (Ward, Saunders, & Pate, 2007). With such concerted effort, the factors that relate jointly in this study to levels of physical activity in PE and daily life are likely to be enhanced.

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