

Effect of Learning Activity on Students' Motivation, Physical Activity Levels and Effort/Persistence

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Abstract

The type of learning activity offered in physical education may influence students' motivational beliefs, physical activity participation and effort/persistence in class. However, most empirical studies have focused on the individual level rather than on the learner-content interactions. Accordingly, the potential effects of learning activities on these outcome variables have been overlooked. This study examined whether students' motivational beliefs (self-efficacy and outcome expectancy), moderate-to-vigorous physical activity (MVPA) and effort/persistence in physical education classes varied as a function of learning activity (soccer vs. fitness). Participants were 225 students (112 boys, 113 girls) in grades 6-8 from a suburban public school in the Southeastern region of the U.S. Each of the three grade levels incorporated three classes, and 25 participants were randomly selected from each class. Students responded to questionnaires measuring their self-efficacy, outcome expectancy and perceived effort/persistence toward soccer and fitness classes, respectively. Students' MVPA in soccer and fitness classes were measured via Actical accelerometers. The results revealed that students reported higher scores in self-efficacy and outcome expectancy toward fitness than they did toward soccer. However, students exhibited higher MVPA in the soccer classes. Regression analyses yielded that only self-efficacy significantly predicted MVPA, while both self-efficacy and outcome expectancy emerged as predictors of effort/persistence across learning activities.

The findings may have significant implications for educational practice. For example, physical educators must consider psychological and physical effects that different learning activities may have on students when designing and implementing physical education programs.

Key words: outcome expectancy, self-efficacy

It has become evident that school children do not presently engage in sufficient levels of physical activity, partly due to social and environmental changes (e.g., excessive TV and computer use, pressures of standardized testing, etc.) in society (Centers for Disease Control and Prevention [CDC], n.d.d.; Zhu, 2008). This partially leads to dramatic increases in the prevalence of overweight and obesity among this population and will cause health problems (e.g., type 2 diabetes, cardiovascular disease, and low self-confidence) in their future (Levin, McKenzie, Hussey, Kelder, & Lytle, 2001; Ogden et al., 2006; U.S. Department of Health and Human Services [USDHHS], 2001, 2008). Accordingly, participating in regular physical activity has been identified as an indispensable strategy to prevent childhood obesity (Ogden et al.,

2006).

Nearly all adolescents in school settings participate in physical activity through school physical education (PE) programs for health and wellness (e.g., maintaining healthy body composition) (Levin et al., 2001; USDHHS, 1996, 2001, 2008). School PE has the potential to increase daily physical activity (PA) levels for all children and therefore can play a critical role in promoting public health (Wallhead & Buckworth, 2004). In addition, students' positive motivational beliefs toward PE have been identified as an important factor of active engagement in PE classes (Lee, 1997). Evidence has shown a decline in students' motivational beliefs and PA levels across the middle school years (e.g., Fredricks & Eccles, 2002; Parish & Treasure, 2003), but well-designed research has the potential to help teachers develop strategies that will cease or even reverse this trend. In response, this study was designed to illuminate the relationships between learning activity, students' motivational beliefs, in-class PA levels and effort/persistence in a middle school PE setting.

Learning Activity, Motivational Beliefs, Physical Activity and Effort/Persistence

In this study, learning activity is defined as the learning content specifically offered to students in the PE class. In middle school PE in the U.S., learning activity ranges from sport-related activities (e.g., basketball, soccer) to lifelong activities (e.g., jogging). The type of learning activity may influence students' motivational beliefs in PE. Bong (2001) has reported that students form motivational beliefs that are specific to particular academic tasks and contexts. As known, motivational beliefs are shaped by individual propensities as well as given circumstances. Although some beliefs may have strong roots in personal predispositions, other beliefs might be a result of the interaction between the individual and the specific context he/she encounters (Pintrich, 2000). A review in PE also has documented that learning activities tend to influence students' attitudes and motivational beliefs (Lee, 1997). For example, students' positive motivational beliefs reflect perceived enjoyment and usefulness of the learning activities (Lee, 1997). However, most empirical studies on students' motivational beliefs in PE have focused on individuals' psychological dispositions rather than on the learner-content interactions and, consequently, the potential effects of learning activities on motivational beliefs have been overlooked. Therefore, empirical studies examining the impact of learning activities on students' motivational beliefs toward PE are warranted.

According to Pintrich and Schunk (1996), individuals' motivational beliefs (e.g., ability beliefs and incentives) directly influence decisions they make about whether or not they continue to engage in a task. The self-efficacy theory proposes that an individual's achievement behaviors can be explained by his or her motivational beliefs including self-efficacy and outcome expectancy (Bandura, 1986, 1997), and therefore it is considered

a viable theoretical approach to investigate students' motivational beliefs in middle school PE (Gao, Lodewyk, & Zhang, 2009). In fact, self-efficacy theory (Bandura, 1986, 1997) has been recently used in PE to explain students' achievement-related cognitions and behaviors such as perceived effort and in-class PA levels (Chase, 2001; Gao et al., 2009; Gao, Newton, & Carson, 2008).

Self-efficacy, a task-specific ability belief, refers to an individual's beliefs about his or her ability to accomplish a task (Bandura, 1986, 1997). In general, individuals who feel efficacious tend to perform well, try new behaviors, and exert effort on those behaviors using challenging and realistic goals (Gao, Lee, & Harrison, 2008). In particular, high self-efficacy could lead to high levels of motivational beliefs, effort/persistence and increased PA adherence in PE (Gao, Newton, & Carson, 2008; Gao, Xiang, Harrison, Guan, & Rao, 2008). Gao and colleagues (Gao, Lee, & Harrison, 2008) claimed that self-efficacy can influence achievement behaviors as long as certain outcome expectancy exists. Rather than assuming the existence of incentives, scholars need to measure outcome expectancy along with self-efficacy. That is, outcome expectancy needs to be integrated with self-efficacy to increase our understanding of achievement behaviors (Gao, Lee, & Harrison, 2008; Rodgers & Brawley, 1996). Generally, outcome expectancy accounted for little variance in PA behavior and teacher-rated effort after self-efficacy was considered (Gao et al., 2009; Rovniak, Anderson, Winett, & Stephen, 2002).

Recently outcome expectancy has been conceptualized as the multiplicative combination of outcome likelihood and outcome value (Gao, Lee, & Harrison, 2008; Gao et al., 2009). Specifically, outcome likelihood refers to the perceived outcomes (positive or negative) of a behavior, whereas outcome value reflects the perceived value of the expected behavioral outcome (Gao, Lee, & Harrison, 2008; Gao et al., 2009; Rodgers & Brawley, 1996). This form of conceptualization is consistent with the theoretical foundation which highlights the important role of incentives on achievement behaviors (Bandura, 1986, 1997). Outcome expectancy has been posited to positively predict intentions and engagement in PE and in-class PA (Gao et al., 2009; Gao & Kosma, 2008; Gao, Xiang, Lee, & Harrison, 2008; Williams, Anderson, & Winnet, 2005). Like many other motivational beliefs, self-efficacy and outcome expectancy are both specific to activity (or task). However, the issue of how they might vary across different learning activities has not been readily explored in the field of PE. Inquiry in this area might provide teachers and curriculum developers with knowledge about how students' self-efficacy and outcome expectancy change in specific learning activities.

The learning activities also may influence students' PA levels in PE (Fairclough & Stratton, 2006). Regardless of the postulation suggesting that team-based invasion games (i.e., soccer and football) usually promote relatively high in-class PA levels, previous studies have yielded various findings as researchers utilized different instruments and a large variety of learning activities. MacFarlane and Kwong (2003) found that students were more active (highest heart rates) during ball games (e.g., soccer, basketball, and football) and free play than during gymnastics. In their studies using heart rate monitors, Kulinna and her colleagues (2003) reported that the highest scores in moderate-to-vigorous physical activity (MVPA) were identified during hula-hoop, volleyball, fitness, and soccer.

Simons-Morton and associates (1993) observed that the highest scores in MVPA were attained during walking/jogging, football, and dodge ball.

While the multi-activity PE programs (consisting of multiple sports and physical activities) have been dominant in the United States for decades, today's students are becoming increasingly aware of the importance of healthy lifestyles, and thus they tend to be more motivated and interested in programs that emphasize health-related fitness and nutrition (Ennis, 2003). In addition, there is a call for shifting the emphasis of PE programs from learning sport skills to enhancing health-related fitness (Schiesel, 2008). To provide empirical data on the relationships between learning activities and students' motivational beliefs, in-class PA levels and effort/persistence in PE classes, this study focused on two activities that are common to middle school PE programs, soccer and a health-related fitness activity. Soccer represents a sport with an emphasis on game play and a health-related fitness activity focuses on the promotion of healthy and active lifestyles in PE.

In sum, the main purpose of this study was to determine if students' motivational beliefs (self-efficacy and outcome expectancy), MVPA and effort/persistence differed as a function of the learning activity (soccer vs. health-related fitness). Based on the literature reviewed, it was hypothesized that students would exhibit higher levels of motivational beliefs in health-related fitness (health-related physical activity) but would demonstrate higher MVPA in soccer (traditional team sport). Second, it was hypothesized that students' self-efficacy would emerge as a significantly positive predictor of their MVPA and effort/persistence across learning activities.

Methods

The Participants

The 225 participants were students (112 boys, 113 girls) enrolled in a suburban public school (6th - 8th grades) in the Southeastern region of the U.S. Each of the three grade levels incorporated three classes with approximately 35 students per class. Twenty-five participants were randomly selected from each class. Four participants were identified as univariate outliers and thus they were excluded from the study. Two hundred students completed data for all measures for the health-related fitness class and 178 students completed data for the soccer class. However, only 163 students ($M_{\text{age}} = 12.39$, $SD = .95$; 75 boys, 88 girls) completed all measures for both health-related fitness and soccer classes. The families of the students had middle to high socioeconomic status. The ethnic composition of the sample was as follows: (a) 84.7 % Caucasian; (b) 9.8 % African American; (c) 3.1 % Hispanic; and (d) 2.4 % Asian American.

The participants in each class had a 90-minute PE class taught by three PE teachers on alternate days. Given the time allotted for dress change and roll check, the participants actually had approximately 60 minutes to do activities in class. All the teachers were experienced PE specialists and shared the teaching assignments for these classes during the time of data collection.

The Research Setting

The PE program in this school consisted of a variety of activities, including capture the flag, soccer, football, basketball,

health-related fitness stations, walking/jogging, and dance. During the present study, four weeks were allocated for health-related fitness and soccer units, respectively. It is important to note that students were divided into two or more groups based on their sex (single gendered groups) after the warm-up. For the soccer unit, instructions and basic rules were given by the PE teachers before the start of this study. Boys were assigned into two squads (8-9 students per squad) whereas girls were assigned into two other squads. Students remained in these squads for the data collection period. Every 15 minutes, the squads switched sides of the playing field. At the start of each class, the PE teachers reinforced the game rules and then allowed the games to commence following the warm-up activities. As a result, no formal instruction was given throughout the class during the data collection period.

The health-related fitness unit targeted the FITNESSGRAM testing (Cooper Institute for Aerobics Research, 1999) and primarily focused on cardiovascular endurance and muscular strength and endurance. Specifically, the PE teachers set up eight stations prior to the arrival of the students. The stations included activities such as bench steps, shuttle run, push-ups, jump rope (individual ropes), speed ladder, crunches and square run. After the warm-up, the teachers took five minutes to explain the activities to be performed and gave demonstrations at each station. Four to five students participated at each station for about one minute, and they had 15 seconds to move to the next station. The students were required to work in each station at least three times in the class. During the data collection period, all the students worked on the same stations.

Procedure

Informed parental consent forms and child assent forms were obtained in accordance with the University Institutional Review Board and school district requirements. Data were first collected in the health-related fitness classes and then in the soccer classes with a time interval of four weeks. All the data were collected in the middle period of the four-week instructional time after the students were familiar with the fitness activities or the soccer game so they could accurately assess their self-efficacy beliefs and outcome expectancy toward these two activities. The data collection schedule was coordinated with the teachers in a way that instructional time was not interrupted. Students first completed questionnaires regarding their self-efficacy, outcome expectancy and effort/persistence on the health-related fitness as well as the demographic data. The average time required to complete the survey was 10 minutes. Then their in-class PA levels in health-related fitness were assessed by accelerometers for one period of class. Similarly, students completed questionnaires regarding their self-efficacy, outcome expectancy and effort/persistence on soccer during the soccer unit, then had their in-class PA levels in one soccer class assessed via accelerometers. Classes were randomly selected for this assessment. It is important to note that the data collection days represented typical instructional days in the PE classes. Also, the students were familiar with wearing the accelerometers before the study, and therefore the Hawthorne effect on the study variables was minimized.

Two undergraduate students were recruited and trained to assist with the data collection of the accelerometers. The accelerometers

were placed in the corresponding waistbands before each class. The accelerometers along with waistbands were then distributed to the students during roll taking. In the first day of PA measurement for the fitness class, each student was assigned an ID that matched with the number on her or his waistband. The student assistants and the researchers assisted the students with the accelerometer use. Also, the time for practice during class sessions was monitored and recorded. The identical procedure was followed in the soccer classes.

Instrumentation

Demographic information was gathered in the survey regarding students' age, grade, gender, ethnicity, height and weight.

Self-efficacy. To assess the self-efficacy, six items were borrowed from a questionnaire used in a recent study with middle school children (Gao, Newton, & Carson, 2008). This measure has demonstrated acceptable validity and internal consistency in the previous study. The items were used with a 5-point Likert-type scale ($1 = strongly disagree$, $5 = strongly agree$). The participants were asked: "With regard to this week's physical education class, I have confidence in..." The sample answers were: (a) my ability to do well in physical education class; and (b) my ability to learn skills in physical education class. The mean score of these items was used to assess the students' self-efficacy for health-related fitness or soccer. In this study, both internal consistencies of students' self-efficacy for health-related fitness ($\alpha = .85$) and soccer ($\alpha = .86$) were acceptable.

Outcome expectancy. The measure of outcome expectancy was derived from a recent study conducted by Gao and colleagues (2009) among middle school students. The data generated by this measure demonstrated acceptable validity and internal consistency. As stated earlier, outcome expectancy is formed by the interaction of outcome likelihood and outcome values. To measure outcome likelihood, students rated the likelihood of occurrence of 10 different possible outcomes following participation in that week's physical education classes. A 7-point Likert-type scale was used ($1 = very unlikely$, $7 = very likely$). To measure outcome values, students rated the perceived value of each outcome on a 7-point Likert-type scale ($1 = very unimportant$, $7 = very important$). The sample outcomes included: (a) knowing how to exercise after finishing school; (b) learning how to improve fitness and health; (c) learning to cooperate; and (d) playing with friends. The product of outcome likelihood and outcome value was calculated for each outcome, and the mean of these 10 outcomes was then used as an overall indication of outcome expectancy. The measure of students' outcome expectancy for health-related fitness ($\alpha = .84$) and soccer ($\alpha = .80$) showed satisfactory reliability.

Physical activity levels. To measure students' PA levels in health-related fitness and soccer classes, Actical activity monitors were utilized (Mini-Mitter Co., Inc., Bend, OR). Actical activity monitors provide reliable and valid data when used with children (McIver, Pfeiffer, Almeida, Dowda, & Pate, 2004; Puyau, Adolph, Vohra, Zakeri & Butte, 2004). They are objective, new, uniaxial activity monitors, - small in size, and therefore easy to use (28 x 27 x 10 mm, 17 grams with a watch battery). In this study, the Actical devices were worn on the student's hip using 15-second epochs. The sampling frequency for the Actical devices is 32 Hz, and

the sensitivity is 0.01 grams. The devices collect motions in the frequency range of 0.5-3.0 Hz. Actical devices are programmed and data can be downloaded to a PC by connecting the monitor to a serial port computer interface using Actical Readers. Once data have been downloaded to corresponding software, data files can be exported into a Microsoft Excel format (Microsoft Corporation, Redmond, WA).

Given the duration (60 minutes) of the PE class and the aims of this study, activity counts were measured in 15-second epochs to capture the activity patterns of children. Cut-off points established by Puyau et al. (2004) were employed to the activity data set: (a) 0-99 counts per min. = sedentary; (b) 100-1499 counts per min. = light; and (c) ≥ 1500 counts per min. = moderate to vigorous physical activity. Students' MVPA in PE class was quantified by using the average activity counts at the moderate to vigorous intensity levels per minute (average counts/min). A student's percentage of time engaged in MVPA was used as the measure of her/his PA levels in class. This measure was retrieved directly from the Actical outputs.

Effort/Persistence. The measure of students' perceived effort/persistence to perform or learn in their PE classes was borrowed from Guan et al. (2006), and was assessed via eight items. Students rated each item on a 7-point scale, ranging from 1 (*not at all true for me*) to 7 (*very true for me*). The stem for these items was "In this fitness (soccer) class..." One sample item was: "When I have trouble performing some skills, I go back and practice." The scale previously demonstrated acceptable reliability and validity among secondary students (Guan et al., 2006).

Data Analyses

First, descriptive and correlation analyses were calculated to describe the sample characteristics and relationships among the study variables. Second, a MANOVA with repeated measures was performed to examine if mean scores of self-efficacy, outcome expectancy, MVPA and effort/persistence differed by learning activity (health-related fitness versus soccer). Follow-up univariate tests were conducted if the MANOVA yielded a main effect for learning activity. Additionally, four hierarchical multiple regression analyses were performed to examine the relative contributions of students' self-efficacy and outcome expectancy to their MVPA and perceived effort/persistence for fitness and soccer, respectively.

Results

Descriptive Statistics

Overall, average scores of the self-report measures fell within a reasonable range. Specifically, the students reported moderate levels of motivational beliefs and perceived effort/persistence, as the mean scores of these variables were above the midpoint (i.e., 3 for self-efficacy, 25 for outcome expectancy, and 4 for effort/persistence) for both the soccer and health-related fitness classes (See Table 1). However, the students demonstrated large variability in their percentages of time engaged in MVPA in class ($SD = 9.71 - 9.91$), ranging from 35.6% to 65.5% for the health-related fitness class and from 28.2% to 71.8% for the soccer class. These results indicated that some middle school students were physically active whereas others were relatively inactive in PE class.

Table 1 shows the correlations between each study variable

across the learning activity. Generally, students' motivational beliefs (self-efficacy and outcome expectancy) were positively related to their MVAP and perceived effort/persistence ($r = .15 - .64, p < .05$ for all) within each learning activity. Also, students' motivational beliefs and effort/persistence toward fitness were significantly and positively related to their motivational beliefs and effort/persistence toward soccer (i.e., .31 for self-efficacy, .53 for outcome expectancy, and .54 for effort/persistence). Additionally, students' MVPA in the fitness class was also positively associated with their MVPA in the soccer class ($r = .35$).

Table 1. Internal Consistency, Descriptive Statistics, and Correlations among Variables (N = 163)

Variable	1	2	3	4	5	6	7	8
1. Self-efficacy (fitness)	.85							
2. Outcome Expectancy (fitness)	.64**	.84						
3. MVPA (fitness)	.47**	.33**	-					
4. Effort/Persistence (fitness)	.39**	.44**	.27**	.82				
5. Self-efficacy (soccer)	.31**	.43**	.30**	.61**	.86			
6. Outcome Expectancy (soccer)	.49**	.53**	.24**	.67**	.62**	.80		
7. MVPA (soccer)	.10	.08	.35**	.07	.24**	.15*	-	
8. Effort/Persistence (soccer)	.57**	.61**	.34**	.54**	.41**	.49**	.22**	.79
Mean	4.05	33.97	48.13	4.96	3.89	31.09	52.26	5.10
Standard Deviation	.71	11.63	9.91	1.28	.65	11.45	9.71	1.32

Notes. Cronbach alpha coefficients are provided along the diagonal; * $p < .05$; ** $p < .01$.

Results of the MANOVA

The MANOVA repeated measures yielded a significant main effect for learning activity (Wilks' $\Lambda = .78, F_{4,159} = 11.52, p = .00$). Partial eta squared η^2 was computed to assess the effect size of the significant difference. The value was relatively large ($\eta^2 = .23$), suggesting that effect of learning activity is practically meaningful. Follow-up univariate tests revealed students reported significantly higher self-efficacy in health-related fitness than in soccer, $F(1,162) = 6.46, p = .014, \eta^2 = .04$, and scored significantly higher outcome expectancy in health-related fitness than in soccer, $F(1,162) = 10.88, p < .001, \eta^2 = .06$. However, students displayed significantly higher MVPA in soccer than in health-related fitness, $F(1,162) = 23.30, p < .001, \eta^2 = .14$. No further differences were found in students' self-reported effort/persistence.

Hierarchical Multiple Regression Analyses

Results of the hierarchical multiple regressions are shown in Table 2. When being entered into the model in the first step, self-efficacy occurred as the significantly positive predictor of students' MVPA in fitness ($F_{1,162} = 56.93, p < .01$) and soccer ($F_{1,162} = 12.11, p < .01$), and accounted for 22.3% and 5.8% of the variance, respectively. However, outcome expectancy failed to predict MVPA when being entered into the second step for each learning activity. In regard to students' effort/persistence, our data yielded that self-efficacy was a significant predictor ($F_{1,162} = 34.81$

for fitness, $F_{1,162} = 40.24$ for soccer, $p < .01$) for effort/persistence in the first step, explaining 14.6% and 16.5% of the variance for the fitness and soccer classes, respectively. Outcome expectancy ($F_{1,162} = 16.67$ for fitness, $F_{1,162} = 24.94$ for soccer, $p < .01$) further accounted for a significant portion of the remaining variance (6.5% for fitness, 9.2% for soccer) in the second step of the model.

Table 2. Results of Regression Analyses on Students' MVPA and Effort/Persistence

Dependent variables	Independent variables	R ²	R ² changes	β	t Value	
MVPA (fitness)	Step 1	.223				
	Step 2	Self-efficacy		.47	7.55**	
		Self-efficacy	.224	.001	.44	5.46**
		Outcome expectancy		.04	.45	
Effort/Persistence (fitness)	Step 1	.146				
	Step 2	Self-efficacy		.38	5.90**	
		Self-efficacy	.211	.065	.17	2.07*
		Outcome expectancy		.33	4.08**	
MVPA (soccer)	Step 1	.058				
	Step 2	Self-efficacy		.22	3.48**	
		Self-efficacy	.066	.008	.20	2.81*
		Outcome expectancy		.08	1.12	
Effort/Persistence (soccer)	Step 1	.165				
	Step 2	Self-efficacy		.41	6.34**	
		Self-efficacy	.257	.092	.17	2.22*
		Outcome expectancy		.38	5.00**	

Notes. R² values are cumulative, with each incremental step adding to the variance explained; β values are standardized regression coefficients from the final stage of the regression analysis. * $p < .05$; ** $p < .01$.

Discussion

This study focused on middle school students and investigated the effect of two learning activities (i.e., soccer and health-related fitness) on students' motivational beliefs, MVPA and perceived effort/persistence in PE classes. It also examined the predictive strengths of students' motivational beliefs on MVPA and effort/persistence within each learning activity. According to the descriptive analyses, students showed moderate levels of motivational beliefs and effort/persistence toward health-related fitness and soccer classes in their PE program. Additionally, they exhibited large variability of their MVPA in these classes.

The significant relationships between the two learning activities, students' motivational beliefs and in-class PA levels were observed in this study. This finding offers interesting insights into the study of children's motivational beliefs in PE. Specifically, students reported higher self-efficacy and outcome expectancy in health-related fitness classes than they did in soccer classes. This result reveals that health-related fitness and soccer, as learning activities offered in many middle school PE programs, had different relationships with students' self-efficacy and outcome expectancy, supporting the view that it is important for researchers to consider the effects of learning activities when examining students' motivational beliefs

in PE (Lee, 1997). It also supports the argument that students are becoming increasingly aware of the health benefits of PA and they tend to be motivated toward health-related fitness activities (Ennis, 2003).

It is possible that students in today's school are more familiar with the health-related fitness activities because the overall enrollment in health-related fitness/conditioning activities has increased about three times in twelve years in the United States (National Center for Educational Statistics [NCES], 1998). In addition, the tasks in the health-related fitness classes observed in the present study were primarily locomotor and non-locomotor skills. They were simple and thus students were able to master them and achieve a sense of success. As a result, students were more likely to report high self-efficacy scores. In contrast, in the soccer classes, students had many relatively difficult subject control skills (e.g., dribbling, shooting, and passing) to master and game strategies and rules to learn. The level of difficulty experienced in soccer classes might lead students to believe they had lower ability than they did in health-related fitness classes.

The advocacy for health promotion and developing health-related active lifestyles during the past decade could also influence the way children value health-related fitness activities, and result in more positive views toward participation in health-related fitness activities. Soccer, a performance-oriented sport, is played less as children get older because of its highly competitive nature and team play format. Accordingly, middle school students might devalue the outcomes of playing soccer. In short, the study findings are congruent with existing theory and research that school age children and adolescents' motivational beliefs indeed differed as a function of academic domains (Bong, 2001; Marsh & Yueng, 1996; Simpson, Licht, Wagner, & Stader, 1996) or specific learning activities (Lee, 1997).

Students exhibited significantly higher PA levels in soccer classes than in health-related fitness classes. This result provides strong empirical support for the first research hypothesis, and upholds the notion that team-based invasion games (i.e., soccer, football) promote high PA levels. One possible reason of this finding may be that there were stations set up in health-related fitness classes and those stations were made up of different activities such as shuttle run and crunch. As a result, students' PA levels may vary from station to station. For example, students could generate more MVPA in stations focusing on cardiovascular activities (e.g., shuttle run, square run) than those focusing on muscular strength and endurance activities (e.g., crunch, and push ups). Additionally, transitions between stations could reduce the time that students became engaged in MVPA. In contrast, there was no skill practice session in the soccer classes and therefore instructional time and waiting time were minimized. Students spent the majority of time running in an effort to try and score a goal. Consequently, students' MVPA were high during the data collection time. Apparently, the results support the first hypothesis.

One of the objectives of this study was to investigate the predictive utility of students' self-efficacy and outcome expectancy on their MVPA and perceived effort/persistence in different learning activities in PE. As expected, self-efficacy significantly predicted students' MVPA across the learning activities. The finding is in line with recent studies indicating that, in contexts where one has

little chance for withdrawal such as compulsory PE programs, self-efficacy is posited to predict individuals' PA levels (Dishman et al., 2004; Gao, Newton, Carson, 2008). Similarly, self-efficacy also was a positive predictor of effort/persistence. The finding corroborates the notion that self-efficacy is a determining factor for effort/persistence in PE (Gao et al., 2009; Gao, Newton, & Carson, 2008), and provides strong support for the second hypothesis. Therefore it is important to implement interventions to effectively increase students' self-efficacy in PE. To achieve this, physical educators should help students maintain relatively accurate but high self-efficacy by achieving actual success on tasks; keeping tasks relatively challenging but at a reasonable level of difficulty; providing accurate and timely feedback; and using role models to provide vicarious experiences.

In regards to the predictive strength of outcome expectancy, our data indicated that students' outcome expectancy failed to predict their MVPA across the learning activities in PE. This is in line with the findings from recent studies (e.g., Rovniak et al., 2002). Surprisingly, outcome expectancy emerged as a positive predictor of effort/persistence. The result is contradicted with the second hypothesis and recent findings (Gao et al., 2009) concerning the relationship between outcome expectancy and effort. We speculate that the discrepancy might be due to the measure of effort/persistence used in the two studies. That is, students' effort/persistence in the present study was self-reported, while in Gao et al.'s (2009) study, students' effort was rated by teachers.

In summary, the most significant finding of this study is that the results revealed different relationships between learning activities and students' motivational beliefs and in-class PA levels. Specifically, a team-based game (soccer) promoted higher levels of PA than health-related fitness activities, whereas students held higher motivational beliefs in the health-related fitness class. However, there are limitations in the study that warrant consideration. First, although both soccer and fitness classes were taught by PE specialists in the same school and provided approximately the same length of time for students to engage in activities, the learning environment in each class could be different and thus might have differentially impacted students' motivational beliefs and PA levels. For example, the soccer class created an environment that emphasized competition and winning, while the health-related fitness class used student-centered stations and deemphasized competition. However, this confounding variable has not been controlled in the present study. Future research should use a systematic observation instrument to determine differences in the learning environments and then examine their resulting impact on students' motivational beliefs and PA behaviors. Second, all the students completed the health-related fitness unit before completing the soccer unit. It is possible that the health-related fitness unit could have influenced the students' motivational beliefs or MVPA when they entered the soccer unit. Future study should use counterbalancing to eliminate such carry-over effect. Finally, the data related to PA levels during the soccer unit was based solely on game play. A more typical unit that includes instruction and subsequent skill development, as well as game play would likely result in less PA levels. This would potentially result in a less favorable comparison to a fitness-related activity, with regard to PA.

Despite these limitations, the results in this study may have significant implications for educational practice. That is, teachers must consider psychological and physical effects that different learning activities may have on students when designing and implementing PE programs that attempt to develop students' positive motivational beliefs about physical activity and demonstrate high PA levels in those programs. Second, students' motivational beliefs varied as a function of learning activity. This suggests that middle school children showed different interest and motivational beliefs toward different learning activities in PE. Other factors affecting students' motivational beliefs might include social norms, learning environments, and teachers' attitudes and behaviors in addition to the learning activities offered. Therefore, PE teachers should take all these factors into account when attempting to motivate students to participate in PE classes. Additionally, students are likely to be physically active and exert effort when they believe they can accomplish certain activities in PE. Physical educators might adopt effective strategies to raise students' self-efficacy through the promotion of individualized and ability-oriented tasks that increase success.

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