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An Investigation Of The Association Between Physical Self Perceptions, Autonomous Motivation, And Fitness Education Strategies

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AN INVESTIGATION OF THE ASSOCIATION BETWEEN PHYSICAL SELF PERCEPTIONS, AUTONOMOUS MOTIVATION, AND FITNESS EDUCATION STRATEGIES

By

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This thesis, submitted by Andrea P. Charlebois in partial fulfillment of the requirements for the Degree of Master of Science, from the University of North Dakota, has been read by the Faculty Advisory Committee under whom the work has been done and is hearby approved.

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Andrea P. Charlebois
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ABSTRACT

The purpose of this study was to investigate the relationships between relative autonomy (autonomous versus controlled motivation), engagement in physical activity in a physical education class, and health-related fitness test scores. Participants were a total of 300 students drawn from grades 9, 10, 11 and 12 from a local Midwestern high school. Motivation, perceived competence, and self-reported physical activity levels were assessed using appropriate questionnaires. Heart rate monitors were used to record adolescent's heart rate taken during technology enhanced physical education classes to obtain a quantifiable measure of physical activity. The use of Fitnessgram assessment included a variety of health-related physical fitness tests that assessed aerobic capacity; muscular strength, muscular endurance, and flexibility; and body composition. Scores from these assessments were compared to Healthy Fitness Zone® standards to determine students' overall physical fitness and suggest areas for improvement when appropriate. Support was shown for the conceptual links between competence feedback (fitness test scores), subsequent competence perceptions (CY-PSPP scores) and more autonomous exercise motivation (RAI scores). To some extent, these results represent support for the physical education program's curricular approach and long-term aims. Future research should try to evaluate how such approaches affect motivation over the students subsequent adult lives.

CHAPTER I

INTRODUCTION

Regular participation in physical activity has been linked to improved health status in children and adults and is one way to fight obesity (Berkey, Rockett, Gillman, & Colditz, 2003). Current recommendations call for children ages five to twelve to be physically active 60 minutes each day, with bouts of continual activity lasting at least 15 minutes (Council for Physical Education for Children [COPEC], 2004). Many researchers and professional organizations (American College of Sports Medicine [ACSM], 2000; Centers for Disease Control [CDC], 1997; McKenzie et al., 1995) identify physical education as a potentially important component in efforts to produce healthier children, and it is recommended that physical education be offered at every grade level every day. It is further suggested that children spend 50% of instructional time in physical education in moderate to vigorous physical activity (Burgeson, Wechsler, Brener, Young, & Spain, 2001).

Being physically active is a lifestyle choice for most individuals and it is important for researchers to learn more about these choices under the broad umbrella of motivation. Roberts (2001) defines motivation as the "investigation of the energization, direction and regulation of behavior (p. 3)."

While there are many "theories" of motivation many, are limited in scope, and there is a lot of conceptual commonality between them. However, most of the key constructs are contained in major contemporary meta-theories of motivation, with Self

Determination Theory likely being the most encompassing, and experimentally supported (Ryan & Deci, 2000).

Perceived Competence

Engagement behaviors of any kind are linked to the objective of displaying competence, or the antithesis, avoiding the display of incompetence (Nicholls, 1984). An individual's need to be perceived as one who is skilled or capable permeates almost every decision and action in one's life. The importance of the desire to show competence, therefore, cannot be underestimated. Fortunately, a competent performance includes a diverse range of acceptable outcomes, depending on the individual and his/her goals or ideals. If individuals are task-involved, then they formulate their own criteria for success and evaluate their success based on personal improvement and increased skill. Exhibiting superior performance or requiring little or less effort than others to be successful is indicative of ego-involvement (Duda & Whitehead, 1998). Perceived competence pervades most facets related to student motivation (Harter, 1985). Moreover, when perceptions of competence change for the worse or better, students' motivation levels are affected linearly, that is, as perception of competence increase, levels of motivation also increase (Vallerand, Gauvin, & Halliwell, 1986). Social comparison is one of the foremost ways individuals can receive information regarding their own levels of competence (Whitehead,1995) while external feedback is a second source of information related to one's competence (Deci, 1971).

Students who feel competent are more likely to self-report engagement in moderate to vigorous physical activity (Kimiecik, Horn, &Shurin, 1996). Task enjoyment and perceived competence have been shown to predict attendance and adherence rates in physical activity classes (Ryan, Frederick, Lepes, Rubio, & Sheldon, 1997). Papaioannou (1994) reports that students with little or no prior experience with physical activity often find the physical education environment to be quite intimidating. Those who have previous experience with activity are likely to have greater perceptions of their own competence in physical education and enjoy their physical education classes more than the students with lower perceived competence (Ntoumanis, 2001). It is widely recognized that perceived competence is a powerful predictor of engagement (Kimiecik, Horn, & Shurin, 1996), but the question remains, how do we foster competence and what predicts perceived competence? The basis of this work demonstrates that perceived competence is fostered by: (1) a motivational climate focused on learning and improvement, (2) higher levels of self-determination, and (3) a positive attitude where value, usefulness, and enjoyment are fundamental.

Perceptions of the Motivational Climate

Perceived climate is an important variable in the physical education class context. The seminal work related to motivational climate was conducted by Ames and her colleagues (Ames,1992; Ames & Archer, 1988). Competence can be defined in many ways, and the way in which a climate or environment is structured can have an enormous impact on motivation. A task-or mastery-involved environment is one where students

demonstrate their ability by mastering a task and comparisons are self-referenced. In this environment, students in physical education are more likely to be intrinsically motivated, believe that there are no gender disparities, and believe that success is the result of effort (Treasure, 1997). An ego-involved climate, on the other hand, implies that children demonstrate their ability by having a superior performance over another individual (Nicholls, 1984). In this ego or performance-oriented climate, levels of boredom increase while intrinsic motivation decreases, students attempt to win or succeed through deception or cheating, and ability, not effort, is emphasized (Treasure, 1997). Regardless of the student perceptions of the climate, competence alone is not sufficient for engagement.

Recognizing the value of the task is also necessary in that individuals must find significance in the activity and believe they can be competent before they will willfully engage (Wigfield & Eccles, 2002).

The powerful influence of children's perceptions of motivational climates has been demonstrated in recent studies that have focused on investigating ways to promote children's physical activity in physical education classes. Bryan, Johnson, and Solmon (2004) used interviews to investigate children's perceptions of fitness classes with elementary school students. Their results support the notion that children will retain positive messages that are consistently conveyed regarding health, physical activity, and fitness. Students clearly enjoyed participating in activities that they perceived to be fun and that provided a wide variety of opportunities to move and be active.

Self-Determination Theory

Self-determination theory is unique among social cognitive theories because it tries to make sense of why people do what they do (Ntoumanis, 2002) and provides a framework to understand individual choices about physical activity. Organismic in nature, the theory also takes into account that human beings regularly try to assimilate new ideas or interests into their own sense of self (Ryan & Deci, 2000). When individuals feel as though they are acting out of their own volition, or have choices among several possible courses of action, they are more likely to engage in certain behaviors, such as choosing to be physically active on their own, or in physical education.

Formally SDT comprises five mini-theories, each of which was developed to explain a set of motivationally based phenomena that emerged from laboratory and field research. Each, therefore, addresses one facet of motivation or personality functioning. These are summarized below:

1. Cognitive Evaluation Theory (CET) concerns *intrinsic motivation*, motivation that is based on the satisfactions of behaving "for its own sake." Prototypes of intrinsic motivation are children's exploration and play, but intrinsic motivation is a lifelong creative wellspring. CET specifically addresses the effects of social contexts on intrinsic motivation, or how factors such as rewards, interpersonal controls, and ego-involvements impact intrinsic motivation and interest. CET highlights the critical roles played by

competence and autonomy supports in fostering intrinsic motivation, which is critical in education, arts, sport, and many other domains.

2. ***Organismic Integration Theory (OIT),*** addresses the topic of extrinsic motivation in its various forms, with their properties, predictors, and consequences. Broadly speaking extrinsic motivation is behavior that is instrumental—that aims toward outcomes extrinsic to the behavior itself. Yet there are distinct forms of instrumentality, which include external regulation, introjection, identification, and integration. These subtypes of extrinsic motivation are seen as falling along a continuum of *internalization*. The more internalized the extrinsic motivation the more autonomous the person will be when enacting the behaviors. OIT is further concerned with social contexts that enhance or forestall internalization—that is, with what conduces toward people either resisting, partially adopting, or deeply internalizing values, goals, or belief systems. OIT particularly highlights supports for autonomy and relatedness as critical to internalization.

3. Causality Orientations Theory (COT), describes individual differences in people's tendencies to orient toward environments and regulate behavior in various ways. COT describes and assesses three types of causality orientations: the autonomy orientation in which persons act out of interest in and valuing of what is occurring; the control orientation in which the focus is on rewards, gains, and approval; and the impersonal or amotivated orientation characterized by anxiety concerning competence.

4. ***Basic Psychological Needs Theory (BPNT)*** elaborates the concept of evolved psychological needs and their relations to psychological health and well-being. BPNT argues that psychological well-being and optimal functioning is predicated on autonomy, competence, and relatedness. Therefore, contexts that support versus thwart these needs should invariantly impact wellness. The theory argues that all three needs are essential and that if any is thwarted there will be distinct functional costs. Because basic needs are universal aspects of functioning, BPNT looks at cross-developmental and cross-cultural settings for validation and refinements.

5. ***Goal Contents Theory (GCT),*** grows out of the distinctions between intrinsic and extrinsic goals and their impact on motivation and wellness. Goals are seen as differentially affording basic need satisfactions and are thus differentially associated with well-being. Extrinsic goals such as financial success, appearance, and popularity/fame have been specifically contrasted with intrinsic goals such as community, close relationships, and personal growth, with the former more likely associated with lower wellness and greater ill-being.

Self-determination theory postulates that all beings have basic psychological needs that they attempt to meet. Competence, autonomy, and relatedness are identified as the "nutriments" of self-determination theory. It is hypothesized that the nutriments are met by various social situations that can support motivated states and other positive results such as accomplishment (Standage & Treasure, 2002). Identifying the factors that

foster human potential, growth, integration, and well-being is the goal of self-determination theory (Ryan & Deci, 2000) and enhanced motivational states are expected when individuals are able to meet their basic psychological needs through the nutriments (Ryan, 1995).

Competence is defined as the need to have an influence on our surroundings, which are noticeable in important outcomes in that environment (Deci & Ryan, 2000). For motivation of any kind to be present, individuals have to feel competent in the task at hand (Deci & Ryan, 2000). It is widely accepted that higher levels of perceived competence are associated with higher levels of self-determination and intrinsic motivation (Ferrer-Caja & Weiss, 2000; Goudas & Biddle, 1994; Harter & Connell, 1984; Li, Lee, & Solmon, 2005; Ntoumanis, 2001; Standage, Duda, & Ntoumanis, 2003). Due to the public nature of participation in physical education, the role of perceived competence should be thoroughly examined (Whitehead & Corbin, 1991). Additionally, current research indicates that students with higher levels of perceived competence are more active during their physical education class time (Parish & Treasure, 2003). Gender differences related to perceived competence are also evident, with girls reporting lower levels of perceived competence than boys (Morgan et al., 2003).

Autonomy, defined as "a sense of feeling free from pressures and the possibility to make choices among several courses of action" (Guay, Vallerand, & Blanchard, 2000; p. 177-178), has a stronger effect on intrinsic motivation than perceived competence

(Goudas & Biddle, 1995). The perception of experiencing autonomy support in physical education classes has been positively linked to higher levels of intrinsic motivation and identified regulation (Hagger, Chatzisarantis, Culverhouse & Biddle, 2003). In physical activity settings, when individuals have a low sense of autonomy, their levels of perceived competence become very important in relation to their intrinsic motivation (Markland, 1999). When perceived autonomy is inherently low, it is imperative that the environment fosters feelings of accomplishment and a sense of competence (Markland, 1999). Standage, Duda, and Ntoumanis (2003) found in their study of middle school students that when the physical education environment is perceived to be autonomy promoting and low in control, students report higher levels of competence, autonomy, and relatedness. Perhaps even more importantly, students in physical education who had increased levels of self-determination reported stronger intentions to participate in physical activity outside of their school time.

The third nutriment, relatedness, is exemplified by a condition of loving and caring for others, while love and care are also received by the individual (Deci & Ryan, 2000). Physical education research has established a weak, but positive, correlation between relatedness in physical education classes and higher levels of self-determination (Ntoumanis, 2001). Individuals in physical activity settings often report that social interaction is a primary reason for their participation (Ntoumanis, 2001).

Continuum of Self-Determination

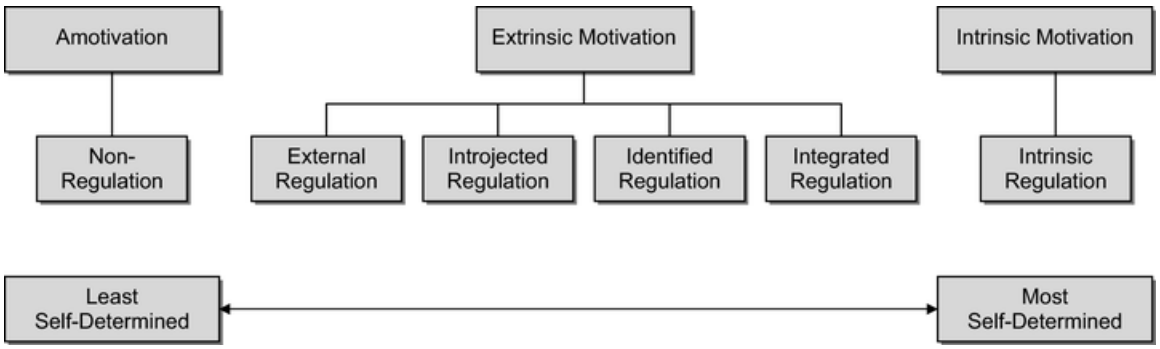

Figure 1: Continuum of Self-Determination

Levels of motivation are conceptualized within self-determination theory on a continuum. ***The Organismic Integration Theory (OIT),*** addresses the topic of extrinsic motivation in its various forms, with their properties, determinants, and consequences. Broadly speaking extrinsic motivation is behavior that is instrumental—that aims toward outcomes extrinsic to the behavior itself. Yet there are distinct forms of instrumentality, which include external regulation, introjection, identification, and integration. These subtypes of extrinsic motivation are seen as falling along a continuum of *internalization*. The more internalized the extrinsic motivation the more autonomous the person will be when enacting the behaviors. OIT is further concerned with social contexts that enhance or forestall internalization—that is, with what conduces toward people either resisting, partially adopting, or deeply internalizing values, goals, or belief systems. OIT particularly highlights supports for autonomy and relatedness as critical to internalization.

This motivational regulatory continuum places intrinsic motivation at the highest level and amotivation at the lowest level. Varying levels of extrinsic motivation are delineated between the two end points of intrinsic and amotivation. The levels of extrinsic motivation are: external regulation, introjected regulation, identified regulation, and integrated regulation (Deci & Ryan, 2000). The progression through which an individual takes a novel behavior and makes it part of the self is referred to as internalization (Ryan & Deci, 2000). The degree to which the individual internalizes a new behavior is represented within the incremental levels of motivation within the continuum (Ryan & Deci, 2000). Self-determination theory postulates that the highest level of self-determination is characterized by intrinsic motivation, where the individual chooses to participate solely for the sake of the activity as an end in itself (Deci & Ryan, 1985). The conclusion of much research in the area of physical activity is that involvement in physical activity is not inevitably intrinsically motivated (Ryan et al., 1997). Individuals may begin to participate in physical activity because they want to lose weight, or their doctors have recommended that they do so. In either case, these individuals are not participating for intrinsic reasons, though hopefully they will begin to understand the benefit of participation and move along the continuum toward a higher level of self-determination.

Intrinsic motivation is conceptualized as having three distinct components: knowing, accomplishing and experiencing stimulation (Vallerand et al., 1993). Knowing is represented by taking part in or doing something in order to discover, grow and

increase in wisdom. Students in physical education, for example, may take pleasure in learning a new sport or discovering unique movement patterns. Accomplishment is represented by the affirmative feelings of endeavoring in something exceptional or succeeding at a new pursuit. Accomplishment can be facilitated in physical education by affording students with occasions to be successful and have their accomplishments recognized. Encountering stimulation is best represented by participation for the purpose of experiencing happiness, enjoyment, excitement, and "aesthetic enjoyment" (Vallerand et al., 1993; p. 98). Examples of encountering stimulation are often associated with participation in physical activities such as rock climbing or white water rafting, which are innately thrilling and invigorating.

When individuals engage in an activity as a means to an end, rather than the activity as an end in itself, then the motivation to engage in the task is extrinsic, rather than intrinsic. Within self-determination theory, however, it is recognized that there are varying levels of internalization and self-determined forms of extrinsic motivation. Although the behavior is internalized, the motivation is extrinsic because it is associated with the outcome of the activity, such as exercising to maintain good health, rather than for enjoyment. Four levels of regulation are delineated, and integrated regulation represents the highest degree of self-determined regulations within extrinsic motivation (Deci & Ryan, 2000). The most important distinction regarding integrated regulation is that the behavior has been assimilated into the sense of self by the individual. The next level of regulation is identified, and there are subtle differences between integrated and

identified regulation. When individuals believe an activity has significance to their goals they are said to be functioning at a level of identified regulation (Standage, Treasure, Duda, & Prusak, 2003). This stage of the continuum has been referred to as the "threshold of autonomy" (Whitehead, 1995) where an individual elects to be involved because they want to do so, not because they ought to (Biddle, 1999). Positive engagement patterns in physical activity are expected when individuals choose to participate because they desire to do so, not because they feel as though they must (Chatzisarantis, Biddle, & Meek, 1997). Introjected regulation is the next level of extrinsic motivation. Integrating the regulation into the sense of self has not yet occurred for individual at this level of the continuum. External controls such as burdens of guilt, shame or decreased self-worth are present for the individual who participates only out of a sense of compulsion, guilt or duress. Adherence is often inconsistent for individuals at this stage, though they are more likely to continue than those at the level of external regulation (Deci & Ryan, 2000).

The lowest form of extrinsic motivation is external regulation, which is adjacent to amotivation on the self-determination continuum. Participation to achieve a desired result, such as a reward, or to circumvent a negative outcome or some type of punishment are the reasons cited for participation at this level of motivation (Deci & Ryan, 2000). Individuals operating at this level are likely to withdraw from the task if the incentive or risk of punishment is eliminated (Deci & Ryan, 2000). Many individuals who initiate a physical activity or exercise regimen are frequently extrinsically motivated to do so

(Ingledew, Markland, & Medley, 1998). However, if the individual stays with the program over time, it may be possible for them to move along the continuum and begin exercising for more self-determined reasons.

According to self-determination theory, individuals who quit or drop out are more likely to be operating at lower levels of self-regulation. If environments could be structured in such a way as to cultivate higher levels of self-determination, individuals may be more likely to stay involved with the activity or behavior over time.

A lack of incentive, characterized by a conviction that success is not likely and that the activity is not worthwhile, is distinctive of amotivation (Standage et al., 2003). In this state, the individual is not inspired to make an effort toward a certain end (Biddle, 1999) because of thoughts of ineptitude (Bandura, 1986) or simply because they do not value the activity (Ryan, 1995). A negative relationship emerges in physical education and physical activity settings between amotivation and involvement in or intention to be involved in physical activity (Standage, Duda, & Ntoumanis, 2003).

Hypotheses

The aim of this study is to investigate the relationships between motivation regulatory styles, perceptions of self-competence, and health-related fitness indicators. In addition to healthful fitness scores, there is a need to better understand the predictors of physical activity in youth. As perceived competence theory suggests, perceptions adolescents hold of themselves may be important motivational influences for current and future physical activity (Biddle, Page, Ashford, Jennings, Brooke & Fox, 1993). Through

the study of self-perception, important findings for the motivational predictors of physical activity in adolescents can be explored. The possession of positive feelings of self-worth or high self-esteem has been considered important, not only as an index of mental well-being, but also as a mediator of behavior (Fox, 1988). Research shows self-esteem is associated with positive achievements and socially-related behaviors such as leadership ability, satisfaction, decreased anxiety, and improved academic and physical performance (Hayes, Crocker & Kowalski, 1999). Such research has highlighted the importance of self-esteem in physical education and exercise programs (Biddle et al., 1993). Fox and Corbin (1989) developed the "Physical Self-Perception Profile" (PSPP), which has enabled the physical component of self-esteem to be examined in more detail. They identified Sports Competence, Physical Condition, Body Attractiveness, and Strength Competence as distinct sub-areas, and these were shown to be subordinate to global physical self-esteem, and global general self-esteem, in a hierarchical organization. However, as this model was established with college-age students, further modifications by Whitehead (1995) enabled the model to be used with children and adolescents, renaming it "Children and Youth Physical Self-Perception Profile" (CY-PSPP).

Through the CY-PSPP, research has suggested a relationship exists between physical self-perceptions, physical activity level and BMI. Crocker et al. (2000), in a study on children and adolescents, found that physical self-perceptions are related to physical activity. Based on motivation theories, which state that people are drawn towards activities in which they can demonstrate a high degree of skill or competence

(Hayes et al., 1999), it follows that physical self-perceptions should be positively related to levels of physical activity. With respect to self-perceptions and BMI, research found a number of psychological variables were related to increased BMI (Kolody & Sallis, 1995).

Based on the literature reviewed, the following hypotheses will be tested.

1. Higher more healthful fitness scores will predict higher Subsequent Relative Autonomy Index Scores (BREQ-2).
2. Higher more healthful fitness scores will predict subsequent higher scores on CY-PSPP scores.
3. Time in Healthy Heart Rate Zone will be associated with higher Relative Autonomy Index scores (BREQ-2).
4. Time in Healthy Heart Rate Zone will be associated with higher CY-PSPP scores.
5. Higher more healthful fitness scores will be associated with more time in Healthy Heart Rate Zone.
6. Higher scores on CY-PSPP will be associated with higher Relative Autonomy Scores (BREQ-2).
7. Higher CY-PSPP PIP discrepancies will be negatively associated with Relative Autonomy Scores (BREQ-2).
8. CYPSPP PIP discrepancies will be negatively associated with physical self worth.

CHAPTER II

METHOD

The purpose of this study was to investigate the relationships between self-determination, perceptions of the motivational climate, and engagement in physical education class physical activity, with health-related fitness test scores

Participants

The participants were a total of 244 (123 males, 121 females) students drawn from all twenty classes of ninth, tenth, eleventh, and twelfth grade physical education students attending the same high school in an urban community in the Midwest region of the United States. Students were chosen on the basis on that they were readily accessible to the researcher. Permission was obtained from the IRB, Grand Forks Public Schools, cooperating teachers, parents and participants. Only one student did not participate, and this was because he/she was a foreign exchange student who did not have immediate access to parental permission.

Measures/Instrumentation

Heart rate monitors. Polar E600 heart rate monitors were used to assess time in the healthy heart rate zone during the technology-enhanced PE lesson. Polar E600 heart rate monitors record and download heart rate data, and have been found to be reliable and valid for measuring activity in adults and children (Leger & Thivierge, 1988).

Physical Self Esteem.

The Children and Youth--Physical Self-Perception Profile (Whitehead, 1995). CY-PSPP consists of 36 items about your physical self-perception. The items represent six domains: Global Self Esteem, Global Physical Self-Worth, and the sub domain of Physical Self Worth, Sport Competence, Body Attractiveness, Physical Strength, and Physical Condition. Each item consists of two statements in a structured alternative format. First, the participants must decide which of the two statements that best describes them and then mark with (X) whether the statement is kind of true or very true for them.

Physical self-perceptions have shown to be important predictors of self-worth and exercise behavior (Welk, Corbin, Dowell, & Harris, 1997). The CY-PSPP has been shown to be valid and reliable (Fox & Corbin,1989; Kowalski, Crocker, Kowalski, Chad, & Humbert, 2003; Asci et al.,1999; Welk et al., 1997).

Perception of Importance-CY-PIP (Whitehead, 1995).

The CY-PIP is an 8-item questionnaire designed to examine students" perceptions of importance of physical activity competency. Questions are arranged in a structured alternative response format. Example questions include: 'some students think it is important to be good at sports BUT other students don't think how good you are at sports is that important' or 'some kids think exercise is important to feel good BUT other students don't think exercise is important to feeling good'. Students choose the statement

that represents how they feel and then choose if that statement is “sort of true for them” or “really true for them”. Questions were designed to load on four subscales, including sport/athletic competence importance, condition/stamina competence importance, attractive body adequacy importance, and strength competence importance. No reliability and validity information was available for this scale, though it shows high face validity (Whitehead, 1995).

Behavioral regulation in exercise questionnaire-2 (BREQ-2)

The BREQ-2 is a 19-item self-report measure developed to assess exercise regulations consistent with Self Determination Theory (SDT). The BREQ-2 is an extension of the behavioral regulation in exercise questionnaire (BREQ; Mullen et al., 1997).

The BREQ contains four subscales that measure external, introjected, identified, and intrinsic regulation of exercise behavior, and the BREQ-2 includes an additional subscale that assesses amotivation. Sample items characterizing each BREQ-2 subscale were as follows: “I don’t see the point in exercising” (amotivation; four items); “I exercise because other people say I should” (external regulation; four items); “I feel guilty when I don’t exercise (introjected regulation; three items); “I value the benefits of exercise” (identified regulation; four items); “I enjoy my exercise sessions” (intrinsic regulation; four items). Following the stem, “Why do you exercise?”, participants respond to each item on a five-point scale anchored by (0) ‘Not true for me’ and (4) ‘Very true for me’.

Previous research has supported the BREQ's multidimensional four-factor structure

(Wilson, Rodgers, & Fraser, 2002), invariance across gender (Mullen et al., 1997), and the ability of BREQ scores to discriminate between physically active and non-active groups (Mullen & Markland, 1997).

Relative Autonomy Index

Relative Autonomy Index (RAI). The RAI can be calculated to provide a measure of where an individual is on the continuum. For example, the BREQ-2 has four subscales: external, introjected, identified, and intrinsic. To form the RAI, the external subscale is weighted -2, the introjected subscale is weighted -1, the identified subscale is weighted +1, and the intrinsic subscale is weighted +2. The controlled subscales are weighted negatively, and the autonomous subscales are weighted positively. The more controlled the regulatory style represented by a subscale, the larger its negative weight; and the more autonomous the regulatory style represented by a subscale, the larger its positive weight.

Procedures

The students and physical education teachers of the school involved in the study were provided with consent forms and written information about the purposes of the study. Parental consent forms were obtained from all 244 participants. The students completed a general demographic questionnaire asking students age, grade and gender along with CY-PSPP, CY-PIP and BREQ-2 and demographic questionnaires in a quiet

environment at the beginning of regular PE time under the supervision of an experienced physical education teacher. Both oral and written instructions were given to the students regarding the content and the completion of the questionnaires. Students completed the demographic questionnaire and the CY-PSPP, CY-PIP and BREQ-2 questionnaire after the technology enhanced physical activity lesson.

It was emphasized to the participants that the questionnaire is designed to measure students' general feelings and motivations about physical education classes and not about one particular class. The questionnaire took approximately 10–12 min to complete. The student's class teacher and one researcher were present to help students having difficulty understanding the questions.

The researcher informed students that their teachers would not know what their answers were and that their survey responses were completely confidential. The researcher also continually reminded the students that there are no right or wrong answers, but that they were simply being asked what they honestly thought. Students were reminded throughout the completion of the surveys to read each question carefully and respond honestly. Permission to conduct the survey was obtained from the school board, school principal, school physical education faculty, and the Institutional Review Board from the University of North Dakota. The entire sample were volunteers and parental consent was obtained for each student.

Technology Enhanced Lesson and Fitnessgram Tests

As part of the study, heart rates were recorded during a specifically planned technology enhanced physical activity class. The heart rates were then downloaded and analyzed at the conclusion of each physical education class period and were recorded for statistical analysis. The task for the participants was to try to keep their heart rate in the healthy zone for the duration of the running activity. The participants were able to monitor whether or not their heart rates were in the zone by checking their heart rate monitors as they wished during the activity.

The PACER is a multistage fitness test adapted from the 20-meter shuttle run test published by Leger and Lambert (1982) and later revised (Leger et al., 1988). The test is progressive in intensity—it is easy at the beginning and gets harder at the end. The progressive nature of the test provides a built-in warm-up and helps children to pace themselves effectively. The test has also been set to music to create a valid, fun alternative to the customary distance run test for measuring aerobic capacity.

Fitnessgram

Physical fitness assessment program includes a variety of health related physical fitness tests designed to assess cardiovascular fitness, body composition, muscle strength, muscular endurance, and flexibility. The table below (Table 1) reproduced from page 26 of the *FITNESSGRAM/ACTIVITYGRAM*: *Test Administration Manual* (3rd. ed) (Cooper Institute, 2004), lists the various tests available in the battery and denotes the recommended (primary) assessment in each category. Additional

information on the assessments is available in separate chapters of the Reference Guide devoted to aerobic capacity, body composition, and musculoskeletal fitness. In later chapters you will learn about each of the tests. Criterion-referenced standards associated with good health are used rather than normative standards.

Table 1. Fitnessgram Test Items

Aerobic Capacity	Body Composition	Abdominal Strength & Endurance	Trunk Extensor Strength & Endurance	Upper Body Strength & Endurance	Flexibility
The PACER	Skin fold Measurements	Curl Up	Trunk Lift	90 Degree Push up	Back Saver Sit and Reach
Mile Run	Body Mass Index			Modified Pull Up	Shoulder Stretch
Walk Test				Flexed Arm Hang	

The temporal sequence of the elements of the study is shown in Figure 2 below.

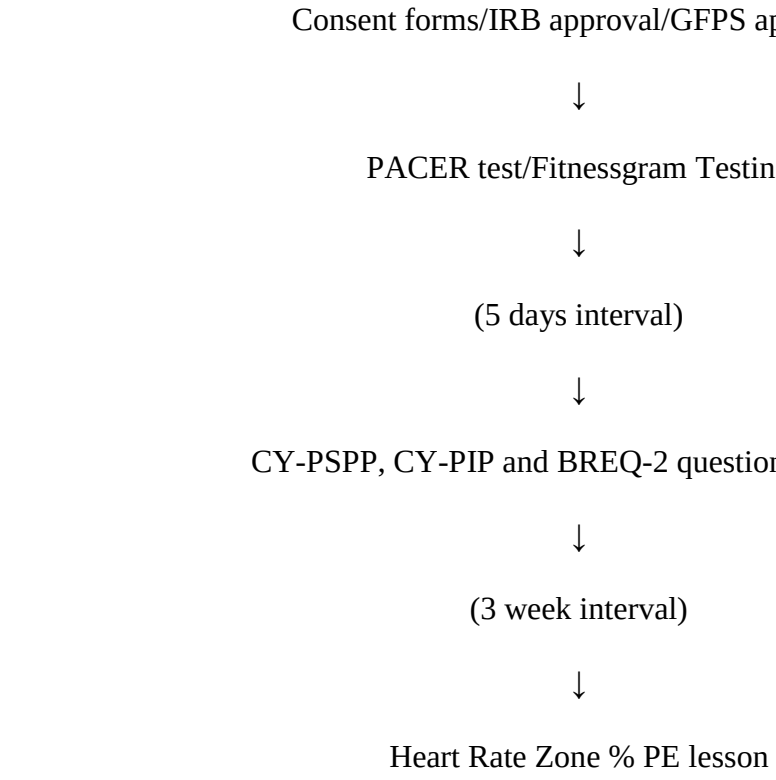

Figure 2: Flow Diagram Showing Sequence of Study

Design and Analysis

The hypotheses were tested primarily with linear regression analyses and Pearson correlation analyses to evaluate predictive and associative relationships respectively.

CHAPTER III

RESULTS

This study, conducted in an Upper Midwest High School of 244 students (males *n* = 123, females *n* = 121) investigated the relationships between selected fitness test scores and measures of physical self-perceptions and physical activity motivation.

The descriptive statistics are summarized first (see Table 2 below), and then the results of the statistical analyses are set out in the order of the eight hypotheses proposed in the introduction to this study.

Hypothesis 1. Higher more healthful fitness scores will predict higher subsequent Relative Autonomy Index scores (from BREQ-2).

Although the block of fitness test variables significantly predicted RAI both when the analysis was conducted on the whole sample, or separately by sex, the prediction was weak. On the female sample, the prediction rose to 11% of the variance explained with the Pacer test, Push-ups, and Trunk Lift being the significant individual predictors. See Table #3 below for details of the analyses.

Table #2: Descriptive Statistics

	N	Male	Female	Overall
Height in Inches	312	68.06 (3.30)	64.27 (2.83)	66.22 (3.61)
Weight in Pounds	312	151.88 (33.10)	135.43 (26.40)	143.87 (31.08)
BMI	312	22.97 (4.47)	23.04 (4.33)	23.00 (4.40)
PACER	312	48.38 (22.33)	29.30 (16.64)	39.08 (21.92)
CURLUP	312	55.28 (24.33)	41.40 (25.08)	48.52 (25.62)
PUSHUP	312	17.19 (8.81)	6.94 (5.90)	12.20 (9.11)
SITANDRLT	312	9.91 (3.39)	10.94 (3.12)	10.41 (3.36)
SITANDRRT	312	9.98 (3.39)	10.99 (3.19)	10.47 (3.33)
SHOURT	312	1.14 (.35)	1.09 (.29)	1.12 (.32)
SHOULT	312	1.26 (.44)	1.18 (.38)	1.20 (.42)
TRUNKL	312	11.05 (1.53)	11.20 (1.33)	11.12 (1.44)
TIMEINZONE	247	76.71 (24.07)	76.70 (26.26)	76.71 (25.12)
SPCOMP	309	3.10 (.57)	2.66 (.72)	2.89 (.69)
COND	309	3.12 (.66)	2.78 (.69)	2.95 (.70)
BODY	312	3.00 (.66)	2.64 (.74)	2.82 (.72)
STRCOMP	310	2.99 (.59)	2.47 (.69)	2.74 (.69)
PSW	311	3.14 (.63)	2.85 (.68)	3.00 (.67)
GSW	311	3.31 (.70)	3.17 (.65)	3.24 (.68)
SPPIP	303	3.11 (.80)	2.70 (.82)	2.91 (.84)
CONDPIP	303	3.09 (.67)	2.88 (.70)	2.99 (.69)
BODYPIP	303	3.05 (.76)	2.98 (.77)	3.02 (.76)
STRPIP	303	2.94 (.74)	2.54 (.72)	2.74 (.76)
AMOT	309	.50 (.80)	.42 (.75)	.46 (.78)
EXREG	309	1.01 (.86)	.95 (.84)	.98 (.85)
INTROJ	309	1.65 (1.13)	1.61 (1.17)	1.63 (1.15)
IDENT	309	2.67 (.99)	2.64 (1.09)	2.65 (1.04)
INTRIN	309	2.65 (1.11)	2.54 (1.04)	2.59 (1.07)
RAI	309	8.12 (6.76)	8.10 (6.46)	8.11 (6.60)
SPCOMPDISCAdj	300	-.24 (.34)	-.32 (.49)	-.28 (.42)
CONDDISCAdj	300	-.22 (.34)	-.27 (.41)	-.24 (.37)
BODYDISCAdj	303	-.30 (.52)	-.55 (.68)	-.42 (.62)
STRDISCAdj	301	-.24 (.40)	-.34 (.47)	-.29 (.44)
OVERALLDISCAdj	295	-.98 (1.23)	-.1.47 (1.59)	-1.22 (1.43)
Valid N (listwise)	231			

Table #3. Fitness Test Scores as Predictors of the RAI

Dependent Variable	**Predictor Variables**	***β***	***p***	**R^2Adj.**
RAI (Overall) $F(4, 304) = 5.09, p < .005$	Pacer Curl-ups Push-ups Trunk lift	.13 .05 .08 .10	NS NS NS NS	 .05
RAI (Males) $F(4, 153) = 2.72, p < .05$	Pacer Curl-ups Push-ups Trunk lift	.14 .05 .11 .00	NS NS NS NS	 .04
RAI (Females) $F(4, 146) = 5.51, p < .001$	Pacer Curl-ups Push-ups Trunk lift	.21 -.04 .19 .19	<.05 NS <.05 <.05	 .11

Hypothesis 2. Higher more healthful fitness scores will predict subsequent higher scores on CY-PSPP scores.

It was decided to test this hypothesis by using the three tests that involved actual vigorous activity (Pacer, curl-ups and push-ups) plus the trunk lift flexibility test (entered as a block) as predictors of the CY-PSPP scale scores. In general, the results supported the hypothesis with predictive associations that were reasonably substantive (up to 28% of the variance explained) and conceptually congruent (e.g., Pacer test a substantive predictor of Physical Condition self-perceptions). The full details of the regression analyses are displayed in Table # 4 below.

Table # 4. Prediction of Physical Self-Perceptions by Fitness Test Scores

DEPENDANT VARIABLE	PREDICTOR VARIABLE	β	p	R^2 Adj.
SCOMP (Overall)	Pacer	.23	<.005	
$F(4, 304) = 14.18$, $p < .001$	Curl-ups	.05	NS	
	Push-ups	.17	<.05	
	Trunk lift	.-07	NS	.15
SCOMP (Males)	Pacer	.17	NS	
$F(4, 154) = 5.99$, $p < .001$	Curl-ups	.05	NS	
	Push-ups	.20	<.05	
	Trunk lift	.02	NS	.11
SCOMP (Females)	Pacer			
$F(4, 145) = 2.14$, p NS	Curl-ups			
	Push-ups			
	Trunk lift			
COND (Overall)	Pacer	.27	<.001	
$F(4,304) = 31.45$, $p < .001$	Curl-ups	.16	<.01	
	Push-ups	.20	<.005	
	Trunk lift	.03	NS	.28
COND (Males)	Pacer	.28	<.005	
$F(4,153) = 14.94$, $p < .001$	Curl-ups	.11	NS	
	Push-ups	.22	<.05	
	Trunk lift	.04	NS	.26
COND (Females)	Pacer	.23	<.05	
$F(4,146) =, 10.64$ $p < .001$	Curl-ups	.19	<.05	
	Push-ups	.17	<.05	
	Trunk lift	.02	NS	.20
BODY (Overall)	Pacer	.23	<.005	
$F(4,307) = 15.22$, $p < .001$	Curl-ups	.07	NS	
	Push-ups	.17	<.05	
	Trunk lift	-.01	NS	.16
BODY (Males)	Pacer	.16	NS	
$F(4,155) = 7.36$, $p < .001$	Curl-ups	.05	NS	
	Push-ups	.24	<.05	
	Trunk lift	.03	NS	.14
BODY (Females)	Pacer	.23	<.05	
$F(4,147) = 3.12$, $p < .05$	Curl-ups	.09	NS	
	Push-ups	.02	NS	
	Trunk lift	-.04	NS	.06
STRCOMP (Overall)	Pacer	.04	NS	
$F(4,305)$ 17.44, $p < ..001$	Curl-ups	.08	NS	
	Push-ups	.36	<.001	

	Trunk lift	.02	NS	.18
STRCOMP (Males) $F(4,153) = 3.79$, $p < .01$	Pacer Curl-ups Push-ups Trunk lift	.02 .05 .25 .04	NS NS <.05 NS	 .07
STRCOMP (Females) $F(4,147) = 3.73$, $p < .01$	Pacer Curl-ups Push-ups Trunk lift	.01 .12 .21 .05	NS NS <.05 NS	 .07
PSW (Overall) $F(4,306) = 15.43$, $p < .001$	Pacer Curl-ups Push-ups Trunk lift	.20 .12 .16 .02	<.01 NS <.05 NS	 .16
PSW (Males) $F(4,154) =$, $p < .001$	Pacer Curl-ups Push-ups Trunk lift	.13 .19 .20 .03	NS <.05 <.05 NS	 .18
PSW (Females) $F(4,147) = 3.21$, $p < .05$	Pacer Curl-ups Push-ups Trunk lift	.23 .05 .05 .00	<.05 NS NS NS	 .06
GSW (Overall) $F(4,306) = 4.11$, $p < .005$	Pacer Curl-ups Push-ups Trunk lift	.11 .09 .06 .02	NS NS NS NS	 .04
GSW (Males) $F(4,155) = 1.77$, $p <$ .NS	Pacer Curl-ups Push-ups Trunk lift			
GSW (Females) $F(4,146) = 3.05$, $p < .05$	Pacer Curl-ups Push-ups Trunk lift	.19 .14 -.10 .04	NS NS NS NS	 .05

Hypothesis 3. Time in Healthy Heart Rate Zone will be associated with higher Relative Autonomy Index scores (BREQ-2).

Analysis of the overall sample (N = 244) revealed that here was no association between RAI and the time in the HR zone (r = .09, p = NS). Analysis by sex (males n = 123, females n = 121) showed no correlation between those variables for females (r = -.03, p = NS), but there was a small association for males (r = .21, p < .05).

Hypothesis 4. Time in Healthy Heart Rate Zone will be associated with higher CY-PSPP scores.

There were no significant correlations between time in the Healthy HR Zone and the CY-PSPP scales. See Table #5 for the full results.

Table # 5 Correlation of Time in Healthy HR Zone with CY-PSPP Variables

CY-PSPP Scale	Males (n = 125)	Females (n = 122)	Overall
SPCOMP	.02 (NS)	.04 (NS)	.03 (NS)
COND	-.06 (NS)	-.00 (NS)	-.03 (NS)
BODY	.02 (NS)	-.12 (NS)	-.05 (NS)
STRCOMP	.02 (NS)	.05 (NS)	.03 (NS)
PSW	.00 (NS)	-.01 (NS)	-.01 (NS)
GSW	.08 (NS)	-.16 (NS)	-.04 (NS)

Hypothesis 5. Higher more healthful fitness scores will be associated with more time in Healthy Heart Rate Zone.

While there were statistically significant correlations between time in the Healthy HR zone and the Pacer and curl-up tests, the associations were not substantive—and moreover, were not in the expected direction—with better test scores being associated with lower percentages of time in the HHR zone. The coefficients are displayed in Table #6.

Table # 6 Correlation of Time in Healthy HR Zone with Fitness Test Scores

	Males	Females	Overall
Pacer	-.21 *	-.19 *	-.18 **
Curl-ups	-.18 *	-.12 (NS)	-.14 *
Push-ups	-.15 (NS)	-.04 (NS)	-.08 (NS)

(* = $p < .05$, ** = $p < .01$)

Hypothesis 6. Higher scores on CY-PSPP will be associated with higher Relative Autonomy Scores.

Since the majority of the correlations were statistically significant, there was some support for this hypothesis. Substantively, the level of support was mostly in the low-to-moderate range. The actual coefficients and their significance levels are displayed in Table # 7 below.

Table # 7 CY-PSPP Scale Correlations with RAI

	Males	Females	Overall
SPCOMP	.51****	.33****	.39***
COND	.57****	.49****	.51****
BODY	.33****	.12	.21****
STRCOMP	.36****	.24***	.28****
PSW	.49****	.26***	.37****
GSW	.30****	.16	.23****

*p<.05
**p<.01
***p<.005
****p<.001

Hypothesis 7. Higher CY-PSPP PIP discrepancies will be negatively associated with Relative Autonomy Scores (BREQ-2).

The CY-PSPP-CY-PIP discrepancy scores were computed in two different ways. First, the CY-PIP scores were simply subtracted from the CY-PSPP scales scores. Thus, scores could be positive or negative—with larger negative scores representing larger discrepancies. However, since a CY-PSPP score that is higher than the corresponding CY-PIP scale score is not technically a discrepancy, a second method was used—identical to the first—except all positive scores were recoded to zero (i.e., no discrepancy). The correlations with both types of discrepancy scores are presented in Table 7 below (note that because higher negative numbers are numerically more positive, the negative correlations actually are computed as positive scores).

There was little support for this hypothesis. The only two statistically significant associations were not substantive. All coefficients are displayed in Table # 8.

Table # 8 Association of PSPP-PIP Discrepancies with RAI

	Males (*n*=123)	Females (*n*=121)	Overall (*n*=244)
SPCOMPDISC	.01	-.08	-.04
SPCOMPDISCadj	.11	-.01	.04
CONDDISC	.13	.01	.07
CONDDISCadj	.21**	.00	.10
BODYDISC	.13	-.04	.04
BODYDISCadj	.19*	-.04	.07
STRCOMPDISC	.04	-.09	-.03
STRCOMPDISCadj	.06	-.05	.01
TOTALDISCadj	.19*	-.03	.07

*p<.05
**p<.01
***p<.005
****p<.001

Hypothesis 8. CYPSPP PIP discrepancies will be negatively associated with physical self worth.

This hypothesis was supported substantively in most cases (note that the coefficients appear positive because smaller negative discrepancy scores are more positive). However, in every case the actual CY-PSPP subscale score associations with PSW were higher than the discrepancy scores. All coefficients are displayed in Table # 9.

Table # 9 Association of PSPP-PIP Discrepancies with PSW

	Males (*n*=123)	Females (*n*=121)	Overall (*n*=244)
SPCOMP	.71****	.66****	.70****
SPCOMPDISC	.05	.41****	.25****
SPCOMPDISCadj	.16	.41****	.32****
COND	.76****	.61****	.70****
CONDDISC	.27***	.22**	.25****
CONDDISCadj	.40****	.21**	.30****
BODY	.77****	.81****	.80****
BODYDISC	.37****	.51****	.46****
BODYDISCadj	.43****	.49****	.49****
STRCOMP	.69****	.56****	.64****
STRCOMPDISC	.18*	.26***	.24****
STRCOMPDISCadj	.21*	.28***	.26****
TOTAL DISC	.42****	.49****	.48****

*p<.05
**p<.01
***p<.005
****p<.001

CHAPTER IV

DISCUSSION

The purpose of this study was to investigate the relationships between relative autonomy (autonomous versus controlled motivation), engagement in physical activity in a physical education class, and health-related fitness test scores.

The health benefits of regular moderate physical activity have been well-established (Warburton, Nicol & Bredin, 2006), yet participation rates across the majority of the population are generally too low to accrue those benefits (US Department of Health & Human Services, 1996). Thus, promotion of physical activity is a public health priority. Understanding the antecedent correlates of participation in physical activity is considered a useful first-stage endeavor to focus on intervention efforts. Research has provided evidence that physical activity participation is related to many factors spanning personal, social, and environmental categories (Trost et al., 2002).

Understanding the "determinants" of young people's participation in physical activity has been identified as a research priority (Sallis et al., 1992). While recognizing that "determinants" will be multifactorial and not restricted to motivation or other psychological variables (Sallis et al., 2000), it is important to identify key motivational factors associated with physical activity.

Many people have argued that high school physical education should be designed to promote physical activity in adult life. Although writers such as Sallis (1992, 2000) use

the term "determinate," for most adults physical activity is actually likely to be a self-determined or volitional behavior.

Thus, this study examined the relationships of motivational constructs and fitness and activity variables in high school physical education. It capitalized on the availability of fitness and activity data in a physical education program that aimed to motivate students to be active in the future.

This chapter will go on to discuss each hypothesis with a particular focus on the issue of how the motivational constructs might relate to volitional engagement in physical activity in the future. One caveat however, is that the study was conducted over a short time span during a school semester. Therefore, it was not possible to ascertain how the motivational constructs related to volitional physical activity outside of school, either in the short -or long- term.

The logic underpinning the hypothesis 1 (Fitness scores would predict RAI) was based on the empirically-based assumption that higher perceptions of competence are generally linked to higher perceptions of autonomy i.e., most people are likely to volitionally engage in the behaviors they feel competent at. Thus, it was anticipated that competence information (fitness test scores) would influence the subsequent BREQ-2 questionnaire responses which were reported as the relative autonomy index (RAI). The lack of support for this hypothesis does not seem to have an obvious explanation from a theoretical perspective. Possibly, the conceptual link between fitness scores (a state of

being, or "product") and motivational regulatory style regarding exercise (a behavior or "process") may not have been clear or psychologically meaningful to the participants.

Hypothesis 2: While hypothesis 1 examined links between competence feedback (fitness test scores) and exercise related motivation, this hypothesis looked at the link between fitness test scores and specific physical competence/adequacy sub-domains. That more direct conceptual link may be why the predictive relationships were found here, and the anticipated congruence of the links between the various subscales and the fitness tests (e.g. between COND and Pacer, STRCOMP and Push-Ups) supports the logic of the relationships, and is consistent with previous research (e.g., Whitehead, 1995).

Hypotheses 3, 4 and 5: Perhaps the lack of association between motivation and physical self-perception with time in the healthy heart rate zone in these hypotheses could be explained by the "motivational nature" of the PE lesson. The heart rate lesson was supervised to the extent that the individuals' motivational regulatory styles may have likely been "overridden" by the controlling directions of the teacher and the immediate task-related feedback from the HR monitors. The heart rate monitors gave students accurate real-time feedback as to whether they were in the correct zone, and the instructor was constantly directing them to keep in that zone for the specified time period.

Hypothesis 6: As in hypothesis 2 the logic underlying this hypothesis was that perceptions of physical competence/adequacy are likely linked to more autonomous motivation for exercise because most people are more likely to volitionally engage in

behavior they feel they are competent at. Since the majority of the correlations were statistically significant, there was some support for this hypothesis. The level of support was in the low to moderate range.

Recently, Wilson and Rodgers (2002) examined the relationship between the exercise motives from self-determination theory and physical self-esteem in physically active females. They reported that more autonomous exercise motives were positively related to physical self-esteem. Generally, links between the types of motivation from self-determination theory and the level of self-esteem have been reported by Kernis, Paradise, Whitaker, Wheatman and Goldman (2000). These authors found that global perceptions of self-worth were negatively associated with external and introjected regulations and positively associated with identified regulation and intrinsic motivation. Thus, the data from this study are consistent with those earlier results.

Hypotheses 7 and 8: When research on the structure and content of self-esteem started to progress beyond the simplistic global view of the construct, psychologists such as Harter proposed the "discounting hypothesis" as a likely mechanism that explained how perception of competence versus incompetence might be cognitively processed in the way that underpinned global perceptions. Earlier data (Harter, Fox) did seem to support the discounting hypothesis, but it was not long before criticism came from researchers such as Marsh(1994) who showed the raw association between PSPP subscales and global perceptions (PSW,GSW) were typically stronger than the discrepancy scores. Thus the data from this study support Marsh's criticism.

CY-PSPP- PIP discrepancies will be negatively associated with physical self worth.

In summary, although this study has limitations (convenience sample, and short time frame of study) as an overall perspective, it seems reasonable to conclude that the support for hypotheses 2, 6 and 8 do show support for the conceptual links between competence feedback (fitness test scores), subsequent competence perceptions (CY-PSPP scores) and more autonomous exercise motivation (RAI scores). Thus, to some extent, these results may show support for the physical education program's long term aims. As our society continues to deal with problems such as obesity and other lifestyle-related health issues, research such as this may help to shape the way we guide physical education students in the process of becoming physical activity for a lifetime. It may be wise to focus energy upon the influences on physical activity that are modifiable such as perceived competence. Physical activity and perceived physical competence measures are needed which can be used by physical education practitioners to track the physical activity patterns of their students.

Since research has fairly consistently shown that high self-esteem may be an important outcome of performing well in school, and is associated with choice, persistence, and success in a broad range of achievement and health-related behaviors (Baumeister, Campbell, Krueger, & Vohs, 2003; Fox, 2000), and because public school physical education is a context in which almost all students engage in physical exercise, future research on the links between physical self-perception and physical activity motivation is warranted. Because much of that research, including this study, has

focused on associations and short term predictive links, future research should particularly try to explore how school PE affects physical activity motivation over the longer term – i.e., into the subsequent adult years.

APPENDICES

Appendix A

Statement to Subjects

My name is Andrea Charlebois. I am a researcher from The University of North Dakota and I am here to ask for your help. If you would be prepared to help us find out some very important information about how kids of your age feel, we would be very grateful.

You do **not** have to help us if you don't want to. If you don't want to help it won't be held against you in any way. If you don't wish to fill out the questionnaires (that are about to be given out), you can just sit quietly while the others complete them--or you can hand in a blank questionnaire at the end. Nobody will ever know that you didn't do it.

You will notice that you **don't** put your name on the questionnaire. This is to make sure the answers are kept private and confidential. When you hand in the questionnaire to me I will quietly ask you your name so that I can match it up with the ID# on a separate sheet. Only **I** will ever get to look at this sheet. Neither your teachers or anybody else would be able to identify your answers even if they were allowed to see the finished questionnaires--which they won't! Nobody else will ever know if you volunteered to help or not. I will keep all the information **completely confidential** so that none of you need worry about being embarrassed in any way.

Because the information will be kept completely confidential you should not hesitate to be absolutely honest in your answers. In fact, because it is perfectly natural for people to be different from one another, there are no right or wrong answers to any of the questions. If you really feel that you cannot answer according to how you truly feel, then leave the questionnaire blank. Nobody will know.

Thanks for listening to my introduction. Now this is how to fill out the questionnaire. . .

Instructions to the Children

As you can see from the sentences and the top of the sheet where it says "What I Am Like," we are interested in what each of you is like, what kind of a person you are like. This is **not** a test. There are **no right or wrong answers**. Since kids are very different from one another, each of you will be putting down something different.

First let me explain how the questions work. There is a sample question at the top marked (a). I'll read it aloud and you follow along with me. . . This question talks about two kinds of kids, and we want to know which kids are most like *you*.

1. So, what I want you to decide first is whether *you* are more like the kids on the left side who would rather play outdoors, or whether you are more like the kids on the right side who would rather watch T.V. Don't mark anything yet, but first decide which kind of kid is *most like you*, and go to that side of the sentence.

2. Now, the *second* thing I want you to think about, now that you have decided which kind of kids are most like you, is to decide whether that is only *sort of true*

for you, or *really true for you*. If it's only sort of true, then put an X in the box under sort of true; if it's really true, then put an X in that box, under really true.

3. For each sentence you only check **one** box. Sometimes it will be on one side of the page, another time it will be on the other side of the page, but you can only check *one box* for each sentence. You don't check both sides, just the *one* side most like you.

4. OK, that one was just for practice. Now you can do the other sentences yourselves. For each one, just check one box, the one that goes with what is true for you, what you are most like.

Appendix B

Demographic Information Questionnaire

*(Please note, your information will **not** be sold or given to outside entities. It is for internal use only.)*

1. Name: _____

2. Teacher:_____

3. Grade Level: 9th 10th 11th 12th

4. Age Group: 11-13 14-17 18-20

5. Gender: Female Male

6. How often do you use the exercise?

   Daily Weekly Monthly Occasionally Never

7. What do you activities do when you exercise? *(e.g., run, walk, lift weights ,team sports, cardio machines etc)*

   _____
   _____
   _____
   _____
   _____

Appendix C

What I Am Like

ID#: _____ Age: _____ Grade: _____ Boy or Girl (circle which)

SAMPLE SENTENCE

	Really True for me	Sort of True for me				Sort of True for me	Really True for me
(a)	☐	☐	Some kids would rather play outdoors in their spare time	**BUT**	Other kids would rather watch T.V.	☐	☐
1.	☐	☐	Some kids do very well at all kinds of sports	**BUT**	Other kids *don't* feel they are very good when it comes to sports.	☐	☐
2.	☐	☐	Some kids feel *uneasy* when it comes to doing vigorous physical exercise	**BUT**	Other kids feel *confident* when it comes to doing vigorous physical exercise.	☐	☐
3.	☐	☐	Some kids feel that they have a good-looking (fit-looking) body compared to other kids	**BUT**	Other kids feel that compared to most, their body *doesn't* look so good.	☐	☐
4.	☐	☐	Some kids feel that they *lack* strength compared to other kids their age.	**BUT**	Other kids feel that they are stronger than other kids their age.	☐	☐
5.	☐	☐	Some kids are *proud* of themselves physically	**BUT**	Other kids *don't* have much to be proud of physically.	☐	☐
6.	☐	☐	Some kids are often *unhappy* with themselves	**BUT**	Other kids are pretty *pleased* with themselves.	☐	☐
7.	☐	☐	Some kids wish they could be a lot better at sports	**BUT**	Other kids feel that they good enough at sports.	☐	☐
8.	☐	☐	Some kids have a lot of stamina for vigorous physical exercise	**BUT**	Other kids soon get out of breath and have to slow down or quit.	☐	☐
9.	☐	☐	Some kids find it *difficult* to keep their bodies looking good physically	**BUT**	Other kids find it *easy* to keep their bodies looking good physically.	☐	☐
10.	☐	☐	Some kids think that they have stronger muscles than other kids their age	**BUT**	Other kids feel that they have weaker muscles than other kids their age.	☐	☐

	Really True for me	Sort of True for me				Sort of True for me	Really True for me
11.	☐	☐	Some kids *don't* feel very confident about themselves physically	**BUT**	Other kids really feel good about themselves physically.	☐	☐
12.	☐	☐	Some kids are *happy* with themselves as a person	**BUT**	Other kids are often *not* happy with themselves.	☐	☐
13.	☐	☐	Some kids think they could do well at just about any new sports activity they haven't tried before	**BUT**	Other kids are afraid they might *not* do well at sports they haven't ever tried.	☐	☐
14.	☐	☐	Some kids *don't* have much stamina and fitness	**BUT**	Other kids have *lots* of stamina and fitness.	☐	☐
15.	☐	☐	Some kids are *pleased* with the appearance of their bodies	**BUT**	Other kids wish that their bodies looked in better shape physically.	☐	☐
16.	☐	☐	Some kids *lack* confidence when it comes to strength activities	**BUT**	Other kids are very confident when it comes to strength activities.	☐	☐
17.	☐	☐	Some kids are very *satisfied* with themselves physically	**BUT**	Other kids are often *dissatisfied* with themselvers physically.	☐	☐
18.	☐	☐	Some kids *don't* like the way they are leading their life	**BUT**	Other kids *do* like the way they are leading their life.	☐	☐
19.	☐	☐	In games and sports some kids usually *watch* instead of play	**BUT**	Other kids usually *play* rather than watch.	☐	☐
20.	☐	☐	Some kids try to take part in energetic physical exercise whenever they can	**BUT**	Other kids try to *avoid* doing energetic exercise if they can.	☐	☐
21.	☐	☐	Some kids feel that they are *often* admired for their good-looking bodies	**BUT**	Other kids feel that they are *seldom* admired for the way their bodies look.	☐	☐
22.	☐	☐	When strong muscles are needed, some kids are the *first* to step forward	**BUT**	Other kids are the *last* to step forward when strong muscles are needed.	☐	☐
23.	☐	☐	Some kids are *unhappy* with how they are and what they can do physically	**BUT**	Other kids are *happy* with how they are and what they can do physically.	☐	☐
24.	☐	☐	Some kids *like* the kind of person they are	**BUT**	Other kids often wish they were someone else.	☐	☐

	Really True for me	Sort of True for me				Sort of True for me	Really True for me
25.	☐	☐	Some kids feel that they are *better* than others their age at sports	**BUT**	Other kids *don't* feel they can play as well.	☐	☐
26.	☐	☐	Some kids soon have to quit running and exercising because they get tired	**BUT**	Other kids can run and do exercises for a long time without getting tired.	☐	☐
27.	☐	☐	Some kids are *confident* about how their bodies look physically	**BUT**	Other kids feel *uneasy* about how their bodies look physically.	☐	☐
28.	☐	☐	Some kids feel that they are *not* as good as others when physical strength is needed	**BUT**	Other kids feel that they are among the *best* when physical strength is needed.	☐	☐
29.	☐	☐	Some kids have a positive feeling about themselves physically	**BUT**	Other kids feel somewhat negative about themselves physically.	☐	☐
30.	☐	☐	Some kids are very *happy* being the way they are	**BUT**	Other kids wish they were *different*.	☐	☐
31.	☐	☐	Some kids *don't* do well at new outdoor games	**BUT**	Other kids are *good* at new games right away.	☐	☐
32.	☐	☐	When it comes to activities like running, some kids are able to keep on going	**BUT**	Other kids soon have to quit to take a rest.	☐	☐
33.	☐	☐	Some kids *don't* like how their bodies look physically	**BUT**	Other kids are *pleased* with how their bodies look physically.	☐	☐
34.	☐	☐	Some kids think that they are strong, and have good muscles compared to other kids their age	**BUT**	Other kids think that they are weaker, and *don't* have such good muscles as other kids their age.	☐	☐
35.	☐	☐	Some kids wish that they could feel better about themselves physically	**BUT**	Other kids *always* seem to feel good about themselves physically.	☐	☐
36.	☐	☐	Some kids are *not* very happy with the way they do a lot of things	**BUT**	Other kids think the way they do things is *fine*.	☐	☐

Appendix D

HOW **IMPORTANT** ARE THESE THINGS
TO HOW YOU FEEL ABOUT YOURSELF AS A PERSON?

	Really True for me	**Sort of True for me**				**Sort of True for me**	**Really True for me**
1.	☐	☐	Some kids think it's important to be good at sports	**BUT**	Other kids *don't* think how good you are at sports is that important.	☐	☐
2.	☐	☐	Some kids *don't* think that having a lot of stamina for energetic exercises is very important to how they feel about themselves	**BUT**	Other kids think that having a lot of stamina for vigorous exercise is *very* important.	☐	☐
3.	☐	☐	Some kids think it's *very* important to have a good-looking (fit-looking) body in order to feel good about themselves as a person	**BUT**	Other kids *don't* think that having a good-looking body is important at all.	☐	☐
4.	☐	☐	Some kids think that being physically strong is *not* all that important to how they feel about themselves as a person	**BUT**	Other kids feel that it's *very* important to be physically strong.	☐	☐
5.	☐	☐	Some kids *don't* think doing well at athletics is that important to how they feel about themselves as a person	**BUT**	Other kids feel that doing well at athletics is important.	☐	☐
6.	☐	☐	Some kids feel that having the ability to do a lot of running and exercising is *very* important to how they feel about themselves as a person	**BUT**	Other kids *don't* feel it's all that important to have the ability to do a lot of running and exercising.	☐	☐
7.	☐	☐	Some kids *don't* think that having a body that looks in good physical shape is important to how they feel about themselves	**BUT**	Other kids feel that it's *very* important to have a body that looks in good physical shape.	☐	☐
8.	☐	☐	Some kids think that having strong muscles is *very* important to how they feel about themselves	**BUT**	Other kids feel that it's *not* at all important to have strong muscles.	☐	☐

HOW **IMPORTANT** ARE THESE THINGS
TO HOW YOU FEEL ABOUT YOURSELF AS A PERSON?

	Really True for me	**Sort of True for me**				**Sort of True for me**	**Really True for me**
1.	4	3	Some kids think it's important to be good at sports	**BUT**	Other kids *don't* think how good you are at sports is that important.	2	1
2.	1	2	Some kids *don't* think that having a lot of stamina for energetic exercises is very important to how they feel about themselves	**BUT**	Other kids think that having a lot of stamina for vigorous exercise is *very* important.	3	4
3.	4	3	Some kids think it's *very* important to have a good-looking (fit-looking) body in order to feel good about themselves as a person	**BUT**	Other kids *don't* think that having a good-looking body is important at all.	2	1
4.	1	2	Some kids think that being physically strong is *not* all that important to how they feel about themselves as a person	**BUT**	Other kids feel that it's *very* important to be physically strong.	3	4
5.	1	2	Some kids *don't* think doing well at athletics is that important to how they feel about themselves as a person	**BUT**	Other kids feel that doing well at athletics is important.	3	4
6.	4	3	Some kids feel that having the ability to do a lot of running and exercising is *very* important to how they feel about themselves as a person	**BUT**	Other kids *don't* feel it's all that important to have the ability to do a lot of running and exercising.	2	1
7.	1	2	Some kids *don't* think that having a body that looks in good physical shape is important to how they feel about themselves	**BUT**	Other kids feel that it's *very* important to have a body that looks in good physical shape.	3	4
8.	4	3	Some kids think that having strong muscles is *very* important to how they feel about themselves	**BUT**	Other kids feel that it's *not* at all important to have strong muscles.	2	1

Appendix E

Scoring Instructions for the CY-PSPP and CY-PIP Scales

For validity, reliability, and other CY-PSPP and CY-PIP data, see the references below:

Whitehead, J.R. (1995). A study of children's physical self-perceptions using an adapted physical self-perception questionnaire. *Pediatric Exercise Science, 7*, 132-151. (Please cite this one as the original source of the CY-PSPP).

Eklund, R.C., Whitehead, J.R., & Welk, G.J. (1997). Validity of the CY-PSPP: A confirmatory factor analysis. *Research Quarterly for Exercise and Sport, 68*, 249-256.

The CY-PSPP scales are as follows:

Sport/Athletic Competence*:	#'s 1, 7, 13, 19, 25, 31.
Condition/Stamina Competence:	#'s 2, 8, 14, 20, 26, 32.
Attractive Body Adequacy:	#'s 3, 9, 15, 21, 27, 33.
Strength Competence:	#'s 4, 10, 16, 22, 28, 34.
Physical Self-Worth (Global):	#'s 5, 11, 17, 23, 29, 35.
Global Self-Worth*:	#'s 6, 12, 18, 24, 30, 36

The CY-PIP scales are as follows:

Sport/Athletic Competence Importance:	#'s 1, 5.
Condition/Stamina Competence Importance:	#'s 2, 6.
Attractive Body Adequacy Importance:	#'s 3, 7.
Strength Competence Importance:	#'s 4, 8.

- Score each item from 1 to 4, or 4 to 1 as shown on the accompanying score-master pages.
- It makes conceptual sense to calculate a mean score for each subscale. In other words, add the six item scores for each subscale and then divide it by six.

- Note that the two CY-PSPP scales denoted thus* are from Susan Harter's (1985) *Manual for the Self-Perception Profile for Children*. Please be sure to give appropriate credit in any citation.

- Note that the CY-PIP Scale items did not load on separate factors (see *Ped. Ex. Sci.* paper). Thus, be cautious with their use.

Good luck with any projects involving the CY-PSPP/CY-PIP Scales. Please feel free to communicate with me if any questions arise. I would much appreciate it if you would share your data and results. You can reach me at the numbers/addresses below. All comments are welcome.

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Appendix F

EXERCISE REGULATIONS QUESTIONNAIRE (BREQ-2)

Age: _____ years **Sex: male female (please circle)**

WHY DO YOU ENGAGE IN EXERCISE?

We are interested in the reasons underlying peoples' decisions to engage, or not engage in physical exercise. Using the scale below, please indicate to what extent each of the following items is true for you. Please note that there are no right or wrong answers and no trick questions. We simply want to know how you personally feel about exercise. Your responses will be held in confidence and only used for our research purposes.

		Not true for me		**Sometimes true for me**		**Very true for me**
1	I exercise because other people say I should	0	1	2	3	4
2	I feel guilty when I don't exercise	0	1	2	3	4
3	I value the benefits of exercise	0	1	2	3	4
4	I exercise because it's fun	0	1	2	3	4
5	I don't see why I should have to exercise	0	1	2	3	4

6	I take part in exercise because my friends/family/partner say I should	0	1	2	3	4
7	I feel ashamed when I miss an exercise session	0	1	2	3	4
8	It’s important to me to exercise regularly	0	1	2	3	4
9	I can’t see why I should bother exercising	0	1	2	3	4
10	I enjoy my exercise sessions	0	1	2	3	4
11	I exercise because others will not be pleased with me if I don’t	0	1	2	3	4
12	I don’t see the point in exercising	0	1	2	3	4
13	I feel like a failure when I haven’t exercised in a while	0	1	2	3	4
14	I think it is important to make the effort to exercise regularly	0	1	2	3	4
15	I find exercise a pleasurable activity	0	1	2	3	4
16	I feel under pressure from my friends/family to exercise	0	1	2	3	4
17	I get restless if I don’t exercise regularly	0	1	2	3	4
18	I get pleasure and satisfaction from participating in exercise	0	1	2	3	4
19	I think exercising is a waste of time	0	1	2	3	4

Thank you for taking part in our research

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Appendix G

Technology Enhanced Lesson

Advanced 5 Minute Heart Health Walk and Jog

Objective: Students will explain why the faster they move their bodies the faster their heart will beat, which over time will increase their level of cardiorespiratory endurance.

Explanation:

The heart is a muscle and, like any muscle, if worked, can become stronger. If the heart becomes stronger, it will be able to pump more blood with each beat, which means it can beat at a slower rate and circulate the same amount of blood. This increased efficiency enables a person to work, exercise or play more often, more vigorously and for longer periods of time without becoming tired.

Directions:

1. Set up the designated activity area and line students up.
2. Tell the students that their goal is to count the number of laps they walk in a 5 minute period.
3. Set the time and have the students begin walking around the designated area.
4. At the end of the five minutes have the students check their heart rate, note how many laps they have walked and discuss with a partner how they feel in regards to heart rate, temperature and breathing.

5. Line students up again and tell them their goal is to count the number of laps they jog in a five minute time period. Tell them they must jog at a pace they can maintain for the entire time.
6. Set the time and have students begin jogging around the designated area.
7. At the end of the five minutes have the students check their heart rate, note how many laps they jogged and discuss with a partner how they feel in regards to heart rate, temperature and breathing.

Reflective Questions:

1. How many people got more laps when compared to jogging or walking?
2. Why were you able to get more laps when jogging compared to walking?
3. What physical changes took place when jogging compared to walking?
4. How long could you have walked? Please explain.
5. How long could you have jogged? Please explain.
6. What would happen of you were to run at full speed?
7. What results will you feel and see if you were to so this activity three times a week for six weeks?

Appendix H

FITNESSGRAM® Tests

AEROBIC CAPACITY

1) **PACER** (Progressive Aerobic Cardiovascular Endurance Run) – Set to music, a paced, 20-meter shuttle run increasing in intensity as time progresses
Or:
• One-Mile Run – Students run (or walk if needed) one mile as fast as they can
• Walk Test – Students walk one mile as fast as they can (for ages 13 or above since the test has only been validated for this age group)

BODY COMPOSITION

2) **Skin Fold Test** – Measuring percent body fat by testing the tricep and calf areas Or:
• Body Mass Index – Calculated from height and weight

MUSCULAR STRENGTH AND ENDURANCE

3) **Curl Up** – Measuring abdominal strength and endurance, students lie down with knees bent and feet unanchored. Set to a specified pace, students complete as many repetitions as possible to a maximum of 75
4) **Trunk Lift** – Measuring trunk extensor strength, students lie face down and slowly raise their upper body long enough for the tester to measure the distance between the floor and the student's chin
5) **Push-Up** – Measuring upper body strength and endurance, students lower body to a 90-degree elbow angle and push up. Set to a specified pace, students complete as many repetitions as possible
Or:
• Modified Pull-Up (proper equipment required) – With hands on a low bar, legs straight and feet touching the ground, students pull up as many repetitions as possible
• Flexed Arm Hang – Students hang their chin above a bar as long as possible

FLEXIBILITY

6) **Back-Saver Sit and Reach** – Testing one leg at a time, students sit with one knee bent and one leg straight against a box and reach forward
Or:
• Shoulder Stretch – With one arm over the shoulder and one arm tucked under behind the back, students try to touch their fingers and then alternate arms

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