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# Cognitive Indices of Physical Self-Perception: Relationships with Physical Activity

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# Cognitive Indices of Physical Self-Perception: Relationships with Physical Activity

**by**

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## Dedication

This dissertation is dedicated to my wife Bridget for her support and understanding throughout the long years it took me to reach this point.

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I would like to acknowledge my parents for supporting me both financially and emotionally while I embarked on the education process that none of us thought would ever end. I would also like to thank Dr. John Bartholomew for taking me in when no one wanted me, and shaping me into a scientist. Hopefully one day I will fully realize the potential he has nourished in me. I must also thank my wonderful committee, Dr. Gayle Acton, Dr. Alexandra Loukas, Dr. Carol Holahan, and Dr. Fred Peterson for their guidance, support, and eternal patience.

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# Cognitive Indices of Physical Self-Perception: Relationships with Physical Activity

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Self-esteem has been linked to numerous conditions such as depression, and along with physical self-worth, can be considered an important marker of psychological health. The first model proposed to explain the relationship between physical activity, physical self worth and self-esteem was the Exercise and Self-Esteem Model (EXSEM). The EXSEM has been supported in numerous studies despite the inability of the current measurement tools to test the complete model.

The measurement conundrum was addressed Marsh (1994) with the development of the Physical Self-Descriptive Questionnaire (PSDQ). The PSDQ was designed to encompass more of the physical self previously ignored in other measurement tools. However, the PSDQ has been utilized exclusively in adolescents and requires validation in adult populations.

To further address shortcomings of the EXSEM measurement model the Physical Self-Attribute Questionnaire was developed (Moore, Bartholomew, & Kilpatrick, In Review). Unfortunately, to date the PSAQ has not been utilized in a population homogeneous in regard to physical activity, nor has it been utilized with a proven measure of physical activity.

Older adults have been shown to benefit greatly from physical activity, and vary greatly with regards to their physical activity levels. Regrettably, research involving older adults and the EXSEM is very limited. It is for this reason that this dissertation is being undertaken; to test the PSDQ in a population of older adults while testing the utility of the PSDQ as an addition to the EXSEM.

For this purpose, 249 community dwelling older (60+) adults were recruited from a large community faith based organization. Participants completed the PSDQ, PSAQ, and a measure of self-reported physical activity, health history, and demographic information.

The factor structure of the PSDQ was replicated in the study population and the sub-scales of the PSDQ demonstrated desirable internal reliability. Additionally, the PSDQ explained a significant amount of variance in self-reported physical activity. Furthermore, the PSAQ demonstrates considerable utility in explaining both unique variance in physical activity, and indirect effects through the sub-domains measured by the PSDQ.

The current study supports the use of the PSDQ and the PSAQ in the measurement of the EXSEM. However, further research is needed utilizing larger samples before conclusions can be reached.

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# CHAPTER I

# Introduction

## BACKGROUND

### The Exercise and Self-Esteem Model

The Exercise and Self-Esteem Model (EXSEM) (Sonstroem & Morgan, 1989) is the first model to examine the Physical domain of self concept in a hierarchical manner. Global self-esteem is at the top of the hierarchy, with physical self-esteem as a lower-order construct (Figure 1.1). The major improvement of this model over similar models that included physical self-concept was that the EXSEM separated physical self-worth into two constructs; physical competence and physical acceptance, below global self-esteem. Physical competence was defined as a statement of ones physical ability, e.g. "I am very strong physically," "I am an attractive person." Physical acceptance was the amount of regard one holds for their given level of physical ability, such as valuing an attractive body. Below physical competence exist specific self-efficacies concerning physical tasks. This construct is taken directly from Bandura's self-efficacy theory (Bandura, 1977). The value of this model lies in the acknowledgement that the impact of exercise is not only mediated by increases in self-efficacy, but the influence of the increase in self-efficacy impacts global self-esteem through changes in a person's perceived ability along with changes in the affect that accompanies those changes. The EXSEM was the first model to highlight the role of affect in the influence of physical changes.

## The Physical Self-Perception Profile

While Sonstroem & colleagues developed the EXSEM, Fox and Corbin (1989) were developing the Physical Self-Perception Profile (PSPP). In contrast to the EXSEM, Fox's PSPP was developed to measure Physical Self-Worth along with four physical sub-domains: Strength, Condition, Sport Competence, and Attractive Body. Fox's PSPP was developed to address the shortcoming of physical self-perception research that had failed to consider the multi-dimensionality of the physical self. To date Fox's PSPP is a widely used and accepted measure of the physical self (Marsh, 1997). Utilizing Fox's PSPP, Sonstroem & colleagues attempted to test an expanded version of the EXSEM which included two levels of perceived physical competence: Physical Self-Worth (PSW) and multiple physical sub-domains; Strength (STREN), Attractive Body (BODY), Physical Condition (COND), and Sport Ability (SPORT) (Figure 1.2). Results showed that the model demonstrated acceptable indices of fit utilizing structural equational modeling. Thus Fox's PSPP confirmed the hierarchical nature of the physical self, and it expanded the competency domain of the EXSEM to include four physical sub-domains, bringing attention to the multi-dimensionality of the physical self. Unfortunately, the sub-domains of Fox's PSPP are limited in scope and do not encompass the entire physical self (Marsh, Richards, Johnson, Roche, & Tremayne, 1994). Specifically, sub-domains such as flexibility and body fat, which are two of the five components of physical fitness, are not included.

## The Physical Self-Descriptive Questionnaire

Following the development of Fox's PSPP, the Physical Self-Descriptive

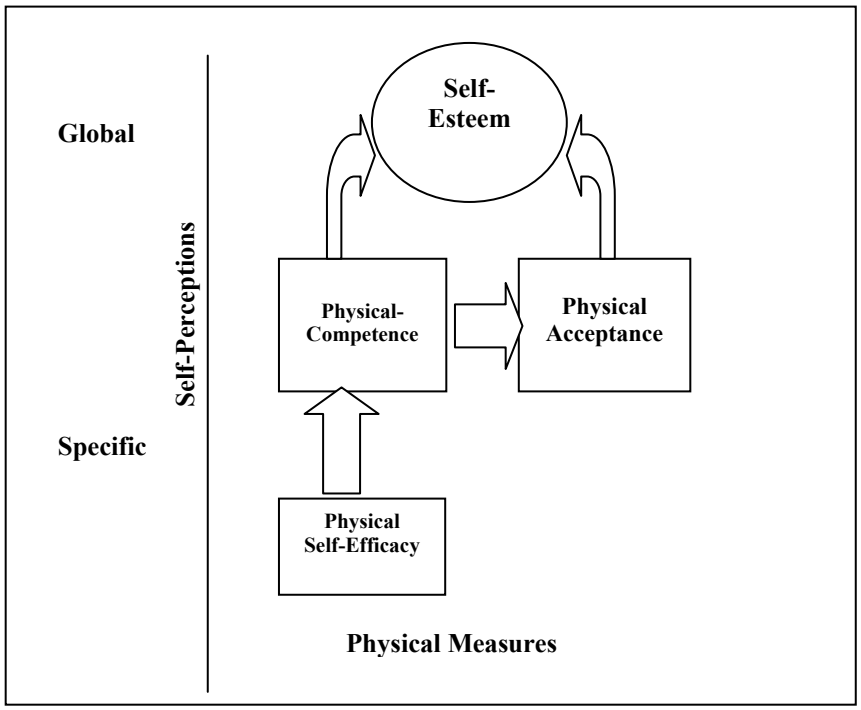


**Figure 1.1: The original Exercise and Self Esteem Model (Sonstroem & Morgan, 1989)**

Questionnaire (PSDQ) was developed by Marsh, Richards, Johnson, Roche, & Tremayne (1994) to address the shortcomings of Fox's PSPP. Marsh's PSDQ was developed initially for use with adolescent populations and includes sub-domains similar to those of Fox's PSPP, such as strength, endurance, sport competence, and attractiveness. In addition, Marsh's PSDQ included sub-domains of flexibility, coordination, body fat, health, and physical activity, along with a sub-scale for global self-esteem and physical self-concept. Thus, Marsh's PSDQ provides a more encompassing view

of the physical self. Much like Fox's PSPP, Marsh's PSDQ has proven to be psychometrically sound in cross cultural samples. Unfortunately, Marsh's PSDQ has been used exclusively in adolescent samples. For Marsh's PSDQ to be a viable measurement tool for research it needs to be validated in populations that are more diverse. An older population would be particularly appropriate.

**Older adults, self-esteem, and exercise**

It has been widely demonstrated that programs for older adults that involve walking, aerobic conditioning, and resistance training benefit those who wish to improve basic components of health related fitness such as flexibility, body composition, muscular strength, and muscular endurance (Conn, 1998). As the mean age of the population increases, great interest has surrounded the use of exercise and conditioning to counteract the debilitating effects of the aging process. Regular activity can minimize or reduce the loss of flexibility, muscular strength, and endurance, and slow the advance of chronic problems such as cardiovascular disease, obesity, osteoporosis, and decreased immune function (Conn, 1998; Judge, Whipple, & Wolfson, 1994). In addition to these physical

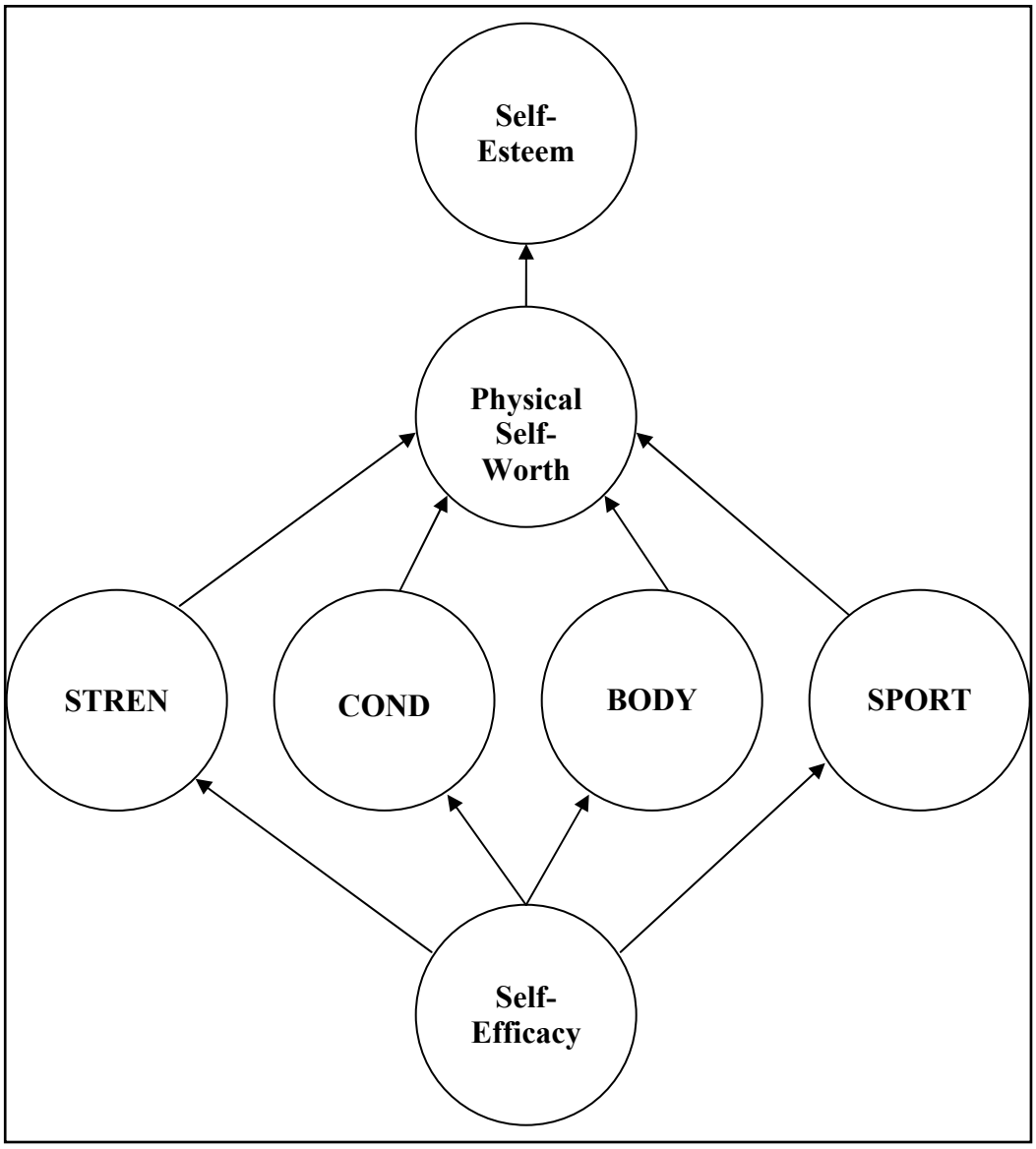


**Figure 1.2: The Exercise and Self-Esteem Model as measured with the Physical Self-Perception Profile (Sonstroem, Harlow, & Josephs, 1994).**

benefits, exercise provides many psychological benefits in the elderly, including enhanced positive and reduced negative mood states, enhanced self-efficacy, enhanced body image, and improved self-esteem (Bozoian, Rejeski, & McAuley, 1994). It has also been shown that older adults receive benefits from exercise that are not generalizable for the middle age community. These include improvements in self-confidence, social life, sex life, sleep patterns, loneliness, and family relations (Emery & Blumenthal, 1990).

Considering the unique characteristics of older adults and their responses to exercise, a researcher wishing to study older adults within the context of the EXSEM should pay special attention to the measurement tools utilized. In the only previous study to test the EXSEM in older adults, Fox's PSPP was utilized to assess physical self worth and the physical sub-domains (McAuley, Blissmer, Katula, Duncan, & Mihalko, 2000). However, the authors chose to delete the items corresponding to the sport competence domain since it was assumed to be unaffected by the training modalities (walking, stretching/toning) within an older sedentary population. This deletion left three remaining sub-domains: Strength, Condition, and Attractive Body. Because flexibility, perceived health, and coordination, are particularly important to an older population, it is important that a measurement model also include these sub-domains. For this reason, the Physical Self-Descriptive Questionnaire appears to be a more appropriate measure for this population. Unfortunately, to date Marsh's PSDQ has not been validated in a sample of older adults.

## Purpose of Study 1

The purpose of this study, therefore, is to validate Marsh's PSDQ in older

adults with varying levels of physical activity. Marsh's PSDQ (Appendix A) will be given to this population along with the Physical Activity Scale for the Elderly (PASE), which will be utilized to measure physical activity (Appendix B). So that the population sample may better be defined, participants will complete a health history questionnaire and provide basic demographic information such as age, gender, income, ethnicity, and marital status (Appendices C & D, respectively).

**STUDY 2**

Although Fox's PSPP and PSDQ appear to be useful measures of physical self-esteem, Sonstroem makes clear that these instruments fail to encompass the cognitive facet of self-acceptance as originally envisioned in the EXSEM (Sonstroem, 1997). Because behavior is affected by both cognitive processes and affect (Sonstroem, 1997), a full understanding of physical esteem can only be derived from an assessment of physical competence and physical acceptance as separate constructs. Such an analysis would indicate if an individual's motivation to exercise comes from the perception of low physical competence relative to others their age, or from dissatisfaction with their perceived competence. This information could potentially drive the design of interventions to enhance the motivation to be physically active. Unfortunately, Fox's PSPP and Marsh's PSDQ were designed to assess only physical competence, albeit at both a domain, i.e. physical self-worth, and sub-domain level, i.e. strength, attractive body, conditioning, and sport ability. Thus, although Marsh (Marsh, 1997) has clearly shown that self-ratings of competence domains differ as a function of activity history, BMI, and physical fitness, it is not clear if this effect is mediated by

differences in perceived competency or acceptance. Likewise, while Fox's PSPP has been shown to explain 27.6% of the variance in self-reports of exercise behavior (Sonstroem et al., 1994), it does not allow one to partition the variance into its component parts of competence and acceptance. Although this proposed separation may not explain a greater degree of variance, it is necessary to better understand the relationship between activity and esteem if one is to design and evaluate interventions based on this model (Sonstroem, 1997).

Researchers working with general self-esteem have also noted the need to move from describing objective behaviors to understanding how self-perception drives their behavioral decisions. Working from the earlier theories of William James (1890), Brett Pelham and William Swann (1989) devised a measurement framework that attempted to partition each of the cognitive facets of domain specific self-esteem (Pelham & Swann, 1989, 1994). Pelham and Swann asked participants to rate their (1) competence relative to others their age and sex; (2) the certainty of each competency rating; (3) the importance of domain; and (4) their acceptance of their present rating (defined as discrepancy from ideal self); for ten domains of self-esteem. It was discovered that importance contributed only to the self-esteem of those who believed themselves generally low in competence. Furthermore, individuals who viewed their high competency domains as important were especially likely to be high in self-esteem when they were certain of these ratings (Pelham & Swann, 1989) While the results only suggested small trends in these directions, this early work supported the utility of this conceptual framework and suggests a measurement paradigm that might be applied to other constellations of self-perceptions. Specifically, it is likely that these cognitive facets are just as, if not more important when examining sub-domains within

physical self-esteem; e.g. strength, endurance, attractiveness. In order to test this possibility, a measure of the cognitive facets must be validated in conjunction with a measure of the sub-domains for physical self-esteem.

To this end, the Physical Self-Attribute Questionnaire (PSAQ) was developed (Moore, Bartholomew, & Kilpatrick, In Review). Moore's PSAQ, developed originally for use with Fox's PSPP, was designed to measure cognitive facets (competency, certainty, importance, discrepancy from ideal) of various physical sub-domains. Specifically, for each sub-domain of Fox's PSPP (strength, condition, sport competence, attractive body), participants are asked to rate their competency relative to others, their certainty of this rating, the importance of this domain, and the discrepancy from their ideal self. Moore's PSAQ has been tested in a convenience sample of undergraduates and has shown a stable factor structure over time, as well as acceptable reliability and validity (Moore et al., In Review). In addition, the constructs of Moore's PSAQ, when added in the place of self-efficacy within the EXSEM, have been shown to expand the models explanatory ability with acceptable indices of fit for a diverse group of active young adults (Moore & Bartholomew, In Preparation). Furthermore, Moore's PSAQ has demonstrated promising ability to explain variance in self-esteem and physical sub-domains following a 12-week resistance exercise program (Moore & Bartholomew, In Preparation).

Despite the relative success of Moore's PSAQ within the framework of the EXSEM, the three studies conducted to date have left many questions unanswered. Foremost, will the EXSEM with the inclusion of the constructs of Moore's PSAQ, fit information gathered from populations more in need of physical activity interventions, such as older adults, who report more diverse

backgrounds and activity histories? Secondly, these previous studies failed to compare self-perceptions with the current level of physical activity. As a result, no conclusions can be made about the relation of the newly modified EXSEM to self-reports of physical activity. Thirdly, Moore's PSAQ has only been utilized with the limited number of sub-domains found in Fox's PSPP. As a result, Study 2 was designed to address these issues by modifying Moore's PSAQ for use with Marsh's PSDQ in an older sample.

## Purpose of Study 2

Study 2 is designed to test the ability of the cognitive facets of physical self-concept as measured by Moore's PSAQ, to explain variance within the physical sub-domain scores as measured by the Physical Self-Descriptive Questionnaire (PSDQ) in a sample of older adults. Moore's PSAQ will be modified to include the nine sub-domains of Marsh's PSDQ: health, appearance, endurance, strength, body fat, coordination, flexibility, physical activity, and sport competence. Marsh's PSDQ (Appendix A) will be given to this population along with the modified PSAQ (Appendix E). In addition, assessments will also include the Physical Activity Scale for the Elderly (PASE) to measure physical activity (Appendix B). Finally, so that the population sample may better be defined, participants will complete a health history questionnaire and provide basic demographic information such as age, gender, income, ethnicity, and marital status (Appendices C & D, respectively).

## HYPOTHESES

### Study 1: Validation of Marsh's PSDQ in a sample of older adults

Hypothesis 1.1: Marsh's PSDQ demonstrates acceptable factor validity in a sample of older adults.

Hypothesis 1.2: Marsh's PSDQ demonstrates acceptable internal reliability in a sample of older adults.

Hypothesis 1.3: Marsh's PSDQ subscales combine to predict a significant percentage of variance in self-reported physical activity.

### Study 2: Utilization of Moore's PSAQ with Marsh's PSDQ

Hypothesis 2.1: Moore's PSAQ items explain a significant percentage of the variance in the related subscales of Marsh's PSDQ.

Hypothesis 2.2: Theoretical groupings of Marsh's PSDQ will mediate the relation between the cognitive facets of Moore's PSAQ and self-reported physical activity.

## DEFINITION OF TERMS

- Physical Activity is an umbrella term describing any bodily movement produced by the skeletal muscles resulting in energy expenditure.
- Exercise is a sub-set of physical activity that is volitional, planned, structured, repetitive, and aimed at improvement or maintenance of an aspect of fitness or health.
- Affect is a specific feeling state generated in reaction to a certain event or appraisal.
- Self-perception is an umbrella term that denotes all types of statements about the self, both specific and global.

- Self-esteem or Self-Worth is the awareness of good possessed by the self and represents how positive individuals feel about themselves in general.
- Self-concept is a mental representation of one's beliefs about oneself in different sets of situations (e. g. Physical self-concept).
- Domains of self-concept lie at the second level of the hierarchy and include academic, social, emotional, and physical self-concept.
- Sub-domains lie below the Domain level and for the physical domain can include strength, attractiveness, sport ability, and flexibility among others.
- Cognitive Facets lie below the sub-domain level and include competency, certainty, importance, and ideal-self discrepancy.
- Physical self-esteem or Physical self-worth represents how positively an individual views oneself in the physical domain, and is comprised of perceptions of competence and affective evaluations about ones perceived physical competencies.
- Physical competencies are self-perceptions about specific sub-domains of ones physical self (e.g. one's ratings of their physical strength relative to persons their age and gender).
- Physical certainty is the degree to which a person feels confident in the accuracy of their perceptions of competence in a physical sub-domain (e.g. one's degree of certainty in the accuracy of their competency ratings concerning their physical attractiveness).
- Physical Acceptance is a state of comfort with ones physical competence within a physical sub-domain (e.g. one's ratings of their discrepancy from their ideal self concerning their flexibility).

- Physical importance is the degree to which you value a specific physical sub-domain (e.g. one's rating of how personally important physical strength is to them).
- Self-efficacy is ones perceived ability to perform a specific task.

## DELIMITATIONS

The results of the both Study 1 and Study 2 will be applicable to community living older adults in the rural southeastern United States.

## LIMITATIONS

Study 1 and Study 2 are completely reliant on self-report. Since there are no objective measures of physical fitness or physical activity, it is possible that the data will be biased. However, the measure of physical activity has been repeatedly validated in this population and appears to be a reliable and valid measure of physical activity in older adults.

Second, these studies rely exclusively on volunteers from community settings. It is possible that the sample could be biased towards more active individuals that might be more willing to participate in a research project. However, the recruitment of participants from non-activity organizations will provide a broad sample of individuals which should be representative of the population being investigated.

## SIGNIFICANCE OF STUDY

This study will provide the opportunity to validate two measurement tools in an older sample, which will hopefully support their further use in this population. By making additional theoretically grounded tools available for research with the Exercise and Self-Esteem model, this study can potentially

advance this line of research to a point that interventions utilizing this model can be undertaken.

Additionally, despite a renewed interest in physical self-esteem in the last fifteen years, little has been done to examine the mediators within the Exercise and Self-Esteem model. Though some work has been done with regards to other sub-domains (e.g. intraindividual variance, perceived health status), different theoretical models and paradigms have not been applied to the exercise and self-perception research. Only by testing these models within the framework of the existing Exercise and Self-Esteem model can we begin to understand how ones perceptions of themselves affects their choice of exercise behaviors.

Third, older populations have been noticeably absent from the research concerning physical self-perception and exercise despite the inclusion of physical activity rehabilitation programs that affect many within the latter third of the lifespan. It is important to understand how these populations differ across activity levels from a perceptual standpoint, if we are to understand the motivational aspects of physical self-perception. Little is currently known about the extent older adults differ from other populations in the manner in which they view their physical selves. It is only through research such as this that we can examine these differences in a way that might provide insight into how to motivate inactive older adults.

# CHAPTER II

## Review of literature

### SELF-ESTEEM (STUDY 1 AND STUDY 2)

Research in self-esteem and self-concept began with the work of William James in the late 1800's. Self-esteem and self-worth have been defined as "the awareness of good possessed by the self and represents how positive individuals feel about themselves in general" (Fox, 2000). Restated, self-esteem is a global measure of cognitions, emotions, perceptions, and evaluations of the self. It has been postulated that after the basic physiological needs, the drive for self-esteem is the most powerful of motivations (Fox, 2000). Self-esteem has been examined in countless contexts, including adolescent risk taking (Collingwood, 1997), sport participation (Richman & Shaffer, 2000), gender roles (Butcher, 1989; Williams & Currie, 2000), chronic disease (Blake, 1991; Lewis, 1989; Yates & Belknap, 1991), physical activity (McAuley, Mihalko, & Bane, 1997; Tiggemann & Williamson, 2000), education (Fenzel, 1992; Tremblay, Inman, & Willms, 2000), sexuality (Wiederman & Hurst, 1998), and aging research (Allison & Keller, 1997; Loomis & Thomas, 1991). Unfortunately, self esteem is often included in many studies as just one of many indicators of mental health or psychological adjustment, and initial findings or interpretations can be mixed. For example, self esteem has been reported to be protective in adolescents by reducing sexual risk taking and disordered eating (Fisher, Schneider, Pegler, & Napolitano, 1991; Taylor-Seehafer & Rew, 2000). In contrast, it has also been shown to be associated with increased negative risk taking behavior in other studies (Millstein

& Irwin, 1988; Vavrik, 1997). Likewise, self-esteem has been reported to decline with aging (Brandtstaedter, Wentura, & Greve, 1993), to be resilient to aging (Brandtstaedter et al., 1993), decline due to illness (Conn, Taylor, & Abele, 1991), and be resistant to changes in health status (Penninx et al., 1998).

Many of these discrepancies can be understood through an examination of the different facets of global self-esteem that may serve to mediate these relationships. For example, some self-esteem researchers have begun to distinguish between contingent self-esteem and true self-esteem (Deci & Ryan, 1995). Contingent self-esteem is dependent upon meeting expectations or achieving a standard, and thus is highly unstable. True self-esteem is a more stable and resilient entity, resistant to recent events. Unfortunately, much of the research conducted cannot differentiate between one with contingent self-esteem who has recently succeeded and one with high true self-esteem (Deci & Ryan, 1995). However, the nature of their self-regard and the corresponding behaviors of interest might differ greatly. Thus, while widely studied, self-esteem's reciprocal relationship with behavior is only beginning to be understood. However, despite these shortfalls, sufficient evidence exists that high levels of self-esteem are adaptive and provide a clear benefit, specifically for those with positive stable views of the self. It is only through continued research aimed at understanding the mediators and moderators of self-esteem in relation to behavioral choices that we can fully understand its importance. Such a discussion begins with a consideration of the multiple components that underlie global self-esteem.

Global self-concept in psychological terms is what sociologist refer to as "identity". It has been largely considered a multidimensional concept since the

earlier work of Shavelson, Hubner, and Stanton (Shavelson, Hubner, & Stanton, 1976). As with the sociological notion of identity, where a man can simultaneously be a husband, father, dentist, and deacon, this new model of self-concept had many components. These components are domain specific self-concepts that are limited to descriptive perceptions of the self, without an evaluative aspect. Shavelson and colleagues (1976) were the first to propose a hierarchical model of the self with self-esteem at its highest level, underscored by various domain specific self-concepts, e.g. academic, social, physical, and emotional (Marsh & Sonstroem, 1995). Underlying each of these domains were a series of sub-domains. Thus, where we have specific concepts of the self, e.g. the physical self, we simultaneously judge ourselves in a number of sub-domains, e.g., sport competence and attractiveness (Fox & Corbin, 1989; Marsh et al., 1994). In addition, just as general self-esteem is supported by a number of domain-specific self-concepts, each of these sub-domains can be viewed as a function of any number of more narrowly defined factors. For example, soccer competence may underlie sport competence and fatness may underlie attractiveness, with sub-factors further specifying the cognitions that a person holds for each factor. Competence / ability areas (such as soccer ability) would be expressed in terms of specific self-efficacies, e.g. goal keeping ability, and perceptive areas (such as attractiveness) might be expressed as perceptual moments related to the environment (Fox, 2000, Fox, 1999 #15). Thus, what was originally viewed as a general concept "identity," is now considered to be composed of multiple levels of perceived abilities, each level representing a further degree of specificity.

Although a person's identity can be broken down in this fashion, each of these self-perceptions are not simultaneously activated, nor do they exert equal influence over behavior (Pelham & Swann, 1989). Much of the influence of these descriptive perceptions will be based on the cognitive evaluations and value judgments that are associated with each perception. Those judgments include the certainty or stability of their perceptions, their acceptance of their perceived ability levels as well as the importance of the domain in question. These cognitive facets are expected to interact to impact behavioral choices. A fuller description of these facets will be presented in a later section and will form the basis for Study 2.

## EXERCISE AND SELF-ESTEEM (STUDY 1 AND STUDY 2)

Compared to more general work concerning the self which dates back to the 1800's, research concerning physical activity and self-esteem is relatively new. Fox (2000) recently conducted a comprehensive review of exercise intervention studies that had measured self-perception and self-esteem outcomes. Since 1971, 37 randomized controlled studies were identified, of these; nine were unpublished theses or dissertations. Also considered were 42 non-randomized controlled studies. The studies utilized a diverse group of populations, physical activity regimens, and protocols. Of the 37 randomized studies identified, eight were with children, seven with college students, and nine were with special clinical groups. The clinical groups included alcoholics, depressives, overweight, and learning disabled individuals. Interestingly, none of the 79 studies included in Fox's extensive review included older adults.

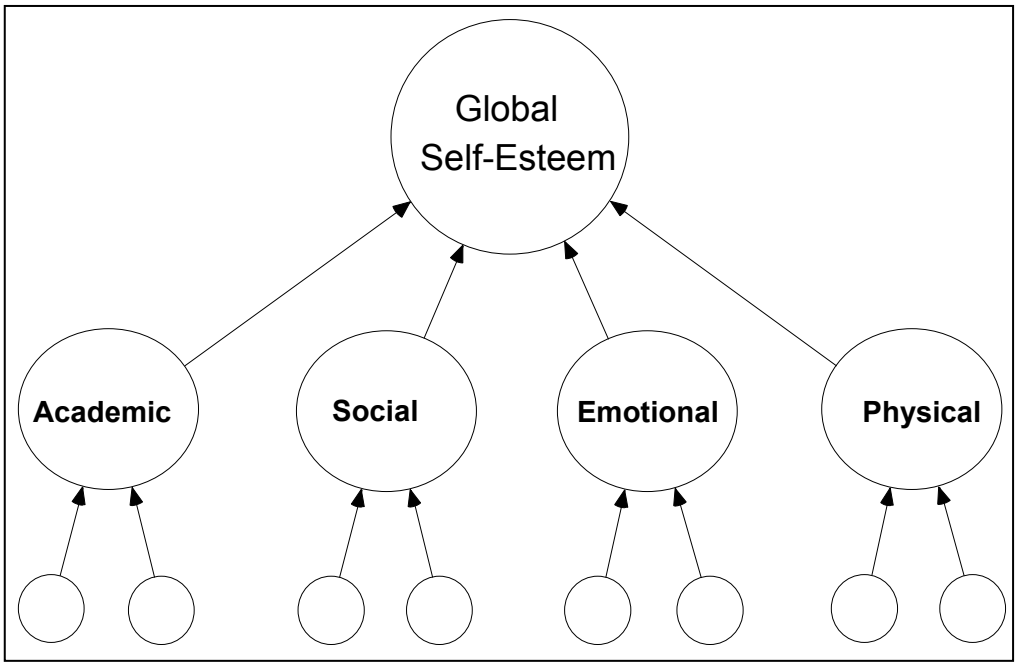


**Table 2.1: The hierarchical model of self-esteem (Shavelson et al., 1976)**

Comparisons of the literature were made difficult by the varied measures of self that were utilized. The constructs studied varied from global self-esteem to body image. Many of the earlier studies utilized The Tennessee Self-Concept Scale, which includes a physical self-concept sub-scale. Regrettably, the physical sub-scale has been criticized for poor psychometric properties and for the inclusion of items that are not applicable to physical activity (Marsh & Richards, 1988). Despite these qualifiers, it was concluded that exercise can promote physical self-worth and improve body image, with 78% of the studies indicating significant improvements (Fox, 2000). However, results concerning global self-esteem were mixed, with approximately half of the studies revealing a positive impact for exercise, with the greatest benefit occurring for participants with lower baseline values. Although endurance training and weight training produced the strongest results, several types of exercise were also effective in changing self-perceptions, e.g. swimming, aerobics, and physical activity classes**.** Unfortunately, as was the case with early self-esteem research in other areas, much of this work was atheoretical in nature and was instead largely limited to descriptions of the larger relationship between activity and self-esteem.

It was not until the work of Sonstroem and Morgan (1989), with their introduction of the Exercise and Self-Esteem Model (EXSEM) that a theoretical framework was advanced to guide research in this area. The EXSEM was the first model that attempted to explain the relationship between exercise and global self-esteem through a hierarchical relationship. The hierarchy begins with global self-esteem, leading downward through physical self-esteem (self-concept), through physical competence and acceptance, and finally to specific physical self-efficacies (Sonstroem & Morgan, 1989). Physical acceptance, although

hypothesized to exist at the same level in the hierarchy as physical competence, was thought to be indirectly influenced by self-efficacies through it relationship with physical competence.

Despite the presence of acceptance in the original model, measurement tools utilized to assess the EXSEM were designed to solely measure physical competence. For example, Sonstroem and colleagues tested the EXSEM with a group of middle-age female exercisers in a cross sectional design (Sonstroem et al., 1994). A measure was given to assess physical self-worth at the domain level, as well as four competence-based sub-domains: strength, condition, sport competence, and attractive body. Also measured were three performance specific self-efficacies. Structural equation modeling revealed acceptable indices of fit for the model (Sonstroem et al., 1994). Interestingly, the contribution of self-efficacy was relatively weak and, as a result, Sonstroem suggested that the role of self-efficacy should be rethought and possibly revised. A larger concern is the failure to include measures of physical acceptance. The measurement models available at the time did not allow for the assessment of physical acceptance at either the domain (to accompany physical self-worth) or sub-domain level. Thus, a major mediational step was missing from the first efforts to validate the model.

The ability of exercise to impact the constructs of the EXSEM was first tested by McAuley and associates (1997) who utilized a sample of middle aged, sedentary, but otherwise healthy adults in a short duration, longitudinal study. Specifically, participants completed 20 weeks of a structured physical activity program. Results supported the hierarchical nature of the EXSEM with the largest effects observed at the sub-domain level, perceived fitness, (ES = .54), followed by the domain level, physical self-worth, (ES = .41), with the smallest

effect for global self-esteem (ES = .22) (McAuley et al., 1997). Although these effects support the hierarchical nature of the model, this study, unfortunately utilized the same measurement scheme as Sonstroem's initial work, and did not include a measure of physical acceptance. Furthermore, the role of self-efficacy within the model was again not supported. Another study, utilizing a similar study population, partially replicated the findings of McAuley and associates (Alfermann & Stoll, 2000). Participants who underwent a six month exercise program demonstrated large gains in perceived physical fitness (ES = .54) and physical self-worth (ES = .50), with smaller gains in self-esteem (ES = .20) (Alfermann & Stoll, 2000). Unfortunately, specific physical sub-domains were not measured for this study.

To date, the only study that attempted to test the model as a whole utilized a sample of women with breast cancer recruited from breast cancer support groups (Baldwin & Courneya, 1997). Self-esteem, self-reported exercise, physical competence and acceptance were assessed and fit to the EXSEM. The researchers found that 46% of the variance in global self-esteem could be explained by competence, acceptance, and strenuous exercise. Unfortunately, the measure of acceptance utilized was the Body Visual Analogue Scale which is used to measure body satisfaction (Baldwin & Courneya, 1997), and not physical acceptance as a whole. For example, where physical acceptance relates to the degree a person feels comfortable with their physical self, the Body Visual Analogue Scale focuses strictly on current and desired physical appearance and not whether the person is contented with who they are in form and function.

Therefore, though a body of literature has been established to test the theoretical basis of the EXSEM, there are serious limitations to these assessments.

First, no research has supported the fundamental role of self-efficacy as underlying the physical sub-domains of competence and acceptance. Second, only one study has examined the role of physical acceptance, and that assessment was poor. Clearly, additional research is required to fully assess all aspects of the EXSEM. It is only by these and other perceptual sub-domains of physical self-esteem that we can fully understand the factors that contribute to a person's view of their physical self.

### THE PHYSICAL SELF-PERCEPTION PROFILE

At approximately the same time that the EXSEM was introduced by Sonstroem and Morgan, the Physical Self-Perception Profile (PSPP) was developed by Fox and Corbin (1989) to measure physical self-worth and four physical sub-domains. Fox's PSPP is a 30 item questionnaire in the forced choice format, which asks participants to indicate their level of agreement with one of two statements. Fox's PSPP is scored to produce five subscales: Physical Self-Worth (PSW), Strength (STREN), Conditioning (COND), Sport Competence (SPORT), and Attractive Body (BODY). Fox's PSPP was the first measure designed to assess the physical self as a hierarchical entity, and, to date, it has been the most widely utilized instrument to test the EXSEM (Fox, 2000). Fox's PSPP has been widely validated (Marsh, 1997), and has been used to assess changes in physical self-worth and other sub-domains in response to exercise in other studies with middle-aged (McAuley et al., 1997) and older adults (McAuley et al., 2000).

Despite demonstrating sound psychometric properties in many different samples, Fox's PSPP has numerous limitations. Foremost is the limited scope of

the physical sub-domains (e.g. Strength, Condition, Sport Competence, and Attractive Body) which do not fully encompass the physical self. Secondly, the forced choice format has received criticism for being confusing and inappropriate for especially young or old participants (Marsh et al., 1994). It was for these reasons that the Physical Self Descriptive Questionnaire was considered for the present studies.

## THE PHYSICAL SELF-DESCRIPTIVE QUESTIONNAIRE

To address the shortcomings of Fox's PSPP and other measures of the physical self, the Physical Self-Descriptive Questionnaire (PSDQ) (Marsh et al., 1994) was developed. Marsh's PSDQ is a 70 item scale with 11 sub-scales that measure general self-esteem, physical self-esteem and nine sub-domains of the physical self: (1) physical strength, (2) physical endurance, (3) physical attractiveness, (4) sport competence, (5) flexibility, (6) coordination, (7) body fat, (8) physical activity, and (9) health status. It is a scale that asks participants to rate their agreement with 70 statements on a six point Likert scale anchored by "False" and "True", with four points in between. Marsh's PSDQ has been validated against other measurement scales such as the Physical Self-Perception Profile (Marsh et al., 1994) and external physical criteria (Marsh, 1996), performing well on both. When compared to Fox's PSPP, the physical self-worth, strength, and sport competence sub-scales of Marsh's PSDQ are highly correlated with the corresponding sub-scale of Fox's PSPP with correlations reported of .81, .86, and .86, respectively. The condition and attractive body sub-scale of Fox's PSPP were each moderately correlated with two sub-scales of Marsh's PSDQ. Condition was correlated with physical activity (.73) and

endurance (.70), while body attractiveness was correlated with appearance (.68) and body fat (.61) (Marsh et al., 1994). Therefore, while Marsh's PSDQ does not measure the identical four sub-domains as Fox's PSPP, it would appear that Marsh's PSDQ can adequately assess these sub-domains as well as the additional sub-domains of coordination, body fat, attractiveness, physical activity, and health.

Marsh's PSDQ is a preferred measure to Fox's PSPP not only due to the additional sub-domains measured, but also due to its less novel answer format. By providing participants with a scale which is likely to be more familiar to them, participants will be less likely to make mistakes due to the answer format. Support for this perspective can be seen in the relatively low rate of mistakes in young validation samples (Marsh, Asci, & Thomas, 2002). Unfortunately, due to the extensive nature of the validation efforts on behalf of the developers of Marsh's PSDQ, the populations that have been utilized have been relatively homogeneous in respects to age. In fact, to date, all studies have been conducted in adolescent populations. While this is truly an important population to study, for Marsh's PSDQ to be usefully in a broader array of research, it must be validated in a more diverse population with respect to age. This will be the focus of study 1.

## EXERCISE AND OLDER ADULTS (STUDY 1 AND STUDY 2)

It has long been known that structured exercise has numerous benefits for people of all ages and functional ability (Allison & Keller, 1997; Dishman, 1994b), and programs for older adults that involve walking, aerobic conditioning, and resistance training have been proven to benefit those who wish to improve

basic components of health related fitness such as flexibility, body composition, muscular strength, and muscular endurance (Conn, 1998). As the mean age of the population increases, great interest has surrounded the use of exercise and conditioning to counteract the debilitating effects of the aging process. For many aspects of aging such as the loss of flexibility, muscular strength, and endurance, literature supports the hypothesis that the losses in these areas can be counteracted through exercise (Judge et al., 1994). Regular activity can minimize or reduce chronic problems such as cardiovascular disease, obesity, osteoporosis, and decreased immune function (Conn, 1998). Thus, it has been reported that older people that were defined as high in activity had one half to two thirds lower mortality rates than those who were sedentary (Erikssen, 2001). The neuromuscular and cardiovascular systems also experience a number of deteriorations during the normal aging process. The most notable deteriorations due to advanced age are muscle weakness, decreased postural stability, and reduced aerobic capacity (Scully, Kremer, Meade, Graham, & Dudgeon, 1998). This deterioration can result in decreased postural control. This lends itself to a higher incidence of falls, which is a common cause for mortality in the elderly (Buchner et al., 1997). Fortunately, exercise can lead to increased postural stability and control in the elderly (Judge, Lindsey, Underwood, & Winsemius, 1993; Wolfson et al., 1993). In addition to these physical benefits, exercise provides many psychological benefits in the elderly, including enhanced positive and reduced negative mood states, enhanced self-efficacy, enhanced body image, and improved self-esteem (Bozoian et al., 1994). Exercise has also been shown to prevent and treat depression, which is common in the elderly (Singh, Clements, & Fiatarone-Singh, 2001). It is particularly interesting that elders appear to receive

benefits from exercise that are not generalizable to the middle age community. These include improvements in self-confidence, social life, sex life, sleep patterns, loneliness, and family relations (Emery & Blumenthal, 1990). Though these are not specifically related to fitness, these may reflect the general changes seen in mood states, stress, anxiety, and depression seen in other studies.

### IMPLICATIONS OF THE EXERCISE AND SELF-ESTEEM MODEL IN OLDER ADULTS (STUDY 1 AND STUDY 2)

Despite much literature espousing the ability of exercise to slow or even reverse the physical and psychological effects of aging, the majority of elderly people (along with much of the general population) remain inactive (Dishman, 1994a). It is, therefore, critical that effective interventions be developed to increase levels of physical activity. Thus, the question of how to intervene and with what type of activity remains a topic of much interest. It is known that to increase adherence in older adults it is necessary to increase the level of social support as well as self-esteem (Courneya & McAuley, 1995). However, if adherence is to be improved, older adults must first become motivated to exercise. It has been demonstrated that as adults age, they develop a self-serving bias concerning their level of physical activity (Wilcox & King, 2000). That is to say, older adults tend to overestimate their physical activity relative to others their age. This bias is especially prevalent in those with high perceptions of personal health. As a result, these individuals do not participate in the recommended levels of physical activity. This bias can possibly lead to rapidly deteriorating health in those whose high perceptions of health are inaccurate. Given the apparently critical role of physical self-perceptions in motivating behavior, we must better

understand the nature of physical self-views in older populations, how they change with age and how physical activity is related to these changes.

As an initial step in the process, Study 1 of this dissertation will test the factor structure of Marsh's PSDQ within a heterogeneous sample of older adults to determine the internal reliability of the sub-scales of Marsh's PSDQ. Furthermore, Study 1 will determine the relationship between the physical sub-domains measured by Marsh's PSDQ and self-reported physical activity.

## EXPANSION OF THE EXERCISE AND SELF-ESTEEM MODEL (STUDY 2)

Although competence and acceptance were outlined in the EXSEM, other perceptual distinctions have been supported in the self-esteem literature. Of particular interest is the role of perceived importance for each of the ability domains of the self as well as the stability of our perceptions of competencies. William James' early work concerning the self yielded an intuitive proposition. Namely, that the attribute or ability that a person values, or has "staked their salvation on," should have more influence on that person's global self-esteem than an attribute that is not as salient (James, 1890; Pelham & Swann, 1989). Thus, someone who strongly values academic excellence would be affected to a greater extent by negative information concerning their academic ability than one who did not value academics to the same extent. Furthermore, someone who's life is centered on a particular aspect of the self (e.g. a musicians artistic ability), will draw greater esteem (or lack thereof) from their perceived competencies in that domain due to it's saliency to their life and their knowledge of that domain. A musician is better able to gauge one's musical ability than a non-musician and will better know her standing among others. Unfortunately, despite the intuitive

appeal of James' early propositions, neither importance nor saliency has been greatly supported in the literature.

Much of the literature has examined importance by weighted ratings of importance. This work has provided little or no support for the inclusion of importance. In fact, McAuley & associates (1997) found that importance weighted self-conceptions explained very little extra variance in global self-esteem than did the un-weighted scores. Furthermore, work by Marsh utilizing a more complex scoring system failed to show value in importance ratings (Marsh, 1994, 1995). Marsh hypothesized that social norms provide an innate weighing system. Thus, as we are exposed to society, we internalize these evaluations; leaving little inter-individual variation in importance and, in turn, no predictive utility from its measurement (Marsh, 1994). Thus, Marsh has argued that there is no need to include importance in a measurement tool of physical self-worth.

The limitation of this body of literature is that most of the work on importance has utilized a score given to a particular domain (e.g. physical self), which is then used to weight the various physical sub-domain scores (e.g. strength and attractiveness), rather than collect separate importance ratings for each sub-domain. Furthermore, the body of work that has dealt with complex weighted models involving importance (Marsh, 1994) has focused on explaining variance in self-esteem or physical self-worth scores. Given the hierarchical nature of self-esteem, McAuley and associates (1997) have suggested that emphasis concerning importance ratings should be directed towards their influence on the sub-domain scores rather than their ability to explain additional variance in general self-esteem. Thus, additional work is required to explore the role of importance at the sub-domain level.

While the role of the certainty of ones competency ratings lacks the intuitive appeal of importance ratings, one needs to look no further than research into social comparison theory to understand the role of certainty in the study of the self. In the classic study of "Mr. Clean" and "Mr. Dirty", (Morse & Gergen, 1970) it was demonstrated that one's self-esteem can be raised or lowered based upon their comparison group. Furthermore, it was demonstrated that the effect of the comparison group was moderated by the person's degree of self consistency, operationalized in this study as the degree to which they have a stable view of who they were. Thus, those with unstable views were most disturbed by this comparison group. Unfortunately, though there is not a large body of research that has examined certainty within the framework of self esteem particularly physical self-worth. However, research has been conducted that laid the groundwork for future investigations. In 1989, Pelham and Swann devised the Self-Attribute Questionnaire (SAQ) (1989) to assess self-perceptions in ten different self-concept domains similar to those proposed by Shavelson et al (1976). Other questions ask participants to rate the importance of these self-concepts, their discrepancy from their ideal self within these domains, and the certainty of their responses. They computed composite self-perception scores that represented global perception, certainty, importance, and discrepancy across each domain. Their initial results showed that these composite scores were a significant predictor of global self-esteem and that differential importance (the amount of importance people impute to particular attributes relative to other attributes) was clearly associated with self-esteem in participants with relatively negative self-views (Pelham & Swann, 1989). Also, this effect was most pronounced in subjects who possessed high differential certainty. Thus, it appears that

importance may serve to mediate the impact of a particular domain on general self-esteem only in those individuals with either low or unstable self-perceptions. Regardless, the measurement paradigm presented by Pelham and Swann does appear to have utility.

Unfortunately, the domain level at which the SAQ is assessed is overly broad. For example, artistic ability can include sculpting, painting, singing, and playing instruments, all of which would elicit different ratings of certainty, importance, and ideal-self discrepancy even from one highly invested in the artistic domain. Similar issues occur for other domains, e.g. intellectual ability, social skills, physical attractiveness, leadership ability, emotional stability, luck, and discipline. Thus, within physical attractiveness, one may feel certain about their facial attractiveness, but not when it comes to their body. The role of certainty is therefore diminished by the convoluted nature of this level of analysis. Therefore, importance is likely to have its greatest impact for specific skills at the facet (e.g. painting, kicking a soccer ball, etc.) level. However, measurement at this level is especially cumbersome due to the numerous skills that people possess. Thus, it may be that Pelham and Swann's measurement model is best applied at the sub-domain level rather than the domain level.

### THE PHYSICAL SELF-ATTRIBUTE SCALE

It was in considering the promise of Pelham and Swann's early work that the Physical Self-Attribute Scale (PSAQ) was designed (Moore & Bartholomew, In Preparation). Based on the SAQ, Moore's PSAQ was designed to test the same cognitive facets as applied to the physical sub-domains of physical strength, physical endurance, attractive body, sport ability, and flexibility. The scale was

altered in no other way than to insert the physical sub-domain (e.g. Physical strength) into the questionnaire where the domains (e.g. Artistic ability, Intellectual ability) had originally existed. For an example, a competency question is; "Relative to others your age and gender, rate your physical strength, with those in the "top 5%" being strongest". The participant would then indicate their percentile ranking on strength. A copy of Moore's PSAQ can be found in Appendix E**.** The specific sub-domains used in Moore's PSAQ were selected so that it would compliment the Physical Self-Perception Profile (PSPP)(Fox & Corbin, 1989).

For the first validation work Fox's PSPP and PSAQ were given to a sample of 154 undergraduate students enrolled in health promotion classes at a large southern university. Of the 154 who completed the questionnaires, 23 (2 males, 21 females) were incorrectly completed or incomplete and omitted from the analysis, leaving 131 (26 males, 105 females) complete questionnaires for analysis. First, Moore's PSAQ proved reliable at the sub-domain level (Cronbach's $\alpha$ = .64-.82 for both samples). In addition, a confirmatory factor analysis (CFA) was performed, with the analyzed factor structure presented in Figure 2.2. At Time 1 indices of fit for the factor structure were acceptable, with $X^2$ (74) = 85.22 $\underline{\rho}$ < .175, CFI= .99, TLI = .98, RMSEA = .034, which supports the five factor structure hypothesized to exist in conjunction with Fox's PSPP. For Time 2, indices of fit for the factor structure were also acceptable, with $X^2$ (74) = 130.28 $\underline{\rho}$ < .0001, CFI= .96, TLI = .94, RMSEA = .076. Thus, the results of the CFAs at Time 1 and Time 2 would suggest a test-retest factor structure that remains stable over a two-week period.

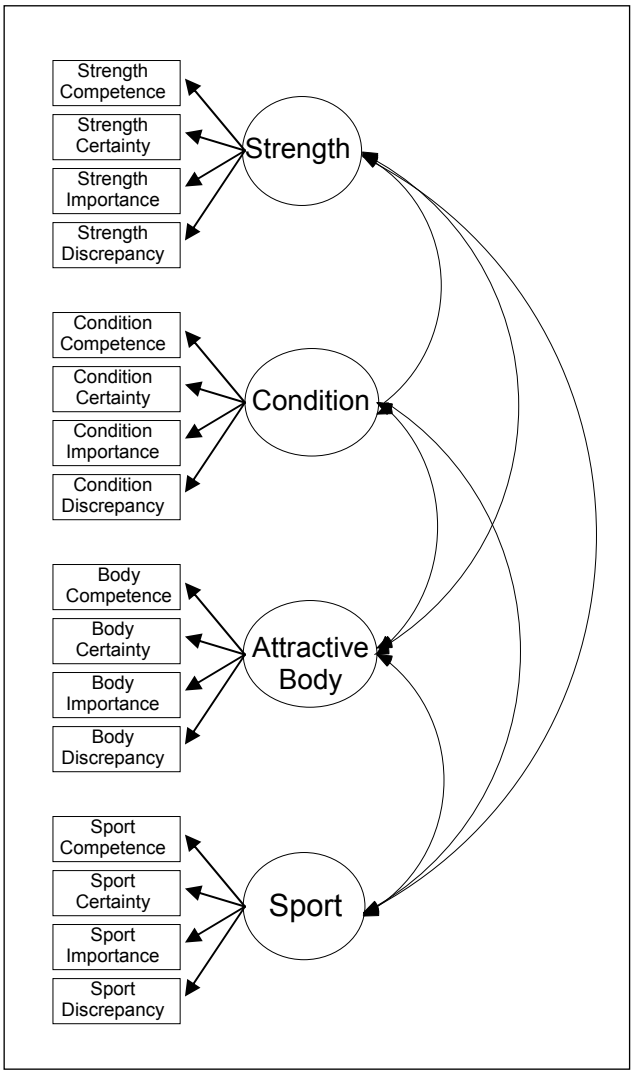


**Figure 2.2: The confirmatory factor structure of the Physical Self-Attribute Questionnaire (Moore & Bartholomew, In Preparation).**

Lastly, Fox's PSPP sub-domain scores were regressed onto the sub-domain facets measured by Moore's PSAQ. Moore's PSAQ demonstrated sufficient ability to explain variance in the sub-domain scores of Fox's PSPP in both current exercisers ($\underline{R^2}$ = .41 -.57) and a broader sample including current exercisers and non-exercisers ($\underline{R^2}$ = .35 -.60). Moore's PSAQ therefore appears to have acceptable reliability and validity; and it would appear that the constructs of Moore's PSAQ are viable additions to the EXSEM. Not only does Moore's PSAQ add the cognitive facet of physical acceptance below the sub-domain level of the EXSEM, as suggested by Sonstroem at the domain level (Sonstroem & Morgan, 1989) and Fox at the sub-domain level (Fox, 2000)**,** Moore's PSAQ also adds a measures of stability and importance, which have, to date, been studied independent of the overall model (Fox, 2000).

Despite the success of the initial validation of Moore's PSAQ, it is important to determine if the cognitive facets measured by Moore's PSAQ are sensitive to physical changes. For this reason a second study was undertaken to determine the sensitivity of Moore's PSAQ to changes in self- perception following a resistance exercise program (Moore & Bartholomew, In Preparation). For this study, participants were recruited from weight training classes at a large southern university. Participants completed both Fox's PSPP and Moore's PSAQ at the beginning of class prior to one repetition maximal (1RM) strength testing, and twelve weeks later prior to final 1RM assessment. Results indicated that the competency scores for all sub-domains tested (strength, endurance, body, and sport) increased significantly over a 12-week program ($\underline{ES}$ =.44, .21, .27, .17 respectively), as did certainty ratings for strength and attractive body ($\underline{ES}$ = .21, .28). Additionally, there was a significant reduction in ideal-self discrepancy for

the strength domain (ES=.27). Thus, Moore's PSAQ revealed those changes in self-perceptions that would be expected to follow 12 weeks of resistance training. In addition, to determine if the changes in these variables followed the EXSEM model, the factor structure of each sub-domain was tested at Time 2 controlling for Time 1. Separate sub-domains were tested instead of the full model due to limits in sample size and homogeneity of the sample (current weight lifters). An example of the model tested can be seen as Figure 2.3. For all four sub-domains, acceptable indices of fit were observed. Thus, the changes in self-perceptions that follow exercise training appear to follow the EXSEM in a group of young, weightlifters. However, these data must be questioned until the model as a whole can be assessed and applied to different populations.

In order to test the model as a whole, a larger sample was drawn in a third study to examine the structure of the newly modified Exercise and Self-Esteem Model (Moore & Bartholomew, In Preparation). Three hundred and eighty undergraduates were recruited from five different activity classes at a large southwestern university. The classes were chosen to produce variability in ratings across the sub-domains, specifically: swimming conditioning, step aerobics, resistance and cardiovascular cross training, and tennis. Participants complete Fox's PSPP and Moore's PSAQ and their responses were fit to the EXSEM. The model again showed acceptable fit indices when tested as a whole, with X2 (148) = 447.83, $\rho < .0001$, CFI = .94, TLI = .91, RMSEA = .073. This, again, supports the five-factor structure hypothesized to exist for Moore's PSAQ when used in conjunction with PSPP. Thus, three studies have been conducted to validate the measurement model applied with Moore's PSAQ.

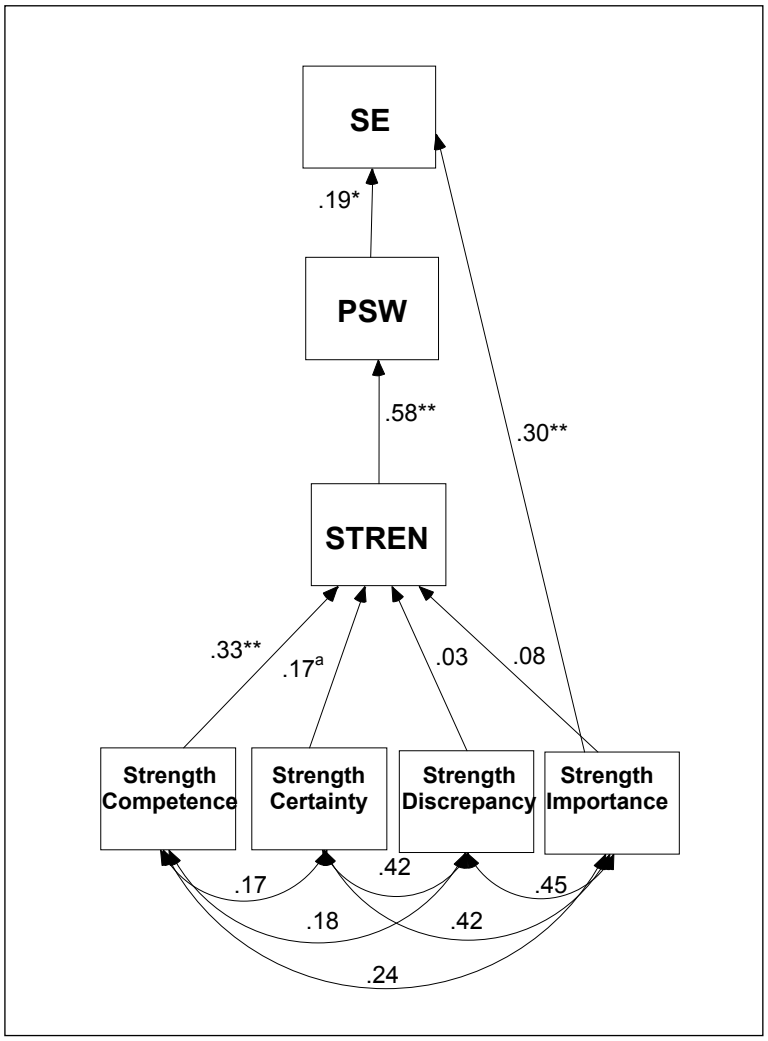


**Figure 2.3: Path analysis model for the strength sub-domain (Moore & Bartholomew, In Preparation)**

The factor validity of the model was supported through CFA using samples homogenous and diverse exercisers of college age. The test-retest validity was supported through multiple CFAs. Lastly, the construct validity was supported by examining the changes in PSAQ constructs following 12 weeks of weight training. As a result, this modified version of the EXSEM is promising. It provides the potential to understand the influences of the physical sub-domains on physical self-worth and self-esteem. With the cognitive facets of Moore's PSAQ in place, a researcher can now determine not just how much a sub-domain impacts physical self-worth, but the extent to which this relationship is a function of perceived competency, certainty, importance, or acceptance. Furthermore, these influences can be directly compared to one another. This is illustrated in the resistance exercise study discussed above (Moore & Bartholomew, In Preparation). For the strength sub-domain, competency ratings had a greater relative influence on strength esteem ($\beta$=.33, $p<.01$) than did discrepancy from ideal ($\beta$=.03, NS). It is hoped that future applications of this model will allow researchers to clarify the role of cognition within the study of self-esteem and physical self-worth.

It is important to recognize that PSAQ represents a measurement model or paradigm for assessing the cognitive facets of self-esteem that can be applied to any constellation of perceptive domains of the self. It is not intended to be a fixed questionnaire. Pelham and Swann developed this paradigm and applied it to a range of domains. The modification of this paradigm, as Moore's PSAQ, has been to apply these facets to the physical sub-domains of Fox's PSPP. However, given the limitations of Fox's PSPP, it is important and wholly appropriate to

apply this paradigm to other instruments that assess a broader array of physical sub-domains (i.e. Marsh's PSDQ). Marsh's PSDQ has the sub-domains of (1) physical strength, (2) physical endurance, (3) physical attractiveness, (4) sport competence, (5) flexibility, (6) coordination, (7) body fat, (8) physical activity, and (9) health status, which clearly encompass an expanded tract of the physical self. In addition, the research to date utilizing Moore's PSAQ has been exclusively conducted with active, healthy young adults. While exercise interventions are needed for people of all ages, older adults can benefit from physical activity to a greater extent due to the diverse physical nature of the aging population and their ability to respond to physical interventions (Conn, 1998). Furthermore, when attempting to develop a theoretical model, it is important to examine a diverse population, with a range of physical conditions. Younger adults, especially those in the university setting, are a homogeneous population with relatively minimal variability regarding their physical condition. It is for these reasons that the most sensible extension of Moore's PSAQ within the EXSEM would occur in conjunction with Marsh's PSDQ within a sample of older adults. This application serves as the basis of Study 2 of this dissertation.

## CONCLUSIONS

Since the early work of William James it has been clear that how we view ourselves can have broad implications on one's overall mental health (James, 1890). Self-esteem has been linked to numerous mental disorders such as depression, but can also be considered an important independent outcome (Fox, 1999). Much the same can be said about physical self- worth, which has been demonstrated to mediate the relationship between physical activity and self-

esteem (Sonstroem et al., 1994), while exhibiting protective mental properties in and of itself (Sonstroem & Potts, 1996).

The first model to examine the relationship between physical activity and self-esteem was the Exercise and Self-Esteem Model (EXSEM)(Sonstroem & Morgan, 1989). The theoretical basis of the EXSEM states that exercise increases self-efficacy, leading to increased physical competence, which in turn impacts physical acceptance and physical self-worth. Increases in physical self-worth are then related to increases in self-esteem. The EXSEM has been supported in numerous studies (McAuley et al., 2000). Unfortunately, the measurement of the EXSEM has largely not followed the theoretical foundation of the model. Furthermore, the utilization of Fox's PSPP and its four physical sub-domains fails to encompass the entirety of the physical self. Therefore, other measurement tools with a broader scope, such as Marsh's PSDQ must be considered. In addition, factors at the cognitive level have not been assessed within the framework of the EXSEM. This dissertation aims to address both issues.

Older adults vary greatly, relative to younger adults, with regards to their physical activity levels. Furthermore, older adults have been shown to benefit greatly from physical activity with improvements in mental health, coordination, balance, flexibility, strength, endurance, body composition, and self-efficacy (Conn, 1998; Emery & Gatz, 1990; Judge et al., 1993). Unfortunately, research involving older adults and the EXSEM is quite limited and has utilized measurement scales insensitive to many of the benefits expected for older adults. It is for this reason that Study 1 of this dissertation was undertaken: to confirm the factor structure and reliability of Marsh's PSDQ in a population of older adults as

well as the ability of the sub-domains of Marsh's PSDQ to explain variance in physical activity of older adults.

While the addition of new sub-domains to the measurement of the EXSEM addresses one of the limitations of the previous research in this area, it does not address the present failure to assess cognitive facets. This measurement conundrum was addressed by Moore and Bartholomew (In Review) who developed the Physical Self-Attribute Questionnaire (PSAQ) to assess competence, acceptance, certainty, and importance at the physical sub-domain level. Moore's PSAQ has demonstrated acceptable psychometric properties (Moore & Bartholomew, In Preparation), demonstrated sensitivity to physical changes (Moore & Bartholomew, In Preparation), and proven valuable as an addition to the measurement of the EXSEM (Moore & Bartholomew, In Preparation). Unfortunately, to date Moore's PSAQ has not been utilized with Marsh's PSDQ, in a population homogeneous in regard to physical activity, or with a proven measure of physical activity. It is for these reasons that Study 2 was undertaken.

# CHAPTER III

# Methods

## GENERAL INTRODUCTION

This dissertation utilizes self-report data in order to obtain information concerning older adult's global self-esteem and self-concepts within the physical domain and to determine their relationship to self-reported physical activity. To accomplish this, a large (N=249) sample of older adults who are heterogeneous with respect to activity patterns were recruited. In addition, the psychometric properties of a the Physical Self-Descriptive Questionnaire and the Physical Self-Attributes Questionnaire were examined in this population in hopes that it may prove a useful tool for future research aimed at understanding the structure of physical self-concept within older adults.

## STUDY 1

### Design

This study is cross-sectional and descriptive by design. Subjects are described in terms of health history, activity level, age, ethnicity, income, and marital status. Furthermore, this study includes different analyses designed to determine the psychometric properties of the Physical Self-Descriptive Questionnaire (PSDQ) in an older population and to gain a better understanding of the relationships between self-esteem, physical self-esteem, the sub-domains of physical self-esteem, and self-reported physical activity. Confirmatory factor analyses are employed to test the factor structure or Marsh's PSDQ and structural

equation modeling, in the form of path analyses, is employed to test the relationships between physical activity and physical self-perceptions as measured by Marsh's PSDQ. Data were examined to determine the overall fit of the theoretical groupings of physical sub-domains, as well as the ability of each model to explain variance in self-reported exercise behavior.

## Participants

To ensure the applicability of this dissertation's findings to the population in question, a large, diverse sample was pursued (n=249). Attempts were made to ensure equal numbers of men and women and minority group representation equivalent to national averages. Participants were excluded only if they were unable to complete the questionnaires due to language restrictions, cognitive impairment, or communication difficulties. Participants were asked to participate if they were at least 60 years of age and willing and able to complete all questionnaire measures. No additional limitations were placed on health status, gender, or ethnicity. Participants were recruited at each location by the primary researcher through announcements by officials at each site. Participants at all sites were informed that the survey would take approximately 30 minutes and may be completed on site, or taken home and returned to drop boxes at the site of recruitment.

## Recruitment

Participants were recruited from four locations in north-central Mississippi. These locations were not chosen to allow comparison across collection settings. Instead, these were selected to maximize the likelihood of obtaining a normal distribution of physical activity within this sample of older

adults in a rural setting. The first setting is the HealthPlex Fitness Facility at Baptist Memorial Hospital-North Mississippi (Oxford, MS). The Baptist HealthPlex fitness facility offers a wide variety of state-of-the-art cardiovascular and weight training equipment, classes for health-related conditions and clinically-educated instructors. Aerobic classes, cardiac rehabilitation, fitness assessment, exercise prescriptions and dietary counseling are among the services offered at the HealthPlex. This location was chosen due to the range of individuals that visited the center, from phase three cardiac rehabilitation patients to active, older adults. Though the center is not exclusive to older adults, the arrangement is such that it caters to the desires and concerns of older individuals and, as a result, a large percentage of it's clientele (>65%) is above the age of 60. The second recruitment site was Shiloh Baptist Church which is in the Oxford area. The third recruitment site was the Foster Grandparents program at the North Mississippi Regional Center. The Fourth location was the Hermitage Gardens assisted living residence home. The latter three locations were chosen to provide a less active group of participants with demographics that are similar to those at the Health-Plex.

## Instrumentation

Participants were asked to complete six questionnaires for the present study: (1) The Physical Self-Descriptive Questionnaire, (2) the Physical Activity Survey for the Elderly, (3) a questionnaire to assess health history, (4) a questionnaire to assess demographic information, and two questionnaires that will be mentioned in study 2. Copies of these questionnaires can be found as Appendices A-D.

The Physical Self-Descriptive Questionnaire (Marsh et al., 1994) provides scores for general self-esteem, physical self-esteem and nine, lower-order esteem domains related to the physical self: (1) physical strength, (2) physical endurance, (3) physical attractiveness, (4) sport competence, (5) flexibility, (6) coordination, (7) body fat, (8) physical activity, and (9) health status. It is a scale that asks participants to rate their agreement with 70 statements on a six point Likert scale anchored by "False" and "True", with four points in between. Scores were computed by averaging sub-domain responses resulting in a range of 1-6 for each sub-domain, self-esteem, and physical self-worth scores. Marsh's PSDQ has been validated against other measurement scales such as the Physical Self-Perception Profile (Marsh et al., 1994) and external physical criteria (Marsh, 1996), performing well on both behalves. Furthermore, the cross cultural validity of Marsh's PSDQ was recently tested in a sample of Turkish college students (Marsh et al., 2002). Results demonstrated strong support for the validity of Marsh's PSDQ and confirmed earlier validation efforts in an Australian sample (Marsh et al., 1994).

The Physical Activity Scale for the Elderly (PASE) (Washburn, McAuley, Katula, Mihalko, & Boileau, 1999) is a brief instrument designed to assess physical activity in older adults. The PASE records leisure activity such as walking, muscular toning, light, moderate, and strenuous sports, as "never", "seldom" (1-2 days/wk), "sometimes" (3-4 days/wk), and "often" (5-7 days/wk). Duration is broken into the categories: less than 1 hour, between 1 and 2 hours, 2-4 hours, or more than 4 hours. Different types of work, such as that involving mostly sitting are recorded in total hours per week. Housework (light and heavy), lawn work, home repair, gardening, and caring for others are recorded as yes/no.

A composite score for the PASE is computed by multiplying each activity score by empirically derived weights and summing across activities to produce a composite activity score. The validity of the PASE has been confirmed in two studies that both support a strong relationship between the activity score for the PASE and objective activity indices (Harada, Chiu, King, & Stewart, 2001; Washburn et al., 1999).

The health history questionnaire was developed specifically for this study and asks participants to indicate if they have ever been diagnosed with any of ten major health conditions and if so, to indicate the date of first diagnosis. The demographic questionnaire asks for the participant's age, gender, ethnicity, marital status, income level, and education level. Both of these questionnaires are included to allow for a fuller description of the sample population.

## Test Administration

The questionnaires were given to participants to complete at the recruitment locations. Participants were asked to complete them on-site with assistance from the researcher as needed. They were also allowed to take them home for completion. All information was completed without any identifying information included on the surveys.

## Statistical Analysis

To test the hypothesis that Marsh's PSDQ will have acceptable factor validity, two confirmatory factor analyses were performed with the AMOS (Arbuckle, 1995) statistical software. For the first factor analysis, the 70 items of Marsh's PSDQ were utilized to verify that they conform to the 11 factors initially verified in younger adults. To further confirm the factor structure, a second

confirmatory factor analysis was performed to the specifications of Marsh (1994). For the second analysis, item pairs were computed. Item pair are suggested due to their resistance to idiosyncratic variance. Item pairs are calculated by averaging the first two items in each scale to form the first item pair, the second two items to form the second item pair, and so forth, The reason for this second analysis is that the use of item pairs improves the ratio of subjects to items to a more appropriate ratio (249:35) which is superior to the initial validation ratio of 105:25 (Marsh & Redmayne, 1994).

Since the fit of the factor structure can be analyzed using a large number of indices of fit, there remains disagreement as to the appropriate indices of fit to utilize. As a result, it is the general practice to report multiple indices of fit. The following will be considered to indicate good fit in the present study: The chi-square statistic, the comparative fit index (CFI), the Tucker-Lewis Index (TLI), and the root mean square error of approximation (RMSEA). All four are readily accepted in the general literature (Kline, 1998), as well as in the current body of literature from which this study was designed (Marsh et al., 2002). Criteria for good fit were a small chi-square statistic relative to degrees of freedom resulting in a significant p statistic. However, since the Chi-square statistic is sensitive to a number of sample factors (including sample size and complexity), the other indices will also be considered as they demonstrate strong resistance to the influence of sample size. A CFI and TLI greater than .90 will be considered indicative of acceptable fit, with indicators greater than .95 considered indicative of close fit (Marsh et al., 2002). The most appropriate statistic for this model, due to its relative complexity, was the RMSEA (MacCallum & Austin, 2000). A RMSEA below .08 was considered good fit of the model.

Hypothesis one, which states that Marsh's PSDQ will demonstrate acceptable factor validity, was tested utilizing confirmatory factor analysis according to the criteria outlined above. To test hypothesis two, Cronbach's Alpha was calculated for each of the eleven sub-scales of Marsh's PSDQ. To test hypothesis three, a path analysis will be conducted including the scores for physical self-worth, and the nine physical sub-domains to determine their ability to predict self-reported physical activity as measured by the PASE. Structural equational modeling is a term that encompasses many techniques, but path analysis was employed for the current study. Whereas other analyses depend upon multiple indicators of each construct, path analysis allows for the modeling of relationships between single-item variables or observations (Kline, 1998). Structural equational modeling (SEM) is based upon the principles of correlation, covariance, and regression. The benefit of SEM as it will be used here is that it provides standardized disturbance terms which are analogous to the proportion of unexplained variance or error (i.e., $1-R^2$). Furthermore, SEM also provides standardized regression coefficients that are calculated while simultaneously considering the model as a whole. The fitting of a model can therefore provide variances and covariances of the observed variables, as well as the disturbance terms, standardized path coefficients (beta weights), and proportions of explained variance ($R^2$). The predictive ability of the physical sub-domains measured by Marsh's PSDQ were measured by the $\beta$ coefficients and $\underline{p}$ values given by the path analysis model.

To ensure the correct power for the analyses, two suggestions were followed to determine the minimum sample size for the analysis. Following the suggestion of Marsh (1994), a minimum ratio of subjects to observations of 4 to 1

was observed for the confirmatory factor analysis. For the path models, the suggestion of Kline (1998) of five subjects for each estimated parameter was used as a guideline.

## STUDY 2

### Design

This study is cross-sectional and descriptive by design. As in Study 1, subjects are described in terms of health history, activity level, age, ethnicity, income, and marital status. Furthermore, this study includes different analyses designed to determine the ability of the cognitive facets measured by the Physical Self-Attribute Questionnaire to explain variance in the physical sub-domains measured by the Physical Self-Descriptive Questionnaire (PSDQ). In addition, path analyses were employed to test the ability of theoretical groupings of physical sub-domains and their cognitive facets to explain variance in self-reported physical activity as measured by the Physical Activity Scale for the Elderly. Data were examined to determine the overall fit of the theoretical groupings of physical sub-domains, as well as the ability of each model to explain variance in self-reported exercise behavior.

### Participants

To ensure to applicability of this dissertation's findings to the population in question, a large, diverse sample was pursued (n=249). Attempts were made to ensure equal numbers of men and women and minority group representation equivalent to national averages. Participants were excluded only if they are unable to complete the questionnaires due to language restrictions, cognitive impairment, or communication difficulties. Participants were asked to participate

if they are at least 60 years of age and willing and able to complete all questionnaire measures. No additional limitations will be placed on health status, gender, or ethnicity. Participants were recruited at each location by the primary researcher through announcements by officials at each site. Participants at all sites were informed that the survey would take approximately 30 minutes and may be completed on site, or taken home and returned to drop boxes at the site of recruitment.

## Recruitment

Participants were recruited from four locations in north-central Mississippi. These locations were not chosen to allow comparison across collection settings. Instead, these were selected to maximize the likelihood of obtaining a normal distribution of physical activity within this sample of older adults in a rural setting. The first setting is the HealthPlex Fitness Facility at Baptist Memorial Hospital-North Mississippi (Oxford, MS). The Baptist HealthPlex fitness facility offers a wide variety of state-of-the-art cardiovascular and weight training equipment, classes for health-related conditions and clinically-educated instructors. Aerobic classes, cardiac rehabilitation, fitness assessment, exercise prescriptions and dietary counseling are among the services offered at the HealthPlex. This location was chosen due to the range of individuals that visited the center, from phase three cardiac rehabilitation patients to active, older adults. Though the center is not exclusive to older adults, the arrangement is such that it caters to the desires and concerns of older individuals and, as a result, a large percentage of it's clientele (>65%) is above the age of 60. The second recruitment site was Shiloh Baptist Church which is in the Oxford

area. The third recruitment site was the Foster Grandparents program at the North Mississippi Regional Center. The Fourth location was the Hermitage Gardens assisted living residence home. The latter three locations were chosen to provide a less active group of participants with demographics that are similar to those at the Health Plex.

## Instrumentation

Participants were asked to complete six questionnaires for the present study: (1) The Physical Self-Descriptive Questionnaire, (2) the Physical Activity Survey for the Elderly, (3) a questionnaire to assess health history, (4) a questionnaire to assess demographic information, and (5) the Physical Self-Attribute Questionnaire. Copies of these questionnaires can be found as Appendices A-E.

The Physical Self-Descriptive Questionnaire, the Physical Activity Survey for the Elderly, the health questionnaire, and the demographic questionnaire are described in Study 1. The Physical Self-Attributes Questionnaire (Moore et al., In Review) was adapted for use with the Physical Self-Descriptive Questionnaire. Moore's PSDQ consists of 36 questions divided into four sections: 1) Competence within nine physical domains; physical strength, physical endurance, physical attractiveness, sport competence, flexibility, coordination, body fat, physical activity, and health status, 2) Certainty of the nine competency ratings, 3) Importance of the nine domains, and 4) Discrepancy from one's ideal self within these domains as an indication of physical acceptance. Scores are gathered for each item with its individual score being considered a cognitive facet. Scores on each item can range from 1 to 9. Although this questionnaire has not been

formally analyzed in the nine domain format, it has been used in conjunction with Fox's PSPP in the five domain format (strength, endurance, sport ability, flexibility, and physical attractiveness). In this instance, it has shown acceptable test retest correlations and consistent factor structure in a sample of young adults (Moore & Bartholomew, In Preparation).

## Test Administration

The questionnaires were given to participants to complete at the recruitment locations. Participants were asked to complete them on-site with assistance from the researcher as needed or they will be allowed to take them home for completion. All information will be completed without any identifying information included on the surveys.

## Statistical Analysis

To test the hypothesis that the cognitive facets of Moore's PSDQ will explain significant percentage of variance in the subscales of Marsh's PSDQ, a series of hierarchical regressions was performed, one for each physical sub-domain of Marsh's PSDQ. Specifically, the physical sub-domain score from Marsh's PSDQ was regressed onto the four cognitive facets (e.g. Competency, Certainty, Importance, and Discrepancy) which were entered simultaneously. The second hypothesis states that theoretical groupings of Marsh's PSDQ will mediate the relationship between the cognitive facets measured by Moore's PSAQ and self-reported physical activity. To test the second hypothesis, theoretical groupings of the physical sub-domains were devised based upon prior literature and empirically driven concepts. The first grouping was designed to replicate the work of McAuley and associates (2000) who examined the structure of the

EXSEM in older adults. In this study the sub-domains of Attractive Body, Strength, and Condition as measured by Fox's PSPP were utilized. For the current study, the sub-domains of Appearance, Strength, and Endurance were selected because they have been shown to be the most similar to those used by McAuley (Marsh et al., 1994). The second grouping of Flexibility, Coordination, and Sport is based upon their shared relationship with motor behaviors and their demonstrated similarities in past analyses (Marsh et al., 1994). The third grouping of Health, Physical Activity, and Body Fat was made due to their relationships with physical health and illness avoidance. The Physical Activity subscale was excluded due to its close relationship with the dependent measure.

**PILOT DATA**

Three of the measures proposed for this dissertation (PSDQ, PSAQ, and BSSS) utilize a complex format that could be confusing to older individuals, and Moore's PSAQ has never been utilized in the nine sub-domain format. Unfortunately, neither Marsh's PSDQ nor Moore's PSAQ have been utilized in an older population. Pilot testing was therefore conducted for the following reasons:

- To determine if Marsh's PSDQ is sensitive to perceptual differences across individuals.
- To test the internal reliability of Marsh's PSDQ in older adults relative to previous applications in younger samples.
- To test the internal reliability of Moore's PSDQ in older adults relative to previous applications in younger samples.

- To test the internal reliability of Moore's PSDQ in the nine sub-domain format.
- To determine the relationship between the sub-domain scores on Marsh's PSDQ and the cognitive facets measured by Moore's PSDQ for each sub-domain, relative to previous findings between Moore's PSDQ and Fox's PSPP.

Pilot data was collected in a population of older adults at a Hospital-affiliated wellness center similar to the HealthPlex Fitness Facility. Forty-five active older adults (21 males, 23 females, mean age 69.9 yrs) participated in the pilot study. Participants completed Marsh's PSDQ, PSAQ, and a brief demographic questionnaire under the same constraints (at home or on site) as the proposed dissertation.

The mean, standard deviation, range, and minimum and maximum scores for Marsh's PSDQ sub-scales and items of Moore's PSDQ can be seen in Table 3.1 and 3.2, respectively. This sample demonstrated considerable range on all sub-domains of the PDSQ with seven of the eleven sub-scales producing either maximum scores for the scale (Self-esteem, Attractiveness, Health, Physical activity), minimum scores for the scale (Physical endurance, Sport competence) or both (Body fat). Moore's PSDQ displayed similar results with maximum ranges for 10 of the 36 items. These findings would support the suggestion that both Marsh's PSDQ and Moore's PSDQ are sensitive to individual differences in the perceptions of older individuals.

To examine the internal validity of Marsh's PSDQ, Cronbach's Alpha was computed for each subscale and are presented in Table 3.3 along with the coefficient alphas observed in an adolescent sample from the initial validation

article (Marsh et al., 1994). As can be seen in this table, Cronbach's Alpha's observed for Marsh's PSDQ were desirable, ranging from .78-.97. To test the internal reliability of Moore's PSDQ, Cronbach's Alpha was computed for the four cognitive facets grouped according to the sub-domain from Marsh's PSDQ (i.e. Competency, Certainty, Importance, and Discrepancy for the Strength sub-domain). These were borderline acceptable, ranging from .63-.74. The Cronbach's Alpha's are presented in Table 3.4 along with data taken from previous samples of college-aged adults. The previous samples utilized Moore's PSDQ designed for use with Fox's PSPP and wording changes are noted in the table, with only the data for those five scales reported. As can be seen in Tables 3.3 and 3.4, both Marsh's PSDQ and Moore's PSDQ appear to have desirable internal reliability within a sample of older adults in a physical activity setting similar to that exhibited in adolescent and college-aged samples.

To determine the ability of the cognitive facets of Moore's PSDQ to explain variance in the sub-domain scores for Marsh's PSDQ, each sub-domain score was regressed onto the cognitive facets of Moore's PSDQ for the matching sub-domain. A comparison of the $R^2$ values reported in the initial validation sample and those for the pilot data are displayed in table 3.5. In the initial study utilizing Moore's PSDQ, high $R^2$ values for the physical sub-domains was considered evidence for criterion validity of Moore's PSDQ. The cognitive facets of Moore's PSDQ explained a significant amount of variance in the sub-domains of Marsh's PSDQ, ranging from 30% of the variance explained in Health to 62% of the variance explained in Attractive Body. As a result, it appears that internal and construct validity of Moore's PSDQ is similar across multiple samples within the same population, as well as across single samples from different populations.

In summary, though the results from the pilot data supported the applicability of Marsh's PSDQ and PSAQ in older populations, there are numerous limitations to the present research. Most obvious is the low number of participants in the pilot study. Secondly, these participants were all currently involved in a physical activity program, which limits the generalizability of the data. Thirdly, the health history or current physical activity level of the participants was not obtained. Finally, the theoretically groupings of Marsh's PSDQ sub-scales could not be tested with this limited number of relatively heterogeneous participants. It is for these reasons that this dissertation is being proposed. Data analysis for the present study will be identical to those computed for the pilot study, with the addition of a test of the overall fit of the factor structure of Marsh's PSDQ in study 1 and the theoretically groupings of Marsh's PSDQ sub-scales including the cognitive facets measured by Moore's PSDQ in study 2.

| | Mean | SD | Range | Min | Max |
|---|---|---|---|---|---|
| Age | 69.93 | 6.67 | 29 | 55 | 84 |
| Self-esteem | 5.26 | 0.51 | 2.13 | 3.88 | 6.00 |
| Physical Self-Concept | 4.09 | 0.90 | 3.83 | 2.00 | 5.83 |
| Strength | 3.64 | 0.81 | 3.50 | 2.17 | 5.67 |
| Physical Endurance | 2.14 | 0.94 | 4.17 | 1.00 | 5.17 |
| Attractiveness | 4.33 | 0.81 | 3.67 | 2.33 | 6.00 |
| Sport competence | 3.06 | 1.26 | 4.33 | 1.00 | 5.33 |
| Flexibility | 3.59 | 0.82 | 4.17 | 1.17 | 5.33 |
| Health | 5.18 | 0.68 | 3.38 | 2.63 | 6.00 |
| Amount of Body Fat | 3.32 | 1.48 | 5.00 | 1.00 | 6.00 |
| Coordination | 3.94 | 0.81 | 3.67 | 2.00 | 5.67 |
| Amount of Physical Activity | 4.28 | 1.09 | 4.33 | 1.67 | 6.00 |

**Table 3.1: Mean, standard deviation, range, and minimum and maximum scores for the participant's age and PSDQ sub-scale scores.**

| | Mean | SD | Range | Min | Max |
|---|---|---|---|---|---|
| Perception of Strength | 6.66 | 1.36 | 6 | 4 | 10 |
| Perception of Physical Endurance | 6.64 | 1.60 | 7 | 3 | 10 |
| Perception of Attractiveness | 6.59 | 1.58 | 8 | 2 | 10 |
| Perception of Sport competence | 5.61 | 2.10 | 9 | 1 | 10 |
| Perception of Flexibility | 6.39 | 1.67 | 6 | 4 | 10 |
| Perception of Health | 7.41 | 1.79 | 7 | 3 | 10 |
| Perception of Amount of Body Fat | 6.25 | 2.35 | 9 | 1 | 10 |
| Perception of Coordination | 7.09 | 1.57 | 7 | 3 | 10 |
| Perception of Physical Activity | 7.09 | 1.63 | 6 | 4 | 10 |
| Certainty of Strength | 5.57 | 1.35 | 6 | 3 | 9 |
| Certainty of Physical Endurance | 5.89 | 1.47 | 6 | 3 | 9 |
| Certainty of Attractiveness | 5.48 | 1.66 | 7 | 2 | 9 |
| Certainty of Sport competence | 5.50 | 2.03 | 8 | 1 | 9 |
| Certainty of Flexibility | 5.61 | 1.57 | 6 | 3 | 9 |
| Certainty of Health | 6.59 | 1.59 | 6 | 3 | 9 |
| Certainty of Amount of Body Fat | 6.11 | 1.76 | 6 | 3 | 9 |
| Certainty of Coordination | 5.89 | 1.71 | 6 | 3 | 9 |
| Certainty of Physical Activity | 6.18 | 1.53 | 5 | 4 | 9 |
| Importance of Strength | 6.25 | 1.33 | 5 | 4 | 9 |
| Importance of Physical Endurance | 6.73 | 1.34 | 5 | 4 | 9 |
| Importance of Attractiveness | 5.89 | 1.57 | 6 | 3 | 9 |
| Importance of Sport competence | 4.52 | 1.97 | 8 | 1 | 9 |
| Importance of Flexibility | 6.41 | 1.59 | 6 | 3 | 9 |
| Importance of Health | 8.32 | 0.93 | 4 | 5 | 9 |
| Importance of Amount of Body Fat | 7.05 | 1.48 | 6 | 3 | 9 |
| Importance of Coordination | 7.05 | 1.45 | 5 | 4 | 9 |
| Importance of Physical Activity | 7.02 | 1.58 | 6 | 3 | 9 |
| Discrepancy from ideal Strength | 5.18 | 1.82 | 7 | 2 | 9 |
| Discrepancy from ideal Physical Endurance | 5.09 | 2.04 | 7 | 2 | 9 |
| Discrepancy from ideal Attractiveness | 5.36 | 1.86 | 8 | 1 | 9 |
| Discrepancy from ideal Sport competence | 5.16 | 2.12 | 7 | 2 | 9 |
| Discrepancy from ideal Flexibility | 5.18 | 1.81 | 8 | 1 | 9 |
| Discrepancy from ideal Health | 6.30 | 2.16 | 8 | 1 | 9 |
| Discrepancy from ideal Amount of Body Fat | 4.91 | 2.52 | 8 | 1 | 9 |
| Discrepancy from ideal Coordination | 5.68 | 2.19 | 8 | 1 | 9 |
| Discrepancy from ideal Physical Activity | 5.75 | 2.15 | 8 | 1 | 9 |

**TABLE 3.2: MEAN, STANDARD DEVIATION, RANGE, AND MINIMUM AND MAXIMUM SCORES FOR THE ITEMS OF MOORE'S PSDQ.**

| | Pilot Data (N=44) M age 69.9 | Marsh et al (1994) (N=315) M age 14.8 |
|---|---|---|
| Self-esteem | .78 | .86 |
| Physical Self-Concept | .93 | .92 |
| Strength | .84 | .88 |
| Physical Endurance | .86 | .90 |
| Attractiveness | .89 | .90 |
| Sport competence | .97 | .91 |
| Flexibility | .87 | .86 |
| Health | .82 | .82 |
| Amount of Body Fat | .93 | .89 |
| Coordination | .86 | .88 |
| Amount of Physical Activity | .84 | .88 |

**Table 3.3: Cronbach's Alpha for the sub-scales of Marsh's PSDQ in older adults (pilot data), and adolescents (Marsh et al., 1994).**

| | Pilot Data (N=44) M age 69.9 | Sample 1(N=131) M age 23.2 | Sample 2(N=120) M age 20.2 |
|---|---|---|---|
| Strength | .63 | .70 | .66 |
| Physical Endurance/Condition | .60 | .69 | .64 |
| Attractiveness/Attractive Body | .73 | .66 | .70 |
| Sport competence | .68 | .74 | .69 |
| Flexibility | .59 | .69 | .53 |
| Health | .71 | - | - |
| Amount of Body Fat | .67 | - | - |
| Coordination | .74 | - | - |
| Amount of Physical Activity | .74 | - | - |

**Table 3.4: Cronbach's Alpha's for Moore's PSDQ in the nine sub-domain format in older adults (pilot data), and in college aged students in five sub-domain format (Moore & Bartholomew, In Preparation)**

| | Pilot Data (N=44) M age 69.9 $R^2$ | Sample 1(N=131) M age 23.2 $R^2$ | Sample 2(N=120) M age 20.2 $R^2$ |
|---|---|---|---|
| Strength | .59 | .49 | .57 |
| Physical Endurance/Condition | .40 | .43 | .47 |
| Attractiveness/Attractive Body | .61 | .35 | .41 |
| Sport competence | .52 | .65 | .59 |
| Flexibility | .49 | - | - |
| Health | .30 | - | - |
| Amount of Body Fat | .59 | - | - |
| Coordination | .55 | - | - |
| Amount of Physical Activity | .34 | - | - |

**Table 3.5: Regression coefficients for sub-domain scores from Marsh's PSDQ (pilot data) or PSPP (sample 1 & 2)(Moore & Bartholomew, In Preparation) regressed onto the cognitive facets of Moore's PSDQ**

# CHAPTER IV

# Results

## STUDY 1

The Purpose of study 1 is to validate Marsh's Physical Self-Descriptive Questionnaire in older adults with varying levels of physical activity. Specifically, the factor structure of Marsh's PSDQ was confirmed in an older population along with the internal reliability of the sub-scales. Furthermore, Marsh's PSDQ was used to explain variance in self-reported activity levels assessed by the Physical Activity Scale for the Elderly.

### The Participants

Older adults from community settings were examined in order to validate Marsh's PSDQ, and to understand the relationships between self-perceptions and physical activity. A total of 249 participants, aged 60 – 101 ($\underline{M}$ = 72.73, $\underline{SD}$ = 7.63) years were recruited for this study. Adults recruited for this study ranged from extremely active to very inactive as measured by the PASE with a distribution very similar to reported norms. Demographic data are presented in Figure 4.1 though Figure 4.6 located in Appendix E. Specifically, of the respondents, 6.0% reported being single, 51.0% reported being married, 4.8% being divorced, 0.8% separated, 35.7% widowed, and 1.6% omitted the question. Annual income levels for the population were generally low with 42.2% of the sample reporting income below $15,000, with 13.7% reporting income of $15,001-30,000, 12.0% reporting $31,000-45,000, 5.2% reporting $45,001-

60,000, and 14.5% reporting more than $60,000. The question was not answered by 12.4% of the sample. Education level was extremely varied with 12.9% reporting only a grade school education, 17.3% reporting some high school, 29.7% reporting a high school degree, 16.5% reporting some college, 7.6% reporting a college degree, and 14.9% reporting a graduate degree. The question was omitted by 1.2% of respondents.

Efforts were made to recruit individuals of all ethnicities, and the ethnic break down was very similar to the 2000 census breakdown for the county from which participants were respondents 69.9% reported being Caucasian, 18.5% being African-American, 6.4% being Native American, 0.8% being Asian-American, 0.8% being Other, and no one reported being Hispanic. For the 2000 Lafayette County census, 71.27% reported being Caucasian, 24.9% African-American, 1.66% Asian-American, 1.10% Hispanic, 0.13% Native American, 1.10% Hispanic, and 0.91% Other (www.CensusScope.org, 2002). For a complete breakdown of the demographics and disease status of the participants, see Table 4.1.

**Ratings of Physical Self-Perceptions**

Scores for the Physical Activity Scale for the Elderly (PASE) and Marsh's Physical Self-Descriptive Questionnaire (PSDQ) are presented within each gender in Table 4.2. Scores were within the expected range for men and women combined. A series of T-test were conducted to examine differences across gender. Men and women differed significantly on Marsh's PSDQ sub-scales of Strength ($\underline{t}$ (242) =3.08, $\underline{\rho}$ = .002), Endurance ($\underline{t}$ (242) =4.17, $\underline{\rho}$ < .001), Sport ($\underline{t}$ (242) =3.83, $\underline{\rho}$ < .001), Flexibility ($\underline{t}$ (242) =2.86, $\underline{\rho}$ = .005), Coordination ($\underline{t}$ (242)

=2.97, ρ = .004), Physical Activity (t(242) =4.20, ρ < .001), and Body Fat (t (242) =2.26, ρ = .025), with men scoring higher in all cases. No significant differences were observed for Self-Esteem, Physical Self-Concept, Appearance, or reported physical activity (PASE).

**Psychometric Properties of the Physical Self-Descriptive Questionnaire in Older Adults**

Hypothesis one states that Marsh's PSDQ will demonstrate acceptable factor validity. This was tested utilizing confirmatory factor analysis according to the criteria outlined in Chapter 3. The factor validity of Marsh's PSDQ was confirmed through confirmatory factor analysis (CFA) utilizing the AMOS software program. Two models of the factor structure were tested, the first utilizing each of the 6 or 8 items to indicate the 11 factors, and the second utilizing item pairs. Item pairs are computed by averaging the first two items to create a pair and so forth. The item pair method is suggested by Marsh (1994) and the use of item pairs with allow for comparisons with previous findings. Indices of fit for the factor structure of the complete 70-item model were acceptable, with $X^2$ (2290) = 6337.11 ρ < .001, CFI= .91, TLI = .90, RMSEA = .084. The item-pair factor structure was also confirmed, with $X^2$ (523) = 2340.64, ρ < .001, CFI= .93, TLI = .91, RMSEA = .12. Both models fit according to the criteria set forth in chapter 3 with the exception of the RMSEA. Hypothesis two states that Marsh's PSDQ will demonstrate acceptable internal reliability in a sample of older adults. This was tested by computing Cronbach's Alpha for each of the Sub-scales of Marsh's PSDQ. The sub-scales of Marsh's PSDQ exhibited good internal reliability with excellent values for Self-Esteem (α = .81), Physical Self-Concept (α = .88), Strength (α = .83), Endurance (α = .87), Appearance (α =

.88), Sport ($\underline{\alpha}$ = .93), Flexibility ($\underline{\alpha}$ = .86), Body Fat ($\underline{\alpha}$ = .90), Coordination ($\underline{\alpha}$ = .82), and Physical Activity ($\underline{\alpha}$ = .88). The Health sub-domain ($\underline{\alpha}$ = .67) displayed considerably lower yet still acceptable internal reliability. Values can be seen in Table 4.2.

### Relationship of the Physical Self-Descriptive Questionnaire to Physical Activity

Hypothesis three states that the sub-scales of Marsh's PSDQ will combine to predict a significant amount of variance in physical activity. To test this, a hierarchical regression analysis and a path analysis were conducted including the scores for physical self-worth, and the nine physical sub-domains to determine their ability to predict self-reported physical activity as measured by the PASE. The path analysis model can be seen in Figure 4.7. The model was tested initially with all possible covariances and both direct paths from the sub-domains and indirect paths through Physical Self-Concept. Indices of fit for the initial model were $X^2$ (1) = 1.466, $\underline{p}$ = .226, CFI= 1.00, TLI = .98, RMSEA = .043. In congruence with the methods of Sonstroem and associates (1994), McAuley and colleagues (2000), "model trimming" was conducted in which backward elimination was utilized to remove non-significant paths and covariances. After each path/covariance was deleted, the model was re-run. Model trimming was then conducted until all remaining paths were significant. Model trimming was determined to be proper since their were no a priori hypotheses concerning the direct paths to self-reported physical activity and accepting the initial model based upon good indices of fit despite insignificant path coefficients would capitalize on chance association that improve model fit.

| Variable | M(N=80) | F(N=164) | Unknown(N=5) | Total (N=249) |
|---|---|---|---|---|
| Demographics | | | | |
| Age (M, SD) | 72.32 (7.67) | 71.29 (12.30) | - | 72.73 (7.63) |
| Marital Status (N(%)) | | | | |
| Single | 1(1.3) | 14(8.5) | | 15(6.0) |
| Married | 67(83.8) | 56(34.1) | 4(80.0) | 127(51.0) |
| Divorced | - | 12(7.3) | - | 12(4.8) |
| Separated | - | 2(1.2) | - | 2(.8) |
| Widowed | 12(15.0) | 77(47.0) | - | 89(35.7) |
| Omitted | - | 3(1.8) | 1(20.0) | 4(1.6) |
| Education (N(%)) | | | | |
| Grade School | 4(5.0) | 27(16.5) | 1(20.0) | 32(12.9) |
| Some High School | 10(12.5) | 32(19.5) | 1(20.0) | 43(17.3) |
| High School Degree | 17(21.3) | 57(34.8) | - | 74(29.7) |
| Some College | 13(5.2) | 28(17.1) | - | 41(16.5) |
| College Degree | 5(6.3) | 12(7.3) | 2(400) | 19(7.6) |
| Graduate Degree | 29(11.6) | 8(4.9) | 1(20.0) | 37(14.9) |
| Omitted | 2(2.5) | - | 1(20.0) | 3(1.2) |
| Income (N(%)) | | | | |
| 0-15,000 | 17(21.3) | 87(50.0) | 1(20.0) | 105(42.2) |
| 15,001-30,000 | 5(6.3) | 28(17.1) | 1(20.0) | 34(13.7) |
| 30,001-45,000 | 15(18.8) | 15(9.1) | - | 30(12.0) |
| 45,001-60,000 | 6(7.5) | 5(3.0) | 2(40.0) | 13(5.2) |
| 60,000+ | 26(32.5) | 10(6.1) | - | 36(14.5) |
| Omitted | 11(13.8) | 19(11.6) | 1(20.0) | 31(12.4) |
| Ethnicity (N(%)) | | | | |
| Caucasian | 67(83.8) | 103(62.8) | 4(80.0) | 174(69.9) |
| African American | 7(8.8) | 39(23.8) | - | 46(18.5) |
| Hispanic | - | - | - | - |
| Native American | 4(5.0) | 12(7.3) | - | 16(6.4) |
| Asian American | - | 2(1.2) | - | 2(0.8) |
| Other | - | 2(1.2) | - | 2(0.8) |
| Omitted | 2(2.5) | 6(3.7) | 1(20.0) | 9(3.6) |
| Disease Status (N(%)) | | | | |
| CVD | 25(31.3) | 30(18.3) | | 55(22.1) |
| Past Heart Attack | 17(21.3) | 20(12.2) | | 37(14.9) |
| Cancer | 18(22.5) | 22(13.4) | | 42(16.9) |
| Arthritis | 32(40.0) | 108(65.9) | | 143(57.4) |
| Joint Replacement | 10(12.5) | 14(10.4) | | 27(10.8) |
| Asthma | 4(5.0) | 15(9.1) | | 19(7.6) |
| Pulmonary Disorder | 6(7.5) | 8(4.9) | | 14(5.6) |
| Blood Disease | 2(2.5) | 10(6.1) | | 12(4.8) |
| Irregular Heartbeat | 12(15.0) | 28(17.1) | | 42(16.9) |
| Hypertension | 33(41.3) | 84(51.2) | | 120(48.2) |
| Diabetes | 10(12.5) | 34(20.7) | | 44(17.7) |
| Renal Disease | 3(3.8) | 4(2.4) | | 7(2.8) |
| Liver Disease | 1(1.3) | 5(3.0) | | 6(2.4) |
| Epilepsy | - | 1(0.6) | | 1(0.4) |
| Stroke | 2(2.5) | 12(7.3) | | 14(5.6) |
| Parkinson's Disease | 3(3.8) | - | | 3(1.2) |
| Gastrointestinal Disorder | 13(16.3) | 26(15.9) | | 40(16.1) |
| Other | 5(6.3)) | 12(7.3) | | 17(6.8) |

**Table 4.1: Demographic characteristics/health status for sample by gender**

| | Male (n=80) M (SD) | Female (n=164) M (SD) | Total (N=249) M (SD) | Min | Max |
|---|---|---|---|---|---|
| Physical Activity (PASE) | 166.19 (86.28) | 158.93 (68.25) | 160.78 (74.55) | 0 | 368.5 |
| Self-esteem | 5.16 (.78) | 5.17 (.81) | 5.16 (0.79) | 2.8 | 6 |
| Physical Self-Concept | 4.43 (1.00) | 4.39 (1.30) | 4.40 (1.19) | 1 | 6 |
| Strength | 3.80 (1.20) | 3.31 (1.14) | 3.48 (1.18)** | 1 | 6 |
| Physical Endurance | 2.55 (1.39) | 1.84 (.91) | 2.09 (1.14)** | 1 | 6 |
| Appearance | 4.47 (.94) | 4.56 (1.27) | 4.53 (1.16) | 1 | 6 |
| Sport competence | 2.92 (1.51) | 2.17 (1.26) | 2.45 (1.41)** | 1 | 6 |
| Flexibility | 3.64 (1.27) | 3.15 (1.24) | 3.33 (1.27)** | 1 | 6 |
| Health | 4.76 (.81) | 4.68 (.78) | 4.72 ( 0.79) | 1.9 | 6 |
| Amount of Body Fat | 4.17 (1.58) | 3.69 (1.54) | 3.85 (1.57)* | 1 | 6 |
| Coordination | 3.76 (1.22) | 3.28 (1.13) | 3.46 (1.19)** | 1 | 6 |
| Amount of Physical Activity | 3.53 (1.49) | 2.7 (1.37) | 3.01 (1.48)** | 1 | 6 |

**Table 4.2: Means and Standard deviations for the PASE and Marsh's PSDQ**
*** ρ < .05, ** ρ < .01**

| PSDQ Sub-scale | Cronbach's Alpha |
|---|---|
| Self-Esteem | .81 |
| Physical Self-Concept | .88 |
| Strength | .83 |
| Physical Endurance | .87 |
| Appearance | .88 |
| Sport competence | .93 |
| Flexibility | .86 |
| Health | .67 |
| Amount of Body Fat | .90 |
| Coordination | .82 |
| Amount of Physical Activity | .88 |

**Table 4.3: Reliability coefficients for Marsh's PSDQ**

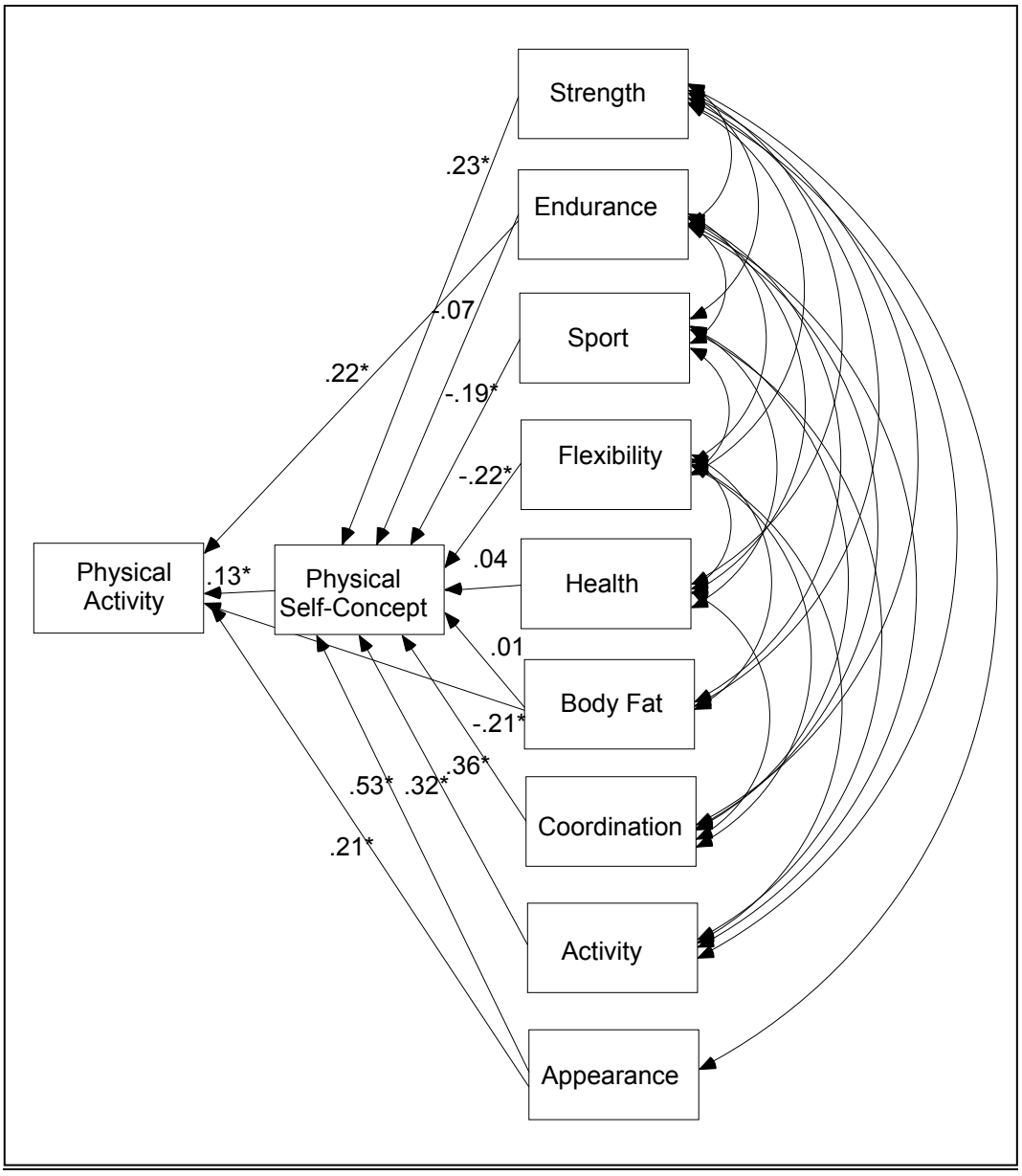


**Figure 4.7: Path analysis model for Marsh's PSDQ**

Table 4.4 lists the standardized direct and indirect effects for physical self-concept and the physical sub-domains on self-reported physical activity. The indirect effect is that which is mediated by the physical self-concept score. All remaining covariances are significant at the $\underline{\rho} \leq .05$ level. The model explained 21% of the variance in self-reported physical activity ($\underline{\rho} < .001$). The final model has indices reflective of poor fit with $X^2$ (19) = 159.58, $\underline{p} < .001$, CFI= .91, TLI = .73, RMSEA = .173.

## Summary

Thus, hypothesis one was tested through Confirmatory Factor Analysis. The model was supported through acceptable indices of fit. Hypothesis two was tested through reliability analysis. Eight sub-scales evidenced excellent reliability with health being low but acceptable. Lastly, hypothesis three was tested through multiple regression. Results supported the ability of Marsh's PSDQ to explain a significant amount of variance in physical activity. Unfortunately, the indices of fit for the model were generally poor with only one of the three selected indices indicative of acceptable fit.

## STUDY 2

The Purpose of study 2 was to determine the ability of the cognitive facets measured by Moore's Physical Self-Attribute Questionnaire (PSAQ) to explain variance in the physical sub-domains measured by Marsh's Physical Self-Descriptive Questionnaire (PSDQ). Secondly, study 2 was designed to determine if theoretically grouped physical sub-domains measured by Marsh's PSDQ mediate the relationships between the cognitive facets measured by Moore's PSAQ and self-reported physical activity.

## Participants

Participants for study 2 are the same as those utilized for study 1. Please refer to the results section for study 1 or Table 4.1 for complete details of the participants of study 2.

## Ratings of Physical Self-Perceptions

Scores for Moore's Physical Self-Attribute Questionnaire (PSAQ) are presented within each gender in Table 4.5. Scores were within the expected range for men and women combined. A series of t-tests were conducted to examine differences across gender. Men and women differed significantly on 21 of the 36 PSAQ facet scores. Notably, men scored significantly higher on 17 of the 21 facets while women scored significantly higher than men on four facets. These results can be seen in Table 4.5.

## Relationships of the Cognitive Facets to the physical sub-domains of Marsh's PSDQ

Hypothesis one states that the cognitive facets of Moore's PSAQ will explain a significant percentage of variance in the subscales of Marsh's PSDQ. To test this, a series of hierarchical regressions were performed, one for each physical sub-domains of Marsh's PSDQ. Specifically, the physical sub-domain score from Marsh's PSDQ was regressed onto the four cognitive facets (e.g. Competency, Certainty, Importance, and Discrepancy) which were entered simultaneously. The results can be seen in Table 4.6. The respective cognitive facets explained a significant amount of variance (all $\underline{\rho} < .001$) in Strength ($\underline{R^2} = .41$), Endurance ($\underline{R^2} = .36$), Appearance ($\underline{R^2} = .35$), Sport ($\underline{R^2} = .50$), Flexibility ($\underline{R^2} = .40$), Health ($\underline{R^2} = .31$), Body Fat ($\underline{R^2} = .10$), Coordination ($\underline{R^2} = .45$), and

| Dependent Variable | $R^2$ Model | $R^2$ | Standardized Direct Effects β (ρ≤) | Standardized Indirect Effects β (ρ≤) | Predictor |
|---|---|---|---|---|---|
| Physical Activity (PASE) | .21 | .03 | .127 (.072) | - | Physical Self-Concept |
| | | .05 | .217 (.001) | .009 (ns) | Physical Endurance |
| | | .04 | -.211 (.001) | .001 (ns) | Amount of Body Fat |
| | | .05 | .206 (.003) | .067 (.001) | Appearance |
| | | .01 | - | -.025 (.005) | Sport Competence |
| | | .01 | - | .029 (.005) | Strength |
| | | .01 | - | -.028 (.009) | Flexibility |
| | | .01 | - | .046 (.001) | Coordination |
| | | .01 | - | .041 (.001) | Amount of Physical Activity |
| | | - | - | .005 (ns) | Health |

**Table 4.4: The standardized direct and indirect regression coefficients for the path analysis model with combined indirect and direct $R^2$ for significant predictors for Figure 4.7**

Physical Activity ($\underline{\mathbf{R^2}}$ = .42). As can be seen in Table 4.6, the competency facet was a significant predictor for 8 of the 9 sub-domains, the certainty facet was a significant predictor for 7 of the 9 sub-domains, the importance facet was a significant predictor for 7 of the 9 sub-domains, and the discrepancy facet was a significant predictor for 5 of the 9 sub-domains.

Hypothesis two states that theoretical groupings of Marsh's PSDQ will mediate the relationship between the cognitive facets measured by Moore's PSAQ and self-reported physical activity. To test this, four theoretically grouped models were tested utilizing path analysis. Three of the models were built to the specifications set forth in chapter three. The first model includes the sub-domains of Strength, Endurance, and Attractiveness. The second model includes the sub-domains of Health, Body Fat, and Activity. The third model includes the sub-domains of Flexibility, Coordination, and Sport. Given the results of Study 1 which indicated that Body Fat, Endurance, and Attractiveness are the only significant predictors of physical activity in this sample, they were combined into a 4$^{th}$ model. For all models, the initial model included all covariances between the matching cognitive facets (e.g. Competency, Certainty) and between the four facets for each sub-domain (e.g. all four of the Endurance facets). These paths are inherent to the model as originally designed (Moore & Bartholomew, In Preparation), were thus maintained regardless of statistical significance. Other paths directly leading from the cognitive facets to physical activity are not specified in the hypothesized model, and are, as a result, candidates for model trimming. Model trimming was performed as described for Study 1 until only significant paths from the cognitive facets to physical activity remained. The paths from the physical sub-domains (Marsh's PSDQ) to physical activity were

not removed nor were the paths from the cognitive facets to the physical sub-domains regardless of significance.

For the first grouping of the sub-domains of Appearance, Strength, and Endurance, the initial and final models can be seen in Figure 4.8 and Figure 4.9. The first model explained 25% of the variance in self-reported physical activity and the model displayed indices of questionable fit with $X^2$ (69) = 343.14, $\underline{p}$ < .001, CFI= .89, TLI = .83, RMSEA = .127. For second grouping of the sub-domains of Health, Body Fat, and Physical Activity, the initial and final models can be seen in Figure 4.10 and Figure 4.11. The model explained 23% of the variance in self-reported physical activity and the model was partially confirmed with indices of fit moderately acceptable, with $X^2$ (70) = 335.04, $\underline{p}$ < .001, CFI= .90, TLI = .82, RMSEA = .124. For the third grouping of the sub-domains of Flexibility, Coordination, and Sport, the initial and final models can be seen in Figure 4.12 and Figure 4.13. The model explained 16% of the variance in Physical Activity and the model displayed indices of poor fit $X^2$ (70) = 408.11, $\underline{p}$ < .001, CFI= .88, TLI = .80, RMSEA = .140. Finally, the initial and final models for the grouping of the sub-domains of Body Fat, Endurance, and Attractiveness can be seen in Figure 4.14 and Figure 4.15. The model explained 25% of the variance in Physical Activity the model was partially confirmed with indices of fit moderately acceptable, with $X^2$ (72) = 270.08, $\underline{p}$ < .001, CFI= .90, TLI = .84, RMSEA = .105.

**Summary**

Thus, hypothesis one was tested through hierarchical regression analysis. The hypothesis was supported with the four respective facets explaining a

significant amount of variance in all nine sub-domains. Hypothesis two was tested through a series of four path analysis models. The models all explained a significant amount of variance in self-reported physical activity, but all models failed to produce indices of fit indicative of close fit. Furthermore, the relationship between the cognitive facets and self-reported physical activity were not completely mediated by the physical sub-domain scores.

| | M(n=80) | F(n=164) | TOT(N=249) | | |
|---|---|---|---|---|---|
| | M (SD) | M (SD) | M (SD) | Min | Max |
| Strength Competence | 6.75 (2.45) | 5.82 (2.14) | 6.16 (2.29)** | 1 | 10 |
| Physical Endurance Competence | 6.83 (2.54) | 5.48 (2.87) | 5.96 (2.83)** | 1 | 10 |
| Attractiveness Competence | 6.60 (2.54) | 5.74 (3.29) | 6.06 (3.08)* | 1 | 10 |
| Sport Competence | 5.23 (2.94) | 4.03 (2.93) | 4.48 (3.00)** | 1 | 10 |
| Flexibility Competence | 5.94 (2.45) | 5.41(2.48) | 5.61 (2.49) | 1 | 10 |
| Health Competence | 6.96 (2.11) | 6.26(2.34) | 6.53 (2.29)* | 1 | 10 |
| Body Fat Competence | 6.43 (2.02) | 5.87(2.59) | 6.10 (2.43) | 1 | 10 |
| Coordination Competence | 6.89 (2.18) | 5.87(2.52) | 6.24 (2.45)** | 1 | 10 |
| Physical Activity Competence | 6.85 (2.44) | 5.77(2.69) | 6.14 (2.67)** | 1 | 10 |
| Certainty of Strength | 5.83 (1.70) | 5.22(1.74) | 5.44 (1.71)** | 1 | 9 |
| Certainty of Endurance | 5.85 (1.70) | 5.26(1.64) | 5.47 (1.67)** | 1 | 9 |
| Certainty of Attractiveness | 5.31 (1.89) | 5.27(1.97) | 5.32 (1.94) | 1 | 9 |
| Certainty of Sport | 5.90 (1.74) | 5.01(2.03) | 5.33 (2.01)** | 1 | 9 |
| Certainty of Flexibility | 5.78 (1.91) | 5.19(1.85) | 5.41 (1.91)* | 1 | 9 |
| Certainty of Health | 5.99 (1.93) | 5.59(1.85) | 5.75 (1.89) | 1 | 9 |
| Certainty of Body Fat | 5.71 (1.91) | 5.46(1.99) | 5.57 (1.96) | 1 | 9 |
| Certainty of Coordination | 6.26 (1.75) | 5.32(1.86) | 5.66 (1.89)** | 1 | 9 |
| Certainty of Physical Activity | 6.30 (1.86) | 5.45(1.87) | 5.74 (1.90)** | 1 | 9 |
| Importance of Strength | 6.10 (2.17) | 5.95(2.49) | 6.00 (2.37) | 1 | 9 |
| Importance of Endurance | 6.39 (2.27) | 5.89(2.49) | 6.07 (2.41) | 1 | 9 |
| Importance of Attractiveness | 5.68 (2.26) | 5.56(2.44) | 5.57 (2.38) | 1 | 9 |
| Importance of Sport competence | 4.91 (2.64) | 4.46(2.57) | 4.60 (2.59) | 1 | 9 |
| Importance of Flexibility | 6.20 (2.21) | 5.63(2.53) | 5.85 (2.43) | 1 | 9 |
| Importance of Health | 7.34 (2.16) | 6.38(2.74) | 6.72 (2.59)** | 1 | 9 |
| Importance of Body Fat | 6.48 (2.02) | 5.80(2.56) | 6.05 (2.40)* | 1 | 9 |
| Importance of Coordination | 6.66 (2.12) | 5.93(2.61) | 6.20 (2.47)* | 1 | 9 |
| Importance of Physical Activity | 6.79 (2.12) | 5.91(2.63) | 6.22 (2.50)** | 1 | 9 |
| Discrepancy from ideal Strength | 5.75 (2.32) | 6.90(2.41) | 6.53 (2.42)** | 1 | 9 |
| Discrepancy from ideal Endurance | 6.00 (2.27) | 6.85(2.45) | 6.57 (2.41)** | 1 | 9 |
| Discrepancy from ideal Attractiveness | 6.13 (2.21) | 6.87(2.44) | 6.59 (2.39)* | 1 | 9 |
| Discrepancy from ideal Sport | 6.15 (2.15) | 6.42(2.64) | 6.35 (2.47) | 1 | 9 |
| Discrepancy from ideal Flexibility | 6.01 (2.32) | 6.86(2.56) | 6.59 (2.51)* | 1 | 9 |
| Discrepancy from ideal Health | 6.56 (2.09) | 7.02(2.55) | 6.84 (2.41) | 1 | 9 |
| Discrepancy from ideal Body Fat | 6.19 (2.16) | 6.33(2.92) | 6.27 (2.68) | 1 | 9 |
| Discrepancy from ideal Coordination | 6.33 (2.16) | 6.87(2.44) | 6.70 (2.35) | 1 | 9 |
| Discrepancy from ideal Physical Activity | 6.31 (2.28) | 6.76(2.64) | 6.63 (2.52) | 1 | 9 |

**Table 4.5: Means, standard deviations, minimum, and maximum values for the cognitive facets of Moore's PSAQ * = $\rho \leq .05$, ** = $\rho \leq .01$. Note: Higher discrepancy scores imply less ideal-self discrepancy**

| | | Cognitive Facet (Standardized **β (ρ)**) | | | |
|---|---|---|---|---|---|
| Physical Sub-Domain | $R^2$ | Competence | Certainty | Importance | Discrepancy |
| Strength | .41 | **.49** (.001) | **.13** (.028) | **.13** (.019) | **.11** (.028) |
| Physical Endurance | .36 | .**43** (.001) | **.23** (.001) | .06 (.341) | .02 (.727) |
| Appearance | .35 | **.26** (.001) | .11 (.067) | **-.17** (.006) | **.51** (.001) |
| Sport competence | .50 | **.51** (.001) | **.21** (.001) | **.16** (.004) | .06 (.204) |
| Flexibility | .40 | **.42** (.001) | **.20** (.001) | **.13** (.030) | **.11** (.031) |
| Health | .31 | **.42** (.001) | .02 (.814) | **.13** (.034) | **.18** (.002) |
| Amount of Body Fat | .10 | .03 (.689) | **.18** (.009) | -.03 (.629) | **.26** (.001) |
| Coordination | .45 | **.44** (.001) | .**22** (.001) | **.15** (.013) | .03 (.493) |
| Amount of Physical Activity | .42 | **.39** (.001) | **.28** (.001) | **.12** (.051) | .02 (.743) |

**Table 4.6: Standardized regression coefficients and significance levels for the cognitive facets measured by Moore's PSAQ on the sub-domains measured by Marsh's PSDQ.**

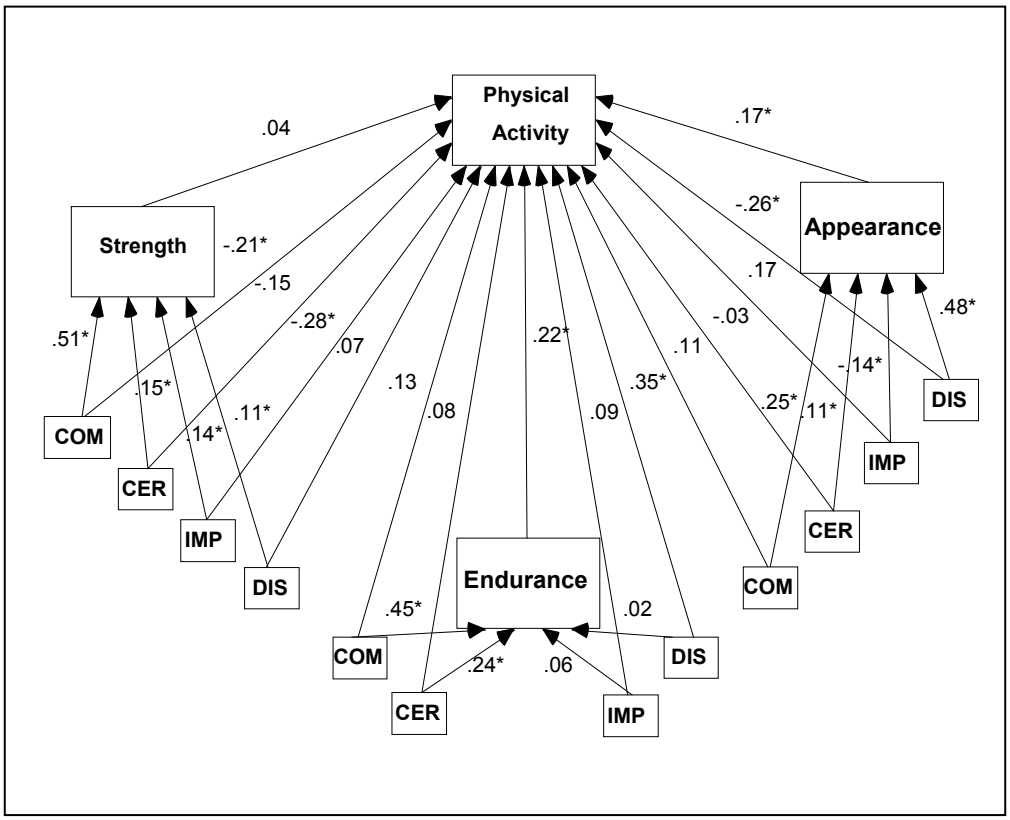


**Figure 4.8: Original untrimmed path analysis model for theoretical group 1. Significant paths marked with *.**

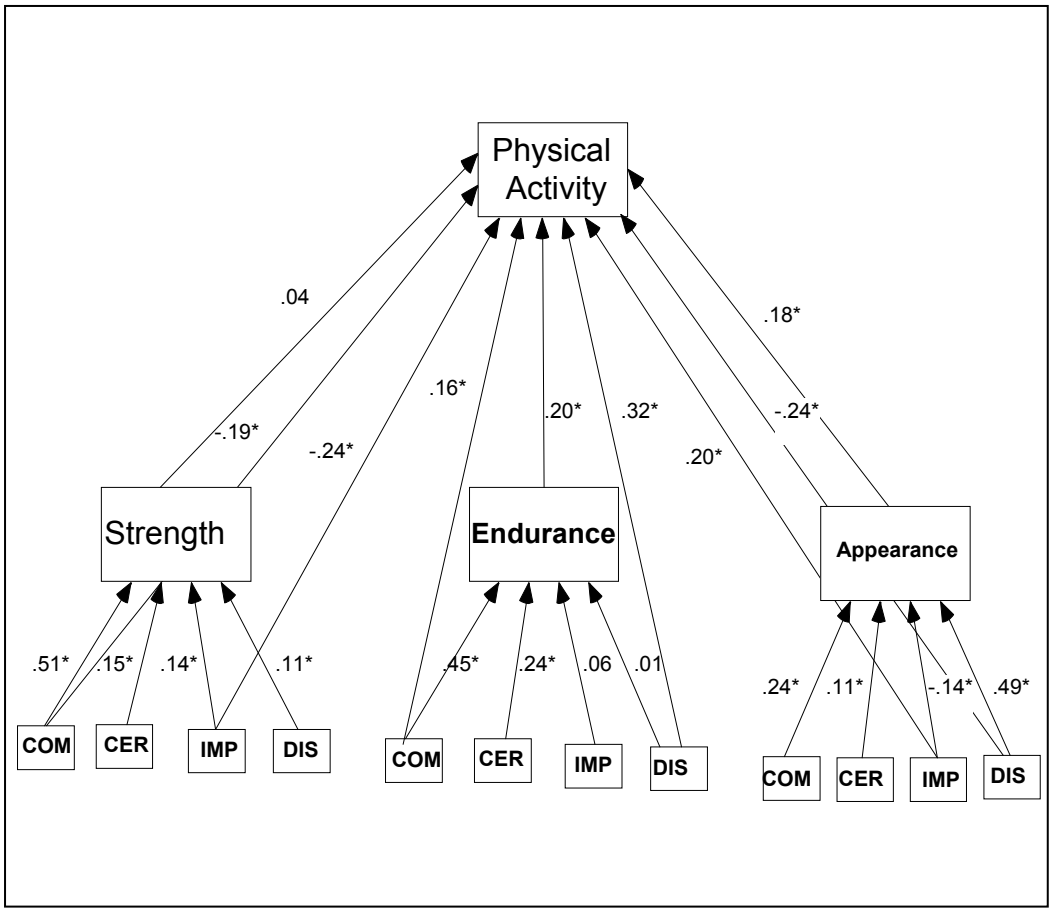


**Figure 4.9: Trimmed path analysis model for theoretical group 1. Significant paths marked with *.**

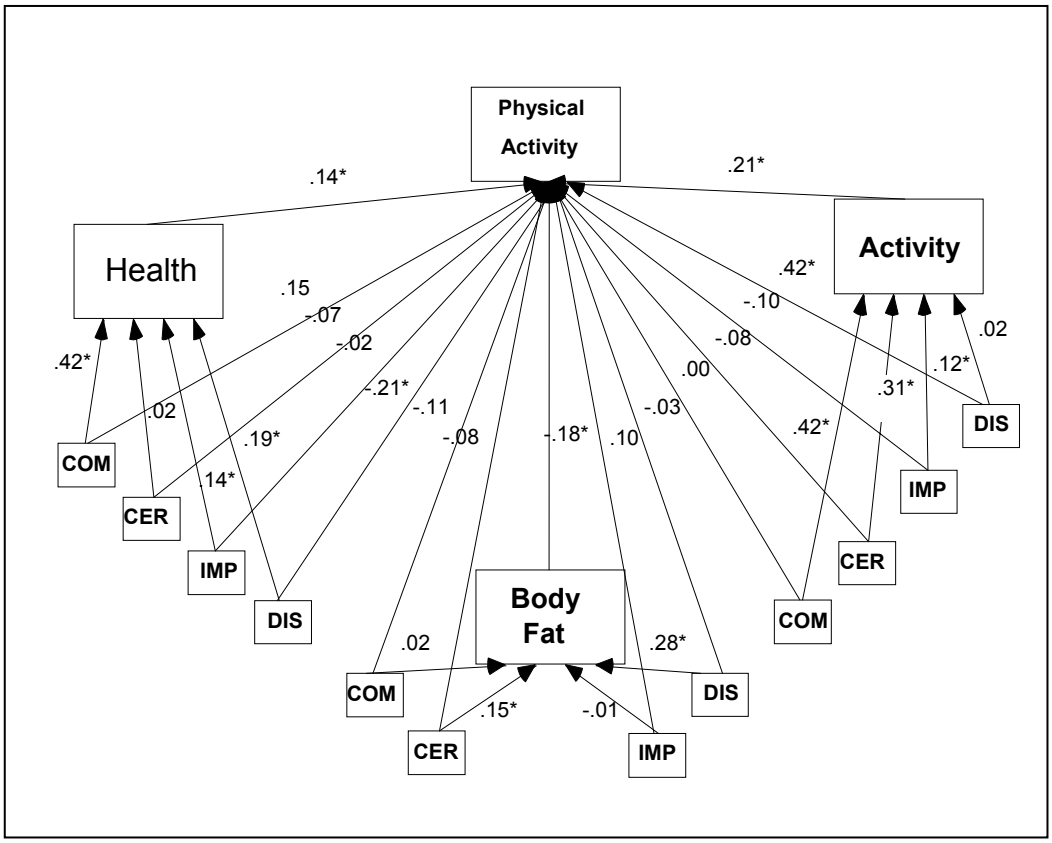


**Figure 4.10: Original untrimmed path analysis model for theoretical group 2. Significant paths marked with *.**

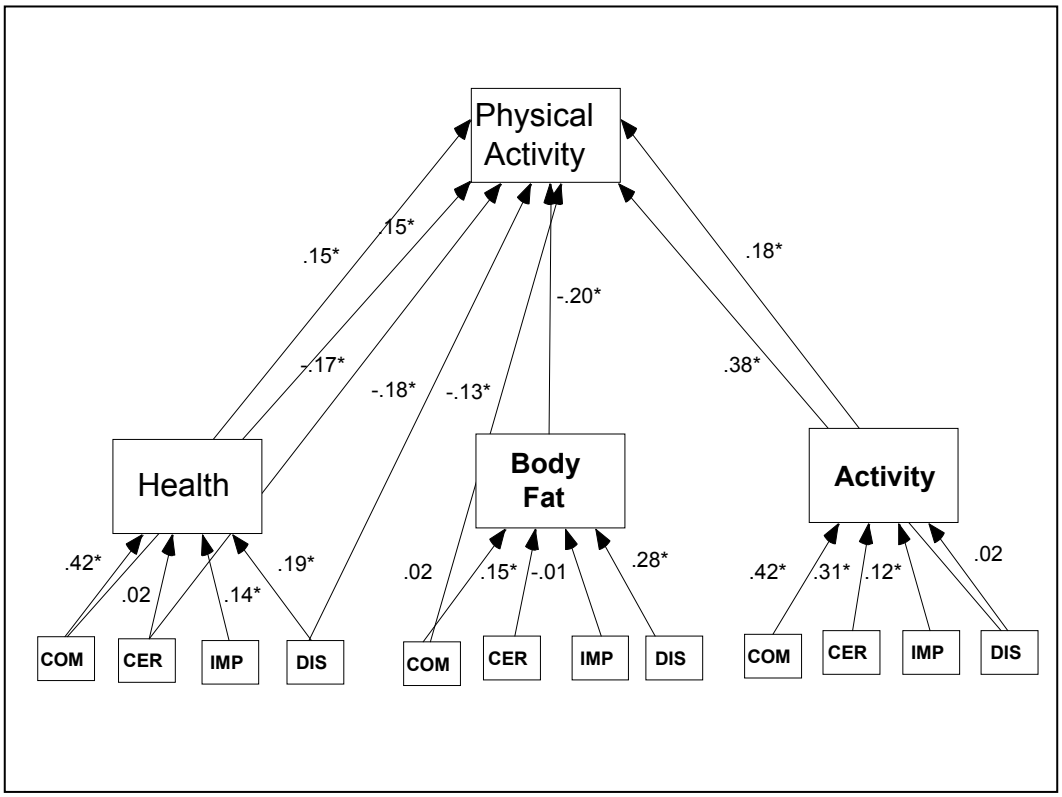


**Figure 4.11: Trimmed path analysis model for theoretical group 2. Significant paths marked with *.**

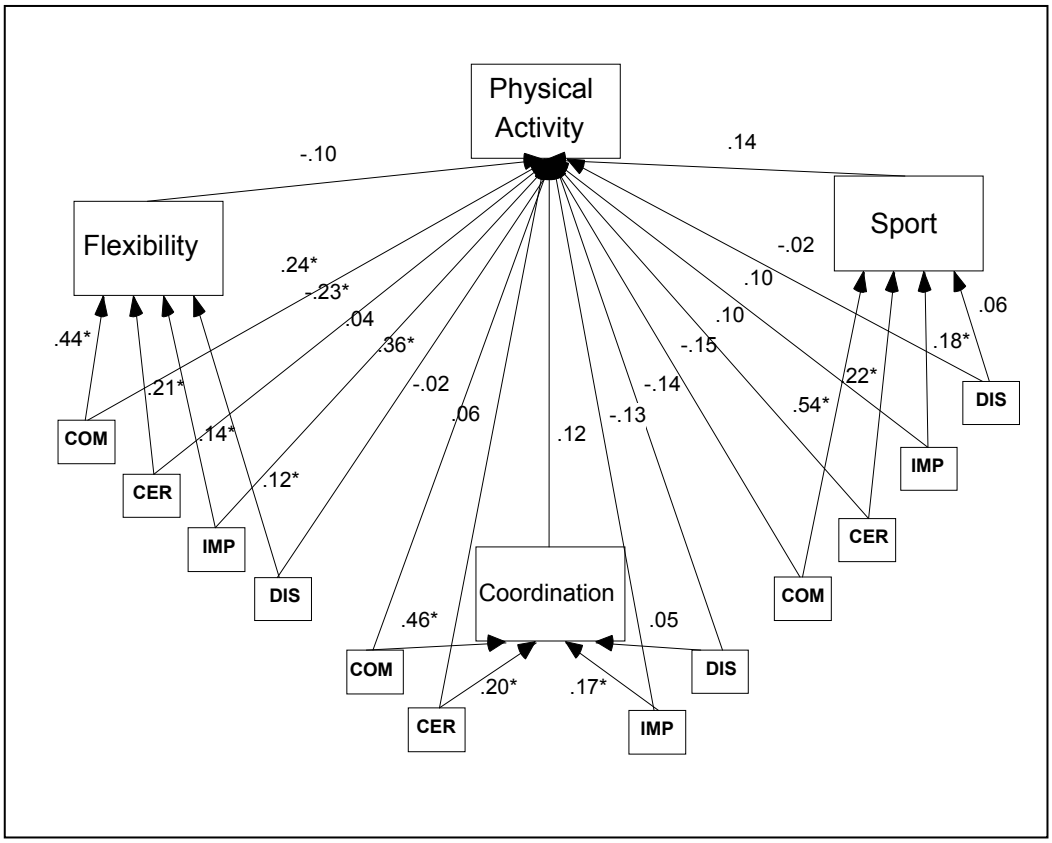


**Figure 4.12: Original untrimmed path analysis model for theoretical group 3. Significant paths marked with *.**

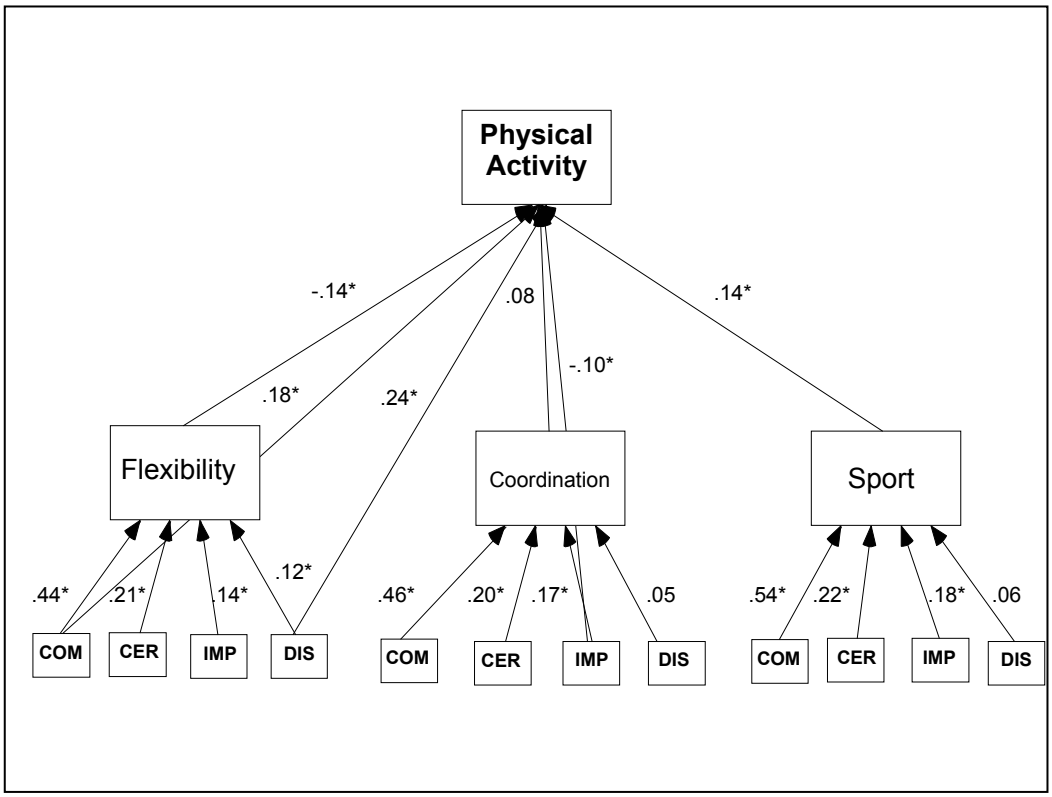


**Figure 4.13: Trimmed path analysis model for theoretical group 3. Significant paths marked with *.**

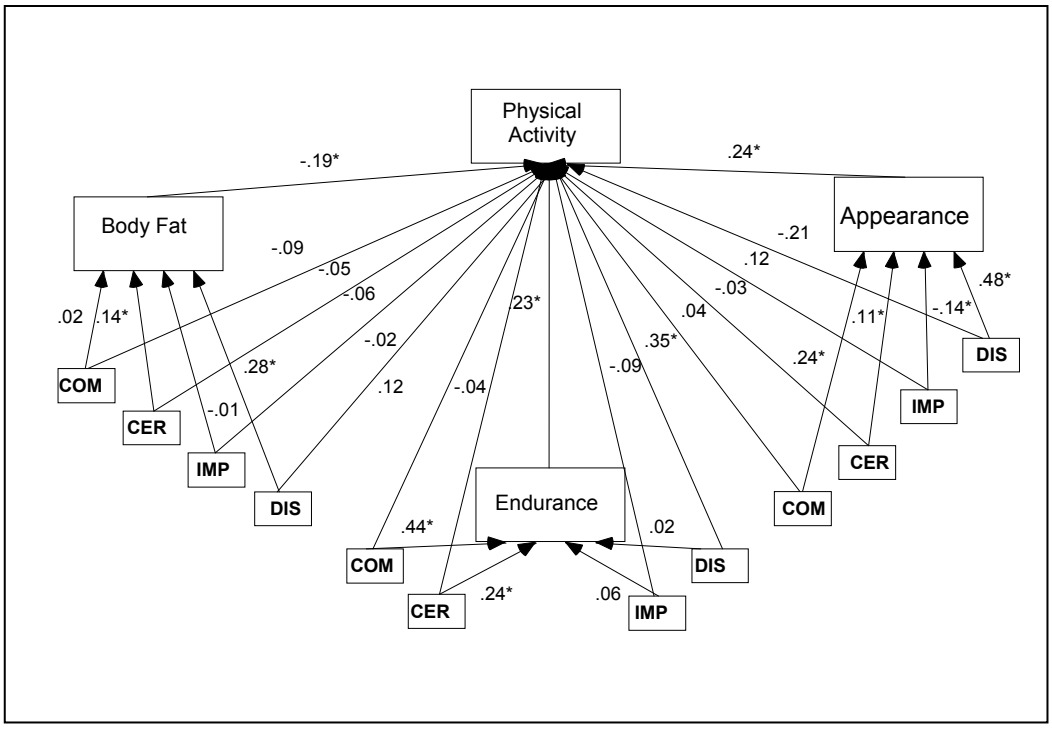


**Figure 4.14: Original untrimmed path analysis model for theoretical group 4. Significant paths marked with *.**

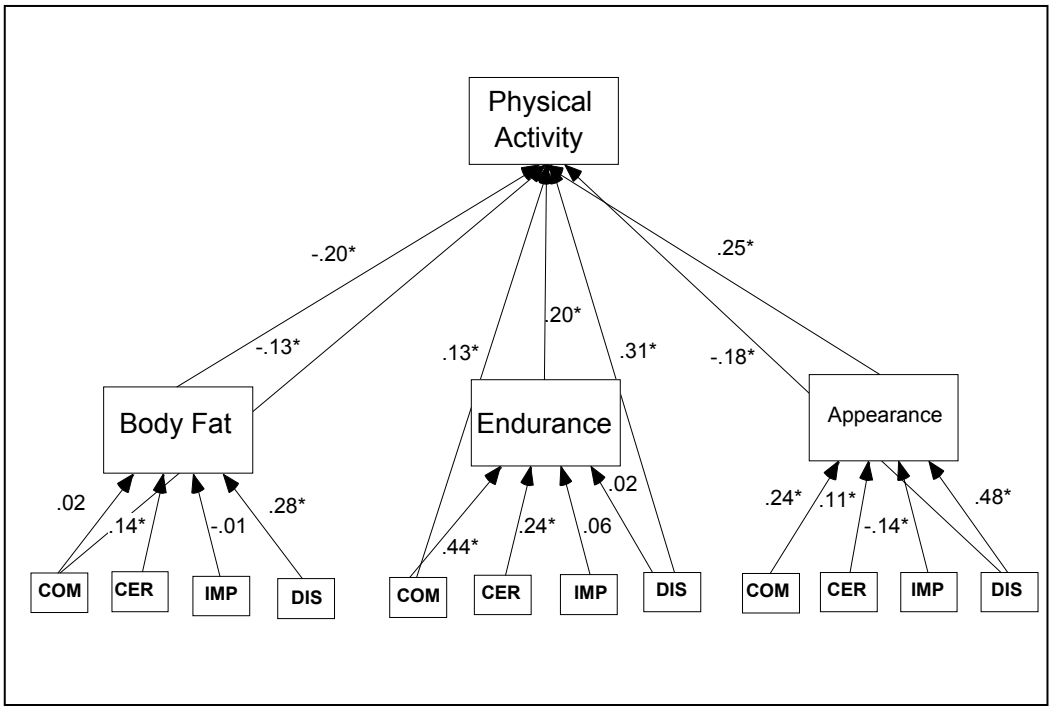


**Figure 4.15: Trimmed path analysis model for theoretical group 4. Significant paths marked with *.**

# CHAPTER V

# Discussion

## STUDY 1

The purpose of study 1 was to validate Marsh's Physical Self-Descriptive Questionnaire (PSDQ) in older adults with varying levels of physical activity. Hypothesis one and two centered on the statistical validity of the instrument. Hypothesis one stated that Marsh's PSDQ would demonstrate acceptable factor validity in a sample of older adults. This hypothesis was tested through two Confirmatory Factor Analyses (CFA); one utilizing the individual items of Marsh's PSDQ and the other utilizing item-pairs. The second analysis is the recommended analysis by Marsh (1994) it, therefore, allows a comparison with other validations reported in the literature. Both analyses generally supported the factor structure of the model with acceptable fit for the model, with fit indices that are closely related to those reported by Marsh (1994). Specifically, the Tucker-Lewis Index (TLI) for the two current analyses is .90 and .91 respectively. Marsh (1994) reported a TLI = .94 for a sample of adolescents. Hypothesis two stated that Marsh's PSDQ would demonstrate acceptable internal reliability in a sample of older adults. This hypothesis was also supported with Cronbach's Alpha for all sub-scale exceeding .67 and 10 of 11 subscales with $\underline{\alpha} > .81$ (.67 to .93 median = .87). This finding is a replication of the pilot data which displayed similarly high internal reliability (.78 to .97 median = .86) and it coincides with previously published reliabilities in an adolescent samples (.82 to .92 median = .88) and (.87

to .96 median = .91) (Marsh et al., 1994). Thus, Marsh's PSDQ appears to posses similar statistical properties in an older sample as with a younger sample.

Hypothesis three centered on Marsh's PSDQ predictive utility and stated that the sub-scales would combine to predict a significant percentage of the variance in physical activity. This hypothesis was also supported. The sub-scales of Marsh's PSDQ combined to explain 21% of the variance in physical activity. This coincides with a previous study that examined the relationships between the sub-scales and self-reported hours engaged in heavy activity (Marsh, 1996). Results found zero order correlations of .16 to .43 between the sub-scales of Marsh's PSDQ and self-reported activity of adolescents. In addition, the magnitude of the effect is similar to that found by Sonstroem and colleagues (1994) who utilized a sample of adult female aerobic exercises (age $\underline{M}$ = 38.4. Although, Sonstroem and associates utilized the Physical Self-Perception Profile (Fox & Corbin, 1989) and not Marsh's PSDQ, their measure explained 27.6% of the variance in exercise participation. These results also coincided at the sub-domain level. In Sonstroem's work, only the sub-domains of Condition ($\underline{\beta}$ = .69) and Attractive Body ($\underline{\beta}$ = -.29) significantly related to exercise participation. In the current sample, three sub-domains were significantly related to physical activity: Endurance ($\underline{\beta}$ = .22), which is the sub-domain highest correlated with Fox's PSPP's Condition (Marsh et al., 1994), and Body Fat ($\underline{\beta}$= -.21) and Appearance ($\underline{\beta}$ = .21), which are equally correlated with Fox's PSPP's Attractive Body (Marsh et al., 1994). Interestingly, while the standardized regression coefficient for Body Fat was very close to that reported for Attractive Body ($\underline{\beta}$ = -.29) by Sonstroem, the coefficient for Appearance ($\underline{\beta}$ = .21) in the present study is in the opposite direction. This suggests that the Attractive Body sub-scale of

Fox's PSPP may be based primarily on one's perception of their body fat than their general appearance. Future direct comparisons would be required to fully test this possibility. More importantly, the current results would suggest that being higher in body fat is associated with less physical activity in older adults. Ideally, this effect would be replicated with an objective measure of body fat in a longitudinal design to better demonstrate a causal effect.

## Limitations of Study 1

One must take caution when generalizing the present findings due to several factors unique to the sample. First, this sample is from a rural setting in the southeast that may not generalize to other populations. Specifically, the agrarian nature of the society that many of these seniors grew up in may have an influence on their beliefs concerning their physical self not shared by more urban residents. In addition, the population was predominately Caucasian or African American and Marsh's PSDQ may not maintain its factor structure or internal reliability in older adults from a different culture, such as the Latino or traditional Native American cultures. Additionally, while the associations between the sub-domains of Marsh's PSDQ and physical activity appear promising, the current sample is relatively small and no objective, physical measures were collected. Any significant relationships could simply be due to random association. However, the pilot data results were very similar to the current results, which would support the belief that these are true findings**.** Furthermore, the pilot data was collected in a sample from an urban area of the southwest, which would support the robust nature of the findings.

## Conclusions for Study 1

Clearly, the Physical Self-Descriptive Questionnaire has potential for use with older populations based upon the findings of study 1. Preliminary support for the factor structure of Marsh's PSDQ was confirmed along with initial evidence for the internal reliability of its sub-scales. Furthermore, Marsh's PSDQ was shown to explain a significant amount of variance in physical activity that replicates previous research. In addition, Marsh's PSDQ has shown promise that it may be able to partition the explained variance in physical activity providing inroads for future research.

## STUDY 2

Study 2 was designed to test the ability of the cognitive facets measured by Moore's Physical Self-Attribute Questionnaire (PSAQ) to explain variance within the physical sub-domains measured by Marsh's PSDQ. Furthermore, Study 2 was designed to determine if the sub-domains of Marsh's PSDQ mediate the relationship between the cognitive facets and physical activity.

Hypothesis one stated that the cognitive facets measured by Moore's PSAQ will explain a significant percentage of the variance in the related sub-domains of Marsh's PSDQ. This hypothesis was supported. The cognitive facets explained a significant amount of variance in all nine of Marsh's PSDQ's sub-domains, explaining 10-50% of the variance. These results are similar to the pilot data that was collected in a similar, but independent sample, in which the cognitive facets explained 30-61% of the variance in their related sub-domains. Furthermore, the current results replicate previous findings by Moore and associates (In review) when utilizing Fox's PSPP. Specifically, in a sample of

college students, the cognitive facets of Moore's PSAQ explained 35-65% and 41-59% of the variance in their related sub-domains as measured by Fox's PSPP. Thus the current findings support the results of the pilot data and confirm the previous literature. With the exception of Body Fat, the $R^2$ values for the current sample are similar to the pilot data and previous literature utilizing Fox's PSPP. The current low findings for the Body Fat sub-domain may simply be due to random variability within the sample. Furthermore, the competency facet was a significant predictor for 8 of the 9 sub-domains, the certainty facet was a significant predictor for 7 of the 9 sub-domains, the importance facet was a significant predictor for 7 of the 9 sub-domains, and the discrepancy facet was a significant predictor for 5 of the 9 sub-domains which supports the utility of all four of the cognitive facets in partitioning variance at the sub-domain level.

Hypothesis two stated that theoretical groupings of the sub-domains of Marsh's PSDQ would mediate the relationship between the cognitive facets of Moore's PSAQ and physical activity. This hypothesis was only partially supported. Each theoretical model had at least two significant direct paths from one of the cognitive facets to physical activity. Furthermore, none of the models had high indices of fit. In examining the direct effects of the cognitive facets on physical activity, it is interesting to note that five of the physical competency facets, which assessed self-rated competency versus their peers, (strength, endurance, health, body fat, and flexibility) exerted a direct effect on physical activity independent of their related sub-domain as assessed by Marsh's PSDQ. In addition, of these five corresponding sub-domains, only three (Endurance, Body Fat, and Flexibility) showed a direct relationship with physical activity. This is interesting since it supports the notion that the sub-domain measurement is

a conglomeration of cognitive processes, and only by separating these cognitive processes to the cognitive facet level does one gain predictive utility. This assertion is further supported since five of the discrepancy facets, which were used to indicate physical acceptance, (endurance, appearance, flexibility, activity, and health) also exerted direct effects on physical activity. However, only two of the five corresponding sub-domains (endurance and appearance) had a direct relationship with physical activity. Again, this supports the use of Moore's PSAQ in understanding the cognitive indices of physical activity behavior. Three of the importance facets, strength, appearance, coordination, had direct effects on physical activity, and only Appearance of the three sub-domains had a direct relationship with physical activity. The Certainty facet had only one direct relationship (health) with physical activity. The Health sub-domain of Marsh's PSDQ was also not significantly related to physical activity.

When evaluating these findings, one might first assume that the direct relationships are due to the theoretical groups. However, the direct relationship between competency facets and activity occurred across all four of the theoretical groupings, as did the relationship between discrepancy and activity. The direct relationship between importance and activity occurred in two of the four models. This would suggest that the associations are not due to the groupings. Furthermore, the relationship between activity and the competency and discrepancy facets support the role of competency and acceptance posited in the original EXSEM model**.** If these relationships hold in future research, it will support the assertion that the roles of competency and acceptance extend past their relationship with global physical self-worth and into actually physical activity behavior.

Therefore, based upon these results, the original Exercise and Self-Esteem Model is supported by the current data as it relates to physical activity in older adults. An individual's individual competencies and the acceptance appear to play a direct role in one's decision to engage in a more active lifestyle. However, it fails to support the mediational role of the general sub-domains in this effect since many of the cognitive facets displayed direct relationships with physical activity.

The present data are cross sectional in nature, and the directionality of these relationships cannot be known. Since the aim of study 2 is to determine if the impact of the cognitive facets was mediated by the sub-domain scores, no attempt was made to remove facets from the model. Previous research by Moore and Bartholomew (In Preparation) in young adults has supported the expansion of the EXSEM to include cognitive facets in a four sub-domain model. Therefore, the a priori structure of the models was not modified.

It is particularly interesting that the importance facets for strength, coordination, and appearance explain variance in physical activity. In contrast, Marsh has failed to show any support for importance ratings. It has been argued by Marsh (1994), that the lack of utility of ratings of importance is that importance for most physical attributes is normative, in that everyone attributes the same importance to individual sub-domains. However, Appearance is an area that has been shown to be devalued as we age (Reboussin et al., 2000) in favor of function. Thus, it is likely that ratings of importance of appearance are more variable in older adults than it is for other age groups. Thus, it is possible that importance plays a role only within sub-domains that have greater intraindividual variation with respect to importance. For those domains that may be more

universally important to older adults, such as endurance, importance may serve less utility than discrepancy from one's ideal. However, the standard deviation of the importance of appearance ratings was no different from any other sub-domain in the present study.

### Limitations of Study 2

The results for study 2 should be interpreted cautiously due to the relatively low sample size and nature of the sample. This sample comes from a rural setting in the southeast and may not be indicative of other localities with respect to normative beliefs or attitudes. Furthermore, the sample size is the minimum for models of the complexity of those tested in this study. Therefore, the current results need replication in larger, more diverse samples that will be more robust to sample inconsistencies. Furthermore, since the current data is cross sectional in nature, causality cannot be determined. However, despite these cautions, the role of cognitive facets in determining physical activity is clarified by the current results. The current findings provide direction for future research utilizing Moore's PSAQ and should be viewed as a promising start in a line of research into the role of cognitive facets of self-perception.

## GENERAL DISCUSSION

The aim of this dissertation was to determine both the applicability of Marsh's PSDQ for use with an older population and the usefulness of adding cognitive facets to this model. The current research is promising. Marsh's PSDQ displays acceptable reliability and a consistent factor structure in older adults. Furthermore, the cognitive facets measured by Moore's PSAQ appear to be a valuable addition to the EXSEM, especially considering their relationships with

physical activity. With the addition of cognitive facets to the EXSEM, competency and acceptance can finally be assessed as was the original design of this model. In addition, the examination of cognitive facets across multiple populations may serve to explain the role of importance in the EXSEM.

As previously stated, caution should be expressed in the interpretation of the current results. The relatively small sample size prevented an examination of the model as a whole. In addition, the cultural homogeneity of the sample prevents generalizability of the results outside of region from which the data was collected. The agrarian nature of the sample might have an influence on the normative attitudes held for physical activity and the physical self (for example, by raising the impact of ideal/self discrepancy on physical activity behaviors). Although this example is speculative, it illustrates the care that must be exercised in examining the results from any single data collection. It may be that these data, though an accurate reflection of cognitions within this sample, do not generalize to older adults from other regions of the country. What is less open to doubt is the general support for the measurement model. Furthermore, as with any research conducted with a single sample, results may simply be due to capitalization on random chance rather than real findings.

Despite these limitations, the current research provides preliminary support for the psychometric properties of Marsh's PSDQ when used with an older population. Furthermore, the current data also support the addition of the cognitive facets measured by Moore's PSAQ to the EXSEM. More importantly, the current results provide a new line of inquiry into the role of importance in physical self-concept research involving the elderly.

The current findings should be viewed as a first step in a process to expand the EXSEM to include more inclusive physical sub-domains and the addition of cognitive facets. However, the current research should be replicated in an independent sample of older adults to confirm the factor structure and psychometric properties of Marsh's PSDQ. Furthermore, future research should be conducted to test the model as a whole, which will require a very large and diverse sample of individuals. Additionally, a prospective study should be undertaken to determine what, if any, relationship exist between the expanded EXSEM and exercise adherence. Clearly, there is much research needed before the expanded EXSEM can be utilized in intervention research. However, the current research is a promising beginning to understanding the role of cognitions within the physical self and their relationship with physical activity.

# APPENDICIES

# APPENDIX A

**The Physical Self-Description Questionnaire**

Please read each sentence below and decide your answer. There are six possible answers for each question—"True", "False", and four answers in between. There are six boxes next to each sentence, one for each of the answers. The answers are written at the top of the numbers. Choose your answer to a sentence and place an X in the box. Do not say your answer aloud or talk about it with anyone else. Below is an example:

| | FALSE | MOSTLY FALSE | MORE FALSE THAN TRUE | MORE TRUE THAN FALSE | MOSTLY TRUE | TRUE |
|---|---|---|---|---|---|---|
| In general, I am neat and tidy. | ☐ | ☐ | ☐ | ☒ | ☐ | ☐ |

I answered "more true than false" because though I am neat, I do have my messy moments.

You should have only one answer checked for each sentence. Do not fail to answer any sentences, even if you are not sure which box to check. If you have any questions please do not hesitate to ask. Otherwise, please begin.

| | FALSE | MOSTLY FALSE | MORE FALSE THAN TRUE | MORE TRUE THAN FALSE | MOSTLY TRUE | TRUE |
|---|---|---|---|---|---|---|
| 1. When I get sick I feel so bad that I cannot even get out of bed. | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 2. I feel confident when doing coordinated movements. | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 3. Several times a week I exercise or play hard enough to breathe hard (huff and puff). | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 4. I am too fat. | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 5. Other people think I am good at sports. | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

| | FALSE | MOSTLY FALSE | MORE FALSE THAN TRUE | MORE TRUE THAN FALSE | MOSTLY TRUE | TRUE |
|---|---|---|---|---|---|---|
| 6. I am satisfied with the kind of person I am physically. | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 7. I am attractive for my age. | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 8. I am a physically strong person. | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 9. I am quite good at bending, twisting, and turning my body. | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 10. I can run a long way without stopping. | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 11. Overall, most things I do turn out well. | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 12. I usually catch whatever illness (flu, cold, ect.) is going around. | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 13. Controlling movements of my body comes easily to me. | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 14. I often do exercise or activities that make me breathe hard. | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 15. My waist is too large. | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 16. I am good at most sports. | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 17. Physically, I am happy with myself. | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

| | FALSE | MOSTLY FALSE | MORE FALSE THAN TRUE | MORE TRUE THAN FALSE | MOSTLY TRUE | TRUE |
|---|---|---|---|---|---|---|
| 18. I have a nice looking face. | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 19. I have a lot of power in my body. | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 20. My body is flexible. | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 21. I would do well in a test of physical endurance and stamina. | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 22. I don't have much to be proud of. | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 23. I am sick so often that I cannot do all the things I want to do. | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 24. I am good at coordinated movements. | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 25. I get exercise or activity three or four times per week that makes me huff and puff and last at least 30 minutes. | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 26. I have too much fat on my body. | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 27. Most sports are easy for me. | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 28. I feel good about the way I look and what I can do physically. | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 29. I'm better looking than most of my friends. | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

| | FALSE | MOSTLY FALSE | MORE FALSE THAN TRUE | MORE TRUE THAN FALSE | MOSTLY TRUE | TRUE |
|---|---|---|---|---|---|---|
| 30. I am stronger than most people my age. | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 31. My body is stiff and inflexible. | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 32. I could jog 5 kilometers without stopping. | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 33. I feel that my life is not very useful. | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 34. I hardly ever get sick or ill. | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 35. I can perform movements smoothly in most physical activities. | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 36. I do physically active things (jogging, dancing, aerobics, swimming) at least three times a week. | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 37. I am overweight. | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 38. I have good sports skills. | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 39. Physically, I feel good about myself. | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 40. I am ugly. | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 41. I am weak and have no muscles. | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 42. My body parts bend and move in most directions well. | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

| | FALSE | MOSTLY FALSE | MORE FALSE THAN TRUE | MORE TRUE THAN FALSE | MOSTLY TRUE | TRUE |
|---|---|---|---|---|---|---|
| 43. I think I could run a long way without getting tired. | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 44. Overall, I am no good. | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 45. I get sick a lot. | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 46. I find my body handles coordinated movements with ease. | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 47. I do a lot of sports, dance, gym, or other physical activities. | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 48. My stomach is too big. | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 49. I am better at sports than most of my friends. | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 50. I feel good about who I am and what I can do physically. | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 51. I am good looking. | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 52. I would do well in a test of strength. | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 53. I think I am flexible enough for most sports. | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 54. I can be physically active for a long period of time without getting tired. | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 55. Most things I do, I do well. | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

| | FALSE | MOSTLY FALSE | MORE FALSE THAN TRUE | MORE TRUE THAN FALSE | MOSTLY TRUE | TRUE |
|---|---|---|---|---|---|---|
| 56. When I get sick it takes me a long time to get better. | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 57. I am graceful and coordinated when I do sports and activities. | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 58. I do sports, exercise, dance or other physical activities almost every day. | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 59. Other people think that I am fat. | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 60. I play sports well. | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 61. I feel good about who I am physically. | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 62. Nobody thinks that I'm good looking. | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 63. I am good at lifting heavy objects. | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 64. I think I would perform well on a test measuring flexibility. | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 65. I am good at endurance activities like distance running, aerobics, bicycling, swimming, or cross-country skiing. | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 66. Overall, I have a lot to be proud of. | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

| | FALSE | MOSTLY FALSE | MORE FALSE THAN TRUE | MORE TRUE THAN FALSE | MOSTLY TRUE | TRUE |
|---|---|---|---|---|---|---|
| 67. I have to go to the doctor because of illness more than most people my age. | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 68. Overall, I'm a failure. | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 69. I usually stay healthy even when my friends get sick. | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 70. Nothing I do ever seems to turn out right. | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

# APPENDIX B

**The Physical Activity Scale for the Elderly (PASE)**

| | | | |
|---|---|---|---|
| **Instructions:** Please complete this questionnaire by placing an X in the box next to the correct response or filling in the blank. Here is an example: | | | |
| | | | |
| During the past 7 days, how often have you seen the sun? | | | |
| | | | |
| ☐ NEVER | ☐ SELDOM | ☒ SOMETIMES | ☐ OFTEN |
| | (1-2 DAYS) | (3-4 DAYS) | (5-7 DAYS) |
| | | | |
| Answer all items as accurately as possible. All information is strictly confidential. | | | |

**LEISURE TIME ACTIVITY**

| | | | |
|---|---|---|---|
| 1. Over the past 7 days, how often did you participate in sitting activities such as reading, watching TV or doing handcrafts? | | | |
| ☐ NEVER | ☐ SELDOM | ☐ SOMETIMES | ☐ OFTEN |
| ↓ | (1-2 DAYS) | (3-4 DAYS) | (5-7 DAYS) |
| GO TO Q.#2 | ↓ | ↓ | ↓ |

| | | |
|---|---|---|
| | 1a. What were these activities? | |
| | 1b. On average, how many hours per day did you engage in these sitting activities? | |
| | ☐ LESS THAN 1 HOUR | ☐ 1 BUT LESS THAN 2 HOURS |
| | ☐ 2-4 HOURS | ☐ MORE THAN 4 HOURS |

| | | |
|---|---|---|
| 2. Over the past 7 days, how often did you take a walk outside your home or yard for any reason? For example, for fun or exercise, walking to work, walking the dog, etc.? | | |
| ☐ NEVER | ☐ SELDOM | ☐ SOMETIMES | ☐ OFTEN |
| ↓ | (1-2 DAYS) | (3-4 DAYS) | (5-7 DAYS) |
| GO TO Q.#3 | ↓ | ↓ | ↓ |

| | | |
|---|---|---|
| | 2a. On average, how many hours per day did you spend walking? | |
| | ☐ LESS THAN 1 HOUR | ☐ 1 BUT LESS THAN 2 HOURS |
| | ☐ 2-4 HOURS | ☐ MORE THAN 4 HOURS |

3. Over the past 7 days, how often did you engage in light sport or recreational activities such as bowling, golf with a cart, shuffleboard, fishing from a boat or pier or other similar activities?

| ☐ NEVER | ☐ SELDOM | ☐ SOMETIMES | ☐ OFTEN |
|---|---|---|---|
| ↓ | (1-2 DAYS) | (3-4 DAYS) | (5-7 DAYS) |
| GO TO Q.#4 | ↓ | ↓ | ↓ |

3a. What were these activities?

3b. On average, how many hours per day did you engage in these light sport of recreational activities?

| | |
|---|---|
| ☐ LESS THAN 1 HOUR | ☐ 1 BUT LESS THAN 2 HOURS |
| ☐ 2-4 HOURS | ☐ MORE THAN 4 HOURS |

4. Over the past 7 days, how often did you engage in moderate sport and recreational activities such as doubles tennis, ballroom dancing, hunting, ice skating, golf without a cart, softball or other similar activities?

| ☐ NEVER | ☐ SELDOM | ☐ SOMETIMES | ☐ OFTEN |
|---|---|---|---|
| ↓ | (1-2 DAYS) | (3-4 DAYS) | (5-7 DAYS) |
| GO TO Q.#5 | ↓ | ↓ | ↓ |

4a. What were these activities?

4b. On average, how many hours per day did engage in these moderate sport and recreational activities?

| | |
|---|---|
| ☐ LESS THAN 1 HOUR | ☐ 1 BUT LESS THAN 2 HOURS |
| ☐ 2-4 HOURS | ☐ MORE THAN 4 HOURS |

5. Over the past 7 days, how often did you engage in strenuous sport and recreational activities such as jogging, swimming, cycling, singles tennis, aerobic dance, skiing (downhill or cross-country) or other similar activities?

| ☐ NEVER | ☐ SELDOM | ☐ SOMETIMES | ☐ OFTEN |
|---|---|---|---|
| ↓ | (1-2 DAYS) | (3-4 DAYS) | (5-7 DAYS) |
| GO TO Q.#6 | ↓ | ↓ | ↓ |

5a. What were these activities?

5b. On average, how many hours per day did you engage in these strenuous sport and recreational activities?

| | |
|---|---|
| ☐ LESS THAN 1 HOUR | ☐ 1 BUT LESS THAN 2 HOURS |
| ☐ 2-4 HOURS | ☐ MORE THAN 4 HOURS |

6. Over the past 7 days, how often did you do any exercises specifically to increase muscle strength and endurance, such as lifting weights or pushups, etc.?

| ☐ NEVER | ☐ SELDOM | ☐ SOMETIMES | ☐ OFTEN |
|---|---|---|---|
| ↓ | (1-2 DAYS) | (3-4 DAYS) | (5-7 DAYS) |
| GO TO Q.#7 | ↓ | ↓ | ↓ |

6a. What were these activities?

6b. On average, how many hours per day did you engage in exercises to increase muscle strength and endurance?

| | |
|---|---|
| ☐ LESS THAN 1 HOUR | ☐ 1 BUT LESS THAN 2 HOURS |
| ☐ 2-4 HOURS | ☐ MORE THAN 4 HOURS |

**HOUSEHOLD ACTIVITY**

| | | | |
|---|---|---|---|
| 7. During the past 7 days, have you done any light housework, such as dusting or washing dishes? | | | |
| | | | |
| ☐ NO | ☐ YES | | |
| | | | |
| 8. During the past 7 days, have you done any heavy housework or chores, such as vacuuming, scrubbing floors, washing windows, or carrying wood? | | | |
| | | | |
| ☐ NO | ☐ YES | | |
| | | | |
| 9. During the past 7 days, did you engage in any of the following activities? | | | |
| | | | |
| | Please answer YES or NO for each item. | | |
| | | | |
| | | NO | YES |
| a. | Home repairs like painting, wallpapering, electrical work, etc. | ☐ | ☐ |
| | | | |
| b. | Lawn work or yard care, including snow or leaf removal, wood chopping, etc. | ☐ | ☐ |
| | | | |
| c. | Outdoor gardening | ☐ | ☐ |
| | | | |
| d. | Caring for an other person, such as children, dependent spouse, or an other adult | ☐ | ☐ |

**WORK-RELATED ACTIVITY**

| | | | | |
|---|---|---|---|---|
| 10. During the past 7 days, did you work for pay or as a volunteer? | | | | |
| | | | | |
| ☐ NO | | ☐ YES | | |
| | | ↓ | | |
| | | | | |
| | | | | |
| | 10a. | How many hours per week did you work for pay and/or as a volunteer? | | |
| | | | | HOURS |
| | | | | |
| | 10b. | Which of the following categories best describes the amount of physical activity required on your job and/or volunteer work? | | |
| | | | | |
| | | ☐ | Mainly sitting with slight arm movements. [**Examples**: office worker, watchmaker, seated assembly line worker, bus driver, etc.] | |
| | | | | |
| | | ☐ | Sitting or standing with some walking. [**Examples**: cashier, general office worker light tool and machinery worker.] | |
| | | | | |
| | | ☐ | Walking, with some handling of materials generally weighing less than 50 pounds. **[Examples:** mailman, waiter/waitress, construction worker, heavy tool and machinery worker.] | |
| | | | | |
| | | ☐ | Walking and heavy manual work often requiring handling of materials weighing over 50 pounds. [**Examples:** lumberjack, stone mason, farm or general laborer.] | |
| | | | | |

# APPENDIX C

| Age: | | | Gender: | Male | Female |
|---|---|---|---|---|---|
| | | | | ☐ | ☐ |

| Marital Status: | Single | Married | Separated | Widowed | Divorced |
|---|---|---|---|---|---|
| | ☐ | ☐ | ☐ | ☐ | ☐ |

| Ethnicity: | Caucasian | African American | Hispanic | Native American | Asian American | Other |
|---|---|---|---|---|---|---|
| | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

| Approximate annual household income: | 0-15,000 | 15,001-30,000 | 30,001-45,000 | 45,001-60,000 | 60,001+ |
|---|---|---|---|---|---|
| | ☐ | ☐ | ☐ | ☐ | ☐ |

| Education: | Grade School | Some High School | Completed High School | Some College | College Degree | Graduate Degree |
|---|---|---|---|---|---|---|
| | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

# APPENDIX D

**Health Checklist:**

This questionnaire is designed to assess basic indicators of general health. For each condition, please indicate whether you have ever been diagnosed as having the condition, and if so, please indicate the year of diagnosis or each occurrence.

| Condition: | YES | NO | Year of first diagnosis: |
|---|---|---|---|
| Heart disease | ☐ | ☐ | |
| Past heart Attack | ☐ | ☐ | |
| Cancer (Type:_____) | ☐ | ☐ | |
| Arthritis | ☐ | ☐ | |
| Joint (e.g. knee, hip) replacement | ☐ | ☐ | |
| Asthma | ☐ | ☐ | |
| Pulmonary (lung) disorder | ☐ | ☐ | |
| Blood disease (for example: anemia) | ☐ | ☐ | |
| Irregular heartbeat | ☐ | ☐ | |
| Hypertension (high blood pressure) | ☐ | ☐ | |
| Diabetes | ☐ | ☐ | |
| Renal (kidney) disease | ☐ | ☐ | |
| Liver disease | ☐ | ☐ | |
| Epilepsy | ☐ | ☐ | |
| Stroke | ☐ | ☐ | |
| Parkinson's disease | ☐ | ☐ | |
| Gastrointestinal (e.g. stomach, bowel) disease | ☐ | ☐ | |
| Other (Specify:_____) | ☐ | ☐ | |

# APPENDIX E

This questionnaire has to do with your attitudes about some of your activities and abilities. For the first nine items below, you should rate yourself relative to other people **your age and gender** by using the following scale:

| Bottom 5% | Lower 10% | Lower 20% | Lower 30% | Lower 50% | Upper 50% | Upper 30% | Upper 20% | Upper 10% | Top 5% |
|---|---|---|---|---|---|---|---|---|---|

An example of the way the scale works is as follows: if one of the traits that follows was "height", a woman who is just below average in height would choose "lower 50%" whereas a woman who is taller than 80% (but not taller than 90%) of her female counterparts would choose "upper 20%".

1. Relative to others your age and gender, rate your physical **strength**, with those in the "top 5%" being the strongest:

| Bottom 5% | Lower 10% | Lower 20% | Lower 30% | Lower 50% | Upper 50% | Upper 30% | Upper 20% | Upper 10% | Top 5% |
|---|---|---|---|---|---|---|---|---|---|
| ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

2. Relative to others your age and gender, rate your physical **endurance**, with those in the "top 5%" being those with the most endurance:

| Bottom 5% | Lower 10% | Lower 20% | Lower 30% | Lower 50% | Upper 50% | Upper 30% | Upper 20% | Upper 10% | Top 5% |
|---|---|---|---|---|---|---|---|---|---|
| ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

3. Relative to others your age and gender, rate your physical **attractiveness**, with those in the "top 5%" being the most attractive:

| Bottom 5% | Lower 10% | Lower 20% | Lower 30% | Lower 50% | Upper 50% | Upper 30% | Upper 20% | Upper 10% | Top 5% |
|---|---|---|---|---|---|---|---|---|---|
| ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

4. Relative to others your age and gender, rate your **sport competence**, with those in the "top 5%" being the most competent in sports:

| Bottom 5% | Lower 10% | Lower 20% | Lower 30% | Lower 50% | Upper 50% | Upper 30% | Upper 20% | Upper 10% | Top 5% |
|---|---|---|---|---|---|---|---|---|---|
| ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

5. Relative to others your age and gender, rate your physical **flexibility**, with those in the "top 5%" being the most flexible:

| Botto m 5% | Lower 10% | Lower 20% | Lower 30% | Lower 50% | Upper 50% | Upper 30% | Upper 20% | Upper 10% | Top 5% |
|---|---|---|---|---|---|---|---|---|---|
| ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

6. Relative to others your age and gender, rate your physical **health**, with those in the "top 5%" being the most healthy:

| Botto m 5% | Lower 10% | Lower 20% | Lower 30% | Lower 50% | Upper 50% | Upper 30% | Upper 20% | Upper 10% | Top 5% |
|---|---|---|---|---|---|---|---|---|---|
| ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

7. Relative to others your age and gender, rate your **amount of body fat**, with those in the "top 5%" having the *least* amount of body fat:

| Bottom 5% | Lower 10% | Lower 20% | Lower 30% | Lower 50% | Upper 50% | Upper 30% | Upper 20% | Upper 10% | Top 5% |
|---|---|---|---|---|---|---|---|---|---|
| ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

8. Relative to others your age and gender, rate your physical **coordination**, with those in the "top 5%" being the most coordinated:

| Bottom 5% | Lower 10% | Lower 20% | Lower 30% | Lower 50% | Upper 50% | Upper 30% | Upper 20% | Upper 10% | Top 5% |
|---|---|---|---|---|---|---|---|---|---|
| ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

9. Relative to others your age and gender, rate your **amount of physical activity**, with those in the "top 5%" being the most physically active:

| Bottom 5% | Lower 10% | Lower 20% | Lower 30% | Lower 50% | Upper 50% | Upper 30% | Upper 20% | Upper 10% | Top 5% |
|---|---|---|---|---|---|---|---|---|---|
| ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

---

On the 27 questions that follow, you will be ask to rate how certain you are of the first nine responses, the importance of each domain to you personally, and how you compare to your "ideal self" within each domain. Feel free to mark any one of the nine boxes that best describes your feelings.

**Now rate how *certain* you are of your standing on each of the above traits:**

| | Not at all certain | | | | | Moderately certain | | | Extremely certain |
|---|---|---|---|---|---|---|---|---|---|
| 10. Strength: | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 11. Endurance: | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 12. Attractiveness: | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 13. Sport Competence: | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 14. Flexibility: | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 15. Health | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 16. Body Fat | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 17. Coordination | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 18. Physical Activity | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

**Now rate how personally *important* each of these domains is to you:**

| | Not at all important to me | | | | | Moderately important to me | | | Extremely important to me |
|---|---|---|---|---|---|---|---|---|---|
| 19. Strength: | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 20. Endurance: | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 21. Attractiveness: | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 22. Sport Competence: | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 23. Flexibility: | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 24. Health | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 25. Body Fat | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 26. Coordination | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 27. Physical Activity | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

**Now rate yourself relative to your "ideal self": the person you would be if you were exactly the way you would *like* to be:**

| | Very short of my ideal self | | | | | Somewhat like and somewhat unlike my ideal self | | | Very much like my ideal self |
|---|---|---|---|---|---|---|---|---|---|
| 28. Strength: | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 29. Endurance: | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 30. Attractiveness: | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 31. Sport Competence: | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 32. Flexibility: | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 33. Health | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 34. Body Fat | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 35. Coordination | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |
| 36. Physical Activity | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ | ☐ |

# APPENDIX F

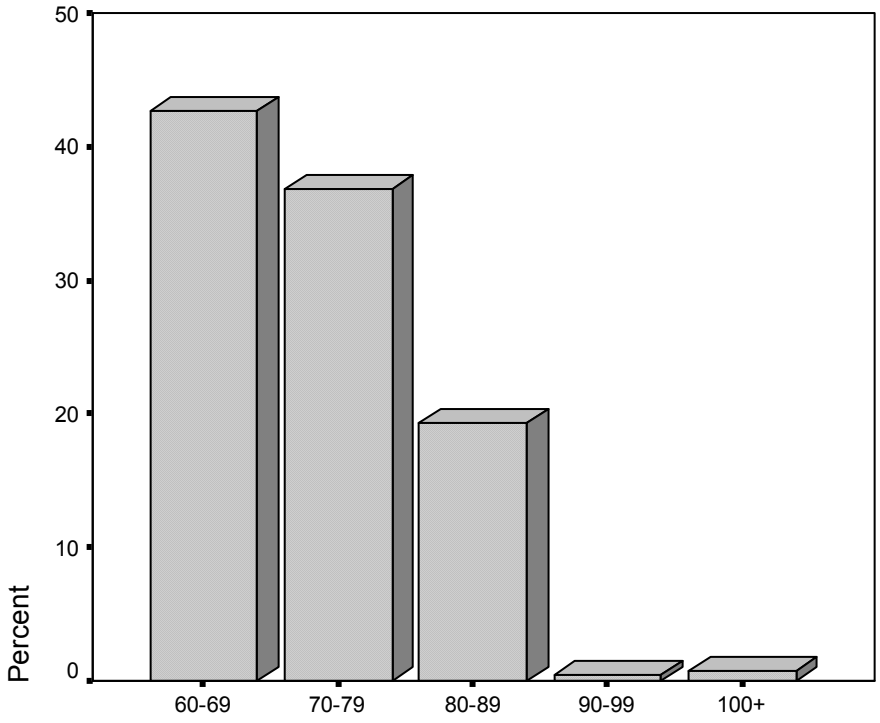


**Figure 4.1: Age distribution by percentage for entire sample**

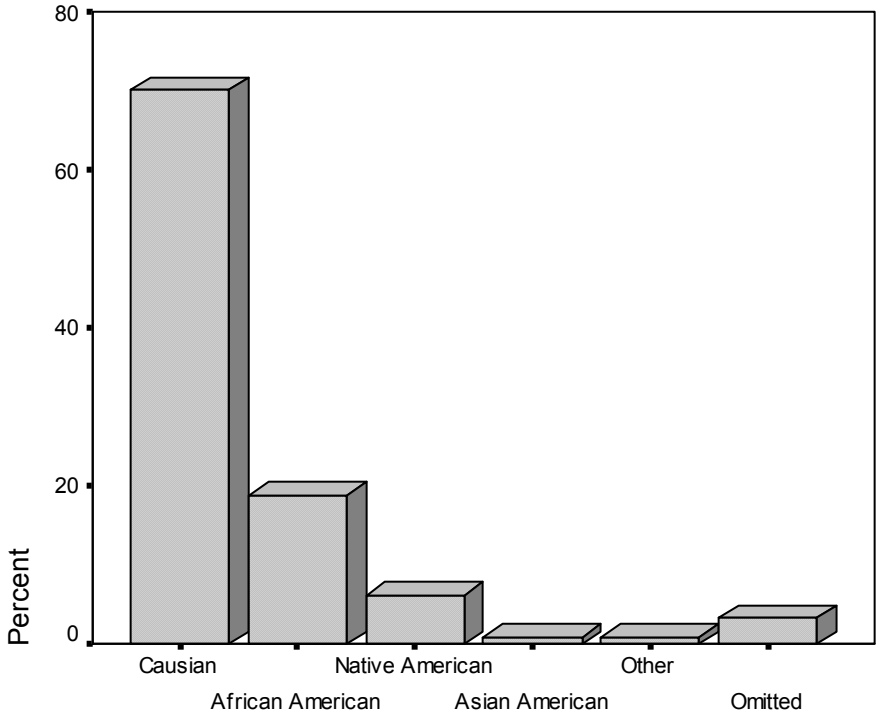


**Figure 4.2: Ethnic breakdown by percent for the entire sample**

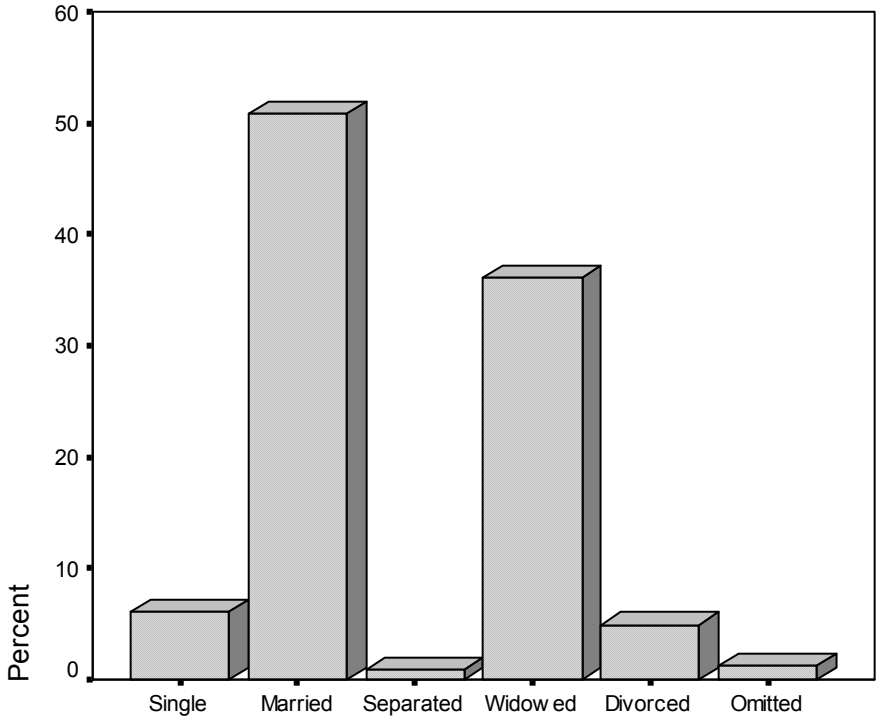


**Figure 4.3: Marital Status by percent for entire sample**

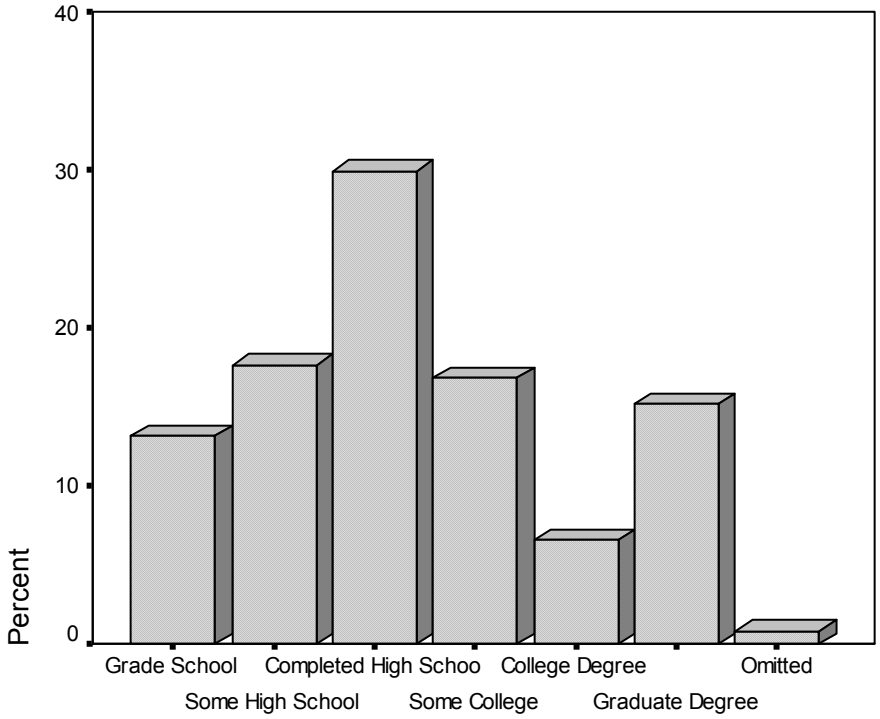


**Figure 4.4: Education distribution by percent for entire sample**

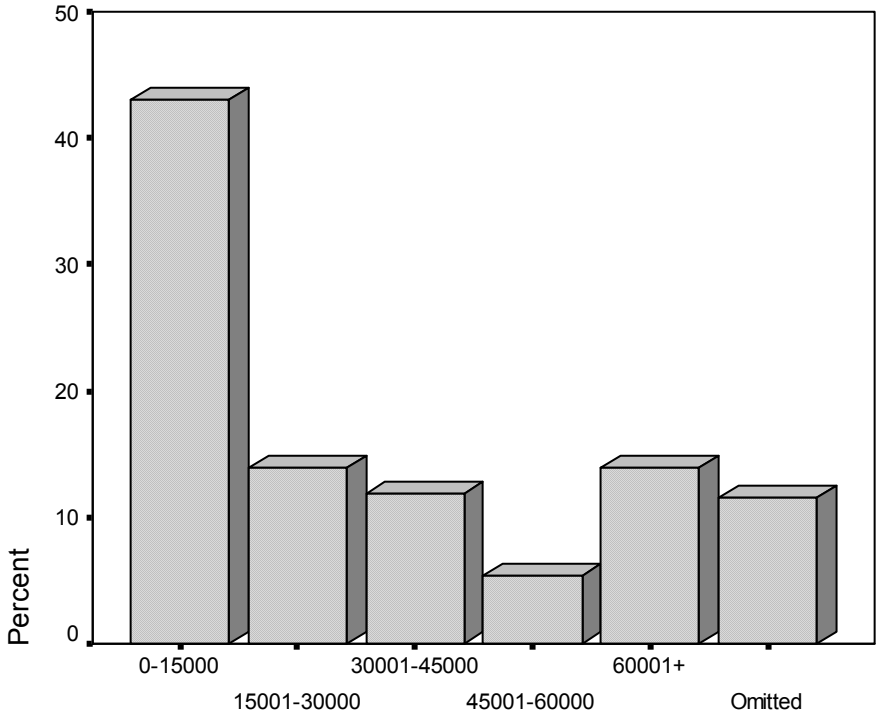


**Figure 4.5: Income distribution by percent for entire sample**

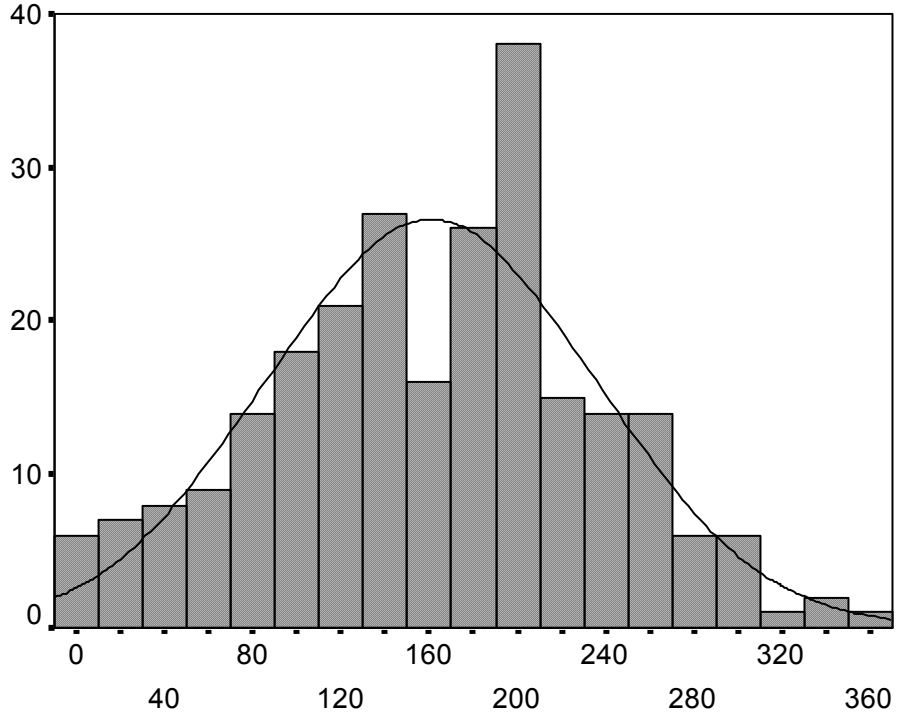


**Figure 4.6: Distribution of PASE activity scores for entire sample**

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# Vita

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