2011

Physical activity and health-related quality of life among elementary students: an integrated perspective

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PHYSICAL ACTIVITY AND HEALTH-RELATED QUALITY OF LIFE AMONG ELEMENTARY STUDENTS: AN INTEGRATED PERSPECTIVE

A Dissertation

Submitted to the Graduate Faculty of the
Louisiana State University and
Agricultural and Mechanical College
in partial fulfillment of the
requirements for the degree of
Doctor of Philosophy

in

The Department of Kinesiology

by
Xiangli Gu
B. Ed., East China Normal University, 1999
August 2011

ACKNOWLEDGEMENTS

I would like to first acknowledge my advisor, Dr. Melinda A. Solmon, for her guidance and support during my study at LSU. Your diligence and intelligence have motivated me to excel not only in this program, but also in my future career. As a trusted mentor, Dr. Solmon, you have always directed me to make the best decisions in my own teaching and research experiences. Without the continuous assistance and encouragement that you have provided, I believe that I would not be where I am today. Through your guidance, I feel I have learned and grown a lot in the past four years, especially in learning to question my own assumptions about research and to value quantitative methodologies. I want to thank you, Dr. Solmon, for guiding me to understand the hard work, discipline and rigor that scholarship requires.

A special and deep thank to Dr. Amelia Lee. Thanks so much for being one of my committee members. I cannot adequately represent the deep gratitude I feel towards you. Without your encouragement and support, I would never have had a chance to get into the Ph.D. program at LSU. You helped open the door towards my professional career in Kinesiology. I greatly appreciate all the suggestions, insights and comments of my committee members, as well as their valued time. Thank you to all of them: Dr. Baker, I have greatly appreciated, valued, and enjoyed all of our conversations within and outside of the school. As one of your teaching assistants, I learned a lot from you on how to be a responsible and valued teacher in the classroom. Dr. Garn, your suggestion to "focus on the classroom goal structure" provided me a broad viewpoint in the designing of my dissertation; and in my mind you are not only one of my teachers who will be remembered but also a trusted friend who always can provide support and help at any time I ask for. I also want to thanks Dr. Tuuri, my Dean's Representative. I

appreciated your comments and suggestions during my dissertation progress which made my work become more successful.

I'm very grateful to all the students who are the subjects of this dissertation. I greatly appreciate their willingness to participate in this research and the time. I especially acknowledge and thank three schools and physical education teachers for welcoming me to their schools and assisting me in the completion of my data collection.

In the Department of Kinesiology, I would also like to thank Mrs. Kathy Hill for her constant support while I was a teacher assistant in the department, and also appreciated greatly her help in my data collection. A special thanks to Idashelly Arnold, Melvin Carter, and Ellen Albarado for creating a helpful learning and teaching setting (I loved the coffee smell all over the main office every morning). I am also thankful for the wonderful group of graduate students that I have gotten to know through my four years Ph.D. experience—past (Dr. Elizabeth A. Domangue) and present (Dr. Costas Tsouloupas, TaeEung Kim, Dr. Ashley Samson, Zhujun Pan, Rusty Ware, Iksu Seo, Emily K. Beasley, Dr. Taeg Kwon). You all were wonderful, and I really appreciate for helping me throughout my research process.

I am also grateful to Dr. Allen Jackson, my current department chair at University of North Texas, who has given me so much important statistical advice for my dissertation data analysis. Thanks very much for your time and valued information.

My deepest and greatest gratitude goes to you, Tao, my dear husband. From the time I knew you in China, my life became changed not only because of your life philosophy, but also because of your great self-regulation. For the past four years at LSU, your solid support, your love and strength, consistent encouragement, belief in my ideas, and your listening served not only as a spouse but also as a soul mate. I always knew that I could count on you for anything

and I know that I still can and always will. I feel so rich and lucky having you and my daughter, Betsy, in my life. Betsy, my dear, I love you so much. You help me to laugh every time I feel exhausted from work. You open up such a bright sky in my life. Because of you, Betsy, your father and your mom's life become true and alive.

Finally, I would like to acknowledge my parents (Yongan Gu and Mingfan Qian), my parents–in-law (Minnan Zhang and Yun Kuang), my sister (Xianghong Gu) and her family, for their unconditional love, support and guidance throughout my four years of school in United States and my entire life. Your contributions have ultimately made this degree a reality for me.

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ABSTRACT

School physical education (PE) not only offers and promotes health-related physical activity, but also encompasses the promotion and development of perceptions of mental health (USDHHS, 2010). It has been suggested that health-related quality of life (HRQOL) can predict future health, monitor children's psychosocial health, and identify those most at risk or in need of support at an early stage. Assessing physical activity (PA) and health-related quality of life have become major issues in pediatric public health and also serve as a major goal of Health people 2020 (USDHHS, 2010). Research including assessment of theory-based mediators of health-related outcomes is needed (Ryan, Patrick, Deci, & Williams, 2008).

Grounded in the expectancy-value (Eccles., 1983) and achievement goal (Ames, 1992a, 1992b) frameworks, the primary purpose of this study was to examine the relationships among the perceptions of motivational climate in PE, expectancy-value beliefs, intention to participate in PE, HRQOL, and PA among elementary children. A secondary purpose was to examine gender and racial differences in students' motivation in physical education, intention, HRQOL and PA.

Participants were 336 elementary school physical education students from three schools in the southeast US. They completed surveys and wore pedometers during three days of physical education classes. The findings support the assertion that children with higher expectancy beliefs were more likely to be physically active and report higher HRQOL than those with low levels of expectancy beliefs. Perception of a mastery motivational climate together with positive expectancy beliefs could be an advantage for physical and psychosocial health among children in this study, whereas perception of a performance motivational climate was associated with less physical activity (i.e. lower steps/min) during PE even if students view PE as important,

interesting and useful. There were gender and race differences on children's motivation, HRQOL and PA during PE, which suggests that interventions aimed at preventing physical inactivity and developing optimal mental health should be tailored to individual needs in light of those differences. This research may provide useful information on the translation of theory to practice designed to influence children's health perceptions and behaviors.

CHAPTER ONE: INTRODUCTION

Emerging evidence indicates that physical inactivity is associated with increasingly high rates of obesity and overweight in U.S. population in recent years (U.S. Department of Health and Human Services [USDHHS], 2008). Regular participation in physical activity can reduce obesity, overweight, depression and stress, and also has been linked to improved health status (e.g. cognitive function, self-esteem) in youth and adults (American College of Sport Medicine [ACSM], 2000; Berkey, Rockett, Gillman, & Colditz, 2003; Hallal, Victora, Azevedo, & Wells, 2006). Although physical activity is associated with positive health outcomes, children are not as active as they should be and obesity is identified as one of the most stigmatizing and least socially acceptable conditions in childhood.

School physical education programs have been identified as potentially important settings in efforts to increase school-aged students' physical activity levels and consequently, can play a critical role in promoting perceptions of health (Wallhead & Buckworth, 2004). Many researchers and professional organizations recommend that physical education be offered at every grade level every day, and suggest that children should accumulate at least 60 minutes per day of moderate to vigorous physical activity (ACSM, 2000; USDHHS, 2008).

Although 97% of elementary school students take physical education, children cannot meet the physical activity recommendations within the allotted instructional time (National Association for Sport and Physical Education [NASPE], 2010; USDHHS, 2008). Although the physical, social, and mental health benefits of regular physical activity participation are well documented, nearly one third of American youth are not vigorously active on a regular basis and their physical activity participation decreases as they age (USDHHS, 2008). Designing efficient and effective intervention programs is an important component in efforts to address school

students' decrease in physical activity participation with the goal of improving their health. In addition, gender and ethnic differences should be taken into account when addressing these issues as girls are less active than boys and African Americans and other minority populations are at increased risk for physical inactivity as compared to White populations (ACSM, 2000; Berkey, et al., 2003; Mckenzie, 2003; NASPE, 2010).

Health-related Quality of Life

There is growing use of health-related quality of life (HRQOL) as a measure of an individual's perception of their own physical and psychosocial health. It is a comprehensive and multidimensional construct that includes physical, emotional, social, and school functioning (Revicki, 1989; Varni, Seid, & Kurtin, 2001). HRQOL is of growing interest in public health as a general health outcome. Research on HRQOL and physical activity has predominantly been focused on elderly populations with chronic conditions including cardiovascular disease, arthritis, and cancer (Chyun et al., 2006; Courneya & Friedenreich, 1999) and with general adult populations without health impairments (Bize, Johnson, & Plotnikoff, 2007; Vuillemin et al., 2005). Physical activity has been positively related to physical and psychosocial functions in both general populations and elderly populations with chronic conditions. Researchers also suggest that moderate to vigorous physical activity (MVPA) may have benefits on HRQOL (Vuillemin et al., 2005; Wendel-Vos, Schuit, Tijhuis, & Kromhout, 2004). The demonstration of a positive relationship between HRQOL and physical activity could provide elders with a motivation to be more physically active.

In recent years, some cross-sectional studies have examined the HRQOL of overweight and obese children and adolescents (Schwimmer, Burwinkle, & Varni, 2003; Swallen, Reither, Haas, & Meier, 2005; Williams, Wake, Hesketh, Maher, & Waters, 2005). Researchers found

that obesity in adolescence is related to poor physical quality of life, and HRQOL is frequently worse for females than for male (Bisegger, Cloetta, Rueden, & Abel, et al., 2005; Swallen et al., 2005). Although the importance of identifying physical activity motivational factors to increase HRQOL has been recognized in adult populations, little is known regarding the association between HRQOL and physical activity levels in school children (Gillison, Standage, & Skevington, 2006; Standage & Gillison, 2007). Studying the relationship between HRQOL and physical activity in children and adolescents is important because physical activity has the potential to affect both health and wellness by enhancing HRQOL.

Based on the notion that engagement in regular physical activity during childhood promotes physical and mental health (CDC, 2007; Hallal et al., 2006), it is important to examine how to increase school children's engagement in regular physical activity to enhance health outcomes. Given the fact that motivation can influence students' physical and psychological behavioral changes, and school students' motivation for participation in physical education begins to decline as early as in elementary school and beyond, it is of great consequence to study student motivation, physical activity and HRQOL (Bouffard, Marcoux, Vezeau, & Bordeleau, 2003; Xiang, McBride, &Bruene, 2006). Identifying psychological factors that influence physical activity behavior has the potential to provide a clearer understanding of the decisions school children make regarding being physically active. This effort also can facilitate the development of effective intervention strategies aimed at the prevention of physical inactivity and impaired mental health among school children.

Expectancy-value Model of Achievement Choice

To understand school students' motivation and motivational behaviors, the expectancy-value model of achievement choice has been widely used in education and physical activity

fields (Eccles et al., 1983; Gao, Lee, Solmon, & Zhang, 2009; Gu, Solmon, & Zhang, 2010, 2011a; Wigfield, 1994; Xiang, Chen, & Bruene, 2005). Eccles and her colleagues (Eccles et al., 1983; Eccles, Wigfield, & Schiefele, 1998) proposed two primary indicators of achievement choices and behaviors: (a) the person's expectancy-related beliefs in a particular domain (beliefs about ability and expectancies for success), and (b) subjective task values (attainment value, interest value, utility value, and cost).

Beliefs about ability are defined as individuals' evaluations of their competence in different achievement tasks. Expectancies for success refer to individuals' beliefs about how well they will do on an upcoming task and are closely related to their beliefs about ability. Belief about ability and expectancy for success comprise the two major components of expectancy-related beliefs. These components are related to each other although they are conceptually distinct.

According to the expectancy-value model of achievement choice, subjective task values are defined as an incentive, that is, how an achievement task meets various needs of individuals. The major components include attainment value (importance), intrinsic value (interest), utility value (usefulness), and cost (Eccles et al., 1983; Wigfield & Eccles, 1992). Specifically, attainment value refers to the importance of doing well on a given task. Intrinsic value concerns the enjoyment the individual obtains from performing the task or the subjective interest the individual has for the task. Utility value or usefulness of the task reflects how a task fits into an individual's current or future plans. Cost refers to how the decision to engage in an activity limits access to other activities, assessments of how much effort or time will be spent to accomplish the activity, and its emotional cost. Although Eccles and colleagues identify cost as a dimension of value, it has typically not been operationalized in research studies.

Research has demonstrated students' motivational outcomes, including their performance, persistence/effort, selection of challenging tasks, and choices of achievement tasks are predicted by their expectancy-related beliefs and subjective task values (Eccles et al., 1998; Gao, Lodewyk, & Zhang, 2009; Gu, Solmon, & Zhang, 2011b; Xiang, McBride, & Bruene, 2006). Researchers also conclude that students tend to engage in and participate in activities in which they believe they are competent, as well as those that they view as interesting, important, and useful in academic and school physical education domains (Eccles et al., 1983; Eccles et al., 1998; Wigfield & Eccles, 2002; Xiang, McBride, Guan, & Solmon, 2003).

Given that sport and physical education have been identified as achievement contexts, achievement behaviors in those domains include performance, persistence, and intention, as well as health-related indicators and physical activity participation. Researchers have reported a positive relationship between psychosocial factors (e.g., competence beliefs, attitude, perceived behavioral control); HRQOL and self-reported physical activity levels in adults (Kosma, Rebecca, Cardinal, Bauer, & McCubbin, 2009). One recent study (Gao, Newton, & Carson, 2008) have supported the notion that individuals with high levels of perceived ability are likely to be more physically active in physical activity classes. To date, there has been little research that examines the predictive utility of students' expectancy-related beliefs and task values in association with their HRQOL and physical activity levels, especially for elementary children's in-class physical activity levels.

Most traditional sports and physical education research has found that boys are more likely to have higher ability beliefs and expectancies for success than girls (Eccles & Wigfield, 2002; Fredricks & Eccles, 2002; Jacobs, Lanza, Osgood, Eccles & Wigfield, 2002; Xiang, McBride, & Bruene, 2004). Gao, Lee, Solmon, and Zhang (2009), however, found no gender

difference for ability beliefs and intention for physical activity. Further, several studies demonstrated that children's perceptions of ability and task values drive achievement behavior in domains that vary in gender stereotyping (Eccles & Harold, 1991; Eccles & Wigfield, 2002; Fredricks & Eccles, 2002; Gao & Xiang, 2008; Jacobs et al., 2002).

In comparison to the gender, very few studies have been used the expectancy-value model to investigate different racial groups' motivation in physical education, physical activity participation, and HRQOL. Racial differences in physical activity and physical activity motivational beliefs (i.e. competence beliefs, self-schema) are, however, routinely reported (Harrison, 2001; Harrison, Lee, & Belcher, 1999). Cox and Whaley (2004) found that African-American athletes reported higher expectancy beliefs than White students. African-American athletes, however, reported lower effort and persistence. One recent study also found that African American students had higher scores in expectancy-related beliefs than White students, but no differences in task value and task performance emerged on a dart-throwing task (Gao, Kosma, & Harrison, 2009). Given the inconsistent results, researchers indicate that racial-role appropriateness may explain the higher motivational scores of African American athletes towards some particular sports such as basketball. It is possible that racial-role appropriateness might also affect students' engagement and persistence in activities in the physical education class that go beyond those stereotyped activities for their race. Knowing the negative impact of racial-role stereotypes, it is important for physical educators to structure the learning environment in order to maximize the optimum expectancy and value beliefs that students placed on the activity.

The Expectancy-value model further posits that within particular social contexts an individual's achievement beliefs and behaviors are affected by organization, structure, and

teaching practices. This motivational sequence of "social factors (individual's perception of socializer's beliefs, expectations and attitudes) ----expectancies and values----motivational consequences" proposed by expectancy-value model can be encountered at global, contextual, and situational motivational levels. In general, the expectancy-value not only emphasizes social-cognitive processing in the development of motivational beliefs but also social and culture context (Pintrich & Schunk, 2002). Furthermore, researchers (Gu, Solmon, & Zhang, 2010) argue that we need to examine psychosocial mediators of change (e.g. self-efficacy, expectancy beliefs) in order to better understand how the modification of the social environment translates to behavioral change.

Achievement Goal Theory/Motivational Climates

A viable theoretical framework that provides a clearer understanding of the social psychological factors of children's motivation in sports and physical education is achievement goal theory (Nicholls, 1984, 1989). According to this theory, there are two dimensions of goals in achievement settings: task-involved goals and ego-involved goals. Task-involved goals focus on mastery of the task at hand, are primarily based upon personal improvement, and are evident when perceptions of competence are self-referenced. Ego-involved goals are related to demonstrating superiority or outperforming others, and are evident when competence is normatively referenced. It is assumed that individuals can evaluate their competence in two different orientations, and these divergent perceptions of ability are assumed to be intimately related to the two different orientations.

The key elements of the achievement goal theory have been widely used to operationalize the concept of motivational climates as a situation-induced environment directing the goals of an action in achievement contexts (Ames, 1992a, 1992b; Nicholls, 1984). Ames (1992a, 1992b)

explored analogous goals from a situational perspective through measuring students' perceptions of classroom climates. Specifically, a mastery motivational climate emphasizes self-referenced success, effort, and individual improvement. This environmental focus is on developing competence rather than protecting one's perception of ability. In contrast, a performance motivational climate focuses on social comparison (e.g. winning or outperforming others) and emphasizes normative ability.

It is acknowledged that individuals' achievement behaviors are affected by the environments (e.g., motivational climates) created by coaches, parents, teachers, and administrators (Boixadós, Cruz, Torregrosa, & Valiente, 2004; Reinboth & Duda, 2006; Xiang, Chen, & Bruene, 2005). PE teachers as a direct informant interacting with children can develop a mastery or performance motivational climate through the expectations, values, beliefs, and behaviors in sport and physical education. Consistent with the research that has adopted a dispositional approach, research from a situational perspective has also supported the contention that a mastery-involving climate within the physical education setting facilitates adaptive motivational patterns (Solmon, 1996; Ommundesen & Kvalø, 2007; Xiang, McBride, Guan & Solmom, 2003). Ommundesen and Kvalø (2007) reported that students' perceptions of a task-involving climate were related to higher levels of interest and enjoyment toward physical education. Perception of a performance climate, however, was linked with maladaptive motivational and affective responses (e.g. distress; Ntoumanis & Biddle, 1999; Pensgaard & Glyn, 2000).

Given the fact that motivational beliefs alone cannot explain individuals' behaviors (e.g., physical fitness, physical activity levels; Gao, Newton, & Carson, 2008; Reinboth & Duda, 2006), it is clear that sport and physical education environments should be mastery-involved to

facilitate motivational behaviors and well-being. Perceptions of a mastery motivational climate have been positively linked to motivation (the satisfaction of basic needs for autonomy, competence and relatedness, and intrinsic motivation; see Ommundsen & Kvalø, 2007; Standage, Duda, & Ntoumanis, 2003; Sarrazin, Vallerand, Guillet, Pelletier, & Cury, 2002), which in turn predicted indices of well-being (e.g., subjective vitality and physical symptoms; Reinboth & Duda, 2006). Xiang, Solmon, and McBride (2006) in their qualitative research also found that if children are not afforded a mastery physical education context, it is unlikely they will focus on learning, improving their skill levels, and acquiring the knowledge associated with living health and activity lifestyles. In addition, a mastery motivational climate indirectly predicts the vigorous exercise involvement mediated by students' metacognition in physical education (Theodosiou & Papaioannou, 2006).

It is apparent that physical activity settings are contexts where children and adolescents frequently engage in spontaneous social interaction. The existing literature, however, has not sufficiently evaluated the primary roles of the motivational climates created by physical education teachers in youths' development of ability beliefs and values toward school physical education, as well as motivational behaviors such as physical activity. Gu, Solmon, and Zhang (2010) found that a supportive motivational climate created by middle school physical education teachers was related to students' expectancy for success and values, as well as their achievement outcomes in physical education. More research is needed to integrate individual-level perspectives with social factors in school physical education in the study of school students' physical activity and HRQOL. Using an integrative framework whereby constructs of the achievement goal theory are integrated with the expectancy-value model may facilitate progress in this area. That is, identifying multiple theory-based factors that influence physical activity

behavior and HRQOL has the potential to provide a clearer understanding of the decisions school children make regarding being physically active, as well as providing insight into how classroom climates created by physical education teachers affect children's motivation, physical activity, and HRQOL.

To date, no study has attempted to test the theoretically assumed motivational sequence between motivational climates, expectancy-value constructs, HRQOL and physical activity in elementary school students. Thus, it is not clear whether changes in mastery or performance classroom climates created by physical education teachers may be linked to changes in children's competence beliefs and task values towards physical education, which in turn influences students' physical activity and HRQOL. Based on the previous literature, it makes conceptual sense that a mastery-involving climate would relate to more positive competence beliefs and task values, and as a consequence, these motivational responses may also positively influence students' physical activity and HRQOL.

There is an emerging trend calling for more empirical research by using motivational constructs (e.g. cognitive factors: competence beliefs, task values) to drive a research agenda for researchers and practitioners to structure a mastery motivational climate designed to influence school children's achievement outcomes and motivational behaviors in physical education. Exploring the relationships among the motivational climate, motivational constructs of expectancy-value model, and the role that they play in determining physical activity choices is a viable avenue to pursue as we investigate ways to encourage children to adopt healthy and physically active lifestyles.

The major purpose of this study, therefore, is to examine the relationships among motivational climate created by physical education teachers, students' motivation, intention for

future participation in PE, HRQOL, and physical activity (PA), with the goal of learning how to create a mastery-involving climate that promote the adoption of physically active lifestyles and promote health for elementary students. A secondary purpose is to examine gender and racial differences in the study variables (i.e., students' motivation in physical education, intention, HRQOL, and PA).

Specific research questions and associated hypotheses were: 1) What are the relationships among expectancy-related beliefs, task values, intention, perceptions of the motivational climate, HRQOL, and PA? It was hypothesized that:

a) Students' expectancy-related beliefs and task values would be positively related to perceptions of a mastery motivational climate, and student's intentions to take physical education in the future.
b) Students' PA participation would be positively associated with their HRQOL.
c) Students' expectancy related beliefs and task values would be positive predictors of intention for future participation in PE, their HRQOL and PA.

2) How do expectancy-related beliefs and task values affect the relationship between perceptions of the motivational climate and intention, HRQOL and PA?

d) It was hypothesized that expectancy related beliefs and task values would emerge as mediators in the relationship between perceived motivational climate and intention, HRQOL and PA.

3) How do expectancy related beliefs, task values, perceptions of the motivational climate, intention, HRQOL, and PA vary according to gender and race?

e) Boys would have higher levels of motivation in physical education, intention, HRQOL and engagement in PA than girls.

f) White students would have higher levels of motivation, intention for future participation in PE, HRQOL, and engagement in PA than ethnic minorities in this study.

CHAPTER TWO: METHOD

Recruitment of Participants and Research Settings

Participants were 336 (157 boys, 179 girls) elementary school students (4th 172; 5th 164) recruited from three public schools in the southeastern United States. The participants consisted of fourth (51.2%) and fifth (48.8%) graders ranging in age from 9-12 years (M age = 9.87, SD = 0.039). The majority of the participants (53.3%) were White students and the remainder (46.7%) including African-American (37.4%), Asian-American (1.5%), Hispanic-American (1.8%) and others (5.9%) were classified as minorities. See Table 1 for a complete description of the demographics (i.e., gender, race, grade) of the students by schools.

Table1.

Number of Students, Gender and Race at Each School.

School	Students	Gender	Race
Lowery School	n = 200 4th & 5th grades	Female = 89 Male= 111	White = 167 Black = 12 Hispanic-American = 2 Asian-American = 6 Other = 13
Ponder Middle School	n=64 5th grade	Female = 30 Male= 34	White = 3 Black = 59 Hispanic-American = 1 Asian-American = 0 Other = 1
Cedar Elementary School	n=72 4th grade	Female = 38 Male= 34	White = 9 Black = 55 Hispanic-American = 2 Asian-American = 0 Other = 6

Lowery School is a public school that serves students in kindergarten through 5th grade. The student population is of 85.8% White, 9.49% Black, 1.47% Hispanic, 3.16% Asian

Americans and 1% American Indian, with 1.54% enrolled in the free or reduced lunch program. There are three full-time physical education teachers who teach the students in 4th and 5th grades. Students attend their physical education class every day for 30-minute sessions. Lowery School is located in a mid-sized urban school district, serving students who are primarily middle to upper income.

Ponder Middle School is a public school that serves students in 5th through 8th grades. The student population is of 14.64% White, 84.42% Black, and 0.93% Hispanic students. A large proportion (93.77%) of students qualify for free or reduced lunch program. There are two physical education teachers who teach the students in 5th grade. The fifth graders at Ponder Middle School attend their physical education class every day for 30-minute sessions.

Cedar Elementary is also a public school that serves students in 2nd through 4th grades. There is only one full-time physical education teacher who teaches the students in 4th grade. The student population is composed of 87.17% Black, 10.18 % White, 0% Asian, and 2% Hispanic students, with 91.59% of the students enrolled in the free or reduced lunch program. The students attend physical education class once a week for 50-minute sessions. Students from Cedar Elementary matriculate to Ponder Middle School. These schools are both in a rural school district of primarily low socio-economic status.

Approval to conduct the study was received from the University Institutional Review Board. Permission to collect data in the schools was granted by the school district, the school principal, and the physical educators before the start of the study.

Instrumentation

Demographic information was included in the survey about students' grade, gender, race, school, and age. Standardized self-report questionnaires were used to assess students'

perceived motivational climates (Xiang, McBride, & Solmon, 2003), students' motivation in physical education (Xiang, McBride, & Bruene, 2004), intention for future participation in PE (Xiang et al., 2003), self-reported PA (PAQ-C; Kowalski, Crocker, & Faulkner, 1997), and HRQOL (Varni, Seid, & Kurtin, 2001) at the 7th and 8th weeks of the school year. The validity and reliability of these measures for use with elementary school students has been established in previous research.

Perceived Motivational Climate. A nine-item scale was used to measure students' perceptions of motivational climates in physical education (Xiang et al., 2003). The scale consists of five mastery- and four performance-focused statements beginning with the stem, "In my physical education class…." The five mastery-focused statement are "My teacher feels happy when I learn something new" (item 1), "My teacher feels happy when I do my best" (item 2), "My teacher says it is OK for me to make mistakes" (item 3), "My teacher says it is OK for me to ask for help if I do not know how to do the activities or games" (item4), and "My teacher makes sure that I have enough time to learn new skills" (item 5). The four performance-focused statements are "My teacher feels happy when I do better than other kids" (item 6), "My teacher is proud of me when I am the best student" (item 7), "My teacher says only a few kids can be the best" (item 8), and "My teacher encourages me to do better than other kids" (item 9). Students respond on a five-point Likert scale ranging from strongly disagree (1) to strongly agree (5).

Expectancy-related Beliefs. The participants were asked five questions to assess their beliefs about ability (three items) and expectancies for success (two items) in class using a 5-point Likert scale. The questions for beliefs about ability include (a) How good are you at activities and games in P.E.? (1= *very bad*, 5= *very good*); (b) How good are you at activities and games in P.E., compared to most of your other school subjects? (1= *a lot worse in this activity*,

5= *a lot better in this activity*); and (c) If you were to list all the students in your P.E. class from the worse to the best, where would you put yourself? (1= *one of the worst*, 5= *one of the best*). Two questions used to assess expectancies for success include (a) How good would you be at learning something new in P.E. this year? (1= *very bad*, 5= *very good*); (b) How well do you think you will learn activities and games in P.E. this year? (1= *not at all well*, 5= *very well*). These self-report questions were chosen from a previously validated questionnaire developed and used by Xiang and her colleagues (2004). The mean of these five items was taken to give an overall indication of the magnitude of a student's expectancy-related beliefs.

Subjective Task Values. A 6-item validated instrument developed and used by Xiang et al. (2004) was used to assess the participants' subjective task values. Two items of assessing students' perceptions of importance include: (a) For me, being good at activities and games in P.E. is… (1=*Not very important*, 5= *Very important*); (b) Compared to your other school subjects, how important is it to you to be good at activities and games in P.E? (1= *Not very important*, 5= *Very important*). Intrinsic value (interest; two items) include: (a) In general, I find learning new activities and games in P.E. is…(1= *very boring*, 5) *very fun*); (b) How much do you like activities and games in P.E.? (1= *Don't like it at all*, 5= *Like it very much*). Two items were posed to assess students' perceptions of usefulness: (a) In general, how useful is what you learn in P.E.? (1= *Not useful at all*, 5= *Very useful*); (b) Compared to your other school subjects, how useful is what you learn in P.E.?(1= *Not useful at all*, 5= *Very useful*). Participants were asked to respond on each of the 6 statements with a 5-point scale appropriate for the items. The mean of these six items was used as students' subjective task values.

Intention for Future Participation in Physical Education. This measure was developed and validated by Xiang and colleagues (Xiang et al., 2003). The students were asked

to respond to a single question on a 5-point scale: "When you get to high school, you will have a choice whether you want to take physical education. How much would you want to take it?" (1 = *not at all*, 5 = *very much*). Similar items in previous research provide evidence for the reliability and validity with elementary children in both academic and physical education settings (Eccles et al., 1983; Gao, Lee, Solmon et al., 2009; Xiang et al., 2003)

Health-related Quality of Life. The 23-item pediatric QOL inventory generic core scales (PedsQL 4.0; Varni et al., 2001) was used to assess participants' HRQOL, including physical functioning (8 items), emotional functioning (5 items), social functioning (5 items), and school functioning (5 items). The stem for the items was: "In the past 7 days, how much of a problem has this been for you …". Example items (23 items) include: "It is hard for me to do sports activity or exercise" (physical functioning); "I feel sad or blue" (emotional functioning); "other kids do not want to be my friend" (social functioning); and "I have trouble keeping up with my schoolwork" (school functioning). A 5-point Likert response scale will be used across child self-report (0 = *never a problem*; 1 = *almost never a problem*; 2 = *sometimes a problem*; 3 = *often a problem*; 4 = *almost always a problem*). The items were reverse scored and transformed to a linear scale (0-100), with 100 indicating highest and 0 lowest possible HRQOL. Scale scores were created by dividing the sum of the responses by the number of items answered. The scale scores were not calculated if more than 50% of items in the scale were missing. All instruments demonstrated adequate reliability and validity in previous studies.

Physical Activity (PA). The Physical Activity Questionnaire for Older Children (PAQ-C) was used to assess students' levels of PA. It is a 7-day recall questionnaire intended to assess students' moderate and vigorous PA such as recreational activities, sports, and other types of exercise in the previous week (Kowalski, Crocker & Faulkner, 1997). Other PA behaviors

related to students' physical education class, free time, recess, extracurricular sports, weekend activities, and evening activities are also addressed within this questionnaire. A final overall score was obtained as an indicator of PA level for the student. The PAQ-C is a reliable and valid measure of PA for students beyond Grade 3 (Kowalski, Crocker, & Faulkner, 1997).

Levels of Engagement in Physical Activity in Physical Education Classes (Steps/min). To measure students' PA engagement in physical education classes, pedometers were utilized for three regularly scheduled physical education classes in this study (ACCUSPLIT pedometers, Accusplit, Inc., Livermore, CA). Pedometers have been established as a reliable and valid tool for measuring PA for both adults and children (Rowlands & Eston, 2005; Tudor-Locke, McClain, Hart, Sisson, & Washington, 2009). Activity step counts were converted to steps per minute to account for individual variances in the amount of daily PE activity time. The steps per minute (steps/min) are reported in this study as a simple ratio, created by dividing the total steps taken for a monitored period by the duration of that periods (total actual activity time) recorder by researchers.

Research Design and Procedures

A correlational research design was used in this study. According to previous research (Miller & Roberts, 2004) the perceived motivational climate is likely to be established within 2-6 weeks. Thus, the data collection was conducted after 6th week of the school year. Students completed the questionnaires during physical education classes. Due to the length of the surveys they were administered over a two-day period. In order to ensure students understood the items and read each item carefully, trained research assistants read each item of the instrument to the students and answered questions when clarification was needed. Surveys were administered in classrooms in groups of 25 to 30 students. All students were informed that their teachers would

not have access to their responses. Students were encouraged to answer truthfully and assured that their responses would be anonymous and would not affect their physical education grades.

On the first scheduled day students completed instruments assessing the perceived motivational climate, expectancy-related beliefs and task values, intention and HRQOL. These questionnaires were distributed to all students under the supervision of the researchers. Students spent approximately 20-25 minutes on the first set of surveys. On the next day, students completed the PAQ-C, which took about 10 minutes. After that, the students were instructed on how to use pedometers. They were told to clip the pedometer on the waistband of their shorts or pants on the right side. The researchers and teachers observed each student to be sure that they attached the pedometers correctly. Then students wore the pedometer for a practice activity to allow them to become accustomed to using them. Each student was assigned a specific pedometer with an identification number and used the same pedometer throughout the study.

After the survey data were collected, three days were scheduled to assess students' PA engagement measured by pedometers during regularly scheduled physical education classes. The teachers were told that the three data collection days should be representative of the typical physical education classes. To facilitate the pedometer data collection, two volunteer research assistants were recruited prior to the start of each class. They completed the following protocol: (a) placed numbered sheets with each student's name on a bleacher or bench in the activity area for easy access; (b) put up a numbered pedometer on the same number sheet; (c) reset all pedometers to 0; (d) posted a class list with students' names and assigned pedometer numbers. Students picked up and attached their pedometers immediately prior to PE as instructed by their teachers from the station they were assigned. The research assistants helped students attach the pedometers to their waist belts and made sure the students wore the assigned pedometers. Every

class was observed by one or more of the researchers to be sure students were not opening pedometer cases or shaking pedometers. In addition, the actual activity time (i.e. any games or activity time excluding the instructional time) was recorded and standardized in order to calculate the students' pedometer-determined PA, reported as the average number of steps per minute. Immediately following the end of class, participants were instructed to remove their pedometers and return them to the assigned station. Between classes, the researcher recorded step counts from each pedometer on a data sheet. Each pedometer was then reset to 0 and returned to the station for the next class.

Data Analyses

Several steps were taken to analyze the data. First, Cronbach's alpha coefficients were used to examine the internal consistencies of the self-reported measures. Intraclass correlation (ICC) was used to test the relative reliability of three days pedometer measurement which provides estimates of systematic and error variance (Baumgartner & Jackson, 1991; Thomas, Nelson, & Silverman, 2010). Then, bivariate correlations among the study variables (students' perceived motivational climate, students' motivation in physical education, intention, HRQOL, and PA) were examined to test hypotheses a and b. Next, four regression analyses were used to determine the predictive strength of students' expectancy beliefs and task values in physical education in predicting intention, HRQOL and their PA participation (self-report PA and steps/min).

To test whether students' motivation (expectancy-related beliefs and task values) is a mediator between motivational climate and intention, HRQOL, and PA, a series of regressions was used to test hypotheses d. This method involves a three step approach, defined as a causal steps approach in which several regression analyses are conducted and significance of the

coefficients is examined at each step for determining mediation or indirect effects (Baron & Kenny, 1986). Step 1: Conduct a regression analysis with the independent variable (X) predicting the dependent variable (Y) to test for path C. This step establishes that there is an effect that may be mediated. Step 2: Conduct a regression analysis with the independent variable (X) predicting the mediator (M) to test for path A. This step essentially involves treating the mediator (M) as if it were an outcome variable (dependent variable). Step 3: Conduct a multiple regression analysis with the independent variable (X) and the mediator (M) predicting the dependent variable (Y) to test the significance of path B. It is not sufficient just to correlate the mediator with the dependent variable; the mediator and the dependent may be correlated because they are both caused by the independent variable. Thus the independent variable must be controlled in establishing the effect of the mediator on the dependent variable (p. 1176; See Figure 1).

When significant relationships are established from step 1 through step 3, some form of mediation is supported: (1) if the effect of the independent variable on the dependent variable is no longer significant when the mediator is controlled, the finding supports full mediation; (2) if the effect of the independent variable on the dependent variable is reduced after the effect of the mediator on the dependent variable is controlled for (i.e., both X and M significantly predict Y), then the partial mediation is indicated (Baron & Kenny, 1986).

Specifically, two multiple regression analyses (testing path A) were computed to test whether motivational climate (independent variables) predicts students' expectancy-related beliefs and task values (mediators); four multiple regression analyses (testing path B) were performed to test whether students' expectancy-related beliefs and task values (mediators) can predict students' intention for future participation, HRQOL, and PA controlling for motivational

climate; and four regression analyses (testing path C) were conducted to test whether motivational climate (independent variables) can predict students' intention, HRQOL, and PA.

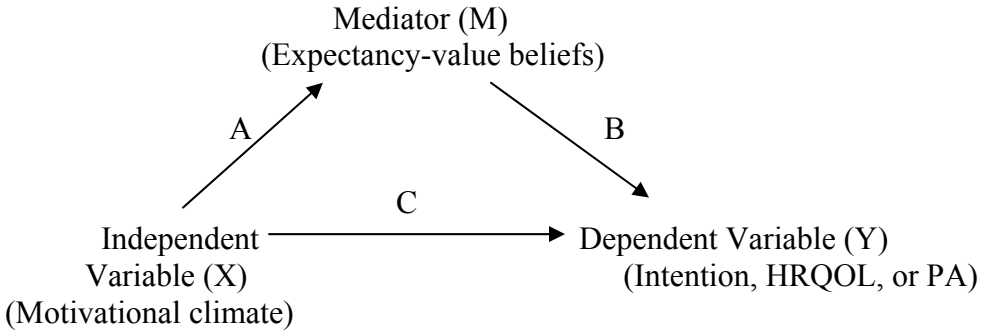

Figure 1. Definition of mediator

Finally, to test the hypotheses e and f, two 2 x 2 (Gender x Race) multivariate analyses of variance (MANOVA) were performed to determine whether gender and race differences existed. Specifically, motivational constructs (expectancy-value beliefs, perceived motivational climate) were dependent variables in the first MANOVA; and students' intention, self-reported PA, steps/min and HRQOL were included in the second MANOVA as the dependent variables. The fixed factors were gender and race. An alpha level of .05 was used for all statistical analyses.

CHAPTER THREE: RESULTS

The initial research question and hypotheses centered on relationships among study variables. Simple correlations and Cronbach's alpha coefficients are presented in Table 2. Reliability coefficients indicated that all of the instruments demonstrated acceptable internal consistency. The intraclass correlation (ICC=.88; see Thomas et al., 2010, p. 200) was calculated indicating step counts were reliable across the three days. The correlational analysis revealed that students' expectancy-related beliefs and task values were positively related to intention for future participation in physical education and perceived mastery climate, supporting hypothesis a. Perceptions of a mastery climate were positively associated with health-related quality of life, whereas perceptions of a performance climate was reversely related to steps/min. Supporting hypothesis b, students' HRQOL was positively associated with both self-reported PA and steps/minute in this study ($r = .22$, $r = .24$, $p < .000$, respectively). No correlation was found between self-reported PA and steps/min.

Results of multiple regressions (See Table 3) partially support hypothesis c that the motivational constructs would predict intention, HRQOL and PA. Expectancy beliefs ($\beta = .42$, $p < .000$) and task values ($\beta = .26$, $p < .000$) were significant predictors of students' intention for future participation in PE and accounted for 37.7% of the variance. Children's HRQOL was significantly and positively predicted by expectancy-related beliefs ($\beta = .24$, $p < .000$) explaining 5.9% of the variance. Expectancy-related beliefs were positive significant predictors of children's self-report PA participation in physical education accounted for 13% of the variance ($\beta = .28$, $p < .000$), whereas, task values emerged as a negative predictor of steps/min ($\beta = -.15$, $p < .02$), but only accounted for 2.9% of the variance.

Table 2.

Descriptive statistics and correlations among the study variables (N =336)

Measure	1	2	3	4	5	6	7	8
1. Expectancy beliefs	(.72)							
2. Task values	.58**	(.72)						
3. Mastery-involving climate	.32**	.30**	(.70)					
4. Performance-involving climate	.21**	.21**	.13*	(.69)				
5. Intention	.58**	.51**	.27**	.15**	(-)			
6. HRQOL	.24**	.14**	.24**	-.06	.16**	(.88)		
7. PA	.35**	.28**	.10	.11	.29**	.22**	(.88)	
8. Steps/min	-.12*	-.17*	.09	-.26**	-.13*	.24**	-.02	(.88)
M	4.27	4.21	4.27	2.76	4.37	80.21	3.42	77.20
SD	.56	.55	.63	.91	.86	13.54	.70	28.35

Note. Cronbach alpha coefficients are provided along the diagonal (Steps/min = Intraclass correlation). *M = mean; SD = standard deviation; * p < .05; ** p < .01.*

Table 3.

Multiple Regressions on Students' Intention, HRQOL, PA, and Steps/min (N = 336)

Dependent Variables	Independent Variables	R^2	β	T Value	P
Intention		.377			
	Expectancy beliefs		.42	7.97**	.000
	Task values		.26	4.98**	.000
HRQOL		.059			
	Expectancy beliefs		.24	3.72**	.000
	Task values		.00	-.00	.999
PA		.129			
	Expectancy beliefs		.28	4.43**	.000
	Task values		.12	1.89	.059
Steps/min		.029			
	Expectancy beliefs		-.03	-.44	.662
	Task values		-.15	-2.30*	.022

Notes. β values are standardized regression coefficients from the final stage of the regression analysis; PA = Self-reported PA; Steps/min = Pedometer-determined PA; * $p < .05$; ** $p < .01$.

Tests of Mediation Effects

To examine the mediational hypothesis d, the relationship between an independent variable and a dependent variable is decomposed into two causal paths, as shown in Fig. 1 (Baron & Kenny, 1986). An indirect or mediated effect implies that the independent variable causes the mediator, which in turn causes the dependent variable (Sobel, 1990). Thus, in this study the mediation analysis provides an examination of the process through which the motivational climate influences children's intention, HRQOL and PA by examining the effect of

the motivational climate on the mediators (i.e., expectancy-related beliefs and task values). The procedures proposed by Baron and Kenny (1986) were used to test this assumption. Accordingly, the three steps described in the analysis section are presented below.

Model 1-Mediational Effect of Expectancy-value Beliefs on Intention. Equation 1: Intention was regressed onto the perceptions of the motivational climate (Path C, sometimes called total effect, see Table 4). Results showed that both mastery and performance motivational climates were significant predictors of intention (β = .26, *p* = .000; β = .11, *p* = .036, respectively), accounting for 8.6% of the variance.

Table 4.

Regression Analyses Testing Mediation Effect on Intention (N =336, Path C, Equation 1)

Variables	B	SE B	R^2	β	T Value	P
Equation 1: Intention			.086			
Mastery-involving climate	.35	.072		.26	4.88**	.000
Performance-involving climate	.105	.05		.11	2.11*	.036

Notes. B values are unstandardized regression coefficients; SE B values are the standard errors for unstandardized regression coefficients; R^2 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; * $p < .05$; ** $p < .01$.

Equation 2: Expectancy-related beliefs and subjective task values were separately regressed onto the perceptions of the motivational climate (Path A, Table5). Perceptions of the motivational climate (mastery- and performance-involving features) were significant predictors of both expectancy-related beliefs (β = .30, *p*= .000; β = .17, *p*= .001, respectively) and subjective task values (β =.28, *p* = .000; β = .17, *p*= .001, respectively), accounting for 13% and 12% of the variance, respectively.

Table 5.

Multiple Regressions for Predicting Expectancy-value Beliefs (N = 336; Path A, Equation 2)

Dependent Variables	Independent Variables	B	SE B	R^2	β	T Value
Expectancy beliefs				.13		
	Mastery-involving climate	.26	.05		.30	5.75**
	Performance-involving climate	.10	.03		.17	3.25**
Task values				.12		
	Mastery-involving climate	.25	.05		.28	5.45**
	Performance-involving climate	.10	.03		.17	3.29**

* $p < .05$; ** $p < .01$.

Equation 3: Intention was regressed onto the expectancy-value constructs, controlling for perceptions of the motivational climate (Path B). Specifically, the expectancy-value constructs were entered in the first block, and motivational climate constructs were entered in the second block. As can be seen from Table 6, when expectancy-value constructs were entered into the model, the effects of motivational climate (both mastery- and performance- motivational climates) on intention for future participation in PE are no longer significant. Based on a comparison between results obtained from equation 1 and equation 3, the finding supports full mediation because the effect of the independent variable on the dependent variable becomes non-significant after taking into account the effect of the mediator (Baron & Kenny, 1986). Consistent with our hypothesis the expectancy-value beliefs completely mediated the relationship between motivational climate and intention for future participation in PE.

Table 6.

Regression Analyses Testing Mediation Effect on Intention (N =336, Path B, Equation 3)

Variables	B	SE B	R^2	β	T Value	P
Equation 3: Intention			.38			
Block 1						
Expectancy beliefs	.63	.08		.41	7.54**	.000
Task values	.40	.09		.25	4.67**	.000
Block 2						
Mastery-involving climate	.09	.06		.07	1.42	.157
Performance-involving climate	.00	.04		.00	.00	.999

* $p < .05$; ** $p < .01$.

Model 2-Mediational Effect of Expectancy-value Beliefs on HRQOL. Equation1: HRQOL was regressed onto the perceptions of the motivational climate (Path C, see Table 7). Results showed that a mastery-involving climate was a significant predictor of HRQOL (β = .25, p= .000), accounting for 6.6% of the variance.

Table 7.

Regression Analyses Testing Mediation Effect on HRQOL (N =336, Path C, Equation 1)

Variables	B	SE B	R^2	β	T Value	P
Equation 1: HRQOL			.066			
Mastery-involving climate	5.39	1.15		.25	4.70**	.000
Performance-involving climate	-1.40	.80		-.09	-1.77	.078

* $p < .05$; ** $p < .01$.

Equation 2: Expectancy-related beliefs and subjective task values were separately regressed onto the perceptions of the motivational climate (Path A, see Table 5). This step is the same in all mediation models and details are described in the first mediation model.

Equation 3: HRQOL was regressed onto the expectancy-value constructs, controlling for perceptions of the motivational climate (Path B). Specifically, the expectancy-value constructs were entered in the first block, and motivational climates constructs were entered in the second block. As can be seen from Table 8, the effect of perceptions of the motivational climate (i.e. mastery-involved climate) on the HRQOL was weaker, although still significant (β = .19, *p*= .001), after taking into account the effect of mediator (i.e. expectancy-related beliefs β = .22, *p* = .001). However, the effect of a performance motivational climate on HRQOL became significant (β = -.13, *p*= .017) after controlling for the mediator.

Table 8.

Regression Analyses Testing Mediation Effect on HRQOL (N =336, Path B, Equation 3)

Variables	B	SE B	R^2	β	T Value	P
Equation 3: HRQOL			.104			
Block 1						
Expectancy beliefs	5.39	1.59		.22	3.35**	.001
Task values	-.44	1.61		-.018	-.271	.786
Block 2						
Mastery-involving climate	4.10	1.20		.19	3.43**	.001
Performance-involving climate	-1.90	.79		-.13	-2.39*	.017

* $p < .05$; ** $p < .01$.

According to Baron and Kenny (1986), partial mediation is established when the path from independent variable to dependent variable is reduced in absolute size but is still significant

when the mediator is controlled. The results (See Table 7 and Table 8) indicated that after controlling for the expectancy beliefs, the effect of the mastery motivational climate on HRQOL decreased from .25 to .19 (i.e. the standardized regression coefficients) but was still significant. Thus, the results indicated that expectancy beliefs are a partial mediator in the relationship between the mastery motivational climate and students' HRQOL. On the other hand, in the first equation there was no significant prediction of a performance motivational climate on HRQOL, but the effect became significant after controlling for the expectancy-value beliefs in the third equation. Analysts propose that the essential steps in establishing mediation are step 2 and step 3, and it is possible that mediation can exist even if there is not a significant relationship between the independent and dependent variables (First equation; MacKinnon, Fairchild, & Fritz, 2007).

Particularly, in some cases, step 1 is not met, but there is still mediation because the mediator acts like a suppressor variable in this case, or referred to as "inconsistent mediation". In this study the pattern of coefficients indicates the presence of inconsistent mediation (i.e., a suppressor effect; absolute values of standardized regression coefficient increased from -.09 to -.13) of expectancy beliefs on the relationship between the perception of a performance motivational climate and HRQOL. According to Conger (1974, p. 36-37), a suppressor is defined as "a variable which increases the predictive validity of another variable (or set of variables) by its inclusion in regression equation," where predictive validity is assessed by the magnitude of the regression coefficient. However, the three step approach proposed by Baron and Kenny (1986) for testing mediation effects assumes a consistent mediation model and does not allow for suppression or inconsistent mediation (Mackinnon, Krull, & Lockwood, 2000).

Model 3-Mediational Effect of Expectancy-value Beliefs on Steps/min. Equation 1: Steps/min was regressed onto the perceptions of the motivational climate (Path C, see Table 9).

Results showed that both mastery and performance motivational climates were significant predictors of steps/minute (β = .13, *p* = .02; β = -.28, *p* = .000, respectively), accounting for 8.3% of the variance. Perception of a performance climate was a negative predictor.

Table 9.

Regression Analyses Testing Mediation Effect on Steps/min (N =336, Path C, Equation 1)

Variables	B	SE B	R^2	β	T Value	P
Equation 1:Steps/min			.083			
Mastery-involving climate	5.67	2.38		.13	2.38*	.018
Performance-involving climate	-8.59	1.64		-.28	-5.23**	.000

* $p < .05$; ** $p < .01$.

Equation 2: Expectancy-related beliefs and subjective task values were separately regressed onto the perceptions of the motivational climate (Path A, see Table 5). This step is the same in all mediation models and details are described in the first mediation model.

Equation 3: Steps/min was regressed onto the expectancy-value constructs, controlling for perceptions of the motivational climate (Path B). Specifically, the expectancy-value constructs were entered in the first block, and motivational climate constructs were entered in the second block. As can be seen from Table 10, when expectancy-value constructs were entered into the model, the effect of a performance motivational climate on steps/min is reduced after controlling for the expectancy-value beliefs accounting for 11% of the variance in the model (β = -.25, *p*= .000). On the other hand, the effect of a mastery motivational climate on steps/min is also significant but increased (β = .18, *p*= .001) after controlling for the mediator.

Table 10.

Regression Analyses Testing Mediation Effect on Steps/min (N =336, Path B, Equation 3)

Variables	B	SE B	R^2	β	T Value	P
Equation 3 :Steps/min			.11			
Block 1						
Expectancy beliefs	-1.82	3.31		-.04	-.55	.584
Task values	-7.87	3.35		-.15	-2.35*	.02
Block 2						
Mastery-involving climate	8.06	2.49		.18	3.23**	.001
Performance-involving climate	-7.60	1.66		-.25	-4.59**	.000

* $p < .05$; ** $p < .01$.

In the mediation context, the relationship is reduced because the mediator explains part or all of the relationship because it is in the causal path between the independent and dependent variables (Mackinnon et al., 2000). The results (See Table 9 and Table 10) indicated that the effect of the performance motivational climate on steps/min after controlling for task values (i.e. absolute values of standardized regression coefficient) was decreased from -.28 to -.25. Thus, the data partially supported the hypothesis that the expectancy-value construct (i.e. task values) emerged as a mediator of the relationship between the performance motivational climate and steps/min, indicating a partial mediation. However, a situation in which the magnitude of the relationship between independent variable and dependent variable becomes larger when a third variable is included would indicate suppression or inconsistent mediation (Conger, 1974; Mackinnon et al., 2000), as described in the second mediation model. The pattern of coefficients

indicates the presence of inconsistent mediation (i.e., a suppressor effect; standardized regression coefficient increased from .13 to .18) of task values on the relationship between a mastery motivational climate and steps/min.

Model 4-Mediation Effect of Expectancy-value Beliefs on Self-reported PA. Equation 1: Self-reported PA was regressed onto the perceptions of the motivational climate (Path C, see Table 11). There was no significant prediction of motivational climate on self-report PA in this step, so the mediation analysis was not conducted for self-report PA because this does not meet the criteria for determining mediation proposed by Baron and Kenny (1986).

Table 11.

Regression Analyses Testing Mediation Effect on Self-reported PA (N =336, Path C, Equation 1)

Variables	B	SE B	R^2	β	T Value	P
Equation 1:Self-reported PA			.018			
Mastery-involving climate	.09	.06		.08	1.51	.133
Performance-involving climate	.07	.04		.09	1.72	.086

* $p < .05$; ** $p < .01$.

Multivariate Analysis of Variance (MANOVA)

Descriptive statistics by gender and race are reported in Table 12. Interpretation of the race effects must be interpreted in the context of differences between the schools. Most of the White students were in Lowery School. They were middle income and had experienced female teachers who provided mastery focused instruction. Virtually all of the African American

students were in schools serving a low SES population in a rural area. Two of the three teachers were male. So, the race effects are confounded by SES and by school differences. It was hypothesized that motivational constructs, intention, HRQOL, and PA would vary as a function of gender and race. The 2 x 2 MANOVA on motivational constructs yielded a significant main effect for gender [Wilks' Lambda = .937, F = 5.52 (4, 329), p < .000], and race [Wilks'Lambda =.921, F = 7.009 (4, 329), p < .001]. The gender by race interaction was also significant [Wilks'Lambda =.966, F = 2.88 (4, 329), p = .023]. Follow-up univariate comparisons between groups show significant main effects for gender for expectancy-related beliefs [F (1, 334) = 10.918, p < .001, ES = .35]. Boys scored higher than girls on expectancy-related beliefs but not on task values. For race, effects for expectancy-related beliefs [F (1, 334) = 12.038, p < .001, ES = .37], task values [F (1, 334) = 13.533, p < .001, ES = .39], and perceived performance motivational climate were significant [F (1, 334) = 8.679, p = .003, ES = .32]. As can be seen in Table 12, the minority students scored higher than White students on expectancy-related beliefs and subjective task values, as well as perceptions of a performance motivational climate.

A follow-up factorial ANOVA revealed that the gender by race interaction was significant for the perception of a mastery motivational climate [F (1, 332) = 7.021, p = .008, ES = .09]. No other interactions were significant. As illustrated in Figure 2, the perceptions of a mastery motivational climate for boys and girls in PE varied by students' race. Minority girls' perceptions of a mastery motivational climate were higher than minority boys', while the opposite was shown for the White boys and girls. Minority girls and White boys had higher perceptions of a mastery motivational climate than White girls. Minority boys had the lowest perceptions of a mastery motivational climate.

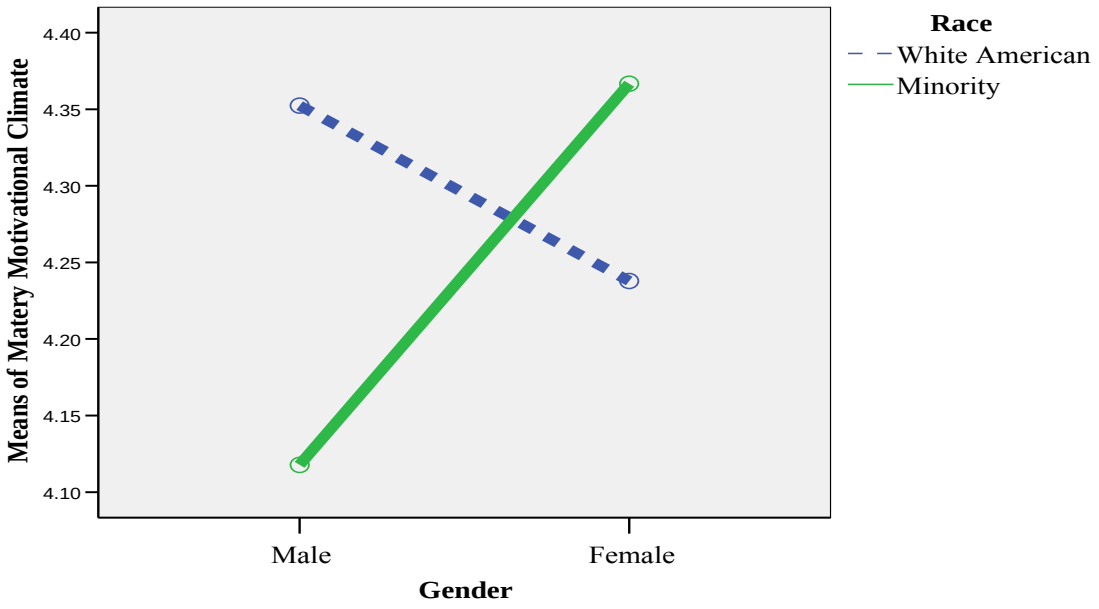

Figure 2. Gender by Race Interaction for Mastery Motivational Climate

The second 2 x 2 MANOVA for study outcome variables (intention, HRQOL, PA, and steps/min) yielded a significant main effect for gender [Wilks' Lambda = .895, F = 9.699 (4, 329), $p < .001$], and race [Wilks'Lambda =.591, F = 56.96 (4, 329), $p < .001$]. The interaction between gender and race was also significant [Wilks' Lambda = .954, F = 3.987 (4, 329), p = .004]. Univariate follow-ups for gender revealed significant effects for intention [F (1, 334) = 17.954, $p < .001$, ES = .45], HRQOL [F (1, 334) = 4.512, $p < .034$, ES = .23] and PA [F (1, 334) = 27.642, $p < .001$, ES = .55]. Boys reported higher levels of intention, HRQOL and PA than girls, and no gender differences were evident in steps/min. With regard to the race, there was a significant main effect for intention [F (1, 334) = 12.665, $p < .001$, ES = .38] and HRQOL [F (1, 334) = 11.183, $p < .001$, ES = .36]. White students reported significantly higher HRQOL than

minority students, but minority students intended to participate in PE in the future more than White counterparts.

There was a main effect for race for steps/min [F (1, 334) = 204.515, p < .001, ES = 1.23] with White students recording higher numbers of steps than minority students. The gender by race interaction was also significant [F (1, 332) = 12.801, p < .001, ES = .11] and that takes precedence in the interpretation of the findings. The interaction graphed in Figure 3 shows that boys' and girls' steps/min in PE depend on their race. White students reported more steps/min than minority students overall. The White girls tended to take fewer steps than White boys, while the reverse was true for minority students. Minority boys had the lowest step counts among four groups.

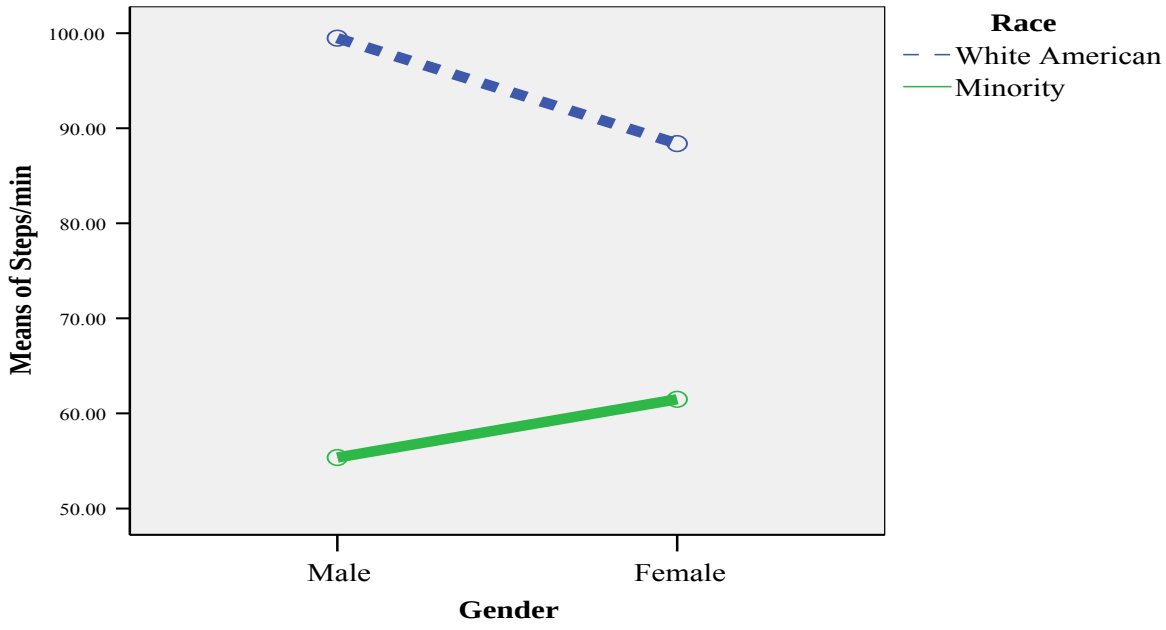

Figure 3. Gender by Race Interaction for Steps/min

Table 12.

Multivariate Analysis of Variance: the Mean of Study Variables for Gender and Race

Variables	Gender		Race	
	Male (N=157) M (SD)	Female (N= 179) M (SD)	White (N= 179) M (SD)	Minority (N= 157) M (SD)
Expectancy beliefs	4.37 (.52)**	4.18 (.57)**	4.17 (.55)**	4.38 (.55)**
Task values	4.21 (.55)	4.21 (.55)	4.11 (.50)**	4.32 (.58)**
Mastery-involving climate	4.24 (.69)	4.30 (.57)	4.29 (.52)	4.25 (.74)
Performance-involving climate	2.84 (.97)	2.68 (.86)	2.62 (.83)**	2.91 (.98)**
Intention	4.57 (.74)**	4.18 (.92)**	4.21 (.87)**	4.54 (.81)**
HRQOL	81.88 (13.70)*	78.75 (13.27)*	82.49 (11.17)**	77.61 (15.44)**
PA	3.63 (.70)**	3.24 (.65)**	3.42 (.67)	3.42 (.74)
Steps/min	78.96 (32.02)	75.76 (24.68)	93.59 (20.77)**	58.63 (24.04)**

* $p < .05$; ** $p < .01$.

CHAPTER FOUR: DISCUSSION

The primary goal of this study was to enhance our understanding how of individual and contextual factors influence PA and HRQOL in elementary school children. Based on the motivational sequence posited by expectancy-value theory, it was hypothesized that expectancy-related beliefs and task values would be significant correlates of health-related outcomes (i.e. PA and HRQOL); and the perceived motivational climate (i.e. the mastery- and performance-involving features) would be significantly related to expectancy-related beliefs and task values. Such information is central to developing and implementing effective health promotion programs in the now-burgeoning area of elementary school PE and children's well-being (i.e., physical and psychosocial health). This study is the first study to explore the salient relationships of the expectancy-value model with PA levels in elementary children and expanded the applicability of this theoretical framework in understanding individual's health outcome such as HRQOL (Gu, Solmon, & Zhang, 2011a).

Motivational Climate and Expectancy-Value Constructs

With respect to the teacher-created social context, the findings from the present study revealed that student perceptions of a mastery climate were positively related to expectancy beliefs and task values. This finding supports the growing body of literature exploring sources of expectancy beliefs and task values (Gu, Solmon, & Zhang, 2011b; Gu, Solmon, & Zhang, 2010; Sabiston & Crocker, 2008; Xiang et al., 2006). Teachers are a significant factor in how children perceive the motivational climate in educational settings (Goudas, Biddle, & Fox, 1994; Xiang et al., 2006). Teachers' motivational orientations ultimately affect how children are motivated, as the way that a teacher structures the motivational climate can promote a specific state of achievement involvement (Ames, 1992a, 1992b). This study supports previous research findings that elementary-aged children's perceptions of the physical education climate as task-oriented

were positively correlated to higher levels of expectancy beliefs and task values in motivational processes (Xiang et al., 2006). This suggests that an emphasis on a mastery motivational climate in physical education could facilitate students' adaptive motivational patterns.

Interestingly, perceptions of a performance motivational climate made a small but positive contribution in explanation of the expectancy beliefs and task values in this study, which is inconsistent with previous research findings (Ames, 1992a, 1992b; Ntoumanis & Biddle, 1999; Pensgaard & Glyn, 2000). Goudas and colleagues (1994), however, provided evidence that students who scored high on both dimensions (mastery and performance classroom climates) reported higher levels of intrinsic motivation. In our study, task values incorporate interest and importance associated with intrinsic motivation. Additionally, a more recent study with students in Singapore (Sproule, Wang, Morgan, McNeill, & McMorris, 2007) also supports our finding that both mastery and performance motivational climates are positively correlated with perceived competence and intrinsic motivation towards PE.

Research on motivational patterns associated with perceptions of a performance climate reveal less consistent findings (Xiang et al., 2004), and there is a need to examine the discrepancy between teachers' and students' perceptions of motivational climate in PE. In addition, measuring students' situational and dispositional goal orientations may help to explain young people's motivational processes to better understand students' physical activity behaviors and health perceptions, as well as help to guide more effective intervention. Finally, the results support developmental perspectives of the expectancy-value model related to environmental influences presented by significant others (Reinboth & Duda, 2006; Sabiston & Crocker, 2008; Standage, Duda, & Ntoumanis, 2003). For example, Reinboth and Duda (2006) found that a mastery-involving climate created by coaches plays an important role in fostering needs

satisfaction and well-being (i.e., subjective vitality) as compared with performance-involving climate.

PA and HRQOL

A primary contribution of this study was to explore the relationship between PA and HRQOL in children. Consistent with studies in adult populations and adolescents (Bize, Johnson, & Plotnikoff, 2007; Gu, Solmon, &Zhang, 2011a), there was a positive association among these variables in healthy children. This suggests promotion of PA may be beneficial in achieving desired health benefits across diverse populations. Compared to previous studies, our study provides additional evidence because of the inclusion of pedometers as objective measures of PA. Self-report measures provide a reasonable snapshot of population levels of PA, but combined measurement of the self-report and pedometer-based PA is recommended in investigating individual's HRQOL (Bize et al., 2007).

Using multiple measures in the physical education studies can provide a more accurate assessment of students' current levels of PA, but the valid and reliable measurement of children's PA remains challenging. There was no significant correlation between self-reported PA and steps/min in this study. This is consistent with some research evidence that self-reports compared to objective measures (motion sensors: accelerometers and pedometers) show only fair to poor agreement (coefficients range from 0.2-0.4) (See reviews, Bauman & Merom, 2002; Bauman, Phongsavan, Schoeppe, & Owen, 2006; Washburn, Heath, & Jackson, 2000). This does not necessarily mean that self-reported PA has poor validity, as the PAC-Q measures different dimensions of behavior including PA within and beyond PE class compared to the movement-related aspects of PA measured by pedometers specifically during PE classes. Another possible explanation is that the class content and teachers' behavior may have contributed to the

incongruence between students' self-reported activity level and pedometer counts (steps/min) within the limited time in PE (McKenzie, Marshall, Sallis, & Conway, 2000). Based on achievement goal theory, the perceptions of motivational climate can influence how children construct their physical education experiences and modify their exercise behaviors (Ames, 1992a, 1992b; Xiang et al., 2003; Xiang et al., 2006).

The critical goal of national health promotion measurement is to assess trends in health risk factors and their antecedents and correlates. Assessing and promoting PA and HRQOL have become major issues in pediatric public health and also serve as a major goal of Health People 2020 (USDHHS, 2010). Research involving children's HRQOL in elementary school physical education provides important information for understanding variations in the development of children and their success in their early school years. Knowledge of the association between HRQOL and PA could help target interventions and direct resources to individuals, communities, or health issues most at risk in school PE. One of the important future research directions would be to explore the casual relationship between PA and HRQOL.

This positive relationship has important practical implications for those involved in the promotion of physical and psychological health in youth. Accordingly, health practitioners and pediatricians should be made aware that children who are physically inactive or sedentary may be more likely to perceive themselves in a negative manner relative to impaired physical and psychosocial functions incorporated in HRQOL. There is evidence that at-risk weight status is negatively related to children's and adolescents' HRQOL (Schwimmer et al., 2003; Swallen et al., 2005; Williams et al., 2005). From an applied perspective, PA and exercise intervention programs within or after school aimed at lowering children's health risk status and/or childhood obesity are highly recommended. Links between PA, and psychosocial health in school children,

however, are less well-substantiated (Gu, Solmon, & Zhang, 2011a) and certainly constitute a promising area of future investigation.

Expectancy-Value Beliefs, Intention, PA, and HRQOL

In line with our hypothesis, as well as previous research (Gao, Newton, & Carson, 2008; Gu, Solmon, & Zhang, 2011a; Sabiston & Crocker, 2008), it was clear that competence beliefs and task values are both integral to understanding adolescents' PA. One of the most important findings of this study was that expectancy-related beliefs was a significant predictor of self-report PA and HRQOL for elementary students. Specifically, students tend to engage in and participate in activities in which they believe they are competent. For those who perceived competence in PE, a direct positive impact on their HRQOL was evident. Consistent with the previous studies, this finding suggests that health promoters should focus on enhancing students' confidence in PA and physical education by promoting successful and positive learning experiences, to encourage them to adopt and maintain physically active lifestyles. In addition, our results also support the notion that HRQOL can be affected by domain specific motivation (e.g., automomous motivation; Standage et al., 2007). That is, an individual with a high level of competence beliefs in PE is likely to present positive behaviors and mental health. Our study findings additionally confirmed existing evidence by extending this investigation to elementary school children (Gu, Solmon, & Zhang, 2011a).

Inconsistent with the hypotheses, task values emerged as a small but significant negative predictor of steps/min ($r = -.15$, $p=.022$). This finding is difficult to explain, but the mediation model provides insight into a possible explanation. According to the mediation analysis, if there is a strong performance-involving environment operating in a PE class, it is quite plausible, at least for some students in the class, to have higher competence beliefs and task values toward

PE. Consequently, emphasizing social comparison in the classroom environment may cause those children to be less physically active, explaining the lower numbers of steps/min in that particular class time. Future work in PE, going beyond cross-sectional designs, could ascertain whether, as the mediators of expectancy-related beliefs and task values overtime become increasingly fulfilled, students' lower steps/minutes result from the performance-motivational climate. Another explanation for the negative association between steps/min and task values could be variations in class activities and instructional approaches. The comparison of steps/min between White and minority students revealed systematic differences between these groups, and it is acknowledged that most of the White students who had more steps were in one school while most of the minority students were at the other schools. Researchers observed classes and recognized some of the variation in step counts could be attributed to elements in the instructional environment such as task design, availability of equipment, and space. It is also important to note that although the negative relationship was significant, it is of a small magnitude and should be interpreted with caution.

Consistent with earlier work exploring the expectancy-value model in elementary PE (Xiang et al., 2003, 2004), both expectancy beliefs and task values were related to intention for future participation in PE. Intention also had a positive association with HRQOL. Taken together, the pattern of relationships among expectancy beliefs, task values, HRQOL, PA, and intention supports theoretical predictions and provides evidence that promoting PA for elementary-aged children has the potential to produce long term health benefits. According to the mediation analysis, the association between perceptions of motivational climate and study outcomes was significantly influenced by the inclusion of the mediators (expectancy beliefs and

task values) in the model. It is clear that expectancy beliefs and task values are important correlates of PA behavior and HRQOL.

Mediational Effects of the Expectancy-value Beliefs

The findings from the mediation tests partially support the theoretical assertion (Eccles et al., 1983; Pintrich & Schunk, 2002) that perceptions of expectancy beliefs and task values are important mediators of the social context-achievement outcome relationship. In the mediation analysis, perceptions of expectancy-related beliefs were found to be a partial mediator of a mastery motivational climate and HRQOL, whereas task values were a partial mediator of a performance motivational climate and steps/min. A high mastery motivational climate together with high expectancy beliefs could be an advantage for children's future health, whereas a high performance motivational climate could produce less activity (i.e. lower steps/min) within PE even if students view PE as important, interesting and useful. In addition, expectancy-value beliefs emerged as a full mediator of the relationship between motivational climate and students' intention for future participation in PE. It is promising that the motivational climate during PE is associated with students' competence and task values during the elementary years and ultimately serve to motivate children to attend PE in the future.

We argue that PE teachers, in general, are aware of the importance of fostering competence beliefs among children of all abilities, and our data support the continuation of efforts aimed to maintain or foster students' PA and psychosocial well-being. On the other hand, physical education curricula that emphasize enjoyable, important and useful PA and that help students develop the knowledge, attitudes, motor skills, and competence are needed. This can ultimately increase class time PA participation, as well as foster the adoption and maintenance of physically active lifestyles. To date, little is known about the role of motivational constructs in

elementary students' PA behavior and HRQOL (Gu, Solmon, & Zhang, 2011a) in the PE domain. Although classroom climates clearly have the potential to affect students' motivation in PE, a paucity of work has examined their potential positive and negative influence on motivation, which consequently influences children's physical and psychosocial health. Our study provided the first evidence on this issue, and although this is a good beginning, additional study is needed to refute or replicate our findings.

The significant mediation or indirect effects of perceptions of the motivational climate on PA and HRQOL through expectancy-value constructs further supports the tenets of the expectancy-value model. Although some support has been found for the meditational role of expectancy-value beliefs on motivational-related behavior (self-reported leisure-time PA; Sabiston & Crocker, 2008) in adolescents, the current work extends this to the prediction of indices of psychological well-being and in class PA (steps/min) in elementary PE. Research including assessment of theory-based mediators and health outcomes is also suggested (Ryan et al., 2008) from a health-care perspective, recognizing the importance of these behavioral mediators of health-related outcomes. Furthermore, the support of mediation effects reinforces the notions that (1) the expectancy-value model is a viable framework to investigate not only elementary children's PA behavior but also their psychosocial well-being; and (2) motivational processes towards PE proposed by the expectancy-value model may have implications for general perceptions of health such as HRQOL.

Group Differences

Gender Effects. Consistent with our hypotheses, the mean scores of expectancy-related beliefs, self-report PA, and HRQOL were higher for boys compared to girls. In general, researchers have consistently found that boys are more likely to hold higher expectancy-related

beliefs than girls in most traditional sport activities and physical education (Eccles & Harold, 1991; Jacob et al., 2002; Xiang et al., 2006; Gao & Xiang, 2008). They argue that gender differences in children's expectancy beliefs may vary by class activities and tasks, and might be a function of perceived gender appropriateness of the activities or tasks. In addition, PE is more targeted to boys' interests through activity choices, with most of the time spent on ball games or other activities traditionally more associated with boys. It is plausible that gender differences on expectancy beliefs would be presented when some classes or schools had sport activities during PE, which are defined as a masculine-typed activity (Gao et al., 2009).

No gender differences existed on the task values in this studies which supported the notion that during elementary school, children's subjective task values do not appear differentiated (Cox & Whaly, 2004; Gao et al., 2009; Wigfield & Eccles, 1992, Xiang et al., 2003). While Eccles and Harold (1991) lamented that gender differences emerged at ages as young as six years old, our findings provided insight that even though females may have lower expectancy beliefs towards some particular activities or tasks, possibly rooted in stereotypical gender views, they can have as much interest in that particular activity and perceive it to be as useful and as important as males do. Although it is encouraging that girls' values are not lower than boys', it remains a concern that expectancy beliefs are already lower as early as the 4^{th} and 5^{th} grades, especially in light of the predictive utility that expectancy beliefs have for intention, HRQOL, and self-reported PA.

Other socializing agents beyond the class content, such as teachers, parents and siblings' behaviors or perceptions are likely to be instrumental in shaping children's expectancy beliefs and task values at this age (Gu, Solmon, & Zhang, 2010; Xiang et al., 2006). The motivational climates created by PE teachers were positively related to students' expectancy-value beliefs,

and no gender differences were evident in perceptions of motivational climate. Consequently, future studies should address the influence of other socializing agents such as parents and siblings and varied source of expectancy beliefs and task values in addressing children's gender difference on self-perceptions and values within or beyond PE settings.

Boys had higher intentions for future participation in PE than girls, which is in accordance with previous study (Xiang et al., 2003). As hypothesized, boys scored significantly higher on HROQL as compared to girls, consistent with previous work with an adolescent population (Bisegger et al., 2005). One recent study provided the first evidence of gender differences on HRQOL in primary school students. No significant gender differences emerged on the total HRQOL scores in 4th grade students, but girls reported significantly lower emotional functioning than boys (Laaksonen et al., 2008). It has been speculated that gender differences may be related to different role expectations in society for girls and boys (Santalahti, Aromaa, Sourander, Helenius, & Piha, 2005). The inconsistent results suggest that gender specific differences in reporting different dimensions of HRQOL need further examination in elementary aged populations.

Boys had higher scores on self-reported PA but steps/min did not differ. Hannon and Ratliffe (2005) found high school males, however, had higher average step counts than females in all settings when controlling for teacher effect. In our study, boys reported more activity than girls either in school or after school as measured by the questionnaire, but they did not record higher class activity levels (step counts). Classes were highly structured and teachers were careful to ensure that all children had equitable opportunities to engage in class. This demonstrates that further studies should be undertaken that monitor and report data by activity

types and using multiple measures of PA. School PE must devote special efforts to foster the early physical development of girls.

Race Effects. Differences emerged between White and minority students on most of the study variables including expectancy beliefs, task values, intention, HRQOL and steps/minute. This highlights the importance of examining these variables across different racial and ethnic groups. The minority participants reported significantly higher scores than the White participants on all expectancy-value constructs, as well as perceptions of a performance motivational climate. In the sport domain, there is evidence that racial groups display different perceptions of racial-role appropriateness toward particular sports and physical activities (Gao, Lee, & Harrison, 2008; Harrison & Belcher, 2006). That is, particular sports such as football, basketball, and track sprinting are perceived as more appropriate for African Americans, while others such as golf and hockey are regarded as more appropriate for White students. For example, Cox and Whaley (2004) reported that African Americans scored significantly higher on expectancy for success and task values as basketball athletes in high school, in comparison with the White students.

It is plausible that racial-role appropriateness might be a reason for the race effect on the expectancy-value beliefs in our study as most monitory were African American (80%) and their PE task or activity was primarily as basketball. In fact, in African American culture, sport is valued as an expression of self- and a potential way out of economic hardship and racial oppression (Coakley, 2001; Major, 1998), which could be another reason for African Americans' higher scores on self- and task beliefs. In light of the competitive nature of some types of sports, it makes sense that African Americans would perceived the classroom environment as more performance-oriented, and demonstrate higher perceptions of expectancy beliefs, report more interest in activities, and believe activities are more useful and important to them.

In terms of study outcomes, minority students reported higher intention for future participation in PE than White students, while White children scored significantly higher on HRQOL and steps/min than minority children. Inconsistent with the hypotheses minority students are more likely to participate in PE in the future compared to their White counterparts. However, this finding was supported by expectancy-value model that expectancy beliefs and task values have the strongest relationship with achievement behaviors such as intention, persistence, and performance (Eccles & Harold, 1991; Gao, Lodewyk, & Zhang, 2009; Xiang et al., 2003), because minority students' both expectancy beliefs and task values were higher than White students in this study.

Since minorities perceived the classroom climate to be more performance oriented than White students in this study, such perceptions of environment which focused on outcomes more outside their personal control (i.e. beating others, attaining social approval and rewards) could negatively influence their HRQOL. It is consistent with the theoretical proposition that a supportive social context (i.e. a mastery-involving climate) is positively related to exercise behaviors, as well as well-being (i.e. HRQOL; Reinboth & Duda, 2006; Standage & Gillison, 2007). The finding that minority children reported lower levels of HRQOL than White children is important for several reasons. First, this supports the notion that elementary school children are able to report their HRQOL with sufficient accuracy to provide valid data. Socio-economic status (SES) is a confounding variable, as virtually all of the minority children were also of lower SES, while the majority of White students were middle income or higher. This study is one of the first to explore HRQOL with elementary students, and this evidence that minority children of low SES already report lower physical and psychosocial well-being by the upper elementary school years is an important concern.

In addition, minority students recorded lower class activity (i.e. steps/min) than White students. Minority children perceived classroom climates as performance-oriented more than White counterparts, which could produce lower steps/min within PE although the minority children had higher expectancy beliefs and task values compared to White children. Perhaps the most important finding regarding race and steps/min was the gender by race interaction. It is of interest that minority boys had the lowest step count, and interpretation of the meditational model suggests this could be a function of the perception of a performance oriented climate. Unsurprisingly, there was no race difference on self-report PA because the likelihood that self-report or social desirability bias affected responses on the self-reported PA questionnaires is always of concern for both adults and youths.

CHAPTER FIVE: SUMMARY AND CONCLUSION

This study made a unique contribution to the literature by showing how individual and social factors affect students' decisions to adopt physically active lifestyles and exploring students' global psychological well-being (HRQOL). The findings highlighted that researchers and practitioners need to consider individual factors (e.g., expectancy-value constructs) and social factors (e.g., motivational climates) as they design effective interventions to promote PA and prevent obesity and promote health status among elementary school students. Based on the integration of achievement goal theory and the expectancy-value model, enhancing mastery motivational climates in physical education classes by implementing integrative approaches to PA and global psychological health promotion is an essential element needed in the future endeavors. On the other hand, our study also suggests that in some situations students' self- and task beliefs may be positively influenced by a performance motivational climate.

As this line of research develops, it will be important to move past correlational and cross-sectional designs that represent a "snapshot" approach to exploring these motivational constructs. Longitudinal studies where expectancy value beliefs, motivational climates, physical activity and health-related quality of life are assessed over several time periods are needed to further our understanding of the reciprocal effects of these constructs. In due course, based on this line of inquiry, theoretically driven interventions need to be designed and tested. It will be important to determine the effectiveness of interventions that manipulate the motivational climate with the intent of fostering expectancies and values that will ultimately produce increased physical activity levels and health-related quality of life.

This research increased our understanding of how students' motivation in school physical education influences their PA engagement and HRQOL (i.e., physical, emotional, social, and

school dimensions). One important implication of the study for practitioners might be that children's expectancy-value beliefs in PE, perceptions of health, and self-reported activity levels could be used in screenings to identify groups of children who are at risk to be physically inactive and therefore more prone to be poor health status. In addition, our study provided specific evidence that differences exist in children's levels of motivation and their health-related perceptions in elementary PE, given similar task values. It is clear that meaningful gender and race differences exist in the field of motivation, HRQOL and PA of children during PE, and that these differences have relevance for the research and practice of public health. Findings provided valuable insights regarding how to promote students' PA and HRQOL, and suggesting that interventions aimed in prevention and health promotion must be gender-and race-specific, and must be designed to reach target groups by emphasizing what is important to them.

The findings from the study must be considered within the context of inherent limitations. With the cross-sectional nature of the study, causal relationships cannot be established. There is a need for prospective, longitudinal and experimental studies to test for causality. Second, as this study adopts the classic achievement goal theory, further research is needed to investigate the 2 x 2 achievement goal approach (approach-avoidance dimensions; Elliot &Covington, 2001). Third, in this study we measured HRQOL by children's self-report. More informative measurements such as parents' perceptions of their child's HRQOL could provide a more accurate picture. The inclusion of both self-report and parents report of children's HRQOL can more accurately detect health-related problem in children (Felder-Puig, Topf, Gadner, & Formann, 2008). Lastly, the race effects reported are confounded by SES and school differences. A larger sample of schools drawing from a variety of SES and ethnic populations would strengthen future studies.

To conclude, this study supported the relationship between motivational climate, expectancy-value beliefs, intention, PA, and HRQOL. These findings underscore the importance of future research in PE to inform the development of teaching methods and curricula contributing to the promotion of participation in PA and the optimal psychosocial health. In terms of public health, it is imperative to monitor HRQOL in children and adolescents with and without chronic illness and representing various individual, social and culture differences.

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APPENDIX A: LITERATURE REVIEW

Elementary School Students' Motivation in Physical Education,

Health-Related Quality of Life and Physical Activity

Emerging evidence indicates that physical inactivity is associated with increasingly high rates of obesity and overweight in U.S. population in recent years (U.S. Department of Health and Human Services [USDHHS], 1996, 2000). This widespread problem, especially among school-aged students, leads to health problems in later life such as cardiovascular disease and diabetes. Further, research documents regular participation in physical activity can reduce obesity, overweight, depression and stress, and also has been linked to improved health status (e.g. cognitive function, self-esteem) in youth and adults (American College of Sport Medicine [ACSM], 2000; Berkey, Rockett, Gillman, & Colditz, 2003). Although physical activity is associated with positive health outcomes, children are not as active as they should be and obesity is identified as one of the most stigmatizing and least socially acceptable conditions in childhood.

Given the health benefits of regular physical activity, it is important to make significant efforts to encourage increased physical activity in school children and adolescents. Particular focus should be placed on children and adolescent because early physical activity experiences are important influences on adult physical activity patterns (Scott & Willits, 1989; Thompson, Humbert, & Mirwald, 2003). That is, school-aged students who are active during the childhood are more likely to maintain high levels of physical activity across the life span, than those who are inactive.

School physical education and sport programs have been identified as potentially important settings in efforts to increase school-aged students' physical activity levels and

consequently, can play a critical role in promoting public health (Wallhead & Buckworth, 2004). Furthermore, many researchers and professional organizations recommend that physical education should be offered at every grade level every day, and suggest that children should accumulate at least 60 minutes per day of moderate to vigorous physical activity (ACSM, 2000; Centers for Disease Control and Prevention [CDC], 1997; Cobin & Pangrazi, 2003).

Although 97% of elementary school students take physical education, children cannot meet the physical activity recommendations within the allotted instructional time (Sallis & Mckenzie, 1991). Although the physical, social, and mental health benefits of regular physical activity participation are well documented, nearly one third of American youths are not vigorously active on a regular basis. Students' motivation to participate in physical education and sport programs declines over the school years and this decline is greater in girls than boys (National Association for Sport and Physical Education [NASPE], 2004; Thomas, Lee & Thomas, 2003). To address school students' decrease in physical activity participation with the goal of improving their health, it is vital to design efficient and effective intervention programs. In addition, gender and ethnic differences should be taken into account when addressing these issues as girls are less active than boys and African Americans and other minority populations are at increased risk for physical inactivity as compared to Caucasian populations (ACSM, 2000; Berkey, et al., 2003; Mckenzie, 2003; NASPE, 2004).

Previous studies have supported the notion that physical activity is associated with health-related quality of life in adults. In recent years, researchers have also begun to investigate health-related quality of life in children. This area of investigation is still in its infancy, but initial work suggests this is an important area of inquiry for monitoring children's health in physical, psychological, and social dimensions. The purpose of this review paper is to examine relevant

literature to explore the role that physical activity may play in children's health-related quality of life. First I review the existing body of knowledge relating to children's health-related quality of life. Second, the expectancy-value model of achievement choice is presented as a framework for investigating how children's motivation in physical activity settings interacts with health-related quality of life. Third, social-contextual factors are considered by examining how the motivational climate can enhance or constrain decisions to be physically active. Finally, I conclude with a synthesis of this literature to identify issues that have emerged in current research, implications for practice, and suggestions for future research directions.

Health-related Quality of Life

According to the Centers for Disease Control and Prevention (CDC, 2007b), patient-oriented outcomes such as health-related quality of life is defined as a person's or group's perceived physical and mental health over time. This is an important element in determining the health benefits of various interventions for clinicians, researchers, and patients. Health-related quality of life is a comprehensive multidimensional construct that includes physical, emotional, social, and school functioning (Revicki, 1989; Varni, Seid, & Kurtin, 2001), and is of growing interest in public health as a general health outcome (Nutbeam, 2000).

Health-related Quality of Life in Adults

Initial research efforts on health-related quality of life and physical activity focused primarily on elderly populations with chronic disease conditions such as cardiovascular, arthritis, and cancer. There is evidence that physical activity has a positive effect on health-related quality of life in chronically diseased elderly populations (Chyun, Melkus, & Katten et al., 2006; Courneya & Friedenreich, 1999; Rejeski, Brawley, & Shumaker, 1996). For example, there was a positive association between health-related quality of life and physical activity level among

diabetic patients (Chyun et al., 2006; Smith & McFall, 2005). Several meta-analyses also reported significant improvements in physical and psychological well-being in older adults associated with participation in physical activity (Kelley, Kelley, Hootman, & Jones, 2009; Lawlor & Hopker, 2001; Netz, Wu, Becker, & Tenenbaum, 2005).

Although it is evident that physical activity had a positive effect on health-related quality of life in chronically diseased elder population, little is known regarding the association between health-related quality of life and physical activity level in younger and non-diseased populations. Fox (1999) suggested that moderate physical activity should be considered as a viable means of treating depression and anxiety and promoting mental well-being in the general public. Bize, Johnson, and Plotnikoff (2007) found physical activity consistently had a positive effect on health-related quality of life in the general adult population in their systematic review. This result is consistent with evidence that individuals who meet public health recommendations for physical activity report higher health-related quality of life than those who do not (CDC, 2007b; Vuillemin, Boini, & Bertrais, et al., 2005). Vuillemin and colleagues (2005) also concluded that leisure-time physical activity of at least 30 minutes of moderate intensity may benefit health-related quality of life in the general population.

In another cohort study, Wendel-Vos, Schuit, Tijhuis, and Kromhout (2004), reported a significant positive trend of "physical activity of at least moderate intensity" for health-related quality of life in both men and women. Kelly et al. (2009), however, found that physical activity did not significantly affect other domains (e.g., mental health, social function) except physical function. These researchers suggest that further investigation is needed concerning the dose effects of physical activity on the health-related quality of life needed to produce improvement in function.

Although the findings of the recent literature review consistently support the notion that physical activity has a positive influence on health-related quality of life in adults (Rejeski & Mihalko, 2001; Schechtman & Ory, 2001), the mechanisms underlying this influence are not clear. A few research efforts focused on the relationship between physical activity and health-related quality of life in adults have been based on a strong theoretical framework (e.g. self-efficacy; Elavsky, McAuley, Motl, Konopack, Marquez, & Hu, et al., 2005; McAuley, Konopack, Motl, Morris, Doerksen, & Rosengren, 2006). McAuley and his colleagues (2006) proposed that physical activity effects on health-related quality of life in older adults are mediated by psychological outcomes such as self-efficacy. They suggest that a reduction in self-efficacy is likely to lead to subsequent reductions in a number of outcomes, including health status and, ultimately, health-related quality of life. Furthermore, from an integrative perspective incorporating the theory of planned behavior combined with the stages of change, Kosma and her colleagues (2009) reported that physical activity had a significant direct effect on health-related quality of life, and that physical activity served as a mediator between individual's motivation and health-related quality of life. Based on previous studies, it is evident that some psychosocial factors provide important insight into understanding the underlying mechanism between health-related quality of life and physical activity, a vital aspect of aging and public health.

Health-related Quality of Life in Youth

In light of the growing body of evidence relative to health-related quality of life in adult populations, researchers have begun to extend this line of investigation to children and adolescents (Schwimmer, Burwinkle & Varni, 2003; Swallen, Reither, Haas, & Meier, 2005; Williams, Wake, Hesketh, Maher, & Waters, 2005). Children's and adults' health-related quality

of life are defined along similar conceptual dimensions, encompassing valued health attributes such as a sense of well-being, the ability to maintain good physical, emotional, and intellectual functions, and the ability to involve in social activities (Speith & Harris, 1996). It is of special relevance in public health because quality of life at this age is the foundation for quality of life and health in adulthood.

Initial investigation with children explored the relationship between health-related quality of life and weight status. Schwimmer and colleagues (2003) found that obesity in children and adolescents is linked to significantly lower health-related quality of life. Specifically, in comparison with healthy children and adolescents, the obese children and adolescents reported significant impairment (5.5 times greater) in all domains (physical, emotional, social, and school functioning). This finding was partially confirmed by another longitudinal study, which demonstrated that both underweight and overweight adolescents had worse physical functioning than adolescents with BMI in the healthy range (Swallen, et al., 2005). Williams and colleagues (2005) also found that health-related quality of life begins to decline as soon as a child is overweight.

Although physical activity has been associated with the prevention of weight gain over the life span and better long-term maintenance of weight loss following dietary interventions (Tolfrey, Jones, & Campbell, 2000), very few studies have directly examined the association among children's BMI, health-related quality of life and physical activity. One recent study provided initial evidence of a positive relationship between physical activity and improved quality of life among a morbidly obese population seeking gastric-bypass surgery (GBS; Bond et al., 2006).

Many health benefits are associated with engaging in recommended levels of physical activity (Vuillemin et al., 2005; Wendel-Vos et al., 2004). Individuals who engage in a physically active lifestyle are likely to enjoy a higher quality of life and live longer than those who do not. Investigation of the relationship between health-related quality of life and physical activity in children and adolescents has extended beyond weight status to explore this construct from a broader perspective. This line of study is of critical importance because physical activity has the potential to be a positive influence on both health and wellness by enhancing health-related quality of life (Penedo & Dahn, 2005).

Improvement in psychosocial health at the elementary age could have far-reaching consequences for children as they age. Some studies have found that social and emotional health at the elementary level are better predicators of academic performance than are early cognitive skills or family background (Ladd & Burgess, 1999; McClelland, Morrison, & Holmes, 2000). Children's mental health problems such as depression begin to increase in early middle school, especially among girls (Wade, Cairney, & Pevalin, 2002). Gender, race/ethnicity, and age may differentially affect the psychosocial elements of health-related quality of life (Swallen, Reither, Haas, & Meier, 2005), so evaluating childrens' and adolescents' health-related quality of life should also take gender and ethnicity into account (Kolip & Schmidt, 1999).

Age and gender differences in health-related quality of life are not completely understood. In a general index of health-related quality of life, as well as some individual aspects, children often have higher values than adolescents (Bisegger et al., 2005; Simeoni, Sapina, Antoniottia, & Auquier, 2001). Bisegger et al. (2005) also found physical and psychological well-being were higher for male adolescents than for females, which confirmed and extended previous studies (Simeoni et al., 2001). That is, with increased age, health-related

quality of life decreases to a greater extent for females than for males. In a recent study, however, Laaksonen et al. (2008) indicated that girls reported somewhat higher health-related quality of life scores on most scales, but that no significant gender differences existed in primary school children. The gender differences in health-related quality of life of children, especially primary school children, are even less clear, or are inconsistent.

Researchers propose that there are many factors associated with the children's health-related quality of life, such as parents' quality of life, school performance, and psychological problems (Felder-puig, Topf, Gadner, & Formann, 2008). Thus, it is important to identify children's health-related quality of life at an early stage because there is a paucity of health-related quality of life research results in children (Bullinger et al., 2006).

Measurement Issues in Children's Health-related Quality of Life. In the pediatric health outcomes literature (Matza, Swensen, Flood, Secnik, & Leidy, 2004; Wallander, Schmitt, & Koot, 2001), there is growing consensus that measurement of health-related quality of life is an essential component needed to provide a comprehensive picture of children's health status. The PedsQL 4.0 is a 23-item survey instrument measuring physical, emotional, social, and school functioning, including child self-report and parent proxy-report. The PedsQL was derived from an early measure specifically developed for children with cancer (Varni et al., 1998a, 1998b, 1999) and has been used extensively in a broad range of studies. The instructions ask how much of a problem each item has been during the past one month. A 5-point Likert response scale is used across child self-report and parent proxy-report (0 = never a problem; 1 = almost never a problem; 2 = sometimes a problem; 3 = often a problem; 4 = almost always a problem).

Recently published US population normative data indicate that there are high levels of internal consistency for both the self-report and parent-proxy report in 8 to 12-year-olds (Varni,

Burwinkle, Seid, & Skarr, 2003). A recent series of studies has established the feasibility, reliability and discriminant validity of the PedsQL scale for both parent proxy and child self-reports in both diseased and healthy children above the age of 5 years as a measure of health-related quality of life(Varni, Seid, & Kurtin, 2001; Varni, Limbers, &Burwinkle, 2007a, 2007b; 2007c).

To accurately detect health-related problem in children, researchers recommend that children themselves, their parents and their teachers, in case of school children, serve as three types of informants (Achenbach, McConaughy, & Howell, 1987; Eiser & Morse, 2001b). Felder-Puig, Topf et al. (2008) confirmed that since one adult (e.g., parent, or teacher) as the informant leads to incomplete assessment of child's health-related quality of life, children's subjective experiences and perceptions should be considered if possible. Although multi-proxy measurements of health-related quality of life in children can be important, they may also be sources conflicts.

Motivational Constructs and Health-related Quality of Life

Given that motivation can influence student physical and psychological behavioral changes in physical education and/or physical activity, it is of great consequence to study student motivation for participation in physical education and/or physical activity. Researchers suggest that some cognitive constructs (e.g., self-efficacy, expectancy beliefs) may confound the association between physical activity level and health-related quality of life, and the investigation of these constructs could provide a clearer explanation of this relationship (Bize, Johnson, & Plotnikoff, 2007; Rejeski et al., 1996). For example, based on the self-determination theory, Gillison, Standage, and Skevington (2006) found that greater self-determined motivation predicted higher levels of leisure-time exercise and better quality of life. They also indicated that

negative self-perceptions have a direct negative impact on quality of life (e.g. self-perceptions, social relationships). Additionally, a recent study by Standage and Gillison (2007) indicated that autonomous motivation towards physical education was positively associated with the social, school, physical, and emotional domains of health-related quality of life. This study also provided preliminary evidence that health-related quality of life can be affected by domain specific motivation. Although these two studies made unique contributions to the literature by establishing the role of the motivational process within physical education in promoting students' global psychological well-being, future investigation of the causality between physical activity and health-related quality of life is needed.

Children's competence in meeting physical task requirements based on the standards held by their friends and classmates is important to their successful inclusion in physical activity (Evans & Roberts, 1987). Failure to present adequate competence in physical activity settings can lead the way to exclusion and to negative social and emotional consequences for children (Fitzpatrick & Watkinson, 2003; Watkinson, Dwyer, & Nielsen, 2005). These studies demonstrated that children with disabilities, those who view as themselves as awkward, fail to meet physical achievement goals, and/or are excluded in physical activity settings will likely suffer emotional scars as a result of these experiences. In addition, lack of inclusion is assumed to have a long lasting negative effect on social, cognitive skills, emotions, and friendships (Pellegrini, 1995; Pellegrini & Smith, 1998).

Taken together, these findings suggest that an optimal correlation might exist among motivation (e.g., competence beliefs), physical activity, and health-related quality of life (i.e., emotional, physical, school, and social functions) in different contexts. For example, a positive association between high levels of physical activity and improved self-efficacy and social

influence scores has been reported in adolescents (Strauss, Rodzilsky, Burack & Colin, 2001). That is, compared with low self-efficacy children, children with increased levels of self-efficacy engage in more intense physical activity. Little is known, however, regarding the association between health-related quality of life and physical activity levels based on motivational constructs such as expectancies and values in children and adolescents, thus creating a gap in this literature. Given the fact that physical education has been characterized as an important health-promotion and achievement context for children, the expectancy-value model of achievement choice (competence and value beliefs) can be useful to explain why some children engage in physical activity while others do not, as well as to examine the relationship between physical activity and their health behavior changes that affect health-related quality of life.

Expectancy-Value Model of Achievement Choice

In the physical activity literature, many studies have clearly demonstrated that the strength and quality of students' motivational outcomes, specifically, persistence, effort, and physical activity participation, are closely linked to their beliefs about their own ability and goal perspectives (Nicholls, 1984). To understand school-aged students' motivational behaviors, the expectancy-value model of achievement choice has been widely used in classroom and physical activity settings (Eccles et al., 1983; Jacobs, Lanza, Osgood, Eccles, & Wigfield, 2002; Wigfield, 1994; Wigfield & Eccles, 1992; Xiang, Chen, & Bruene, 2005; Xiang, McBride, & Bruene, 2006; Xiang, McBride, & Guan, 2004; Xiang, McBride, Guan, & Solmon, 2003).

Eccles and her colleagues (Eccles et al., 1983; Eccles, Wigfield, & Schiefele, 1998) developed the expectancy-value model of achievement choice. They proposed two primary determinants of achievement choices and behaviors (a) the individual's expectancy-related beliefs, consisting of beliefs about ability and expectancies for success in a particular domain;

and (b) the subjective values associated with the task. Beliefs about ability are defined as individuals' evaluations of their competence in different achievement tasks. Expectancies for success refer to individuals' beliefs about how well they will do on an upcoming task and are closely related to their beliefs about ability. According to the expectancy-value model of achievement choice, belief about ability and expectancy for success comprise the two major components of expectancy-related beliefs. These components are related to each other although they are conceptually distinct. Conceptually, beliefs about ability are distinguished from expectancies for success, with beliefs about ability focusing on individuals' perceptions of their current competence at a given task or activity, and expectancies for success focusing on the future.

Subjective task values are defined as an incentive, that is, how an achievement task meets various needs of individuals. This construct consists of four major components: attainment value (importance), intrinsic value (interest), utility value (usefulness), and cost (Eccles et al., 1983; Wigfield & Eccles, 1992). Attainment value refers to the importance of doing well on a given task. Intrinsic value concerns the enjoyment the individual obtains from performing the task or the subjective interest the individual has for the task. Utility value or usefulness of the task reflects how a task fits into an individual's current or future plans. Cost refers to how the decision to engage in an activity limits access to other activities, assessments of how much effort or time will be spent to accomplish the activity and its emotional cost. Researchers have suggested that students tend to engage in and participate in activities in which they believe they are competent, as well as those that they view as interesting, important, and useful in academic and school physical education domains (Eccles et al., 1983; Eccles et al., 1998; Gao, Lee,

Solmon, & Zhang, 2009; Wigfield & Eccles, 2002; Xiang et al., 2003, Xiang, McBride, & Guan, 2004).

Based on the expectancy-value model of achievement choice, expectancy-related beliefs and subjective task values are assumed to be positively related to each other, although they represent two distinct constructs (Cox & Whaley, 2004; Gao, Lodewyk, & Zhang, 2009; Xiang et al., 2003; Xiang, McBride, & Bruene, 2004). For example, Xiang and her colleagues (2003) found that expectancy-related beliefs and subjective task values were clearly differentiated from each other across physical education and throwing but at the same time they were positively related to each other. Children's intention for future participation in physical education was also positively associated with these two constructs. Researchers have demonstrated that students' achievement outcomes, including their performance, persistence, selection of challenging tasks, and choices of achievement tasks are predicted by their expectancy-related beliefs and subjective task values (Eccles et al., 1983; Eccles et al., 1998; Xiang, Chen, & Bruene, 2005; Xiang, McBride, & Bruene, 2006). Specifically, based on the expectancy-value model of achievement choice, evidence suggests that expectancy-related beliefs are associated with performance and persistence, whereas achievement task values are associated with affect, intention, and task choice (Cox & Whaley, 2004; Gao & Xiang, 2008; Xiang, McBride, & Bruene,2004; Xiang, et al., 2003).

Expectancy-Value Model in Academic Settings

The expectancy-value model of achievement choice was developed with school-aged children in academic domains (Eccles et al., 1983). Many studies have been conducted investigating children's expectancy and value beliefs in reference to academic settings (Eccles & Wigfield, 2002; Jacobs, et al., 2002; Pintrich & Schunk, 2002).

In terms of the relationship between domain-specific motivation and students' achievement and choice, it is posited that achievement behaviors in math, science, and English are positively associated with youths' self-concepts (Cole, Bergin, & Whittaker, 2008; Eccles & Harold, 1991; Eccles, Wigfield, Harold, & Blumenfeld, 1993). For example, Eccles and Harold (1991) found that children's self-concepts of ability were strong predictors of the amount of free time that adolescents spent on math, language arts activities and English. This is partially consistent with a longitudinal study (Simpkins, Davis-Kean, & Eccles, 2006) that also indicated that the number of math and science courses taken throughout high school was associated with youths' 6th-grade self-concept and 10th-grade beliefs. That is, youth who took more courses were more likely to have higher expectancies and values beliefs regarding math and science.

Subjective task values are characterized in the model as a multidimensional construct. The four components, attainment value, intrinsic value, utility value, and cost have been investigated and each component has been reported to have its own unique relationship with achievement behaviors. For example, Beverly, Joyce and Farenga (2000) found that youths' task values, specifically interest, and feelings of the importance predicted actual number of math and science courses adolescents took in high school. Pintrich and Schunk (2002) have also proposed that high levels of interest lead to more cognitive engagement, self-regulation, and achievement.

Perceptions of subjective task values can be an indirect predictor of students' performance in academic setting, while ability beliefs serve as a direct influence (Pajares & Miller, 1994; Pajares & Valiante, 1999, 2001). Specifically, Pajares and colleagues reported that ability beliefs (e.g. self-efficacy) directly affected academic performance, whereas the overall task value only accounted for a small portion of the variance in performance. In addition, Cole and colleagues (2008) found that students' perceived usefulness and importance for taking a low

stakes test were important predictors of test-taking effort, and effort was a strong predictor of performance. More specifically, by using a path analysis they found the indirect effects of the usefulness and importance task value variables on the math, social and science subtest score via the effort variable were statistically significant. The indirect effect of interest via effort was not significant. The findings of this study extend expectancy-value theory by establishing the mediating role of effort between academic motivation and test performance.

Along with the previous studies, evidence indicates that youth's academic ability (e.g. math, reading, science self-concepts) and subjective task values are differentiated from one another by the end of first grade. More specifically, even in elementary school years those beliefs independently influence choice of activities and achievement behaviors in academic settings. In general, students' perceptions and interpretations of learning mathematics predict their intentions and choice about future mathematics study, which in turn influence work and career roles (Eccles, 1987; Jacobs & Eccles, 1992). For example, Watt and Bornholt (2000) confirmed that gender, current course level, and perceived usefulness of mathematics were the main predictors of planned participation in mathematics-related careers. As they age girls' expectancies and values in math typically decrease. Harris and Robinson (2007) indicated that prior skills and successes may affect school behaviors or achievement in academic domain. In order to address students' future participation in mathematics-related careers, intervention programs are needed to focus on students' perceptions of usefulness of mathematics.

Expectancy-Value Model in Physical Activity

Studies focusing on motivation in academic settings have provided an understanding about the reasons children choose to engage in certain activities or behaviors in school. The expectancy-value model of achievement choice has also been proven to be a very useful

theoretical framework to understand individuals' achievement behaviors in sport and physical education domains (Cox & Whaley, 2004; Eccles et al., 1983; Gao, 2008; Gao & Xiang, 2008; Jacobs et al., 2002; Xiang et al., 2005; Xiang et al., 2006; Xiang, McBride, & Guan, 2004; Xiang et al., 2003).

Using this model, studies have demonstrated that students' achievement outcomes, including their performance, persistence, and choices of achievement tasks, are predicted by their expectancy-related beliefs and subjective task values (Eccles et al., 1983; Eccles, Wigfield, & Schiefele, 1998). Cox and Whaley (2004) indicated that for both White and African American athletes, the relationships among expectancy-related beliefs, subjective task values, effort and persistence were significant. That is, athletes who had high expectancies for success in basketball and thought basketball was more interesting, useful, and important and presented more effort and persistence in the activity. Within the expectancy-value theory, expectancy-related beliefs and task values are proposed to be positively related (Eccles, et al., 1983). Recent research in physical education provided empirical evidence concerning the relationship between these two constructs (Gao, Lodewyk, & Zhang, 2009; Xiang et al., 2003; Xiang, McBride, & Guan, 2004). Gao and his colleagues (2009) found that ability beliefs and incentives (task values) were significantly and positively related to one another. In addition, researchers have observed that the more intrinsic aspects of children's task values (i.e., interest and importance) correlate more closely to their expectancy-related beliefs and positive achievement behaviors than the more extrinsic aspects of task values (i.e., usefulness; Xiang et al., 2005; Xiang et al., 2006).

Although Wigfield and Eccles (1992) argued that expectancy-related beliefs emerge as better predictors of academic performance than subjective task values, one recent study in physical activity indicated that expectancy-related beliefs and subjective task values were not

significant predictors of task performance. Gao, Kosma, and Harrison (2009) found that expectancy-related beliefs and subjective task values did not significantly predict task performance (dart-throwing task) in both African and White American students. This was not in accordance with the previous research demonstrating that children's performances were significantly predicted by ability beliefs in sport and physical education (Feltz & Magyar, 2006; Wigfield & Eccles, 1992; Xiang et al., 2006). Xiang and her colleges (2006) reported children's performance in the timed 1-mile running test was significantly predicted by ability beliefs but not task values. The novelty of the task used in the Gao, Kosma, and Harrison (2009) study may be an explanation for the inconsistency in these results.

According to previous empirical studies and literature, it is evident that in physical education children's subjective task values emerged as influential predictors in children's intention for future participation (Gao, Lee, Solmon, & Zhang, 2009, Xiang et al., 2003, Xiang, McBride, & Bruene, 2004). Specifically, ability beliefs better predict performance and effort, whereas subjective task values were major determinants of intention (Xiang et al., 2003; Xiang, McBride, & Bruene, 2004). For example, Xiang et al. (2005) reported that extrinsic reward and selected intrinsic motivation constructs played a small role in predicting running-test scores. However, the intrinsic value that those children had for running emerged as the most important construct in predicting future motivation for running. A result of a recent study (Gao, Lee et al., 2009) are in line with previous research findings that expectancy-related beliefs did not significantly predict middle school students' intention, and indicated that subjective task values were important predictors of students' intention/ task choice. Specifically, if students view physical education as more important, interesting, and useful, they would have stronger intention for future participation.

Recently studies have supported the notion that individuals with high levels of perceived ability are likely to be more physically active in physical activity classes (Gao, Newton, & Carson, 2008; Parish & Treasure, 2003). Given that sport and physical education have been identified as achievement contexts, achievement behaviors in those domains include performance, choice and persistence, as well as health-related physical fitness indicators and physical activity engagement. Researchers have reported a positive relationship between psychosocial factors (e.g., attitude, perceived behavioral control); health-related physical fitness and self-reported physical activity levels (Martin, Kulinna, McCaughtry, Cothran, Dake, & Fahoome, 2005; Shen, McCaughtry, & Martin, 2007). To date only two studies have investigated the relationships between middle school students' expectancy and value beliefs and their objective physical activity levels and physical fitness based on expectancy-value model. In Gao, Lodewyk, and Zhang's (2009) study, ability beliefs emerged as significant predictor for middle school students' cardiovascular fitness (Pacer test). Gao, Newton, and Carson (2008) found that students' self-efficacy, task values made significant contributions to predict their pedometer-based physical activity levels in class. In this study, they first combined self-efficacy (not expectancy-related beliefs) and task values constructs to examine middle school students' in-class physical activity levels and fitness levels. According to Bandura (1986), both self-efficacy and expectancy-related beliefs are personal perceptions about one's perceived ability.

To date, rare research have examined the predictive utility of students' expectancy beliefs and task values in association to their health-related physical fitness and physical activity levels, especially for elementary children's in-class physical activity levels. Based on the empirical evidence, it is possible that expectancy-value model of achievement choice could play an important role in predicting physical activity and physical fitness levels because of the positive

association between expectancy-beliefs and task values and achievement behaviors such as effort, persistence, and performance (Cox & Whaley, 2004; Gao & Xiang, 2008). In order to more clearly understand the association between students' achievement motivation and achievement outcomes, further research is needed to examine objective achievement outcomes such as in-class physical activity levels based on expectancy-value model of achievement choice.

Developmental Considerations in Expectancy-Value Constructs

In order to optimize the application of the expectancy value model, it is important to consider how children's expectancies and values evolve as they progress through school. According to the expectancy-value model, children's expectancy beliefs and task values together enable them differentiate and evaluate their ability and activity values. If children can distinguish what they are good at and what they value, the expectancy value information is more likely to be used in decision making. In considering the development of children's competence beliefs, expectances for success, and achievement task values, two main approaches have been used. The first is to examine changes in the structure of these constructs, or how the structure of these constructs becomes differentiated. The second is to explore changes in mean levels of expectancies and values over time.

Researchers have examined the structure of children's expectancy beliefs and subjective task values in order to assess how or whether the structure of these constructs are distinct (Fredricks & Eccles, 2002; Gao, Lee, & Harrison, 2008; Jacobs, Lanza, Osgood, Eccles, & Wigfield, 2002, Lee, Carter, & Xiang, 1995, Xiang, McBride, & Guan, 2004). Evidence suggests that two separated ability constructs proposed in the model (competence beliefs, expectancies for success) are less clearly differentiated within a given different activity domain, in children ranging in age from first through twelfth grades (Eccles, Wigfield, Harold, & Blumenfeld 1993;

Wigfield, 1994; Wigfield et al., 1992). Even during the very early elementary school years, however, children do seem to distinguish between their competence beliefs and subjective values (Eccles et al., 1993). Children can clearly distinguish between competence beliefs of different activities and their values for those activities at very early age, even the first grade (Eccles et al., 1983; Eccles et al., 1993). Children also have identified different components of subjective values (important, interest, usefulness, and cost), especially in children in fifth grades and above (Wigfield, 1994).

With regard to mean level changes overtime, most studies have reported that children's expectancy beliefs decline across school years in sport and physical education (Caspersen, Pereira, & Curran, 2000; Gao, Lee, & Harrison, 2008; Jacobs et al., 2002; Lee, Carter, & Xiang, 1995; Spinath, & Spinath, 2005; Xiang, McBride, & Guan, 2004). For example, Jacobs and her colleagues (2002) in their longitudinal study found children's expectancy beliefs in sport declined over the course of schooling and that this decline accelerated over time from 1st through 12th grade. Xiang and her colleagues (2003) reported there was a decline occurring in the transition from primary to intermediate grades in children's expectancy beliefs in physical education. These results demonstrate that the decline of school-related motivation and competence beliefs in physical activity evident in adolescents begins in elementary school (Caspersen et al., 2000; Spinath, & Spinath, 2005).

On the other hand, Xiang and her colleagues (2005, 2006) found that there were no significant changes in expectancy beliefs in their study with fourth graders in a year-long running program. The explanation for the conflicting finding was that younger and older children may view ability beliefs and competence in different ways. Specifically, young children always

believe they are competent in the upcoming tasks, and the expectancy beliefs become more accurate and realistic as children grow older (Fredricks & Eccles, 2002).

With regard to competence beliefs and expectancy for success, researchers examining changes in the mean level of children's values generally have found that older children's overall ratings of task values for sport and physical education decrease compared with younger children (Jacob et al., 2002, Xiang et al., 2003). For instance, more recently studies (Xiang et al., 2005, 2006) extended the finding that each component of subjective values (importance, interest, and usefulness) declined over time. In the Fredricks and Eccles' long-term longitudinal study, they found the ratings of interest declined slightly, and a larger decline in the perceptions of importance of sports. In addition, Wigfield and colleagues (1997) also indicated that there were decreases in the perceptions of the usefulness and importance of sports, whereas the interest in sport remained stable over a three year period. Based on this evidence, further study is needed to understand children's changes of task values across school years towards sports and physical education and to develop strategies to prevent this decline.

Taken together, it is evident that students' motivation to participate in physical education programs declines as they grow older, and the decline is greater for adolescents than young children (Fredricks & Eccles, 2002; Gao, Lee, Solmon, & Zhang, 2009; Jacobs et al., 2002; Xiang, McBride, & Bruene, 2004). In other words, students were less likely to value the benefits of participation in physical education. Thus, the elementary school years seems as an important period to build children's self-perceptions (e.g. attitude, beliefs, health knowledge) and the behavioral habits (e.g. physical activity participation).

Gender Issues in Expectancy-Value Constructs

The research literature concerning gender differences between expectancy-belief and task values is mixed. For example, Jacobs et al. (2002) found significant gender differences in the average values for language arts and sports, but not for average math values in their longitudinal study. The picture was very different for the expectancy-beliefs across grade 1 through 12 in three academic domains (e.g., mathematics, language arts, and sports). Although boys had slightly higher math competence beliefs at elementary school than girls, the gender differences disappeared by high school because of the sharp decline of boys' math beliefs. For the language arts, girls maintained higher self-perceptions over time than boys, whereas in sport domain boy maintained higher competence beliefs than girls across all grades of school. Simpkins and colleges (2006) also found no gender differences in youths' value of math. Girls, however, had lower math self-concepts during their longitudinal study, which is consistent with Jacobs et al. (2002). The results of this study also confirmed previous work (Eccles &Harold, 1991, Simpkins et al., 2006) that girls are less likely to participate in math activities than boys. In addition, Watt and Bornholt (2000) found that gender imbalance existed in students' plans for senior mathematics courses as well as mathematics-related careers, and perceived talent and expectations of success in mathematics were higher for boys than for girls.

Research concerning gender differences in children's achievement choices and expectancy-related beliefs and values has also yielded inconsistent findings in sport and physical education settings. For instance, Lee (1997) reported the existence of the gender differences in children's expectancy beliefs and the difference varied by activities and tasks. In general, in most traditional sport activities and physical education, the research evidence has provided consistent results that boys were more likely to hold higher ability beliefs and expectancies for success

(Eccles & Harold, 1991; Gao & Xiang, 2008; Jacob et al., 2002; Xiang et al., 2003). For example, Jacobs et al., (2002) found significant gender differences in children's beliefs in most domains in their longitudinal study. Other researchers (Gao, Lee et al., 2009) also indicated that men scored significantly higher than women in expectancy-related beliefs and performance.

Further, some studies suggest that gender differences may be a result of perceived gender appropriateness of activities or tasks (Lee, Fredenburg, Belcher & Cleveland, 1999; Solmon, Lee, Belcher, Harrison, & Wells, 2003). For example, male students tend to have higher competence beliefs and perform better on masculine-typed tasks (e.g., basketball and football), whereas female students are likely to feel more competent and perform better on feminine-typed tasks (e.g., dance and gymnastic). Thus, female students tend to hold higher competence beliefs than males when sport and physical education construct a particular feminine-typed activity and vice versa.

Inconsistent results we also evident concerning the effect of gender on task values. Many studies report that boys like sport more and perceive more importance on participating in sport and physical education than do girls (Eccles & Harold, 1991; Fredricks & Eccles, 2002; Jacobs et al., 2002). Xiang et al., (2003, 2006), however, found that no gender differences in task values toward physical education or a running program for the elementary school students. In addition, Gao, Lee, Solmon, and Zhang (2009) provided further evidence that boys and girls did not differ on the mean scores of task values over the course of one school year from a sample of middle school students. They suggested that the perspectives of perceived gender appropriateness may be used to explain those studies' findings because the students might view physical education or running as a gender-neutral activity (Gao, Lee et al., 2009). Taken together, the research literature indicates that in gender-role stereotype activities (e.g. masculine or/and feminine

characteristics) children's motivational beliefs (e.g. expectancy beliefs, task values) may vary. It is clear that more research is needed to understand the differences of achievement motivation between boys and girls across school years.

Racial Differences in Expectancy-Value Constructs

In comparison to the gender, there is little research on racial differences on students' expectancy-related beliefs and task values. In academic settings, research has revealed that even in face of achievement failure minority students (African American and Hispanic American) kept optimism and positive self-esteem (Graham, 1994; Lay & Wakstein, 1985). To date, in the research in more general education contexts has yielded mixed results focusing on the value minority children have toward school. For example, Graham and Taylor (2001) reported that African Americans devalued the importance, attractiveness, and utility of academic success, whereas Goldsmith (2004) found that African Americans value education more than Whites. Moreover, researchers have indicated that prior skills and successes may affect school behaviors or achievement in academic domain. Harris and Robinson (2007) reported that African Americans students had lower academic achievement explained by prior skills than White students.

In the sport domain, most studies are primarily focused on African Americans, and previous evidence indicates that racial groups display different perceptions of racial-role appropriateness toward particular sports and physical activities (Gao, Lee, & Harrison, 2008, Goldsmith, 2003; Harrison, Lee, & Belcher, 1999). In general, some particular sports such as football, basketball, and track sprinting are perceived as more appropriate for African Americans, while others such as golf and hockey are regarded as more appropriate for Whites (Harrison & Belcher, 2006). In comparison with the White Americans, African Americans

scored significantly higher on expectancy beliefs and task beliefs as basketball athletes in high school, indicating they had higher perceptions of competence, were more interested in basketball, and perceived basketball to be more useful and important to them (Cox & Whaley, 2004). These findings provided good evidence regarding expectancy beliefs and task values that ethnic groups place on specific sports because in the African American culture basketball has been labeled as a "Black" sport and is considered to be a racial-appropriate sport (Harrison, 1999).

Recent research, however, found that African American students had higher scores in expectancy-related beliefs than White Americans, but no differences in task value and task performance for a dart-throwing task (Gao, Kosma, & Harrison, 2009). Given the inconsistent results, the dart-throwing task might be viewed as a task that was not linked to race by the participants in the study.

Hence, racial-role appropriateness may explain the higher motivational scores of African American athletes towards some particular sports such as basketball. It is possible that racial-role appropriateness might also affect students' engagement and persistent in activities in the physical education class that beyond those stereotyped activities for their race. Knowing the negative impact of racial-role stereotypes, it is important for physical educators and coaches to structure the learning environment in order to maximize the optimum expectancy and value beliefs that students placed on the activity.

Perceived Motivational Climate

Expectancy-value model further posits that within particular social contexts an individual's achievement beliefs and behaviors are affected by organization, structure, and teaching practices. Researchers (Baranowski, Anderson, & Carmack, 1998; Lewis et al., 2002;

Gu, Solmon, & Zhang, 2010) argue that we need to examine psychosocial mediators of change (e.g. self-efficacy, expectancy beliefs) in order to better understand how the modification of the social environment translates to behavioral change. A viable theoretical framework that can help clearer understanding of the social psychological determinants of children's motivation in sports and physical education is achievement goal theory.

According to achievement goal theory (Nicholls, 1984, 1989), there are two dimensions of goals in achievement settings: task-involved and ego-involved. Task-involved goals focus on mastery of the task at hand, are primarily based upon personal improvement, and are evident when perceptions of competence are self-referenced. Ego-involved goals are related to demonstrating superiority or outperforming others, and are evident when competence is normatively referenced. It is assumed that individual can evaluate their competence in two different orientations, and these divergent perceptions of ability are assumed to be intimately related to the two different orientations. A plethora of studies have reported that compared to the ego-involved goals, task-involved goals are related to more positive achievement outcomes in youth sport and physical education (for reviews, see Duda, 1999; Duda & Hall, 2001; Duda & Ntoumanis¸2005).

While Nicholls early work examined achievement goals from a dispositional perspective, Ames (1992a, 1992b) explored analogous goals that she labeled mastery and performance climates from a situational perspective through measuring students' perceptions of classroom climates. Parents, coaches, PE teachers, sport heroes, and significant others can develop a mastery or performance motivational climate through the expectations, values, beliefs, and behaviors in sport and physical education. Social situational factors manifest in the motivational climate created by significant others are assumed to exert a powerful influence on children's

variations in achievement behavior (Ames, 1992a, 1992b; Treasure & Roberts, 1998; Vazou, Ntoumanis, & Duda, 2006).

Because individuals interpret their sport and physical activity experiences in unique ways, Ames (1992a, 1992b) proposed that it would be preferable to explore the psychological climate related to individual's interpretations of the achievement context. Two types of motivational climates have been proposed (Ames, 1992a, 1992b). Specifically, a mastery motivational climate emphasizes self-referenced success, effort and individual improvement. This environmental focus is on developing competence rather than protecting one's ability. In contrast, a performance motivational climate focuses on social comparison (e.g. winning or outperforming others) and emphasizes normative ability. It is acknowledged that individuals' achievement behaviors are affected by the environments (e.g., motivational climates) created by coaches, parents, teachers, and administrators (Boixados, Cruz, Torregrosa, & Valiente, 2004; Reinboth & Duda, 2006; Xiang, Chen, & Bruene, 2005). Perceptions of ability have been identified as an influential element in the motivational climate. Teachers cannot change students' ability levels, but they can create a supportive or mastery climate by using appropriate strategies to encourage and motivate children of diverse abilities to actively engage in class learning activities.

Although the influence significant others have in shaping goal orientations is well established, researchers suggest that the perceptions of motivational climate in physical education may affect students not only in terms of performance but also psychologically. Newton and Duda (1999) concluded that an environment that promotes working together and fosters self-enhancement is an atmosphere that will enhance intrinsic motivation. Boixados et al. (2004) revealed that athletes who usually perceive a mastery or task-involving climate present more

favorable responses in relation to intrinsic motivation, satisfaction, and positive fair play attitudes. Gu, Solmon, Zhang and Xiang (2011) found that the greater the cohesiveness of the activity class, the greater the likelihood the students would exhibit more adaptive motivational patterns (e.g., expectancy for success and task value). Therefore, in line with previous research, these results further support creating a task/mastery-involving climate within the physical education domain (Solmon, 1996; Treasure & Robert, 2001; Gano-Overway & Ewing, 2004).

Empirical evidence documents that a highly task-involved climate is related to positive engagement patterns regardless of the personal orientation, and is a significant predictor of physical activity, and is related to students' persistence, low state and trait anxiety (Newton & Duda, 1999; Papaioannou & Kouli, 1999; Parish & Treasure, 2003; Yoo, 2003). For example, Yoo (2003) reported students who perceived a stronger mastery-involving and a weaker performance-involving climate had lower state and trait anxiety. In addition, Vazou and colleges (2006) found that a perceived mastery motivational climate emerged as the predictor of physical self-worth, enjoyment, and effort, whereas trait anxiety was predicted by performance-involving motivational climate. However, most studies that focused on the association between motivational climates and cognitive functions were in sport settings rather than physical education. It is noted that the motivational climates have a hierarchical structure both in athletic teams and in physical education classes (e.g., athletes are nested within sports teams, or students are nested within physical education classes; see Papaioannou, Marsh, & Theodorakis, 2004), thus it is important to know whether variations in perceptions of the climate created by teacher will affect students' cognitive function, as well as their physical activity.

Given the suggestions that motivational beliefs alone cannot explain individuals' behaviors (e.g., physical fitness, physical activity levels; Gao, Newton, & Carson, 2008;

Reinboth & Duda, 2006), it is clear that sport and physical education environments should be mastery-involved to facilitate motivational behaviors and well-being. For example, researchers found that perceptions of a mastery motivational climate were positively linked to motivation (the satisfaction of basic needs for autonomy, competence and relatedness; see Standage, Duda, & Ntoumanis, 2003; Sarrazin, Vallerand, Guillet, Pelletier, & Cury, 2002), which in turn predicted indices of well-being (e.g., subjective vitality and physical symptoms; Reinboth & Duda, 2006). Perceptions of a performance motivational climate, on the other hand, were linked to a lower sense of connection, value, mutual support, which in turn may influence individual's indices of well-being.

Research supports the notion that physical education teachers should create a supportive classroom environment when they teach a novel task which is difficult. Examples of ways to do this are to provide opportunities to practice the task at an appropriate level of difficulty and focusing on mastering task and personal improvement (Li, Lee, & Solmon, 2007). Xiang, Solmon, and McBride (2006) in their qualitative research also found that if children are not afforded a mastery physical education context, it is unlikely they will focus on learning, improving their skill levels, and acquiring the knowledge associated with living health and activity lifestyles.

Social support from family, community and school can play an important role in school physical education programs. A recent study by Standage and Gillison (2007) revealed that the social context created by a physical education teacher (e.g. autonomy-supportive class climate) is positively related to levels of autonomy, competence, and relatedness, and therefore, has a positive influences on students' motivation, general self-esteem, and health-related quality of life. Children interviewed by Watkinson et al. (2005) expressed the awareness of the moderating

role the activity climate might play socially and physically to influence their decisions to participate in an activity.

It is apparent that sport and physical activity settings are contexts where children and adolescents most frequently engage in spontaneous social interaction. To date, researchers have examined the relationships among dispositional goal orientations, perceptions of the motivational climates, and students' cognitive, affective and behavioral patterns in physical education (Theodosiou & Papaioannou, 2006; Treasure &Robert, 2001), and the results have yielded implications for practice. There is an emerging trend calling for more empirical research by using motivational constructs (e.g. cognitive factors: competence beliefs, task values) to drive a research agenda for researchers and practitioners to structure climates designed to influence children's and adolescent's achievement outcomes and motivational behaviors. Exploring the relationships among the motivational climate, motivational constructs of expectancy-value theory, health-related quality of life, and the role that they play in determining physical activity choices is a viable avenue to pursue as we investigate ways to encourage children to adopt activity life styles.

Future Research Directions

Based on recommendations by Chen (2001) and Gu et al., (2011), researchers should begin to use a more integrated approach to student motivation within the realm of physical education. A framework that not only includes aspects of expectancy beliefs and task values but also examines the achievement context, physical education curriculum, and social environment as they relate to health-related quality of life has the potential to make a contribution to the literature.

There is a series of research studies that are needed to lay the foundation to establish this line of inquiry. First, there is a need for further research to assess the relationship between health-related quality of life and physical activity level in children. Initial findings and theoretical arguments support the hypothesis that children who are physically active will have higher health-related quality of life, but this needs to be empirically investigated. If that relationship is meaningful, then evidence suggests that consideration of gender and ethnic issue is an important area of investigation. A related concern is the reliance on adults as informants may result in inappropriate assessment of a child's health-related quality of life (Achenbach et al., 1987; Felder-Puig, et al., 2008a), so future research efforts should take care to include both the parents' and the child's perceptions.

Once the relationship between physical activity and health-related quality of life is established, predictors or variables that are influential in that relationship need to be investigated. The expectancy-value model of achievement choice can be a framework to guide research to provide a clearer understanding of the complex relationship among ability beliefs, task values, and the predictive utility of these constructs on motivated behaviors and levels of physical activity and health-related quality of life in sport and physical education domains. Investigation of the characteristics of the motivational climate that influence these relationships is also an important avenue of study. Theoretical predictions are that a mastery climate in physical education classes should positively relate to expectancies and values, which in turn translate to higher levels of participation in physical activity and ultimately improved health-related quality of life in children, but these hypotheses need to be tested.

As this line of research develops, it will be important to move past correlational and cross-sectional designs that represent a "snapshot" approach to exploring these motivational

constructs. Longitudinal studies where expectancy value beliefs, motivational climates, physical activity and health-related quality of life are assessed over several time periods are needed to further our understanding of the reciprocal effects of these constructs. In due course, based on this line of inquiry, theoretically driven interventions need to be designed and tested. It will be important to determine the effectiveness of interventions that manipulate the motivational climate with the intent of fostering expectancies and values that will ultimately produce increased physical activity levels and health-related quality of life. In addition, there is a lack of information regarding the appropriate physical activity dose needed to achieve benefits in physical, psychological, and social function. Future research efforts should focus on identifying variations in the frequency, duration, and intensity components of physical activity programming that result in functional improvement.

Implications for Practice

Even though the investigation of the relationships among children's health related quality of life, physical activity, expectancy values, and motivational climate is in the initial stages, several implications for practice are supported based on the evidence presented in this paper. First, health-related quality of life indicators can be used as a basis to identify children with an at-risk status, which in turn can guide efforts to provide support by practitioners and significant others. Measuring health-related quality of life can provide parents and teachers with information concerning children and adolescents' perceptions of health and quality of life that provides a basis for action if there is cause for concern. Researchers propose that there are many factors associated with the children's health-related quality of life, such as parents' quality of life, school performance, psychological aspects, as well as physical activity levels (Felder-puig, Baumgartner, Topf, Gadner, & Formann, 2008b; Fox, 1999; Vuillemin et al., 2005). Most work

suggests that physical activity is associated with better quality of life and health outcomes. The demonstration of a positive relationship between health-related quality of life and physical activity level could provide individuals with motivation to be more physically active. Assessment and promotion of physical activity may be beneficial in achieving desired benefits across diverse populations.

The expectancy-value model of achievement choice has proven to be a useful framework to understand school children's motivation and behavioral changes in sports and physical education. Understanding the influence on expectancies and values on children's decisions to engage in physical activity can help physical educators and other practitioners to carefully structure the sport or activity environment in order to maximize the positive expectancies and values that individual hold for the activity. Specifically, teacher and coaches should emphasis the value of the activity, design tasks that are at a reasonable level of difficulty, provide appropriate feedback concerning performance, and foster the belief that success will result when effort is expended.

Although the gender-role/racial-role stereotypes may be somehow fixed in sport and physical education, it is important for physical educators to understand ways to foster intrinsic motivation for diverse groups. Strategies, such as offering choice, using personal reference for success, supporting autonomy, increasing awareness of the benefits of an activity, and providing learning experiences that are enjoyable and interesting to diverse individuals are all critical for motivation in physical education and might overcome amotivation among the different groups.

In addition, based on the literature, health promoters and researchers need to focus on the development and implementation of physical activity motivational programs that incorporate both optimum expectancy-related beliefs and subjective task value beliefs and reinforce the value

of positive activity outcomes, such as increased physical, psychological, and social aspects of quality of life. Finally, to date physical activity research has tended to focus on individual-level factors. There is broad agreement, however, that effective public health approaches to promoting physical activity should emphasize the role of social environment (e.g., social support) as a key modifiable determinant of physical activity (McNeill, Kreuter, & Subramanian, 2006). In sport and physical education settings, significant others, such as coaches, physical education teachers, and particularly parents affect children's sense of expectancies, values and activity participation. A supportive learning environment emphasizing a mastery-involved climate and individualized criteria for success should be emphasized in order to allow students to achieve a sense of success, establish and maintain positive ability perceptions, and promote a general sense of well-being.

Physical activity participation is a motivated behavior, in that a student ultimately must decide whether or not to actually engage in that behavior. As noted by Wigfield and Eccles (2000), there is an important decision-making component to motivation. Indeed, individuals make different types of decisions depending on the contextual information that is presented to them (Tverskey & Kahneman, 1981). Thus, one of the logical implications of the research on children and adolescent physical activity is that physical education teachers and other professionals can and do affect students' decision-making process. Consequently, they must make every effort to create a positive climate that will foster motivation.

Summary and Conclusions

School physical education and sport programs have been identified as potentially important settings in efforts to increase school-aged students' physical activity levels and therefore, are the primary avenues for helping children learn the skill and knowledge needed to

lead a healthy and physically active lifestyle (Wallhead & Buckworth, 2004). In addition, it has been suggested that health-related quality of life may be an influential predictor of future health and health care needs as well as identifying dimensions of children's health that are at risk (Simeoni et al., 2001; Seid, Varni, Segall, & Kurtin, 2004). However, the relationship between health-related quality of life and school students' physical activity level is not clearly understood, especially for children and adolescents without clinical conditions.

Researchers suggest that enhancing intrinsic goals could yield benefits relevant to improving mental health and increasing physical activity levels of children and adolescents (Gillison et al., 2006; Xiang et al., 2003; Yoo, 2003). There is a convincing case that studying motivation (what and why of goal pursuits), physical activity, and psychological well-being in this specific social context is a very important area of research. Developmental theorists have asserted that the relationship between children's' motivation and their social context is complex (Cox & Paley, 1997; Bronfenbrenner, 1979). Positive associations among high levels of physical activity, improved self-ability beliefs, and motivational climate have been reported in adolescents (Gao, Newton, & Carson, 2008; Strauss et al., 2001). According to the theoretical perspectives addressed in this review, children's physical activity and their health-related quality of life are clearly influenced by social motivational contexts. Few studies, however, have examined the mechanisms that influence children's health-related quality of life in physical activity context. Children's health-related quality of life appears to be related to motivational constructs such as expectancy-related beliefs and task values, as well as physical activity levels, but this line of investigation is in its infancy.

Integrating the expectancy-value model of achievement choice with the achievement goal theory to investigate elementary school students' physical activity levels and health-related

quality of life is a viable avenue of research, and gender and racial issues need to be addressed within this context. Creating a favorable motivational climate in physical education can result in greater satisfaction and enjoyment and the promotion of positive attitudes for activity participants. Currently there is not a clear understanding of how components of the motivational climate and expectancy-related beliefs and task values interact to affect children's physical activity participation and ultimately health-related quality of life. This area of inquiry has the potential to provide valuable insight that can guide interventions targeting children's health.

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APPENDIX B: THE PEDSQL ™ 4.0 INVENTORY USER-AGREEMENT

PedsQL™

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ID _____

USER-AGREEMENT

Use of the PedsQL™ 4.0 Generic Core Scales, Modules and Translations

Date : !27 ! ! 04 ! !_2010_!
day month year

1. USER'S NAME

Name : ***Xiangli Gu***
Title : Ph.D student
Company : Louisiana State University
Address : 126 Pedagogy Laboratory
112 Long Field House Baton Rouge, LA, 70803-0001
Country : USA
Phone : 225-578-5714 Fax :225-578-3680
Email : xgu1@tigers.lsu.edu

2. CONTEXT OF PEDSQL USE

1. **Individual clinical practice** ☐ *(please go directly to section 4)*

- Expected duration of use: Indefinite ☐ or Number of years _____

2. **Mode of administration** ☒ Paper
☐ Electronic version

If electronic administration, please precise the type of medium:
- PDA ☐ - Web-based ☐
- CDr / DVD ☐ - Other ☐ (please precise):.....

3. **Research study** ☐

- **Title**: Elementary School Students' Motivation in Physical Education, Health-related Quality of Life and Physical Activity
- **Disease or disorder**:_____
- **Type of research**: clinical trial ☐1 economic ☐2 quality of life ☒3 epidemiologic ☒4
- **Quality of Life as primary end point**: yes ☒1 no☐2
- **Design**:

comparative - parallel group	☐1
comparative - cross-over	☐2
non comparative with follow-up or cohort follow-up	☐3
cross-sectional	☒4
Other (*please specify*)___**prospective study**_____	☒5

- **Number of expected patients (total):** 300

- **Number of administrations of the questionnaire per patient:** [ ]
- **Length of the follow-up (if any) for each patient:** [12] months
- **Planned study date:** *start* [08 / 2010] month/year *end* [08 / 2011] month/year

3. PROJECT FINANCING

- Not funded academic research ☒
  Not funded academic research: if your project is not explicitly funded, but funding comes from overall departmental funds or from the University or individual funds then fees are waived.
- Funded academic research ☐
  Funded academic research: academic projects receiving funding from commerce, government, EU or registered charity should anticipate paying the corresponding fees

  Note: Funded academic research sponsored by industry fits "commercial study" category
- Large non-commercial organization Research and Evaluation (per-study license) ☐
  Large non-commercial organization Research and Evaluation; e.g. states, nations, hospitals, healthcare systems (includes an important number of patients and/or centres)
- Large non-commercial organization Unlimited Research and Evaluation and clinical use (annual license, unlimited use) ☐
  Large non-commercial organization Research and Evaluation; e.g. states, nations, hospitals, healthcare systems (includes an important number of patients and/or centres)

  Please specify number of centres----------
- Commercial study ☐
  Commercial studies (industry, CRO, any for-profit companies)

  Please specify number of centres----------

Granting / Sponsoring from (if any) *(name of the governmental/foundation/company or other funding/sponsoring source):* .....

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4. REQUESTED PEDSQL™ SCALES *(please tick the appropriate box(es))*

PedsQL™ Generic Core Scales *Please specify:* *Standard* ☐ *Acute* ☐ *Both* ☒

Young Adult (18-25)		Adolescent (13-18)		Child (8-12)		Young Child (5-7)		Toddler (2-4)
Child self-report	Parent proxy-report	Child self-report	Parent proxy-report	Child self-report	Parent proxy-report	Child self-report	Parent proxy-report	Parent proxy-report
☐	☐	☐	☐	☒	☒	☐	☐	☐

PedsQL™ Infant Scales

☐ Parent-report form (1-12 months) ☐ Parent-report form (13-24 months)

PedsQL™ Short Form 15 Generic Core Scales

Adolescent (13-18)		Child (8-12)		Young Child (5-7)		Toddler (2-4)
Child self-report	Parent proxy- report	Child self-report	Parent proxy- report	Child self-report	Parent proxy- report	Parent proxy- report
☐	☐	☐	☐	☐	☐	☐

PedsQL™ Arthritis Module

Adolescent (13-18)		Child (8-12)		Young Child (5-7)		Toddler (2-4)
Child self-report	Parent proxy- report	Child self-report	Parent proxy- report	Child self-report	Parent proxy- report	Parent proxy- report
☐	☐	☐	☐	☐	☐	☐

PedsQL™ Asthma Module

Adolescent (13-18)		Child (8-12)		Young Child (5-7)		Toddler (2-4)
Child self-report	Parent proxy- report	Child self-report	Parent proxy- report	Child self-report	Parent proxy- report	Parent proxy- report
☐	☐	☐	☐	☐	☐	☐

PedsQL™ Short Form 22 Asthma Module

Adolescent (13-18)		Child (8-12)		Young Child (5-7)		Toddler (2-4)
Child self-report	Parent proxy- report	Child self-report	Parent proxy- report	Child self-report	Parent proxy- report	Parent proxy- report
☐	☐	☐	☐	☐	☐	☐

PedsQL™ Brain Tumor Module

Adolescent (13-18)		Child (8-12)		Young Child (5-7)		Toddler (2-4)
Child self-report	Parent proxy- report	Child self-report	Parent proxy- report	Child self-report	Parent proxy- report	Parent proxy- report
☐	☐	☐	☐	☐	☐	☐

PedsQL™ Cancer Module *Please specify:* *Standard* ☐ *Acute* ☐ *Both* ☐

Adolescent (13-18)		Child (8-12)		Young Child (5-7)		Toddler (2-4)
Child self-report	Parent proxy- report	Child self-report	Parent proxy- report	Child self-report	Parent proxy- report	Parent proxy- report
☐	☐	☐	☐	☐	☐	☐

PedsQL™ Cardiac Module

Adolescent (13-18)		Child (8-12)		Young Child (5-7)		Toddler (2-4)
Child self-report	Parent proxy- report	Child self-report	Parent proxy- report	Child self-report	Parent proxy- report	Parent proxy- report
☐	☐	☐	☐	☐	☐	☐

PedsQL™ Cerebral Palsy Module

Adolescent (13-18)		Child (8-12)		Young Child (5-7)		Toddler (2-4)
Child self-report	Parent proxy- report	Child self-report	Parent proxy- report	Child self-report	Parent proxy- report	Parent proxy- report
☐	☐	☐	☐	☐	☐	☐

PedsQL™ Cognitive Functioning Scale* *Please specify:* *Standard* ☐ *Acute* ☐ *Both* ☐

Adolescent (13-18)		Child (8-12)		Young Child (5-7)		Toddler (2-4)
Child self-report	Parent proxy- report	Child self-report	Parent proxy- report	Child self-report	Parent proxy- report	Parent proxy- report
☐	☐	☐	☐	☐	☐	☐

**The Cognitive Functioning Scale is a part of the PedsQL™ Multidimensional Fatigue Scale*

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PedsQL™ Diabetes Module *Please specify:* *Standard* ☐ *Acute* ☐ *Both* ☐

Young Adult (18-25)		Adolescent (13-18)		Child (8-12)		Young Child (5-7)		Toddler (2-4)
Child self-report	Parent proxy-report	Child self-report	Parent proxy-report	Child self-report	Parent proxy-report	Child self-report	Parent proxy-report	Parent proxy-report
☐	☐	☐	☐	☐	☐	☐	☐	☐

PedsQL™ End Stage Renal Module

Adolescent (13-18)		Child (8-12)		Young Child (5-7)		Toddler (2-4)
Child self-report	Parent proxy- report	Child self-report	Parent proxy- report	Child self-report	Parent proxy- report	Parent proxy- report
☐	☐	☐	☐	☐	☐	☐

PedsQL™ Multidimensional Fatigue Scale *Please specify:* *Standard* ☐ *Acute* ☐ *Both* ☐

Young Adult (18-25)		Adolescent (13-18)		Child (8-12)		Young Child (5-7)		Toddler (2-4)
Child self-report	Parent proxy-report	Child self-report	Parent proxy-report	Child self-report	Parent proxy-report	Child self-report	Parent proxy-report	Parent proxy-report
☐	☐	☐	☐	☐	☐	☐	☐	☐

PedsQL™ Neuromuscular Module

Adolescent (13-18)		Child (8-12)		Young Child (5-7)		Toddler (2-4)
Child self-report	Parent proxy- report	Child self-report	Parent proxy- report	Child self-report	Parent proxy- report	Parent proxy- report
☐	☐	☐	☐	☐	☐	☐

PedsQL™ Oral Health Scale

Adolescent (13-18)		Child (8-12)		Young Child (5-7)		Toddler (2-4)
Child self-report	Parent proxy- report	Child self-report	Parent proxy- report	Child self-report	Parent proxy- report	Parent proxy- report
☐	☐	☐	☐	☐	☐	☐

PedsQL™ Pediatric Pain Coping Inventory™

Adolescent (13-18)		Child (5-12)		Young child version is included in the child version	No Toddler version
Child self-report	Parent proxy- report	Child self-report	Parent proxy- report		
☐	☐	☐	☐		

PedsQL™ Pediatric Pain Questionnaire™ (PPQ)

Adolescent (13-18)		Child (8-12)		Young Child (5-7)		No Toddler version
Child self-report	Parent proxy- report	Child self-report	Parent proxy- report	Child self-report	Parent proxy- report	
☐	☐	☐	☐	☐	☐	

PedsQL™ Present Functioning Visual Analogue Scales

Child (5-18)	
☐ Child-report form	☐ Parent-report form

PedsQL™ Rheumatology Module

Adolescent (13-18)		Child (8-12)		Young Child (5-7)		Toddler (2-4)
Child self-report	Parent proxy- report	Child self-report	Parent proxy- report	Child self-report	Parent proxy- report	Parent proxy- report
☐	☐	☐	☐	☐	☐	☐

PedsQL™ Transplant Module

Adolescent (13-18)		Child (8-12)		Young Child (5-7)		Toddler (2-4)
Child self-report	Parent proxy- report	Child self-report	Parent proxy- report	Child self-report	Parent proxy- report	Parent proxy- report
☐	☐	☐	☐	☐	☐	☐

PedsQL™ Family Information Form

☐ Parent-report form

PedsQL™ Family Impact Module

☐ Parent-report form
PedsQL™ Gastrointestinal Symptom Scale
☐ Parent-report form
PedsQL™ Healthcare Satisfaction Module
☐ Parent-report form
PedsQL™ Healthcare Satisfaction Module for Hematology/Oncology
☐ Parent-report form

5. TRANSLATIONS

Please indicate in which language(s) and for which country(ies) the above requested PedsQL scale(s) is/are needed:

Language:	*For use in the following country*	*Language:*	*For use in the following country*	*Language:*	*For use in the following country*
e.g. English	*USA*				
e.g. Spanish	*USA*				

The PedsQL™ translation(s) may not be available in the country required. Please check availability of translations with MAPI Research TRUST or consult the PedsQL website at www.pedsql.org section "Translations".

If not available in the language(s) required, a Linguistic Validation must be undergone.

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USER AGREEMENT

This agreement is between MAPI RESEARCH TRUST and Xiangli Gu ("user")

MAPI Research TRUST shall deliver the original **PedsQL™** and/or the translations requested by "User" subject to the following conditions:

- The translations requested are available, and
- The present contract is duly completed and signed by "User"

The use of the PedsQL™ in the above mentioned context is subject to the following conditions:

1.This user agreement is for the use of the PedsQL™, i.e., the PedsQL™ Pediatric Quality of Life Inventory™ report forms, registered copyrights in the PedsQL™ (e.g., U.S. copyright registration No. TXu 856-101) and related treaty, convention and common law rights pertaining thereto, with all rights reserved to Dr. James W. Varni, licensor and author of the PedsQL™ .

2. Fee: the use of the PedsQL™ for unfunded academic research purposes is free. The use of the PedsQL™ for any funded academic research, large non commercial organization research and evaluation (e.g., States, Nations, Hospitals, Healthcare Systems) or commercial purpose and large non commercial organization unlimited research/evaluation/clinical use is subject to a royalty fee payable to the author, Dr. James W. Varni and a distribution fee payable to MAPI Research TRUST (refer to the "PedsQL Cost structure" in Appendix of this User-Agreement).

3. "User" shall not modify, abridge, condense, translate, adapt, recast or transform the PedsQL™ questionnaires in any manner or form, including but not limited to any minor or significant change in wordings or organisation in PedsQL™ questionnaires, **without the prior written agreement of Dr. James W. Varni**. If permission is granted, any improvements, modifications, or enhancements to the PedsQL™ which may be conceived or developed, including translations and modules, shall become the property of Dr. James W. Varni.

4. "User" shall not reproduce the PedsQL™ questionnaires except for the limited purpose of generating sufficient copies for use in the above mentioned clinical investigations and shall in no event distribute copies of the PedsQL™ questionnaires to third parties by sale, rental, lease, lending, or any others means.

5. In case of publication, "User" shall cite the following PedsQL™ publication(s) in the reference section of the publication. It is requested that a copy of all published papers and abstracts using the PedsQL™ be provided to Dr. James W. Varni.

- ***PedsQL Generic Core Scales***: Varni JW, et al. The PedsQL™: Measurement Model for the Pediatric Quality of Life Inventory. *Medical Care,* 1999; 37(2):126-139

  Varni, J.W., et al. The PedsQL™ 4.0: Reliability and validity of the Pediatric Quality of Life Inventory™ Version 4.0 Generic Core Scales in healthy and patient populations. *Medical Care,* 2001; 39(8): 800-812.

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  Varni, J.W., et al. (2003). The PedsQL™ 4.0 as a pediatric population health measure: Feasibility, reliability, and validity. *Ambulatory Pediatrics*, 3, 329-341.

  Chan, K.S., Mangione-Smith, R., Burwinkle, T.M., Rosen, M., & Varni, J.W. (2005). The PedsQL™: Reliability and validity of the Short-Form Generic Core Scales and Asthma Module. *Medical Care*, 43, 256-265.
  Varni, J.W., & Limbers, C.A. (2009). The PedsQL™ 4.0 Generic Core Scales Young Adult Version: Feasibility, reliability and validity in a university student population. *Journal of Health Psychology*, 14, 611-622.

- ***Asthma Module***: Varni, J.W., Burwinkle, T.M., Rapoff, M.A., Kamps, J.L., & Olson, N. The PedsQL™ in pediatric asthma: Reliability and validity of the Pediatric Quality of Life Inventory™ Generic Core Scales and Asthma Module. *Journal of Behavioral Medicine*, 2004; 27:297-318.

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- ***Brain Tumor Module***: Palmer, S.N., Meeske, K.A., Katz, E.R., Burwinke, T.M., & Varni, J.W. (2007). The PedsQL™ Brain Tumor Module: Initial reliability and validity. *Pediatric Blood and Cancer*, 49, 287-293.
- ***Cancer Module***: Varni, J.W., Burwinkle, T.M., Katz, E.R., Meeske, K., & Dickinson, P. The PedsQL™ in pediatric cancer: Reliability and validity of the Pediatric Quality of Life Inventory™ Generic Core Scales, Multidimensional Fatigue Scale, and Cancer Module. *Cancer*, 2002;94: 2090-2106.
- ***Cerebral Palsy Module***: Varni JW, Burwinkle TM, Berrin SJ, Sherman SA, Artavia K, Malcarne VL, Chambers HG (2006). The PedsQL™ in Pediatric Cerebral Palsy: Reliability, Validity, and Sensitivity of the Generic Core Scales and Cerebral Palsy Module. *Developmental Medicine and Child Neurology*, 48: 442-449.
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6. The author of the PedsQL™ requests to be acknowledged in any communication including publication in which the questionnaire is used, as follows: "The Quality of Life study described in this paper was carried out using the PedsQL™, developed by Dr. James W. Varni".

7. All data, results and reports obtained by, or prepared in connection with, the authorized use of the PedsQL™ shall remain the "User's" property.

8. Electronic use:

All screens related to the PedsQL™ of the above mentioned e-application shall include the appropriate copyright and trademark information.

Last version of the screens related to the PedsQL™ as it will be presented in the application shall be reviewed and approved by Dr James W. Varni before being given permission to use.

User may incorporate the PedsQL™ questionnaires in its above mentioned electronic application.

9. Confidentiality:

MAPI Research TRUST and "User" acknowledge that each party in connection with the terms of this agreement will obtain certain information, which is confidential and/or property to the other party in the course of its use of the PedsQL™.

All and any information related to the PedsQL™ including but not limited to the following information concerning clinical investigations, creations, systems, materials, software, data and know-how, translations, improvements ideas, specifications, documents, records, notebooks, drawings, and any repositories or representation of such information, whether oral or in writing or software stored, are herein referred to as confidential information.

In consideration of the disclosure of any such confidential information to the other, each party agrees to hold such confidential information in confidence and not divulge it, in whole or in part, to any third party except for the purpose specified in this agreement.

10. If, at any time during the term of this agreement, either party hereto learns of any infringement by a third party of any Intellectual Property Rights in connection with any of the PedsQL™ , the party first learning of such infringement shall promptly notify the other. MAPI Research TRUST shall have the right, but shall have no obligation, to institute proceedings against the infringing party. The "User" shall assist MAPI Research TRUST in any such proceedings, if so requested by MAPI Research TRUST.

In the event of total or partial breach by MAPI Research TRUST of any of its obligations hereunder, MAPI Research TRUST's liability shall be limited to the direct loss or damage (excluding loss of profit and operating losses) suffered by "User" as a result of such breach and shall not include any other damages and particular consequential damages.

11. This agreement holds for the above mentioned study only. The use of the PedsQL™ in any additional study of the "User" will require a separate agreement.

12. Under no circumstances may Dr. James W. Varni or MAPI Research TRUST be held liable for direct or consequential damage resulting from the use of the PedsQL™ .

13. This agreement shall be effective as the date set forth in the preamble and shall continue for a term of ...years or months. Either party may terminate this Agreement immediately upon providing written notice to the other party in the event of (a) the other party's unexcused failure to fulfill any of its material obligations under this Agreement or (b) upon the insolvency or bankruptcy of, or the filing of a petition in bankruptcy or similar arrangement by the other party. Upon termination, 'User" shall cease all use of the services of the PedsQL™ . As soon as execution of this agreement, MAPI Research TRUST shall promptly provide "User" with a definitive invoice, and "User" shall pay such invoice within thirty (30) days of the date of the invoice. Upon expiration or termination of this Agreement MAPI Research TRUST may retain in its possession confidential information it acquired from PedsQL™ while under contract.

In the event of termination or non-renewal of this Agreement by MAPI Research TRUST for any cause or failure by MAPI Research TRUST to conclude a new agreement with "User" upon the expiry of this Agreement, MAPI Research TRUST will have no liability for payment of any damages and/or indemnity to "User".

14. MAPI Research TRUST shall not disclose, whether to the public press or otherwise, the name of "Company name", to any third party to this agreement except to the author of the PedsQL™. This Agreement and any of the rights and obligations of "User' are personal to the "User" and cannot be assigned or transferred by "User" to any third party or by operation of law, except with the written consent of MAPI Research TRUST notified to "User".

15. The entire agreement between the parties hereto is contained herein and this Agreement cancels and supersedes all prior agreements, oral or written, between the parties hereto with the respect to the subject matter hereto. This Agreement or any of its terms may not be changed or amended except in writing and the failure by either party hereto to enforce any or all of the provision(s) of this Agreement shall not be deemed a waiver or an amendment of the same and shall not prevent future enforcement thereof.

If any one or more of the provisions or clauses of this Agreement are adjudged by a court to be invalid or unenforceable, this shall in no way prejudice or affect the binding nature of this Agreement as a whole, or the validity or enforceability of each/and every other provision of this Agreement.

16. This Agreement shall be governed by and construed in accordance with the laws of France.

17. Any disputes between the parties hereto arising from this Agreement, including without limitation its validity, interpretation performance, and/or termination and its consequences shall be resolved by the tribunal de commerce of LYON (FRANCE).

18. This agreement may not be altered, amended or modified except by written document signed by all parties.

IN WITNESS WHEREOF, the parties hereto have caused this agreement to be executed by their duly authorised representatives as of the date first above written.

AGREED

User's Signature:	**Company/Organisation Stamp (if applicable):**
XiangLi Gu	
Title: Ph.D student	
Company/Organisation: Louisiana State University, Baton Rouge, LA	
Date: 04/27/2010	

APPENDIX C: INSTRUMENTATION

1.Grade (Circle one): 4th 5th 2. Your Name: (first) _____ (last) _____

3. Gender: male female 4. Date of Birth: _____ (month) _____ (day) _____(year)

5. Race (Check one): White-American African-American Hispanic-American Asian-American Other

Using the scale below, please circle the best answer that best describes your feelings toward physical education (P.E.).

1. How good are you at activities and games in P.E.?

Very bad	Bad	Not sure	Good	Very good

2. If you were to list all the students in your P.E. class from the worse to the best, where would you put yourself?

One of the worst	One of the bad	Not sure	One of the good	One of the best

3. How good are you at activities and games in P.E., compared to most of your other school subjects?

A lot worse in P.E.	A little worse in P.E.	Not sure	A little better in P.E.	A lot better in P.E.

4. How good would you be at learning something new in P.E. this year?

Very bad	Bad	Not sure	Good	Very good

5. How well do you think you will learn activities and games in P.E. this year?

Not at all well	Not well	Not sure	Well	Very well

6. For me, being good at activities and games in P.E. is

Not very important	Not important	Not sure	Important	Very important

7. Compared to your other school subjects, how important is it to you to be good at activities and games in P.E.?

Not very important	Not important	Not sure	Important	Very important

8. In general, I find learning new activities and games in P.E. is

"Way" boring	"Way" a little boring	Not sure	"Way" a little fun	"way" fun

9. How much do you like activities and games in P.E.?

Don't like it at all	Don't like it	Not sure	Like it	Like it very much

10. Some things that you learn in school help you do things better outside of class. We call this being useful. For example, learning about plants might help you grow a garden. In general, how useful is what you learn in P.E.?

Not very useful at all	Not useful	Not sure	Useful	Very useful

11. Compared to your other school subjects, how useful is what you learn in P.E.?

Not very useful at all	Not useful	Not sure	Useful	Very useful

12. When you get to high school, you will have a choice whether you want to take P.E.. How much would you want to take it?

Not at all	Not likely	Not sure	Likely	Very much

"During physical education class..."

Check √ in only ONE box on each line.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. My teacher feels happy when I learn something new.					
2. My teacher feels happy when I do my best.					
3. My teacher feels happy when I do better than other students.					
4. My teacher says it is OK for me to make mistakes.					
5. My teacher says only a few kids can be the best.					
6. My teacher says it is OK for me to ask for help if I do not know how to do an activity.					
7. My teacher encourages me to do better than other students.					

8. My teacher makes sure that I have enough time to learn how to do the activity.					
9. My teacher is proud of me when I am the best student.					

In the past *7 days*, how much of a *problem* has this been for you ….

ABOUT MY HEALTH AND ACTIVITIES (*problems with*...)	Never	Almost Never	Some-times	Often	Almost Always
1. It is hard for me to walk more than one block	0	1	2	3	4
2. It is hard for me to run	0	1	2	3	4
3. It is hard for me to do sports activity or exercise	0	1	2	3	4
4. It is hard for me to lift something heavy	0	1	2	3	4
5. It is hard for me to take a bath or shower by myself	0	1	2	3	4
6. It is hard for me to do chores around the house	0	1	2	3	4
7. I hurt or ache	0	1	2	3	4
8. I have low energy	0	1	2	3	4
ABOUT MY FEELINGS (*problems with*…)	Never	Almost Never	Some-times	Often	Almost Always
1. I feel afraid or scared	0	1	2	3	4
2. I feel sad or blue	0	1	2	3	4
3. I feel angry	0	1	2	3	4
4. I have trouble sleeping	0	1	2	3	4
5. I worry about what will happen to me	0	1	2	3	4
HOW I GET ALIONG WITH OTHERS (*problems with*…)	Never	Almost Never	Some-times	Often	Almost Always
1. I have trouble getting along with other kids	0	1	2	3	4
2. Other kids do not want to be my friend	0	1	2	3	4
3. Other kids tease me	0	1	2	3	4
4. I cannot do things that other kids my age can do	0	1	2	3	4
5. It is hard to keep up when I play with other kids	0	1	2	3	4
ABOUT SCHOOL (*problems with*…)	Never	Almost Never	Some-times	Often	Almost Always
1. It is hard to pay attention in class	0	1	2	3	4
2. I forget things	0	1	2	3	4

3. I have trouble keeping up with my schoolwork	0	1	2	3	4
4. I miss school because of not feeling well	0	1	2	3	4
5. I miss school to go to the doctor or hospital	0	1	2	3	4

Have you done any of the following activities in the past 7 days (last week)? If yes, how many times?	None	1-2 times	3-4 times	5-6 times	7 times or more
1. Skipping/Jumping Rope					
2. Roller Blading					
3. Active Games (tag)					
4. Walking for exercise					
5. Bicycling					
6. Jogging or Running					
7. Swimming laps					
8. Baseball, softball					
9. Dance (social, recreational)					
10. Football					
11. Racket sports (badminton, tennis, racquetball)					
12. Skateboarding					
13. Soccer					
14. Volleyball					
15. Hockey (roller, ice, street)					
16. Basketball					
17. Ice Skating					
18. Martial Arts (karate, judo)					
19. Gymnastics					
20. Other					

21. Which one of the following describes you best for the last 7 days? Read all five statements before deciding on the one answer that describes you.
A. All or most of my free time was spent doing things involving little physical effort.
B. I sometimes (1-2 times last week) did physical things in my free time.
C. I often (3-4 times last week) did physical things in my free time.
D. I quite often (5-6 times last week) did physical things in my free time.

E. I very often (7 times last week) did physical things in my free time.

22. In the last 7 days, during your physical education (PE) classes, how often were you very active (playing hard, running, jumping, throwing)?

I don't do PE	Hardly Ever	Sometimes	Quite Often	Always

23. In the last 7 days, on how many days right after school, did you do sports, or play games in which you were very active?

None	1 time	2-3 times	4 times	5 times

24. In the last 7 days, on how many evenings did you play sports, dance or play games in which you were very active?

None	1 time	2-3 times	4 times	5 times

25. This past weekend, how many times did you play sports, dance, or play games in which you were very active?

None	1 time	2-3 times	4 times	5 times

26. In the last 7 days, what did you normally do *at lunch* (besides eating lunch)?
A. Sat down (talking, reading, doing schoolwork) B. Stood around or walked around
C. Ran or played a little bit D. Ran around and played quite a bit
E. Ran and played hard most of the time

27. Were you sick last week, or did anything prevent you from doing your normal physical activities?
(1). Yes (2). No

28. If yes, what prevented you? _____

APPENDIX D: RAW DATA

ID	grade	gender	age	race	exb	tv	Mclimate	Pclimate	HRQOL	PA	Steps/min
1	4	2	9	1	2.80	3.50	3.80	2.50	74.79	2.79	88.44
2	4	1	9	1	4.60	4.33	4.80	3.25	97.50	4.81	95.77
3	4	1	10	1	4.80	4.67	4.60	3.75	93.44	4.41	113.18
4	4	1	9	2	5.00	4.67	4.60	3.75	84.58	4.59	93.87
5	4	2	9	2	4.40	4.50	4.60	2.50	82.19	3.64	99.13
6	4	2	9	5	4.60	4.50	4.20	2.00	96.88	2.79	108.92
7	4	1	10	1	4.20	3.33	4.60	3.50	67.40	2.18	115.05
8	4	1	11	1	3.80	3.50	4.20	1.50	45.00	2.83	100.21
9	4	2	9	1	4.80	4.67	4.00	4.25	92.60	3.61	84.08
10	4	2	9	5	2.80	3.33	3.20	2.50	74.38	2.61	86.41
11	4	1	10	5	4.60	4.83	4.60	3.50	91.98	4.40	110.13
12	4	2	9	5	4.00	3.17	4.80	2.00	80.42	1.96	125.69
13	4	2	10	1	3.60	3.83	3.60	2.00	95.10	3.79	92.95
14	4	1	9	1	5.00	4.50	3.20	1.75	98.33	4.11	115.92
15	4	2	9	1	3.60	3.67	4.00	2.00	68.96	3.59	99.33
16	4	2	9	2	4.80	4.83	4.60	2.75	74.79	2.78	98.95
17	4	1	9	5	4.60	4.83	4.60	2.00	89.38	4.71	124.21
18	4	1	10	1	4.20	4.17	4.60	3.25	93.33	3.44	114.21
19	4	1	10	1	4.60	4.67	3.80	3.00	87.71	4.19	107.85
20	4	2	9	1	4.40	4.50	4.60	1.25	80.00	2.97	79.74
21	4	2	9	1	4.20	3.67	3.40	1.75	75.73	3.95	82.21
22	4	2	9	1	3.40	4.00	3.20	2.50	83.85	3.41	88.67
23	4	1	9	5	4.40	3.67	4.20	1.75	86.56	1.89	39.82
24	4	1	9	1	4.60	4.50	4.80	3.50	98.44	4.65	97.15
25	4	2	9	1	2.00	2.50	4.20	4.00	83.85	3.19	79.56
26	4	1	9	1	4.40	4.50	4.20	2.25	55.00	3.56	120.64
27	4	2	10	1	3.40	3.33	4.40	2.75	59.38	2.26	111.67
28	4	1	9	1	4.00	4.83	4.60	3.50	78.75	3.74	100.84
29	4	1	10	1	4.00	4.33	3.20	3.00	61.35	2.81	74.65
30	4	2	9	1	4.60	4.33	5.00	2.50	95.10	3.44	81.97
31	4	1	9	5	4.80	4.83	4.40	2.75	78.44	4.51	65.48
32	4	1	10	1	3.80	2.67	5.00	5.00	81.67	3.66	89.19
33	4	2	9	1	4.40	4.83	4.60	2.00	82.71	3.51	72.74
34	4	2	10	1	4.20	3.67	4.20	3.00	87.08	2.85	139.74
35	4	2	10	5	4.80	5.00	4.40	1.00	91.15	3.10	43.97
36	4	2	9	1	4.80	4.83	4.40	3.25	82.92	3.51	81.45
37	4	1	10	1	4.40	4.50	4.40	1.50	83.65	3.21	117.97
38	4	2	10	1	3.00	4.17	4.00	1.75	81.35	2.64	83.32
39	4	2	9	1	4.00	4.17	3.60	3.25	67.08	3.34	78.97
40	4	2	9	1	3.20	3.33	4.20	2.25	69.38	2.49	57.74
41	4	1	9	1	4.40	4.33	4.60	2.75	82.81	3.68	107

42	4	2	9	1	4.80	4.50	4.80	3.00	93.44	2.94	92.97
43	4	1	9	1	3.60	3.50	3.80	3.00	90.31	2.61	82.9
44	4	2	9	5	5.00	4.33	5.00	2.75	91.98	3.24	89.77
45	4	2	9	1	3.80	3.50	4.00	2.75	82.29	3.40	82.87
46	4	1	9	1	3.80	4.00	3.20	3.00	67.19	4.32	97.23
47	4	1	10	1	4.60	3.67	4.40	1.25	91.88	4.04	101.97
48	4	2	9	1	4.40	3.50	4.60	2.75	90.31	3.64	111.45
49	4	1	9	1	3.60	3.00	4.00	3.00	67.71	2.62	105.35
50	4	2	9	1	3.40	3.83	3.20	2.25	74.58	2.70	91.65
51	4	1	10	1	4.60	3.83	3.80	1.25	86.15	3.22	68.71
52	4	2	10	1	4.00	4.33	5.00	4.50	70.94	3.73	77.92
53	4	1	9	1	4.60	4.83	4.20	4.50	86.77	3.71	109.39
54	4	2	10	5	4.60	5.00	5.00	3.50	100.00	4.47	94.4
55	4	1	9	1	5.00	4.00	4.60	3.25	96.04	3.24	96.16
56	4	1	10	1	4.40	4.33	4.00	1.25	80.21	4.46	107.25
57	4	2	9	5	4.20	4.50	5.00	3.00	82.40	2.93	118.38
58	4	2	9	1	4.00	3.67	3.60	3.00	72.60	3.21	85.74
59	4	1	10	1	3.80	4.00	3.80	3.50	95.10	3.51	96.77
60	4	1	9	2	3.80	4.00	4.40	3.00	55.73	3.44	102.26
61	4	1	9	5	3.60	4.67	4.20	2.50	91.25	3.96	102.91
62	4	1	9	1	4.20	3.83	4.00	2.75	74.17	4.49	122.18
63	4	1	9	1	4.40	4.17	4.80	3.50	91.15	4.60	99.88
64	4	2	9	1	3.80	4.33	4.60	3.75	78.85	2.76	92.71
65	4	2	9	1	3.80	4.33	4.40	2.75	82.29	3.59	101.17
66	4	2	9	1	4.60	4.50	4.60	2.50	88.65	4.25	89.33
67	4	1	10	1	4.80	3.83	4.40	2.75	100.00	4.22	104.14
68	4	2	9	1	3.20	4.50	4.20	2.25	72.40	3.50	92.28
69	4	1	11	1	4.80	3.83	4.20	3.75	91.88	3.82	74.24
70	4	2	9	1	3.60	3.33	4.00	2.25	87.19	2.61	84.16
71	4	2	10	1	3.80	4.00	4.00	2.75	81.15	4.28	89.33
72	4	1	9	1	5.00	4.33	4.40	2.00	86.25	4.41	114.81
73	4	2	9	1	3.60	4.67	5.00	3.25	75.63	3.68	94
74	4	2	9	1	3.60	4.50	4.80	2.50	92.50	3.43	83.19
75	4	2	9	2	3.40	3.83	3.20	2.50	83.23	3.13	78.42
76	4	1	9	1	4.80	4.50	5.00	3.50	90.94	4.12	82.55
77	4	2	9	1	3.20	4.00	3.00	3.25	50.52	3.69	68.27
78	4	1	10	1	4.80	5.00	4.60	5.00	85.21	3.93	86.33
79	4	2	9	1	4.20	4.33	4.40	2.25	83.23	3.84	104.52
80	4	2	9	1	4.00	3.00	3.40	1.75	73.44	3.17	63.27
81	4	2	10	1	4.60	4.17	4.00	2.75	91.25	3.55	65.76
82	4	1	9	1	4.40	4.17	3.00	3.00	79.90	4.14	131.55
83	4	1	10	1	4.60	4.17	4.40	2.50	91.88	3.66	127.36
84	4	2	10	1	4.40	4.17	3.80	2.75	86.04	4.01	98.27
85	4	1	9	5	4.40	4.33	4.40	1.50	91.67	4.55	117.97
86	4	2	9	1	4.80	4.67	4.60	3.00	95.10	3.90	81.15

87	4	2	9	1	4.00	3.83	4.00	1.00	80.63	2.88	111.36
88	4	1	9	1	4.60	4.33	4.00	3.50	90.31	2.17	107.94
89	4	1	10	1	4.60	4.67	4.60	2.75	85.31	4.15	127.97
90	4	2	9	1	4.40	4.00	4.40	1.75	91.15	2.62	101.33
91	4	2	9	1	2.80	3.67	4.00	1.75	73.23	3.70	89.85
92	4	1	9	1	4.40	4.17	5.00	3.00	93.54	2.93	112.7
93	4	2	9	1	3.20	4.67	4.40	4.50	86.88	3.07	109.15
94	4	2	9	1	4.20	3.17	4.40	2.50	90.31	3.09	106.79
95	4	1	9	1	3.40	3.83	4.80	1.00	79.79	3.97	106.42
96	4	2	9	1	4.20	4.00	4.40	2.25	80.83	3.81	77.06
97	4	1	9	1	4.60	4.00	4.80	1.50	83.75	4.04	104.33
98	4	2	9	1	4.80	4.50	4.20	4.25	90.00	3.19	75.03
99	4	1	9	1	4.60	4.17	4.40	2.00	81.56	3.76	112.97
100	4	1	9	1	3.80	4.33	4.60	2.25	78.44	3.11	129.42
101	5	2	10	2	3.80	3.67	4.60	2.00	92.60	2.19	80.22
102	5	2	11	1	4.40	4.67	4.60	1.50	85.94	4.06	77.9
103	5	2	10	1	4.60	4.67	4.40	2.25	97.50	4.61	114.17
104	5	2	10	1	4.80	4.33	4.20	4.00	83.02	3.83	76.79
105	5	2	10	2	3.80	3.67	4.00	1.50	89.38	3.11	65.39
106	5	2	10	1	4.40	3.83	4.20	2.25	89.58	2.21	121.98
107	5	2	11	2	4.40	4.33	4.00	2.25	85.21	3.24	81.95
108	5	1	10	1	4.60	3.33	4.80	1.75	85.94	3.20	107.96
109	5	1	10	1	4.60	4.50	5.00	2.50	97.60	4.64	134.49
110	5	2	10	3	4.40	4.50	4.40	2.50	95.10	4.36	116.19
111	5	1	11	1	4.40	4.00	4.40	1.50	91.77	4.44	137.55
112	5	2	10	1	4.20	4.67	5.00	2.00	70.21	2.38	75.75
113	5	2	11	1	4.40	3.83	4.40	2.25	85.42	2.11	102.3
114	5	2	10	1	3.60	3.00	4.60	3.00	91.04	3.22	70.83
115	5	2	11	1	3.20	3.83	5.00	2.75	75.73	4.11	54.46
116	5	2	10	1	4.00	4.67	4.20	2.25	96.77	4.16	87.22
117	5	1	10	1	4.80	4.67	4.40	2.50	99.17	4.31	137.03
118	5	2	10	1	3.60	3.67	3.40	2.75	90.42	3.13	118.07
119	5	1	10	1	4.60	4.33	4.80	1.50	80.42	4.34	93.79
120	5	1	10	1	3.80	3.83	4.60	2.50	68.65	4.19	52.63
121	5	2	11	1	3.60	3.83	4.20	2.75	62.60	3.21	98.24
122	5	1	11	1	4.20	4.00	4.80	4.75	88.75	3.81	73.08
123	5	1	10	1	4.40	3.83	4.40	1.50	90.21	3.94	99.78
124	5	1	11	3	4.80	4.67	4.40	2.25	90.21	3.87	87.76
125	5	2	10	1	4.00	4.17	4.60	1.50	83.23	3.30	107.6
126	5	1	10	1	2.60	2.67	3.80	1.00	46.15	2.38	110.81
127	5	2	10	2	4.20	4.83	4.60	1.50	91.98	3.26	93.71
128	5	1	10	1	4.60	4.67	4.80	2.75	93.44	3.79	92.95
129	5	2	10	1	4.00	4.33	4.40	2.25	81.56	1.94	84.58
130	5	2	10	1	3.40	3.83	4.80	3.75	64.90	3.21	100.44
131	5	2	10	1	4.00	3.83	4.40	2.50	83.85	2.78	99.94

132	5	1	10	1	3.40	4.00	4.20	2.25	91.88	2.70	135.95
133	5	2	10	1	4.20	4.33	4.00	2.00	95.00	3.48	68.76
134	5	2	11	1	4.40	4.33	5.00	2.25	77.19	2.54	103.48
135	5	2	10	2	4.00	4.17	4.40	1.75	84.58	3.21	84.79
136	5	1	11	1	3.60	3.33	4.60	1.75	61.77	2.99	115.8
137	5	2	10	4	4.00	4.17	4.00	2.00	81.98	3.16	98.59
138	5	2	10	4	4.20	4.67	4.80	2.25	97.60	3.26	106.06
139	5	1	10	1	4.00	4.50	4.20	2.75	68.44	2.51	98.92
140	5	1	10	1	4.80	3.67	5.00	2.50	79.69	3.56	99.51
141	5	2	10	1	4.80	4.50	3.60	2.50	76.15	3.58	108.11
142	5	1	10	1	4.20	4.00	4.00	2.00	70.94	3.09	108.26
143	5	1	11	1	4.60	4.50	4.20	2.50	92.60	2.99	77.8
144	5	1	11	1	4.40	4.00	4.80	2.25	84.58	3.59	64.69
145	5	2	10	1	4.00	4.17	4.40	2.00	92.71	3.29	95.31
146	5	1	11	1	3.20	4.33	5.00	1.00	75.10	3.43	108.22
147	5	2	10	1	4.00	4.17	4.40	2.25	82.81	2.81	73.37
148	5	2	10	1	4.40	4.67	4.40	2.25	97.60	3.73	101.77
149	5	2	10	4	4.20	4.33	4.80	3.50	63.85	2.74	101.29
150	5	1	10	1	4.80	4.67	4.20	2.50	92.60	3.29	83.89
151	5	2	11	1	3.80	3.83	3.80	2.75	68.54	2.86	81.34
152	5	2	10	1	4.00	3.67	4.40	3.00	83.02	2.69	96.5
153	5	1	10	4	4.80	3.67	4.60	1.75	76.56	3.14	113
154	5	2	10	1	4.40	4.67	5.00	3.25	85.42	2.99	107.34
155	5	1	10	1	4.20	3.83	4.80	1.25	90.42	3.69	117.32
156	5	2	10	1	4.00	3.00	4.80	2.50	85.52	3.51	107.66
157	5	1	11	1	4.40	4.67	4.60	2.75	86.98	3.07	111.61
158	5	2	11	1	3.60	3.83	4.80	1.25	67.29	2.24	102.43
159	5	1	10	1	4.60	4.17	4.40	2.00	87.92	3.51	118.16
160	5	1	10	4	4.80	3.50	4.00	4.00	85.31	2.80	118.34
161	5	1	11	1	3.80	3.50	3.80	2.25	80.63	2.75	110.07
162	5	2	10	1	4.00	3.33	4.60	2.25	89.58	2.19	106.93
163	5	2	11	1	4.20	4.17	4.80	3.00	87.92	3.11	93.34
164	5	1	10	1	4.80	4.33	4.60	2.75	91.98	2.81	117.5
165	5	1	10	1	4.60	4.00	5.00	2.50	100.00	3.79	100.2
166	5	2	11	1	4.20	4.00	3.20	2.50	78.96	2.99	109.25
167	5	1	11	1	2.80	3.50	4.20	1.75	73.33	2.64	103.82
168	5	2	10	1	3.60	3.67	4.80	3.75	83.13	3.36	101.27
169	5	2	11	1	3.80	4.00	3.40	3.50	62.92	2.79	99.75
170	5	2	10	1	4.00	4.00	4.60	3.00	75.10	2.97	92.05
171	5	2	10	1	4.00	3.33	4.20	2.00	86.46	3.14	88.93
172	5	2	10	1	4.20	4.17	4.80	2.75	87.71	3.71	96.82
173	5	1	9	1	4.60	4.83	5.00	2.50	95.94	3.16	143.45
174	5	2	10	1	4.60	4.67	5.00	2.00	90.21	2.29	79.46
175	5	1	11	1	4.80	4.67	5.00	3.00	90.94	4.47	109.98
176	5	1	10	1	5.00	4.50	5.00	2.00	74.06	3.52	105.05

177	5	1	10	1	4.20	3.50	4.00	3.00	94.38	3.84	113.24
178	5	1	10	1	4.20	4.33	4.20	3.00	85.21	3.04	88.85
179	5	2	10	1	4.20	4.33	3.80	2.75	74.90	4.28	69
180	5	1	11	1	2.80	3.17	2.80	3.00	58.75	1.44	85.49
181	5	1	10	1	4.60	3.50	4.00	1.75	92.71	3.92	101.02
182	5	2	10	1	4.40	4.50	1.80	1.00	76.35	4.64	93.15
183	5	1	10	1	4.20	4.50	4.20	2.00	86.15	3.15	106.98
184	5	2	10	1	4.60	4.33	4.00	3.00	93.33	2.92	85.07
185	5	2	10	4	4.00	3.83	4.80	2.50	83.75	3.13	74.17
186	5	2	11	1	4.60	4.67	5.00	2.50	96.77	3.19	73.85
187	5	2	10	1	4.00	4.17	4.20	2.25	77.19	2.51	74.78
188	5	1	11	1	4.00	3.67	4.20	2.50	64.17	2.94	81.29
189	5	1	10	1	4.00	4.00	4.20	2.75	88.75	3.47	78.46
190	5	2	10	1	4.60	4.33	4.20	2.50	89.69	3.39	110.07
191	5	1	11	1	3.40	4.00	3.80	2.75	78.02	4.23	77.59
192	5	2	10	1	4.20	4.33	4.20	1.75	76.56	3.90	117.98
193	5	1	11	1	4.60	4.67	3.80	3.00	83.75	3.54	101.85
194	5	2	10	1	4.60	4.67	4.40	3.00	98.33	3.96	73.07
195	5	2	11	2	4.40	3.00	3.60	2.00	51.46	3.85	61.63
196	5	1	10	1	4.40	3.67	4.00	2.75	89.48	3.98	87.02
197	5	2	10	2	4.40	4.33	4.00	2.50	83.75	3.06	73.29
198	5	2	10	1	4.20	4.50	4.20	1.75	70.00	3.41	62
199	5	2	10	1	4.20	4.50	4.00	2.00	83.54	2.84	87.27
200	5	2	11	1	3.80	4.33	4.40	3.00	86.88	3.56	74.05
201	5	1	12	2	3.80	3.83	3.80	2.75	60.63	1.63	40.54
202	5	1	10	2	4.20	3.67	5.00	4.00	100.00	4.51	57.21
203	5	1	10	2	4.40	4.00	4.20	2.50	73.23	2.97	39.46
204	5	1	10	2	4.80	4.67	5.00	1.50	96.77	4.69	48.11
205	5	1	11	2	4.20	4.17	4.00	2.25	52.19	3.24	44.7
206	5	1	10	2	4.40	5.00	4.20	3.50	75.83	3.91	46.19
207	5	1	10	2	5.00	5.00	5.00	5.00	13.75	4.74	56.9
208	5	1	10	2	5.00	4.83	4.20	3.50	91.15	3.97	57.77
209	5	1	10	2	4.00	3.83	4.20	3.50	95.94	3.67	33.62
210	5	1	10	2	4.20	4.67	4.40	3.25	84.58	2.91	50.1
211	5	1	11	2	4.20	4.50	4.80	3.50	93.33	2.65	36.09
212	5	1	11	2	5.00	3.83	4.60	3.00	80.52	3.19	27.64
213	5	1	10	2	5.00	5.00	4.40	4.00	96.67	4.11	28.8
214	5	1	11	2	4.60	4.17	3.60	3.75	95.10	3.56	31.57
215	5	1	10	2	4.60	4.33	4.60	2.50	87.92	3.47	43.8
216	5	1	10	2	4.40	4.17	3.80	2.50	72.40	3.48	31.46
217	5	1	10	2	4.80	4.33	4.00	1.75	91.15	3.66	81.05
218	5	1	10	2	4.00	4.33	5.00	3.75	76.46	2.49	51.54
219	5	1	11	2	4.80	4.67	5.00	2.00	92.81	4.84	41.72
220	5	1	10	2	3.60	4.17	4.60	4.00	79.06	3.10	26.68
221	5	1	11	2	5.00	4.33	5.00	4.00	72.81	3.86	47.04

222	5	1	10	2	4.40	4.17	4.00	2.50	80.52	3.19	65.71
223	5	1	11	2	4.20	4.17	5.00	1.50	96.77	3.94	66.66
224	5	1	11	2	4.60	4.33	4.40	2.50	87.71	3.76	32.34
225	5	1	11	2	3.80	4.33	4.20	4.00	83.65	3.34	71.51
226	5	1	10	2	3.80	4.17	5.00	3.00	85.94	3.36	22.78
227	5	1	10	2	4.60	4.00	3.80	3.50	70.63	3.56	34.7
228	5	1	10	5	4.40	4.00	3.40	4.00	77.08	2.68	31.94
229	5	1	11	2	3.00	3.50	1.00	1.00	64.06	2.00	37.83
230	5	1	10	2	5.00	5.00	4.40	4.00	98.33	3.83	77.02
231	5	2	10	2	4.40	4.83	4.80	1.50	69.17	3.09	78.8
232	5	2	10	2	4.40	4.67	4.60	2.75	63.02	2.99	84.55
233	5	2	11	1	4.40	4.33	4.20	2.50	58.85	2.04	58.89
234	5	2	10	2	4.20	3.83	1.60	2.50	70.21	2.99	60.46
235	5	2	10	2	2.20	3.33	4.00	3.00	68.02	2.00	44.84
236	5	2	10	2	4.00	4.33	4.20	3.50	76.35	1.79	52.46
237	5	2	10	2	4.20	1.83	5.00	4.00	87.81	2.50	93.15
238	5	2	10	3	4.40	3.83	4.60	2.75	66.77	3.32	50.03
239	5	2	11	2	4.00	3.50	3.80	3.50	67.19	2.07	57.96
240	5	2	10	2	5.00	4.67	5.00	1.75	85.63	2.59	46.79
241	5	2	10	1	4.80	4.83	4.00	3.75	89.27	3.11	79.77
242	5	2	10	2	4.80	4.83	5.00	1.00	88.85	4.31	48.22
243	5	2	10	2	4.80	4.83	5.00	4.00	51.25	2.99	90.03
244	5	2	10	2	4.00	4.17	5.00	3.00	82.60	2.24	59.17
245	5	2	11	2	4.80	4.50	4.60	2.00	65.31	3.59	70.18
246	5	2	10	2	3.40	4.00	4.40	2.25	59.69	2.84	75.93
247	5	2	10	2	4.40	4.33	4.80	3.75	57.92	3.14	53.48
248	5	2	11	2	4.60	4.67	4.80	1.75	90.21	2.66	49.44
249	5	2	11	2	4.40	4.17	5.00	2.25	75.21	2.42	67.95
250	5	2	12	2	4.00	3.83	3.60	2.25	91.04	3.23	66.84
251	5	2	10	2	4.40	4.50	4.60	1.75	87.08	2.40	76.75
252	5	2	10	2	5.00	4.67	3.80	1.75	84.58	3.64	55.08
253	5	2	10	2	4.40	5.00	4.60	3.25	59.17	3.20	42.1
254	5	2	10	2	4.20	4.83	4.20	4.00	83.13	3.34	50.1
255	5	2	10	2	4.80	4.33	3.80	2.75	75.42	2.58	75.03
256	5	2	11	1	4.40	4.67	3.80	2.25	75.63	3.27	59.22
257	5	2	11	2	4.00	4.17	4.40	2.25	97.60	2.84	44.33
258	5	2	12	2	4.80	4.83	4.80	3.00	85.10	2.76	41.05
259	5	2	12	2	4.40	4.83	4.20	4.00	45.83	3.12	50.31
260	5	2	10	2	5.00	4.67	5.00	3.75	68.33	3.43	60.94
261	5	2	10	2	5.00	4.67	4.80	4.75	73.13	3.49	51.85
262	5	2	10	2	3.80	4.00	4.60	2.00	70.63	3.66	47.4
263	5	2	10	2	4.20	4.67	4.40	1.00	100.00	3.96	48.17
264	5	2	11	2	4.40	3.67	4.20	3.25	91.25	2.27	49.5
265	4	2	9	2	5.00	4.67	4.40	2.75	85.31	3.21	63.35
266	4	1	10	1	4.60	4.67	3.60	3.00	82.08	4.36	51.73

267	4	1	10	2	4.60	4.00	4.80	3.50	88.54	4.11	63.54
268	4	2	9	2	4.60	3.83	4.40	2.75	37.50	4.81	33.45
269	4	2	9	2	4.40	5.00	5.00	3.00	93.33	3.76	22.76
270	4	1	10	2	5.00	5.00	5.00	4.50	85.42	4.31	38.7
271	4	2	9	2	3.80	4.83	4.80	3.00	91.04	3.77	46.82
272	4	1	10	2	2.80	1.83	1.20	1.75	72.40	4.52	53.55
273	4	1	10	2	4.80	4.83	4.40	5.00	90.00	3.72	43.02
274	4	2	10	2	3.60	4.67	3.60	1.50	37.29	3.72	39.05
275	4	2	9	2	3.20	4.33	3.20	3.00	82.50	3.22	57.92
276	4	2	9	2	3.60	3.50	4.20	4.00	41.56	2.89	57.83
277	4	2	10	2	4.00	4.50	3.80	2.75	47.29	1.97	32.87
278	4	1	10	2	4.40	4.00	3.20	3.25	94.38	3.79	59.62
279	4	1	10	5	3.60	4.17	3.40	3.50	59.90	2.40	40.21
280	4	1	9	1	5.00	5.00	5.00	5.00	90.00	4.86	39.3
281	4	2	9	2	4.40	4.83	4.40	3.50	90.10	2.97	26.64
282	4	1	9	2	4.80	4.33	5.00	2.00	78.85	3.38	35.87
283	4	1	10	1	3.60	3.83	4.00	3.00	87.29	2.55	48.9
284	4	1	10	2	4.80	4.17	4.00	2.50	93.44	3.92	46.3
285	4	1	9	2	4.80	4.67	2.80	4.00	60.52	3.69	43.04
286	4	2	10	2	4.80	4.83	4.80	4.75	64.27	3.66	44.71
287	4	1	10	2	4.60	3.83	4.40	2.50	96.88	3.59	43.86
288	4	1	10	2	5.00	5.00	4.20	5.00	62.29	4.01	40.87
289	4	1	9	2	4.60	4.50	3.00	2.75	92.71	3.45	56.33
290	4	1	10	5	4.60	4.00	3.40	4.00	74.38	3.99	59.56
291	4	1	10	1	4.60	4.17	4.80	1.50	92.50	3.96	35.73
292	4	2	9	2	4.20	4.50	4.40	2.00	63.75	4.35	47.05
293	4	1	9	2	4.00	4.00	4.00	4.00	40.00	2.74	34.38
294	4	1	11	1	4.80	4.83	5.00	3.25	90.94	3.81	45.61
295	4	2	9	2	4.60	5.00	5.00	2.25	74.06	4.16	45.58
296	4	2	10	2	4.60	4.50	5.00	1.50	81.56	4.00	35.32
297	4	2	9	5	4.80	4.17	4.80	2.00	46.98	3.14	69.5
298	4	2	9	1	4.80	4.17	4.00	4.75	68.85	4.64	58.61
299	4	2	9	5	4.80	3.83	4.80	3.25	66.67	4.16	41.98
300	4	2	9	2	5.00	4.17	4.80	3.00	80.00	4.35	39.92
301	4	2	10	2	4.40	4.83	4.80	3.50	74.38	3.61	66.89
302	4	1	9	2	5.00	4.33	4.20	2.75	69.06	3.33	35.38
303	4	1	9	5	3.60	3.00	3.00	2.25	62.50	3.71	52.19
304	4	1	9	2	3.40	3.00	4.00	3.00	71.98	3.56	64.24
305	4	2	9	1	4.00	4.00	4.40	3.00	68.65	2.24	44.28
306	4	1	11	2	4.60	4.83	5.00	2.00	77.08	2.80	57.61
307	4	2	9	2	5.00	5.00	4.80	3.25	76.46	3.66	44.21
308	4	1	10	2	3.80	4.67	2.40	2.25	82.71	3.58	82.26
309	4	2	10	1	5.00	3.83	4.60	3.25	47.60	3.68	48.7
310	4	1	10	2	4.40	4.17	4.60	3.50	86.98	3.97	50.47
311	4	1	9	2	4.60	3.33	1.80	2.00	91.04	4.26	40.87

312	4	1	10	2	4.80	5.00	4.80	2.25	83.44	4.32	67.8
313	4	2	9	2	2.40	3.50	3.40	2.00	54.90	3.21	31.45
314	4	2	9	2	4.20	4.17	4.00	2.25	81.56	2.91	52.57
315	4	1	9	2	3.80	4.33	4.00	3.00	75.00	4.14	51.04
316	4	2	10	5	4.60	4.50	3.80	2.50	69.69	4.16	38.34
317	4	2	9	2	4.20	4.17	3.80	1.75	72.08	3.40	57.78
318	4	2	9	2	5.00	5.00	4.40	5.00	90.52	4.83	23.87
319	4	1	10	2	4.80	5.00	4.80	4.50	95.10	4.74	54.17
320	4	1	10	2	4.60	4.67	2.80	2.25	56.35	3.30	44.2
321	4	2	10	2	5.00	4.50	5.00	5.00	100.00	4.62	39.79
322	4	1	10	2	4.20	4.17	4.20	3.75	66.04	4.11	39.79
323	4	2	9	2	4.60	4.83	4.80	4.25	81.35	3.81	31.22
324	4	2	10	2	4.80	5.00	3.40	3.00	46.15	2.99	58.11
325	4	1	10	3	5.00	5.00	5.00	5.00	91.67	4.12	50.87
326	4	2	10	2	4.60	4.50	3.80	4.00	76.25	1.97	32.8
327	4	2	10	2	5.00	5.00	4.20	2.00	55.21	3.24	44.3
328	4	2	9	2	4.60	5.00	5.00	5.00	71.56	2.71	48.11
329	4	1	10	3	5.00	5.00	4.20	3.75	73.85	4.68	56.24
330	4	1	10	1	5.00	5.00	4.20	3.75	77.19	4.58	62.36
331	4	2	9	2	5.00	4.83	4.00	4.25	72.19	1.99	39.49
332	4	2	10	2	3.00	3.00	3.00	3.00	71.67	4.26	26.71
333	4	1	10	2	5.00	5.00	5.00	2.00	91.77	4.25	34.76
334	4	1	9	2	5.00	5.00	4.40	4.25	80.63	2.76	47.51
335	4	1	11	2	4.80	5.00	3.60	4.75	66.46	4.13	53.32
336	4	1	11	2	4.60	3.83	3.00	3.00	51.77	3.14	61.07

exb = expectancy-related beliefs
tv = subjective task values
mclimate = mastery motivational climate
pclimate = performance motivational climate
stepspermin = steps/min (pedometer-determined PA)

VITA

Xiangli Gu was born in Shanghai, China. She received her Bachelor of Physical Education in Department of Kinesiology at East China Normal University. From 1999-2006, she has been a physical education instructor and coach at Shanghai Business College, where she was the recipient of excellent teacher in 2003. As a certified coach in aerobic dance and yoga, she led her female teams to obtain a champion, two silver medals, and a bronze medal in Shanghai. Further, she has published two book chapters and six peer-reviewed research articles in China. In 2007, Xiangli was admitted to the doctoral program at the Louisiana State University (LSU) in the Department of Kinesiology. While at LSU, Xiangli' academic progress is evidenced by her 4.0 G.P.A. As a result of her hard work, she had made numerous research presentations at international and national conferences, and had authored and co-authored several research manuscripts. Most recently, one of her manuscripts was accepted for publication in peer-reviewed journal.

Xiangli has been the recipient of several honors at LSU such as LSU College of Education Lillian Oleson Scholarship and LSU Graduate School Travel Awards. Beyond school setting, Xiangli's researches also have been awarded by the professional organization such as the American Alliance for Health, Physical Education, Recreation and Dance (AAHPERD). One of her grant proposals has been funded by the AAHPERD research consortium graduate student grant program in 2010. Furthermore, she also got a research award for one of her research projects from 2011 AAHPERD research consortium for graduate student.

Through engaging in various organizations and activities at the international, national, university, and community levels, Xiangli have displayed a strong commitment to professional service. She was elected as a student representative of the International Chinese Society for

Physical Activity and Health, and an advisory board member of Dance Lesson Ideas Section in PE Central. Further, she has been a reviewer for American Educational Research Association and AAHPERD conference abstracts, and 2008 International Convention on Science, Education and Medicine in Sport conference abstracts.

Currently, Xiangli is a faculty member in the Department of Kinesiology, Health Promotion, and Recreation at University of North Texas. Armed with the dedication and zeal, she hopes to be exemplary educator and researcher focusing on promoting individuals' health and health-related behaviors.