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Research has shown that the working environment of physical education influences teacher motivation. Identifying the characteristics of teachers' working environment may contribute to developing a productive and motivating working environment for physical education teachers.

The first part of this dissertation study was focused on developing and validating an instrument that measures physical education teachers' job demands/resources perception on five theorized dimensions: organizational resources, physical resources, cognitive demands, physical demands, and emotional demands. The content validity was achieved through expert evaluation of the consistency between the items and the dimensions they represent. The evaluation rendered an average consistency rating of 3.6 on a 5 point scale. The construct validity and reliability were determined with a physical education teacher sample (n=193). Exploratory factor analysis (EFA) established a five-dimension construct structure matching the theoretical construct with factor loadings ranging from .57 to .85. The intraclass correlational coefficients ranged from .75 to .80 for job resources and from .80 to .83 for job demands, respectively. The inter-scale correlational coefficients ranged from .14 to .25, showing both convergent and divergent validity. Confirmatory factor analysis (CFA) confirmed the construct structure found in the EFA with high dimensional factor loadings ranging from .47 to .81 for job resources scale and from .51 to .86 for job demands scale. The model fit tests produced acceptable indices including the RMSEA < .05. It is concluded that the instrument met the required

psychometric standards to be useful to measure physical education teachers' perception of their working environment.

The second part of the study was to determine the extent to which the perceived job demands and resources influence physical education teachers' motivation regulatory processes and motivation. An *a priori* model was proposed for testing based on the integration of the Self-Determination Theory (SDT) and Job Demands-Resources Model. Certified physical education teachers in two southeastern states (n=193) provided self-reported data on perceived job demands and resources in the working environment, motivation regulatory processes, and motivation to teach. Structural equation modeling analysis revealed that increasing job demands in working environment enabled the teachers to adopt more autonomous regulatory processes, such as integrated regulation (γ = .20) but not more controlling regulatory processes, such as external regulation (γ = -.16) and introjected regulation (γ = -.22). The findings of the study provide empirical evidence that relate perceptions of working environment to physical education teachers' motivation to teach.

UNDERSTANDING PHYSICAL EDUCATION TEACHER MOTIVATION IN RELATION TO JOB RESOURCES AND DEMANDS

by

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Approved by

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To my family.

APPROVAL PAGE

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CHAPTER I

INTRODUCTION

Physical education has been acknowledged as a means to educate all children about the benefits of physical activity to health and to help nurture a healthy and active lifestyle in children. Professional organizations, including the National Association of Sport and Physical Education (NASPE), the American Heart Association (AHA), and government agencies, such as the Center for Disease Control and Prevention (CDC), have issued standards, policies and/or recommendations to promote physical education in schools throughout K-12 grades. It has become a consensus that the ultimate goals of physical education are to provide in-class health-enhancing physical activity experiences and to teach the knowledge and skills necessary for developing healthy and active lifestyles (NASPE & AHA, 2012). To fulfill the goals, a motivated teaching force is required in all K-12 schools, especially in public schools. The goal of this dissertation study is to understand physical education teacher motivation.

In this introductory chapter, I first define motivation and teacher motivation. Second, I conduct a brief review and critique of the theoretical orientations adopted in the research on physical education teacher motivation. Third, I elaborate theories I use to guide this research and provide a rationale for their relevance according to the unique characteristic of physical education. Fourth, I present the research problems and hypotheses, discuss their limitations, and deliberate the significance of the study. At the

end of the Chapter, I list definitions of the key concepts and terms based on which variables are determined, operationalized, and delimited.

Definitions of Motivation and Teacher Motivation

As a psychological construct, motivation is defined as energetic forces that instigate and sustain goal-directed activity over lengthy periods (Pintrich & Schunk, 1996). This definition specifies motivation as characterized by (1) what energizes human behaviors; (2) what directs or channels such behavior; and (3) how this behavior is maintained or sustained (Steers & Porter, 1983).

In education, much motivational research has been conducted to understand student motivational processes leading to achievement behaviors in various learning settings, including how students channel their behaviors to learning or non-learning goals and the extent to which they are able to sustain motivated behaviors over time. Various achievement motivation theories, including self-efficacy, expectancy-value, achievement goal, self-determination and attribution theories have been used in studies of student achievement motivation. Overall, this category of research examines how different types of motivational processes affect students' learning process and achievement (Hayenga & Corpus, 2010). Thus, these achievement motivation theories emphasize that individual achievement is the primary goal of individual motivational processes. Also, it is the individual achievement goals that primarily direct and sustain one's behaviors.

Similar to the research on student motivation, studies on teacher motivation are mostly based on the same achievement theoretical perspective. Many studies that adopt these achievement motivation theories for teacher motivation research assume that the

degrees of teacher motivation are primarily related to their psychological dispositions and associated with achieving tangible goals. And, the environmental factors were often not heavily emphasized in these studies. The psychological dispositions include achievement goal orientations, perceived competence, and beliefs of locus of control and task values. The goals are similar to those in the research on learner motivation, such as better grades and acquisition of new skills.

When applying these theoretical perspectives used to studying student motivation to teacher motivation, researcher may encounter two issues. First, often ignored, is that these psychological dispositions may not be the only source of teacher motivation. Firestone and Pennell (1993) and others (e.g., Bogler, & Somech, 2004) have noted that teacher motivation is determined in part by their working environment rather than their psychological dispositions associated with wanting to achieving a tangible outcome. Without considering environmental factors in their workplace, especially the challenges in the diverse working conditions physical education teachers face, conceptualizing physical education teacher motivation as isolated from the school environment is inappropriate for studying their motivation. For example, a competent teacher may not be highly motivated because the school administration does not provide a supportive environment for physical education (Patton & Griffin, 2008). To date, little research has been conducted to directly address physical education teacher motivation from a job environment perspective and in relation to their self-determined motivation to teach. As a result, little is known about the relation between physical education teacher motivation and working environmental factors, which is the focus of this study.

Second, teacher motivation is a type of work motivation, defined as "a set of energetic forces that originate both within as well as beyond an individual's being, to initiate work-related behaviors, and to determine its form, direction, intensity and duration" (Pinder, 1998, p. 11). This type of motivation is distinctively different from student achievement motivation. The goal of student achievement motivation is to achieve the optimal learning process and outcomes both of which are often operationalized at the individual level (e.g., individual grades); the goal of teacher motivation therefore leads to organizational outcomes that are operationalized at the institutional level. Thus, to fully understand teacher motivation in work places, one must adopt the appropriate theoretical framework that is relevant for unique characteristics of teacher motivation.

A Brief Review of Teacher Motivation Research in Physical Education

Most research in physical education supports the notion that teacher motivation is influenced by standards, policy and curricular factors. Curtner-Smith (1999) noticed that due to lack of institutional support and curriculum accountability, some physical education teachers' motivation is low. In turn, low motivation leads to a low fidelity of curriculum implementation (Curtner-Smith, 1999). Patton and Griffin (2008) reported that in some cases, when teachers are willing to embrace curriculum change, lack of institutional support may hinder their motivation to actually implement the change. In an environment characterized by unfavorable teaching conditions, many physical education teachers are likely to remain motivationally-challenged or become resistant to curricular innovation, although they probably know the benefits of the innovation for their students.

Physical education attracts more public attention due to increased concerns about children's insufficient physical activity and subsequent health consequences. There are, however, different curricular perspectives on what physical education should be. According to Ennis (2006), there are three dominant types of physical education. The public health physical education focuses on increasing students' participation in intensive physical activities in every lesson to address major public health concerns. The recreational physical education emphasizes providing instantly enjoyable experiences to children with a hope that they will become active based on the enjoyable experiences. The educational physical education attempts to help children become knowledgeable movers who can apply scientific knowledge and principles to develop an active lifestyle.

It is likely that each type of physical education curriculum creates a different working environment for teachers. Teaching in different types of curriculum may expose teachers to different job demands and require different job resources. Therefore, investigating teacher motivation in physical education needs to pay special attention to the influence generated by curricular context. Historically, physical education has not been a subject area where the pedagogical content and teaching methods are subject to standards and policies. The first standard that requires what students need to know and to be able to do was published in 1995 (NASPE, 1995). As a result, studies of teacher motivation have been conducted mostly in curricular environments where teachers decide what to teach, how to teach and when to teach (see Spittle, Jackson, & Casey, 2009; Carson & Chase, 2009). With the prevalence of educational accountability, studying

teacher motivation in relation to environment factors defined by standards, policies and curricula adopted will shed light on the understanding of teacher motivation.

To summarize, there are two factors making current teacher motivation different from previous. First, the curricular contexts may influence teachers' motivation and behaviors in teaching the content. Thus, the curricular context, imposed in part by standards and policies, exists as a source of external regulation for teachers. Second, the more workload and higher expectations there are for the teachers, the more institutional support may be needed for them to teach successfully. Under such a circumstance, the curricular context may influence teacher motivation by imposing job demand for the teachers. For instance, when teachers are expected to teach educational physical education, lack of equipment can become a unique job demand that influence their motivation. The two factors indicate that, first, research on teacher motivation need to emphasize theories that can conceptualize workplace motivation under a regulated working environment; and second, there is an urgent need to study the influence on teacher motivation under different job demands and resources.

Theoretical Frameworks for this Study

To address the issues in teacher motivation research in physical education, it is necessary to investigate teachers' working environment in relation to their motivation. Due to the significance carried by job demands and resources, adopting a motivation framework that can incorporate/conceptualize teachers' job demands and job resources in their working environment can help accomplish the research goal of this study.

Job Demands

Job demands refer to those physical, emotional, cognitive and organizational aspects of the job that require sustained effort, and are therefore associated with certain physiological and/or psychological costs (Bakker, Demerouti, & Schaufeli, 2003). Enormous job demands could exhaust mental and physical strength, which will lead to the depletion of energy and possibly to burnout (Bakker, & Demerouti, 2007). In physical education, teachers in various schools or teaching different types of physical education could face different types and degrees of job demands. For instance, teachers who teach in low socioeconomic schools are often subject to high emotional demands for dealing with students' disruptive behaviors (Wilson & Lipsey, 2007). For another example, in some schools, teachers need to teach unreasonably large classes, which significantly increase their physical and emotional demands. As mentioned earlier, when competence-based (knowledge and skill) learning goals are centralized in physical education, teachers who used to teach recreational physical education are likely to experience unprecedented cognitive job demands, such as planning more learning-oriented activities and systematically organizing learning assessment. Thus, understanding how teachers perceive their job demands is critical for researchers to understand teacher motivation. In some cases, teachers may perceive the job demands as obstacles that prevent them from teaching effectively. In other cases, the job demands could be considered as job challenges that can provide teachers opportunities to fulfill their needs and facilitate their personal growth. Thus, investigating how teachers perceive job demands is critical for understanding their motivational processes.

Job Resources

Job resources refer to those physical, social, or organizational aspects of the job that may: (1) reduce job demands and the associated physiological and psychological costs; (2) function in achieving organizational work goals; and/or (3) stimulate personal growth, learning, and development (Demerouti, Bakker, Nachreiner & Schaufeli, 2001). As a non-tested subject, physical education is subject to various disadvantages in attracting necessary resources. First, driven by the No Child Left Behind (NCLB) Act, public schools have been allocating available resources mainly to tested subjects. Cutting back instruction time and resources from physical education has become a common strategy in many public schools to increase instructional time for and improve test scores in reading and math (Crawford, 2004). Lack of resources may further prevent teachers from prioritizing student learning in physical education. The situation may be especially severe in inner city schools where many teachers face small budget and crowded facilities (Kulinna, McCaughtry, Cothran, & Martin, 2006). Second, some physical education teachers lack job resources for personal growth and development. There is no institutional measure that evaluates their performance systematically and provides performance-related feedback for personal growth. As Doune (1995) summarized, physical education teachers have few resources that can improve their status, advance their career, and involve themselves in educational decision making.

Job Demands-Resources Model

To understand physical education teacher motivation better, the Job Demands-Resources Model can be used chosen to evaluate working environmental factors for

physical education teachers. The Job Demands-Resources Model is a heuristic model with two key assumptions (Demerouti, et al., 2001; Schaufeli, Bakker, & Van Rhenen, 2009). First, any working environment is characterized by two categories of components, namely, job demands and job resources. Second, the Job Demands and Resources model assumes that job resources evoke psychological processes associated with motivation, and job demands evoke psychological processes associated with exhaustion and disengagement (Demerouti, et al., 2001; Bakker, Van Emmerik, & Riet, 2008). Overall, as a theoretical framework, the Job Demands-Resources model can be used to capture the environmental factors in working settings (Demerouti, et al., 2001). Therefore, in this dissertation study, the model was used as part of the theoretical framework to study the impact of the working environment on teachers' motivation.

Self-Determination Theory

In public schools, particularly dealing with the ongoing changes of standards and policies, teachers often exhibit different views towards the changes (Chen, 2006). To conceptualize teacher motivation under such a regulating force generated by externally imposed standards and policies, a theoretical framework other than those from the achievement motivation perspective is needed to connect teachers' working environment with their motivation regulatory processes. SDT is a theory that focuses on motives that drive behavioral regulation (Deci & Ryan, 2000). As Deci and Ryan (2008) note, "SDT is an empirically derived theory of human motivation and personality in social contexts that differentiates motivation in terms of being autonomous and controlled" (p. 416). Because of its emphasis on regulation generated by context, SDT is chosen for this study to be

integrated with the Job Demands-Recourses model to investigate physical education teacher motivation.

SDT has two assumptions. First, SDT assumes that human beings have three basic psychological needs – autonomy, competency and relatedness – that they attempt to meet. Satisfaction of these needs facilitates self-determined motivation and regulates motivated behaviors (self-regulation). Individuals experience greater self-determination if their needs are more satisfied in the environment (for a review, see Connell & Wellborn, 1991). Second, SDT assumes that motivation is regulated by extrinsic values (such as those based on rewards). In response to the extrinsic regulation for motivation, individuals may adopt different self-regulatory processes – external regulation, introjected regulation, identified regulation and integrated regulation – based on their degrees of internalization of the extrinsic motivation sources (rewards, control, shame, value, etc.). A more detailed definition for the four regulatory processes is included in Chapter II. Motivation that relies on these extrinsic sources is characterized by one or more of the self-regulatory processes.

Matching SDT with Job Demands-Resources Model

Although both SDT and Job Demands-Resources model emphasize the relationship between motivation and environmental factors, each has its unique theoretical foci. SDT addresses the psychological regulatory processes in connection with needs satisfaction; while the Job Demands-Resources model captures external factors in the working environment (job demands and resources) that could operate as sources of motivation regulation. It appears that each theory alone may not be able to provide

holistic theoretical underpinnings about physical education teacher motivation due to separate foci on *either* the working environment *or* the psychological regulatory processes. Therefore, by integrating the two theories, we can possibly understand teacher motivation as a result of psychological regulation influenced by working environment.

Increased influence of policy and standards on student learning have begun to place greater job demands on physical education teachers to change their teaching from non-competence to competence-based outcomes (Chen & Ennis, 2009). It is not clear, due to lack of empirical research, if providing teachers certain resources could facilitate them to adopt necessary instructional change to meet the demands. Consequently, it is not clear to what extent the changes in the working environment affect their motivation to teach. Adopting the integrated theoretical frameworks may allow an opportunity to clarify the relationship between teacher motivation and changes in the teaching environment.

Integrating SDT and the Job Demands–Resources model allows us to understand physical education teachers' motivation through establishing a connection between regulatory processes and job demands and resources embedded in their working environment. In addition, the integrated model enables us to draw connection between teachers' motivation regulatory processes and working environment. In other words, the strength of integrating the two theories lies in understanding motivation through factors in working environments as well as the motivation regulatory processes of individuals in the working environments. Figure 1.1, included in the appendix at the end of the chapter, depicts the integrated model that contains SDT and the Job Demands-Resources model.

As the Figure 1.1 postulates, regulating factors (resources and demands) embedded in the working environment influence motivation self-regulatory processes teachers adopt. The adopted regulatory processes, in turn, influence the level of motivation which impact how teachers' needs for autonomy, competence, and relatedness are satisfied in the working environment and how their performance contributes to the organizational goals. Due to the scope of a dissertation study, only the paths from Job-Demands-Resources to Regulatory Processes to Teacher Motivation (the gray area) was investigated in this study.

Statement of the Problem

Physical education teachers are called upon to respond to policies and standards that challenge them to promote student learning of knowledge and skills relevant for developing life-long active behaviors. Such a challenge may lead to changes of the curriculum goals, content, and teaching methods. Potentially, the challenge may also move many teachers out of their zone of curricular safety (Rovegno, 1994) as they may perceive the challenges as additional job demands. First, with a new goal of teaching – having students learn health knowledge and relevant physical skills – clearly specified, a teachers' range of pedagogy and content choices can become limited (Archbald & Porter, 1994). In addition, curricular and accountability reforms increase the workloads for most teachers, such as longer class preparation, more student-teacher interaction, and more time and energy to spend on assessment and report. Additionally, when learning becomes the priority, evidence of students' learning becomes evidence for teacher performance as well (Wong, Anagnostopoulos, Rutledge, & Edwards, 2003). It could put teachers'

performance under institutional scrutiny. All these factors could challenge teacher motivation and possibly lead to their work disengagement. On the other hand, these curriculum and accountability reforms could potentially become sources of motivation for teachers. The reforms realign physical education with the mission of public education, and provide teachers with an opportunity to improve the status of physical education, which potentially increases their access to job resources. Thus, it is important to investigate the influence generated by external regulation on teacher motivation (Archbald & Porter, 1994).

The purpose of this study, therefore, is to describe the job demands and resources in physical education teachers' working environment, and the relationship between job demands and resources, regulatory processes, and their motivation to teach physical education. Specifically, the study uses a correlational design to test the integrated model described in Figure 1.1 as *a priori*, to understand the relationship.

Research Questions

Specifically, the study attempts to answer the following research question: To what extent the perceived job demands and resources determine teachers' motivational regulatory processes and, ultimately, their motivation to teach physical education? In other words, to what extent the theorized *a priori* model (as Figure 1.1 depicts) is used to explain physical education teacher motivation?

Significance of the Study

To address the issue of childhood physical inactivity, standards and policies are issued by various professional organizations and state-level governmental agencies to

regulate physical education towards a learning-oriented and behavior-changing direction. Physical education teacher's motivation in part determines how successfully teachers accomplish their goals. Investigating the current job resources and demands for physical education teachers and understanding the motivation regulatory processes of teachers who are subject to the external regulations would provide insight for motivating more teachers to work towards the goal.

Previously, teacher motivation research in physical education has been conducted in a relatively autonomous working environment where teachers can almost freely choose content and teaching strategies. This autonomy gradually diminishes when standards and policies gradually are imposed on teachers (Mahony & Hextall, 2000). In such a working environment, the standards and policies influence the content and teaching practices by changing the job demands and resources for teachers. Thus, the pressing need for adopting learning- and achievement-oriented physical education calls for investigation of teacher motivation in an externally regulated working environment (Archbald & Porter; 1994; Reeve, 2009).

Assumptions

Based on my theoretical reasoning, the current study assumes that physical education as a subject in public schools would gradually change its content and teaching methods to prioritize students' learning of health knowledge and physical skills, and teachers would be held accountable for teaching standard-based curriculum. The study also assumes that factors embedded in the school working environment could hinder or promote physical education teachers' motivation in teaching standard-based curriculum.

Additionally, the study assumes that in the school environment teachers adopt different motivation regulatory processes and demonstrate different levels of motivation.

Limitations and Delimitations

The study is theoretically limited. This is the first attempt to use the framework that combines SDT and Job Demands-Resources model to study teacher motivation although the decision derives from an extensive, careful review of the literature and theorizing by the researcher. There is little empirical evidence to indicate that such an integrated model would be theoretically sound. Thus, there is a risk that findings may not be externally valid even though results from data analysis suggest so.

The scope of this study is limited to the sample that includes teachers from two eastern coastal states. Thus, data collected delimited to their current perception of the variables, including working environment, regulatory processes and motivation.

Structure of the Dissertation

This dissertation includes six chapters. Chapter I, Introduction, provides an introduction for the entire dissertation by briefly presenting the to-be-addressed research question, theoretical framework and significance of this study. Chapter II, Literature Review, elaborates the urgency of conducting teacher motivation research in the field of physical education, and conceptually justifies the decision of choosing the Job Demands-Resources Model and Self-Determination Theory to form an integrated theoretical framework for this study. Chapter II also reviews studies conducted on (physical education) teacher motivation with SDT, review and critiques the methods through which teacher motivation was measured in previous studies. Chapter III, Research Methods,

delineates the procedures through which two independent but related studies were conducted. Information related to the research context, data collection procedure, data collection tools (instruments) and data analysis is included in Chapter III. Chapter IV and V are organized in the format of manuscript for journal submission. Chapter IV is entitled *Developing a Psychometric Instrument to Measure Teachers' Job Demands and Resources*. It describes the procedure through which a 21-item psychometric instrument to assess physical education teachers' perception of job demands and resources was developed and validated. Chapter V is entitled U*nderstanding Physical Education Teacher Motivation in Relation to Job Demands and Resources*. It describes a survey-based correlational study through which the relationship between teachers' perception of job demands and resources, regulatory processes and teacher motivation was investigated. Both Chapter IV and V include discussion of administrative, pedagogical and theoretical implications based on the findings. The dissertation ends with Chapter VI, Conclusions and Implications, which contains brief suggestions and outlook for future research.

Definitions of Key Terms

The need for autonomy: The need for autonomy refers to individuals' efforts to have a say over their behavior, to feel like the `origin' and not the `pawn' of their actions (deCharms, 1968).

The need for competence: This refers to the need for "feeling effective in one's ongoing interactions with the social environment and experiencing opportunities to exercise and express one's capacities" (Ryan & Deci, 2004, p. 7).

The need for relatedness: The need for relatedness "refers to feeling connected to others, to caring for and being cared for by those others, to having a sense of belongingness both with other individuals and with one's community (Ryan & Deci, 2004, p. 7).

External regulation: According to SDT, external regulation is one of among several forms of extrinsic motivation. As a regulatory process, it refers to behavior motivated by extrinsic rewards and punishments (Ryan & Deci, 2006).

Introjected regulation: Introjected regulation is a regulatory process that "involves an external regulation having been internalized but not, in a much deeper sense, truly accepted as one's own" (Ryan & Deci, 2004, p. 17).

Identified regulation: As a regulatory process, identified regulation refers to "a more self-determined form of extrinsic motivation, for it involves a conscious valuing of a behavioral goal or regulation, an acceptance of the behavior as personally important" (Ryan & Deci, 2004, p. 17).

Integrated regulation: As a regulatory process, integrated regulation refers to "the most autonomous form of extrinsically motivated behavior. It results "when identifications have been evaluated and brought into congruence with the personally endorsed values, goals, and needs that are already part of the self" (Ryan & Deci, 2004, p. 17).

Job resource: Job resources refer to "those physical, psychological, social or organizational aspects of the job that either/or (1) reduce job demands and the associated physiological and psychological costs; (2) are functional in achieving work goals; (3)

stimulate personal growth, learning and development" (Schaufeli & Bakker, 2004, p. 296).

Job demand: Job demands refers to those physical, psychological, social or organizational aspects of the job that require sustained physical and/or psychological (cognitive and emotional) effort and are therefore associated with certain physiological and/or psychological costs (Bakker, Demerouti, & Schaufeli, 2003).

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Appendix A

Figures and Tables

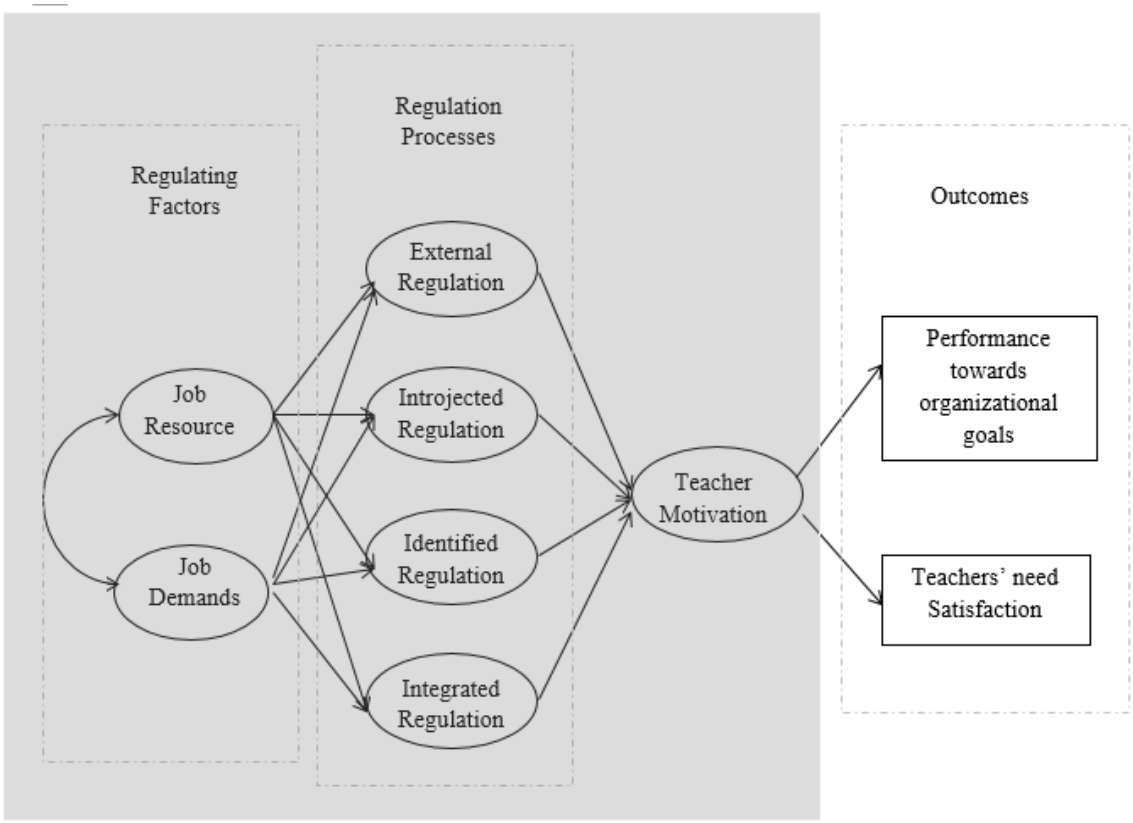

Figure 1.1 The Integrated Model that Combines SDT with the Job Demands-Resources Model

CHAPTER II

LITERATURE REVIEW

Researchers have adopted various theories in studying teacher motivation. In general, these theories are from the family of achievement motivation theories, including, noticeably, expectancy value theory (Abrami, Poulsen & Chambers, 2004; Jesus & Lens, 2004), achievement goal theory (Butler, 2007), and self-efficacy theory (see Klassen, Tze, Betts, & Gordon, 2011). Some of teacher motivation studies that adopted these theoretical perspectives often emphasize on teachers' individual psychological dispositions rather than their working environment. By emphasizing on teachers' psychological dispositions, different psychological constructs, such as goals, efficacy, attributions, and interest of teachers becomes the major factors that influence teacher motivation, making teacher motivation relatively independent from school policy, standards and/or curricular environment. In other words, teacher motivation was studied in isolation from the policy, standards and curriculum's direct and/or indirect influences.

In this chapter, I review and critique the extant literature using the Job Demands-Resources model to demonstrate that physical education teachers' motivation is determined by job demands and resources which are defined by teachers' working environment as well as prevalent policies, standards and curricular changes. Subsequently, I explore a conceptualization of teacher motivation in relation to their

regulatory process – a mental process determined and regulated by external forces. I argue that at this critical moment of policy, standard and curriculum change, the Self Determination Theory (SDT) should be considered the most relevant theoretical framework to study and understand physical education teacher motivation.

SDT is a comprehensive framework for studying human motivation (Deci & Ryan, 1985). It postulates that human behavior is both driven by and purported to satisfying the needs to feel autonomous, competent, and related. SDT acknowledges that motivation to work is likely to be extrinsic and, thus, is regulated by many environmental factors through several external regulatory processes. These regulatory processes may facilitate or undermine motivation. SDT and the Job Demands-Resources model are consistent in this important theoretical stipulation. Examining physical education teacher motivation through the joint lens of SDT and the Job Demands-Resources model allows conceptualization of interactions among external influences and teachers' regulatory processes for a better understanding of teacher motivation.

In the following section, I first provide a brief description about current status of physical education. Second, I summarize research on the Job Demands-Resources model and explore its theoretical relevance for understanding physical education teacher motivation. Thirdly, I provide an overview of SDT and review studies on teacher motivation from the SDT perspective. Lastly, I review and critique methods of measuring teacher motivation. I finish the chapter with a summary about what we know and what we still need to know about physical education teacher motivation.

Section I: Teaching Environment and Teacher Motivation in Physical Education

Vast research evidence suggests that a major cause for the child obesity crisis is lifestyle change: from a primarily active one to a fundamentally sedentary one. To prevent such a lifestyle change from happening, children should learn knowledge and skills that enable them to develop and sustain an active lifestyle in their early ages (Saksvig et al., 2005). Although children may acquire the knowledge and skills at home or in many public and private institutions, it is a consensus that public education has the greatest potential to systematically and consistently influence children and adolescents' lifestyle through offering quality physical education programs (Clark, 2007; Corbin, 2002).

Types of Physical Education

In school year 2011–12, 49.5 million students were enrolled in public elementary and secondary schools (National Center for Education Statistics, 2014). As a course taught in public schools, physical education can reach almost every school-age child and adolescent with minimum cost (McKenzie, 2007; World Health Organization, 2004). Because public education is a relatively stable and sustainable institution, physical education in public schools can provide necessary educational service to children and adolescents for the entire time they receive primary and secondary education (Marx & Wooley, 1998). Thus, it is imperative that physical education teachers are motivated to help children and adolescents become knowledgeable and skillful for a healthy and physically active life.

Due to the de-centralized system of public education in the United States, physical education has been taught differently in public schools. As Ennis (2006) summarized, there are three different types of physical education programs: public health physical education, recreational physical education, and educational physical education. They differ fundamentally in terms of the goals for the students to accomplish and have distinct characteristics in objectives and methods of teaching.

Public Health Physical Education. The primary goal of the public health physical education is to increase students' participation in moderate-to-vigorous physical activity as a way to address the issue of children's sedentary lifestyle. The public health physical education provides physical activity programs that are believed can help children burn calories, reduce body weight, and control behavioral risk factors for hypokinetic diseases. With a curriculum conceptual framework that is centered on intensity and duration of physical activity, the public health physical education focuses on teaching only the activities that can quickly increase the amount of moderate-to-vigorous physical activity in the class. Particularly, the typical activities contain game elements and involve a minimum of instruction, which allow the students to boost their heart rate in a relatively short time.

Several well-known school health intervention programs include such type of physical education. Physical education curricula derived from these interventions include Sports, Play and Active Recreation for Kids (SPARK) (Sallis et al., 1997), Middle School Physical Activity and Nutrition (MSPAN) (McKenzie et al., 2004), and Coordinated Approach to Child Health (CATCH) (Luepker et al., 1996). The results from these

intervention studies showed that in physical education lessons carefully planned to increase physical activity amount, students are able to engage in moderate to vigorous physical activity for 50 percent of class time. For instance, in the CATCH study, 96 schools (56 experimental, 40 control) from California, Louisiana, Minnesota and Texas were involved in a 2.5-year intervention program characterized by twice-a-year professional development sessions for physical education teachers, a pre-prepared physical activity curriculum, and continuing consultations for effective instruction and technical support. The results showed that students in the CATCH program schools participated in more moderate and vigorous activities in physical education than did students in the control schools. Another study, SPARK, showed similar results. Students in the SPARK physical education were found experiencing more minutes of physical activity per week in physical education than their peers in the control schools.

A challenge that the public health physical education faces is to help students sustain the level of physical activity after the intervention is over. For instance, a follow-up study on the CATCH program showed a statistically significant decline of vigorous physical activity participation in students over a 5 year period after closing of the intervention. The decline seems to suggest that physical education teachers' motivation to faithfully implement curriculum for the long term is critical to maintenance of a successful program.

Recreational Physical Education. Recreational physical education is described as "multi-activity, exposure, or do-nothing physical education" (Ennis, 2011, p. 11). It is characterized by "curricular structures that produce multiple, short-duration units

consisting of limited instruction and numerous opportunities for highly skilled participants to engage in physical activity" (Ennis, 1999, p. 32). Recreational physical education is based on the assumption that children who enjoy an activity would continue to participate in the activity. Therefore, the primary goal of a recreational physical education is to provide as much enjoyable experience to children as possible. Most recreational physical education programs consist of one- or two-week long random activity units that merely expose students to a variety of games or sports with the hope that children would enjoy some of them. In term of pedagogical content, recreational physical education is heavy on enjoyable and fun activities. Fitness and skill development are considered by-products.

Recreational physical education "has been criticized on a number of grounds, although a majority of the critiques revolve around its lack of relevance and equity" (Cothran, 2001, p.68). One important goal of quality physical education is to prepare students to become skillful movers. As Graham, Holt, Hale and Parker (2010) postulate a quality program should enable children to develop skill competence that helps create confidence leading to safe and successful participation in a wide range of sports and physical activities. Recreational physical education, however, only allocates a limited amount of time for skill development. As a result, neither the students nor the teachers take fitness and/or skill development seriously (Ennis, 2006). In this recreation environment, playing replaces learning. Low skilled and female students often are marginalized and become reluctant participants (Ennis, Solmon, Satina, Loftus, Mensch

& McCauley, 1999). It is not difficult to predict that these low-skilled and female students would become unlikely to engage in regular physical.

In addition, there is research evidence showing that enjoyment may not be a determinant for future participation in physical activities. For example, Ullrich-French and Smith (2009) studied the relationship between soccer enjoyment and its continuing participation with 148 middle school students. They found that enjoyment does not predict continuous participation in soccer. This finding suggests that the enjoyment alone may not be able to facilitate long-term participation of physical activity, even for skilled students.

Educational Physical Education. The goal of educational physical education is to help the learner become a knowledgeable mover. Through educational physical education, individuals know the essential principles of movement and performance, know how to apply these principles in their daily activity for health enhancement and maintenance, and most importantly take responsibility for their health and wellness. Educational physical education places students' learning skill and knowledge as priority. It is expected that the skills and knowledge learned in physical education would enable students to become autonomous participants of physical activity (Ennis, 2010).

Educational physical education intends to enrich students' learning experiences by integrating physical movement and skill practices with knowledge (Ennis, 2006). Its pedagogical content includes motor skills and knowledge about health, exercise and physical activity. Teachers are expected to engage students in moderate-to-vigorous activities and skill practices for the purpose of learning relevant knowledge and

developing relevant competence for a healthful living. From the educational physical education perspective, it is believed that the knowledge and skills learned in physical education eventually would allow students to become able to engage in physical activities safely and effectively for their own purposes (Ennis, 2011). In other words, educational physical education provides students learning opportunities that can bridge physical movement with conceptual understanding of the movement. A recent longitudinal study has revealed that the integration of cognitive knowledge about physical activities in physical education has demonstrated high effectiveness on promoting students' learning of fitness knowledge that is critical to healthful living (Sun, Chen, Zhu & Ennis, 2012). Another influential educational model is Exemplary Physical Education Curriculum (EPEC Classic).

National Standards and Policies on Teaching Physical Education

Regardless which above perspective a physical education program is based on, it is expected to provide students with opportunities to meet the national standards for physical education (NASPE, 2013). The ideas of learning in physical education have been manifested in many national recommendations and guidelines including the National Standards for both K-12 students (NASPE, 2013) and initial physical education teachers by NASPE (NASPE, 2008). According to the standards, the ultimate goal for physical education is to develop physically literate individuals with the knowledge, skills and confidence to perform a lifetime of healthful physical activity (NASPE, 2013). The goal is operationalized into the following five specific standards:

Standard 1 - The physically literate individual demonstrates competency in a variety of motor skills and movement patterns.
Standard 2 - The physically literate individual applies knowledge of concepts, principles, strategies and tactics related to movement and performance.
Standard 3 - The physically literate individual demonstrates the knowledge and skills to achieve and maintain a health enhancing level of physical activity and fitness.
Standard 4 - The physically literate individual exhibits responsible personal and social behavior that respects self and others.
Standard 5 - The physically literate individual recognizes the value of physical activity for health, enjoyment, challenge, self-expression and/or social interaction.

NASPE also has published the *National Standards and Guidelines for Physical Education Teacher Education* (PETE) programs (NASPE, 2008) and *Appropriate Instruction Guidelines K-12* (NASPE, 2009) to assist teachers to help students accomplish the goal and meet the standards. The standards and guidelines specify the expectations and best practices for teaching in elementary, middle and high schools. Physical education teachers are expected to focus on nurturing student learning and positive behavior change. They are also encouraged to use effective class organization and task design to promote student participation, to adopt enthusiastic teaching styles to increase students' success, and to provide positive feedback and using technology to enhance student motivation (NASPE, 2008 & 2009). In addition, teachers are expected to use a variety of assessment, including fitness tests, skill assessments, and knowledge tests to document student progress and monitor their own accountability. The standards and guidelines call for adopting a balanced approach to physical education that emphasizes knowledge acquisition, skill development, and positive behavioral change for active and healthful living. To meet these expectations, it requires policy and curricular support

from educational institutions to create and sustain a physical education environment that are conducive to teaching the balanced physical education.

In addition to the standards and guidelines by NASPE, other institutions and public agencies also have published recommendations and suggestions for physical education in public schools. Many organizations established standards for physical education. For example, the Centers for Disease Control and Prevention (2010) issued *Strategies to Improve the Quality of Physical Education* to emphasize the importance of adopting a well-designed curriculum and providing teachers with appropriate training and supervision (CDC, 2010). On the local level, the state legislature of California passed *Physical Education Model Content Standards for California Public Schools Kindergarten through Grade Twelve* (California State Board of Education, 2005). As mentioned in Chapter I, the State Department of Public Instruction in North Carolina recently revised the *Healthful Living Essential Standards* for all public schools in 2011.

Contextual Limitations for Teaching

With an urgent need to prioritize students' learning in physical education, physical education teachers are dealing with various contextual constraints and limitations. One of the limitations is lack of instructional time. To reach the goal of developing physically literate individuals, NASPE and American Heart Association (2012) recommends in the recent *Shape of the Nation Report* that schools should provide a minimum of 150 minutes per week of instructional physical education for elementary school students, and 225 minutes per week for middle and high school students throughout the school year. Unfortunately, current research findings cast doubt on

institutional effort to meet the minimum requirements. At the policy level, according to the *Shape of the Nation Report* by NASPE (2012), 74.5% states mandate physical education in elementary, middle/high, and high school. However, most states do not specify the amount of instructional time. In addition, 28 states allow waivers and 33 states allow using other courses or activities, such as marching band, to substitute for instructional physical education. These waivers and substitutions further reduce the already scarce opportunities for students to receive physical education instruction.

At the curricular level, physical education has been a content area with little accountability for both teachers and students. For instance, in 2006, the Centers for Disease Control and Prevention released the *Physical Education Curriculum Analysis Tool* (PECAT) to help school districts conduct curriculum evaluation based on the NASPE's standards. However, only a small percentage of schools has endorsed the approach and committed resources to the curriculum evaluation (Story, Nanney, & Schwartz, 2009). Rink and Mitchell (2003) also found that state-wide teacher accountability systems are rare. It appears logical that without a curriculum and instruction evaluation system to encourage teacher accountability, it is difficult to hold students accountable for learning. Indeed, the *Shape of the Nation Report* 2012 revealed that there is no consistent assessment system for students' performance in physical education (NASPE & AHA, 2012). Only 26 states require some forms of student assessment in physical education and include physical education grades in a students' grade point average. Of the 26 states that assess students' performance in physical education, different types and criteria of assessments are used, including physical fitness,

knowledge of physical education content, motor skills, social and personal responsibility in class, participation in extracurricular physical activity, and attitudes towards physical activities. Without an accountability system that prioritizes students' learning and monitors teachers' performance, teachers need to regulate themselves to comply with the standards.

Teacher Motivation as a Rising Concern

The contextual limitations seem to negatively impact teacher motivation. Curtner-Smith (1999) noticed that due to lack of institutional support and curriculum accountability, physical education teachers' motivation becomes weak, which leads to a low fidelity in implementing established curriculum (Curtner-Smith, 1999). Patton and Griffin (2008) reported that teachers constantly encounter institutional barriers, which in turn contribute to their low motivation towards their career. In some cases, when teachers are willing to embrace curriculum change promoted by the standards and policies, the lack of institutional support hinders their motivation to actually implement the change, which eventually leads to resistance to change (Patton & Griffin, 2008). In an instructional environment characterized by unfavorable teaching conditions, curricular and instructional restriction, and accountability systems, many physical education teachers are likely to remain motivationally-challenged or become resistant to curriculum innovations although they probably know the benefits of the innovations for their students.

As a consequence of low teacher motivation, students may not be able to learn what they are expected to learn. Curtner-Smith (1999) reported, in responding to new

standards and curricula, teachers often re-package their old curriculum under the name of new standards or curricula. At the same time, they keep their existing perspectives and ideologies unchanged. In other scenarios, unmotivated teachers invest minimal effort in studying and implementing the standards for learning and teaching (Chen, 2006). In some extreme cases, teachers become resistant to any curricular innovation and change (Patton & Griffin, 2008). As a result, their lack of motivation jeopardizes the institutional regulating effort to help students develop and sustain active and healthful lifestyle.

With increasing pressure from policies and standards, there is an urgent need for physical education teachers to update their knowledge about content and teaching strategies, to accept the changes, and to teach in accordance with standards and policies faithfully and effectively. All these require a strong motivation from teachers. For teachers to become motivated to teach for student learning, schools might need to provide strong support, especially during the times when significant reformation are taking place (Coffey & Lashway, 2002; Fullan, 2004).

Teaching Environment and Teacher Motivation

Together, the issues discussed above around curricular choice, content variety, expectations to meet the standards, challenges in policy and pedagogy present an enormous motivational challenge for physical education teachers. It seems that the challenge comes from two primary sources: a pressing need to deliver quality physical education curricula demanded by the public to address the health concerns and lack of institutional support for teachers to meet the need. Under such a circumstance, the issue of physical education teacher motivation becomes an issue of overcoming the difficulties

in the teaching environment. Lindholm (1997) used the personal investment theory to examine 73 physical education teachers' motivation through two factors: job satisfaction and job commitment. The result reveals that, within the current teaching environment, physical education teachers in general have low incentives and recognition for non-athletics accomplishments and have low level of organizational commitment (Lindholm, 1997). Recently, Kougioumtzis, Patriksson, and Strahlman (2011) reviewed the professionalization process of physical education teachers with a specific focus on their occupational power and professional control. The research shows that physical education teachers in general place a high job prestige for their work. But, in the mean time they recognize that they are largely subjected to a marginalized position in schools and their work is often misunderstood by their students, colleagues and parents. The study reveals the influence of the overall teaching environment on physical education teacher motivation.

Physical education suffers a marginalized status in public schools. As a non-tested subject, physical education schedules are often unstable. Its instructional time is constantly interrupted by other school activities such as standardized tests, school assembly, picture days, and voting days. Physical education teachers teach large-size classes without sufficient resources, such as equipment and activity space. As mentioned before, the majority of states (74.5%) mandate physical education in elementary, middle and high schools, but many states do not have specified length of instructional time. More than a half of the states allow students to waive physical education requirements by participating in extracurricular activities that are unrelated to learning physical movement

and exercise (NASPE & AHA, 2012). In certain schools, the school administrators prioritize coaching over teaching responsibilities. With varied working environments, the public school system often witnesses different levels of teacher motivation, diverse teaching performance and varied students' learning outcomes in physical education.

Working environment is considered one of the determinants for worker motivation along with behavioral and cognitive factors (Bandura, 1986). According to the social cognitive theory of motivation (Bandura, 1986), the influence of working environment needs to be studied and understood in relation to the behavioral and cognitive factors in order to thoroughly understand teacher motivation. Previous studies have identified a number of environmental factors that hinder physical education teachers' motivation and, consequently, lead to low-quality teaching, burnout and low motivation. For instance, Fejgin, Ephraty and Ben-Sira (1995) showed that 15 environmental factors accounted for 57.1% of the variance for physical education teachers' burnout. A multiple regression analysis further identified three of the 15 factors, insufficient remuneration, bureaucratic limitations, and role limitation, to be major contributors accounting for about 23% of the variance for burnout. Responses from the teachers in the study indicate that lack of work diversification on the job, exclusion of physical education teachers from school activities, lack of involvement with students after school hours, lack of special, diversified instructional equipment, and no opportunity for professional development were contributors to the three factors.

To improve the quality of physical education and the students' learning, it is important to document and understand teacher motivation in relation to their immediate

teaching environment. All these environmental factors at the policy and curriculum levels form a job demands-and-resources relation that has been studied as determinants for worker motivation, engagement and performance (Jones & Fletcher, 1996). In the following section, I elaborate physical education teacher motivation by using the Job Demands-Resources model. Particularly, I use the model to conceptualize various environmental factors that influence the complexity of teacher motivation in physical education.

Section II: The Job Demands-Resources Model

Job Demands-Resources Model elaborates the dynamic relation between two sets of conditions in the working environments – job demands and jobs resources – in relation to worker performance/engagement and well-being (Jones & Fletcher, 1996). The model is heuristic in nature in that it conceptualizes workers' physical and psychological well-being and work engagement as determined by their working conditions and environment.

Job Demands and Job Resources

In the Job Demands-Resources model, job demands are defined as "the things that have to be done" (Jones & Fletcher, 1996, p. 34). It often "refers to those physical and/or psychological (cognitive and emotional) efforts and is therefore associated with certain physiological and/or psychological costs" (Bakker, Demerouti, & Verbeke, 2004, p. 86). Across various professions, examples of job demands include high work pressure, time pressure, unfavorable work schedule, unfavorable physical environment, and emotionally demanding interactions with clients (Bakker & Demerouti, 2007). All these factors could eventually lead to workers' burnout, low motivation, and/or deteriorated health.

Job resources refer to the physical, organizational, and social aspects of the job that are "functional in achieving work goals; reduce job demands and the associated physiological and psychological costs; stimulate personal growth, learning, and development" to promote greater productivity (Bakker & Demerouti, 2007, p. 312). Thus, job resources not only reduce the negative influences brought by job demands, but also generate motivational support which leads to high work engagement, low cynicism and better performance (Bakker & Demerouti, 2007). Job resources are also multi-level in nature. Resources can be organizational (e.g., salary, career opportunities), interpersonal (support from administrator and co-workers), organization of work (role clarity, communication within the organization, and role in the decision-making process), and the task-specific (skill level, performance, performance feedback) (Bakker, Hakanen, Demerouti & Xanthopoulou, 2007). In addition to the environment-related job resources listed above, scholars start to pay attention to personal resources. For instance, Xanthopoulou, Bakker, Demerouti and Schaufeli (2009) have identified three personal resources: self-efficacy, organizational-based self-esteem, and optimism. They found that workers with high levels of personal resources often demonstrate high mastery in dealing with job demands and preventing negative outcomes (i.e., exhaustion and failure to achieve performance goal).

The Job Demands-Resources model assumes that workers' well-being and motivation are developed through two underlying psychological processes. The first process mainly concerns with the influence of job demands. When workers are exposed to excessive job demands, they would likely put forth additional physical and/or mental

efforts that are often perceived as cost for motivation. According to Hockey (1993), such cost may gradually exhaust workers' energy and eventually lead to health deterioration or burnout. The second process assumes that providing supportive job resources would foster workers' motivation and facilitate their achievement of work-related goals. When job resources are sufficient, workers would be able to use them and, in turn, invest additional effort in the work. For instance, in a study on human service professionals, Bakker, Demerouti, and Verbeke (2004) revealed that job resources lead to job performance beyond original job descriptions. Without sufficient job resources, workers tend to disengage and withdraw from the work assigned to them (Bakker, Demerouti, & Schaufeli, 2003). Figure 2.1 illustrates a diagram of the model.

Relationships between Job Demands and Resources

In addition to their individual effects, job demands and job resources often function interactively in reality because they co-exist in a given working environment. One of the major interactions between the two is that job resources function as a buffer against the influence of job demands. Sufficient resources can shield the negative impact generated by excessive job demands on workers. When the job resources are given to workers in the form of job demands reduction, workers tend to become more tolerant to job stressors embedded in the working environment (Bakker, et al., 2003; Kahn & Byosserie, 1992). When workers are provided job resources that can facilitate their professional growth, improve their competence and better connect them with the working community, the negative influence from job demands becomes more bearable. Thus, the relation between demands and resources is in a dyadic, one-to-one interactive pattern

despite the fact that job demands/ resources can function individually and independently when job resources/demands are held constant. The dual mediating relationship of the demands-resources interaction suggests the complexity of the factors that determine worker motivation. Empirical research seems to support this understanding of the relationship.

In education, a study was conducted on 805 Finnish teachers from elementary, secondary, and vocational schools to examine the influence of job resources on work engagement under stressful conditions, particularly students' misbehaviors (Bakker, Hakanen, Demerouti & Xanthopoulou, 2007). Based on the characteristics of the teachers' working environment, the study identified students' misbehaviors as the job demand. Job resources included job control, supervisor support, communication within organization, organizational climate, innovativeness, colleagues' appreciation of one's work as job resources. Work engagement was measured through three indicators: vigor, dedication and absorption. Job demands – students' misbehavior was measured with a six-item scale adapted from Teachers' Sources and Symptoms of Stress Questionnaire (Kyriacou & Sutcliffe, 1978). Respondents first read an overall question, "As a teacher, how great a source of stress are the following factors to you?" and were then asked to react to six specific behaviors or situations, such as "noisy pupils," "pupils who show a lack of interest," and "maintaining class discipline." The hypothesis was that job resources would buffer the negative influence from students' misbehavior on teacher work engagement. A moderated structural equation modeling (MSEM) analysis shows that job resources in the forms of supervisor support, the flow of information in

workplace, organizational climate, organizational innovativeness, and colleague's appreciation of one's work can effectively mitigate the influence of students' misbehaviors on teachers' work engagement. Further analyses revealed that in an environment with high students' misbehaviors, job resources were a strong predictor for work engagement. Regression slope B ranged .45 - .63 for vigor, .41 - .69 for dedication, and .29 -.63 for absorption, much higher than those in a low student misbehavior environment (slope B ranged .12 - .24 for vigor, .15 -.23 for dedication, and -.13 - .12 for absorption). Therefore, when the teachers were exposed to high job demands, sufficient job resources helped mitigate negative influence and protect motivation.

In addition to environmental factors, personal resources also can mediate the interaction of job demands and resources. Here, personal resource refers to individuals' sense of their ability to control and impact upon their environment successfully (Hobfoll, Johnson, Ennis, & Jackson, 2003). With personal resources, workers are functional in achieving goals, are likely to be protected from threats and the associated physiological and psychological costs, and are oriented towards personal growth and development (Xanthopoulou, Bakker, Demerouti, & Schaufeli, 2009). Also, workers' work value orientation can be perceived as personal resources. Malka and Chatman (2003) defined work value orientation as "work-related reinforcement preferences, or tendencies to value specific types of incentives in the work environment" (p. 739). Intrinsic work value orientation reflects workers' natural desire to actualize, develop and grow at the work place, to build meaningful and satisfying relationships with colleagues and to help people in need (Vansteenkiste et al. 2007). In other words, intrinsic work values are associated

with higher well-being. On the contrary, extrinsic work value orientation is defined as using the work as the means to certain ends, such as prestige, status, and income (Vansteenkiste et al., 2007). Workers with strong extrinsic work value orientation are more likely to experience less job satisfaction, low vitality on the job, higher emotional exhaustion and higher turnover intention (Demerouti et al. 2012). Thus, workers' motivation is influenced by the congruence between their value and that of the organization, the available job demands and the workers' abilities, and the job resources and personal resources (Broeck, Ruysseveldt, Smulders, & De Witte, 2011).

Manipulating Demand-Resource Relation for Motivation

Theoretically, job demands can be conceptualized into two types: job hindrances and job challenges (Broeck, Cuyper, Witte & Vansteenkiste, 2010). Job hindrance refers to those demands that drain workers' energy, create feeling of lack of control, and elicit negative emotions about the job. Job challenges refer to the demands that require energy and effort but also provide workers potential gains and opportunities for development (McCauley, Ruderman, Ohlott, & Morrow, 1994). Empirically, the two types of job demands have been observed in a study by Broeck and colleagues (2010) where confirmatory factor analysis rendered job hindrances and job challenge as two distinct factors based on the data from 261 Dutch call center agents and 441 Belgian police officers. Follow-up analyses show that after controlling for the effects of job resources, job hindrances related positively to exhaustion and negatively to motivation. Job challenges were positively related to motivation and negatively related to exhaustion in the sample of Dutch call center agents. No meaningful relationships were found in the

sample of Belgian police officers (Broeck et al., 2010). The findings suggest a possibility to change the nature of job demands for maintaining worker motivation.

In addition to reducing job demands or restructuring jobs, researchers also speculate that providing job resources to meet the needs of workers can help maintain engagement and reduce burnout. Demerouti and colleagues (2001) proposed a balanced approach to promoting worker motivation through three strategies: reducing or removing job demands to curb psychological and physiological cost, providing job resources to facilitate work processes, and offering (developmental) resources to stimulate personal growth, learning and professional development in relation to workers' aspiration.

One practical implication of the strategy is to customize resources according to workers' individual motivation profile (Harpaz, 2002). According to Harpaz (2002), workers who demonstrate an intrinsic orientation often value the work due to intellectual fulfillment, opportunities of being creative and socially connected, and autonomy provided by the job. Workers who have an extrinsic motivation profile tend to perceive their job as a means to remuneration. Consistent with Deci and Ryan's earlier findings (1985, 1987), providing resources to encourage extrinsic motivation produces negative consequences such as exhaustion, low job satisfaction and burnout (Harpaz, 2002). Intrinsic motivation oriented resources are associated with positive mental outcomes, including job satisfaction, higher dedication, and vitality (Harpaz, 2002). Workers who were intrinsically motivated were willing to put forth extra effort in work for personal enjoyment (Vansteenkiste et al., 2007).

From a theoretical perspective, organizations might need to provide intrinsically motivated workers the resources that can stimulate their personal growth, learning and professional development in relation to the workers' aspiration and growth, and provide workers with extrinsic motivation the resources that facilitate the work processes. Taking physical education as an example, for an extrinsically motivated physical education teacher who is teaching a large class in a large gymnasium, providing a loudspeaker and microphone system may be a motivation strategy because it helps make the work process easier. For an intrinsically motivated physical education teacher who teaches in the same situation, offering professional development opportunities about how to facilitate learning by innovatively grouping students might greatly motivate them. These different strategies would satisfy each teacher's needs for performing their work well.

Although extrinsic motivation is often considered as a predictor of negative consequences, research does show that it is possible to motivate extrinsically motivated workers for better work engagement. In a study conducted by Demerouti et al. (2012), 123 Dutch employees in different organizations were followed for four weeks. Work pressure, feedback from the supervisor, role clarity, work orientation (intrinsic vs. extrinsic), need for recovery, work enjoyment and concentration were measured at the beginning (Time 1) and the end (Time 2) of the four weeks. It was hypothesized that an increase in job resources (feedback from supervisor and role clarity) from Time 1 to Time 2 would have a stronger positive association with work enjoyment at Time 2 for workers with extrinsic value orientation than those with intrinsic work orientation. Correlational analysis showed that extrinsic work orientation at Time 1 was not significantly related to

work enjoyment at Time 2. The changes of job resources (role clarity and supervisor feedback) from Time 1 to Time 2 were significantly and positively related to work enjoyment. Hierarchical multiple regression analysis was used to examine the potential moderating role of beginning extrinsic work value orientation in the relationship between job resources and work enjoyment at the end of the study. The interaction between Time 1 extrinsic work orientation and role clarity was significant in explaining work enjoyment ($\beta = 0.14$; $p < 0.05$). The results show that an increase of job clarity gave workers with high extrinsic work value orientation more enjoyment than it did for workers with low extrinsic work value orientation. The findings imply that although it is ideal to have a work force of individuals with intrinsic work value orientation, in reality, however, it is equally critical to use to motivate individuals with extrinsic work orientation. The findings further imply that, by offering appropriate job resources, it is possible to motivate physical education teachers with low intrinsic work orientation to teaching.

Centralizing PE through Teacher Motivation

As Broekhoff (1979) once proclaimed, "the strength of Physical Education as a profession is related directly to the success physical educators have in convincing the public that they have important contributions to make to the health and well-being"(p. 252). To help the public recognize this critical role physical education plays for the society, physical education teachers are expected to make a concerted effort to show their dedication to the cause of improving children's overall health and behavior for healthful, active living. Therefore, high teacher motivation is not only necessary for students'

learning but also carries the potential of changing the marginalized status of physical education.

It has become imperative that physical education has to address the pressing health needs of children in the U.S. As suggested by many standards and policies, physical education curriculum needs to make the two changes: improving motor skills for life-long physical activity participation and helping students learn knowledge about the benefits and necessity of a physically active lifestyle. However, due to the lack of institutional and curricular support, physical education teachers may be constrained from embracing the expected changes and become motivated to teach the learning-oriented curriculum. Teaching physical education offers teachers little incentive, recognition, or satisfaction for extrinsic motivation. Often characterized by large classes and limited resources, teaching learning-oriented physical education can be challenging with high job demands associated with perceived cost. When faced with the challenges and demands, many physical education teachers tend to display low motivation to emphasize knowledge and skill learning in their teaching.

By emphasizing environmental factors, personal resources, and their interactive impact on worker motivation, the Job Demands-Resources model provides a conceptual framework for researchers to examine the psychological processes that influence workers' well-being and engagement. Job Demands-Resources model can be used to conceptualize motivation in various working environments by integrating itself with other motivation theories to enhance our understanding of the psychological mechanism of teacher motivation.

Section III: Teacher Motivation and Self-Determination (SDT)

According to the current policy and standards discussed in the previous section, shifting physical education towards developing students' knowledge and skills for healthful living presents high job demands for physical education teachers. In this environment, teachers can face demands of complying with curriculum and various standards. Yet, job resources, both at the organizational and personal levels, can be scarce due to lack of institutional supports and limited financial resources. According to the conceptualization based on the Job Demand-Resource model, the combination of high demand and low resources can become a threat to teacher engagement. Although the Job Demand and Resource model may help explain contextual influence on motivation, it is necessary to understand teacher motivation in the context of teaching physical education.

A Brief Review of Research on Physical Education Teacher Motivation

Physical education teacher motivation has been studied as an issue that can facilitate or hinder students' learning. In research different motivation theories are used including those in the family of achievement motivation: the achievement goal theory, expectancy-value theory, self-efficacy; and behavior modification theory such as the theory of planned behavior. Table 2.1 below provides descriptive information of representative studies. The complete reference information is provided in the References list.

Overall, these studies imply that (a) physical education teachers' motivation could be influenced by their teaching environment that is embedded with the curricular factors; (b) their motivation levels fluctuate in terms of different resources and assistance in the

curricular environment; and (c) satisfying their basic needs of autonomy and competence is critical for motivation to teach. These studies, however, also have presented challenges in studying physical education teacher motivation. First, motivation is studied as an individual psychological disposition which is independent from job demands and resources, rather than an interactively constructed state dependent on the teaching environment. In other words, the research implies that we can describe teacher motivation without understanding it in relation to environmental sources of motivation. It leaves little room for developing effective strategies to improve the working environment to enhance teacher motivation.

Second, in physical education, teacher motivation is often disaggregated from the ultimate goal – students' learning achievement. As illustrated in Martin and Kulinna's studies (2004, 2005), physical education teachers can be motivated but their motivation may not be towards producing relevant student outcome as required by policies and standards. For instance, as illustrated in Section I of this chapter, different types of physical education (recreational, public health, and physical education classes) present a diverse array of goals in physical education programs. In the current context, due to the regulation generated by standards, policies and curriculum, the goal of teacher motivation is towards teaching relevant knowledge and skills for students to adopt healthy and active lifestyle. Without clearly specifying the goal of teacher motivation in the research, the measure and conceptualization of teacher motivation could be problematic. Moreover, teaching different types of physical education also require different job demands and resources.

For the aforementioned two reasons, it is necessary to adopt different theoretical framework(s) in the study of teacher motivation in physical education. For this study, I am attempting to use the Self-Determination theory (Deci & Ryan, 1985) as a framework. In the following sections, I focus on SDT's theoretical assumptions, tenets, and constructs as well as its role for understanding teacher motivation in physical education.

The Self-Determination Theory

SDT conceptualizes motivation and self-regulation of everyday behavior in relation to environmental influences and personal needs (Deci & Ryan, 2000). According to SDT, human motivation stems from satisfying three basic needs: needs for autonomy, competence, and relatedness. *Autonomy* refers to the degree to which individuals can make decisions or generate actions according to their own interests or values (Ryan, 1993). *Competence* refers to how effectively the individuals can interact with the external environment, applying and demonstrating their capacities through various channels (Deci, 1975). Rather than being a concrete possession of knowledge or skill, competence is also expressed as the feeling of confidence in undertaking challenges. *Relatedness* is the sense of belongingness and connection to the natural and social environments in which an individual resides and/or works. It is characterized by feelings of caring for others and being cared for by others. It reflects the extent to which the individual's behavior and cognitive conceptions are in accordance with his or her community.

Theoretical Assumptions. SDT has three theoretical assumptions regarding the nature of people. First, "people are assumed to have an evolved developmental tendency" (Deci & Ryan, 2012b, p. 88). Such a tendency is often facilitated by people's pursuit of

personal growth. Second, "people are assumed to be inherently active and thus to proactively initiate engagement with their environment" (Deci & Ryan, 2012b, p. 87). During this process individuals internalize information given by the external environment (e.g., values, attitudes, contingencies, and knowledge) and regulate their own drives and emotions. Finally, people "will be motivated and display well-being in organizations to the extent that they experience psychological need satisfaction" (Deci, Ryan, Gagne, Leone, Usunov, & Kornazheva, 2013, p. 930). An external environment that enables the satisfaction of the three basic needs also can facilitate motivation to engage in life and enhance psychological well-being.

Theoretical Tenets and Constructs. According to SDT, the person–environment interaction can be understood through a spectrum of motivational states that result from interactions between externally imposed regulations and personal mental dispositions. *Intrinsic motivation* is experienced by individuals when they engage in an activity for the sake of experiencing the activity. *Extrinsic motivation* refers to a motivation state in which an individual engages in an activity to receive an extrinsic reward, whether tangible or symbolic, or to comply with an external contingency imposed by those in control of an environment (Ryan & Deci, 2000). In addition to the intrinsic or extrinsic motivation, SDT also conceptualizes a "state of lacking an intention to act" as *amotivation* (Ryan & Deci, 2000, p. 61). SDT theorists speculate that amotivation might result from not valuing an activity (Ryan, 1995) or not feeling competent to do it (Deci, 1975). Because most individuals engage in working for various forms of rewards,

understanding extrinsic motivation from the SDT perspective is critical in developing motivation strategies in the working environment.

SDT acknowledges the complexity of extrinsic motivation by framing it within a sequence of external regulations. According to SDT, the regulation framework postulates that extrinsic motivation is controlled by four related but different behavioral regulations: external regulation, introjected regulation, identified regulation, and integrated regulation (Deci & Ryan, 2000; Ryan & Deci, 2000). When theorizing intrinsic/extrinsic motivation, deCharms (1968) used the concept of perceived locus of causality to conceptualize intrinsic and extrinsic motivation. To deCharms (1968), perceiving oneself as the locus of causality for one's behavior is the fundamental requirement for intrinsic motivation. Vice versa, when an individual perceives that the locus of causality is determined by external factors rather than oneself, the individuals are more likely to experience extrinsic motivation. For the four behavioral regulations of extrinsic motivation, their loci of causality are gradually distanced from amotivation to approach intrinsic motivation.

External regulation refers to the process whereby motivated behavior is induced and controlled completely by externally imposed contingencies, such as meeting an external demand or obtaining a reward. In physical education, the teacher's motivation might be regulated by the requirement to implement a particular type of program or curriculum and/or incentives associated with the implementation. Another example could be that teachers participate in professional development workshops to meet school district requirement rather than to satisfy their professional interests. Thus, external regulation is

often experienced by teachers as “a pressure from above” (Pelletier, Seguin-Levesque, & Legault, 2002, p. 186) or job demand.

Extrinsic motivation also can come from introjected regulation—“a type of internal regulation that is still quite controlling because people perform such actions in order to avoid guilt or anxiety or to attain ego-enhancements or pride” (Ryan & Deci, 2000, p. 62). One’s sense of self-esteem plays an important role in forming introjected regulation. For instance, teachers are motivated to have students engage in intensive activities to avoid a feeling of not fulfilling their professional responsibilities. Motivation derived from introjected regulation can be characterized by a higher level of autonomy than that from external regulation.

Identified regulation is defined as a type of internal regulation in which the individual accepts the value of the activity as personally important (Deci & Ryan, 2000). In other words, an individual chooses to perform the activity because it carries importance to him or her. Identified regulation is a relatively autonomous or self-determined process in that motivation comes from an individual seeing his/her own value embedded in the activity. Identifying a job to be consistent with one’s own value system provides individuals with a mental basis for motivation. For example, a teacher who values the contribution made by fitness knowledge to students’ adoption of healthy lifestyle would be more motivated to teach an externally imposed fitness curriculum; he/she is also more likely to take on challenges during the teaching process and accept an accountability system to monitor his/her teaching.

The last regulatory process for extrinsic motivation is integrated regulation which, according to Deci and Ryan (2000), is the most complete and effective internalization of external regulations. It makes the individual's extrinsically motivated action fully volitional (Deci & Ryan, 2000). Motivation derived from integrated regulation is characterized by the internalization of external values into one's own value system. Human behaviors, in this sense, signifies a full assimilation between the regulation and the self. The extrinsic motivation derived from integrated regulation shares many characteristics with intrinsic motivation in terms of autonomy and engagement. The difference between the two is that individuals who experience integrated regulation do not participate in the activity for the sake of experiencing and appreciating the process, but rather for separate outcomes (such as values) the activity brings (Ryan & Deci, 2000).

Although the four types of extrinsic motivation cannot be conceptualized as a definitive continuum, research evidence does show that individuals can move along from the external regulation to integrated regulation (Chirkov & Ryan, 2001; Deci, Eghrari, Patrick, & Leone, 1994; Grolnick, Ryan, & Deci, 1991). By integrating externally imposed values into one's own value system, an individual can become increasingly autonomous in complying with external demands and become motivated to meet the demands. In other words, the individual achieves self-regulation by shifting the locus of regulation from the external to the internal. Overall, the more the individual internalizes the external regulations, the more likely he/she is to be motivated to engage in an activity.

Studies that Adopted SDT. Although SDT has been used to study workers' motivation in different settings, only a few studies on physical education teachers'

motivation used SDT as a theoretical framework. In the following paragraphs, I review the studies that use SDT to investigate teacher motivation in physical education and similar fields to provide an explicit picture of this line of research.

A correlational study that involved 247 teachers (117 females and 130 males) sought to examine whether teachers' fulfillment of three basic needs were related to their self-determined motivation (Carson & Chase, 2009). In addition, the study aimed to determine the impact generated by personal, professional, and environmental factors on their fulfillment of the basic needs. The scale that the study used to measure teachers' self-determined motivation was modified from the Sport Motivation Scale (SMS) (Pelletier et al., 1995). In addition, teachers' perceived autonomy, competency, and relatedness (mainly relatedness with colleagues) were measured.

A confirmative factor analysis was used to verify that the structure of the SMS was retained in the study. Then the Cronbach's α was calculated to determine the internal reliabilities for each instrument, ensuring that reliability coefficients of .70 could be achieved. A canonical correlation analysis (CCA) was also used to determine the teachers' fulfillment of three basic needs and their motivation to teach. In the end, multiple regression analyses with stepwise strategy were used to explore how personal, professional, and environmental factors predict teachers' perception of the three needs, respectively.

In the CFA analysis, several indices demonstrated a good fit. The CCA between the variable sets of teachers' fulfillment of needs and self-determined motivation yielded a significant function (R_c = .52), demonstrating that teachers' fulfillment of the three

needs are positively related to all types of extrinsic motivation except amotivation. The step-wise multiple regression analyses showed that conference attendance and perceived equipment quality were significant and positive predictors of teachers' need for autonomy; equipment quality and the reading of professional journals positively and substantially contributed to teachers' competence; and the reading of professional physical education journals and positive perceptions of administration support significantly and positively affected teachers' fulfillment of relatedness.

The study has several strengths and limitations. In terms of strengths, the study successfully confirmed SDT's applicability in physical education teacher motivation. First, teachers' need satisfaction is related to their self-determined motivation in teaching. Second, the study confirmed that environmental factors can influence teachers' motivation by satisfying their basic needs. In terms of limitations, the study used the Physical Education Teacher Efficacy Scale to measure teachers' competency. However, this instrument was intended to measure teachers' efficacy in teaching an educational program for physical education. In its measure of teachers' self-determined motivation, the study used a scale modified from the Sport Motivation Scale, which was not specified to measure teacher motivation toward student learning. In addition, the subjects of the study participated in the study voluntarily, and no information was provided on their teaching goals or pedagogical content. In other words, whether the teachers were teaching for students' learning was not clear. Without a teaching/learning goal specified, the direction of teacher motivation and their self-regulation measured in this study were not

clear. At the same time, teachers' self-determined motivation was not understood in relation to any student achievement outcomes in this study.

In another study on physical education teacher motivation, Taylor, Ntoumanis and Standage (2008) investigated whether teachers' usage of motivational strategies for students can be predicted by their perceived job pressure, perceived student motivation, teachers' personal autonomous orientation (individuals' disposition toward autonomy), and psychological need satisfaction, and self-determined motivation to teach. A total of 204 physical education teachers involved in the study and completed multi-section questionnaire that measures perceived job pressure, personal autonomous orientation, teachers' perception of student motivation, teachers' psychological need satisfaction, teacher self-determined motivation, and teachers' usage of motivational strategies. Structural equation modeling analysis supported a model that teachers' perceived job pressure, perceived students' motivation, and their own autonomous orientation predict the satisfaction of teachers' psychological needs, which influence teacher motivation, which in turn influences teachers' choice of motivational strategies ($\chi 2$ (124) = 183.37; CFI = .92; SRMR = .08; RMSEA = .05). The result of this study shows that perceived job pressure, teachers' autonomous orientation, and their perception of student motivation impact teachers' psychological need satisfaction. In addition, need satisfaction and teachers' personal autonomous orientation predict teachers' self-determined motivation. Particularly, the study shows that perceived job pressure influences teacher self-determined motivation through the satisfaction of psychological needs. In this study, negative perception of student self-determined motivation contributes to the frustration of

teachers' psychological needs, which generates negative influence on teachers' self-determined motivation. The result is consistent with SDT. In addition, it highlights the importance of teachers' psychological attributes on teacher motivation. In other words, teachers' personal autonomous orientation could be perceived as a type of job resources, which influence teachers' need satisfaction and motivation. Such a result also confirms the Job Demands-Resources model.

In a recent study conducted by van de Berghe and colleagues (2013), the relationship between teachers' motivational profiles and teacher motivation was investigated. In the study, teachers' motivational profiles were classified into four categories: 1) a relative controlled group, (2) a relative lowly motivated group, (3) a relative autonomous group, and (4) a relative highly motivated group. Overall, 96 teachers involved in the study and completed the questionnaires on emotional exhaustion (Maslach Burnout Inventory-Educators Survey, Kokkinos, 2006; Maslach & Jackson, 1986) and motivation at work (Self-Regulation Questionnaire, Soenens et al., 2012). The motivation at work section measures teachers' autonomous motivation and controlled motivation. From the teachers' autonomous and controlled motivation, four teachers' motivational profiles were generated by means of cluster analyses. The four motivational profiles explain 72.2% and 66.2% of variance in autonomous and controlled motivation respectively. A MANOVA analysis was conducted by having teachers' motivational profiles as independent variables and teachers' emotional exhaustion, autonomous and controlled motivation as dependent variables. The result shows there were multivariate differences among the four motivational profiles ($F(9,207) = 43.67$, $p < .001$, $\eta 2 = 0.58$).

The relative controlled group of teachers reported the highest feelings scores on emotional exhaustion. The relative autonomous group had the lowest scores on feelings of emotional exhaustion. According to the result, teachers who are autonomous could be considered as having job resource. It might help the teachers to perceive the job demands from a positive perspective and help teachers to buffer the negative influence of job demands. Thus, the result of this study further confirms the legitimacy of connecting SDT and the Job Demands-Resources model.

Outside of physical education, research shows that the working environment influences teachers' self-determination motivation toward teaching. Pelletier, Seguin-Levesque, and Legault (2002) investigated the extent to which teacher motivation and teaching behavior are influenced by the pressure from having to comply with a curriculum, from adopting standards and from colleagues and students The hypothesized Model 1 proposes that teachers' perception of constraints at work, perception of students' motivation toward learning, and teachers' motivation are all directly associated with teachers' behavior. Model 2 proposes that the relationship between two environmental factors (teachers' perceived constraints at work and perceived student motivation) and teachers' behavior is mediated by teachers' motivation. Model 3 proposes that the two environmental factors (teachers' perceived pressure at work and perception of student motivation) have direct effect on teachers' behavior and indirect effect through teacher motivation. The three hypothesized models are shown in the Figure 2.2.

The result of the SEM analysis reveals that mediated model (model 2) fits the data more adequately than the two other models. The result of the study also shows that

teachers' perception of constraints at work and their perception of students' motivation explained 18% of the variance of teachers' motivation toward their work. It indicates the less work constraints and the higher motivation from students, the higher motivation the teachers have. Also, teachers' motivation explained 13% of the variance of teachers' autonomy support. It indicates that the teachers with higher motivation are more likely to be autonomy supportive to their students. In contrary, teachers who were subjected to high work pressures and low student motivation are more likely to have low self-determination, which in turn jeopardizes the degree to which they are autonomy supportive to their students.

In a study outside of physical education, Lam, Cheng, and Choy (2010) examined the relationship between school support, teacher motivation and teachers' willingness to persist in using project-based learning strategy. Based on SDT, the study postulated that the school environment that supports the needs for competence, autonomy, and relatedness would facilitate teacher motivation. School support was operationalized in three dimensions: support for competency, support for autonomy and support for relatedness among colleagues. The study was conducted in eight middle schools in Hong Kong, involving 182 teachers (107 female; 75 male).

The result of structural equation modeling shows that teachers' willingness to persist in using project-based learning was positively related with supportive school environment. Specifically, teachers who perceived their schools as being supportive of collegiality, teacher competence and autonomy had higher motivation in using project-based learning and stronger willingness to persist in this educational innovation. In

addition, teachers' perception of school support predicted their future persistence both directly and indirectly through its influence on teacher motivation. In other works, school support had both direct and indirect effect on teachers' continuation. The indirect path between teacher persistence and school support via teacher motivation suggests that through satisfying teachers' three basic needs, schools can motivate teachers. In addition, the motivation, in turn, contributes to the teachers' attitude towards future persistence. Such a finding confirms SDT. The direct path between school support and teacher persistence suggests that except for satisfying teachers' three basic needs, the other supports provided by the school to facilitate teachers' work have direct impact on teachers' attitude for future continuation. These supports may not satisfy teachers' basic psychological needs, but they still can facilitate teachers to continue with the educational innovation. This study further confirms the necessity of integrating the Job Demands-Resources model with SDT for a better understanding of teacher motivation. Particularly, it raises the issue that job resources may generate different effects on teacher motivation and work engagement.

In another study outside of physical education, Berg, Bakker, and Cate (2013) studied teacher motivation in a Dutch University Medical Center. In its pilot study, the researchers interviewed 16 faculty members and generated 22 items about factors that might affect teacher motivation. Over 600 faculty members rated a survey that includes the 22 items on a five-point Liker scale (from 1 very negative to 5 very positive) to measure whether the factors influence teacher motivation. The result of the survey shows that "teaching about my own specialty," "appreciation for teaching by my direct

supervisor," "teaching to small groups," "feedback on my teaching performance," and "freedom to determine what I teach" were ranked as top-five motivators. It confirms SDT in that working environment that satisfies teachers' needs of competence, relatedness and autonomy can most motivate teachers. At the same time, the top-five factors that most hamper teacher motivation were "unmotivated students," "poor facilities," "limited teaching time," "bureaucracy and rules about teaching," and "not familiar with content." The result matches the Job Demands-Resources model in that high job demands greatly discourage teacher motivation.

Wagner and French (2010) used SDT to study the relationship between early childhood teachers' motivation and their working environment. Fifty-four early childhood teachers and teacher assistants participated in 1-year longitudinal professional development program that includes workshops and on-site support visits. The study adopted mixed-method: quantitative analysis of motivation and work attitude surveys and qualitative analysis of teacher interviews to investigate teacher motivation and working environment. Through a regression analysis, two factors – supervisor support ($p<.005$) and the nature of the work itself ($p < .01$) – are identified as significant predictors of teacher motivation ($R^2 = .694$, $F(6, 41) = 15.511$, $p < .001$). The qualitative analysis matches the finding of the quantitative analysis – work environment may support or undermine teacher motivation. The result of this study confirms the validity of SDT in teacher motivation within a different working context.

These aforementioned studies shed light to this dissertation. Especially, their findings largely confirm that SDT as a theoretical framework can capture the regulating

nature of working environment. Particularly, these studies show that in order to have a thorough understanding of teacher motivation, we need to investigate the satisfaction of teachers' psychological needs in their working environment, and different regulatory processes associated with different degrees of need satisfaction. At the same time, the existing literature of physical education teacher motivation in general and the studies using SDT as theoretical framework in particular show certain limitation. First, studies of physical education teacher motivation often ignore the influence of the curricular context. As a result, whether physical education teachers were regulating themselves to making their class a learning-oriented environment was unknown. Second, the existing studies in physical education rarely connect teachers' need satisfaction and their motivational regulatory processes with environmental factors. In the following section, I propose a model by integrating SDT and Job Demands and Resources model for this dissertation study. Then, I operationalize the variables of SDT and Job Demands-Resources model for this dissertation research.

Section IV: Integrating SDT with Job Demands-Resources Model

As the review of studies of teacher motivation shows, studies based on these motivation theories often overlook the fact that teaching environment is not achievement-oriented. Unlike the learning environment in which students/learners are working to achieve certain goals for their own interest, the working environment for teachers plays the role of regulating teachers towards organizational goals.

The SDT framework accurately captures the regulating nature of working environment. According to the SDT, under regulation, teachers adopt different regulatory

processes in response to the working environment. Through the different regulatory processes they adopted, teachers demonstrate different levels of motivation. Their motivation, in turn, influences their performance towards the organizational goals and the satisfaction of their basic needs. However, SDT does not specify what factors in the working environment playing the regulating role.

In the Job Demands-Resources model, job resources and demands embedded in the working environment influence teachers' work engagement and energy level (burnout) directly. The teachers' work engagement and energy level (burnout) determine teachers' effort towards the outcome expected by their organization. In comparison with SDT, the Job Demands-Resources model fails to recognize that the external factors, including job resources and demands, influence teachers' performance through their motivation. In addition, the Job Demands-Resources model omits that external factors in working environment produce a spectrum of self-regulatory processes.

By integrating the Job Demands-Resources model with SDT (see Figure 1.1), we can establish a connection between job demands and resources embedded in the external working environment, teachers' regulatory processes, teachers' motivation towards the organizational goals and their needs satisfaction.

As the Figure 1.1 shows, the model has four major components: regulating factors, regulatory processes, motivation, and outcomes. The nature of working environment determines that research of teacher motivation in physical education need to focus on factors that influence teachers' extrinsic motivation and their regulatory processes. These factors include environmental constraints/supports. Using the terms

adopted by the Job Demands-Resources model, job resources and demands work as regulating factors that facilitates teachers to adopt different regulatory processes. The environment dictates that physical education teacher motivation is likely to be extrinsic and regulated externally. The regulatory processes also influence the level of motivation teachers have towards the organizational goals. At the same time, teachers are regulated as well as enabled by external forces in the forms of job demands and resources embedded in working environment. As it is shown in the right part of the integrated model, teachers are not only regulated to work towards the organizational goals, but also to achieve their basic needs.

For this dissertation study, the focus of research is on the relationship between regulatory factors (job demands and resources), regulatory processes, and teacher motivation. The variables that I study are: job demands, job resources, four regulatory processes, and teacher motivation, as shown in the integrated model as latent variables. The relationships that I want to explore are between the regulating factors, regulatory processes and motivation.

The focus of this study is two-folded. First, the purpose of this study is to describe the relationship between environmental factors, namely job resources and demands, and teachers' regulatory processes. Based upon the previous studies on job resources and demands as well as teachers' different regulatory processes demonstrated in empirical setting, it is critical to find out what type of job demands and resources relate to each of teachers' different regulatory processes. According to the integrated model, I am trying to understand the relationships between external regulatory factors and teachers' regulatory

processes. Better understanding of the relationships carries the potential of providing the resources and demands for teachers to adopt more effective regulatory processes.

Second, the purpose of the study is to describe the relationship between the overall regulation, including external regulatory factors and teachers' regulatory processes, and teachers' level of motivation. According SDT, by moving from external regulation to identified regulation, individuals have more autonomous kinds of extrinsic motivation. What is left unknown is whether the more autonomous kinds of extrinsic motivation are actually related to higher levels of motivation. In other words, are teachers who adopt external or introjected regulation as their regulatory processes are actually less motivated than their peers who adopt integrated and identified regulation? Is it possible that teachers who adopt external regulation, due to the job resources and demands he/she is subject to, demonstrate a higher level of motivation than another teacher who adopt higher levels of regulatory processes?

In summary, I would like to address the following the question in this dissertation study: To what extent would the perceived job demands and resources determine teachers' motivational regulatory processes and, ultimately, their motivation to teach physical education? In other words, to what extent would the theorized *a priori* model (as Figure 1.1 depicts) can be used to explain physical education teacher motivation?

Section V: Operationalizing Major Variables

As elaborated above, further research need to be conducted by integrating SDT and the Job Resources and Demands model. By doing so, we can establish a relationship between working environmental factors and teacher motivation through teachers'

regulatory processes. In this study, these factors will be measured by using surveys and validated instruments with tangible validity and reliability. In this section, for measurement purposes, I evaluate existing instruments, and investigate how these factors were operationalized and measured in previous studies along with their validity and reliability evidences.

Teacher Regulatory Processes

To measure regulatory processes, various instruments have been developed and adopted with modification. For instance, Carson and Chase (2009) modified the Sport Motivation Scale (SMS) to measure individuals' different regulatory processes toward sport participation. The scale has seven subscales: intrinsic motivation to know, intrinsic motivation toward accomplishment, intrinsic motivation to experience stimulation, external regulation, introjection, identification, and motivation. The scale was validated with a group of amateur athletes in different university sports team, returned a satisfactory internal consistency ($\alpha = .82$). Although the structural equation modeling analysis show a good fit of the model (the x^2/df ratio = 1.94, the GFI = .94, the AGFI =.92, the RMR =.048, and the value for the NFI = .92), the voluntary nature of sports participation, particularly for amateur athletes, is different from the regulatory nature of working environment. For instance, the scale carries several items on intrinsic motivation, while external regulation was de-emphasized. Considering the working environment of physical education teachers, particularly the fact that their teaching behaviors are influenced by external regulation generated by standards, policies and

curricula, the measure of their motivation towards teaching need to consider the regulatory nature of working environment.

Based on SDT, the Motivation at Work Scale (MAWS) has been created to "measure different work-related behavioral regulations that represent the range of the continuum of motivation to do a particular job" (Gagne, Forest, Gilbert, Aube, Morin, & Malorni, 2010, p. 631). To make sure that the scale reflects the nature of work environment, Gagne and colleagues (2010) did not include amotivation (i.e., lack of any type of motivation) items. In addition, because previous research revealed that it is very difficult to psychometrically distinguish integrated regulation from identified regulation (Vallerand, Pelletier, Blais, Briere, Senecal, & Vallieres, 1992), the scale includes four subscales, with one for intrinsic motivation and three (external regulation, introjection, and identification) for extrinsic motivation. As a result, the scale does not cover the full spectrum of regulatory processes. The validity and reliability of the Motivation at Work Scale has been tested in different models based on SDT in different working environment (Gagne et al. 2010).

In addition to the MAWS, another instrument called the Work Extrinsic and Intrinsic Motivation Scale (WEIMS) has been developed to measure work motivation based on SDT (Tremblay, Blanchard, Taylor, Pelletier, & Villeneuve, 2009). In contrast with the Motivation at Work Scale, the WEIMS has six subscales to measure the full spectrum of self-determined motivation, from intrinsic motivation to amotivation. The WEIMS also allows researchers to calculate the work self-determination index for individual workers (W-SDI; Vallerand, 1997). It is particularly useful when researchers

want to study a particular group of workers who have a wide range of motivation (Tremblay et al. 2009). Because this study focused on teachers' regulatory processes, instruments that emphasize intrinsic motivation and amotivation would not be applicable. Because there is no evidence to show that integrated regulation and identified regulation are not psychometrically distinguishable for physical education teachers, this study considered instruments that can capture the full spectrum of external regulation.

Job Demands and Job Resources

Unlike motivational regulatory processes, job demands and resources were operationalized and measured through a wide range of approaches. Depending on their research settings and questions, researchers operationalized different factors to represent job demands and resources. Table 2.2 provides a summary of how studies measure job resources and demands by domains/factors. For instance, physical demands in teaching included long hours and high workloads (McCormick, 1997). Social demands included high expectations (Coon, 1992; Yu & Ning, 2004).

Overall, measures of job resources include job control, autonomy, coworker, supervisor, organization support, performance feedback, access to information within organization, opportunities for further development, positive social climate, innovative social climate, job variety, and positive workplace events (Crawford, LePine, & Rich, 2010). In addition, personal resources have been measured as self-efficacy beliefs, organizational-related self-esteem, and optimism (Xanthopoulow, Bakker, Demerouti, & Schaufeli, 2009). Measures of job demands include the level of attention required by the job, job responsibility, and pressure to complete tasks, time urgency, organizational

politics, role ambiguity, and role conflict (Crawford, LePine, & Rich, 2010). For job hindrances were measured through work-home interference and emotional demands; job challenges were measures through workload, cognitive demands (Broeck, Cuyper, Witte, & Vansteenkiste, 2010).

Except for studies that measure particular job demands and resources, instrument was also developed to comprehensively measure job demands and resources in various working environments. For instance, de Jonge et al. (2004) developed the Demand-induced Strain Compensation (DISC) Questionnaire to measure job demands and resources across various working environments. For the DISC Questionnaire, both job demands and resources are perceived as multi-dimensional constructs that comprise cognitive, emotional, and/or physical components. Although the instrument has been validated in different research settings, certain dimensions of the DISC Questionnaire do not apply to the working environment of physical education. As a result, it still cannot capture the contextual specificity of the working environment for physical education teachers.

One of purposes for this study is to understand physical education teachers' job demands and resources that are embedded in their working environment comprehensively. As the Chapter two conceptualizes, physical education teachers are regulated external factors, including standards, policies and their working environment. Therefore, instruments that measure particular job demands and resources would not be compatible with the ultimate goal of the study. Additionally, existing instruments to measure working environment comprehensively cannot capture the unique characteristics

of the working environment for physical education. Therefore, an instrument that is specially tailored to measure physical education teachers' working environment needs to be developed.

Teacher Motivation

As addressed in the first chapter, work motivation is defined as "a set of energetic forces that originate both within as well as beyond an individual's being, to initiate work-related behaviors, and to determine its form, direction, intensity and duration" (Pinder, 1998, p. 11). The definition of work motivation indicates that motivation can demonstrate itself as work-related behaviors or energetic forces in the forms of direction and intensity. It suggests that teacher motivation could be measured on two dimensions: behavioral and psychological.

To measure teacher motivation as a hidden attribute from the psychological perspective, its conceptual underpinnings, psychometric properties and construct validity have to be examined through specific procedures. Due to the fact that teacher motivation has been conceptualized from various theoretical perspectives, researchers adopted different psychometric approaches to measure teacher motivation. In the following section, I briefly review the research that measures teacher motivation psychometrically.

One version of Teacher Motivation Questionnaires (McNeil, 1987) was developed to measure teachers' intrinsic and extrinsic motivation towards teaching. Instead of teachers' level of motivation, the instrument operationalizes intrinsic motivation as achievement, recognition, work itself, responsibility, advancement and possibility of growth. The instrument operationalizes extrinsic motivation as policies of the

organization, administration, technical supervision, salary, working condition, status, job security, effects on personal life, and interpersonal relations with supervisors and peers and subordinates (McNeil, 1987). In other words, factors that are considered as potential contributors to teachers' intrinsic and extrinsic motivation are examined respective. Researchers also measure teacher motivation based on the sources of teacher motivation. For instance, Eres (2011) use the Teachers' Motivation Scale to evaluate factors that could possibly motivate teachers. These factors or sources of motivation include parent, physical conditions of the school, school management, students and colleague relationships. These factors are indeed a reflection of teachers' working environment instead of their psychological states/processes.

Some measurements of teacher motivation are derived from motivation theories. For instance, the Subscales Assessing Four Types of Motivation for Teaching (Roth, Assor, Kanat-Maymon, & Kaplan, 2007) was based on SDT. It measures four factors: External motivation, introjected motivation, identified motivation and intrinsic motivation. A similar instrument is called the Teacher Motivation Inventory, which was modified based on Self-Regulation Questionnaire developed by Ryan and Connell (1989). The Self-Regulation Questionnaire also includes four factors: External regulation, introjected regulation, identified regulation and intrinsic motivation. Such kinds of instruments are indeed measuring teachers' regulatory processes.

Also based on SDT, certain studies measure teachers' need satisfaction for teacher motivation. For instance, the Teaching Autonomy Scale (TAS) was to measure the degree to which teachers perceive they have autonomy in working environment. Autonomy was

operationalized through following factors: 1) selection of activities and materials, 2) classroom standards of conduct; 3) instructional planning and sequencing, and 4) personal on-the-job decision making (Pearson & Moomaw, 2005). Another instrument, called Porter Need Satisfaction Questionnaire, based on Maslow's theory on hierarchy of needs was developed to measure teacher motivation through measuring teachers' perceived deficiency for each need area in their working environment (Anderson, & Iwanicki, 1984).

For studies based on Self-Efficacy theory, researchers widely use instruments that are designed to measure teacher efficacy as a proxy variable for teacher motivation. For instance, The Teachers' Sense of Efficacy Scale (Tschannen-Moran & Woolfolk, 2001) was developed to measure teachers' efficacy judgments for certain tasks of teaching (Shaughnessy, 2004). The scale measures teachers' efficacious perception from four perspectives: student engagement, instructional strategies, and classroom management. In the similar vein, Goddard (2002) developed the Collective Efficacy Scale to measure the perceived collective efficacy of teachers.

Researchers also develop instrument for teacher motivation based on Expectancy-Value theory. For instance, Abrami, Poulsen, and Chambers (2010) measured teacher motivation by operationalizing three factors – values, expectancy and cost. In another example, to measure teacher motivation, Butler (2007) measured teachers' achievement goal orientation for teaching by adopting and modifying Motivational Orientations Measures developed for students (Nicholls, 1989). In some cases, researchers measured psychological constructs from more than one motivation theories for teacher motivation.

For instance, Kelley, Heneman, and Milanowski (2002) measured teacher motivation through following factors, including teachers' perception of goals, expectancy, instrumentality, valence, teachers' knowledge and skills, and organizational context factors, including principal leadership, teacher collaboration, and organizational support for goal achievement. No primary theory was specified in their study (Kelley, Heneman, & Milanowski, 2002).

In addition, certain researchers suggest to measure work motivation through measuring other psychological constructs, such as job satisfaction and organizational commitment (Bjorklund, Grahn, Jensen, & Bergstrom, 2007). For instance, by using another version of Teacher Motivation Questionnaire (TMQ) (Marsh & Ware, 1982), a study measured teachers' enthusiasm with the subject and teachers' enthusiasm of teaching the subject as teacher motivation (see McKinney, 2000).

Except for measuring teacher motivation through a psychometric approach, researchers also measure teacher motivation from the behavioral perspective. For instance, Jesus and Lens (2005) use professional engagement to capture teacher motivation. Specifically, professional engagement was operationalized into following components: participation in extra-curricular activities, encouraging and praising students, systematic course improvement, efforts at class preparation, availability to the students outside of class (both for questions and collaboration in projects) and, attempts to diversify teaching strategies (Jesus & Lens, 2005). In a study by to investigate teacher motivation under accountability policy sanctions in Chicago's low-performing schools, semi-structured interviews were conducted with teachers on teachers' perceptions of the

accountability policy, their response to probation status, and changes they made after their schools were placed on probation (Finnigan & Gross, 2007). These questions directly address teachers' behaviors under the regulation of accountability policy in compliance with NCLB.

To summarize, teacher motivation could be measured from psychometrical and behavioral perspectives. Based on the theorization of physical education teacher motivation in this chapter, none of the aforementioned psychometrical approaches reflect the theoretical framework (Figure 1.1) that integrates SDT and the Job Demands-Resources model. Considering the unique regulating nature of physical education teachers' working environment for this study, teacher motivation need to be measured closely in accordance with the definition of teacher motivation, which is effort toward organizational goals in the forms of direction and intensity. By identifying the direction of teachers' work-related behaviors as complying the North Carolina *Healthful Living Essential Standards* during their teaching, teachers' motivation was measured as 1) the degree of consistency between their goal of teaching with the identified goal, and 2) the amount of effort they made towards the identified goals from different perspectives. Thus, it is necessary to develop an instrument that can systematically measure physical education teachers' job demands and resources.

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Appendix A

Figures and Tables

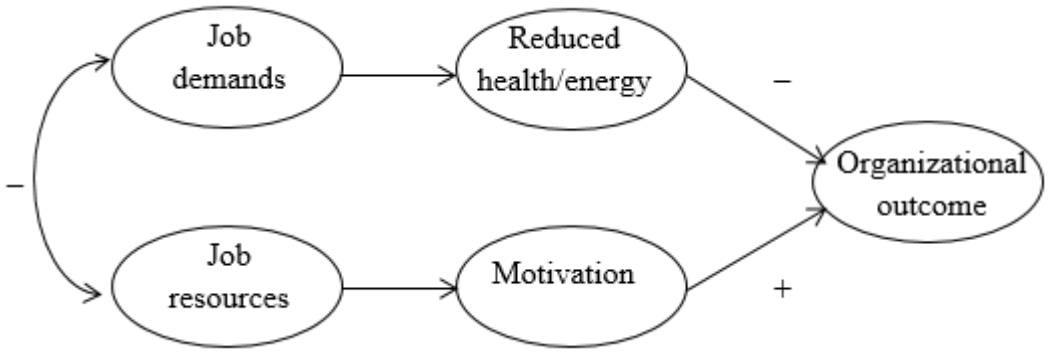

Figure 2.1 Two Different Underlying Psychological Processes Play a Role in the Development of Job-Related Strain and Motivation (Demerouti & Bakker, 2011)

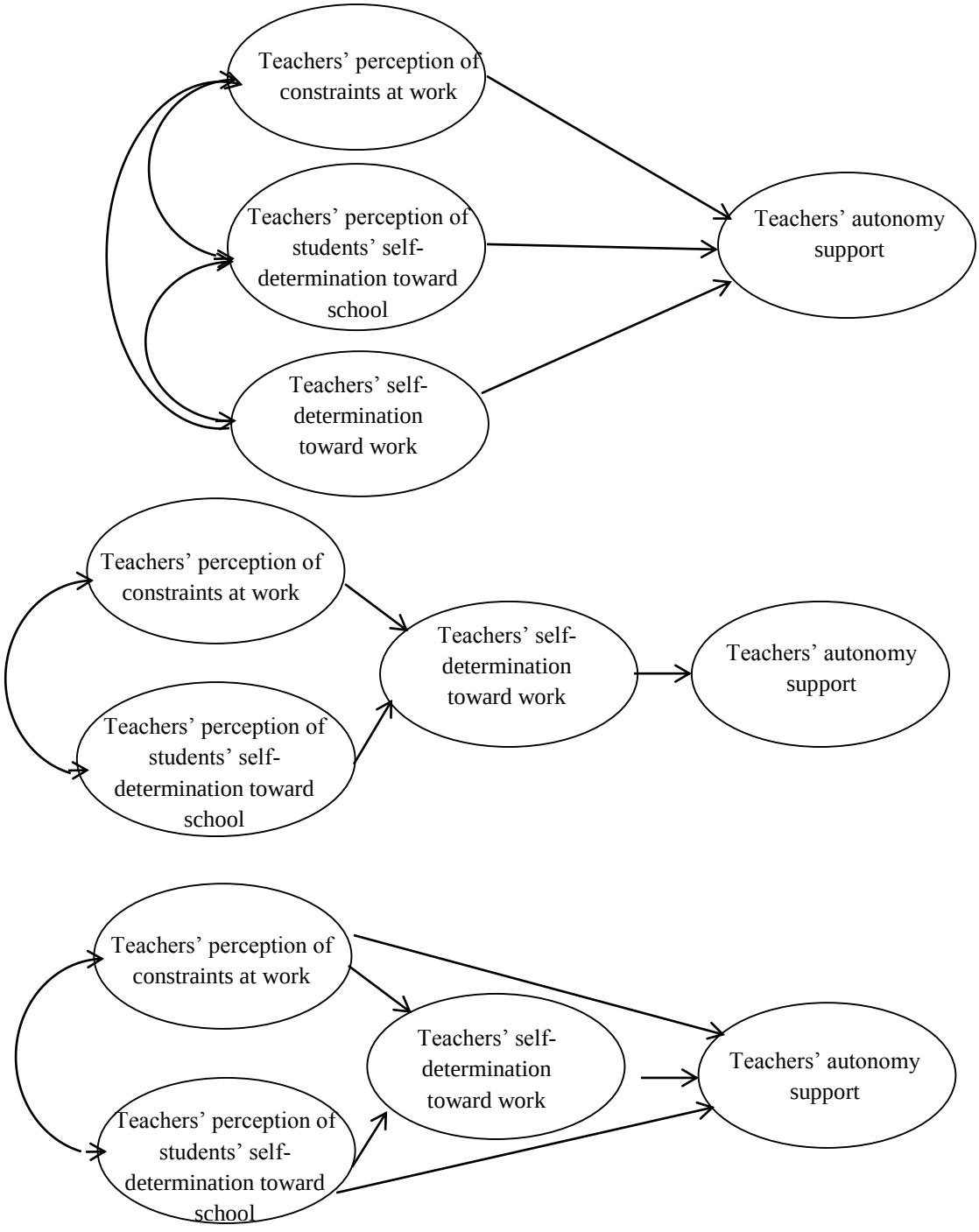

Figure 2.2 Three Hypothesized Models.

Table 2.1

Summary of Research on Physical Education Teacher Motivation

Theory	Study Information
Theory of Planned Behavior	*Authors (Year)*: Kulinna, McCaughtry, Martin, Cothran, & Faust (2008)
	Design/Method: quasi-experimental, curriculum-based mentoring
	Finding: new teachers in the experimental condition increased motivation; new teachers in the control condition decreased motivation
	Note: no learning outcome data to verify the impact of motivation change
Self-Efficacy	*Authors (Year)*: Martin, McCaughtry, Kulinna, & Cothran (2009)
	Design/Method: quasi-experimental, curriculum-based mentoring
	Finding: novice teachers in the experimental condition increased efficacy; novice teachers in the control decreased efficacy
	Note: no learning outcome data to verify the impact of motivation change
	Authors (Year): Gurvitch & Metzler (2008)
	Design/Method: quasi-experimental with (a) lab-to-school student teaching internship (n=31) vs. (b) school-based internship conditions (n=28); teaching efficacy scale survey.

	Finding: no differences in general teaching efficacy between the two conditions; personal teaching efficacy fluctuated in both conditions
	Note: no learning outcome data to verify the impact of motivation change
Expectancy-Value	*Authors (Year)*: Abrami, Poulsen, & Chambers (2004)
	Design/Method: correlational & descriptive inferential-expectancy/value and using cooperative learning strategies; large-scale survey (n=993)
	Finding: teachers with high expectancy/values were more likely to use cooperative learning strategies
	Note: no learning outcome data to verify the impact of motivation change, teaching contexts were not specified
Achievement Goal	*Authors (year)*: Papaioannou & Christodoulidis (2007)
	Design/Method: descriptive correlational-goal orientations to job satisfaction
	Finding: task goal related to job satisfaction

Table 2.2

The Factors/Domains Measured for Job Demands and Resources

Study	Measurement for job demands and resources
Xanthopouloum Bakker, Demerouti, Schaufeli (2009)	*Job resources* were measured on five factors: Autonomy, social support, supervisory coaching, performance feedback, and opportunities for professional development. Each factor was measured by a scale adopted from different instrument. *Personal resources* were measured on three factors: self-efficacy, organizational-based self-esteem and optimism. Each factor is measured by an independent scale adopted from other established instruments.
Schaufeli, Bakker, Rhenen, (2009)	*Job demands* were measured through three factors work overload, emotional demands and work-home interference. The first two factors were assessed by the Questionnaire on the Experience and Evaluation of Work. The third factor was assessed by an instrument that measures time- and behavior-based interference. *Job resources* were measured on four dimensions: social support, autonomy, performance feedback, opportunities to learn and to develop. The four factors were measured by a shorten scales of the Questionnaire on the Experience and Evaluation of Work
Fernet, Guay, Senecal, & Austin (2012)	*Job resources* include teachers' perception of decision latitude in the classroom, and the principle's leadership style. The first factor was assessed with a subscale of the Job Content Questionnaire. The second factor was measured by a scale adapted from the Supervisory Style Inventory.

Bakker, Hakanen, Demerouti, & Xanthopoulou (2007)	*Job demands:* classroom overload and students' disruptive behaviors. Classroom overload was measured with the Job Content Questionnaire. Perceptions of students' disruptive behavior were measured with the Pupil Behavior Pattern Scale. *Job demands:* the only job demand studied is student misbehavior. It was measured with a six-item adopted from Kyriacou and Sutcliffe (1978). *Job resources:* the six factors of job resource are job control, supervisor support, information flow in organization, organizational climate, innovativeness, and colleague's appreciation. The six factors were measured by a scale derived from the Healthy Organization Barometer.

CHAPTER III

RESEARCH METHODS

As summarized in Chapter I and II, SDT and the Job Demands-Resources model can be integrated as a conceptual framework to inform teacher motivation research. The framework postulates that (1) different job resources and job demands create different motivation contexts that influence teachers' choice of the motivation regulatory processes; (2) the regulatory processes in turn determine their motivation towards accomplishing the goals of schooling for physical education. Guided by this framework, an integrated hypothetical model (Figure 3.1) was proposed for this dissertation study to answer the question: To what extent would the perceived job demands and resources determine teachers' motivation regulatory processes and, ultimately, their motivation to teach physical education?

Figure 3.1 is a conceptual framework that integrates SDT and the Job Demand-Resource Model. There were four major components in the framework: regulating factors embedded in the working environment (job demands and resources), motivation regulatory processes (external regulation, introjected regulation, identified regulation and integrated regulation), teacher motivation towards standards-specified goals for physical education, and outcomes (the achievement of organizational goals). In this dissertation

study, the research focus was to test the tenability of using this theorized *a priori* model to explain physical education teacher motivation. Specifically, the relationship among the variables highlighted in the gray area, including job demands and resources, external regulation, introjected regulation, identified regulation, integrated regulation, and teacher motivation towards the goals of teaching learning-oriented and behavior-changing physical education, was to be determined.

Research Design

The theoretical elaboration in Chapter II calls for a better understanding of the influence of job demands and resources on teacher motivation through regulatory processes. The model consists of seven latent factors (in oval shapes) and their interrelationship is described with the directional links among them. The model was tested empirically by identifying worthwhile influential/impactful relationships among the latent factors and by determining its tenability in its original and/or alternative forms if necessary, and its theoretical and practical significance.

In the following sections, I describe (a) the research context (b) participants and recruitment strategies, (c) variables and instrumentation, (d) content validation, (e) data collection procedures and protocols, (f) data analysis plans, (g) measures to control potential threats to measure validity and reliability, and (h) outcome for the dissertation study.

Research Context

The study was conducted in the public schools of North Carolina and Maryland. To align physical education with the mission of K-12 education, the North Carolina

Department of Public Instruction (2011) published the North Carolina Healthful Living Essential Standards to guide physical education in a transition from the conventional sport or recreational based programming to a physical-activity-for-health programming. The goal of the standards is to facilitate public schools in North Carolina to provide physical education through "a sequential educational program that will involve learning a variety of skills that enhance a person's quality of life" and "sequential instruction to reduce risk-taking behaviors and encourage health-promoting behaviors among youth" (North Carolina State Department of Public Instruction, 2011, paragraph. 3). In addition to the mission statement, North Carolina Department of Public Instruction outlined detailed pedagogical content that students are required to learn throughout K-9 physical education. In the state of Maryland, the goals of physical education are also specified by the state-established standards – *Maryland State Content Standards* (Maryland State Department of Education, 2009). In the same vein, the standards place a heavy emphasis on facilitating students' usage of scientific principles in designing and adapting scientifically sound fitness and skill improvement plans. Under the content standards, detailed pedagogical contents and objectives are specified for each grade from pre-kindergarten to high school.

Because the two states share the same goals for public school physical education, it was assumed that their physical education teachers would face similar job demands. The state-issued standards in both states form the backdrop of the external regulation for physical education teachers, under which the standards-specified goals of teacher motivation could be specified for this study. These goals were teaching physical

education that advances students' knowledge, confidence, skills, and motivation needed to engage in a lifelong, healthy, active lifestyle

Research Participants and Recruitment Approaches

Participants of this dissertation study were certified physical education teachers from K-12 public school districts in North Carolina and Maryland. Certification to teach physical education and full-time employment in the school system were the sole screening criteria for participants. No other variables was used to screen and stratify the sample.

Because the study is correlational in nature, a large sample is necessary. Based on the number of items drafted for the Physical Education Teachers' Job Demands-Resources Scale (16 items job demands and 17 items for job resources), the study needed about 200 participants to test the Job Demand Scale and Job Resources Scale separately. The method used to determine this sample size is attached as Appendix B. Physical education teachers in all elementary, middle and high schools were contacted by using a recruitment email message (see Appendix C). In the recruitment message I gave a brief overview of the research and laid out data collection procedures with assurance of anonymity. The sample included a total of 193 certified physical education teachers. There were 109 female teachers (56%) and 84 male teachers (44%). All teachers were certified with at least a bachelor's degree, 83 (43%) held post-graduate degrees. Among the sample, 23 teachers (12%) had less than three years of teaching experiences; 114 teachers (59%) have 4-15 years of experiences, and 56 (29%) had more than 15 year of experiences.

Variables and Instrumentation

The study involved three groups of motivational variables: motivation regulatory processes, teacher motivation and perceptions of job demands and resources (see Figure 3.1). These variables were measured using survey methods.

Motivation Regulatory Processes

Based on SDT, there are four general motivation regulatory processes: external, introjected, identified, and integrated regulation. These regulation processes were operationalized as extrinsic motivation derived from external factors perceived by individuals as various forms of control (Deci & Ryan, 2012a). In research, motivation regulation processes were measured using the Work Extrinsic and Intrinsic Motivation Scale (WEIMS, Tremblay, Blanchard, Taylor, Pelletier & Villeneuve, 2009).

The WEIMS consists of 18 items on a 7-point Likert type scale with 1 indicating "Does not correspond at all" and 7 indicating "corresponds exactly". The 18 items are organized in six 3-item sets; each taps into a dimension of motivation specified in SDT, namely, amotivation, externally regulated motivation, introjected motivation, identified motivation, integrated motivation and intrinsic motivation. The respondents are asked to rate the extent to which each item is consistent with the reasons that they experience in their current work. The original WEIMS survey is attached as Appendix D.

To ensure its relevance to the dissertation study, I modified the WEIMS to reflect the unique characteristics of teaching physical education. The modified WEIMS asks the teachers to use the scale to indicate the extent to which each of the items corresponds to the reasons they are presently involved in their work. Specifically, the stem question of

the original WEIMS asks “why do you do your work”? The stem question of the modified WEIMS asked teachers “why do you teach physical education?” On a 5-point Likert scale, the choice items range from “agree strongly” to “disagree strongly.” In addition, the items of WEIMS were slightly changed according to the characteristics of physical education teachers’ working environment. For instance, “it (my work) is a part of the way in which I have chosen to live my life” is modified to “teaching physical education reflects the way in which I have chosen to live my life”. Because the focus of the study was on the relationship between teachers’ external regulatory processes associated with job demands and resources, the items regarding intrinsic motivation and amotivation were removed from the modified instrument.

The modified WEIMS went through content validation with a panel of four experts who were specialized in Self-Determination Theory. The selected experts published an average of seven SDT-based research articles on peer-reviewed journals in the past three years. All of the experts had published at least one review article on SDT-based empirical studies and an empirical research study that applied SDT in physical education setting. The experts rated the degree of consistency between the modified items and the dimensions that items represent on a 5-point scale (1 as “very inconsistent” and 5 as “very consistent”). Items that received an average rating lower than 3.00 out of 5.00 received substantial revision according to the panel’s suggestion. The content validation of the modified WEIMS received an average score of 3.96/5.00 from the expert panel. The modified WEIMS also went through construct validation with a sample of certified physical education teachers (n=193). The validation showed strong evidence

indicating acceptable content and construct validity for a three dimensions construct for regulatory processes (external regulation, introjected regulation and integrated regulation). The detailed results on the validation process of the modified WEIMS were reported in Chapter V.

Job Demands-Resources Scale

The job demands and resources measures for this study needed to be specific to physical education working environment. To reach this goal, I developed an instrument, named Physical Education Teachers' Job Demands-Resources Scale, to comprehensively measure job demands and resources embedded in physical education teachers' work environment. The instrument development went through three phases: item development, content validation and construct validation.

For item development, three dimensions of job resources and four dimensions of job demands were generated by using the DISC Questionnaire (de Jonge & Dormann, 2003) as a reference with a particular consideration of the unique characteristics of physical education teachers' working environment. Based on literature on physical education teaching environment, 36 items were drafted through in-depth deliberation. Special effort and attention were given to the consistence between the items and the dimensions they tend to measure. Table 3.1 illustrates the items under the three dimensions of job resources and four dimensions of job demands.

For content validation, an expert panel was selected based on knowledge about the Job Demands-Resources model. Five experts who had published studies on peer-reviewed scholarly journals using the Job Demands-Resources model were invited to

serve on the panel. The experts were asked to evaluate the consistency of the items with their respective dimensions and comment on the items. They were also invited to revise the items or write new items to replace those when necessary. According to the experts' feedback, revisions were made on the items and sent back to them for additional feedback. The two rounds of expert evaluation and revision yielded an average ratings of 3.6 on a five-point scale for the 36 items.

For construct validation, a split-sample method was applied to the sample of 193 certified teachers. Specifically, an exploratory factor analysis (EFA) was applied to the responses from one half of the sample on dimension identification and a confirmatory factor analysis (CFA) was conducted on the responses from the other half of the sample for dimension confirmation. Results from the EFA suggested the existence of a five-dimension construct structure – institutional resources, physical resources, cognitive demands, physical demands, and emotional demands. Results from the CFA reaffirmed the construct structure with high dimensional factor loadings (.47-.86) and model fit indexes (RMSEA .05). Detailed information about the instrument development processes of the Job Demands-Resources Scale is included in Chapter IV.

Teacher Motivation

In this study, teacher motivation was conceptualized as behaviors towards educational goals (Steers & Porter, 1983). Teachers' motivation was assumed through effort they invested in the behaviors that reflect the direction (work to reach the educational goals) and energy (ways teachers execute their teaching behaviors) in teaching. Based on the conceptualization, a survey called *Physical Education Teacher*

Motivation Survey was developed to measure teacher motivation. By using Rink's (2009) checklist for PE teachers' self-evaluation and the NASPE Appropriate Instructional Practice Guidelines (K-12) (SHAPE America, 2009) as references, we specified six domains in which physical education teachers might demonstrate teaching behaviors that represent different levels of motivation in daily teaching. These six domains are: (1) assessment, (2) learning environment, (3) teaching objectives, (4) pedagogical content (skills), (5) pedagogical content (knowledge), and (6) feedback to students. In each of the six domains, three items were developed to describe low, medium and high teacher motivation. For example, in Feedback dimension, the items are: (1) I give individualized and specific feedback to students (high effort/motivation); (2) I point out common mistakes and hope students to pay attention (medium effort/motivation); and (3) I encourage students by saying "good job" and give them a pat on the back (low effort/motivation). The survey asks teachers to rank the item most representative of his/her teaching behavior as 1, the item next representative of his/her teaching behavior as 2, and the item least representative of his/her teaching behavior as 3. The ranking scores relative to the motivation level of the items were aggregated to a combined dimension score to represent the teacher's level of motivation in the dimension. Table 3.2 presents the aggregated effort/motivation scores for all possible rank order combinations.

When all items for each dimension were written, they were sent to a group of expert (n= 5) who were specialized in motivation theories and physical education. The selected experts all had (1) experiences in training pre-service physical education teachers, (2) research experiences related to teaching learning-oriented and behavior-

changing physical education, and (3) solid training in motivation theories. We asked the expert panel to determine (a) how the items reflected effort/motivation levels a physical education teacher displays in daily teaching and (b) how the items were consistent with the dimensions under which they were written. Revisions were made until the panel members satisfied with the items. The items in the Teacher Motivation Survey received an average rating of 4.00 out of 5.00 with a standard deviation of .32. Detailed information about the development of Teacher Motivation Survey is included in Chapter V.

Teacher/School Demographic Information

In addition to teachers' motivation regulatory processes, teacher motivation and job demands and resources, teachers' demographic data, including gender, age, ethnicity, years of teaching experience, and the highest degree obtained, were collected along with the data gathered using the above instruments.

Data Collection Procedure and Protocol

The data collection was conducted using Qualtrics, an online platform for survey data collection. Procedures and protocols, including IRB protocols, were created and followed during the data collection process. Below are the details of the procedures that were followed in data collection.

Qualtrics

Qualtrics (Qualtrics Labs, Inc., Provo, UT) is an interface for designing, distributing and administering on-line surveys. It allows researchers to design surveys,

manage distribution of surveys through emails, keep track of participation rates, and collect survey responses as organized in designated formats for statistical analysis. Qualtrics provides researchers various options to format survey questions, including multiple choice, matrix table, text entry, rank order and many more. It allows subjects to choose single answer or multiple answers and to provide further explanation to their choices. With Qualtrics, researchers may organize survey questions into sets, called blocks. Questions can be organized in any given order, including randomizing the order of the questions within a block, and randomizing the orders of blocks. Qualtrics allows researchers to choose from various levels of survey protection. For instance, researchers may set survey as "open access" or "invitation only," which grants access only to individuals who received the links directly from Qualtrics. Researchers also can keep subjects from taking the survey more than once by enabling an option called "Prevent Ballot Box Stuffing."

As respondents progress through the survey, their responses were automatically saved in Qualtrics servers, with no need for them to click any button to save their responses. If the survey is not fully completed, the responses are stored as "Response in Progress" for a period of time. If respondents close their web browser without finishing the survey, the response stay in the state of "Responses in Progress" for the respondents to continue on the surveys. If the respondents do not come back to complete the survey, the response will be closed as-is and moved over to "Recorded Responses." If the respondents come back to resume the survey with the same computer, their previous survey progress will be automatically loaded by clicking the survey link. Once all survey

questions are answered, the responses are moved from the state of "Responses in Progress" to the state of "Recorded Responses," where they will be displayed in reports and in downloaded survey data. Researchers are allowed to set how long partial responses will remain in the state of "Progress in Progress" before being moved over to "Recorded Responses."

Qualtrics provides a function called "Forcing Response." Once the function is enabled, the respondents need to answer the question before they can progress to the next question. If they try to progress without answering the question, a message will remind them that they must answer the question to proceed. This function can effectively reduce missing data and make collecting on-line consent feasible. Once the data collection is over, the survey link can be deactivated. After the data are downloaded for analysis, the survey links can be deleted permanently.

Procedures for Obtaining IRB, School Approval and Subjects' Consent

Prior to the data collection, Institutional Review Board (IRB) application form was submitted to the Office of Research Integrity at the University of North Carolina Greensboro for review and approval. After the IRB application was approved by the Office of Research Integrity, proposals to conduct research in school districts were drafted based on school districts' requirements on external research. Specifically, applications for permission to conduct this research were submitted to 24 North Carolina school districts with all necessary forms completed. Upon receiving feedback from the school districts, revision of the research plan was made accordingly, and the revised applications were re-submitted to school districts. In the end, six school districts in North

Carolina approved the research plans and granted permission for data collection from their PE teachers. The IRB approvals and school districts' approvals were attached in Appendix E.

After the Office of Research Integrity at the University of North Carolina Greensboro reviewed this study, obtaining hardcopy consent from participating teachers and experts was waived. Instead, their consents were collected electronically through Qualtrics. Procedurally, the teachers and experts clicked the survey link sent to them through Qualtrics, they were led to a consent page with detailed information about this study and the completely voluntary nature of their participation in this study. The consent page presented information of the study with two check boxes in the bottom of the page. The first checkbox stated "I have read, understand and consent to participate in the study," and the second stated "I have read, understand and decline to participate in the study." By clicking the first checkbox, the respondent was led to the first survey question. By clicking the second checkbox, they were led to the end of the survey directly. The function of "forcing response" was activated for the consent page to assure that all subjects gave their consent choices before proceeding to the survey. The electronic consent forms were attached as Appendix F.

Data Collection

Data collection was conducted in two steps using Qualtrics. In the first step, data were collected from expert panels to validate the items developed for the Job Demands-Resources Scale and the modified WEIMS. Detailed instructions on how to validate the survey was provided in the beginning of each survey. For each item, experts were asked

to rate the consistency between the items and the dimension the item represents on a five-point Likert scale, which has 5 as “very consistent” and 1 as “very inconsistent.” The “forcing response” was used. A text box was provided for each item for the experts to give written feedback on the items, particularly the items that receive a score lower than 3. A survey link was created and sent to experts via email. After the content validation processes were finished, the entire links were deleted from Qualtrics.

In the second step, data were collected from physical education teachers in North Carolina and Maryland. The validated survey surveys were organized in Qualtrics into four blocks – teacher motivation, job demands and resources, motivation regulatory processes, and teacher’s demographic information.

It is widely recognized that the order of survey questions may influence subjects’ subsequent responses to survey items. Such a phenomenon, called priming, refers to an implicit effect wherein exposure to a stimulus influences subsequent responses to survey items (Bargh & Chartrand, 2000; Thush et al., 2007). Respondents who have been primed with a construct are more likely to report attitudes and behaviors that are consistent with the construct (Kawakami, Dovidio, & Dijksterhuis, 2003, Rodriguez, Neighbors, & Foster, 2014). To control for the potential influence of priming effect on teachers’ responses, items that ask for objective and factual information about teachers’ demographic information and working environment were placed after items that ask about teachers’ motivational dispositions and working environment. This order might prevent teachers from answering teacher motivation related questions based on their perceptions of their working environments. Specifically, the blocks were sequenced in

the following order: (1) the Teacher Motivation Survey, (2) the Modified WEIMS, (3) the Job Demands-Resources scale, and (4) teacher and school's demographic information. At the beginning of each block, the teachers were given a brief introduction on the theme of the block, the number of questions in the block and how long it would take to finish the block of survey. Within each block, the orders of items were randomized. The "forcing response" function was enabled throughout the survey. "Prevent Ballot Box Stuffing" option was enabled to prevent teachers from taking the survey more than once.

There were three approaches through which the survey links were emailed to teachers. First, for both North Carolina and Maryland, the survey link was sent to PE teachers through the state-wide professional organizations for physical education teachers. As a result, teachers who responded to the survey through this approach were members affiliated with these professional organizations. In Maryland, two reminders were sent to organization affiliated teachers. In North Carolina, one reminder was sent to organization affiliated teachers. Second, in five North Carolina school districts that approved this study, the survey link was sent to school districts' officials, including superintendent, and assistant superintendents, curriculum directors, physical education supervisors, who were responsible for physical education curriculum and instruction,. Except for one North Carolina school district that sent the link to teachers only once, other districts sent the link twice. Third, the researcher sent the link to teachers directly. Only one North Carolina school district specified that the survey link to be sent to teachers via this method. During the two weeks' time after the link was sent to teachers, two reminder emails were sent to the teachers to encourage them to complete the survey.

Two weeks after the survey links were sent to the teachers, the survey links were deactivated, data were downloaded, and the survey links and data files were deleted permanently.

Data Analysis

Prior to data analysis, the multivariate normality and multicollinearity were assessed to determine whether these assumptions were violated for SEM analysis. Descriptive statistical analyses were conducted to describe the central tendency and variability for job demands and resources, external regulation, introjected regulation, identified regulation, integrated regulation and teacher motivation. After these preliminary analyses, the data analyses were conducted in two stages to (1) instrument validation analysis for the Job Demands-Resources Scale, results were reported in Chapter IV and (2) the instrument validation analysis for the modified WEIMS and the Teacher Motivation Survey, and the structural equation modeling analysis to answer the research question: to what extent the perceived job demands and resources determine teachers' motivation regulation processes and their motivation? The findings were reported in Chapter V.

In Stage One, the analysis was focused on validating construct for job demands and resources. This main purpose of the data analysis was to determine the construct validity of the Job Demands and Resources Scale through identifying the strength of the link between items and the underlying constructs the items were designed to measure in the scale. In Stage Two, the purpose of the analysis was to test the *a priori* model (Figure

3.1) that depicted a directional relationship among teacher perceptions of job demands resources, motivation regulatory process and motivation.

Stage 1: Examining Construct Validity

Construct validity refers to "the extent to which the new questionnaire conforms to existing ideas or hypotheses concerning the concepts (constructs) that are being measured" (Greco, Walop, & McCathy, 1987, p. 699). Exploratory factor analysis (EFA) and Confirmatory factor analysis (CFA) are the common analytical approaches to construct validity evidence. EFA is used to identify the relationship among variables without an ascertained hypothetical model (Bryman & Cramer, 2005). EFA does not require *a priori* and allows for new insights from the statistical processes to be accounted for in the possible models. However, the models generated through EFA could be sample-sensitive in that the models may not apply to other samples. CFA is often used to address this weakness of EFA by confirming the model-data fit between the *a priori* and a new set of data.

CFA is a factor analysis approach to the construct validity of a measure with *a priori* model. It provides an indication of overall fit and precise criteria for assessing convergent and discriminant validity. CFA is used to reduce the number of observed variables into latent factors. CFA differs from EFA in that it assists the reduction of measurement error and allows for the comparison of alternative models at the latent structural level (McArdle, 1996). Thus, CFA is often used to validate the construct validity when the construct model presents an ascertained structure either by a theory or by a pre-conducted EFA procedure.

To examine the degree to which the measurement for two sets variables – job demands and resources – are relevant to their conceptual frameworks, EFA and CFA were adopted to test the Job Demands and Resources Scale only because it was the only new instrument developed for this dissertation study. CFA was applied to test WEIMS' factor structures because the measurements of motivation regulatory processes were adopted from established instruments. Because the Teacher Motivation Survey was not in Likert-scale format and all items in all dimensions were aggregated into a single measure of motivation (no multi-dimensional structure to be tested), only content validation was conducted through the expert panel.

To validate the Job demands-Resources Scale the sample of certified teachers was randomly divided into two equal-sized samples – Sample 1 and Sample 2 – to perform EFA and CFA respectively. First, an EFA with maximum likelihood extraction and oblique rotation was conducted with Sample 1. Second, a CFA compared the model obtained from EFA and the specified second-order measurement model on Sample 2 to determine whether the model identified by EFA and the specified measurement model would be replicated and fitted with data from Sample 2. At the same time, CFA was applied to items used to measure motivation regulatory processes to test whether the data fit their hypothesized measurement model. For the CFA, each item was allowed to load on its associated factor as it was specified by the measurement models. And the factors were allowed to correlate. As Kline (2011) notes, "there is no statistical gold standard in SEM that automatically and objectively leads to the decision about whether to reject or retain a particular model" (p. 190). For this study, multiple statistical measures of

modeling fitting were adopted [χ^2, the Comparative Fit Index (CFI; acceptable > .90, good fit > .95; Bentler, 1990), the Root Mean Square Error of Approximation (RMSEA; acceptable < .08, good fit < .05; Browne & Cudeck, 1993), and the Standardized Root Mean Square Residual (SRMR; adequate < .08; Hu & Bentler, 1999)]. The detailed information about fitting indices used for construct validation were included in Appendix G.

Stage 2: Data Reduction

In this stage, data were first reduced into latent variables of motivation regulatory processes, job demands and resources, and teacher motivation. For motivation regulatory processes, a sum score was calculated in each regulatory process that has valid construct. For job demands and resources, data reduction was performed on the valid items and their respective constructs (dimensions) determined in the construct validation. According to the construct validation results, a sum score from all remaining items in each retained dimension of job demands and resources was used to represent the perception of the corresponding demands or resources. For teacher motivation, the sum of all aggregated scores from all six dimensions was used to represent teacher motivation.

Stage 3: SEM Model Testing

A full latent variable model – the *a priori* model (Figure 3.1) that represent the specification of regression structure among the three sets of latent variables – was tested with the full set of data using the path analysis algorithm. When the model-data fit indices were determined acceptable, the construct of the SEM model was retained. If the model accepted was the integrated *a priori* model, a decision was made to support the

model as it accurately reflected the relationship among latent variables (teachers' working environment, motivation regulatory processes and teacher motivation). Then, teachers' demographic information, including gender, age and education levels, were included in the *a priori* model as control variables on teacher motivation. It was to see whether the SEM-revealed relationship among the latent variables stands by holding these demographic variables constant. If the *a priori* model was not accepted, efforts were made to seek alternative models. In this case, the analysis was conducted on the alternative model to determine whether the model modification was consistent with the conceptualization of the existing literature. An outcome model was determined when it was determined it is both theoretically relevant and statistically sound. The same set of indices [χ^2, the Comparative Fit Index (CFI; acceptable > .90, good fit > .95; Bentler, 1990), the Root Mean Square Error of Approximation (RMSEA; acceptable < .08, good fit < .05; Browne & Cudeck, 1993), and the Standardized Root Mean Square Residual (SRMR; adequate < .08; Hu & Bentler, 1999)] was used to evaluate the structure of the full SEM model.

Potential Threats to Internal/External Validity

Validity refers to the extent that researcher can make inferences or conclusions based on the research design and implementation. External validity refers to the extent to which research results can apply to other populations or beyond the studied context. Internal validity is the accuracy of the measures of the variables.

Due to the procedure through which the data were collected, the results of this study is subjected to potential sampling biases. I acknowledged that the results of this

study could be subjected to the threat of selection bias, as all the teachers participated in this study on a voluntary basis. Thus, certain groups of teachers could be more likely to respond to the survey than others due to selection biases. Particularly, it is highly likely that a group of teachers who were more conscious about their working environments and teacher motivation related issues had a higher response rate. For instance, teachers who had low job resources and high job demands could be more eager to report their harsh working environment than teachers who had access to abundant resources. Because the survey was sent to teachers via state-wide professional organizations and motivated teachers are more likely to be members of professional organizations, the self-selection process might render more motivated teachers in the sample than less motivated teachers. The self-selection process might result in a potentially biased sample with more motivated teachers. In addition, the data for this study were collected from two coastal states where the state-established standards dictate the direction of teacher motivation. Although the NASPE National Standards (2008) have been widely recognized by researchers in this realm as the "golden standards" for the profession, the consistency between the national standards and state policies varies across states. Thus, generalizing the results of this study to the entire population of physical education teachers needs particular caution due to this limitation. The results of this study could also face two threats to internal validity: (1) socially desired responses to internal validity (especially on teacher motivation measures), and (2) access to the survey link. To address the threat of socially desired responses, I explained to the teachers that the results of the study would be completely anonymous as an attempt to motivate teachers to score the survey

faithfully in the consent form. Because the study posed minimal risk and benefit to the teachers, there were no obvious reasons for teachers to report socially desired answers. Research conducted through on-line survey often faces threat of access control. For instance, the survey link could be posted to public forum and stuffed ballot with bogus-answers. Survey research also faces the threat of priming effect. To address the issue of access control, the survey was programmed as "invitation only." Only teachers who received the survey link through emails could have access to the survey. The option of "Prevent Ballot Box Stuffing" was enabled to allow teachers to complete the survey only once. To minimize the influence of priming effect, questions that asked for subjective answers, including motivation regulatory processes and teacher motivation, were placed at the beginning of the survey.

Outcomes of the Dissertation Study

The results of the dissertation study generated two independent but related manuscripts (see Chapter IV and V). Each manuscript constitutes a chapter that includes an Introduction, Methods, Results, Discussion and Conclusion. Chapter IV reports the process through which the Job Demands-Resources Scale was developed to assess physical education teachers' working environment. Chapter V reports the result of the testing procedure of the *a prior* model (Figure 3.1) that was theorized as to describe the relationship among job demands and job resources, regulatory processes and teacher motivation.

The dissertation ends with Chapter VI. As the conclusion chapter, it provides a brief summary of the studies that integrates findings from both Chapter IV and Chapter

V. It assesses the significance of the research and provides directions for future research and implications of the findings.

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Appendix A

Figures and Tables

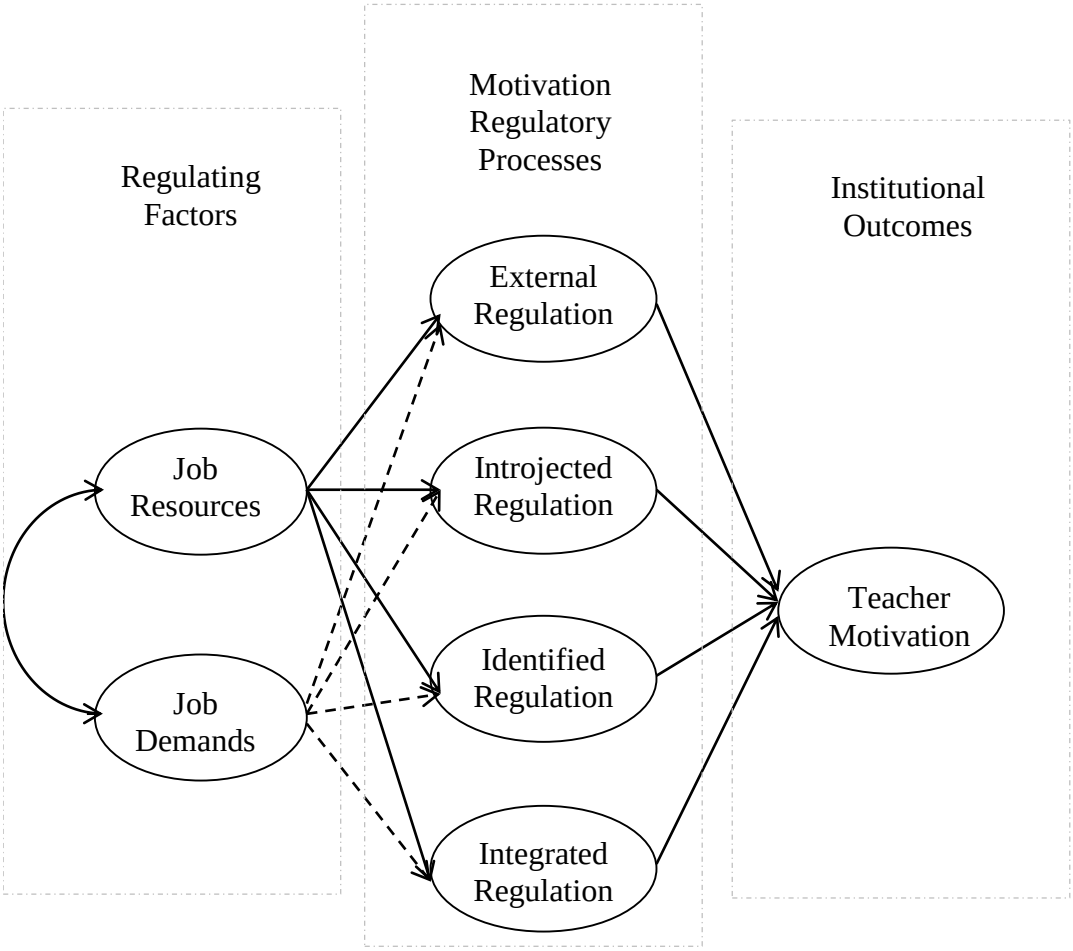


Figure 3.1 The Integrated Model that Combines SDT with the Job Demands-Resources Model.

Table 3.1

Job Demands and Resources Scale (1st draft)

Dimensions	Items
Physical Resources	1. Annual budget for PE department
	2. The available indoor facilities for teaching PE
	3. The available outdoor facilities for teaching PE
	4. Access to personal computer
	5. Financial support for teachers to attend professional conferences
	6. Access to various technologies for teaching PE
	7. Access to sufficient equipment
Organizational Resources	1. Access to professional development opportunities
	2. Opportunities to participate in decision making in school
	3. Opportunities to receive teaching advice from colleagues
	4. Having achievement in teaching PE recognized by the school
Social Resources	1. Support from other teachers at the school
	2. Administrator's recognition of the significance of PE
	3. Students value PE
	4. Parents support PE

Physical	1. Sizes of class
Demands	2. Class preparation time
	3. Equipment
	4. Distraction caused by sharing teaching facilities
Emotional	1. Distress caused by students' disruptive behaviors
Demands	2. Distress resulted from trying to fulfill state/district standards
	3. Distress from having school administrators intervene in one's teaching
	4. Distress resulted from teaching unmotivated students
	5. Distress resulted from teaching students with special needs
Cognitive	1. The challenge of planning lessons based on standards
Demands	2.The challenge of planning lessons to meet students' needs
	3.The challenge to teach lessons that facilitate students' adoption of active lifestyle
	4. Challenge to provide immediate feedback to individual students
	5. Challenge to cope with teacher accountability system
Cognitive Job Demands	1. Carrying different roles in addition to teaching responsibilities

2. Having inadequate instruction time on the school level

3. Having interruptions caused by unrelated school events

4. Having policies that grant students waivers to replace PE with other unrelated activities.

Table 3.2

Statement Ranking and Dimension Scoring for Teacher Motivation

Item 1 High Effort	Item 2 Medium Effort	Item 3 Low Effort	Total Dimension Score
1	2	3	6
1	3	2	5
2	1	3	4
2	3	1	3
3	1	2	2
3	2	1	1

Note: The scoring system is used to score all six teacher motivation dimensions.

Appendix B

Determination of the Minimum Sample Size

This dissertation research adopted factor analysis to validate the construct of the Job Demands-Resources survey. Factor analysis is generally performed with large samples. For EFA, the highest subject to item ratio (*N/p*) is suggested to minimize the chance of over-fitting the data (Winter, Dodou, & Wieringa, 2009). Early researchers recommended that the subject to item ratio (*N/p*) ranges from 3:1-6:1 (Cattell, 1979) to 20:1 (Hair, Anderson, Tatham, & Grablowsky, 1979). Recent research indicates that there are no absolute thresholds that contribute to factor recovery in EFA. Instead, the minimum sample size is a function of several parameters: the level of communities, loadings, numbers of variables per factor and the number of factors (Gagne & Hancock, 2006; MacCallum, Widaman, Preacher, & Hong, 2001; MacCallum, Widaman, Zhang & Hong, 1999; Marsh, Hau, Balla, & Grayson, 1998; Velicer & Fava, 1998). Specifically, factor recovery improves as (a) sample size increases, (b) communalities increase, and (c) the number of variables per factor (p/f) increases (MacCallum et al., 1999). After surveying two years' research articles on PsychINFO (n=303), Costello and Osborn (2005) reported that 62.9% research performed EFA with the subject to item ratios of 10:1 or less, and 78.6% of studies conducted EFA with the subject to item ratios less than or equal to 20:1. Thus, in practice, the subject to item ratios (*N/p*) of 10:1 is still the prevalent rule-of-thumb (Winter, Dodou, & Wieringa, 2009). For this study, there are 16 and 17 items proposed for job resources and demands respectively. For *N/p* to reach the

prevalent rule of 10:1, a minimum sample size of 170 is needed for conducting EFA for job demands and resources separately.

Appendix C

Recruitment Letter to Teachers

Tan Zhang
Department of Kinesiology
University of North Carolina at Greensboro
Greensboro, NC 27412

Dear [Mr. / Ms. LAST NAME],

I am a Ph.D. student in the Department of Kinesiology at the University of North Carolina Greensboro. I am currently conducting my dissertation study. The purpose of this research study is to investigate the working environment of physical education teachers and its influence on teacher motivation, particularly under the recently issued *North Carolina Healthful Living Standards*. The ultimate goal of this study is to improve working environment for physical education teachers, raise the *status quo* of physical education in public schools and raise awareness of the potential contribution that physical education can make to students' health.

As a certified physical education teacher, you are automatically eligible for this study. To participate in this study, you will be asked to take an on-line survey, which may take around 20 minute. By clicking the link below, you will be lead to the on-line survey. If you prefer, you may also choose to finish the survey in hard copy by contacting me.

The survey link: _____

If you are interested in learning more about this study, please contact me via email (t_zhang@uncg.edu). You can also call me at 336-456-7641.

It is important to know that this letter is not to tell you to join this study. Your participation in this study is completely voluntary. The information regarding your participation in the study will be held confidential. Your response to the survey will be keep anonymously.

Thank you for your time and consideration. I look forward to hearing from you.

Sincerely,

Tan Zhang

Pedagogical Kinesiology Lab

Department of Kinesiology

Approved IRB
2/12/15

Appendix D

The Original WEIMS

Why Do You Do Your Work?

Using the scale below, please indicate to what extent each of the following items corresponds to the reasons why you are presently involved in your work

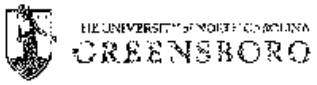
Does not correspond at all			Corresponds moderately			Corresponds exactly
1	2	3	4	5	6	7

1. Because this is the type of work I chose to do to attain a certain lifestyle.	1	2	3	4	5	6	7
2. For the income it provides me.	1	2	3	4	5	6	7
3. I ask myself this question, I don't seem to be able to manage the important tasks related to this work.	1	2	3	4	5	6	7
4. Because I derive much pleasure from learning new things.	1	2	3	4	5	6	7
5. Because it has become a fundamental part of who I am.	1	2	3	4	5	6	7
6. Because I want to succeed at this job, if not I would be very ashamed of myself.	1	2	3	4	5	6	7
7. Because I chose this type of work to attain my career goals.	1	2	3	4	5	6	7
8. For the satisfaction I experience from taking on interesting challenges	1	2	3	4	5	6	7
9. Because it allows me to earn money.	1	2	3	4	5	6	7
10. Because it is part of the way in which I have chosen to live my life.	1	2	3	4	5	6	7
11. Because I want to be very good at this work, otherwise I would be very disappointed.	1	2	3	4	5	6	7
12. I don't know why, we are provided with unrealistic working conditions.	1	2	3	4	5	6	7
13. Because I want to be a "winner" in life.	1	2	3	4	5	6	7
14. Because it is the type of work I have chosen to attain certain important objectives.	1	2	3	4	5	6	7
15. For the satisfaction I experience when I am successful at doing difficult tasks.	1	2	3	4	5	6	7
16. Because this type of work provides me with security.	1	2	3	4	5	6	7
17. I don't know, too much is expected of us.	1	2	3	4	5	6	7
18. Because this job is a part of my life.	1	2	3	4	5	6	7

Note. Intrinsic motivation = 4,8,15; integrated regulation = 5,10,18; identified regulation = 1,7,14; introjected regulation = 6,11,13; external regulation = 2,9,16; amotivation = 3,12,17.

Appendix E

IRB and School Districts' Approvals



THE UNIVERSITY of NORTH CAROLINA
GREENSBORO

OFFICE OF RESEARCH INTEGRITY
2718 Beverly Cooper Moore and Irene Mildred Moore
Humanities and Research Administration Bldg.
PO Box 26170
Greensboro, NC 27402-6170
336.256.0260
Website: www.uncg.edu/ori
Federalwide Assurance (FWA) #218

To: Tan Zhang
Kinesiology, Dept of
[illegible] GREENSBORO, NC 27410

From: UNCG IRB

Authorized signature on behalf of IRB

Approval Date: 3/13/2015
Expiration Date of Approval: 2/11/2016

RE: Notice of IRB Approval by Expedited Review (under 45 CFR 46.110)
Submission Type: Initial
Expedited Category: 7.Surveys/interviews/focus groups
Study #: 15-0038
Study Title: Understanding Physical Education Teacher Motivation in Relation to Job Resources and Demands.

This submission has been approved by the IRB for the period indicated. It has been determined that the risk involved in this research is no more than minimal.

Study Description:

Using a theoretical model by integrating the Self-Determination Theory and the Job Demands-Resources model, the study intends to collect and analyze self-reported data regarding teacher motivation, regulatory processes, job demands and resources for physical education teachers in public schools.

Instrument that is based on the Job Demands-Resources model will be developed to measure job demands and resources in physical education teachers' working environment. Instruments that are based on the integrated theoretical model will be chosen to specifically measure regulatory processes and teacher motivation for physical education teachers. Data will be collected from 17 school districts in North Carolina through an on-line survey tool. Statistic techniques, including multiple regression analysis and structural equation modeling, will be applied to investigate the relationships between teacher motivation, regulatory processes, job demands and resources.

Regulatory and other findings:

- This research meets criteria for waiver of a signed consent form according to 45 CFR 46.117(c)(2). A consent form must still be presented for the participants to read and review, however, they do not need to sign the consent form.
- **Your study is contingent upon approval from another site (school districts). You will need to submit a modification at the time you receive that approval.**

Investigator's Responsibilities

Federal regulations require that all research be reviewed at least annually. It is the Principal Investigator's responsibility to submit for renewal and obtain approval before the expiration date. You may not initiate any research activity beyond the expiration date without IRB approval. Failure to receive approval for continuation before the expiration date will result in automatic termination of the approval for this study on the expiration date.

Signed letters, along with stamped copies of consent forms and other documents materials will be scanned to you in a separate email. **Stamped consent forms must be used unless the IRB has given you approval to waive this requirement.** Please notify the ORI office immediately if you have an issue with the stamped consents forms.

You are required to obtain IRB approval for any changes to any aspect of this study before they can be implemented (use the modification application available at http://integrity.uncg.edu/institutional-review-board/). Should any adverse event or unanticipated problem involving risks to subjects or others occur it must be reported immediately to the IRB using the "Unanticipated Problem--Adverse Event Form" at the same website.

Please be aware that valid human subjects training and signed statements of confidentiality for all members of research team need to be kept on file with the lead investigator. Please note that you will also need to remain in compliance with the university "Access To and Retention of Research Data" Policy which can be found at http://policy.uncg.edu/research_data/.

CC:
Ang Chen, Kinesiology, Dept of

Cumberland County Schools
P.O. Box 2357
Fayetteville, North Carolina 28302
910-678-2300

Date: March 30, 2015

To: Tan Zhang

From: Ron Phipps, Associate Superintendent
Evaluation and Testing

Study: *Understanding Physical Education Teacher Motivation in Relation to Job Resources and Demands*

Your human subject research proposal has been reviewed and approved by the Cumberland County Schools' Research Committee.

The Research Committee approved your request to conduct your research under the conditions that you comply with Cumberland County Policy 5230: ICC and Research Project Guidelines. Please keep in mind that participation is voluntary and instructional time is not to be interrupted.

Congratulations and best wishes with your research project.

Sincerely,

Ron Phipps, Associate Superintendent
Evaluation and Testing

Guilford County Schools

March 20, 2015

Tan Zhang
2205 New Garden Road Apt. 2103
Greensboro, NC 27410

Re: 141533

Dear Tan Zhang:

The Guilford County Schools Research Review Committee has concluded that your proposal *Understanding Physical Education Teacher Motivation in Relation to Job Demands and Resources* meets the requirements of state legislation and the current research policy of Guilford County Schools.

Committee approval does not guarantee access to schools or to individuals, nor does it imply that a study can or will be conducted. School principals make the final decision regarding the participation of their school in the research. Teachers decide independently whether they wish to participate and they may withdraw at any time. The committee expects that the identities of individuals, schools, and the district will remain anonymous throughout all stages of the project.

Please present this letter upon initial contact with principals. Thank you.

Sincerely,

Carolyn Gilbert
Co-Chair, Research Review Committee

PROCEDURE 9.101-P
Page 4

REQUEST TO CONDUCT RESEARCH STUDY OR SPECIAL PROJECT

I agree to furnish Pitt County Schools a copy of the results of this research study or special project.

Tan Zhang — Signature of Person Making Request
3/27/2015 — Date

2205 New Garden Rd. Apt 203
Greensboro, NC 27410
Address

Signature of Supervising Professor
University of North Carolina Greensboro
University/College/Organization

t_zhang@uncg.edu / 336-456-7641
Telephone Number/E-Mail Address

336-256-8566 / a_chen@uncg.edu
Telephone Number/E-Mail Address

(For Office Use Only)

Project Approved ✓
Project Disapproved _____
Referred to _____

Signature of Superintendent/Designee
4/1/15

To: Whom It May Concern

From: Jill Y. Reinhardt, Ed. D.

Date: June 1, 2015

RE: "Understanding Physical Education Teacher Motivation in Relation to Job Resources and Demands."

We approve for Tan Zhang to use Surry County Schools District's data and information in the dissertation study "Understanding Physical Education Teacher Motivation in Relation to Job Resources and Demands."

OFFICE OF THE SUPERINTENDENT
209 North Crutchfield Street / Post Office Box 364 / Dobson, North Carolina 27017 / 336.386.8211 / 336.386.4279 fax

P.O. Box 2513 • Winston-Salem, NC 27102-2513

WS/FCS
Winston-Salem / Forsyth County Schools

Project ID 2015-46

Approval Form for Research Project to be conducted in the Winston-Salem/Forsyth County Schools

Name of Principal Investigator: Tan Zhang

Advisor's Name (if student): Ang Chen

Research/Educational Institution: UNCG

Research Title: Understanding Physical Education Teacher Motivation in In Job Resources and Demands.

The above project has been approved by the Winston-Salem/Forsyth County Schools Administrative Offices. Stipulations to this approval, if any, are noted below. *The investigator understands that the principals have the authority to grant or deny permission for the study to be conducted in their schools.*

Project Timeline: May 2015 - Aug 2015

Stipulations:

Data Confidentiality Form Needed? (Check if yes) :

Marty Ward, Ph.D.
WS/FCS Research & Evaluation

May 24 , 2015
Date

Yadkin County Schools
Learn Today, Lead Tomorrow

March 31, 2015

Tan Zhang
2205 New Garden Road
Apartment 2103
Greensboro, North Carolina 27410

Dear Tan Zhang:

The Yadkin County Schools Research Review Committee has met and reviewed your research proposal *Understanding Physical Education Teacher Motivation in Relation to Job Demands and Resources* and has concluded that is meets the requirements of Yadkin County School Board Policy 5230, Participation in Research Projects.

Please understand that committee approval does not guarantee access to schools or to individuals, nor does it imply that a study can or will be conducted. School principals make the final decision regarding the participation of their individual schools in research. Additionally, teachers decide independently whether they wish to participate and they may withdraw at any time. Also, the committee requests that the identities of individuals, schools, and the Yadkin County Schools district will remain anonymous throughout all stages of the project.

As you contact principals to discuss the research project, please provide them with a copy of this letter. Thank you and best wishes as you work to complete your research.

Respectfully,

Todd Martin
Superintendent

www.yadkin.k12.nc.us
121 WASHINGTON STREET • YADKINVILLE, NORTH CAROLINA 27055
TELEPHONE: (336) 679-2051 • FAX: (336) 679-4013

Appendix F

Experts and Teachers' Consent Forms

Research Information and Consent Form

Principal Investigator: Tan Zhang; Telephone: (336)456-7641; Email: t_zhang@uncg.edu
Faculty Advisor: Ang Chen, Telephone: (336)256-8566; Email: a_chen@uncg.edu
University of North Carolina at Greensboro

Research Project Name: Developing a Psychometric Instrument to Evaluate Job Demands and Resources for Physical Education Teachers.

To be completed by researchers participants aged 18 years and above.

The purpose of the study is to develop a psychometric instrument to evaluate the working environment of physical education teachers with the Job Demands-Resource model. As an expert who had used this model for research, you are invited for participating in this study.

You will not get paid for participating in this study. However, through developing the instrument, the study can benefit the society on 1) evaluating the job resources and demands that could influence physical education teachers' motivation; 2) generating insights on the optimal working environment for physical education teachers. Thus, this study has the potential of improving the status and working environment of physical education teachers.

As an expert of the Job Demands-Resources model, you will be asked to evaluate the content validity of the initial draft of the Job Demands-Resources survey, which may take you about 30 minutes to finish. This study will use Qualtrics to collect data through internet. In completing the on-line survey, you will be asked to rate the consistency between the items and the dimension it represents on the five-point Likert scale, which has five as "very consistent" and one as "very inconsistent," and comment on the items if necessary. Participation in this study will not cause stress, pain, or any other unpleasant reaction to those agreeing to participate. Participation in this study does not involve audio/video recording. You may chooose not to respond to any question that you do not wish to answer. The Institutional Review Board at the University of North Carolina at Greensboro has determined that participation in this study poses minimal risk to you as participant.

All information obtained in this study is strictly confidential unless disclosure is required by law. To prevent breach of confidentiality, following procedures will be taken: 1) Once the data is downloaded from Qualtrics, the survey link and data file will be deleted from my Qualtrics account permanently. 2) The downloaded data file will be saved in a password protected computer in an electronically-keyed research laboratory on the campus of the University of North Carolina Greensboro. Only personnel listed on this IRB protocol will be granted login credentials to access the computer where the data is stored. No copies of the data will be distributed to anyone not listed on this IRB protocol. 3) Personal and institutional identification information will be removed from the data set and replaced using identification codes. The identification codes rather than the personal and institutional names will be used throughout the research to maintain researchers' confidentiality. 4) The key that links the personal and institutional information and identification codes will be saved in another password-protected

computer in the same keyed laboratory. This study will use Qualtrics to collect on-line survey data. Qualtrics provides a promise to protect your data and adhere to industry standards. Absolute confidentiality of data provided through the Internet cannot be guaranteed due to the limited protections of internet access. Please be sure to conduct content validation in a private setting and close your browser when finished, so no one will be able to see what you have been doing.

You may print this page out or save this page for your own record. For more information about the procedures of the study, you may contact Tan Zhang at 336-456-7641 or Dr. Ang Chen at 336-256-8566.

You have the right to refuse to participate or to withdraw at any time, without penalty. If you do withdraw, it will not affect you in any way. If you choose to withdraw, you may request that any of your data which has been collected be destroyed unless it is in a de-identifiable state. The investigators also have the right to stop your participation at any time. This could be because you have had an unexpected reaction, or have failed to follow instructions, or because the entire study has been stopped. If significant new information relating to the study becomes available which may relate to your willingness to continue to participate, this information will be provided to you.

If you have any concerns about your rights, how you are being treated or if you have questions, want more information or have suggestions, please contact Office of Research Integrity at UNCG at (336) 256-1482.

By signing this consent form, you are agreeing that you read, or it has been read to you, and you fully understand the contents of this document and are openly willing consent to take part in this study. All of your questions concerning this study have been answered. By signing this form, you are agreeing that you are 18 years of age or older and are agreeing to participate, or have the individual specified above as a participant participate, in this study described to you by Tan Zhang.

Signature: _____ Date: _____

Approved IRB
2/13/15

Research Information and Consent Form

Principal Investigator: Tan Zhang; Telephone: (336)456-7641; Email: t_zhang@uncg.edu
Faculty Advisor: Ang Chen, Telephone: (336)256-8566; Email: a_chen@uncg.edu
University of North Carolina at Greensboro

Research Project Name: Understanding Physical Education Teacher Motivation in Relation to Job Resources and Demands.

To be completed by certified physical education teachers participants aged 18 years and above.

The purpose of the study is to investigate the relationship among physical education teachers' job demands and resources, regulatory processes and teacher motivation. As a certified physical education teaching in North Carolina public schools, you are invited to participate in this study. Your participation is voluntary.

You will not get paid for participating in this study. However, through investigating the relationship among teachers' job demands and resources, regulatory processes, and teacher motivation, the study can benefit the society on 1) identifying the job resources and demands that could influence physical education teachers' motivation; 2) generating insights on the optimal working environment for physical education teachers. Thus, this study has the potential of improving the status and working environment of physical education teachers.

The study is survey-based research. As a participant, you will answer an on-line survey, which may take you about 45 minutes to finish. Participation in this study will not cause stress, pain, or any other unpleasant reaction to those agreeing to participate. Participation in this study does not involve audio/video recording. The Institutional Review Board at the University of North Carolina at Greensboro has determined that participation in this study poses minimal risk to you as participant. In completing the on-line survey, you will be asked to report regulatory processes, workplace motivation and how you perceive your working environment in terms of job demands and resources. You may chooose not to respond to any question that you do not wish to answer. Thereofre, the potential risk would be resulted from breach of confidentiality, especially releasing the information to participants' employers.

All information obtained in this study is strictly confidential unless disclosure is required by law. To prevent breach of confidentiality, following procedures will be taken to maintain confidentiality. 1) Once the data is downloaded from Qualtrics, the survey link and data file will be deleted from my Qualtrics account permanently. 2) The downloaded data file will be saved in a password protected computer in an electronically-keyed research laboratory on the campus of the University of North Carolina Greensboro. Only personnel listed on this IRB protocol will be granted login credentials to access the computer where the data is stored. No copies of the data will be distributed to anyone not listed on this IRB protocol. 3) Personal and institutional identification information will be removed from the data set and replaced using identification codes. The identification codes rather than the personal and institutional names will be used throughout the research to maintain teachers' confidentiality. This study will use Qualtrics to collect on-line survey data. Qualtrics provides a promise to protect your data and adhere to

industry standards. Absolute confidentiality of data provided through the Internet cannot be guaranteed due to the limited protections of internet access. Please be sure to close your browser when finished so no one will be able to see what you have been doing.
You may print this page out or save this page for your own record. For more information about the procedures of the study, you may contact Tan Zhang at 336-456-7641 or Dr. Ang Chen at 336-256-8566.

You have the right to refuse to participate or to withdraw at any time, without penalty. If you do withdraw, it will not affect you in any way. If you choose to withdraw, you may request that any of your data which has been collected be destroyed unless it is in a de-identifiable state. The investigators also have the right to stop your participation at any time. This could be because you have had an unexpected reaction, or have failed to follow instructions, or because the entire study has been stopped. If significant new information relating to the study becomes available which may relate to your willingness to continue to participate, this information will be provided to you.

If you have any concerns about your rights, how you are being treated or if you have questions, want more information or have suggestions, please contact Office of Research Integrity at UNCG at (336) 256-1482.

By participating in the survey, you are agreeing that you read, or it has been read to you, and you fully understand the contents of this document and are openly willing consent to take part in this study. All of your questions concerning this study have been answered. By participating in the survey, you are agreeing that you are 18 years of age or older and are agreeing to participate, or have the individual specified above as a participant participate, in this study described to you by Ang Chen.

Appendix G

Indices for Evaluating Model Fit

First, the model chi-square x_M^2 was used to test the exact-fit hypothesis or the prediction that there are no discrepancies between the sample covariances and those predicted by the model. Although the χ^2 model fit index was calculated, the model-data fit evaluation relied on the following additional approaches and corresponding indexes due to the high sensitivity of χ^2 with sample size.

Second, the Bentler Comparative Fit Index (CFI) is an incremental fit index that measures the relative improvement in the fit of the proposed model over that of a baseline model. The formula for CFI's calculation is CFI=1-$\frac{x_M^2 - df_M}{x_B^2 - df_B}$. In the formula, $x_M^2 - df_M$ indicates the chi-square noncentrality parameter for the hypothesized model; while $x_B^2 - df_B$ indicates the chi-square noncentrality parameter for the baseline model. For CFI, Bentler's criterion (1990) was used: acceptable > .90 and good fit > .95.

Thirdly, as a badness-of-fit and parsimony-adjusted index, the Mean Square Error of Approximation (RMSEA) was chosen to evaluate model fit. The formula for RMSEA's calculation is RMSEA = $\sqrt{\frac{x_M^2 - df_M}{df_M(N-1)}}$. It estimates the amount of error of approximation per model degree of freedom and takes sample size into account. The criterion to be used for RMSEA is based on Browne and Cudeck (1993) recommendations; acceptable < .08, good fit < .05; excellent fit <.02.

Fourthly, the Akaike Information Criterion (AIC) was used to compare the models (Akaike, 1987). By taking statistical goodness-of-fit and the number of estimated

parameters into account, AIC addresses the issue of parsimony in the assessment of model fit. Models with lower AIC values are considered to have a better fit. It can be used to evaluate models that are not nested with each other. It reflects the extent to which parameter estimates from the original sample will cross-validate in future samples (Bandalos, 1993).

Finally, the Standardized Root Mean Square Residual (SRMR) – a measure of the mean absolute covariance residual – was used to evaluate model fit. SRMA is a measure of the mean absolute correlation residual, the overall difference between the observed and predicted correlation. The criterion recommended by (Hu & Bentler, 1999) was used: SRMR $\leq$ .08 for acceptable fit. Collectively, these indexes should provide reliable assessment and evaluation of the theoretical models.

CHAPTER IV

DEVELOPING A PSYCHOMETRIC INSTRUMENT TO MEASURE PE TEACHERS' JOB DEMANDS AND RESOURCES

Abstract

Research has shown that the working environment of physical education influences teacher motivation. Identifying the characteristics of teachers' working environment may contribute to developing a productive and motivating working environment for physical education teachers. This study focused on developing and validating an instrument that measures physical education teachers' job demands/resources perception on five theorized dimensions: organizational resources, physical resources, cognitive demands, physical demands, and emotional demands. The content validity was achieved through expert evaluation of the consistency between the items and the dimensions they represent. The evaluation rendered an average consistency rating of 3.6 on a 5 point scale. The construct validity and reliability were determined with a physical education teacher sample (n=193). Exploratory factor analysis (EFA) established a five-dimension construct structure matching the theoretical construct with factor loadings ranging from .57 to .85. The intraclass correlational coefficients ranged from .75 to .80 for job resources and from .80 to .83 for job demands, respectively. The inter-scale correlational coefficients ranged from .14 to .25, showing both convergent and divergent validity. Confirmatory factor analysis (CFA) confirmed the construct structure

found in the EFA with high dimensional factor loadings ranging from .47 to .81 for job resources scale and from .51 to .86 for job demands scale. The model fit tests produced acceptable indices including the RMSEA < .05. It is concluded that the instrument met the required psychometric standards to be useful to measure physical education teachers' perception of their working environment.

Introduction

A motivated teaching force of physical education is one of the most critical factors for students to gain sound knowledge and skills to adopt physically active lifestyle. In the past two decades, we have witnessed that the states, school districts and professional organizations generated policies and standards to hold PE teachers accountable for students' learning of the knowledge and skills. Under this circumstance, a teaching workforce with high motivation becomes more critical than ever before.

Workplace motivation is determined in large part by the working environment (Bakker & Demerouti, 2007). Previous research has documented that physical education working environment factors influence teacher motivation (see Blankenship & Coleman, 2009; Green, 2002; Koustelios, Theodorakis, & Goulimaris, 2004; Patton & Griffin, 2008; Sparkes, Templin & Schempp, 1993). Because PE teachers are situated in extremely diverse working environments – teaching diverse student populations, delivering diverse contents, and facing different challenges, a comprehensive understanding of their working environment becomes necessary. Thus, it is imperative to develop a tool to systematically assess PE teachers' working environment for the purpose of building conceptual connection between working environment and workplace

motivation, as well as developing strategies to improve their working environment. Based on the Job Demands-Resources model, the purpose of the study was to develop and validate an instrument that measures physical education teachers' job demands/resources perception.

Job Demands-Resources Model

In order to systematically evaluate physical education teachers' working environment in relation to their motivation, a theoretical framework is needed to accommodate various environmental factors in physical education and to inform PE teacher motivation. The Job Demands-Resources Model (Demerouti, et al., 2001; Schaufeli, Bakker & Van Rhenen, 2009) is a heuristic model that appears to fit well in this context. In this model, job demands are defined as "the things that have to be done" (Jones & Fletcher, 1996, p. 34). It often "refers to those physical and/or psychological (cognitive and emotional) efforts and is therefore associated with certain physiological and/or psychological costs" (Bakker, Demerouti, & Verbeke, 2004, p. 86). Across various professions, examples of job demands include high work pressure, time pressure, unfavorable work schedule, unfavorable physical environment, and emotionally demanding interactions with clients (Bakker & Demerouti, 2007). These factors could eventually lead to low motivation, workers' burnout, and/or deteriorated health.

Job resources refer to the physical, organizational, and social aspects of the job that are "functional in achieving work goals; reduce job demands and the associated physiological and psychological costs; stimulate personal growth, learning, and development" to promote greater productivity (Bakker & Demerouti, 2007, p. 312). Thus,

job resources may reduce the negative influences brought by job demands, and generate motivational support which leads to high work engagement, low cynicism and better performance (Bakker & Demerouti, 2007). Job resources are multi-level in nature, as it can be organizational (e.g., salary, career opportunities), interpersonal (support from administrator and co-workers), nature of work (role clarity, communication within the organization, and role in the decision-making process), and specific task support (skill training, performance feedback) (Bakker, Hakanen, Demerouti & Xanthopoulou, 2007).

The Assumption of the Model. The Job Demands-Resources model assumes that workers' well-being and motivation are developed through two underlying psychological processes. The first process mainly concerns the influence of job demands. When workers are exposed to excessive job demands, they will likely put forth additional physical and/or mental efforts that are often perceived as cost for motivation. According to Hockey (1993), such cost may gradually exhaust workers' energy and eventually lead to health deterioration or burnout. The second process assumes that providing job resources will foster workers' motivation and facilitate their achievement of work-related goals. When job resources are sufficient, workers can use them and invest additional effort in the work. For instance, in a study on human service professionals, Bakker et al. (2004) revealed that job resources lead to job performance beyond original job descriptions. On the contrary, without sufficient job resources, workers tend to disengage and withdraw from the work assigned to them (Bakker, Demerouti, & Schaufeli, 2003).

Measurement of Job Demands and Resources. Depending on their research settings and questions to be answered, researchers mainly operationalized job demands

and resources with two approaches. First, some studies focused on investigating the effects generated by certain aspects of job demands and/or resources in the working environment; second, some studies focused on investigating the effects generated by the overall working environment on workers. Scholars using the first approach to operationalize and measure job demands/resources on very specific, tangible terms, such as job control and autonomy (Xanthopoulou, Bakker, Demerouti, Schaufeli, 2009), coworker, organization support, social climate, access to information within organization (Bakker & Demerouti,. 2007), opportunities to learn and performance feedback (Schaufeli et al. 2009), supervisor's leadership, job variety and workplace events (Crawford, LePine, & Rich, 2010), opportunities for further development (Bakker & Bal, 2010). Measures of specific job demands include the level of attention required by the job, pressure to complete tasks, time urgency, organizational politics (Crawford et al. 2010), role ambiguity and role conflict (Fernet, Guay, Senecal, & Austin, 2004), requirement on the level of attention and precision, and emotional situations in job (Tims, Bakker & Derks, 2013).

Researchers using the second approach to operationalize and measure job demands and resources at the conceptual level as worker perceptions of the overall working environment. For instance, de Jonge and Dormann (2003) developed the Demand-induced Strain Compensation (DISC) Questionnaire to measures both job demands and resources as multi-dimensional conceptual construct that comprises cognitive, emotional, and/or physical dimensions. It has been validated and used in different working environments, such as hospitals (Van Den Tooren & De Jonge, 2008),

schools (Naring, Vlerick, Ban de Ven, 2012), hi-tech companies (Van de Ven & Vlkerick, 2013), fire department (Huynh, Xanthopoulou & Winefield, 2013). Because the DISC Questionnaire has been widely applied on different occupations in various working environments, the dimensions it specifies to measure job demands and resources can be used as a reference for developing an occupation-specific instrument to evaluate physical education teachers' working environment.

The Present Study

It was the goal of this study to develop and validate an instrument to measure physical education teachers' perception of their working environment. A reliable and valid instrument that can systematically evaluate teachers' working environment is crucial for identifying environmental factors that influence teacher motivation and the quality of their instruction. The Job Demands-Resources model provides a theoretical framework to conceptualize working environment for teachers. We used the Job Demands-Resources model as a platform to develop and validate an occupation-specific instrument to reflect the contextual specificity of the teachers' working environment.

Methodology

The study consisted of three phases. In Phase I, based on physical education teachers' working environment and the Job Demands-Resources model, items were generated under specified dimensions. In Phase II, the items' content validity was established with experts evaluating the consistence of the items with Job Demands/Resources dimensions. In Phase III, the items' construct validity was

established by analyzing responses to the items from two independent teacher samples using exploratory factor analysis (EFA) and confirmatory factor analysis (CFA).

Phase I: Item Development

Theoretical Dimension Development. Tasks in this phase were to generate items according to the theoretical specificity of the Job Demands-Resources model. The initial items were first generated by using the DISC Questionnaire as a reference with a particular consideration of the unique characteristics of physical education teachers' working environment. The DISC Questionnaire includes three dimensions for job resources: cognitive, emotional and physical. By considering existing literature on physical education teachers' working environment, three dimensions of job resources – physical, organizational, and social – were specified, replacing the emotional and cognitive resources identified by the DISC Questionnaire. Physical job resources refer to monetary and/or material resources that are available in the working environment and can be used in teaching. Organizational resources refer to the institutionalized supports embedded in schools. Examples are task specificity and variety, action and decision latitude, possibilities for professional development, communication and cooperation possibilities (Rimann & Udris, 1997). Social resources refer to available support that individuals can access through their network relationship in the working environment (Friborg et al. 2005).

In the same vein, job demands were specified in four dimensions– physical, organizational, emotional and cognitive. Physical job demands refer to the musculoskeletal aspect of the job that requires sustained physical effort. Such a demand

exerts pressure on the musculo-skeletal system and is often associated with physical fatigue (Bakker & Demerouti, 2007). Emotional demands refer to the effort needed to maintain professionalism during working (Morris & Feldman, 1996). It is related to teachers' efforts to manage their own emotions and the frequency of interaction that could cause teachers to experience emotional distress. Cognitive demands refer to the brain processes involved in information processing and concentration (Demerouti et al., 2001). Organizational demands refer to the effort needed to overcome systematic barriers such as policies, practices or decision-making procedures that restrict a person from having effective performance (Resodihardjo, 2009).

Item Development. In developing the items, we deliberated and discussed the dimensions carefully and generated items for each dimension. After the items were drafted, we conducted several rounds of in-depth deliberations to revise the items repeatedly to ensure their consistency with their respective dimensional specifications. During the deliberation process, the items inconsistent with the Job Demands-Resources model were dropped. The items consistent with the model and with the working environment of physical education teachers were retained; and the items that are partially consistent were revised.

Phase II: Content Validation

The goal of the content validation was to determine the degree to which the developed items accurately represented the to-be-assessed theoretical dimensions (Oermann & Gaberson, 2014). We followed the traditional expert judgmental method

(Morrow, Jackson, Disch & Mood, 2011) and formed an expert panel to evaluate the consistency of each item with its respective dimension.

The Expert Panel. The expert panel was selected based on knowledge about the Job Demands-Resources model. Experts who had published studies on peer-reviewed scholarly journals using the Job Demands-Resources model were invited to serve on the panel. Via email, the experts were asked to give their consent to participate in this study. A total of five recruited experts eventually completed the content validation processes.

Data Collection. The developed items were distributed to the expert panel on-line through Qualtrics, a web-based self-report mechanism. Qualtrics allows researchers to design surveys, manage distribution of surveys through emails, and keep track of completion rates (Qualtrics Labs, Inc., Provo, UT). The experts were asked to use a 5-point rating scale to evaluate the consistency of the items with their respective dimensions (5="very consistent," 1="very inconsistent"). In addition, ample space was provided for the experts to comment on the drafted items, revise the items, or write new items to replace those when necessary. According to the experts' feedback, revisions were made on the items and sent back to them for additional feedback. The content validation ended after two rounds of rating and commenting, when all experts were satisfied with all items and confirmed with no additional comments and concerns.

Data Analysis. It was determined that an item with a mean rating score below 3.0 and/or with substantial revision suggestions should not be accepted. Items with a mean rating score equal or above 3.0 without substantial comments/suggestions for revision were retained. Items that received comments/suggestions for revision were revised. The

revised items were sent to the panel subsequently for another round of review. When the experts had disagreement on an item, their comments on the item were shared around the panel for discussion until an agreement was reached.

Phase III: Construct Validation

Construct validity refers to the extent to which the operational measures reflect the theoretical constructs they represent (Calder, Phillips & Tybout, 1982). The goal of construct validation is to test the extent to which the relationship among the developed items reflects the relationship among the theoretical dimensions.

Sample. To test the construct validity, we used a sample of in-service, certified physical education teachers (n=193) from two Atlantic Coastal states. The two states share a similar goal for physical education, as it was specified by their state standards – providing students in-class learning experiences to learn knowledge and skills for developing a healthy lifestyle and to receive the benefits of physical activity in physical education. There were 109 female teachers (56%) and 84 male teachers (44%). All teachers were certified with at least a bachelor's degree, 83 (43%) held post-graduate degrees. Among the sample, 23 teachers (12%) had less than three years of teaching experiences; 114 teachers (59%) had 4-15 years of experiences, and 56 (29%) had more than 15 year of experiences.

Data Collection. The items were distributed on-line through Qualtrics. The order of the items was randomized. Once the items were imported to the Qualtrics, a hyper-link was generated. The link was sent to the teacher participants via emails. Before distributing the hyper-link, an approval from the Institutional Review Board (IRB) of the

University of North Carolina at Greensboro was obtained. The IRB granted this study a waiver to collect teachers' consent form on-line. The consent form informed the teachers of the purposes and the methods of the study, the voluntary nature of their participation, and confidentiality arrangements for their responses. The items were placed in Qualtrics with a forced response function. This function requires respondents to complete the response before they can move to the next item. It effectively prevented missing data.

Data Analysis. The data analysis for the construct validation consisted of two separate and related steps: a dimension identification step and a dimension confirmation step. The responses from the 193 teachers were randomly divided into two independent subsamples. Each was used in one of the two steps. In the first step, we assessed the convergent and discriminant validity and reliability using an exploratory factor analysis (EFA) (Bogozzi, Tybout, Craig & Sternthal, 1979), factor correlation analysis (interscale correlation), and intra-class reliability (Crobach α, Chronbach, 1951). These procedures identified the underlying factors based on the existing data. For EFA, a principal component analysis with orthogonal rotation (varimax) was performed, generating dimensions from the teacher responses (Costello & Osborne, 2005). We used the traditional Kaiser-Guttman rule, eigenvalues greater than 1.0, as the criterion to identify and retain underlying factors (Kaiser, 1960; Guttman, 1954). Items with loading higher than .40 were kept. Parallel analysis was used to confirm the number of extracted factors suggested by EFA (Ledesma & Valero-Mora, 2007; Tabachnick & Fidell, 2007).

In the second step, we applied confirmatory factor analysis (CFA) on the other subsample of responses to assess and verify the factors extracted through EFA.

Maximum likelihood estimation was used due to its advantage of allowing a wide range of indexes for model-data fit estimate (Cudeck & O'Dell, 1994). Model fit was evaluated based on various fit indices including χ^2, the Comparative Fit Index (CFI; acceptable > .90, good fit > .95; Bentler, 1990), the Root Mean Square Error of Approximation (RMSEA; acceptable < .08, good fit < .05; Browne & Cudeck, 1993), the Akaike's Informational Criteria (AIC, lower values indicate better fit; Akaike, 1987), and the Standardized Root Mean Square Residual (SRMR; adequate < .08; Hu & Bentler, 1999).

Results

Phase I: Item Development

A total of 25 items were written for job resources. After deliberation, 18 items were retained. The similar approach produced 24 items for job demands. After deliberations, 18 items were retained. Table 4.1 provides sample items in the Organizational Job Resources and Emotional Demands dimensions. Overall, a total of 49 items were initially generated. And a total of 36 items were retained at the end of the Item Development Phase.

Phase II: Content Validation

The two rounds of expert evaluation and revision yielded an average ratings for the 36 items of 3.6/5.0. Three items received an average rating below 3.0. Among the three items, two items collected factual information (budget and numbers of students in a class). Another item was under social resources, asking about parents' support to PE. The expert panel largely considered it as irrelevant to PE teaching. The two items to collect

factual information were excluded from EFA. The item on parents' support was first included in EFA, but later dropped due to low loading. The full list of items for job resources and job demands and the expert ratings are included in the Appendix B.

Phase III: Construct Validation

EFA Results. The EFA subsample included responses from 96 teachers. For job resources, EFA initially yielded three factors: organizational, physical and social resources. After dropping the cross-loading items, there were only two items on the social resources dimension, which indicated an unacceptable factor/dimension (Costello & Osborne, 2005). Thus, two factors – organizational and physical resources – were retained. Together, the two factors explained 49.72% of the total variance. The two factors were consistent with the theoretical dimensions upon which items were initially developed. Table 4.2 reports the relevant information, including Eigenvalues, the percentages of variance explained of the extracted factors, and the loadings of each item under the two factors (dimensions).

The EFA on job demand resulted in a five factor structure. Two factors were eliminated due to insufficient items (two items in each). The final structure retained three factors – cognitive, physical and emotional demands. The three-dimension structure explained 49.84% of the total variance. The result is reported in Table 4.3.

Parallel Analysis Results. In addition to the Kaiser-Guttman rule, parallel analysis (PA) was adopted to confirm the number of extracted factors to retain based on the results of EFA. PA is a Monte Carlo simulation technique to determine the number of factors (Ledesma & Valero-Mora, 2007). Specifically, "eigenvalues are obtained by

simulating normal random samples that parallel the observed data (on which EFA was performed) in terms of sample size and number of variables (Ledesma & Valero-Mora, 2007, p. 3). Researchers recommended to compare the eigenvalue that corresponds to 95th percentile of the distribution of eigenvalues derived from the random data with the eigenvalue obtained from the observed data (Cota, Longman, Holden, Fekken, & Xinaris, 1993; Glorfeld, 1995; Buja & Eyuboglu, 1992). If the eigenvalue obtained from the observed data is larger than the corresponding 95th percentile random data eigenvalue, the factor should be retained. Verse versa, the factor should be dropped. In Table 4.4, the eigenvalues extracted by the EFA were juxtaposed with a list of 95 percentile eigenvalues generated from random data (Buja & Eyuboglu, 1992).

Intraclass and Interscale Correlation. Convergent validity refers to the overlap or similarity of two or more measures' abilities to assess the same construct (Freeman, Felgoise & Davis, 2008). Intraclass correlation, correlation of the items under one construct, indicates that the items are related to the construct they represent. For instance, if the three items to measure physical resources – sufficient budget, sufficient equipment and facilities – show high intraclass correlation, we can conclude that the three items are converging on the same construct. To test convergent validity, intraclass correlational coefficients were calculated for the 9 items that measure job resources and the 12 items that measure job demands. The intraclass correlational coefficients ranged from .75 to .80 for items in the two Job Resources dimensions, and from .80 to .83 for items in the three Job Demands dimensions.

Inter-scale correlations, the correlation among the dimensions, were calculated to examine the interrelated nature of the dimensions as delineated in the theory. The correlation co-efficient, which represented the degree to which any two dimensions were related, was calculated within the job resources and demands dimensions separately. The inter-scale correlations ranged from -.39 to .50, which delineated the interrelated nature of the dimensions as expected in the theory. The results suggest that, despite the shared variance is as large as 25%, the scales still show considerable independence in terms of their representations for their respective dimensions. Table 4.5 reports inter-scale correlation coefficients of the extracted factors.

Construct and Measurement Testing. The confirmatory factor analysis (CFA) was conducted to test the tenability of the construct structure revealed in the EFA as well as measurement invariance across the two sub-samples. Figure 4.1 and Figure 4.2 present the Job Resources and Job Demands dimensional models, respectively. The item loadings ranged from .47 to .81 for the Job Resources model and from .51 to .86 for the Job Demands model.

To test the model-data fit, we tested both configural invariance and metric invariance (Meredith, 1993). Configural invariance, also called pattern invariance, indicates the extent to which the measurement model with the same structures (sets of items and dimensions) are equivalent across different groups in the sample. A satisfactory configural variance indicates the theoretical structure can be observed across different groups (i.e., regardless of gender, age, or other factors). Metric invariance, on the other hand, tests whether the same factor loading within dimensions are equivalent across

different groups in the sample. A satisfactory metric invariance indicates that respondents in different samples (i.e., regardless of gender, age, etc.) are likely to interpret the items in the same dimensions the same way (Byrne, 1998). Satisfaction in both suggests construct validity of the measurement model.

It is recommended that the configural variance be tested first, followed by the metric invariance test. (Dimitrov, 2010). It is because structurally the CFA model to test metric invariance is nested within the model to test configural invariance. Maximum likelihood estimation was used in the testing to allow model comparison. Table 4.6 reports the results of the model fit analyses.

For Job Resources, the χ^2 and other fit indices for the configural invariance suggest a good model fit, indicating that the model structure was held well across both subsamples. For the metric invariance, except χ^2, all other fit indices suggest a good model fit, indicating an equivalent reception of all items in the dimensions by all the teachers in both subsamples

For Job Demands, all model fit indices except χ^2 for both configural and metric invariance suggest adequate model fit. Given the over-sensitivity of χ^2 test, it is recommended that χ^2 results not be considered solely; instead other indices be used as major model fit indicators. The other indices above collectively indicate adequate model fit for both Job Resources and Job Demands constructs.

One index showing support to the observed construct validity is the change in fit index, Chi-square change ($\Delta\chi^2$), between the configural and metric invariances. It was calculated to determine if there are differentiations between the two. No differentiation

between the two can be considered to be a further evidence of model equivalent across samples. The calculated $\Delta\chi^2$ was insignificant for both Job Resources ($\Delta\chi 2$ = 13.09, Δdf =8, p = .11) and Job Demands ($\Delta\chi 2$ = 19.7, Δdf =12, p = .073) constructs.

Discussion

The purpose of this study was to develop and validate a psychometric instrument based on the Job Demands-Resources model to measure physical education teachers' perception of their working environment. The instrument development and validation went through three sequential phases: 1) item development, 2) testing content validity, and 3) construct validation.

In the first phases, items were written on the basis of extensive literature review and internal deliberations. We chose the Job Demands-Resources model as the theoretical framework for its flexibility and compatibility to a multiplicity of working environmental factors. Using this theoretical framework, we were able to identify the dimensions on which teachers' working environmental factors might vary due to their diverse working environments. Based on the identified dimensions, we generated items to characterize the unique working environment of PE teachers. In the second phase, the content validity was established using the expert judgmental approach. The expert panel reviewed, rated and made revisions on the initial items. After repeated evaluation by the experts and revision by the researchers, the experts acknowledged and confirmed that the revised items except three were consistent with the theoretical dimensionality of the Job Demands-Resources model. They also reached a consensus that the items with these dimensions can be used to measure the unique characteristics of physical education

teachers' working environment. In the third phase, a certified physical education teacher sample was asked to respond to the instrument. Using a split-sample method in data analysis, both EFA and CFA were conducted to establish the evidence for construct validity and reliability. For both job resources and demands, collective responses from the sample of certified teachers establish a construct of job demands and resources on five dimensions, accounting for about 50% of variance on the teachers' perception of their working environment. Specifically, the validation evidence confirmed that the perception of job resources is manifested in two dimensions (physical and organizational); and the perception of job demands in three dimensions (physical, emotional and cognitive).

This three-phased procedure resulted in an instrument, *Job Demands and Resources Scale for PE Teachers*, supported by evidence for the content and construct validity and reliability (measurement invariances). The evidence gives researchers confidence that the Job Demands and Resources Scale can provide valid and reliable information for research on a variety of topics associated with physical education teaching environment. The validated Job Demands and Resources Scale for PE Teachers is attached as Appendix C.

In addition to the practical value of the Scale, the findings of the study also render evidence with theoretical implications. These implications, discussed below, inform us about the characteristics of the environment in which physical education is taught. In short, the environment is multifaceted and teachers' perception of the environment centers on the resources-demands dilemma/connectivity.

Multidimensional Working Environment

The multi-dimensional Job Demands and Resources Scale allows us to understand PE teachers' working environment as a whole and in terms of dimension-specific job demands and resources. For job resources, studies have confirmed that the working environment significantly predicts workers' motivation (Bakker, Van Emmerik, & Euwema, 2006; Schaufeli et al., 2009). Particularly, job resources can boost worker motivation (Bakker et al. 2006; Schaufeli et al. 2009). As widely acknowledged, the marginalized status of physical education often leads to lack of basic job resources, such as funding, equipment and facilities, as reflected and validated in the Scale. As Fejgin, Ephraty and Ben-Sira (1995) pointed out, PE teachers depend on the availability of these basic resources more than teachers of other subjects. The lack of these resources presents as a major barrier that prevents them from teaching quality physical education (Young, Felton, Grieser et al., 2007). The lack of resources might be also a major contributor to the "multi-activity, exposure, or do-nothing physical education" (Ennis, 2011, p. 11). Sallis and colleagues (2012) noted, across the United States, "41 states required professional development to maintain/renew physical education teachers' certification/licensure, but most did not provide the funding for teachers to participate" (p. 129). The dilemma of increased demand (maintaining certification) and lack of resources (financial support) resulted in the lack of continuing professional development for PE teachers (Armour & Yelling, 2004). Thus, for better understanding of PE teacher motivation, it is necessary to evaluate job resources available/needed by teachers.

In contrast to physical job resources that are visible in many school environment, organizational resources attracts limited attention from researchers and administrators. Based on the results of this study, physical education teachers identified administrators' recognition of PE value and PE teachers' contribution to education, clearly defined responsibilities, and constructive feedback to instruction, opportunity to participate in school's decision making, and access to professional development to be important job resources. Literature has long pointed out that the lack of these organizational resources contributes to the marginalization of physical education, which eventually lead to dysfunctional PE programs and ineffective teaching (Locke, 1992; Macdonald, 1995; Patton & Griffin, 2008). The Job Demands and Resources Scale allows us to be able to identify teachers' perception of these resources readily.

Widely recognized, job demands in working environments generate negative influence on workplace motivation (Bakker & Demerouti, 2007; Demerouti et al., 2001). The results of this study indicate physical education teachers perceive job demands in three dimensions: physical, emotional and cognitive. Physical demands include distractions resulted from sharing facilities, lack of preparation time and equipment, and distraction from non-teaching duties. These factors related to standards-required physical education programming which requires teachers to emphasize learning-oriented student achievement. Second, emotional demands are part of their job in teaching physical education. As Fejgin and colleagues (1995) noted, dealing with disruptive behaviors in a relatively open setting requires teachers to invest extra effort to overcome emotional challenges. Additionally, by being visible in a gym/on a field, PE teachers' behaviors are

often subjected to scrutiny from school administrators (Fejgin et al. 1995). All these could result in emotional consequences for PE teachers. Third, the findings confirmed that PE teachers are facing cognitive demands, as national and state standards delineate students' learning and achievement as the foremost priority (Lund & Tannehill, 2015). Historically, PE teachers aligned their practices with standards that demanded much more cognitively challenging goals than the traditional curriculum characterized by a recreational activity model (Bulger, Housner & Lee, 2008). These changes led to unprecedented cognitive demands for teachers to update their knowledge about teaching concepts related to healthy lifestyles such as those in nutrition, fitness, and behavior change.

Confirming the distinctive dimensions of job demands and resources allows researchers to use the Scale to conduct dimension-specific and holistic evaluation of teachers' working environments. Evaluating teachers' working environments as a holistic entity can provide information to researchers and policy makers with information about the entire context in which physical education teachers work in. Dimension-specific information, on the other hand, can be used to pinpoint specific areas where interventions may focus to improve the working environment for physical education teachers.

Potential Research

With the Job Demands and Resources Scale for PE Teachers, researchers can investigate the relationship between PE teachers' psychological dispositions and teachers' working environment, namely job resources and job demands. Research on this direction carries the potential of contributing to strategic improvement of teachers'

working environment. As Demerouti and colleagues (2001) suggested, a balanced approach can be adopted to promote worker motivation through three strategies: reducing or removing job demands to curb psychological and physiological cost, providing job resources to facilitate work processes, and offering resources to stimulate personal growth, learning and professional development in relation to workers' aspiration. The development of Job Demands and Resources Scale for PE teachers enables future researchers to collect evidences for developing specific strategies that can promote physical education teacher motivation and facilitate quality teaching.

Conclusion

A three-phase instrument development procedure yielded the Job Demands and Resources Scale for PE Teachers. The scale consists of 21 items to measure physical education teachers' job demands and resources perception. The content validity was achieved through expert review panel with the average item rating of 3.6 on a 5 point scale. With a physical education teacher sample (n=193), construct validity was supported through a two-step cross-sectional testing procedure with a split-sample method. First, exploratory factor analysis (EFA) suggested the five-dimension construct structure – institutional resources, physical resources, cognitive demands, physical demands, and emotional demands. The intraclass correlational coefficients ranged from .75 to .80 and from .80 to .83 for the job resources and job demands dimensions, respectively. Second, confirmatory factor analysis (CFA) reaffirmed the construct structure with high dimensional factor loadings (.47-.86) and model fit indexes (RMSEA .05).

The Job Demands and Resources Scale can be used as a tool to investigate the relationship between PE teachers' working environment and various teacher motivation and performance variables. It also can be used to provide useful information for administrators to assess teachers' working environment to design organization-improvement strategies and teacher performance evaluation.

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Appendix A

Figures and Tables

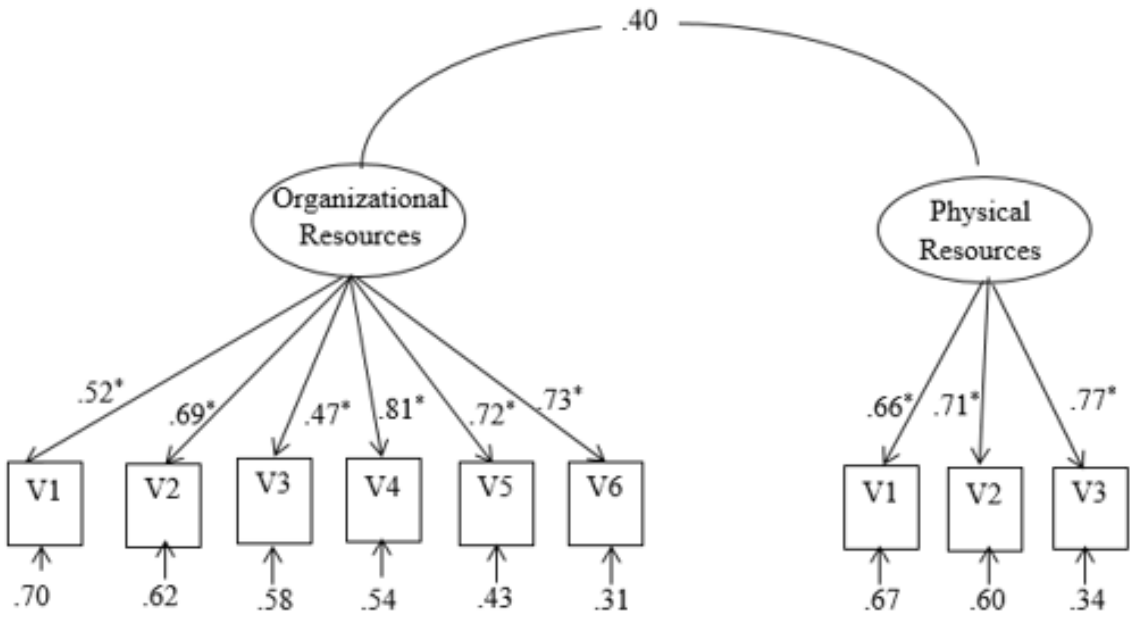

Figure 4.1 Confirmatory Factor Analysis Results for Job Resources.

Note: * $p < .01$, $Z > 1.96$; V1…Vn are corresponding items for the dimensions.

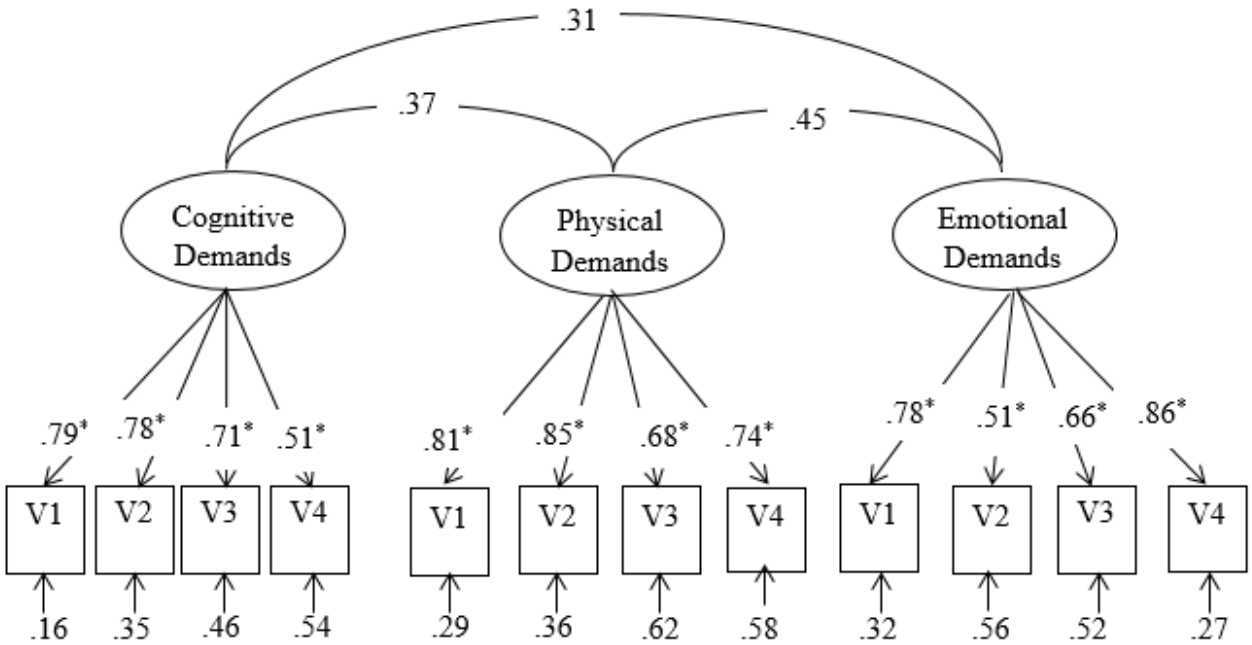

Figure 4.2 Confirmatory Factor Analysis Results for Job Demands.

Note: * $p < .01$, $Z > 1.96$; V1…Vn are corresponding items for the dimensions.

Table 4.1

Sample Items for Organizational Job Resources & Emotional Job Demands (1st draft)

Organizational Job Resources (OR)

1. I have access to professional development opportunities (such as workshops and professional conferences) to improve my teaching.
2. I have opportunities to participate in decision making at my school.
3. I have opportunities to receive teaching advice from my colleagues.
4. My achievement in teaching physical education is recognized by my school.
5. I have clearly defined job responsibilities.

Emotional Job Demands (ED)

1. I experience emotional distress resulting from dealing with students' disruptive behaviors.
2. I experience emotional distress resulting from trying to fulfill state/district standards.
3. I experience emotional distress when my school administrators intervene in my way of teaching.
4. I experience emotional distress resulting from teaching unmotivated students.
5. I experience emotional distress resulting from teaching students with special needs.

Table 4.2

Extracted Dimensions and Corresponding Items for Job Resources

Items	Loadings
Dimension 1: Organizational Resources (Variance explained: 37.04%, Eigenvalues: 4.07)	
1. School administrators recognize PE's significance	.75
2. Achievement in teaching PE is recognized by my school	.74
3. PE teachers have clearly defined responsibilities	.70
4. PE teachers can receive teaching advice from colleagues	.67
5. PE teachers can participate in decision making at my school	.66
6. PE teachers have access to meaningful professional development	.58
Dimension 2: Physical Resources (Variance explained: 12.68%, Eigenvalues: 1.49)	
1. PE department has sufficient budget	.80
2. PE teachers have sufficient equipment	.75
3. PE teachers have sufficient facilities to conduct teaching	.61

Table 4.3

Extracted Factors and Corresponding Items for Job Demands

Items	Loadings
Dimension 1: Cognitive Demands	
(Variance Explained: 0.33%; Eigenvalue: 5.46)	
1. Feel challenged when planning lessons to reflect standards	.85
2. Feel challenged when planning lessons to meet students' needs	.83
3. Feel challenged to teach lesson to facilitate students' adoption of active lifestyle	.79
4. Feel challenged to provide students immediate feedback	.73
Dimension 2: Physical Demands	
(Variance Explained: 11.76%; Eigenvalue: 2.12)	
1. Cope with inadequate class preparation time	.83
2. Cope with inadequate equipment	.74
3. Cope with distractions caused by sharing facilities	.69
4. Cope with interruptions caused by non-teaching duties	.69
Dimension 3: Emotional Demands	
(Variance Explained: 7.74%; Eigenvalue 1.53)	

1. Distress from teaching unmotivated students	.85
2. Distress from students' disruptive behaviors	.68
3. Distress from school administrators' intervening in my teaching	.65
4. Distress resulting from trying to fulfilling standards	.57

Table 4.4

Eigen Values Comparison (EFA v.s. Parallel Analysis)

Factors/Dimensions	Eigenvalues by the EFA	95 Percentile Eigenvalues *(Buja & Eyuboglu, 1992)*
Job Resources		
Factor 1: Organizational Resources	4.07	1.69
Factor 2: Physical Resources	1.49	1.47
Job Demands		
Factor 1: Cognitive Demands	5.46	1.88
Factor 2: Physical Demands	2.12	1.66
Factor 3: Emotional Demands	1.53	1.51

Table 4.5

Intraclass Correlation and Correlations between Five Job Demands/Resources Scales

	Cronbach's α	1	2	3	4
1. Organizational Resources	.80	-			
2. Physical Resources	.75	.39	-		
3. Cognitive Demands	.83	-.05	-.22	-	
4. Physical Demands	.81	-.31	-.39	.35	-
5. Emotional Demands	.80	-.29	-.30	.33	.50

Table 4.6

Model Fit Statistics for Measurement Invariance

Model	Fit statistics						
	χ^2	df	*p*	CFI	AIC	RMSEA	SRMR
	Job Resources						
Configural Invariance	53.36	38	.050	.96	121.36	.05(.00, .07)	.06
Metric Invariance	66.45	46	.014	.93	121.47	.05(.02, .07)	.08
	Job Demands						
Configural Invariance	135.06	102	.016	.95	243.06	.05(.02, .06)	.08
Metric Invariance	154.76	114	.007	.94	238.76	.05 (.03, .06)	.09

Note: χ^2= chi square estimate; df = degrees of freedom; SRMR = Standardized Root Mean Square Residual; RMSEA =Root Mean Square Error of Approximation; CFI = Comparative Fit Index;
AIC = Akaike's Informational Criteria 90% confidence interval of RMSEA is presented in parenthesis.

Appendix B

Expert Ratings for the Developed Items

Item	Mean	S.D.
Dimension: Physical Job Resource (PR)		
PR1. As a teaching resource, my PE department has an annual budget of ___ dollars.	2.4	.55
PR2. The budget for physical education is sufficient for carrying out teaching activities.	3.2	1.79
PR3. As a teaching resource, I have access to the following in-door facilities for teaching physical education (check all that apply).	3.4	1.34
PR4. As a teaching resource, I have access to ____ (outdoor facilities) for teaching physical education (check all that apply).	3.6	1.14
PR5. As a teaching resource, I have access to sufficient facilities for teaching physical education.	4.2	.45
PR6. As a teaching resource, I have access to a personal computer from my school.	3.8	.45
PR7. As a teaching resource, I have sufficient financial support from my school to attend professional conferences.	3	.71

PR8. As a teaching resource, I have access to the following technology for instruction (check all that apply).	4.2	.45
PR9. As a teaching resource, I have access to sufficient equipment for teaching physical education.	3	1.00
Dimension: Organizational Job Resource (OR)		
OR1. I have access to professional development opportunities (such as workshops and professional conferences) to improve my teaching.	3.2	.45
OR2. I have opportunities to participate in decision making at my school.	3.6	.55
OR3. I have opportunities to receive teaching advice from my colleagues.	3.6	.55
OR4. My achievement in teaching physical education is recognized by my school.	3	.71
OR5. I have clearly defined job responsibilities.	3.6	.55
Dimension: Social Job Resource (SR)		
SR1. Physical education is supported by other teachers at my school.	3.2	.45
SR2. The school administrators recognize the significance of physical education.	3.8	.84
SR3. Physical education is valued by students.	3	1.00
SR4. Physical education is supported by parents.	2.2	1.30

Dimension: Physical Job Demand (PD)		
PD1. I normally teach classes of __students (choose one).	1.6	.55
PD2. Teaching the current size classes makes me feel fatigue.	4	.71
PD3. Teaching the current number of classes makes me feel fatigue.	3.8	.45
PD4. I need extra effort to cope with inadequate class preparation time.	3.8	.45
PD5. I need extra effort to cope with inadequate equipment.	4.4	.55
PD6. I need extra effort to cope with the distraction caused by sharing teaching facilities with others.	4	0
Dimension: Emotional Job Demand (ED)		
ED1. I experience emotional distress resulting from dealing with students' disruptive behaviors.	3.6	.55
ED2. I experience emotional distress resulting from trying to fulfill state/district standards.	4.2	.45
ED3. I experience emotional distress when my school administrators intervene in my way of teaching.	4	.71
ED4. I experience emotional distress resulting from teaching unmotivated students.	4	.71
ED5. I experience emotional distress resulting from teaching students with special needs.	4	.71
Dimension: Cognitive Job Demands (CD)		

CD1. I feel challenged to plan lessons that reflect the current state/district standards.	4	.71
CD2. I feel challenged to plan lessons that can meet individual's needs.	3.8	.45
CD3. I feel challenged to teach lessons that facilitate students' adoption of active lifestyle.	4.4	.55
CD4. I feel challenged to provide immediate feedback to individual students during teaching.	4.2	.84
Dimension: Organizational Job Demands (OD)		
OD1. It requires extra effort for me to cope with interruptions to my teaching caused by non-teaching duties (e.g. coaching, and administrative duties).	4.2	.45
OD2. It requires extra effort for me to cope with inadequate instruction time at my school.	4.4	.55
OD3. It requires extra effort for me to cope with interruptions to my teaching caused by unrelated school events (e.g. book fairs, picture days, field trips).	3.8	.45

Note. The response choices for the items are not included to save space.

Appendix C

Job Demands-Resources Scale for PE Teachers

Dimension: Physical Job Resource (PR)

PR1. The budget for physical education is sufficient for carrying out teaching activities.

PR2. As a teaching resource, I have access to sufficient facilities for teaching physical education.

PR3. As a teaching resource, I have access to sufficient equipment for teaching physical education.

Dimension: Organizational Job Resource (OR)

OR1. I have access to professional development opportunities (such as workshops and professional conferences) to improve my teaching.

OR2. I have opportunities to participate in decision making at my school.

OR3. I have opportunities to receive teaching advice from my colleagues.

OR4. My achievement in teaching physical education is recognized by my school.

OR5. I have clearly defined job responsibilities.

OR6. The school administrators recognize the significance of physical education.

Dimension: Physical Job Demand (PD)

PD1. I need extra effort to cope with inadequate class preparation time.

PD2. I need extra effort to cope with inadequate equipment.

PD3. I need extra effort to cope with the distraction caused by sharing teaching facilities with others.

PD4. It requires extra effort for me to cope with interruptions to my teaching caused by non-teaching duties (e.g. coaching, and administrative duties).

Dimension: Emotional Job Demand (ED)

ED1. I experience emotional distress resulting from dealing with students' disruptive behaviors.

ED2. I experience emotional distress resulting from trying to fulfill state/district standards.

ED3. I experience emotional distress when my school administrators intervene in my way of teaching.

ED4. I experience emotional distress resulting from teaching unmotivated students.

Dimension: Cognitive Job Demand (CD)

CD1. I feel challenged to plan lessons that reflect the current state/district standards.

CD2. I feel challenged to plan lessons that can meet individual's needs.

CD3. I feel challenged to teach lessons that facilitate students' adoption of active lifestyle.

CD4. I feel challenged to provide immediate feedback to individual students during teaching.

Note. The response choices include: 1) Strongly disagree; 2) Disagree; 3) Neutral; 4) Agree; 5) Strongly agree.

CHAPTER V

UNDERSTANDING PHYSICAL EDUCATION TEACHER MOTIVATION IN RELATION TO JOB DEMANDS AND RESOURCES

Abstract

Determining how job demands and resources influence physical education teachers' motivation regulatory processes is critical for understanding teacher motivation. The study was conducted to determine the extent to which the PE teachers' perceived job demands and resources influence their motivation regulatory processes and motivation. An *a priori* model was proposed for testing based on the integration of Self-Determination Theory (SDT) and the Job Demands-Resources Model. Certified physical education teachers in two southeastern states (n=193) provided self-reported data on perceived job demands and resources in the working environment, motivation regulatory processes (external regulation, introjected regulation, identified regulation and integrated regulation) and motivation to teach. Structural equation modeling analysis revealed that increasing job demands in teachers' working environments enabled them to adopt more autonomous regulatory processes, such as integrated regulation (γ = .20) but not more controlling regulatory processes, such as external regulation (γ = -.16) and introjected regulation (γ = -.22). The findings of the study provide empirical evidence that relate physical education teachers' perceptions of working environment to their motivation to teach.

Introduction

SHAPE America Standards suggest that the ultimate goal of physical education is to provide physical activity experiences for students to learn knowledge and skills necessary for developing healthy and active lifestyles (NASPE & AHA, 2012; SHAPE America, 2014). To achieve this goal, having a motivated teaching force is critical for physical education in all K-12 schools, especially public schools.

Studies indicate that teachers' working environment plays a significant role on teacher motivation. For example, Bogler and Somech (2004) found that a working environment that promotes teacher professional growth, recognizes teacher professional status and supports teacher decision-making generated positive impact on teacher motivation. Conversely, Patton and Griffin (2008) revealed that a non-supportive environment prohibited highly self-efficacious physical education teachers from actively engaging in effective teaching. In a literature review, Firestone and Pennell (1993) identified seven key environmental elements contributing to teachers' motivation and commitment to teach: job design characteristics, feedback, autonomy, participation, collaboration, learning opportunities, and resources. Thus, the influence generated by work environment should be central to examination of teacher motivation research.

Most research on teacher motivation adopted one or more achievement motivation theories as the theoretical platform for conceptualization and empirical investigation. Exemplary theories manifested in studies on teacher motivation include self-efficacy (Gurvitch & Metzler, 2008; Martin, McCaughtry, Kulinna & Cothran, 2009), expectancy-value (Abrami, Poulsen & Chambers, 2004), achievement goal (Papaioannou &

Christodoulidis, 2007) and self-regulation theory (Carson & Chase, 2009). One common characteristic of these theories is the emphasis on teachers' psychological dispositions similar to the dispositions often observed in students in an achievement setting such as learning to earn good grades. Through connecting physical education teachers' psychological dispositions (such as self-efficacy, expectancy, goal orientation and need satisfaction) to their motivation outcomes, these studies have helped identify the psychological nature of teacher motivation by showing the role perceived efficacy, expectancy beliefs and achievement goals play in the motivation processes.

Teacher motivation is a type of workplace motivation defined as "a set of energetic forces that originate both within as well as beyond an individual's being, to initiate work-related behaviors, and to determine its form, direction, intensity and duration" (Pinder, 1998, p. 11). Teacher motivation concerns long-term and organizational outcomes often operationalized as intangible and long-term organization performances (often reflected in reputations). In contrast, because student motivation is related to achieving tangible and relatively short-term outcomes, it is often operationalized as individual knowledge gain, skill acquisition, and growth (often reflected in grades). From this perspective, teacher motivation is distinctively different from student achievement motivation in that the organizational outcomes that teachers should motivate teachers seem to be different from those that motivate students to achieve in learning. Thus, adopting achievement motivation theories may delimit researchers' conceptualization by presuming teacher motivation to achieve individual, tangible and relatively short-term goals, is similar to those goals that characterize student

motivation. Based on the above reasoning, studies of teacher motivation should go beyond psychological disposition variables, recognizing the influences generated by their working environment. This focus can be achieved by integrating Self-Determination Theory (SDT) with the Job Demands-Resources model.

SDT and Its Relevance for Teacher Motivation Research

Self-determination theory (SDT) focuses on motives that drive behavioral regulation under external influence (Deci & Ryan, 2000). As Deci and Ryan (2008) state, "SDT is an empirically derived theory of human motivation and personality in social contexts that differentiates motivation in terms of being autonomous and controlled" (p. 416). According to SDT, the person-environment interaction is central to human motivation and can be understood through a spectrum of motivational states associated with environmental influences. *Intrinsic motivation* is experienced when an individual engages in an activity for the sake of experiencing the activity. *Extrinsic motivation* refers to a motivation state in which an individual engages in an activity to receive an extrinsic reward, whether tangible or symbolic, or to comply with an external contingency imposed by those in control of an environment (Ryan & Deci, 2000a). As expected, not all work-related motivation can be intrinsic. Rather, in most cases work-related motivation is more or less extrinsic due to the possibility that it is controlled by tangible or symbolic external contingencies in the working environment.

SDT acknowledges the complexity of extrinsic motivation by framing it within a spectrum of four regulatory processes that control an individual's motivation. These regulatory processes are: *external, introjected, identified,* and *integrated regulation* (Deci

& Ryan, 2000; Ryan & Deci, 2000a). Their loci of causality (deCharms, 1968) are gradually distanced from amotivation to approach intrinsic motivation. External regulation is a type of motivation that allows individuals to move away from an amotivation state, while integrated regulation is closet to intrinsic motivation.

According to SDT, external regulation refers to the process whereby motivated behavior is induced and controlled completely by externally imposed contingencies, such as meeting an external demand or obtaining a reward. In physical education, teacher motivation might be regulated by the requirement to implement a particular type of program or curriculum and/or by the incentives associated with the implementation. Extrinsic motivation also can come from introjected regulation – "a type of internal regulation that is still quite controlling because people perform such actions in order to avoid guilt or anxiety or to attain ego-enhancements or pride" (Ryan & Deci, 2000a, p. 62). One's sense of self-esteem plays an important role in introjected regulation. For instance, teachers are motivated to engage students in intensive activities to avoid a feeling of not fulfilling the most important professional responsibility. Identified regulation is defined as a type of internal regulation in which the individual accepts the value of the activity as personally important (Ryan & Deci, 2000a). Individuals choose to perform the activity because it carries importance to them. Identified regulation is a relatively autonomous or self-determined process in that motivation comes when individuals see their own values endorsed in the activity. For example, a teacher who values fitness knowledge contribution to students' healthy lifestyles will be motivated to teach a concept-based fitness curriculum. The last regulatory process for extrinsic

motivation is integrated regulation which, according to Ryan and Deci (2000a), is the most complete and effective internalization of external incentives. It makes the individual's extrinsically motivated action fully volitional (Ryan & Deci, 2000a). Motivation derived from integrated regulation is characterized by the integration of external values into one's own value system. The extrinsic motivation derived from integrated regulation shares many characteristics with intrinsic motivation in terms of autonomy and engagement. The difference between the two is that individuals who experience integrated regulation do not participate in the activity for the sake of experiencing and appreciating the process, but rather for separate outcomes (such as appraising their own values) the activity brings (Ryan & Deci, 2000a).

These four motivation regulatory processes are a crucial framework to explain teacher motivation. It provides a pathway to understanding specific external influences on their motivation with particular mechanisms from rewards to values. It bridges motivation to external context where scholars can understand the extent to which environmental factors mediate teacher motivation regulatory processes. Most importantly, the framework allows integration of the Job Demands-Resources model with SDT to uncover environmental elements that support or impede teacher motivation for future intervention.

Job Demands/Resources in Working Environment

An important assumption in SDT is that extrinsic motivation is a mental process regulated by external sources. Although the motivation regulatory processes framework can explain the mental processes, understanding teaching context that leads to mental

processes requires adoption of a theoretical framework that can operationalize and measure the environment elements.

The Job Demands-Resources model has been widely applied to various occupations/contexts to examine the relationship between working environments and workplace motivation. According to the model, job demands often "refers to those physical and/or psychological (cognitive and emotional) efforts and is therefore associated with certain physiological and/or psychological costs" (Bakker, Demerouti, & Verbeke, 2004, p. 86). Across various professions, examples of job demands include high work pressure, time pressure, unfavorable work schedule, unfavorable physical environment, and emotionally demanding interactions with clients (Bakker & Demerouti, 2007). All these factors could eventually lead to workers' burnout, low motivation, low productivity, and/or deteriorated health. Job resources, on the other hand, refer to the physical, organizational, and social aspects of the job that are "functional in achieving work goals, reducing job demands and the associated physiological and psychological costs, stimulatinh personal growth, learning, and development" to promote greater productivity (Bakker & Demerouti, 2007, p. 312). Thus, job resources not only reduce negative influences brought by job demands, but also generate motivational support leading to high work engagement, low cynicism, high performance, and high productivity (Bakker & Demerouti, 2007). Overall, the model assumes that workers' well-being and motivation are developed through two underlying psychological processes: demands influence motivation negatively and resources foster motivation and engagement (Bakker, Demerouti, & Schaufeli, 2003).

An Integrated Theoretical Model

According to SDT, teachers may adopt different motivation regulatory processes in responses to different demands and/or resources, and demonstrate different levels of motivation as well as performance towards organizational goals. However, SDT does not specify factors in a working environment that play regulating roles. In the Job Demands-Resources model, job resources and demands are postulated to directly influence teachers' work engagement and motivation, although the Job Demands-Resources model alone is not able to pinpoint to the regulation mechanisms that lead to various motivation outcomes. Conversely, integrating SDT and the Job Demands-Resources model enables scholars to build connection between teacher motivation, motivation regulatory processes and job resources, and demands in working environment. Figure 5.1 shows the *a priori* theoretical model based on this integration. The model postulates that (a) job resources and demands in the working environment influence teachers' adoption of motivation regulatory processes teachers adopt; and (b) teachers' adoption of motivation regulatory processes, in turn, influence their level of motivation.

The Present Study

The purpose of the study was to test the tenability of the theory delineated by the *a priori* model. The variables to be studied include: job demands, job resources, motivation regulatory processes, and teacher motivation, as shown in the integrated *a priori* model as latent variables. We hypothesized that job resources were likely to link to high teacher motivation in the workplace, and job demands were likely to link to low motivation. As shown in Figure 5.1, solid lines indicate positive influence generated by

job resources, while the dash lines indicate negative influences generated by job demands. Consistent with SDT predictions, we also hypothesized that the connection between job resources/demands and motivation was likely to be regulated by individual teachers' approaches to motivation regulatory processes. The more autonomous regulatory processes, such as identified regulation and integrated regulation, enable teachers to better regulate their motivation towards externally imposed organizational goals. The controlling regulatory processes, such as external and introjected regulations, would be less likely to lead to teacher motivation compatible to the organizational goal.

Methodology

Research Design

Given the purpose of the study, a correlational design was adopted. Integration of the Job Resources and Demands model and SDT suggested a tentative *a priori* causation relationship among the latent variables. In other words, the theorized relationship was directional, as shown in Figure 5.1, that job resources and demands were causes for adoption of different motivation regulatory processes contributing to the manifestation of different levels of motivation.

Research Context and Participants

The study was conducted in two eastern states in the United States. To align physical education with the mission of K-12 education, both states issued grade-specific standards centered on students' learning health knowledge and skills. The ultimate goal of physical education was to promote students' participation in physical activity in and beyond physical education.

The participants were certified full time physical education teachers (n=193). The sample included 109 (56.48%) females; 84 (43.52 %) males. All teachers held bachelor degrees, while 83 teachers (43.52%) had post-graduate degrees. Most teachers (114, 59.07%) had teaching experience ranging between 4 and 14 years, while 23 (11.92%) taught fewer than three years, and 56 (29.01%) taught physical education 15 years or more.

Variables and Measures

Using survey methods, The study measured four groups of variables, job demands and resources, motivation regulatory processes, teacher motivation, and teacher/school demographic information. Except the demographic information, all other variables were considered latent.

Motivation Regulatory Processes. The four motivation regulatory processes, external, introjected, identified, and integrated, were measured using the Work Extrinsic and Intrinsic Motivation Scale (WEIMS, Tremblay, Blanchard, Taylor, Pelletier & Villeneuve, 2009). The original WEIMS consists of 18 items on a 7-point Likert type scale with 1 indicating "does not correspond at all" and 7 indicating "corresponds exactly". It asks the respondent to indicate "to what extent each of the following items corresponds to the reasons why you are presently involved in your work." The 18 items are organized in six 3-item sets, each tapping into a dimension of motivation specified in SDT: amotivation, externally regulated motivation, introjected motivation, identified motivation, integrated motivation and intrinsic motivation. An example of the external regulation item reads "because this type of work provides me with security." An example

of the integrated regulation item reads “because it is part of the way in which I have chosen to live my life.” Respondents are asked to rate the extent to which each item is consistent with the reasons that they experience in their current work. The original WEIMS is attached as Appendix B. Because the focus of the study is on the relationship between teachers’ extrinsic motivation regulatory processes and their perceived job demands and resources, we focused on measuring four extrinsic motivation regulation dimensions, external regulation, introjected regulation, identified regulation and integrated regulation (Deci & Ryan, 2000).

To ensure relevance to the purpose of the study, the WEIMS was modified to reflect the unique characteristics of teaching physical education. The modified WEIMS allows physical education teachers to use the scale to indicate the extent to which each of the modified items corresponds to the reasons they are presently involved in their work. For instance, the stem question of the original WEIMS was modified from “why do you do your work?” to “why do you choose to teach physical education?” The original 7–point Likert scale was replaced by a 5-point Likert scale for better data quality (Rvilla, Saris, & Krosnick, 2013). The items of WEIMS also were modified according to the characteristics of physical education teachers’ working environments. For instance, “it (my work) is a part of the way in which I have chosen to live my life” is modified to “teaching physical education reflects the way I have chosen to live my life”. The teachers were asked to response on the 5-point Likert scale, ranging from “agree strongly” to “disagree strongly.” The modified WEIMS went through content validation with a panel of four experts and construct validation processes with a sample of certified teachers

(n=193). The validation processes were conducted to ascertain the relevance between the instrument and the context of physical education teaching, and establish the level of confidence that the construct of motivation regulatory processes accounts for the variance in the teacher sample.

Job Demands and Job Resources. For this study, the measure of job demands and resources needs to be specific and compatible to the working environment that the study intended to investigate. The Job Demands and Resources Scale for PE Teachers was developed and validated to comprehensively measure job demands and resources embedded in physical education teachers' work environment (see Chapter IV, Zhang & Chen, in preparation for dissertation text). The development of the scale went through three phases: item development, content validation, and construct validation, resulting in a 21- item scale to measure job demands and resources on five dimensions, physical resources, organizational resources, cognitive demands, emotional demands and physical demands. Confirmatory factor analysis (CFA) showed the dimensional structure of the Job Demands and Resources scale with high dimensional factor loadings (ranging from .47 to .81 for job resources scale and from .51 to .86 for job demands scale) and good model fit indexes (RMSEA .05). The detailed information about the instrument development process is included in Chapter IV.

Teacher Motivation. In this study, teacher motivation is conceptualized as teacher behaviors towards the organizational goals specified by the state standards. Thus, teacher motivation should be measured by the effort teachers invested to reach the goals specified by the standards, and energy they spent to overcome possible difficulties that

prevented them from reaching the standards. To identify teacher behaviors that represent different levels of motivation, we developed the Physical Education Teacher Motivation Survey. Based on the descriptions of effective teachers (Rink, 2009; SHAPE America, 2009), we specified six teacher demonstrated behavioral domains with different motivation levels: assessment, learning environment, teaching objectives, pedagogical content (skills), pedagogical content (knowledge), and feedback to students. The self-evaluation checklist (Rink, 2009) and NASPE Guideline (SHAPE America, 2009) are juxtaposed in Table 5.1.

Under each domain, we developed three statements each describing a teaching behavior that indicates low, medium or high teacher motivation. For example, in the Teaching Feedback dimension, three statements are: (1) I give individualized and specific feedback to students (high effort/motivation); (2) I point out common mistakes and hope students will pay attention (medium effort/motivation); and (3) I encourage students by saying "good job" and give them pat on the back (low effort/motivation). In responding, the teacher was asked to rank the three statements using values from 1 to 3. The "1" indicates that the statement is most consistent with their daily teaching behavior, the "2" is less consistent with their teaching behavior, and the "3" indicates the least consistent behavior. In each dimension, the high, medium, and low effort/motivation statements are arranged with a 1, 2, and 3 order. Teachers' ranking of the three statements was used to give the teachers a composite score for each dimension, representing their level of motivation towards the standards. For instance, if the teacher ranked the three statements

on Teaching Feedback in the order of 1, 2 and 3, the corresponding composite score was 6, the highest score for motivation in this dimension.

The development of the survey consisted of two steps, item development and content validation. When all statements for each dimension were written, they were sent to a group of experts (n= 5) specialized in teacher motivation in physical education. We asked the expert panel to determine (a) how the statements reflected effort/motivation levels a physical education teacher displays in daily teaching and (b) how the statements were consistent with the dimensions under which they were written. The experts were provided a 5-point Likert scale with 1 indicating not relevant for effort/motivation or not consistent with the dimension and 5 indicating highly relevant and strongly consistent, respectively.

Teacher Demographic Information. Teachers' demographic information, including gender, age, ethnicity, years of teaching experience, and the highest degree obtained, were collected along with the Job Demands and Resources Scale, the modified WEIMS and the Teacher Motivation Survey.

Data Collection

Prior to data collection, IRB approval was obtained from the University of North Carolina at Greensboro. The approved IRB allowed the study to collect teacher consent electronically. Organized in four blocks, the consent form and the survey forms were imported to an on-line survey mechanism, Qualtrics (Qualtrics Labs, Inc., Provo, UT), in the order of electronic consent form, Teacher Motivation Survey, the modified WEIMS, the Job Demands-Resources Scale, and teacher/school demographic information.

Inserting the approved electronic consent form at the beginning of the process provided teachers with the study details, such as the purposes and the methods of the study. It also informed them that their participation in the study was voluntary, and their responses would be kept confidential. The teachers could choose to continue to complete the study voluntarily or exit the study at the end of the consent form. The rationale also was for teachers first to concentrate on deliberating questions related psychological dispositions, such as teacher motivation and regulatory processes, in the beginning of the survey and then to report more concrete and factual information towards the end of the survey. Within each block, the orders of the items were randomized. For the Teacher Motivation Survey, the order of three statements under each domain was randomized.

Once all the instruments were imported to Qualtrics, a hyperlink was sent to teachers via email, was generated along with an email message, briefly introducing the study. Across the two states where the study was conducted, certain school districts allowed the researchers to contact the teachers directly. In these school districts, one week after the hyperlink was initially sent to the teachers, another email was sent to the teachers to remind them to complete the survey. In other school districts, the survey link was only sent to the teachers by school district supervisors for physical education. In these school districts, reminder emails were sent by the supervisors two weeks after the survey link sent to the teachers.

Through Qualtrics, a function called “forced response” was enabled. The function required teachers to respond to the item on the screen before they could proceed to the next item, effectively eliminating missing data. All responses were saved automatically in

the Qualtrics server. We examined the progress of data collection and downloaded the results almost daily. Data collection was completed two weeks after the reminder email were sent to the teachers. At that point, the survey links were permanently deleted from the Qualtrics server.

Data Reduction

Data reduction was performed on all three sets of variables: job demands and resources, motivation regulatory processes and teacher motivation. Teachers' responses to the *Job Demands and Resources Scale for PE Teachers* were aggregated by dimensions. For example, the three items measuring physical job resources were aggregated and averaged to represent their corresponding dimension. As a result, five composite scores for each teacher were obtained for physical job resources, institutional job resources, physical job demands, cognitive job demands and emotional job demands. Then, two components of job resources (physical and organizational) were aggregated to represent overall job resources; three components of job demands (physical, cognitive and emotional) were aggregated to represent overall job demands. In the same vein, teachers' responses to the WEIMS were aggregated on four dimensions to represent external regulation, introjected regulation, identified regulation and integrated regulation.

Responses to the Physical Education Teacher Motivation Survey were reduced according to an algorithm reflecting the predetermined effort/motivation behavior of teaching in each dimension (item 1= high effort/motivation, item 2= medium effort/motivation, item 3= least effort/motivation). In other words, the three items in each of the six domains were listed in the order of high-to-low teacher effort/motivation.

Teachers' rank order of the items were reduced to a score, as illustrated in Table 5.2, to reflect their overall effort/motivation. For example, when a teacher ranks the three items in the order of two, three and one, the teacher received a score of 3 for that dimension. A score of 6 in each teaching behavior dimension reflects the highest effort/motivation of the dimension. Table 5.2 presents the aggregated effort/motivation scores for all possible rank order combinations. The total score for the six dimensions were aggregated to represent teachers' effort/motivation towards standards-specified organizational goals.

Data Analysis

Instrument Validation. The three instruments adopted for this study went through different instrument validation processes. Because the WEIMS is an established and previously validated instrument, for this study the modified WEIMS first went through content validation with a panel of four experts who specialized in Self-Determination Theory. The purpose of the processes was to make sure that the modifications made on the instrument reflected the unique context of teaching physical education. The selected experts published an average of seven SDT-based research articles in peer-reviewed journals in the past three years. All of the experts produced at least one review article on SDT-based empirical studies and an empirical research study that applied SDT in physical education setting. The experts were asked to independently rate the consistency between the items and the dimensions they represented on a 5-point Liker scale (5="very consistent," 1="very inconsistent"). Ample space was provided under each item for the experts to revise/re-write the item, if necessary. Items with an

average rating lower than 3.00 were substantial revised according to the experts' feedback and were then re-evaluated by the experts.

Following content validation, construct validation was performed on the modified WEIMS with the same sample of certified PE teachers participating in this study (n=193). A confirmatory factor analysis (CFA) design was used to assess and verify the consistency between the items and the conceptual construct they represent. Maximum likelihood estimation method was adopted for model fitting for its allowance of multiple model-data fit estimates (Cudeck & O'Dell, 1994). According to Bentler (2007), multiple fit indices for model testing, including χ^2, the Comparative Fit Index (CFI; acceptable > .90, good fit > .95 Bentler, 1990), the Root Mean Square Error of Approximation (RMSEA; acceptable < .08, good fit < .05; Browne & Cudeck, 1993), and the Standardized Root Mean Square Residual (SRMR; adequate < .08; Hu & Bentler, 1998), were used for model testing.

The Job Demands-Resources scale was developed specifically for this study. Its validation consisted of item development, content validation, and construct validation using the exploratory factor analysis (EFA) and CFA approaches. Detailed information about the validation processes are included in Chapter IV.

The original Teacher Motivation Survey was not constructed with a numerical scoring system such as a Likert-type scale. With a panel of five experts, content validation was conducted to ensure 1) the statements reflect the teaching behavior of the dimension they represent; and 2) the three statements within each dimension reflect different levels of teacher effort/motivation. The panel included faculty members and

doctoral students in a physical education teacher education program. The selected experts all had (1) experiences in training pre-service physical education teachers, (2) research experiences related to teaching learning-oriented and behavior-changing physical education, and (3) solid training in motivation theories. The experts were asked to separately rate the statements and the dimensions they represent on a 5-point Likert scale (5="very consistent," 1="very inconsistent"). Ample space was provided under each statement for the experts to revise/re-write the item, if necessary. Items with an average rating lower than 3.00 (out of 5.00) were revised in terms of the panel's comments and feedback, until the panel was satisfied with the items. The full Physical Education Teacher Motivation Survey is attached as Appendix C.

Descriptive Analysis and Data Screening. The univariate descriptive statistics were calculated for the three sets of variables included in the *a priori* model: teacher working environment, motivation regulatory processes, and teacher motivation. To meet the assumptions for Structural Equation Modeling (SEM), data normality, multicollinearity and outliers were tested prior to testing the *a prior* model as delineated in Figure 5.1. Multivariate normality was evaluated using Mardia's (1970) coefficient that examines the value of skewness and kurtosis statistically. The coefficient can be converted to a normalized Z score. A Z score greater than 3.00 is an indicator of nonnormality (Bentler, 2001; Ullman, 2006). Multicollinearity leads to unreliable and unstable estimates of regression coefficients and it occurs when there are high correlations among predictor variables (Marsh, Dowson, Pietsch, & Walker, 2004). To identify multicollinearity, variance inflation factors [VIF, the ratio of the total

standardized variance to unique variance $1/(1-R^2)$] were examined to ascertain the VIF values lower than 10 (Hair, Anderson, Tatham and Black, 1995; Kline, 2005).

Structural Equation Modeling Analysis. A full latent variable model – the *a priori* model (Figure 5.1) that conceptually represents the hypothesized relationship among the three sets of latent variables (teachers' working environment, motivation regulatory processes and teacher motivation) was tested using path analysis with the data from the participating teachers (n=193). When the construct of the SEM model (the *a priori* or an alternative) was retained, teachers' demographic information, including state, gender, age and education levels, were included in the model as control variables of teacher motivation. We examined the extent to which the demographic variables swayed the strength and/or direction of the relationship revealed in the path analysis to imply model stability. Similar to CFA that tests construct validity, the multiple model-data fit indexes approach (Bentler, 2007) was used to evaluate the structure of the full structural model.

Results

Instrument Validation

The Modified WEIMS. The content validation of the modified WEIMS received an average score of 3.96/5.00 from the expert panel. The detailed information on content validation is included in Table 5.3. Minor revisions were made on the items according to the expert panel's suggestions. And the final modified WEIMS is included in Appendix D.

The results of construct validation conducted through CFA, including model fit indices, the correlations and item loadings, are reported in Figure 5.2. Items for identified regulation showed low loadings (.30-.45). We then tested the construct of regulatory processes after removing the items under identified regulation. The fitting indices and the item loadings improved significantly. Figure 5.3 reports the CFA results of construct validation for the three- dimension WEIMS.

We decided to remove the dimension of identified regulation for two reasons: first, previous research reported that it is challenging to psychometrically distinguish identified regulation from integrated regulation (see Gagne et al. 2010; Vallerand et al. 1992); second, theoretically, identified regulation could confound introjected and integrated (dissolved in both directions) in professional teachers because they have developed and solidified their value system with the profession. As a result, a modified *a priori* model with three dimensions, included in Figure 5.4, was developed for following SEM model testing.

Physical Education Teacher Motivation Survey. For content validation, the items in the Teacher Motivation Survey received an average rating of 4.00 out of 5.00 with a standard deviation of .32. The detailed information on expert ratings is included in Table 5.4.

Descriptive Analysis and Data Screening

The univariate descriptive statistics for the regulatory processes, job demands and resources, and teacher motivation are reported in Table 5.5. Multivariate normality test indicates that the Mardia's multivariate kurtosis coefficient was 1.32, and the

corresponding significance test (Z = .85), suggesting a normal multivariate distribution. As shown in Table 5.6, multicollinearity screening results indicated independence among the variables (Hair, Anderson, Tatham & Black, 1995; Kline, 2005).

Structural Equation Modeling Analysis

SEM testing was performed on the modified *a priori* model (Figure 5.4). According to the model, the job demands and resources in teachers' working environments contribute to teachers' motivation regulatory processes (external regulation, introjected regulation, and integrated regulation), which in turn contribute to teacher motivation. The model testing results indicated that job demands negatively contributed to both external regulation and introjected regulation, but positively contributed to integrated regulation. Instead, job resources do not significantly contribute to motivation regulatory processes. Among the three regulatory processes for extrinsic motivation, only introjected regulation contributed to teacher motivation, negatively. In addition, results indicated that job demands and job resources are negatively correlated with each other. The model testing results are reported in Figure 5.5.

After teachers' gender, years of teaching experiences and age on teacher motivation were included in the *a priori* model as control variables, the fit indexes showed improvement (see Figure 5.6). The model testing results indicated that job demands still significantly contribute to motivation regulatory processes. Among the three motivation regulatory processes, introjected regulation negatively contributes to teacher motivation. In addition, gender positively contributed teacher motivation. The

modification indices also suggested that teachers' years of experiences are positively correlated with their levels of education.

Discussion

The study focused on testing two research hypotheses: first, job resources and demands in the working environment influence teachers' adoption of motivation regulatory processes teachers adopt; second, the adopted motivation regulatory processes, in turn, influence the level of teacher motivation. By integrating the Job Demands-Resources model with SDT, the modified *a priori* model (Figure 5.4) suggests that better understanding of these relationships carries the potential of changing job resources and demands for teachers to adopt different regulatory processes, which may eventually lead to higher teacher motivation. Specifically, by changing working environmental factors (job resources and demands), it is possible to have teachers to adopt more autonomous kinds of extrinsic motivation, such as shifting from regulatory processes from external regulation to identified regulation. It is also possible that the more autonomous kinds of regulatory processes teachers adopt may relate to higher levels of teacher motivation.

There are four major findings from the analyses. First, the CFA results revealed that the four-dimension model of motivation regulatory processes lacks stability in the studied sample of teachers. The yielded three-dimension model confirms the results of other studies that recognized the difficulty to psychometrically distinguish identified regulation from integrated regulation (Gagne et al. 2010; Vallerand et al. 1992). By confirming the three-dimension construct of motivation regulatory processes, the study

sheds light on future teacher motivation research by understanding in-service teachers' motivation regulatory processes.

The second finding is that a significant association between job demands and teachers' motivation regulatory processes exists. Not only were teachers' job demands were negatively associated with external regulation and introjected regulation but also were positively associated with integrated regulation. This finding suggests that when job demands increase, the teachers' adoption of external regulation and introjected regulation decrease, while their adoption of integrated regulation increases. In other words, with more job demands, teachers are adopting more autonomous regulatory processes. The finding is at odds with what the Job Demands-Resources model and relevant empirical studies that suggest with more job demands, workers need to exert more effort to overcome the demands, and overwhelmingly high job demands drain workers' energy and contribute to their health deterioration and eventually burnout (Bakker, Demerouti, & Verbeke, 2004).

Based on the results, two speculations based on the Job Resources-Demands model and the contextual specificity of physical education teachers' working environment was made. First, considering integrated regulation as an extrinsic motivation processes that is closest to intrinsic motivation, intrinsically motivated teachers are more likely to meet challenges with stronger motivation, because their intrinsic motivation to teach propel them to a higher level of integrated regulation of their teaching behaviors. Second, as Broeck and colleagues (2010) suggested, job demands can be conceptualized into two types: job hindrances and job challenges. Job hindrance refers to those demands

that drain workers' energy, create feeling of lack of control, and elicit negative emotions about the job. Job challenges refer to the demands that require energy and effort but provide workers potential gains and opportunities for development (McCauley, Ruderman, Ohlott, & Morrow, 1994). Broeck and colleagues (2010) found that job hindrances related positively to exhaustion and negatively to motivation, while job challenges were positively related to motivation and negatively related to exhaustion. The finding suggests that changing the nature of job demands has the potential of maintaining or even promoting worker motivation. In the same vein, Deci and colleagues also suggested that a meaningful rationale for engaging in a behavior is to facilitate people to internalize the value and regulation of the behavior (Deci, Eghrari, Patrick & Leone, 1994). We speculate that this group of physical education teachers, who voluntarily participated in this study were already motivated, thus have identified with the standards that promote learning-oriented and behavior-changing physical education and perceived the increasing job demands as job challenges that can contribute to their development and growth. As a result, their perception of job demands as job challenges facilitates their adoption of more autonomous motivation regulatory process – integrated regulation.

The third major finding was the non-significant relationship between job resources and all three motivation regulatory processes. It has been widely documented in research that, in working environments, job resources play a significant role in promoting motivation. For instance, Bakker, Demerouti and Euwema (2005) found that job resources, such as autonomy in making decisions, social support, good relationship with supervisor, and effective performance feedback, can effectively buffer the negative

impact generated by job demands, such as students' disruptive behaviors, on teachers. Research also reveals that a lack of job resources has negative effects on teachers' well-being (Hakanen, Bakker & Schaufeli, 2006), and job resources, such as school support, have a significant negative effect on reducing stressors (Betoret, 2009). Job resources can also boost work engagement when job demands are high (Bakker, Hakanen, Demerouti & Xanthopoulou, 2007). However, the result of this present study did not detect significant relationship detected by previous research.

The inconsistent results, we speculate, may be due to the fact that physical education teachers in public schools generally do not have access to substantial job resources. As the data of the descriptive analysis show, the variance of job resources is much smaller than that of job demand (job resources 1.75; job demands 3.54). The results indicate the direction of future research: if job resources have played such a critical role in promoting motivation and buffering negative effects caused by job demands in other working environments, would job resources, if available, play a similar role for physical education teachers? If yes, what specific job resources would contribute to the adoption of more autonomous motivation regulatory processes? If not, what factor(s) make the working environment of physical education teachers different from other working environments?

As Bandura (1991) ever elaborated, self-regulatory mechanism is central for generating causal behaviors because self-regulation mediates "the effects of most external influences" and provides "the very basis for purposeful action" (p. 248). With self-regulation, "people motivate themselves and guide their action in an anticipatory

proactive way" (Bandura, 1991, p. 248). At the same time, individuals' self-regulation is not independent from their social environment. Scholars have advocated that changing working environment may facilitate effective performance and improve job satisfaction (see Porter & Lawler, 1968). Our findings confirmed that job demands in teachers' working environment influence the motivation regulatory mechanism teachers adopted. It provides evidences for future workplace environmental intervention.

Regarding constructing motivational working environment, Demerouti and colleagues (2001) proposed three strategies to change working environment for better worker motivation: (1) reducing or removing job demands to curb psychological and physiological cost, (2) providing job resources to facilitate work processes, and (3) offering (developmental) resources to stimulate personal growth, learning and professional development in relation to workers' aspiration. The results of the study does not confirm the findings of previous research, but reveals that non-significant relationship between job resources and regulatory processes. Instead, the findings of this study indicate that teacher motivation can also be promoted through giving teachers job challenges to stimulate their personal growth and aspiration and provide an alternative strategy to change the working environment for better teacher motivation.

The fourth important finding of the study is the low association between motivation regulatory processes and teachers' behaviors towards the organizational goal (teacher motivation). Except for introjected regulation that has significant negative relationship with teacher motivation, external regulation and integrated regulation showed non-significant associations with teacher motivation. In other words, regardless

of the teachers' adoption of more autonomous motivation regulatory processes upon the increasing job demands, the changes of their psychological disposition were not significantly reflected on their teaching behaviors.

SDT seems to have provided a plausible explanation for the non-significant association between motivation regulatory processes and teachers' behaviors. As SDT suggests, regulatory processes may underlie the direction of behavior (Gagne & Deci, 2005). However, individuals' basic psychological needs must be satisfied for functioning and well-being. "When these needs are met, growth and integration result" (Ryan & Deci, 2000b, p. 320). In other words, satisfaction of basic needs preconditions the subsequent enactment of behaviors towards organizational goals (Gagne & Deci, 2005). Nevertheless, when the basic needs cannot be met in the working environment, more autonomous regulatory process alone does not always ensure desired behaviors (Gagne & Deci, 2005). Therefore, solely promoting teacher motivation through facilitating teachers' internalization of the values promoted by the standards may not be sufficient for teachers to voluntarily adopt corresponding behaviors towards achieving the standards. Overall, the finding suggests, with the adoption of more autonomous motivation regulatory processes, the extent that the environment supports teachers' experiences of autonomy, competence and relatedness may become critical for facilitate teacher motivation.

Conclusion

A theoretical deliberation of SDT and the Job Demands-Resources model yields an integrated *a priori* model that describes the relationship between physical education teachers' job demands and resources, motivation regulatory processes and teacher

motivation. A SEM analysis of the *a priori* model reveals: (1) job demands positively contribute to teachers' adoption of more autonomous regulatory process, such as integrated regulation; (2) job resources did not demonstrate significant contribution to teachers' adoption of regulatory processes; and (3) introjected regulation was the only motivation regulatory process significantly contributed to teacher motivation.

The above findings provide informative insights for designing motivating working environment for physical education teachers. The evidence suggests that it is critical to consider teachers' job demands/resources as a basis for promoting teacher motivation. Particularly, job demands, when they provide teachers opportunities for growth and development, may contribute to their adoption of more autonomous motivation regulatory processes.

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Appendix A

Figures and Tables

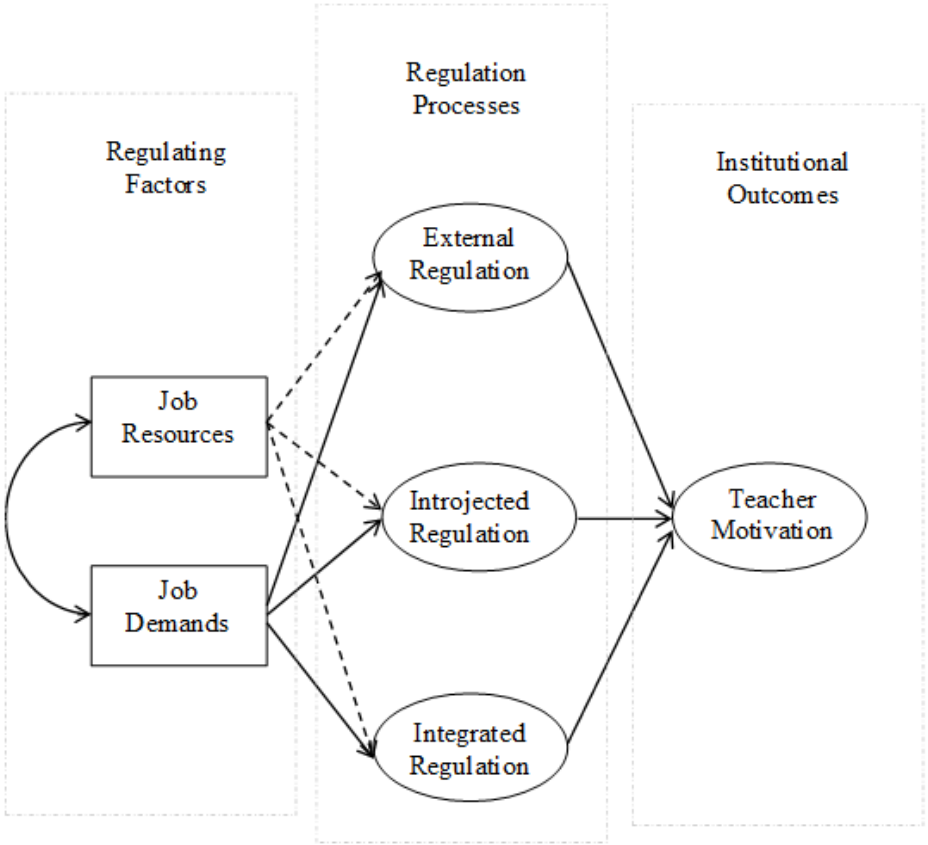

Figure 5.1 The Integrated Model that Combines SDT with the Job Demands and Resources Model.

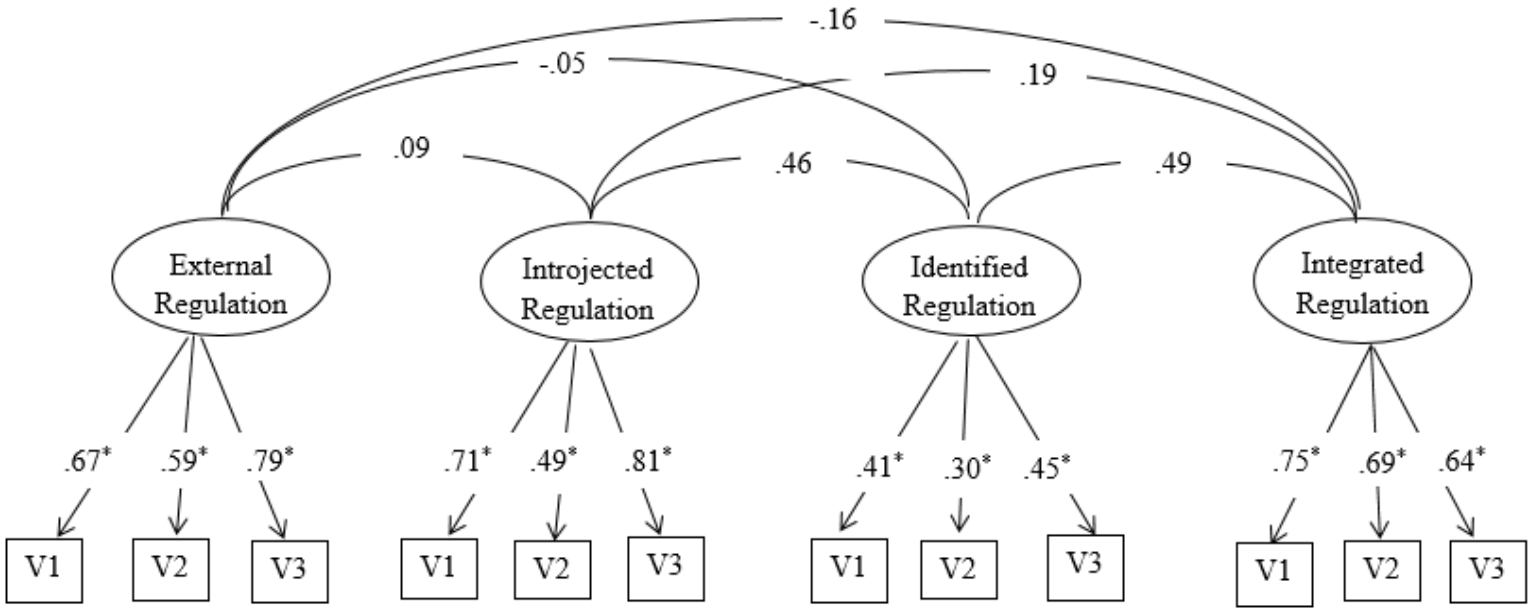

Figure 5.2 CFA Results for Regulatory Processes (Four Dimensions).

χ^2=98.08, p= .00; CFI=.92; SRMR=.07; RMSEA = .10(.09-.104)

Note: * p <.01, Z>1.96; V1…Vn are corresponding item for the dimension

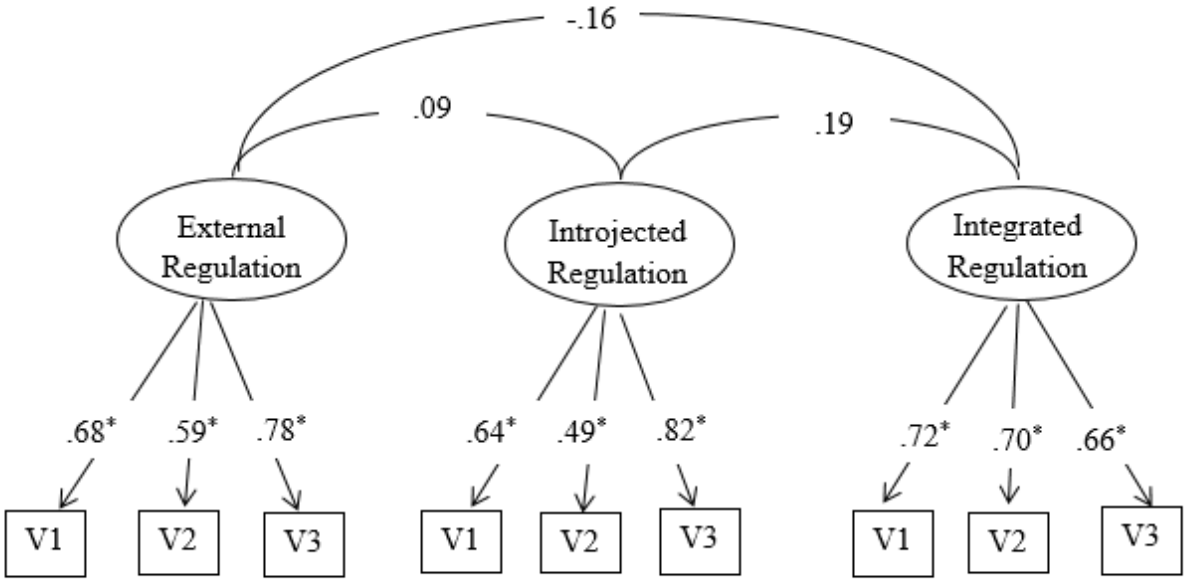

Figure 5.3 CFA Results for Regulatory Processes (three dimensions)

χ^2=45.97, p= .04; CFI=.93; SRMR=.06; RMSEA = .08(.01-.11)

Note: * p <.01, Z>1.96; V1…Vn are corresponding item for the dimension

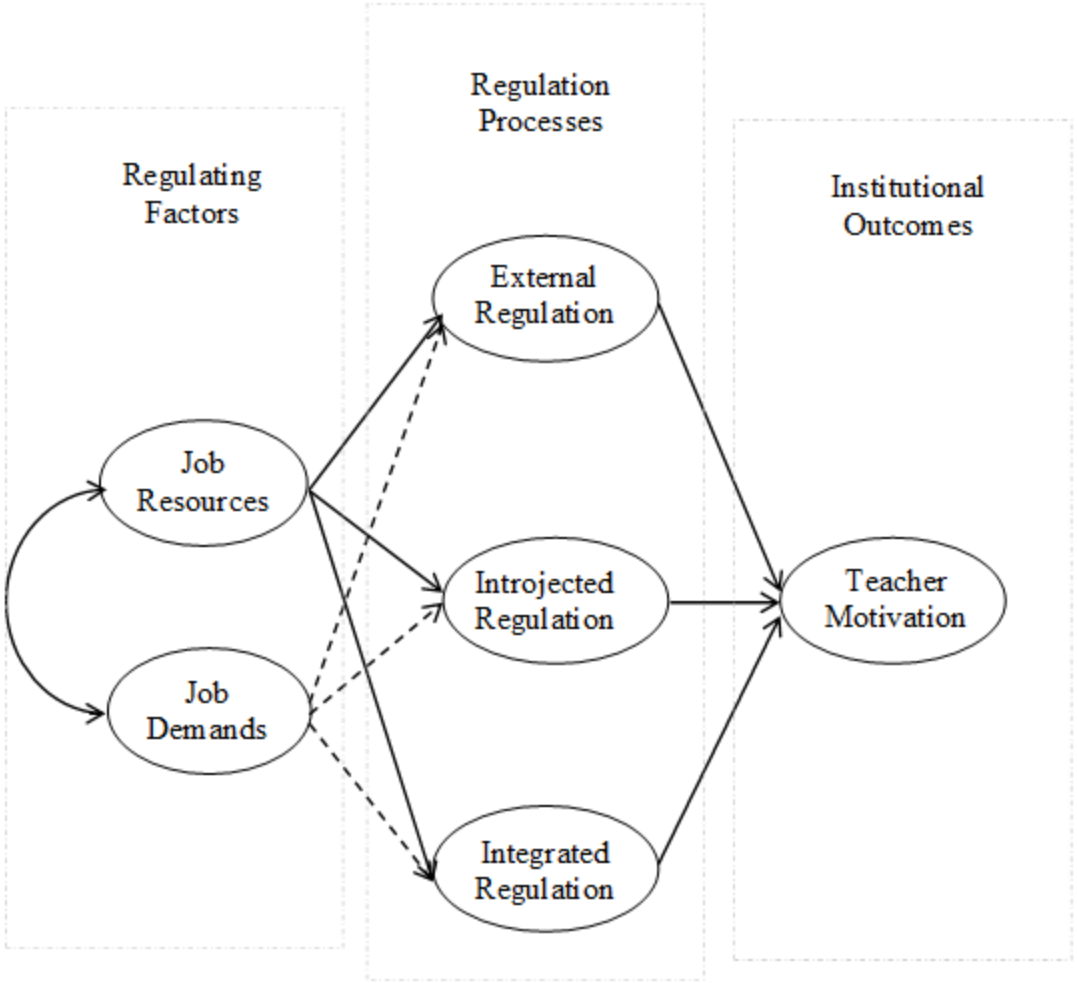

Figure 5.4 The Modified *a priori* Model with Three Dimensions of Regulatory Processes.

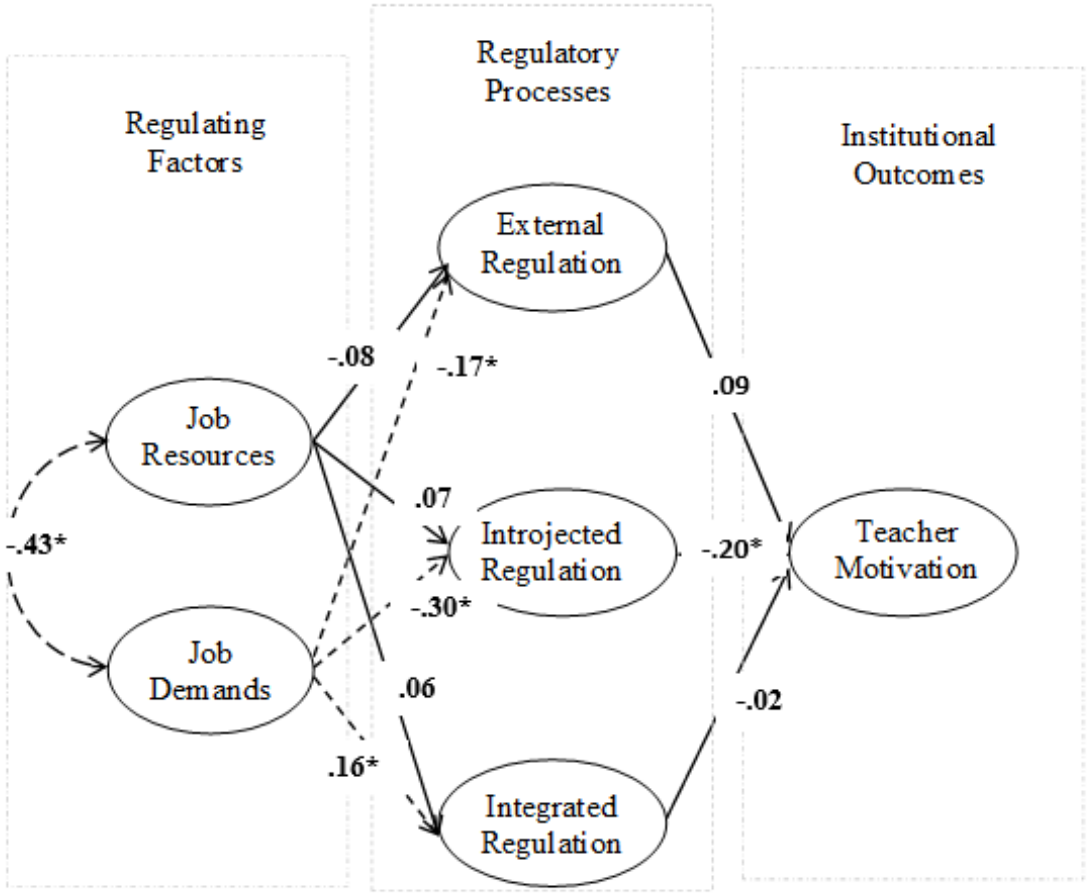

Figure 5.5 The Estimated Parameters for the *a priori* Model.

χ^2=15.18, *p*= .03; CFI= .84; SRMR= .06; RMSEA = .11(.05-.18). Note: * *p* <.01, Z>1.96

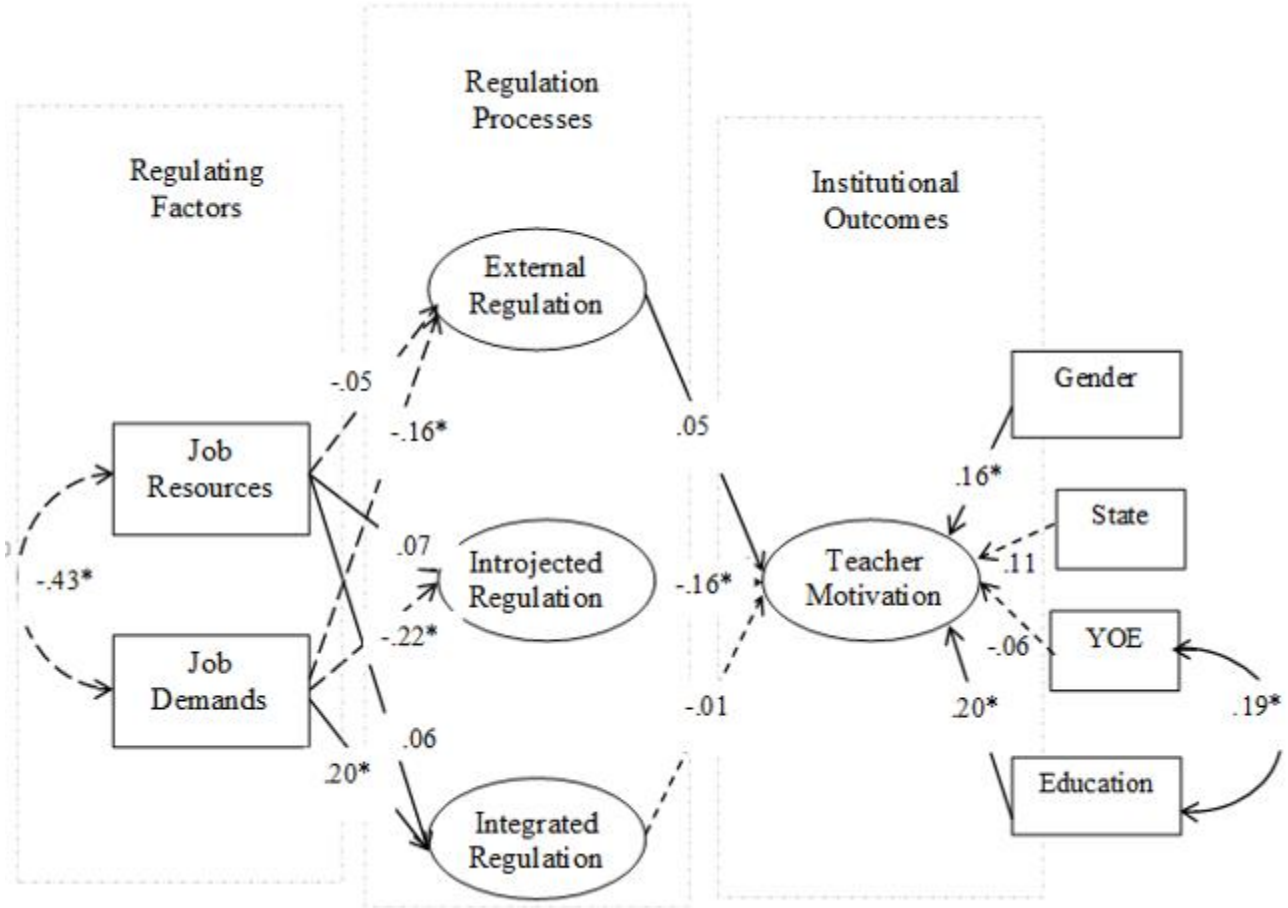

Figure 5.6 The Estimated Parameters with Control Variables.

χ^2=28.82, *p*= .15; CFI= .90; SRMR= .07; RMSEA = .04(.00-.09). Note: * *p* <.01, Z>1.96

Table 5.1

Teacher Self-evaluation Checklist and NASPE Guideline

Rink, 2009	SHAPE America, 2009
1. Maintain good communication with students, such as keeping students' attention, checking for understanding, and organizing learning cues	Learning environment/ Instructional strategies
2. Reinforce learning by providing frequent feedback	Learning environment/ Instructional strategies
3. Maintain a good learning environment by emphasizing students' self-control and responsibilities	Learning environment
4. Motivate students to move and learn with different strategies	Instructional strategies
5. Establish teaching goals and objectives for student learning	Curriculum
6. Plan activities according to the specified goals and objectives	Curriculum
7. Uphold accountability using assessment	Assessment

Table 5.2

Statement Ranking and Dimension Scoring for Teacher Motivation

Item 1 High Effort	Item 2 Medium Effort	Item 3 Low Effort	Total Dimension Score
1	2	3	6
1	3	2	5
2	1	3	4
2	3	1	3
3	1	2	2
3	2	1	1

Note: The scoring system is used to score all six teacher motivation dimensions.

Table 5.3

The Modified WEIMS for Content Validation

Items	Mean	S.D.
Integrated Regulation (IGR)		
IGR1: Because teaching physical education has become a fundamental part of who I am – valuing healthy and active lifestyle.	3.75	.43
IGR2: Because teaching physical education reflects the way in which I have chosen to live my life.	5.00	.00
IGR3: Because the value embedded in my daily PE teaching reflect my personal values.	2.75	.83
Identified Regulation (IDR)		
IDR1: Teaching physical education is the type of work I chose to do to attain a healthy and physically active lifestyle.	4.25	.43
IDR2: I teach physical education to attain my career goal.	3.50	.87
IDR3: Because teaching physical education can help me to achieve objectives important to me.	3.25	.83
Introjected Regulation (IJR)		
IJR1: Because I want to succeed at this teaching job, if not I would be very ashamed of myself.	5.00	.00

IJR2: Because I want to be very good at teaching PE, otherwise I would be very disappointed about myself.	4.25	.43
IJR3: Because I want to outperform other PE teachers on this job.	3.75	.43
External Regulation (ETR)		
ETR1: For the income that teaching PE provides me.	4.75	.43
ETR2: Because teaching physical education provides me income.	4.25	.43
ETR3: Because my current job as a PE teacher gives me job security.	4.50	.87

Table 5.4

Expert Ratings for the Teacher Motivation Survey

Domain	Mean	S.D.
Assessment	3.67	1.75
Learning Environment	4.00	1.10
Teaching Objectives	3.67	.82
Pedagogical Content (Skills)	3.67	1.03
Pedagogical Content (knowledge)	4.33	1.03
Feedback to Students	4.67	1.03

Table 5.5

Descriptive Analysis for Variables

	Mean	S.D.	Variance	Skewness	Kurtosis
External	12.06	2.01	4.04	-.66	.63
Introject	8.56	2.61	6.83	.20	-.32
Integrated	4.86	1.46	2.12	.38	-.14
Job Demands	8.78	1.88	3.54	.14	-.15
Job Resources	6.62	1.32	1.75	-.51	.20
Motivation	23.95	4.58	20.95	-.04	-.38

Table 5.6

Variance Inflation Factors (VIF)

	VIF
Integrated Regulation	1.08
Introjected Regulation	1.09
External Regulation	1.04
Job Demands	1.39
Job Resources	1.04
Teacher Motivation	1.01

Appendix B

The Original WEIMS

Why Do You Do Your Work?

Using the scale below, please indicate to what extent each of the following items corresponds to the reasons why you are presently involved in your work

Does not correspond at all			Corresponds moderately			Corresponds exactly
1	2	3	4	5	6	7

1. Because this is the type of work I chose to do to attain a certain lifestyle.	1	2	3	4	5	6	7
2. For the income it provides me.	1	2	3	4	5	6	7
3. I ask myself this question, I don't seem to be able to manage the important tasks related to this work.	1	2	3	4	5	6	7
4. Because I derive much pleasure from learning new things.	1	2	3	4	5	6	7
5. Because it has become a fundamental part of who I am.	1	2	3	4	5	6	7
6. Because I want to succeed at this job, if not I would be very ashamed of myself.	1	2	3	4	5	6	7
7. Because I chose this type of work to attain my career goals.	1	2	3	4	5	6	7
8. For the satisfaction I experience from taking on interesting challenges	1	2	3	4	5	6	7
9. Because it allows me to earn money.	1	2	3	4	5	6	7
10. Because it is part of the way in which I have chosen to live my life.	1	2	3	4	5	6	7
11. Because I want to be very good at this work, otherwise I would be very disappointed.	1	2	3	4	5	6	7
12. I don't know why, we are provided with unrealistic working conditions.	1	2	3	4	5	6	7
13. Because I want to be a "winner" in life.	1	2	3	4	5	6	7
14. Because it is the type of work I have chosen to attain certain important objectives.	1	2	3	4	5	6	7
15. For the satisfaction I experience when I am successful at doing difficult tasks.	1	2	3	4	5	6	7
16. Because this type of work provides me with security.	1	2	3	4	5	6	7
17. I don't know, too much is expected of us.	1	2	3	4	5	6	7
18. Because this job is a part of my life.	1	2	3	4	5	6	7

Note. Intrinsic motivation = 4,8,15; integrated regulation = 5,10,18; identified regulation = 1,7,14; introjected regulation = 6,11,13; external regulation = 2,9,16; amotivation = 3,12,17.

Appendix C

The Final Modified WEIMS

Integrated Regulation (IGR)

IGR1: Because I value healthy and active lifestyle, teaching physical education has become a fundamental part of who I am.

IGR2: I choose to teach physical education, because the values embedded in my daily teaching reflects my personal values.

IGR3: Because teaching physical education reflects the way in which I have chosen to live my life.

Introjected Regulation (IJR)

IJR1: Because I want to be very good at teaching PE, otherwise I would be very disappointed about myself.

IJR2: I choose to teach physical education, because I want to outperform other PE teachers on this job.

IJR3: Because I want to succeed at teaching physical education, if not I would be very ashamed of myself.

External Regulation (ETR)

ETR1: I choose to teach physical education just to secure an income

ETR2: I choose to teach physical education, just to have the money I get for teaching.

ETR3: I choose to teach physical education, because of the job security it provides to me.

Note: The response choices include: 1) Strongly disagree; 2) Disagree; 3) Neutral; 4) Agree; 5) Strongly agree.

Appendix D

The Final Teacher Motivation Survey

We are using the survey below to determine teaching practices that most physical education teachers use during actual teaching. The survey items are organized in 6 sets, each set includes 3 statements. Please read each statement. Rank a "1" to the statement that is most consistent to your situation, a "2" to the statement that is a less consistent description of your teaching, and a "3" which is the least consistent description of your teaching.

Assessment

1. I assess students' learning process and the outcomes of their learning.
2. I assess students by comparing their performance with the standards.
3. I use attendance, participation and/or dress-out records as assessment.

Learning Environment

1. I expect students to make improvement from each task.
2. I encourage students to practice at their own pace.
3. I encourage students to feel good about themselves.

Teaching Objectives

1. I give individualized and specific feedback to students.
2. I point out common mistakes and hope students to pay attention.

3. I encourage students by saying “good job” and give them pat on the back.

Pedagogical Content (knowledge)

1. I teach students knowledge and how to use the knowledge to develop a healthy lifestyle.
2. I provide students access to materials (such as posters and cards) about health knowledge.
3. I remind my students about the health benefits of physical activities to keep them active.

Pedagogical Content (skills)

1. I match easy, medium and hard experiences to low, average and high skilled students.
2. I provide students with instructional tasks to practice their basic skills.
3. I provide a range of physical activities to keep students occupied to minimize disruptive behaviors

Feedback to Students

1. I design lesson objectives to ensure students can practice skills and improve their level of fitness.
2. I design lesson objectives to ensure my students can enjoy different activities and have fun.

3. I design lesson objectives so that students can enjoy the freedom they need through free-play.

CHAPTER VI

CONCLUSIONS AND IMPLICATIONS

With a pressing need to prioritize students' learning in physical education, physical education teachers are expected to align their teaching practices with the learning standards. There is an unprecedented urgency to foster physical education teacher motivation for students' achievement. Like other workplace motivation regulated by working environment, teacher motivation is externally regulated by their working environment and state and national standards. Thus, investigating the relationship between teacher motivation and working environment is critical in identifying strategies that can effectively nurture and protect teacher motivation.

The in-depth theoretical deliberation resulted in the adoption of the Self-Determination Theory (SDT) as the theoretical framework to investigate externally regulated physical education teacher motivation. In contrast with other motivation theories, SDT is unique in that it postulates autonomous and controlled motivations in terms of different underlying regulatory processes, and suggests that behaviors are characterized in terms of individuals' internalization of external influences (Gagne & Deci, 2005).

In an attempt to clarify the relationship between physical education teachers' working environment and motivation, this dissertation study first developed and validated

the Job Demands and Resources Scale for Physical Education Teachers (Study 1). The scale can help researchers comprehensively evaluate job demands and resources embedded in physical education teachers' working environment. The dissertation study also attempted to identify the relationship between teachers' job demands and resources, motivation regulatory processes and teacher motivation through testing the *a priori* structural equation model based on the Job Demands-Resources model and the Self-Determination Theory (Study 2).

Findings

Findings from Study 1 established strong evidence of validity and reliability for the Job Demands and Resources Scale. The evidence confirmed two job resource dimensions and three job demands dimensions that physical educators relied on to evaluate their working environment. The findings also indicated that using this instrument allowed the researchers to measure physical education teachers' working environment in multiple dimensions. Specifically, the results showed that job resources were characterized by physical and organizational dimensions; while job demands could be specified with physical, cognitive and emotional dimensions. Specifically, the findings revealed that the teachers' perception of job cognitive demands included planning lessons to reflect standards, planning lessons to meet students' needs, teaching lessons to facilitate students' adoption of active lifestyle and providing students immediate feedback. With more standards and policies requiring teachers to meet these demands, it is critical to provide teachers matching resources to address the demands accordingly.

The findings from Study 2 led to the following three conclusions. (1) Job resources did not seem related to teachers' choices of motivation regulatory processes; (2) job demands were related to teachers' choices of motivation regulatory processes. Specifically, the teachers with higher job demands tended to adopt more autonomous regulatory processes; and (3) there was no significant connection between teachers' motivation regulatory processes and teachers' behaviors towards the standards – teaching learning-oriented and behavioral changing physical education.

The first finding appears to indicate that the teachers' overall job resource level varied on a relatively small scale. The second finding suggests the more job demands the teachers perceived, the more autonomous motivation regulatory process they would adopt in teaching. The finding could be explained by the recent learning standards in physical education that centralize on students' learning achievement and behavioral changes to align physical education with the mission of K-12 education. We speculate that the physical education teachers, who participated in this study voluntarily for this study, might perceive the increased job demands to meet the standards as job challenges that can potentially contribute to their development and growth. The third finding seems to suggest that by adopting a more autonomous regulatory process alone such as the integrated regulation, the teachers might not be able to direct their motivation and effort towards the standards.

Theoretical Implications

Overall, the findings seem to suggest that it is plausible to use the Job Demands-Resources model and SDT to interpret the influence of working environment on teacher

motivation. First, the findings of the two studies have shown that the working environment should be understood as an important regulating factor in teacher motivation. To study physical education teacher motivation, it is relevant to investigate working environmental factors and the influences they generate on teachers' psychological dispositions and teaching behaviors. In this study, the influence generated by school environments on physical education teachers is two-fold. On the one hand, the school's environment regulates teachers to work towards the standards through different regulatory processes; on the other, the job demands and resources the schools offer to teachers influence the degree to which the standards can be achieved. Without taking teachers' working environment into consideration, the influences generated by the school environment may be overlooked in research on teacher motivation.

The Job Demands-Resources Model conceptualizes teachers' perception of working environment in forms of job resources and demands. It provides a venue for teacher motivation research by connecting these working environmental factors to teachers' psychological dispositions and workplace behaviors. Previous studies (Bakker, et al., 2003; Cooper, Dewe & O'Driscoll, 2001; Kahn & Byosserie, 1992) have suggested that job demands and job resources function interactively in a given working environment. For instance, by having more access to job resources that facilitate professional growth, improve competence and connect workers with the working community, workers are more likely to perceive the negative influence from job demands as tolerable (Bakker, et al., 2003; Kahn & Byosserie, 1992). A finding in Study 2 also indicates that increasing job challenges that facilitate teachers' growth and development

can actually promote their adoption of more autonomous regulatory processes. Future research on physical education teacher motivation needs to look beyond the scope of teachers' psychological dispositions and may shift the focus to the dynamics between teachers' psychological dispositions and/or behaviors and working environment.

Practical Implications

The findings from the dissertation can inform the practices of school administrators and policy makers on developing and maintaining an optimal working environment for physical education teachers. In promoting physical education that focuses on students' learning and behavioral changes, school administrators and policy makers need to structure job demands as job challenges to promote physical education teachers' motivation towards standards. The evidence supports the notion that increasing job demands is linked to teachers' adoption of more autonomous regulatory processes and is considered as potential contributors to professional growth and development. In designing job demands for teachers, the potential influences that the demands may generated need to be taken into consideration.

Future Research and Recommendations

The findings seem to suggest three potential directions for future research on physical education teacher motivation. First, studies are needed to further clarify the role of job resources played on teacher motivation. Study 2 studied the relationship between the overall job resources, regulatory processes and teacher motivation, but failed to identify significant influence by job resources. Future studies can focus on clarifying the influences by dimension-specific job resources on teachers' choices of regulatory

processes and teacher motivation. Clarifying the issue can help us better understand how to improve the working environment for better teacher motivation.

Second, due to the correlational nature of this study, findings are directional instead of causal. For instance, study 2 revealed that the increase in job demands led to integrated regulation. Based on the result and conceptualization of job challenges and obstacles, I speculate that teachers could possibly perceive the increase in demands carries the potential of contributing to their personal growth and development. Future research is needed to confirm whether the directional relationship is indeed causal.

Three, future studies are needed to determine the influences of other factors/conditions, such as the satisfaction of teachers' basic needs, on the relationship between teachers' motivation regulatory processes and teacher motivation. Study 2 revealed that only introjected regulation had negative significant influence on teacher motivation, while the other two regulatory processes – external regulation and integrated regulation – showed no significant influence on teacher motivation. As teachers' motivation regulatory processes indicate the direction of their potential behaviors (Gagne & Deci, 2005), future studies could focus on investigating the environmental factors/conditions that would actualize teachers' behaviors towards standards.

Limitations

The study sheds light on future teacher motivation research. However, it is also limited in certain ways, especially regarding its sampling process. Thus, application and generalization of the findings need particular caution due to possible sample bias. First, the sample of this study depended on obtaining permission to access to in-service

teachers from school districts. For this study, access to teachers was denied by several school districts, and was limited in some ways by the school districts that granted permission. Second, due to the online self-report method, the sample of this study was self-selected. It is likely that teachers with high motivation and consciousness of their working environment were prone to complete survey. Third, the data for this study were collected from two coastal states where the state-established standards dictate the direction of teacher motivation. Across the nation, physical education teachers are under different standards due to the de-centralized system of public education. These limitations' influence on the external validity of the findings is unknown. The reader should take caution when using the findings.

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