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# The Role of Biographical Characteristics in Preservice Classroom Teachers' School Physical Activity Promotion Attitudes

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Recommendations for increasing children's daily physical activity (PA) call on classroom teachers to assume an activist role at school. This study examined relationships among preservice classroom teachers' (PCT;  $n = 247$ ) biographical characteristics, perceptions and attitudes regarding school PA promotion (SPAP). Results indicated participants who completed SPAP-related college coursework and had PA-related teaching/coaching experiences reported higher SPAP competence. Significant relationships were found among BMI, personal PA competence and SPAP competence in the contexts of PE and extracurricular settings. Personal PA competence and SPAP competence at recess and in the classroom predicted 19% of the variance in SPAP attitudes. Experiences in PA settings and preservice training may have important implications for the overall success of efforts to enhance school PA promotion.

**Keywords:** health promotion, physical activity, physical education, teaching, pediatrics, psychology

The heightened prevalence of obesity and its many associated health problems are well documented (US Department of Health and Human Services [USDHHS], 2001). Amid society's struggle to combat obesity, the purpose and place of schools in reducing this pandemic have been outlined in clear terms (Centers for Disease Control and Prevention [CDC], 1997; Kaplah, Liverman, & Kraak, 2004; Pate, Davis, Robinson, Stone, & McKenzie, et al., 2006; Wechsler, McKenna, Lee, & Dietz, 2004). Since schools are attended by over 95% of young people (Wechsler et al., 2004), the school environment has the potential to significantly impact health-related behavior patterns including those related to physical activity (PA), an important factor in promoting healthy weight (Bar-Or, 1995). Patterns of behavior related to PA emerge during childhood and adolescence (Wechsler et al., 2004) and may "track" into adulthood (Guo, Roche, Chumlea, Gardner, & Siervogel, 1994; Malina, 2001; Must, Jacques, Dallal, Bajema, & Dietz, 1992; Telama, Yang,

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Laakso, & Viikari, 1997; Telama, Yang, Viikari, Valimaki, & Wanne, et al., 2005). Thus, school-based PA should be centrally positioned in the fight against obesity because it targets early stages of pattern development and may encourage lifelong participation in PA. The importance of PA implemented at school is amplified by research indicating dramatic decreases in children's PA levels between grades 1–3 and 4–6 (Trost, Pate, Sallis, Freedson, Taylor, et al., 2002). This fact emphasizes the need for schools to take preventative measures in promoting PA and intervene starting at the earliest levels of school.

Given the key role of PA in promoting healthy weight, PA programming constitutes a major focus of school health promotion guidelines (World Health Organization [WHO], 2007). Without exception physical education (PE) is recognized as a critically important component of PA promotion in schools, based on its potential not only to provide opportunities for PA but also its role in teaching children knowledge and skills which are fundamental to lifetime participation in PA (CDC, 1997; National Association for Sport and Physical Education [NASPE], 2008; Sallis & McKenzie, 1991). However, it is also well understood that school PA promotion can extend beyond PE to other school contexts such as recess, before and after-school programs, and the classroom (CDC, 1997; NASPE, 2008). A school-wide approach can provide students with multiple opportunities to be physically active during the school day. This is especially important given the current trend for school officials to erroneously compromise and even cut PE programs amid budgetary constraints and pressure on schools to increase performance in “core academic subjects” (NASPE, 2006). A recent report by the American Heart Association (Pate et al., 2006) revealed that only eight percent of elementary schools provide the recommended 150 min of PE per week, which still falls severely short of the recommended 60 or more minutes of daily PA for children and adolescents (USDHHS, 2008). Therefore, recommendations for school PA programming implicate the leadership and support of not only PE teachers, but also classroom teachers, administrators, parents and others whose collective effort can contribute to an evolving environmental dynamic geared toward increasing children's PA at school.

Elementary students spend a large portion of their school day with their classroom teacher, and it is generally believed this time can be tapped as a resource for increasing PA (CDC, 1997; NASPE, 2008; Pate et al., 2006; President's Council on Physical Fitness and Sports, 2006). Recommended strategies for classroom teachers to increase children's PA are cited in numerous sources (e.g., Faber, Kulinna, & Darst, 2007; Kahan, 2008; Maeda & Murata, 2004; Rink, Hall, & Williams, in press; Yaussi, 2005). For example, Rink et al. (in press) encourage classroom teachers to schedule time for recess, incorporate PA into the classroom, organize and play games with their students, teach dances, and go for walks with their classes during the school day. Schools functioning to provide such opportunities for PA could help children to meet the recommended 60-min or more of daily PA (USDHHS, 2008). Unfortunately, little research exists through which the potential of classroom teachers to effectively assume the responsibilities of school PA promotion can be gauged.

In the current study, we chose to explore this potential in the context of pre-service education. The teacher socialization literature clearly shows that biographical characteristics (i.e., experiences, perceptions, and personal characteristics) of

preservice teachers are relevant to the choices they will make as practicing teachers (Doolittle, Dodds, & Placek, 1993; Lortie, 1975; Zeichner & Gore, 1990). Research conducted with preservice classroom teachers (PCTs) is consistent with this literature and points to a number of variables which may be influential in shaping beliefs and attitudes related to school PA promotion (Allison, Pissanos, & Sakola, 1990; Callea, Spittle, O'Meara, & Casey, 2008; Faulkner & Reeves, 2000; Morgan, Bourke, & Thompson, 2001; Xiang, Lowy, & McBride, 2002). The importance of attitudes in teaching rests firmly in theory and research linking teachers' attitudes to their actual classroom behavior (Ajzen, 1987; Ajzen & Fishbein, 2005; Armitage & Connor, 2001; Fishbein & Ajzen, 1975; Sutton, 1998). Therefore, an underlying assumption of the current study was that exploring the role of biographical characteristics in PCTs' attitudes toward school PA promotion is an important preliminary step in understanding the potential of classroom teachers to assume responsibilities as PA activists at school.

## Biographical Characteristics and PCTs' Attitudes

Previous research examining the role of biographical characteristics in PCTs' attitudes toward teaching has primarily focused on the PE context to the exclusion of other contexts where school PA promotion can take place, particularly in the classroom, at recess, and in extracurricular settings (i.e., before and after school programs). Studies in this vein demonstrate the importance of preuniversity experiences, especially in K-12 PE, in the formation of attitudes toward teaching PE (Allison et al., 1990; Morgan et al., 2001). For example, in Morgan et al.'s study, the quality of school PE experiences was shown to predict Australian PCTs' perceived PE teaching competence and attitudes toward PE. Notably, perceived PE teaching competence and attitudes toward PE were significantly related in earlier research (Faulkner & Reeves, 2000), suggesting that perhaps PCTs' attitudes are based in part on how skillful or successful they feel in the PE setting. Support for this notion is evidenced in other educational domains, as well (e.g., Avramidis, Bayliss, & Burden, 2000).

Academic experiences in a college program of study have also been shown to be important in PCTs' attitude formation (Avramidis et al., 2000; Benson, Farnsworth, Bahr, Lewis, & Shaha, 2004; Morgan et al., 2001; Solmon, Lee, Belcher, Harrison, Jr., & Wells, 2003; Xiang et al., 2002). For example, Xiang et al. found that completing a PE methods course with a PE field experience component enhanced PCTs' beliefs regarding the value and purpose of elementary PE. However, PCTs were also found to be less willing to teach PE following the course, perhaps because teaching PE was a new experience for many of the PCTs and they found it to be difficult and unrewarding (Xiang et al., 2002). In another study, Morgan et al. (2001) found more advanced cohorts of PCTs to have more positive attitudes, beliefs, and perceived competence in teaching PE than less advanced cohorts of PCTs, supporting the effectiveness of preservice training.

Several other biographical characteristics which may influence PCTs' school PA promotion attitudes include teachers' own sport participation experiences (Callea et al., 2008; Morgan et al., 2001), their teaching/coaching experiences in PA settings, perceived skillfulness in PA and sport participation (Morgan et al., 2001), and physical self-concept (Karteroliotis, 2008; Lerner, 1985). Regarding

sport participation experiences, Callea et al. (2008) found that interest and participation in PA positively related to primary school teachers' perceived efficacy to teach fundamental motor skills. In addition, PCTs in Morgan et al.'s (2001) study felt that their previous playing experiences in sport were important to their PE teaching competence. Given these findings, one might logically reason that PA/sport participation through teaching/coaching might also be an influential factor in PCTs' perceived competence and, arguably, attitudes toward teaching PE and promoting PA in other school contexts.

Morgan et al. (2001) also investigated the influence of PCTs' perceived skillfulness in PA and sport participation. The researchers found that outcome attainment in elementary PE, experiences in high school PE (including perceived competence in skill performance and success), and commitment to sport (including perceived sporting ability) were significant predictors of attitudes toward PA and/or attitudes toward teaching PE, explaining 41% of the total variance in attitudes. Finally, physical self-concept (Karteroliotis, 2008) may be relevant to PCTs' PA promotion attitudes. According to Lerner's (1985) goodness-of-fit hypothesis, positive perceptions and behaviors are enhanced when there is a match between an individual's characteristics and the demands of the task. Physically larger (i.e., overweight) teachers may view themselves as less than ideally matched to the task of PA promotion and this may be related to their perceptions of competence and attitudes toward PA advocacy at school.

The present study was designed to coalesce and extend previous research exploring the nature and role of biographical characteristics regarding PCTs' perceptions and attitudes toward PE. Given the current recommendations involving classroom teachers as PA promotion activists in the classroom, recess, and before and after school settings (e.g., NASPE, 2008), the purpose of this study was to examine the contribution of biographical characteristics to PCTs' perceived competence and attitudes regarding school PA promotion. To this end, variation in age, BMI, PE satisfaction, perceived PA and sport competence, and perceived PA promotion competencies were considered across gender, academic status, course completion, and coaching/teaching experience. A secondary purpose of this study was to examine the relationships among biographical characteristics, perceived PA promotion competencies, and attitudes toward promoting PA. More specifically, the strength of biographical characteristics and perceived PA promotion competencies in predicting PCTs' attitudes was examined.

## Method

### Participants

The participants were 247 male ( $n = 20$ ) and female ( $n = 227$ , 92%) undergraduates majoring in elementary (56%) and early childhood education at a large southeastern university. The average age of the students was 21.76 ( $SD = 4.57$ ) years and the race distribution was 2% Asian, 8% African American, 3% Hispanic, and 87% White Caucasian. The majority of the students were in the junior (51%) or senior year (36%) of their program. Participant recruitment was arranged through the early childhood and elementary education program leaders, who permitted the first author to recruit students at program meetings on campus.

## Instrumentation

**Biographical Questionnaire.** A 15-item biographical questionnaire was used to assess a range of demographic, background, and perception-based variables. Demographic information was ascertained with four items asking participants their age, gender, height and weight. Height and weight were used to calculate BMI. While some previous investigations have shown significant differences between measured and self-reported height and weight (Brunner Huber, 2007; Wada et al., 2005) these differences are generally not greater than what would be expected in daily fluctuations (.52 kg and .11 cm, respectively). Moreover, discrepancies between BMI based on measured versus self-reported data have been shown to be significantly smaller among adults > 19 (-.04) than younger children 12–18 years of age (-.21 to -.31) (Gay, Monsma, & Torres-McGehee, 2009).

Background information was ascertained with three items asking participants to identify their year in school (freshman, sophomore, junior, or senior), college coursework taken related to children and PA, and coaching/teaching experiences in PA settings. Two perception-based variables were measured, including personal competence in PA (five items) and experience satisfaction in elementary and secondary school PE (four items). Perceptions were assessed by a four-point Likert scale (Frery, 2003; Maitland, 2009) where 1 = Strongly Disagree and 4 = Strongly Agree. Example items include “I am physically active” and “My elementary physical education experiences were positive”.

**School Physical Activity Promotion Competence Questionnaire (SPAPCQ).** Perceived competence in promoting PA was assessed with 15-items using an 8-point Likert scale where 0 = No Skills and 7 = Many Skills. Example items include “Create opportunities for my students to participate in safe physical activity in the classroom”, “Lead a before or after school physical activity program” and “Use developmentally appropriate practices when teaching elementary physical education content”.

**School Physical Activity Promotion Attitudes Questionnaire (SPAPAQ).** Attitudes toward promoting school PA were assessed with 9 items on a 4-point Likert scale where 1 = Strongly Disagree and 4 = Strongly Agree. Example items include “Physical education is an important part of the elementary school curriculum”, “Recess is an important part of the school day”, and “It is important for me as a classroom teacher to be physically active”.

## Procedures

Approval to conduct the study was obtained by the first author’s university review board for research with human subjects. Items for the questionnaires were written based on a review of the literature on PCTs’ biographical characteristics and attitudes toward PE/PA (e.g., Avramadis et al., 2000; Benson et al., 2004; Morgan et al., 2001; Xiang et al., 2002) and on school PA programming, particularly discussion on the importance of PE/PA for children and recommendations specifying or implicating the role of classroom teachers in promoting PA (e.g., CDC, 1997; Faber et al., 2007; Kahan, 2008; Maeda & Murata, 2004; NASPE, 2008; Pate et al., 2006; President’s Council on Physical Fitness and Sports, 2006; Yaussi, 2005).

Five experts in PE/PA promotion, including three physical education teacher education faculty and two doctoral students in physical education pedagogy, reviewed the items for thoroughness and content validity. The reviewers were deemed expert in judging for content validity principally because each was involved with a major state-level reform to inculcate legislation-based school PA programming. Involvement among these professionals ranged from leading the said reform; guiding state policy development inclusive of PE/PA requirements and recommended PA promotion strategies in the classroom, at recess, and in before and after school settings; and leading professional development workshops on school PA promotion for principals, physical education teachers, and classroom teachers statewide. The reviewers were also selected based on their experience researching and/or teaching college courses in policy and advocacy related to school PA promotion.

Each reviewer was asked to examine the items for inclusiveness, accuracy, and deviance relative to the constructs of PA Competence, PE Satisfaction, SPAP Competence, and SPAP Attitudes, and to provide notes suggesting changes to maximize each instrument's conceptual fidelity. The reviewers were also asked to comment on the readability and clarity of the wording and language used for each item. Several modifications were made based on the reviewers' notes. These included the addition of one item on the PE Satisfaction scale ("My middle school physical education experiences were positive"), and the rewording of several items on each of the scales (e.g., "Teach educational games to elementary students" was rewritten as "Teach games/sports/fundamental movement skills to elementary students" on the SPAPAQ).

Following these adjustments, the first author pilot tested the questionnaires for feasibility of administration. Specifically, a group of PCTs enrolled in a PA promotion course completed the questionnaires during a regularly scheduled class period. Definitions of three key words—physical education, physical activity, and physical fitness—used throughout the questionnaires were provided in a cover-page of instructions. Definitions were derived from the South Carolina 2005 Student Health and Fitness Act, which serves as a primary source for statewide school PA and PE guidelines. PCTs were also given verbal instructions for completing the questionnaires and provided the opportunity to ask questions at any time if needed. None of the PCTs asked any questions and the total time for administering the questionnaires was approximately 20 min.

Data collection with the actual study sample was conducted by administering the questionnaires following the protocol used in the pilot test at scheduled end-of-semester (Fall 2008) and beginning-of-semester (Spring 2009) program meetings with PCTs. The meetings were organized and led by elementary and early childhood program leaders at the first author's university. Each meeting was attended by different groups of PCTs as determined by program status (i.e., sophomores, juniors, or seniors). Pilot subjects attending the meetings were identified and asked not to participate. It generally took about 15–20 min to administer the questionnaires.

## Data Analysis

The construct validity of the three instruments was examined by exploratory factor analyses (EFA) and Cronbach alpha coefficients, while stability was assessed by test-retest reliability coefficients on a reduced sample ( $n = 18$ ) over a four-day interval. EFAs were run to explore the underlying constructs measured by the instruments developed for the current study (Fabrigar, Wegener, MacCallum, & Strahan, 1999).

Three EFAs, one for each instrument, were conducted through SPSS using principle component analysis with oblim rotation because correlated factors were expected. Eigenvalues  $> 1.0$  were interpreted (Tabachnick & Fidell, 2001). Our approach to item reduction was both statistical and conceptual. Statistically, we required factor loadings of at least .4 on one factor. Conceptually, the team of experts involved in the item development were consulted about items that cross loaded .4 or higher on a second factor to determine to which factor if any, the item should belong.

The relationships among the scales, age, BMI, and year in school were examined through correlation analyses. BMI was stratified into four classifications using the current guidelines of the National Institutes of Health: Underweight ( $<18.5$ ), Normal (18.5–24.9), Overweight (25.0–29.9), and Obese ( $\geq 30$ ). Of 223 PCTs reporting height and weight in this study, eight (3%) were classified as Underweight, 162 (73%) were classified as Normal, 35 (15%) were classified as Overweight, and 20 (9%) were classified as Obese. Given the correlations expected across subscales, Multivariate Analyses of Variance (MANOVA) was performed on the scales across participant characteristics of academic status, SPAP promotion course completion and previous teaching/coaching experience. Because three analyses were conducted a Bonferoni adjustment of .0125 was set as the criteria for rejecting the null hypothesis. In addition, we ran partial correlations holding BMI constant to contrast the relationships among variables dependent and independent of physical size. Hierarchical regression analysis with age, BMI classification, year in school, coached/taught and SPAP course completion entered at step one was based on the relationship these variables had with SPAP Attitudes and the other scale variables. PA competence, PE satisfaction, and PA promotion competency in three school settings (see results of the exploratory factor analyses below) were entered at step two in stepwise fashion to determine variables contributing the greatest amount of variances to SPAP attitudes.

## Results

### Instrument Validity

**Exploratory Factor Analyses.** The EFA for the biographical questionnaire revealed a two-factor solution (eigenvalues  $>2.0$ ) explaining 66.2% of the variance (see Table 1). The five items loading on factor 1 represented PCTs' competence in sport and physical activity and were collectively labeled *PA Competence* while the four items loading on factor 2 represented PCTs' satisfaction with their personal PE experiences and were labeled *PE Satisfaction*.

For SPAP competence scale, the EFA revealed a three-factor solution (eigenvalues  $>2.0$ ) explaining 72.27% of the variance (see Table 2). The seven items associated with factor 1 represented PCTs' SPAP competence in the classroom and during recess and was labeled *Classroom/Recess Competence*. Five items comprised factor 2 and represented SPAP competence while teaching PE specifically and was labeled *PE Teaching Competence*. The three items of factor 3 represented PCTs' SPAP competence during extracurricular activities and was labeled *Extracurricular Competence*.

The EFA for the SPAP attitudes questionnaire revealed a single-factor solution (eigenvalues  $>3.0$ ) explaining 37.38% of the variance (see Table 3) and in general represented PCT attitudes about promoting PA in schools and was thus labeled *School Physical Activity Promotion Attitudes* (SPAP-Attitudes).

**Table 1 Descriptive Statistics and Factor Loadings of the Two Factors from the Biographical Questionnaire**

Item	Preliminary Model			Final Factor Loadings	
	M	SD	Factor 1		Factor 2
1. I like to exercise.	3.08	.71	.85	.04	.86 <sup>1</sup>
2. I am physically active.	3.00	.71	.84	.08	.84 <sup>1</sup>
3. I like being physically active.	3.26	.63	.80	.15	.81 <sup>1</sup>
4. I have a good level of muscular strength.	2.85	.70	.70	.21	.69 <sup>1</sup>
5. I have a good level of muscular endurance.	2.78	.72	.78	.20	.78 <sup>1</sup>
6. I was good at physical education.	2.95	.78	.34	.74	.72 <sup>2</sup>
7. My elementary physical education experiences were positive.	3.17	.78	.13	.80	.81 <sup>2</sup>
8. My middle school physical education experiences were positive.	2.69	.91	.06	.85	.86 <sup>2</sup>
9. My high school physical education experiences were positive.	2.80	.93	.02	.76	.79 <sup>2</sup>
10. <i>I am good at sports.</i>	2.82	1.48	.43	.52	–
Preliminary Model					
Eigen Values			3.47	2.87	
Cumulative Variance			34.73	63.36	
Final Model					
Eigen Values			3.33	2.63	
Cumulative Variance			37.04	66.21	
Cronbach Alpha Coefficient			.87	.82	

Note: Factor loadings  $\geq .4$  were considered for construct inclusion; <sup>1</sup>PCT Physical Activity Competence (PA Competence); <sup>2</sup> PCT Satisfaction with Personal Physical Education Experiences (PE Satisfaction); italicized items were removed from the final EFA.

**Table 2 Descriptive Statistics and Factor Loadings of the SPAP Competence Factors**

Item	Preliminary Model			Final Model		
	M	SD	Factor 1	Factor 2	Factor 3	Final Factor Loadings
1. Create opportunities for my students to participate in safe physical activity in the classroom	4.81	1.42	.81	.13	.24	.82 <sup>1</sup>
2. Stimulate a recess setting to encourage (but not require) physical activity participation by all students in my class	5.04	1.32	.76	.21	.19	.75 <sup>1</sup>
3. Integrate physical activity into classroom lessons	4.81	1.53	.80	.18	.30	.81 <sup>1</sup>
4. Teach active games my students can play at recess	4.99	1.53	.68	.12	.48	.68 <sup>1</sup>
5. Use developmentally appropriate practices when teaching elementary physical education content	4.31	1.76	.72	.50	.14	.72 <sup>1</sup>
6. Modify games to increase their level of developmental appropriateness for elementary-aged children	4.58	1.64	.78	.34	.18	.79 <sup>1</sup>
7. Incorporate movement breaks (e.g., energizers) between lessons in the classroom	5.32	1.48	.74	.25	.13	.75 <sup>1</sup>
8. Teach gymnastics to elementary students	2.56	2.31	.13	.80	.17	.81 <sup>2</sup>
9. Teach dance to elementary students	3.11	2.36	.11	.84	.13	.83 <sup>2</sup>
10. Teach health-related fitness content to elementary students	4.20	1.82	.52	.58	.22	.89 <sup>2</sup>
11. Assist with fitness-testing	3.80	2.05	.46	.57	.28	.60 <sup>2</sup>
12. Assist students and parents in interpreting scores on a fitness test	3.26	2.12	.41	.62	.30	.63 <sup>2</sup>
13. Assign active homework to elementary students	4.32	1.85	.44	.26	.70	.70 <sup>3</sup>
14. Assist a before or after school physical activity program	4.52	1.92	.20	.21	.88	.88 <sup>3</sup>
15. Lead a before or after school physical activity program	4.01	2.06	.20	.27	.85	.86 <sup>3</sup>
16. <i>Supervise an active recess environment</i>	5.60	1.25	.56	.10	.45	—
Preliminary Model						
Eigen Values			5.26	3.12	2.90	
Cumulative Variance			32.86	52.70	76.68	
Final Model						
Eigen Values			2.99	3.10	2.75	
Cumulative Variance			33.26	53.97	72.27	
Cronbach Alpha Coefficient			.92	.72	.88	

Note: Factor loadings  $\geq .4$  were considered for construct inclusion; <sup>1</sup>PCT Recess/Classroom SPAP Competence (Recess/Classroom); <sup>2</sup>PCT Extracurricular SPAP Competence (Extracurricular); <sup>3</sup>Physical Education Teaching Competence (PE Teaching); italicized item was removed from the final EFA.

**Table 3 Exploratory Factor Analysis of SPAP Attitudes**

Items	Preliminary Model		Final Model Factor
	M	SD	
1. Physical education is an important part of the elementary school curriculum.	3.75	0.45	.59
2. Recess is an important part of the school day.	3.88	0.34	.47
3. Elementary classroom teachers should play a major role in physical activity programs at school.	3.24	0.62	.71
4. Elementary classroom teachers can make a significant difference in terms of helping children to adopt lifelong physical activity habits.	3.43	0.55	.67
5. Elementary classroom teachers should provide physical activity for students daily as part of the school day.	3.38	0.64	.75
6. Other school subject areas are more important than physical education.	2.57	0.80	.44
7. Adults who had good elementary physical education programs will be more active.	2.97	0.70	.45
8. It is important for me as a classroom teacher to be physically active.	3.42	0.55	.66
9. It is important for me as a classroom teacher to be physically fit.	3.30	0.61	.60
10. <i>Physical activity should not have to be part of the school day.</i>	3.65	0.66	.23
11. <i>Using time to increase physical activity during the school day will have a negative effect on students' academic performance.</i>	3.56	0.66	.32
12. <i>Elementary classroom teachers should teach physical education.</i>	2.33	0.75	.36
13. <i>Physical education teachers should be solely responsible for increasing children's physical activity at school.</i>	3.07	0.78	.23
Preliminary Model			
Eigen Values			3.61
Variance			27.75
Final Model			
Eigen Values			3.36
Variance			37.38
Cronbach Alpha Coefficient			.77

Note: Factor loadings  $\geq .4$  were considered for construct inclusion; italicized items were removed from the final EFA.

**Internal Consistency.** The Cronbach alpha coefficients for PE Satisfaction, PA Competence and the SPAP Classroom/Recess and PE Teaching Competence scales were good ( $>.8$ ) while the SPAP Extracurricular Competence and SPAP Attitudes scales were adequate ( $>.7$ ).

**Stability.** The questionnaires were administered twice to a separate subsample ( $n = 18$ ) with a four-day interval to test for instrument stability. The subsample was comprised of PCTs enrolled in a semester-long PA promotion course and it was assumed their attitudes and perceived competence were subject to change as a result of being in the course. The authors felt a four-day interval, including two weekend days and occurring at the end of semester, would reduce the likelihood that participants' attitudes and perceptions would change between the first and second administration of the questionnaires, and also provide enough time for participants' to forget their responses to specific items when taking the questionnaires the second time so that a "memory bias" would not confound the results. Test-retest reliability coefficients for PA Competence and PE Satisfaction were .91 and .78 ( $p < .001$ ), respectively. The test-retest reliability for SPAP Competence in each of the three contexts ranged from .70 to .90 ( $p < .001$ ) and for SPAP Attitudes was .77 ( $p < .01$ ).

### Variation Across Participant Characteristics

The summary of the four MANOVAs conducted on participant characteristics is presented in Table 4. The analysis for year in school was not significant but a trend indicating PA Competence ( $p = .06$ ) and Extracurricular Competence ( $p = .07$ ) were lower among seniors was evident. The significant main effect for course completion (Wilks's Lambda = .90,  $F(6,240) = 4.09$ ,  $p < .001$ ,  $\eta^2 = .09$ ) indicated that course completers reported higher PE Teaching Competence than noncompleters ( $\eta^2 = .02$ ) and that there was a trend for completers to report higher Classroom/Recess Competence ( $p = .02$ ). The main effect for coached/taught was also significant (Wilks's Lambda = .88,  $F(6,240) = 5.50$ ,  $p < .001$ ,  $\eta^2 = .12$ ) with significant univariate analyses for all dependent variables ( $\eta^2 = .04$  to  $.09$ ) except SPAP Attitudes, indicating that for each variable, PCTs with previous coaching or teaching experience reported higher scores than those without such experience.

### Correlation Analyses

There were several significant correlations between biographical characteristics, SPAP competencies, and attitudes (Table 5, bottom). Age was positively correlated with BMI ( $r = .20$ ,  $p < .01$ ) but negatively correlated with PE Teaching Competence ( $r = -.18$ ,  $p < .01$ ). BMI was negatively correlated with PA Competence ( $r = -.21$ ,  $p < .01$ ), Extracurricular Competence ( $r = -.22$ ,  $p < .01$ ), and PE Teaching Competence ( $r = -.18$ ,  $p < .01$ ). Year in school was positively correlated with PA Competence ( $r = .14$ ,  $p < .05$ ), Classroom/Recess Competence ( $r = .13$ ,  $p < .05$ ), and PE Teaching Competence ( $r = .15$ ,  $p < .05$ ). PE Satisfaction was positively correlated with PA Competence ( $r = .33$ ,  $p < .001$ ), all three SPAP competence measures ( $r = .13$ ,  $p < .05$  to  $r = .17$ ,  $p < .01$ ), and SPAP Attitudes ( $r = .20$ ,  $p < .01$ ). PA Competence was positively correlated with PE Teaching Competence ( $r = .21$ ,  $p < .01$ ) and SPAP Attitudes ( $r = .37$ ,  $p < .001$ ). Classroom/Recess Competence was positively correlated with SPAP Attitudes ( $r = .32$ ,  $p < .001$ ). PE Teaching Competence was positively correlated with SPAP Attitudes ( $r = .29$ ,  $p < .001$ ). All

**Table 4 Summary of MANOVAs for PCT PE Satisfaction, Competence and Attitudes**

	PCT Background						SPAP Competence						SPAP Attitudes			
	PAS Competence		PE Satisfaction		Recess/Classroom		Extracurricular		PE Teaching		Attitudes		M	SD	F	
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD				
Academic Status			2.80		.21	.87	2.64									2.29
Sophomore ( <i>n</i> = 131)	3.18	.58	2.96	.78	4.66	1.42	4.53	1.89	3.48	1.88					3.31	.38
Junior ( <i>n</i> = 126)	3.01	.56	2.91	.70	4.99	1.20	4.46	1.61	3.61	1.62					3.37	.31
Senior ( <i>n</i> = 90)	2.91	.54	2.87	.62	4.94	1.23	3.95	1.82	3.48	1.58					3.27	.39
SPAP Coursework			2.32		.05	5.33 <sup>a</sup>	1.04							6.35 <sup>a</sup>		.08
Yes ( <i>n</i> = 161)	2.96	.57	2.90	.65	5.06	1.16	4.20	1.76	3.74	1.54					3.32	.35
No ( <i>n</i> = 86)	3.07	.52	2.92	.75	4.68	1.36	4.44	1.70	3.19	1.74					3.34	.35
Taught/Coached			10.39 <sup>b</sup>		12.02 <sup>b</sup>	10.56 <sup>b</sup>	23.10 <sup>c</sup>							9.70 <sup>b</sup>		2.40
Yes ( <i>n</i> = 91)	3.14	.53	3.10	.65	5.26	1.12	4.95	1.50	3.96	1.58					3.37	.34
No ( <i>n</i> = 156)	2.91	.55	2.79	.68	4.74	1.27	3.89	1.75	3.30	1.62					3.30	.35

Note: <sup>a</sup>*p* < .05; <sup>b</sup>*p* < .01; <sup>c</sup>*p* < .001.

**Table 5 Bivariate (Lower) and Partial (Upper) Correlations holding BMI Constant, among Biographical Variables and Questionnaire Scales**

Bivariate Correlations	Partial Correlations								
	1	2	3	4	5	6	7	8	9
1. Age	1.00	n/a	-.12	-.12	.03	-.05	-.04	-.16 <sup>a</sup>	.022
2. BMI	.20 <sup>b</sup>	1.00	n/a	n/a	n/a	n/a	n/a	n/a	n/a
3. Year in School	-.08	-.10	1.00	.11	.13	.11	.06	.13	.098
4. PE Satisfaction	-.09	.01	.10	1.00	.37 <sup>c</sup>	.16 <sup>a</sup>	.16 <sup>a</sup>	.19 <sup>b</sup>	.225 <sup>b</sup>
5. PA competence	-.06	-.21 <sup>b</sup>	.14 <sup>a</sup>	.33 <sup>c</sup>	1.00	.19 <sup>b</sup>	.23 <sup>b</sup>	.17 <sup>b</sup>	.344 <sup>c</sup>
6. Classroom/Recess Competence	.02	-.10	.13 <sup>a</sup>	.14 <sup>a</sup>	.21 <sup>b</sup>	1.00	.64 <sup>c</sup>	.68 <sup>c</sup>	.322 <sup>c</sup>
7. Extracurricular Competence	-.09	-.22 <sup>b</sup>	.09	.15 <sup>a</sup>	.27 <sup>c</sup>	.64 <sup>c</sup>	1.00	.59 <sup>c</sup>	.266 <sup>c</sup>
8. PE Teaching Competence	-.18 <sup>b</sup>	-.18 <sup>b</sup>	.15 <sup>a</sup>	.17 <sup>b</sup>	.21 <sup>b</sup>	.69 <sup>c</sup>	.61 <sup>c</sup>	1.00	.283 <sup>c</sup>
9. SPAP Attitudes	.01	-.07	.11	.20 <sup>b</sup>	.37 <sup>c</sup>	.32 <sup>c</sup>	.29 <sup>c</sup>	.29 <sup>c</sup>	1.00

Note: <sup>a</sup>  $p < .05$ ; <sup>b</sup>  $p < .01$ ; <sup>c</sup>  $p < .001$ .

three SPAP competence measures were positively correlated ( $r = .61, p < .001$  to  $r = .69, p < .001$ ). All correlation results reported here should be interpreted using Cohen's (1988) effect size index, where the effect size for a correlation coefficient of .10 is deemed small, the effect size for a correlation coefficient of .30 is deemed medium, and the effect size for a correlation coefficient of .50 is deemed large.

After controlling for BMI (Table 5, top), the correlation between PA Competence and Extracurricular Competence weakened slightly from .27 ( $p < .001$ ) to .23 ( $p < .01$ ). All other correlations stayed relatively the same.

## Predictors of SPAP Attitudes

Results of the hierarchical regression analysis indicated age ( $\beta = .06, p = .34$ ), BMI ( $\beta = .02, p = .68$ ), year in school ( $\beta = .03, p = .50$ ), coaching/teaching experience ( $\beta = .01, p = .86$ ) and SPAP course completion ( $\beta = .00, p = .96$ ) did not explain significant variance. However, PA Competence ( $\beta = .19; t(3,244) = 4.94, p < .001$ ) and Recess/Classroom Competence ( $\beta = .08; t(3,244) = 4.35, p < .001$ ) were significant, accounting for 12% and 7% of the total variance (19%), respectively ( $R = .45; R^2 = .21; F(4,243) = 18.56, p < .001$ ).

## Discussion

Amid calls for the increased support of classroom teachers in the fight against childhood overweight and obesity, this study aimed to explore factors related to PCTs' attitudes toward PA promotion at school. Like previous research, this study considered characteristics and experiences such as perceptions of personal school PE experiences (Allison et al., 1990; Morgan et al., 2001) and academic experiences (Xiang et al., 2002) as they relate to PA promotion competence and attitudes. However, we employed a broader framework to examine the role of biographical characteristics in PCTs' PA promotion attitudes related not only to PE teaching but also PA promotion in the classroom, at recess and in extracurricular settings. This extended focus is consistent with current American policies and recommendations transitioning classroom teachers from assumed PE teacher roles toward critical agents in PA promotion within additional school contexts (e.g., CDC, 1997; Faber et al., 2007; Kahan, 2008; Maeda & Murata, 2004; NASPE, 2008).

The instruments used in this study were developed to expand upon Morgan and colleague's (2001) study in which they focused on PCTs' attitudes toward and perceived competence in teaching PE, *specifically*. We sought to further Morgan's study by determining PCTs' characteristics that relate to their *overall* school PA promotion competence, which for the elementary school teacher can include teaching PE but also increasing PA in the classroom, at recess, and in before and after school settings, and by determining which of these characteristics predict PA promotion attitudes. Because no known instruments exist to measure these constructs in the setting specified, it was necessary to develop scales. Construct validity was demonstrated in three ways: sound factor structure was established through EFA procedures, stability was shown by good test-retest reliability coefficients and internal consistencies were good overall.

Mean comparisons pointed to two teacher characteristics—college coursework and PA-related teaching/coaching experiences—as key characteristics in PCTs'

perceived competence. Indeed, participants who had completed college courses related to SPAP reported higher PE Teaching Competence than participants who had not taken such courses. In addition, a tendency was found for course completers to report higher Recess/Classroom Competence. These findings suggest that educational experiences included in preservice training might positively influence how PCTs view themselves in relation to PA activism. Future research verifying this possibility is recommended. A promising finding was that the mean for each question, except the question related to teaching gymnastics, was above the scale median indicating the PCTs had positive feelings about the content explored in this study, despite differences in their experiences.

Sport and PA experiences, which have been shown to be influential in PCTs' perceived PE teaching competence (Callea et al., 2008; Morgan et al., 2001), may be important to PCTs' self-concept as PA leaders, regardless of whether previous participation was as a player or as a teacher/coach. In the current study, PCTs' who reported having taught/coached in PA settings were found to have more positive personal PE experiences and higher perceived competence related to personal PA and PA promotion in all three school contexts. Because a causal relationship cannot be inferred from these data, positive self-concepts related to PA and/or PE teaching could be the reason some PCTs became involved with PA-related teaching/coaching.

A trend was also observed indicating lower PA Competence and Extracurricular Competence for senior PCTs than those at earlier stages in their programs of study. This latter finding is somewhat surprising when compared with Morgan et al.'s (2001) study, which indicated that more advanced cohorts of PCTs had more positive perceptions of their PE teaching competence. However, Morgan et al. also found inservice classroom teachers to have worse attitudes and beliefs regarding PE teaching and PA than fourth year PCTs. Inservice teachers may view the charge of promoting PA at school in light of other responsibilities for which they are accountable, such as producing high test scores, and therefore may perceive themselves as less able to assume yet another responsibility. This may also be true for some senior PCTs, if their accrued professional preparation experiences lend insight into the realities of classroom teaching. Interestingly, older participants reported lower PE Teaching Competence in this study, which seems to support the idea that gaining experience and perspective on the varying roles of the classroom teacher could create skepticism among PCTs regarding their ability to promote PA at school.

Using Cohen's (1988) effect size index as a guide for interpretation, several notable correlations with medium effect sizes were found between the variables measured in this study. Extending the work of Morgan et al. (2001), who found that experiences in school PE were related to PCTs' feelings about teaching PE, this study found that PE Satisfaction and PA Competence were moderately correlated. Therefore, PCTs who had good experiences in school PE also had a positive self-concept in relation to their personal PA behavior. Stressing the importance of the relationship between PE Satisfaction and PA Competence is the finding that PA Competence also correlated moderately with SPAP Attitudes. Another notable finding was that SPAP Attitudes moderately correlated with Classroom/Recess Competence. Feeling capable of promoting PA in the classroom and at recess may be influential in how PCTs' conceptualize their role in school-based PA programming. It is worth mentioning that SPAP Attitudes correlated positively with all other constructs in this study, which helps to demonstrate criterion-related validity. Thus, we recommend

the use of this scale as a screening tool for those who may or may not be likely to embrace the expanding role of the classroom teacher in the promotion of PA.

A unique feature of this study was considering the role of BMI in teachers' perceptions and attitudes related to PA promotion. Negative correlations were found between BMI, PA Competence, and SPAP competence in the extracurricular setting and teaching PE. As we postulated, these findings align with Lerner's (1985) goodness-of-fit hypothesis, suggesting that PCTs with higher BMIs may see themselves as less capable in the PA domain and mismatched with tasks associated with promoting school PA compared with PCTs with lower BMIs. When controlling for BMI, however, the results were somewhat mixed. Although the relationship between PA Competence and Extracurricular Competence weakened, thus further supporting Lerner's hypothesis, other relationships remained relatively stable. These findings must be taken in the context of BMI as a proxy for fatness; BMI does not partial fat-mass from fat-free mass and it is possible that participants with larger BMIs may have been proportionately more muscular. Subsequent studies should address this limitation and additionally consider the role of percent body fat. Larger scale studies employing structural equation modeling are warranted to help uncover the role and function of body size and composition in PCTs' PA promotion more specifically. In addition, research including in-depth qualitative interviews is needed to explore the perceptions of PCTs with higher BMIs regarding school-based PA promotion.

On a practical level, preservice educators may need to explore mechanisms for providing extra support and encouragement for overweight PCTs to help these prospective teachers to develop a more positive self-image related to their role as PA activist. A more aggressive approach may be needed in some cases, wherein overweight PCTs with low perceived PA promotion competence are provided with weight management assistance. It is important for PCTs to strive to become the best possible role model for children when it comes to fitness and PA behavior. For instance, children have been shown to perceive PA promotion by overweight teachers as contradictory. Melville and Maddalozzo (1988) found that students responded less favorably to performing exercise, their knowledge of exercise concepts, and their perception of the appropriateness of the teacher as a role model when taught by an overweight physical educator versus one of normal weight.

The secondary purpose of this study was to examine the strength of biographical characteristics and perceived PA promotion competence in predicting PCTs' SPAP Attitudes. After controlling for age and BMI, which were not significant predictors of attitudes in this sample, a significant proportion (19% overall) of SPAP Attitudes was explained by PA Competence and Recess/Classroom Competence. These findings extend those reported by Morgan et al. (2001), who found that the quality of PCTs' school PE experiences was a significant predictor of their attitudes toward teaching PE.

To enhance SPAP Attitudes, teacher educators should consider providing PCTs with opportunities to discuss past PA experiences and put to rest misconceptions of PA Competence in PA promotion. University programs might also provide PCTs with new PA experiences intended to enhance PCTs' self-concepts related to PA. PCTs should be given opportunities to observe skilled recess supervisors and practice supervision under simulated and/or real recess conditions. Similarly, PCTs should be given opportunities to observe inservice classroom teachers role

modeling classroom strategies for promoting PA, (e.g., leading energizers, or movement breaks; integrating PA into academic lessons) and practice these strategies themselves. Through these university experiences, PCTs will be more likely to enter the teaching profession with more positive attitudes toward keeping kids active throughout the school day. However, an especially important question for future inquiry is whether PCTs' SPAP Attitudes will correspond to their PA promotion behaviors with children.

As with all research, certain limitations were present for the current study. First, a more diverse sample may have shed more light on the influence of age, gender, race, and context on PCTs' SPAP attitudes. Although the participant sample in this study provides a fairly accurate representation of the current composition of early childhood and elementary education majors, who tend to be predominantly female and of traditional college age (18–22), differences in context, such as policies at the school, district, or state level may be influential in PCTs' perceptions regarding PA promotion. For example, at the time of this study, a state law was in effect, which required elementary schools to provide children with 90 min of PA in addition to 60 min of PE. PCTs in this study may have been aware of this requirement and felt positive about PA promotion because they viewed it as “the right thing to do.” Second, future research should examine the impact of preservice training on PCTs' knowledge and behaviors because perceived competence may not be congruent with actual competence (Castelli & Williams, 2007). Finally, studies of this nature should also be conducted in comparison with the inservice level, particularly with an eye to understanding how such variables interact with the demands of the school environment and the day-to-day professional work of an elementary classroom teacher.

As demonstrated by the results of this study, numerous factors related to PCTs' attitudes toward promoting PA at school, including satisfaction with previous PE experiences, perceived competence in PA, and perceived competence in promoting PA in the diverse school contexts of physical education, the classroom, recess, and extracurricular settings. In addition, PA Competence and Recess/Classroom Competence predicted SPAP Attitudes. These results help to identify features of future classroom teachers that could enhance their roles as PA promoters and significantly impact health-related behavior patterns that begin in early childhood and elementary school levels. While the implications of this study primarily target what preservice educators can do to facilitate the development of PCTs into confident and agreeable partners in the fight against obesity, we should also emphasize the role of early PA experiences entwined in our findings. This study emphasizes the importance of PE teachers, coaches, and other PA professionals in shaping future classroom teachers' experiences related to PA. It is paramount for every child's PA experiences to be fun, enjoyable, and rewarding because there is the chance that he or she will one day choose to enter the teaching profession and draw on these experiences when asked to value and promote PA in school settings.

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