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Exercise and physical self-perception: effects of a twelve week fitness walking program on self-reported fitness level of college students

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EXERCISE AND PHYSICAL SELF-PERCEPTION:

Effects of a Twelve Week Fitness Walking Program On Self-Reported Fitness Level of College Students

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TABLE OF CONTENTS

CHAPTER ONE

THE PROBLEM

A. INTRODUCTION

Previous research has examined the ability of exercise to exert an influence on self-esteem (Collingwood & Willet, 1971; Collingwood, 1972; Brinkmann & Hoskins, 1975; Heinzelmann & Bagley, 1970; Gary & Guthrie, 1972). It is not known exactly how exercise does influence self-esteem. It has been suggested that other factors of exercise, such as socialization, may influence self-esteem (Sonstroem, 1984). Another possibility also exists. The use of more narrow, content-specific estimation scales assessing self-perceptions of physical fitness and general athletic ability, as compared to global self-esteem scales, seem more likely to reflect actual measures of physical fitness (Sonstroem, 1989). Therefore, one vehicle by which exercise may yield influence is by improving fitness level, and thus actually changing perception of fitness level.

The relationship between self-perception of physical fitness level and self-esteem remains unanswered (Fox, 1990). Ken Fox (1990) provides a model for the role which physical self-perception plays in a person's overall self-esteem. Four components of physical self perception-- sport competence, physical strength, body attractiveness, and physical condition-- contribute to one's physical self-perception. Each component is weighted differently by each individual. For example, sport competence might be very important to one individual, whereas body attractiveness is more important to another. The overall physical self-perception is then combined with other "domains" to comprise the person's self-esteem. Again, one must take into consideration the relative importance of each domain in assessing total self-esteem.

If exercise is to impact the self-esteem of an individual directly, excluding other factors of exercise, three things must occur: 1) A positive change in physical fitness level must occur; 2) There must be a relationship between fitness level

and physical self-perception, as shown in various studies (Sonstroem, 1989) 3) Additionally, self-perception must carry some importance to the individual in determining overall self-esteem (Fox, 1990).

At the researcher's university, located in the south, students register for various physical fitness courses, including a sixteen week fitness walking course. In order to determine if it is possible for this course to positively influence self-esteem, two questions should be answered: 1) what changes, if any, are realized during twelve weeks of fitness walking in the health-related components of physical fitness: cardiovascular fitness, body composition, muscular strength and endurance, and flexibility, and 2) are these changes related to the self-perception of physical fitness?

It should be noted this will not ascertain any change in self-esteem. For this to occur, one must also answer the third question: how important is physical self-perception to the student in assessing his or her self-esteem? In order for self-esteem to

be influenced, according to Fox's model, the student must attribute some importance to the physical self in determining his or her self-esteem. Examination of fitness level and physical self-perception is not synonymous with examination of self-esteem, but it can provide useful information about the ability of exercise to affect self-perception. Eventually, this may lead to an improved understanding of the eventual pathway by which exercise affects self-esteem.

B. PURPOSE

The purpose of this study was to determine if any changes occurred in the health-related components of physical fitness during a sixteen week walking course at a southern university campus. In addition, the study noted the changes which occurred in the student's perception of his/her fitness level, as assessed by questionnaire, and the relationship between actual fitness and perceived fitness level.

C. STATEMENT OF THE PROBLEM

This study was designed to answer the following questions:

1. Was there a significant difference in cardiovascular fitness level, at the beginning of a twelve-week period as opposed to the end of this period?
2. Was there a significant difference between pre and post training abdominal muscular endurance?
3. Was there a significant difference between pre and post training percent body fat?
4. Was there a significant difference between pre and posthamstring and lower back flexibility?
5. Were there changes between the student's pre and post training physical self-perception?
6. Was there a relationship between the following:
   a) perceived physical condition and cardiovascular endurance,
   b) perceived physical strength and abdominal muscular endurance, and

c) perceived body attractiveness and percent body fat?

7. Was there a significant difference between the PRN Monograph (physical self-perception) scores of the control and experimental groups following the twelve-week fitness walking intervention?

D. HYPOTHESIS

The null hypotheses of this study included:"

1. There will be no changes in level of health-related fitness.
2. There will be no changes in perceived level of fitness.
3. There will be no relationship between perceived level of fitness and actual level of fitness.
4. There will be no difference between the self-perception scores of the control group and those of the walking course participants following a twelve-week intervention of fitness walking.

E. THE NEED FOR THE STUDY

This study will allow further investigation into the relationship between reality and perception. As noted by Sonstroem in 1974, it appears that there is a positive and significant relationship between physical fitness and athletic experience, and estimation of one's physical ability. It is relevant to determine if similar results are attainable with a college population, both males and females. Sonstroem's study utilized 710 males, high school grades 9-12. Additionally, the Physical Self-Perception Profile provides a different tool for analysis of physical self-perception. It has, however, been validated for use with college populations (Fox, 1989).

From a more applied aspect, it is of interest to evaluate the ability of this specific course to produce an improvement in the health-related components of physical fitness: cardiorespiratory fitness, muscular strength and endurance, flexibility, and body composition. These components

are included in the Healthy People 2000 goals (Fox, 1990). A detailed analysis in the ability of this particular course to produce improvements in health related fitness might allow subsequent improvement of the course curriculum based on findings.

Additionally, if a relationship exists between students' physical fitness and perceived physical fitness in a fitness walking class, then it may be possible to only analyze the actual fitness level in the future. Although this would require additional research with larger populations, such a link would allow a simpler approach to data collection. A physical fitness teacher could be fairly assured that improving his or her students condition results in an improvement in physical self-perception.

In contrast, if no relationship exists between students' physical fitness and perceived fitness, then another approach is needed. It may be necessary to educate students as to the results of their fitness tests, and the meaning of fitness.

In summary, the information gained may help determine if a relationship exists between actual

fitness level and perceived fitness level. Additionally, the study will provide an evaluation of the ability of the fitness walking course to increase the health-related components of physical fitness. Finally, the study might simplify data collection in the future, or allow modifications to be made to provide students with a more realistic view of their fitness level.

F. DELIMITATIONS OF THE STUDY

The major delimitations of this study were:

1. The study was delimited by the measures of fitness used: sit and reach test (flexibility), one-minute timed sit-up test (abdominal muscular endurance), the Rockport Fitness Walking Test (cardiovascular endurance), skinfold measures using the Lange Skinfold Caliper and the Durnin formula (body fat percentage).
2. The study was also delimited by the PRN Monograph as a measure of physical self-perception (Fox, 1990).

3. The use of college age participants of a fitness walking class at a university in the south delimited the study.
4. The study was delimited by use of college age members of an introductory nutrition course, meeting during the same semester, as a control group.

G. LIMITATIONS OF THE STUDY

The major limitations of this study were:

1. There was an inability to use the same researcher for measurement of the fitness tests: sit and reach, Rockport, and skinfold measures, resulting in decreased reliability of test results.
2. The use of student partners as counters for the sit-up test, and allowing students to measure their own heart rate during the Rockport test limited accuracy, as it is unknown how accustomed these students were to taking their own heart rate.

3. A limit to a 10 day period of measurement was necessary in order to allow a twelve-week treatment period.
4. An inability to administer each test on the same day for all participants was created by both the need to administer the test rapidly (simultaneous testing was needed), and to give make-ups test to provide ample data.
5. There was an inability to administer the questionnaire to controls at the same time of day (controls met at 9:00 am; walking class at 12:00 noon), which might have resulted in some differences simply due to level of alertness experienced at different times of day.
6. There was also an inability to administer make-up questionnaires to control group, whereas the experimental group were given the chance to make up the questionnaire.

H. BASIC ASSUMPTIONS

On the basis of the delimitations and limitations, several major assumptions were made relative to the study.

1. The sample, students enrolled in the walking class, was representative of students expected to enroll in this class in the future.
2. The subjects who completed the control questionnaire were similar in age and gender to the experimental subjects, and were not enrolled in an organized exercise program at the time of the study.
3. The walking class participants gave their highest possible efforts on all field tests: Rockport Walk Test, one-minute timed sit-ups test, and sit and reach.
4. The participants' expectations did not alter the outcome of the study.
5. The bias of the researcher did not alter the results.
6. The instruments of measurement were valid and reliable, and the researcher and all assistants were accurate in measurement.
7. The students accurately recorded their own scores where required.

8. The students answered the questionnaire honestly, after thoroughly reading each question.

I. DEFINITIONS AND INTERPRETATIONS

Morgan-Sonstroem model: This model, found in a review of exercise and self-esteem literature by Robert J. Sonstroem, (Sonstroem, 1989) suggests that exercise intervention may lead to changes in physical measures. This in turn allows for increased physical self-efficacy, which produces increased physical competence. Physical competence leads to physical acceptance, and finally to self-esteem.

Multidimensionality: This approach recognizes the value of global scales, or those which utilize generalized self-esteem or self-worth items, as well as the use of population specific and categorized items, each of which are weighted differently based on perceived importance to the individual.

Objective Measures: This term refers to the physical fitness tests completed: one-minute timed sit-ups

test, Rockport Walking Test, sit and reach test, and percent body fat analysis.

PRN Monograph: Documents research that led to the development of two instruments for measuring physical self-perceptions: The Physical Self-Perception Profile and the Perceived Importance Profile.

Perceived Importance Profile (PIP): Seeks to show how subjects "weight" their sports competence, condition, attractiveness, and strength in assessing their physical self-worth.

Physical Self-Perception Profile (PSPP): Measures "how subjects rate themselves in terms of five factors: sports competence, physical condition, body attractiveness, strength, and over-all physical self-worth" (Fox, 1990, iii). This tool does not take into account the importance of each factor to the individual.

Rockport Fitness Walking Test: Method used to determine cardiovascular fitness, and described in Rockport Walking Program, by Dr. James M. Rippe and

Ann Ward. Requires one-mile timed walk, followed by a 15 second heart rate measurement.

Sit and Reach: Flexibility was scored using a standard sit and reach box, and methodology described in the ACSM Resource manual with one exception: No warm-up period was included.

Sit-ups Test: Abdominal endurance was based upon a timed one-minute sit-up test as described in the ACSM Resource manual. The exception to this description is the use of partners to count the repetitions and hold the ankles.

Skinfolds Measures: Body fat analysis was computed using four skinfold measures: triceps, biceps, subscapular, and suprailium, as described in the ACSM resource manual and using the Lange skinfold caliper (ACSM, 1993). Body fat was then calculated using the Durnin and Wormsley chart (1974).

Subjective Measures: This term refers to the psychological tools (PSPP and PIP), as they are subjective in contrast to the objective physical measures.

Unidimensionality: Although previously the basis for self-esteem research, this may result in validity problems. This involved the use of inventories which "asked subjects to rate themselves on a host of personal qualities and abilities in a wide range of life settings. Totaling all item responses provided an individual's self-esteem score" (Fox, 1990).

CHAPTER TWO

REVIEW OF THE LITERATURE

A. INTRODUCTION

Over the last twenty years, research in a variety of fields, ranging from psychology to physical therapy, has explored the psychological benefits of physical activity. Research has included examination of both acute bouts of activity, and in particular, training periods of 8 to 16 weeks. Investigators have contemplated treatment of clinical in-patients and outpatients in mental and medical institutions. Another area of focus is the nonclinical environment, where researchers have examined adolescents, college-aged students, and elders.

The psychological correlates of exercise investigated include depression, mood and well-being, anxiety, stress, and neurosis. In 1987 Martinsen reviewed nine studies of clinically depressed patients. Martinsen concluded that exercise is as effective as other methods of treatment for depression, including group

psychotherapy, individual psychotherapy, or meditation and relaxation. Additionally, Plant and Rodin (1990) reviewed studies which indicated that exercise improves mood and well-being, in addition to reducing anxiety, depression, and stress. Sexton and colleagues (1989) found that neurotic inpatients showed a marked reduction in anxiety and depression with exercise. Also examined was the positive effect of exercise on cognitive ability. Elsayed and colleagues (1980), Dustman and colleagues (1984), and Clarkson-Smith and Hartley (1989) found a positive relationship between exercise and cognitive ability.

Perhaps the most frequently examined correlate of physical activity is self-concept and self-esteem. Self-concept is defined as "an organized configuration of prescriptions of the self which are admissible to awareness" (Rogers, 1950). Self-esteem, in contrast, "has been described as the degree to which individuals feel positive about themselves" (Gergen). Thus, the key distinction between these two terms is the occurrence of

evaluation. Self-esteem is the evaluative component of self-concept. It is often difficult to separate the two, because it is difficult to examine the structure without looking at the evaluation which takes place. Already it becomes clear that the structure of self-concept is complex. Thus, the first hurdle to overcome in examining effects of physical activity upon self-esteem was the development of a clear model of self-esteem.

The first step in this endeavor was movement from a unidimensional view to a multi-dimensional view of self-concept. That is, instead of measuring self-esteem as a global construct, researchers attempt to view it as a composite of multiple constructs of the self, each weighted differently by the individual. This brings about the question of which substructures to include. Epstein (1973) has included four dimensions: general competence (mental and physical abilities), power, normal self-approval, and love-worthiness. Coopersmith (1967) and Harter (1983, 1985) also included elements of physical competence.

The second step in viewing self-esteem as a multi-dimensional construct is analysis of the individual value placed upon each substructure. According to Rosenberg's model, having a positive self-concept will contribute positively to esteem, but the size of this positive contribution will depend on the facet's importance (Marsh, 1986). Much research has thus been dedicated to determining how such importance can be quantified. There were many problems with cross-products of subarea averages and importance ratings. Single-item rating scales further confounded this effort (Marsh, 1986). Harter, in 1984, had limited success using discrepancy scores. Differences between perceived level of a particular facet, and the importance of the facet are computed. Thus, high esteem results in a score of close to zero, moderate esteem in moderately negative scores, and lowest esteem in most negative scores. However, Marsh (1986) reported only limited support for the discrepancy model.

Because a physical component was included as a substructure in several models of self-esteem, it may also be investigated individually. It has been postulated that body esteem, like self-esteem, is also a multidimensional construct. This theory was investigated by Franzoi and Shields in 1984. The authors utilized a five-point Likert scale, ranging from "strong negative feelings" to "strong positive feelings" about a particular aspect of body esteem. The initial phase revealed subcomponents for males: upper body strength, physical attributes that contribute to the appearance of balanced body proportions, general health; and for females: weight control and body proportions, facial features, general health and physical strength. In the second phase of this study, more items were added based on these findings. The end result was a Body Esteem Scale for males with components of upper body strength, physical attractiveness, and general physical condition. Components of the scale for females were physical attractiveness, weight control, and general physical condition.

The components may vary, but the consensus is that body esteem or physical self-perception is a multidimensional construct made up of subcomponents and based on the perceived importance of these subcomponents (Fox, 1990). The question of how exercise intervention brings about positive changes in body esteem remains. Sonstroem and Morgan (1989) propose a model for such changes. Actual physical measures and changes in physical measures can promote physical self-efficacy, or the belief in one's physical ability to carry out a task (running, walking, bicycling, sit-ups). An improvement in physical self-efficacy can lead to improved sense of physical competence. Physical competence, according to Sonstroem and Morgan, refers to a general evaluation of the self as possessing overall physical fitness. Feelings of self-efficacy developed from specific exercise activities are postulated as generalizing to broader, less well-defined perceptions of the body's abilities. Improved sense of physical competence can lead to improved physical acceptance, or "the degree of

feeling of satisfaction or dissatisfaction with various parts of processes of the body" (Secord and Jourard, 1953). Improved physical competence and physical acceptance in turn influence global self-esteem.

Previous research studies, particularly those utilizing intervention methodology have supported Sonstroem's model. In a study of hemiplegic patients in 1979, Brinkmann and Hoskins found a relationship between changes in fitness and in self-concept. Predicted maximal oxygen uptake, estimated with a bicycle ergometer test, changed over a twelve-week training period. The improvement in predicted maximal oxygen uptake correlated significantly with improvement in the self-concept scale of the Social Vocabulary Index.

Unfortunately, the above mentioned study began at the bottom of the model (physical changes), and then jumped to the top (altered self-concept). It may be more effective if investigation of the ability of intervention (physical training) to alter self-esteem began at the bottom of this process.

The first influence must occur between physical changes and physical self-efficacy and physical competence. That is, when improvements in physical condition can be brought about through training, how effectively do they in turn influence a sense of physical self-efficacy and physical competence. The relationship between estimated physical ability and physical fitness was investigated by Sonstroem in 1974. He found a positive and significant relationship. Estimated physical ability was found to be strongly related to height and athletic experience. Sonstroem also found support for the top of this model, in that estimation of one's physical ability bears a positive and significant relationship with acceptance of self. In other words, actual level of fitness was found to be related to perceived level of fitness (physical competence). This in turn influenced acceptance of self.

B. INTERVENTION AND METHODS OF TREATMENT

The current body of knowledge serves to either test a model for the effects of physical activity upon physical self-concept, or to formulate a new

upon physical self-concept, or to formulate a new model. In some cases, the purpose may be more applied in nature, such as attempting to alleviate depression in a clinical population (Martinsen, 1987,). And, although much research was done in this field prior to the model proposed by Sonstroem and Morgan in 1989, the entire body of knowledge available in the physical activity/physical self-concept area contributes to the testing of this model. There are certain commonalities of research which contribute to this purpose: 1) physical tests related to assessing the health-related components of physical fitness; 2) psychological assessment tools; and 3) an intervention followed by retesting.

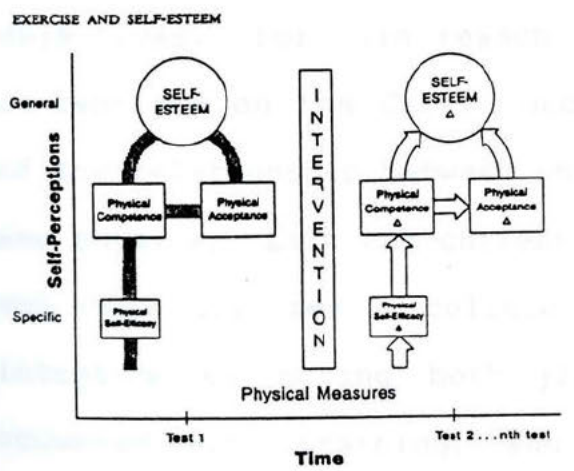


Figure 2—Proposed model for examining exercise and self-esteem interactions.

Figure 2.1. Proposed model for examining exercise and self-esteem interactions (Sonstroem and Morgan, 1989)

Physical measures should be included, because as Sonstroem notes, "They provide the objective reality from which feelings of competence are postulated as developing and generalizing" (Sonstroem & Morgan, 1989). In other words, these are the bottom of Sonstroem's model, and are the portion of the model which health professionals can aim their efforts towards changing. The AAPHERD Health-Related Fitness Test defines fitness in terms of aerobic capacity, abdominal muscular endurance, flexibility, and body composition" (AAPHERD, 1980). The fitness tests will, however, change depending upon the goals of the program and experimental objectives. For this reason, it is most useful to concentrate on the Caruso and Gill's investigation of the relationship between physical self-perception and physical. Like the current investigation, Caruso and Gill utilized a college population, with the intention of noting both physical changes which occurred with training, and the relationship of those changes to physical self-perception.

In order to estimate cardiovascular endurance, the researchers utilized a physical work capacity test on a bicycle ergometer. Three-minute stages at selected workloads were completed until the subject reached a heart rate of 150 beats per minute. The number of minutes completed was then used in data analysis.

For analysis of strength, Caruso and Gill provide two examples of strength assessments. In study 1, the researchers administered one repetition maximum tests for bench press, latissimus dorsi pull-down, and leg press. These measures were divided by the person's body weight to eliminate the effects of body mass upon strength. In study 2, the researchers utilized a different battery of tests, this time oriented more towards muscular endurance. For the Nautilus chest press, pullover, and leg extension, subjects were asked to lift a percentage of their body weight, based on gender and exercise, for as many repetitions as possible. The number of repetitions was then used in data analysis.

Flexibility is specific to type of training and experimental intent. Thus, unless it is a goal of the intervention, it need not be included. Caruso and Gill do not mention flexibility in their inroductory comments, and include no tests of flexibility. It was not discussed in detail the amount of flexibility training which occurred in the two types of intervention, weight training and aerobic dance.

Ideally, a psychological battery of tests would measure each psychological component of Sonstroem and Morgan's proposed model (Sonstroem & Morgan, 1989). These tests include: physical self-efficacy, physical competence, physical acceptance, and global self-esteem. Sonstroem has postulated that the estimation of one's physical ability bears a positive and significant relationship with physical fitness, height, and athletic experience (1974). Thus, the link between actual physical ability and perceived physical ability is important. Additionally, the estimation of one's physical ability has been shown to bear a positive and

significant relationship with acceptance of self. There was, however, no direct relationship shown between physical fitness and acceptance of self (Sonstroem, 1974). Thus, without the tests of physical self-perception, a link would have been absent in the chain of events leading to improved self-esteem.

We may look to previous investigators who have applied psychological tests for each step in Sonstroem and Morgan's model. The first step, physical self-efficacy, was analyzed by Ewart and colleagues (1983) in their work with post-myocardial infarction patients. They utilized a 6-scale assessment tool which measured patients' self-perceived ability to carry out: walking, running distances ranging from one block to five miles, climbing stairs for distances ranging from a few steps to four flights, engaging in sexual intercourse (not including foreplay) from one to twenty or more minutes, lifting objects weighing ten to seventy-five pounds, and overall ability to tolerate physical exertion. They were then asked to

rate their confidence in the judgments they made on the above listed abilities.

Caruso and Gill (1992) provide a test battery which covers the other subcomponents of the Sonstroem-Morgan model. In study 1, the Physical Self-Perception Profile (PSPP), a 30-item, five scale questionnaire, rates perceived sports competence, attractiveness of body, physical condition, physical strength, and general physical self-worth (a global measure). In accordance with the idea that each of these components must be weighted to achieve an overall sense of physical competence or physical self-worth, the Perceived Importance Profile (PIP) is also used. This 8-item scale rates how important individuals find each of the four subscales (excluding the global measure of physical self-worth). An overall discrepancy score may then be computed, which correlates with the global physical self-worth measure (Fox, 1990).

In addition to the PSPP and PIP, used to measure physical competence, the Body Cathexis Scale (Secord and Jourard, 1953) is used to measure body

acceptance. This 40-item scale, uses a 5-point Likert scale ranging from strong positive to strong negative feelings. The purpose is to assess the degree of satisfaction or dissatisfaction of an individual with his or her body.

As a global self-esteem scale, Rosenberg's Self-Esteem Scale is utilized (Rosenberg, 1979). This is a 10-item scale which evaluates items on a 4-point Likert scale ranging from strongly agree to strongly disagree.

Although an intervention phase utilizing pre- and post-testing is ideal, not all researchers chose this methodology. Sonstroem, for example, chose to compare only baseline physical and psychological data. Ewart and colleagues (1983) were interested in the use of a single exercise test in improving patients confidence in abilities to conduct physical activities of everyday life. For those who chose intervention, however, there are three key factors which must be decided: 1) exercise modality, 2) exercise intensity, and 3) length of intervention.

With regards to exercise modality, a review by Weyerer and Kupfer (1994) contrasts effects realized by primarily weight training versus primarily aerobic training programs. Doyne and colleagues (1987) compared the effects of eight weeks of weight lifting versus eight weeks of running in the treatment of depressive disorders among women (Doyne et al 1987). Additionally, Caruso and Gill (1992) compared weight-lifting classes and aerobic fitness classes. No differences were found across the groups, although the ratings of importance attached to components of physical self-perception differed in the study by Caruso and Gill. Thus, it would appear that psychological effects are similar, regardless of mode.

The intensity of the exercise modality is key to changes in the psychological correlates of exercise, based on studies reviewed by Weyerer and Kupfer in 1994. Moses and colleagues (1990) utilized three groups in assessing the psychological effects in healthy adult volunteers: 1) attention-placebo group; 2) high-intensity exercise group; and

3) moderate intensity exercise group. The greatest gains were found in the moderate intensity exercise group (Moses et al, 1989). Additionally, Cramer and colleagues (1991) used an intervention of fifteen weeks of walking with obese women and found that general psychological well-being significantly improved. Sexton and colleagues (1989) compared the effects of eight weeks of moderate exercise (walking) with eight weeks of strenuous exercise (jogging) in neurotic patients. Although the effects were similar, the drop-out rate was higher for the joggers. Sexton thus concluded that regular light, or self-selected exercise, for 30 minutes several times a week is an effective treatment of depression and anxiety.

Duration of training varies from eight weeks (Sexton et al 1989, Doyne et al 1987) to fifteen weeks (Cramer et al 1991). The recommended program duration for changes in physical fitness is 15-20 weeks (ACSM, 1991). The consensus is that the intervention must be of a sufficient duration for

actual physical changes to occur in order to test the Sonstroem-Morgan model.

In summary, three important components are involved in testing of the Sonstroem-Morgan model. Both physical and psychological tests should occur both before and after the intervention period. Additionally, the intervention should utilize either weight-training or aerobic exercise, at a moderate intensity level, and continue over a sufficient number of week to bring about physical changes. Although not all components are needed to test portions of the model, the comparison of physical and psychological data is a necessity. An intervention, although ideal, may be excluded for a simple comparison of physical and psychological data.

C. RECOMMENDATIONS

Researchers have made various recommendations with regards to sample selection and size, psychological measures to be used, physical measures to be used, confounding influences that should be controlled, and other areas in need of examination.

In deciding on a sample group, many factors should be examined including: 1) age of sample; 2) gender of sample; 3) clinical versus non-clinical sample; 4) size of sample; and 5) selection of sample. Much of the available research analyzing the relationships between actual physical and perceived physical data has been conducted with adolescent and college age students (Sonstroem, 1974, Caruso and Gill, 1992, Jackson, et. al, 1987, Harnish and Sullivan, 1987, Newman, 1991, & Marsh, 1986). This may be partially due to the advantages of convenience sampling, such as that used by Caruso and Gill (1992), utilizing already intact weight training, aerobic fitness, and non-fitness activity classes. Additionally, as discovered by Newman in 1991, body image is the primary motivating factor for adolescents to change their health behaviors.

Perhaps because of the common use of adolescent and college-aged students, there is an absence of data for healthy, adult populations. Marsh suggests the use of older populations in research aimed at discovering the role of importance ratings in the

multidimensional construct of self-esteem (1986). Franzoi and Shields (1987) note that there is insufficient data to provide norms for older adults. Weyerer and Kupfer (1994) recommend research aimed towards improving mobility and coordination, more so than endurance, in the elderly. The general consensus is that focus should not only be on adolescents and college-aged person, but on all ranges of the adult stage of life.

Gender has been shown to play a role in development of self-perceptions. According to Jackson (1987), the sexes engage in physical activity for different reasons. The goal for males is fitness over and above appearance, while for females the opposite is true. In examining the role of monitoring on body image, Harnish and Sullivan (1987) suggest that the influence of other personality variables on self-esteem, including interactions with gender should be considered. Weyerer and Kupfer (1994) recommend looking at females of older age and lower socioeconomic status because they are more likely to be inactive and have

an above average prevalence of psychiatric disorders.

The studies reviewed have in many cases examined both genders (Caruso & Gill, 1992, Shuffield & Dana, 1984, Marsh, 1986, Franzoi & Shields, 1984, Harnish & Sullivan, 1987, Jackson, 1987, Newman, 1991, and Brinkmann & Hoskins, 1979). There are also studies which utilized only male subjects (Ewart, et al, 1983, Sonstroem, 1974, and Heaps, 1978). There are, however, no studies reviewed which utilized only female subjects. As mentioned, studies for some female groups would be beneficial, as would studies which examined gender differences.

In deciding whether to use a clinical versus a non-clinical sample, the purpose of the study is of importance. There is a need for such studies as evidenced by Brinkmann and Hoskins' study of hemiplegic patients in 1979. Prior to intervention, the subjects showed a de-valuation of self below that of normal subjects. Caruso and Gill (1992) also suggest examining different populations,

including cardiac patients, obese patients, and adolescents. As mentioned earlier, Weyerer and Kupfer (1994) suggested examining elders in order to determine the benefits of exercise designed to improve mobility and coordination. The overall consensus is that both normal, healthy populations, and clinical populations should b examined.

The size of the sample is dependent upon accessibility, type of population, and types of testing to be completed. Two researchers, Sonstroem (1974), and Marsh (1986), had sample sizes of 710 and 930 respectively. Marsh administered only psychological tools. Sonstroem was only able to administer both psychological and physical measures to 187 students. Additionally, coaches were used to complete part of the tests. The smallest sample size was found in Brinkmann and Hoskins work with hemiplegic patients (1979), with only seven subjects. Again, this smaller sample was probably a function of accessibility to patients who met all criteria, ranging from diagnosis criteria to safety

criteria. Additionally, testing with such persons was more complex.

Random assignment to control and experimental groups is recommended by Weyerer and Kupfer (1994). Additionally, Caruso and Gill (1992) note that lack of a difference between groups (weight training, aerobic-fitness, and control) "may be due to limitations inherent in using intact existing classes, such as self-selection into groups." Marsh (1986), attempts to combat problems of convenience sampling by using a variety of groups, including students from an Australian college (n=151), Outward Bound participants (n=361), juniors from two private Catholic schools (n=296), and high school girls (n=46). Although random sampling and assignment to control and experimental groups is ideal, convenience sampling is the norm as it is highly feasible in comparison.

There are key components that should be included in psychological tools used to measure self-perceptions, namely multidimensionality and multi-item scales. March (1986) has suggested that

the measurement of multiple facets to determine self-concept is more useful than the use of a general facet. Further, he contends that if self-concept is to be understood, it must be considered multidimensionality, due to the complexity of the self as well as to predict behavior and to relate self-concept to other constructs. Additionally, multi-item scales have been shown to be a more accurate measure of self-concept. Also recommended by Marsh is the use of a multi-item importance scale.

Physical fitness measures are a key component of research. Weyerer and Kupfer (1994) suggest that if a comprehensive measure of cardiovascular fitness cannot be used, then the use of a step test is an adequate measure. The Kasch 3-minute recovery test is mentioned specifically. Caruso and Gill (1992) note that physical tests were administered following guidelines set by the American College of Sports Medicine. As discussed earlier, strength tests, flexibility tests, and body composition tests are

also measures related to the health components of physical fitness (Sonstroem & Morgan, 1989).

There are many confounding influences upon research of physical activity and self-concept. These influences, such as feedback, outside activity levels, and the social element, should be controlled for as much as possible. The role of feedback in determining physical fitness self-estimates was researched by Heaps in 1978. Fifty-six male volunteers enrolled in physical education classes at a western university were asked to complete Cooper's 12-minute running test. They ran the test with a "dummy" subject, actually a research assistant. The research assistant, actually in excellent cardiovascular condition, either performed very poorly in comparison to the subject, or very well. This was considered social feedback. Physical feedback was provided by the person monitoring heart rate response, who explained the results saying either, "You are in excellent shape," or "You are in very poor shape." It was found that both types of feedback played a role in the student's assessment

of his condition. The physical feedback played the greatest role. In Ewart, et al. (1983), treadmill testing also had a positive effect in the physical self-efficacy and activity levels observed in cardiac patients following the test.

Caruso and Gill (1992) attempted to eliminate influence of outside activity in their study of different types of activity classes on a university campus. They asked subjects to keep activity logs. These logs were unfortunately sometimes incomplete or not turned in. The authors submitted that this may have been partially responsible for lack of differences noted between the types of classes.

It has also been suggested that the social element of exercise has an effect unto itself. For this reason, Caruso and Gill (1992), recommend examining separately factors that are associated with the exercise setting, and not the actual exercise. These include group participation, social support, and expectancies.

Many recommendations were made for related research. Marsh (1986) suggests research to

determine if there is a causality relationship with self-concept and importance ratings. That is, if someone feels he/she is good at something, will he/she deem it important in order to protect his/her ego? This is referred to as the selectivity hypothesis. Marsh also recommends not only examining the physical ability facet of self-concept, but also the spiritual facet. These two received the greatest variability in importance ratings. Weyerer and Kupfer (1994) recommend studies which determine the extent to which primary care physicians can influence health behavior.

In summary, sample selection and size depends primarily upon the availability of subjects, and the number and complexity of psychological and physical measures to be completed. Physical measures should include a cardiovascular endurance test, and preferably strength, flexibility, and body composition tests. Psychological tests of self-perception should be based on a multi-dimensional model of self-concept, have multi-item scales, and multi-item importance ratings. Confounding

influences such as effects of feedback, outside activity, and the social element of exercise should be eliminated for an accurate analysis of the effects of physical training upon physical self-perception. Finally, additional research is suggested in many related areas.

D. SUMMARY OF LITERATURE REVIEW

The most useful tool provided throughout the literature is the proposed model for examining exercise and self-esteem interactions by Sonstroem and Morgan (1989). This model provides a means of explaining the changes in self-esteem, or in physical self-perceptions which occur as a result of exercise training. This is a chain reaction, with each change influencing the factor above it, and so on, until self-esteem is affected. There are three main hypotheses related to this model:

A. Physical fitness is more highly related to physical self-efficacy than to physical competence, physical acceptance, and global self-esteem.

B. Physical self-efficacy is more highly related to physical competence than to physical acceptance or global self-esteem.

C. Physical competence is more highly related to global self-esteem than is physical self-efficacy or physical fitness. (from Sonstroem & Morgan, 1989).

Research investigating the role of physical activity in changing self-esteem cannot jump from the bottom echelon to the top. Thus, an analysis of the relationship between physical fitness and self-efficacy is better than analysis of physical fitness and self-esteem.

This research study examines physical competence, the next level above physical self-efficacy. Additionally, the intervention element, shown in the model, as well as the intervening time element are also utilized. Sonstroem notes that it is the lower elements of the model which are specific and most easily influenced.

Although physical competence in the model is represented as a unidimensional construct, Sonstroem

notes that, "Future test development at this level may reveal that multiple facets are more representative of physical competence and more definitively trace a path of competence and generalization from exercise to general self-esteem" (Sonstroem & Morgan, 1989). For this reason, the Physical Self-Perception Profile (Fox, 1990) was chosen to represent physical competence in this model. This scale contains both a multidimensional element with four subscales of physical self-perception, and a global measure of physical self-worth.

Physical tests, chosen to measure the change in fitness over time represented at the bottom on Sonstroem's model, were based upon the four health-related components mentioned by Sonstroem: aerobic capacity, abdominal endurance, flexibility, and body composition. The intervention, although shorter than the recommended 15 to 20 weeks (ACSM, 1991) was necessary due to length of testing and limitations of the one semester time frame.

Thus, the research is designed to investigate the lower elements of the model. Namely, if physical fitness is altered successfully across time, through training intervention, will the effects be realized in higher elements. The only element investigated in this case is physical competence. The knowledge gained from this inquiry should contribute to the overall body of knowledge and either support the Sonstroem-Morgan model, or aid in formulation of a new model.

CHAPTER THREE

METHODOLOGY

A. SELECTION OF THE TOPIC

With the intention of completing a University Honors research project, the researcher attended the Southeastern American College of Sports Medicine (SEACSM) conference in Greensboro, NC, in January, 1994. While attending a symposium, research was presented which examined the psychological benefits of exercise for pregnant female subjects. An attendee of the symposium asked what psychological effects a non-pregnant populations might expect to derive from exercise. The student researcher decided to research this particular question and began a review of the literature concentrating on studies which observed the psychological effects of exercise, particularly those related to self-esteem in normal, healthy populations.

The researcher located many studies related to self-esteem and body image. It was recommended by a faculty member of the university that the researcher focus either on self-esteem or on body image. After

reviewing the literature found in the university library through an ERIC search, the researcher found that body image is a motivating factor for changes in health behavior (Newman, 1991). The topic was further narrowed upon attending the ACSM convention in Indianapolis (June, 1994), and speaking with a member of the organization who has done a great deal of research in the area of physical self-perception.

After a discussion in which the researcher explained her ideas, he recommended Fox and Corbin's Physical Self-Perception Profile which assesses four separate components of physical self-perception: sport competence, physical condition, body attractiveness, and physical strength (Appendix C).

After limiting the research topic, the research population was selected. The subjects were limited to the fitness walking class which meets for sixteen weeks due to the nature of the activity (aerobic), the researcher's class schedule, and the willingness of the instructor to participate in the project. Similarly, the control subjects were limited to a non-exercising, intact class outside the department

due to the similar composition of the class (mostly underclassmen and female) and the instructor's willingness to participate. The field tests administered were chosen because of the limited time period available for testing and the researcher's familiarity with these tests.

B. TIME OF RESEARCH

The initial investigation of the topic began in late January, 1994, and continued until the application for university honors and for a provost research grant in March, 1994. Additionally, more applicable sources were found after attending the ACSM conference in June, 1994. The review of these sources continued through December, 1994. The walking class met for the first time on Monday, August 22, 1994.

1. PRE-TEST ANALYSIS:

The testing began on August 29, 1994, with the Physical Self-Perception Profile (PSPP) and Perceived Importance Profile (PIP). These two profiles are contained in a single questionnaire, and were presented to both the control and

experimental subjects on this day (APPENDIX C & D). The sit-up test was also administered to the experimental subjects only. Percent body fat and sit and reach were administered to those with control numbers 1 through 18 on Wednesday, August 31. Those with control numbers greater than 18 completed the Rockport Walk Test on the same day. On Friday, September 2, the two groups were reversed. Thus, those with control numbers 1 through 18 underwent the Rockport Walk Test. Those with control numbers greater than 18 were tested for flexibility (sit and reach) and percent body fat. Make-up tests were given to walking class participants on September 5 and 7.

Data from the fitness tests was compiled by October 1. Scoring of the PSPP and PIP was completed between November 10 and 14, and initial data analysis was completed by December 1.

2. POST-TEST ANALYSIS:

The Rockport Walk Test was administered one of three days: November 16, November 18, and November 21. The questionnaire and sit-ups were administered

on November 28. The control group also completed the questionnaire on November 28. Skinfolds measurements (percent body fat analysis) and sit and reach were given on November 30. Make-ups for the questionnaire, skinfolds analysis, sit-ups, and sit and reach were given on December 2. Physical data was compiled on December 6. Questionnaires were scored between December 6 and February 1. Data analysis was then conducted from December 15 until February 17.

C. SELECTION OF THE SAMPLE

The fitness walking class was chosen as to participate, primarily because of convenience to the researcher and willingness of the instructor to participate. Additionally, participants were asked to sign a consent form, found in Appendix B. Those who were not willing to sign the consent were excluded from data analysis. Finally, those who were not present either during the regular test day or during the make-ups days were excluded from calculations which involved the test not completed. However, if data was available from other tests, it

was considered in the calculations. The participants at the end of the study were 1 male, and 16 females (average age=21.8). Males were excluded from all post and comparative data analysis because of inadequate sample size.

The control group was chosen primarily because of instructor willingness to participate, the large underclassman composition, and its status a non-exercising class in a separate department. Control subjects were also asked to sign a confidentiality statement (Appendix A). Thus, participants were members of the introductory nutrition class which meets at 9:00 am, Monday, Wednesday, and Friday. Subjects in this group included 16 females average age 21.3, and 6 males average age 21.7. Due to exclusion of experimental males from post and comparative data analysis, control male subjects were likewise excluded.

D. DESCRIPTION OF THE INSTRUMENTS TO BE USED

1. PSYCHOLOGICAL (OBJECTIVE) MEASURES:

The psychological instruments used included the Physical Self-Perception Profile (PSPP), a

questionnaire which assesses the individual's self-perception in four sub areas: sport competence, physical condition, body attractiveness, and physical strength. Additionally, a physical self-worth scale is included as a more global measure. Each sub area score is based on responses to six questions. The physical self-worth score is likewise based on responses to six questions. In conjunction with the PSPP, the Perceived Importance Profile (PIP) assesses the importance of each of the above mentioned subdomains with 2 questions determining the score for each of the four areas.

The PSPP and PIP are contained in the PRN Monograph, validated by Fox and Corbin in 1989, and distributed in manual form by the University of Illinois (Fox, 1990). The format of each question is identical. Each contains two statements opposite in nature. The statements begin with "Some people..." and ends with a description of a physical characteristic. One statement is positive in nature, and the other is negative. The examinee chooses one of the two statements and then decides

whether it is "sort of true" or "really true" for them. Thus, there are four types of responses: the negative statement is really true (score of 1), negative statement sort of true (score of 2), the positive statement of is sort of true (score of 3), or the positive statement is really true (score of 4).

2. PHYSICAL (OBJECTIVE) INSTRUMENTS:

Body fat analysis: Body fat percentage was estimated using the sum of four skinfold measures: triceps, biceps, subscapular, and suprailium, as described in the ACSM resource manual and using the Lange skinfold caliper (ACSM, 1993). Body fat was then calculated using the Durnin and Wormsley chart (1974), accounting for age and gender.

Flexibility: Flexibility was scored using a standard sit and reach box, and methodology described in the ACSM Resource manual with one exception: No warm-up period was included.

Aerobic capacity: Aerobic capacity was estimated using the Rockport Fitness Walk Test as described in

the Rockport manual (Rippe, Ward, & Dougherty, 1989).

Abdominal endurance: Abdominal endurance was based upon a timed one-minute sit-up test as described in the ACSM Resource manual. The exception to this description is the use of partners to count the repetitions and hold the ankles.

E. DESCRIPTION OF THE PROGRAM INTERVENTION

The experimental group included members of a walking for fitness class at a university in the Southeast. The researcher had no direct control over the course curriculum. The instructor of the course designed and implemented the activities and course goals. The objectives of the course contained in the syllabus stated that the student will:

- receive sufficient instruction in the techniques of walking,
- be encouraged and desire to participate in walking in varied settings outside the university setting

- develop the knowledge necessary for self-evaluation of nutrition and walking, and
- be able to develop a health goal plan for their lifestyle.

The general format of the course included walking a maximum of three times per week for approximately forty minutes. Although the class did convene for a total of 50 minutes three times per week, attendance monitoring and other diversions rendered it impossible to utilize the entire 50 minute period. Additionally, instructional class periods in nutrition and fitness detracted from the amount of time used for actual walking. The university-scheduled fall break eliminated two class periods. The testing completed by the researcher also delayed the beginning of the intervention. In total, 11 weeks were allowed between the last pre-test day and the first post-test day.

Students were not asked to walk at a specific pace. They did not record their rate of perceived exertion or heart rate during the class. Attendance was often taken before and after class to help

insure participation. Attendance comprised approximately 50% of the students' grades. Average attendance was 84% for those persons who remained in the class. This was calculated from 32 class sessions from August 31 to November 18. The students completed, in addition to the researchers' measures, four timed one-mile walks and recorded their end time and heart rate. Fourteen weeks was allowed between the application of the pre-test and the post-test (questionnaire) for the control group and the experimental group.

F. DATA COLLECTION

Trained laboratory assistants assisted with exercise tests. All had satisfactorily completed a laboratory class in preparation for the Health Fitness Instructor (HFI) examination offered by the American College of Sports Medicine. Covered in the curriculum were correct measurement of skinfolds, abdominal endurance (sit-ups), hamstring and lower back flexibility (sit and reach), and cardiovascular fitness estimation tests, including the Rockport Fitness Walking Test. Additionally, the researcher

obtained Health Fitness Instructor certification from ACSM. The researcher also assisted with the measurement of skinfolds for another activity class in the department two months prior to the beginning of this research study.

The following tests were administered:

Abdominal muscular endurance: The sit-up was completed in the gym on an exercise mat. The use of student partners to hold ankles and count repetitions was utilized. The researcher instructed students to hold the ankles. The person completing the sit-ups was asked to cross arms in front of them. The counter was instructed that one sit-up should include arms reaching to touch thighs and shoulder blades lowering to the mat. They were asked to only rest in the "up" position and to exhale as they raised to a sitting position. The instructor used a stop watch to time one minute saying "ready-go" and "stop." The number of sit-ups completed in one minute was recorded by the student or by his/her partner. The positions were then reversed and the process repeated.

Flexibility: The sit and reach test was used to determine lower back and hamstring flexibility, utilizing a standard sit and reach box (ACSM, 1993). The student sat on the floor, removed his/her shoes, and placed his/her feet flat against the box. The arms were extended and the student was asked to reach along the box as far as possible. The measurer placed hands over the thigh to insure that the knees did not raise. No warm-up period or stretching was done prior to the administration of this test. Two measures were taken, and a third was taken if the first two differed. The final measure was recorded on the students' fitness data sheet.

Cardiovascular fitness: The Rockport One-Mile Walk Test was utilized to measure cardiovascular fitness. This test consisted of walking seven and one-half laps (one mile) on the arena concourse. Subjects were instructed to set a brisk pace and were not allowed to run at any time. In addition, they were instructed to measure their pulse for fifteen seconds directly following completion of the last

lap. At the completion of the test the time (min:sec) was recorded as well as the heart rate.

Body composition: Skinfold measurements were used to provide an estimate of percent body fat. Measurements were taken by two persons who were certified ACSM Health Fitness Instructors. The Lange skinfolds caliper was used. Four locations were measured on the right side, including:

Biceps: A vertical fold taken on the anterior aspect of the arm over the belly of the biceps muscles, 1 cm above the level used to mark the triceps

Subscapular: An angular fold taken at a 45 degree angle 1-2 cm below the inferior angle of the scapula

Suprailium: An oblique fold taken in line with the natural angle of the iliac crest taken in the anterior axillary line immediately superior to the iliac crest

Triceps: A vertical fold on the posterior midline of the upper right arm, halfway between the acromion and olecranon processes, with the

arm held freely to the side of the body (ACSM, 1993).

The caliper was placed 1 cm away from the thumb and finger perpendicular to the skinfold and half way between the crest and the base of the fold. The pinch was maintained while reading the caliper, after waiting 1-2 seconds prior to reading. The four measures were then placed into a prediction equation of body fat (Durnin and Wormsley, 1974)

G. ANALYSIS OF DATA

The pre and post-training PRN Monograph (PSPP and PIP) was scored for both control and experimental groups as described by the authors (Fox, 1990). The hand scoring was completed using answer "keys" which assigned a value based on whether the question was on a normal scale (1-4 left to right), or a reversal scale (4-1 left to right). The scores were then input into the Lotus Spreadsheet, which added each fifth score into a subdomain category. The Perceived Importance Profile (PIP) was scored in the same manner. Every

fourth item was included in the score of a subdomain.

The means and standard deviations for each of the subdomains of the PSPP and PIP were calculated based on assignment to one of four groups: 1) male experimental subject, 2) female experimental subject, 3) male control subject, 4) female control subject. Likewise, means and standard deviations for the four physical fitness tests were calculated for experimental subjects based on gender.

A correlation analysis was performed between the pre-test psychological data and physical data, between the post-test psychological data and physical data, and between changes in physical data and changes in psychological data. Additionally, after controlling for differences already existing between the control and experimental groups on the pre-test PSPP and PIP, the two groups were tested for significant differences on the post-test. Finally, the experimental groups physical fitness data was examined for significant pre-test to post-test changes.

CHAPTER FOUR

RESULTS OF THE STUDY

A. INTRODUCTION

The purpose of this study was to determine if any changes occurred in health-related components of physical fitness during a sixteen week walking course at a university campus in the Southeast. In addition, the study noted both the changes which occurred in the student's perception of his/her fitness level as assessed by questionnaire, and the relationship between actual fitness and perceived fitness level.

The results will be presented in three sections:

1. Pre-Program Analysis
2. Post-program Analysis
3. Comparative Analysis

Descriptive statistics were computed for all data. Additionally, correlations were computed between objective and subjective measures of physical fitness. Two-tailed t-tests were also computed to probe for differences in pre and post training

physical data. An f-test was used to control for differences between the groups of the pre-test PSPP and PIP subscales, and then evaluate the significance of the differences on the post-test.

B. RESULTS OF THE STUDY

1. PRE-PROGRAM ANALYSIS

The subjective measure of physical fitness (PSPP and PIP) results are shown in Table 4.1. The range for each PSPP subscale is 1-32, while for each PIP subscale the possible range is 1-8. Means and standard deviations based on assignment to group are shown in Table 4.1. Likewise, the objective measures of physical fitness were analyzed for means and standard deviation. The results are shown in Table 4.2.

Pearson correlations were conducted to examine relationships between the psychological measures (PSPP and PIP subscales) and physical measures. Only the female experimental subjects were used in correlational analysis, due to small sample size of the male experimental group. For each analysis, a different number of subject scores were correlated,

dependent upon the number of subjects completing each individual fitness test. This is indicated by the n value present at the top of each column in Table 4.3. The analysis revealed significant correlations for the following: Rockport Walking Test and Sport Competence ($p<.01$), Percent Body Fat and Body Attractiveness ($p<.01$), Sit-ups and Sport Competence ($p<.05$), Rockport Walking Test and Sport Importance ($p<.05$), and Sit-ups and Sport-Importance.

2. POST-PROGRAM ANALYSIS

The post-program data were analyzed in a similar manner. Mean and standard deviations were calculated for both the objective and subjective measures of fitness, based on assignment to group. The results of the PSPP and PIP analysis are shown in Table 4.4. Male experimental subjects are excluded, however, due to inadequate sample size. The objective measures of fitness are displayed in Table 4.5.

In Table 4.6 correlations between physical measures and the PSPP and PIP subscales are

displayed. As with the pre-test data, there is a significant correlation between: Rockport Walking Test and Sport Competence ($p<.05$), Sit-ups and Sport Competence ($p<.05$), and Percent Body Fat and Body Attractiveness ($p<.01$). Additionally, significant correlations were found between: Rockport Walking Test and Physical Condition ($p<.05$), Rockport Walking Test and Physical Strength ($p<.05$), Sit-ups and Physical Condition ($p<.05$), Sit-ups and Physical Self-Worth ($p<.05$), Sit and Reach and Physical Condition ($p<.05$), Percent Body Fat and Sport Competence ($p<.05$), Percent Body Fat and Physical Self-Worth ($p<.05$), and Sit and Reach and Strength Importance ($p<.05$).

3. COMPARATIVE ANALYSIS

Table 4.7 displays PSPP and PIP means and standard deviations for both the control and experimental groups. Only female subjects were utilized in this analysis, due to the inadequate number of male experimental subjects. An f-test was used to control for differences between the groups on the pre-test and then evaluate the significance

of the differences in means on the post-test. It was found that significant differences existed between control and experimental subjects on the post-test for two subdomains: physical condition ($p<.05$) and body attractiveness ($p<.01$). These differences were not realized for the other two subdomains of the PSPP (sport competence and physical strength), nor for the global measure, physical self-worth. Likewise, the subdomains of the PIP showed no significant differences between groups.

Pre-test and post-test physical data were analyzed for mean and standard deviation. The results of this analysis for male experimental subjects is displayed in Table 4.8. The sample size prevented evaluation of pre-test to post-test changes for significance. Table 4.9 displays pre-test and post-test means and significant differences for female experimental subjects. For the female subjects only a t-test for paired samples was conducted. A significant relationship was found between pre-test and post-test Rockport Time

($p<.05$). There was a significant difference between the pre-test and post-test means ($p<.01$). A significant relationship between pre-test and post-test sit-up score was revealed ($p<.05$), with a significant difference between the mean scores ($p<.05$). The sit and reach revealed a significant relationship between pre-test and post-test scores ($p<.01$), with no significant difference between the means. Percent body fat revealed a significant relationship between pre-test and post-test values ($p<.01$), and significant difference in means ($p<.05$).

Table 4.10 displays correlations among changes in objective measures and changes in subjective measures. These analyses included only female subjects. A significant correlation was shown among the following: Sit-up Score and Physical Condition ($p<.05$), Sit-up Score and Sport Importance ($p<.05$), Sit and reach and Physical Strength ($p<.05$), and Percent Body Fat and Sport Competence ($p<.05$).

Table 4.1. *Group means and standard deviations for pre-test PSPP and PIP subscale scores, based on assignment to control or experimental groups.*

	Experimental						Control					
	Males (n=3)			Females (n=28)			Males (n=13)			Females (n=21)		
	Mean	±	SD	Mean	±	SD	Mean	±	SD	Mean	±	SD
PSPP subscales												
Sport	12.67	±	1.53	9.75	±	3.11	15.62	±	2.90	12.00	±	4.89
Phys Condition	13.67	±	2.31	10.46	±	3.19	14.39	±	3.69	12.00	±	3.45
Body Attract	10.33	±	0.58	9.86	±	3.15	14.08	±	2.50	10.48	±	3.49
Phys Strength	12.67	±	4.62	11.04	±	3.05	13.62	±	2.40	12.95	±	3.93
PSW	11.67	±	2.08	10.29	±	2.71	15.62	±	2.84	11.52	±	3.93
PIP subscales												
Sportimp	6.33	±	1.16	4.04	±	1.50	6.54	±	1.45	4.81	±	2.25
Conditimp	5.33	±	1.16	5.79	±	1.87	5.92	±	1.38	5.67	±	1.71
Bodyimp	6.00	±	1.00	6.43	±	1.29	5.85	±	1.35	5.71	±	1.15
Strengthimp	5.00	±	1.00	5.79	±	1.52	6.00	±	1.29	5.52	±	1.99

Table 4.2. *Mean pre-test physical fitness scores for the experimental subjects.*

	Males				Females			
	n	Mean	±	SD	n	Mean	±	SD
Rockport Time	4	13:02	±	1:07	27	14:42	±	1:34
Sit-ups	4	39.75	±	4.03	26	28.42	±	7.46
Sit and Reach	2	18.00	±	7.07	20	18.95	±	2.11
Percent Body Fat	4	21.13	±	9.84	25	30.10	±	7.22

Table 4.3. *Correlation among pre-test PSPP and PIP subscale scores and physical data.*

	Physical Measures			
	Rockport (n=27)	Sit-ups (n=26)	Sit & Reach (n=20)	% Body Fat (n=25)
PSPP				
Sport	-0.50 **	0.46 *	0.24	-0.30
Phys Condition	-0.32	0.36	0.22	-0.19
Body Attract	-0.23	-0.02	0.08	-0.52 **
Phys Strength	0.08	0.04	0.12	-0.12
PSW	-0.15	0.03	0.13	-0.28
PIP				
Sportimp	-0.44 *	0.49 *	0.09	-0.07
Conditimp	0.11	0.27	0.30	-0.09
Bodyimp	-0.43 *	0.32	0.30	-0.38
Strengthimp	-0.27	0.17	0.34	0.02

**p<0.01, *p<0.05

Table 4.4. *Group means and standard deviations for post-test PSPP and PIP subscale scores based on assignment to control or experimental groups.*

	Experimental						Control					
	Males (n=1)			Females (n=13)			Males (n=6)			Females (n=16)		
	Mean	±	SD	Mean	±	SD	Mean	±	SD	Mean	±	SD
PSPP subscales												
Sport	***	±	***	12.33	±	3.72	18.83	±	3.60	15.50	±	4.89
Phys Condition	***	±	***	15.33	±	4.76	17.50	±	2.35	14.31	±	4.18
Body Attract	***	±	***	13.47	±	4.24	17.00	±	1.41	11.81	±	4.52
Phys Strength	***	±	***	13.93	±	3.35	18.17	±	2.04	16.31	±	3.68
PSW	***	±	***	13.53	±	3.87	18.17	±	2.56	13.50	±	4.34
	***		***									
PIP subscales	***		***									
Sportimp	***	±	***	4.20	±	1.74	5.83	±	1.17	5.06	±	2.14
Conditimp	***	±	***	6.13	±	1.55	6.17	±	1.17	5.19	±	1.87
Bodyimp	***	±	***	6.07	±	1.16	5.83	±	1.33	5.50	±	1.63
Strengthimp	***	±	***	5.53	±	0.99	6.00	±	1.10	5.44	±	1.59

*** Inadequate sample size.

Table 4.5. *Mean post-test physical fitness scores for the experimental subjects.*

	Males				Females			
	n	Mean	±	SD	n	Mean	±	SD
Rockport Time	3	11:23	±	0:54	27	13:33	±	1:32
Sit-ups	4	37.50	±	5.80	15	29.33	±	6.76
Sit and Reach	3	20.33	±	5.69	15	19.20	±	2.98
Percent Body Fat	4	16.03	±	8.13	15	30.67	±	6.48

Table 4.6. *Correlation among post-test PSPP and PIP subscale scores and physical data.*

	Physical Measures			
	Rockport (n=13)	Sit-ups (n=13)	Sit & Reach (n=12)	% Body Fat (n=12)
PSPP				
Sport	-0.58 *	0.66 *	0.41	-0.71 *
Phys Condition	-0.74 **	0.68 *	0.60 *	-0.52
Body Attract	-0.34	0.57 *	0.17	-0.91 **
Phys Strength	-0.68 *	0.45	0.51	-0.16
PSW	-0.48	0.60 *	0.37	-0.68 *
PIP				
Sportimp	-0.37	0.49	0.22	-0.41
Conditimp	-0.22	0.29	0.37	-0.33
Bodyimp	-0.06	0.38	0.29	-0.30
Strengthimp	-0.33	0.39	0.65 *	-0.06

**p<0.01, *p<0.05

Table 4.7. *Pre-test and post-test PSPP and PIP subscale means and standard deviations for female subjects, based on assignment to control or experimental groups.*

	Experimental (n=15)						Control (n=16)					
	Pre			Post			Pre			Post		
	Mean	±	SD	Mean	±	SD	Mean	±	SD	Mean	±	SD
PSPP subscales												
Sport	9.93	±	3.52	12.33	±	3.72	12.50	±	4.21	15.50	±	4.90
Phys Condition	10.60	±	3.50	15.33	±	4.76	12.00	±	2.61	14.31	±	4.18
Body Attract	9.67	±	3.40	13.47	±	4.24	10.31	±	3.42	11.81	±	4.52
Phys Strength	10.73	±	2.74	13.93	±	3.35	13.06	±	3.57	16.31	±	3.68
PSW	10.40	±	2.85	13.53	±	3.87	11.25	±	3.70	13.50	±	4.34
PIP subscales												
Sportimp	4.13	±	1.46	4.20	±	1.74	5.06	±	2.08	5.06	±	2.14
Conditimp	6.00	±	2.17	6.13	±	1.55	5.75	±	1.77	5.19	±	1.87
Bodyimp	6.40	±	1.40	6.07	±	1.16	5.81	±	1.22	5.50	±	1.63
Strengthimp	5.80	±	1.57	5.53	±	0.99	5.75	±	1.61	5.44	±	1.59

Table 4.8. *Comparison of pre-test and post-test mean physical data for male experimental subjects.*

		Pre			Post		
	n	Mean	±	SD	Mean	±	SD
Rockport	3	12:42	±	1:05	11:23	±	0:54
Sit-ups	4	39.75	±	4.03	37.50	±	5.80
Sit and Reach	2	18.00	±	7.07	18.00	±	5.66
% Body Fat	4	21.13	±	9.84	16.03	±	8.13

Table 4.9. *Comparison of pre-test and post-test mean physical data for female experimental subjects.*

		Pre			Post		
	n	Mean	±	SD	Mean	±	SD
Rockport	16	14:55	±	1:26	13:33	±	1:32
Sit-ups	14	25.86	±	7.17	30.29	±	5.88
Sit and Reach	11	18.18	±	1.89	18.00	±	2.28
% Body Fat	15	31.20	±	6.10	30.67	±	6.48

Table 4.10. *Correlation among changes in PSPP and PIP subscale scores and changes in physical data.*

	Physical Measures			
	Rockport (n=13)	Sit-ups (n=12)	Sit & Reach (n=9)	% Body Fat (n=12)
PSPP				
Sport	-0.02	-0.33	0.55	-0.59 *
Phys Condition	-0.53	0.68 *	0.08	0.20
Body Attract	-0.02	0.36	0.33	-0.48
Phys Strength	-0.27	0.43	0.78 *	-0.08
PSW	-0.29	0.13	0.53	-0.26
PIP				
Sportimp	0.50	0.68 *	-0.24	-0.21
Conditimp	-0.05	0.36	-0.01	0.10
Bodyimp	0.18	-0.32	-0.64	0.34
Strengthimp	0.33	0.00	0.04	0.20

**p<0.01, *p<0.05

Figure 4.1. *Changes in mean sport competence score for female experimental and control subjects.*

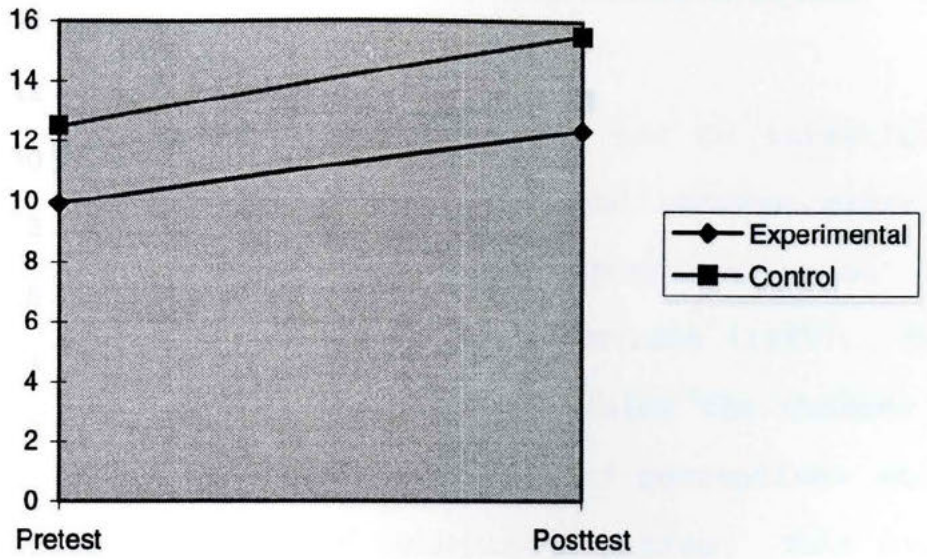


Figure 4.2. *Changes in mean physical condition score for female experimental and control subjects.*

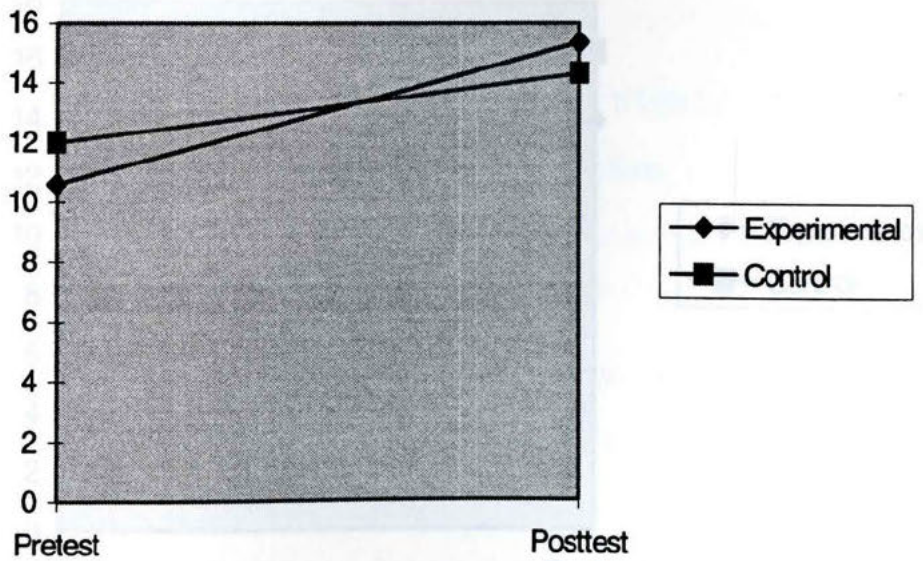


Figure 4.3. *Changes in mean body attractiveness score for female control and experimental subjects.*

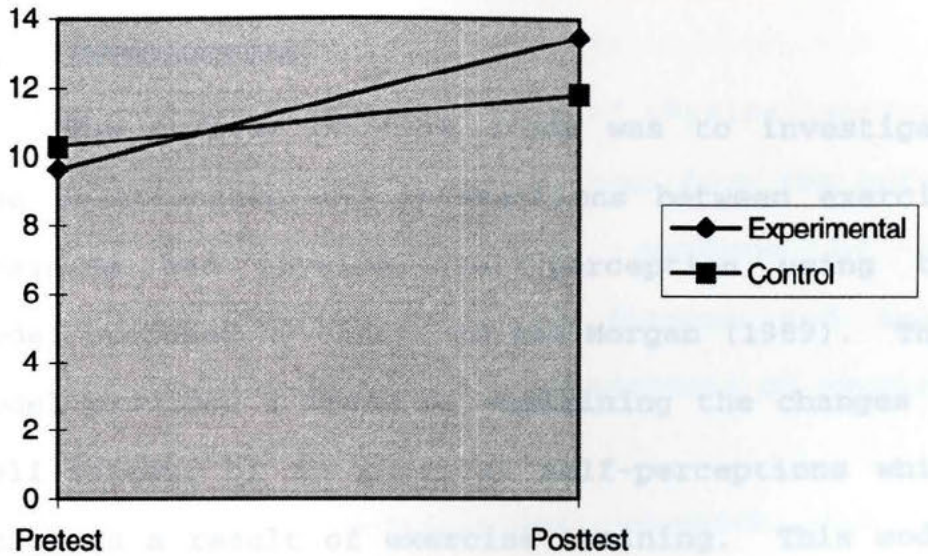
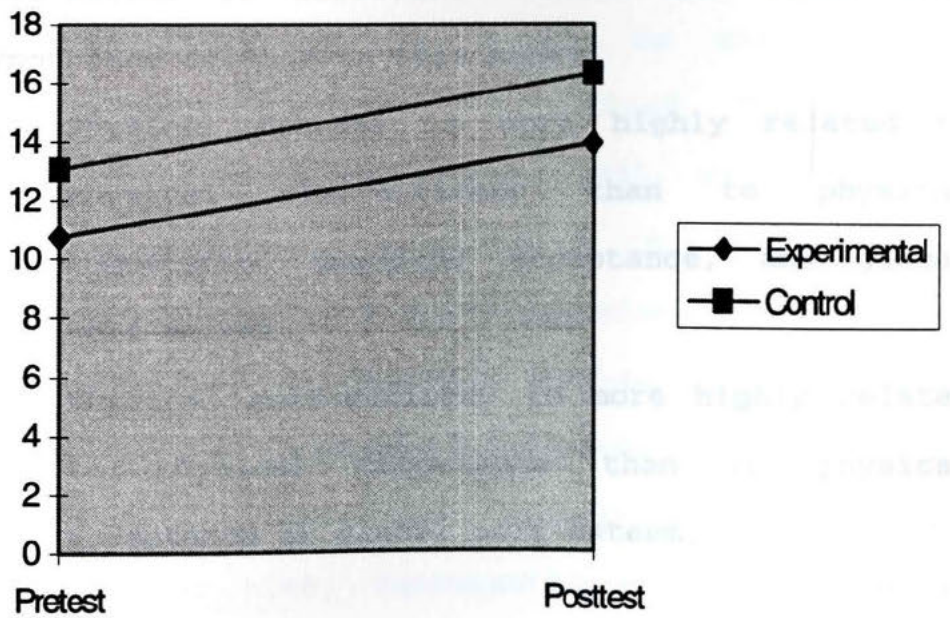


Figure 4.4. *Changes in mean physical strength score for female control and experimental subjects.*



CHAPTER FIVE

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

A. INTRODUCTION

The purpose of this study was to investigate the relationship and interactions between exercise training and physical self-perception using the model proposed by Sonstroem and Morgan (1989). This model provides a means of explaining the changes in self-esteem, or in physical self-perceptions which occur as a result of exercise training. This model proposes a chain reaction, with each chain influencing the factor above it, and so on, until self-esteem is affected. There are three main hypotheses related to this model:

A. Physical fitness is more highly related to physical self-efficacy than to physical competence, physical acceptance, and global self-esteem.

B. Physical self-efficacy is more highly related to physical competence than to physical acceptance or global self-esteem.

C. Physical competence is more highly related to global self-esteem than is physical self-efficacy or physical fitness.

Research investigating the role of physical activity in changing self-esteem cannot jump from the bottom echelon to the top. Thus, analysis of the relationship between physical fitness and self-efficacy is more useful than an analysis of physical fitness and self-esteem.

Although this particular research did not examine physical self-efficacy, it did examine physical competence, the next level above physical self-efficacy. Additionally, the intervention element, shown in the model, as well as the intervening time element are utilized. The Physical Self-Perception Profile (Fox, 1990) was chosen to represent physical competence in this model. This scale contains both a multidimensional element with four subscales of physical self-perception, and a global measure of physical self-worth (Appendix C).

Physical tests chosen to measure the change in fitness over time, represented at the bottom of

Sonstroem's model, were based upon the four health-related components of fitness: aerobic capacity, abdominal muscular endurance, flexibility, and body composition. The intervention included twelve weeks of walking. Thus, the research was designed to investigate the lower elements of the model. For instance, if physical fitness was altered successfully across time, through training intervention, would the effects be realized in the higher elements? The only element investigated in the case is physical competence. The knowledge gained from this inquiry should contribute to the overall body of knowledge, and either support the Sonstroem-Morgan model, or aid in formation of a new model.

B. DISCUSSION OF THE RESULTS

1. PRE-PROGRAM ANALYSIS

In validation of the PRN Monograph, Fox and Corbin utilized college-aged persons at a university in Illinois attending required general education English and communications classes. The mean scores from this sample, divided into three groups (A, B, &

C) provided some normative data for comparison with the control and experimental subjects in the current investigation. The group means in Table 4.1 reveal that the experimental female subjects (n=28) show a devaluation of self in comparison to subjects in Fox's Sample B (n=175). For instance, with regard to sport competence, female experimental subjects revealed a mean of 9.75 in comparison to Sample B, with a mean of 14.49. Female control subjects revealed a mean of 12.00 (n=21). Other subscales reveal similar differences.

Male subjects showed a similar contrast to Fox's validation subjects. For sport competence (n=3), experimental subjects mean score was 12.67. Control subjects mean score of 15.62 was much higher (n=13). However, the Sample B in the validation population showed a mean score of 17.24 (n=180). Again for body attractiveness, the experimental male subjects revealed a mean score of 10.33 for body attractiveness in contrast to controls (mean-14.08), and the validation group (mean=14.91).

It should be noted that the sample size is much smaller in the current investigation, particularly for male experimental subjects. Fox also used a difference type of university course (general education) and a different geographical area. If one looks at another sample included in Fox's research (Sample D), the differences are not so pronounced. This sample was pulled from a group of students at a college in Missouri. These students were enrolled in required general education health-related fitness classes. Overall their scores are lower, and closer to the sample currently under investigation. For example, the mean score for female subjects in Sample D (n=150) for sport competence was 13.4. This is much closer to the mean shown in our female experimental subjects (9.75), than the mean of 14.49 shown in Sample B. However, based on the normative data provided by Fox, there is a devaluation of self by both experimental and control subjects prior to any intervention.

Table 4.2 reveals that male subjects are in the above average to high fitness category overall for the Rockport Fitness Walking Test (Rockport, 1989), while females are in the above average category. For males, the timed sit-ups score of 39.75 places them in the poor category (Gelder, 1987). Females, with a mean score of 28.42, fall in the very poor category. Both males and females fall overall in the minimum category for flexibility (Gelder, 1987). Additionally, for percent body fat, both groups fall in the potential risk category (Howley, 1992). Males show a mean percent of 21.13 (n=4), in comparison to the average college male with a percent of 15 (Gelder, 1987). Females how a mean percent body fat of 30.10, which is higher than the average college female with a percent of 25 (Gelder, 1987).

With regard to the investigation of the relationship between actual physical fitness and perceived level of fitness, there was some preliminary support for the Sonstroem-Morgan model.

Percent Body Fat and Body Attractiveness were strongly related ($p<.01$).

In summary, pre-test data analysis revealed a devaluation of self by experimental subjects. The experimental subjects overall scored themselves the lowest of the three groups and the validation sample the highest, with control subjects falling midway. Experimental subjects showed a low fitness level for: abdominal muscular endurance, flexibility, and body composition. Both fitness testing scores and PSPP and PIP subscale scores reveal that persons enrolled in the university's fitness walking class might benefit from efforts to increase both fitness and estimation of their own fitness level, as both are below normative data (Fox, 1990, Gelder, 1987, Howley, 1992, Rippe, Ward, & Dougherty, 1989).

2. POST-PROGRAM ANALYSIS

As shown in Table 4.6, the post-program correlational analysis between objective and subjective measures provides support for the Sonstroem-Morgan model. There were a greater number of significant relationships on the post-program

analysis. Many of these correlations were shown among the same variable as the pre-program analysis. Namely: Rockport Walking Test and Sport Competence ($p<.05$), Sit-ups and Sport Competence ($p<.05$), and Percent Body Fat and Body Attractiveness ($p<.01$). The increased occurrence of correlation may have several roots. The researcher's accuracy may have improved between pre-test and post-test administration of physical tests and the differing samples may have played a key role. Participation in regular exercise may have increased the students' ability to assess fitness level. In any case, a larger sample size, would be useful, as would more precise cardiovascular, strength, percent body fat, and flexibility tests.

3. COMPARATIVE ANALYSIS

The PSPP and PIP means and standard deviations for control and experimental groups were analyzed using an f-test to control for differences already present between the groups on the post-test. The groups were than analyzed for significant post-intervention differences, revealing significant

differences of two of the PSPP subscales: physical condition ($p<.05$) and body attractiveness ($p<.01$). There were no differences for the remaining PSPP subscales, nor for the PIP subscales. This is clearly displayed in figure 4.1, 4.2, 4.3, and 4.4. In figure 4.2 and 4.3, the experimental subjects' mean score was lower than that of the control subjects on the pre-test. They did, however, surpass the control subjects on the post-test. The same occurs for body attractiveness. As shown in figures 4.1 and 4.4, this did not occur for sport competence and physical strength. This may have been a result of the nature of the intervention. Namely, the improvements in physical condition and the decrease in percent body fat may have resulted from the walking program. Physical strength and sport skills, in contrast, require a specific training program. The PIP subscale values remained stable for both control and experimental subjects from pre-test to post-test.

Table 4.8 displays the pre-test and post-test physical data for male experimental subjects.

Although the sample size is inadequate for statistical analysis, we do see an overall improvement in physical fitness status, with the exception of flexibility and abdominal muscular endurance. Data for female subjects is shown in table 4.11. The t-test for paired samples revealed significant pre-test to post-test changes for all tests except flexibility. Neither males nor females were able to change their overall category of fitness, with the exception of one physical test. Males improved, on average from the potential risk to the fitness category for percent body fat (Howley & Franks, 1992).

Data analysis revealed highly significant differences between pre-test and post-test Rockport Walk time (p=.001). This is logical, given the intervention of twelve weeks of walking. Additionally, walking is an effective means of burning calories, which could potentially lead to weight loss (Howley & Franks, 1992). This is reflected in the change in percent body fat (p=.014). Also, although abdominal muscular

endurance was not a course objective, the abdominal muscles are postural muscles, and are recruited to some degree with walking. This could help to explain the significant difference in pre-test and post-test sit-ups score ($p=.015$). An additional possibility is that one healthy habit (walking) led to other healthy habits for some students such as improved diet and/or strength training.

Table 4.10 displays correlations among changes in objective measures (fitness testing) and changes in subjective measures (questionnaire). A significant correlation was shown among the following: Sit-up Score and Physical Condition ($p<.05$), Sit-up Score and Sport Importance ($p<.05$), Sit and Reach and Physical Strength ($p<.05$), and Percent Body Fat and Sport Competence ($p<.05$). The sit and reach and physical strength correlation may be a result of outside factors, as the paired samples t-test revealed no significant change in flexibility scores. The Sit-up and Sport Importance correlation may be a result of increased competitiveness resulting in a an improved score.

Students may have believed they needed to improve the number of sit-ups completed from the pre-test to the post-test. The relationship of sit-ups to physical condition could follow from inclusion of abdominal muscular endurance as a logical component of physical fitness. The relationship between percent body fat change and sport competence might reveal that students associate athleticism with leanness.

Surprisingly, no significant relationship was found between Rockport time changes and physical condition or other PSPP subdomains. This is despite the fact that the Rockport time did change significantly from pre-test to post-test. It is possible that the female subjects who did not complete the questionnaire, but were able to complete many of the physical tests, altered the outcome of these correlations.

C. SUMMARY OF THE RESULTS

In summary, the results of the study indicated that:

1. There was a significant difference in pre and post cardiovascular endurance, as measured by the Rockport Fitness Walking Test Time.
2. There was a significant difference in pre and post abdominal muscular endurance, as measured by a one-minute timed sit-ups test.
3. There was a significant improvement in body composition following the training, as measured by skinfolds measurement.
4. Some relationship existed between objective measures of physical fitness and subjective measures (physical self-perception) for the following:
   a) Rockport Walk Time and physical condition (pre-test only)
   b) Percent Body Fat and Body Attractiveness (pre-test and post-test only)

The study failed to show any relationship between sit-ups and perceived physical strength. Additionally, the correlation between changes in physical fitness tests and changes in the psychological measures failed to prove any

relationship between percent body fat and body attractiveness, and between physical condition and Rockport Walk Time.

D. CONCLUSION

From the results of the findings of the study, the following conclusions were made:

1. There were changes in health-related fitness. Specifically, a significant difference was seen between the pre-test sit-ups scores and the post-test sit-ups scores (p=.015). Additionally, as significant change in Rockport Walk Time occurred (p=.001), and in percent body fat (p=.014).
2. There were changes in perceived level of fitness, as shown by the mean scores displayed in Figures 4.1-4.4.
3. There was a relationship between perceived and actual level of fitness as shown by both the pre-test, post-test, and changes from pre-test to post-test correlations (Table 4.3, 4.6, and 4.10).

4. There was a significant difference between the self-perception scores of the control group and those of the walking course participants following a twelve-week fitness walking intervention for two of the four PSPP subscales: physical condition (p=.017) and body attractiveness (p=.001).

E. RECOMMENDATIONS

From the results of this research, the following points are recommended for future research:

1. Similar investigations should be conducted with other fitness-related courses. This would allow goals of the each course to be adjusted based on physical self-perception and actual physical data. For example, as shown with the walking course, participants are in a "potential risk" category for percent body fat. Reduction of this risk should thus be included as a course objective.
2. The Rockport Fitness Walking Test should be used in future research, as it was shown to be a useful reflection of general cardiovascular

endurance. Additionally, larger populations could be examined using this and other field tests, such as a one-minute timed sit-up test.

3. Percent body fat analysis should be included as a physical measure in future investigations. It correlated highly with the student's perception of his/her body attractiveness (Tables 4.3 and 4.6).
4. Flexibility should be included if, and only if, it is a goal of the intervention.
5. The physical self-perception profile should be used in further research with college populations, as it has been validated specifically with this population. If at all possible, a short form should be developed to expedite data collection.
6. A validation of the PSPP and PIP for use in other populations, particularly older persons, would be of benefit.
7. Recommendations for the use of a control group include:

a) excluding those persons with an exercise level of three times per week or greater during the intervention period, and

b) administering all physical tests to the control group, both prior to and following the intervention.

8. Recommendations for the experimental group include:

a) use of an activity/attendance log to control for persons who do not attend class regularly, and

b) recording of RPE, HR, and duration of in-class walking sessions

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APPENDIX A

APPENDIX A

CONFIDENTIALITY STATEMENT FOR PROVOST RESEARCH
FALL, 1994

As indicated by my signature below, I understand that all data obtained from the Physical Self-Perception Profile will be reviewed completely by both the researcher and his/her assistants. In addition, I understand that the researcher and his/her assistants will consider these results confidential to the extent permitted by law. The results will not be identified as pertaining to me without my expressed permission.

_____ _____

Date Signature of Participant

_____ _____

Date Signature of Witness

APPENDIX B

INFORMED CONSENT FOR PROVOST RESEARCH
FALL, 1994

Purpose of Study:
The purpose of this study is to document the changes which occur n self-reported level of fitness, as analyzed in questionnaire form, during a 12-week walking class held on the University of Tennessee at Chattanooga campus.

Procedures:
In order to qualify for participation, students must be between the ages of 18 and 22, and enrolled in the above mentioned course. The following tests will be administered:

Rockport Fitness Walking Test: Students will be asked to complete a one-minute timed walking test, which will provide an estimate of their cardiovascular fitness level.
1-minute Timed Sit-ups Test: Students will be asked to complete as many sit-ups in one minute as possible, as an estimate of abdominal muscular endurance.
Sit-and-Reach Test: Students will be asked to complete the sit and reach test as an estimate of hamstring and lower-back flexibility.
Skinfold Measurements: Students will be asked to allow several body sites to be measured by skinfold calipers, as an estimate of percent body fat.

Risks and Discomforts:
During the Rockport Fitness Walking Test, there exists a possibility of certain changes occurring during the test. They include abnormal blood pressure, fainting, disorder of blood pressure, fainting, disorder of heart beat, nd in rare instances, heart attack, stroke, or death. However, every effort will be made to minimize these risks by evaluation of health data provided by the student, and by presence of trained personnel throughout the testing procedures. As a participant, it is

requested that you report any information you possess about your health status or previous experiences of unusual feelings with physical effort which might affect the safety and value of the testing. In additional, please promptly report any feelings of discomfort you experience during the testing.

Benefits to Be Expected:
It is expected that the data obtained will allow you to chart your own progress throughout this walking course. By comparing results obtained at the beginning of the course with those obtained at the conclusion, personal progress is easily noted. In additional, the data obtained from the entire class will allow the university to assess the effectiveness of this course.

Confidentiality:
Your consent to participation in this study includes consent for the investigator and his/her assistants to review all of your medical records as may be necessary for the purposes of this study. The investigator and his/her assistants will consider your records confidential to the extent permitted by law. Your records and results will not be identified as pertaining to you without your expressed permission.

Right to Withdraw:
Your permission to perform this exercise test is voluntary. You are free to deny consent or stop the test at any point, if you so desire. Any questions about the procedures used in the exercise test are encouraged. You may contact the researcher, Kristin Connell, by phone at (615) 877-1297.

_____ _____

Date Signature of Participant

_____ _____

Date Signature of Witness

APPENDIX C

THE PHYSICAL SELF PERCEPTION PROFILE (PSPP)

WHAT AM I LIKE?

These are statements which allow people to describe themselves.
There are no right or wrong answers since people differ a lot.

First, decide which one of the two statements best describes you.

Then, go to that side of the statement and check if it is just "sort of true" or "really true" FOR YOU.

Really True for Me	Sort of True for Me	EXAMPLE			Sort of True for Me	Really True for Me
☐	☐	Some people are very competitive	BUT	Others are not quite so competitive	☒	☐

REMEMBER to check only ONE of the four boxes

1.	☐	☐	Some people feel that they are not very good when it comes to playing sports	BUT	Others feel that they are really good at just about every sport	☐	☐
2.	☐	☐	Some people are not very confident about their level of physical conditioning and fitness	BUT	Others always feel confident that they maintain excellent conditioning and fitness	☐	☐
3.	☐	☐	Some people feel that compared to most, they have an attractive body	BUT	Others feel that compared to most, their body is not quite so attractive	☐	☐
4.	☐	☐	Some people feel that they are physically stronger than most people of their sex	BUT	Others feel that they lack physical strength compared to most others of their sex	☐	☐
5.	☐	☐	Some people feel extremely proud of who they are and what they can do physically	BUT	Others are sometimes not quite so proud of who they are physically	☐	☐
6.	☐	☐	Some people feel that they are among the best when it comes to athletic ability	BUT	Others feel that they are not among the most able when it comes to athletics	☐	☐

	Really True for Me	Sort of True for Me			Sort of True for Me	Really True for Me
7.	☐	☐	Some people make certain they take part in some form of regular vigorous physical exercise	BUT	Others don't often manage to keep up regular vigorous physical exercise	☐ ☐
8.	☐	☐	Some people feel that they have difficulty maintaining an attractive body	BUT	Others feel that they are easily able to keep their bodies looking attractive	☐ ☐
9.	☐	☐	Some people feel that their muscles are much stronger than most others of their sex	BUT	Others feel that on the whole their muscles are not quite so strong as most others of their sex	☐ ☐
10.	☐	☐	Some people are sometimes not so happy with the way they are or what they can do physically	BUT	Others always feel happy about the kind of person they are physically	☐ ☐
11.	☐	☐	Some people are not quite so confident when it comes to taking part in sports activities	BUT	Others are among the most confident when it comes to taking part in sports activities	☐ ☐
12.	☐	☐	Some people do not usually have a high level of stamina and fitness	BUT	Others always maintain a high level of stamina and fitness	☐ ☐
13.	☐	☐	Some people feel embarrassed by their bodies when it comes to wearing few clothes	BUT	Others do not feel embarrassed by their bodies when it comes wearing few clothes	☐ ☐
14.	☐	☐	When it comes to situations requiring strength some people are one of the first to step forward	BUT	When it comes to situations requiring strength some people are one of the last to step forward	☐ ☐
15.	☐	☐	When it comes to the physical side of themselves some people do not feel very confident	BUT	Others seem to have a real sense of confidence in the physical side of themselves	☐ ☐
16.	☐	☐	Some people feel that they are always one of the best when it comes to joining in sports activities	BUT	Others feel that they are not one of the best when it comes to joining in sports activities	☐ ☐

	Really True for Me	Sort of True for Me			Sort of True for Me	Really True for Me
17.	☐	☐	Some people tend to feel a little uneasy in fitness and exercise settings	BUT	Others feel confident and at ease at all times in fitness and exercise settings	☐ ☐
18.	☐	☐	Some people feel that they are often admired because their physique or figure is considered attractive	BUT	Others rarely feel that they receive admiration for the way their body looks	☐ ☐
19.	☐	☐	Some people tend to lack confidence when it comes to their physical strength	BUT	Others are extremely confident when it comes to their physical strength	☐ ☐
20.	☐	☐	Some people always have a really positive feeling about the physical side of themselves	BUT	Others sometimes do not feel positive about the physical side of themselves	☐ ☐
21.	☐	☐	Some people are sometimes a little slower than most when it comes to learning new skills in a sports situation	BUT	Others have always seemed to be among the quickest when it comes to learning new sports skills	☐ ☐
22.	☐	☐	Some people feel extremely confident about their ability to maintain regular exercise and physical condition	BUT	Others don't feel quite so confident about their ability to maintain regular exercise and physical condition	☐ ☐
23.	☐	☐	Some people feel that compared to most, their bodies do not look in the best of shape	BUT	Others feel that compared to most their bodies always look in excellent physical shape	☐ ☐
24.	☐	☐	Some people feel that they are very strong and have well developed muscles compared to most people	BUT	Others feel that they are not so strong and their muscles are not very well developed	☐ ☐
25.	☐	☐	Some people wish that they could have more respect for their physical selves	BUT	Others always have great respect for their physical selves	☐ ☐
26.	☐	☐	Given the chance, some people are always one of the first to join in sports activities	BUT	Other people sometimes hold back and are not usually among the first to join in sports	☐ ☐

	Really True for Me	Sort of True for Me			Sort of True for Me	Really True for Me
27.	☐	☐	Some people feel that compared to most they always maintain a high level of physical conditioning	BUT	Others feel that compared to most their level of physical conditioning is not usually so high	☐ ☐
28.	☐	☐	Some people are extremely confident about the appearance of their body	BUT	Others are a little self-conscious about the appearance of their bodies	☐ ☐
29.	☐	☐	Some people feel that they are not as good as most at dealing with situations requiring physical strength	BUT	Others feel that they are among the best at dealing with situations which require physical strength	☐ ☐
30.	☐	☐	Some people feel extremely satisfied with the kind of person they are physically	BUT	Others sometimes feel a little dissatisfied with their physical selves	☐ ☐

APPENDIX D

HOW IMPORTANT ARE THINGS TO YOU?

	Really True for Me	Sort of True for Me			Sort of True for Me	Really True for Me
1.	☐	☐	Some people feel that being good at sports is vitally important to them	BUT	Others feel that being good at sports is not so important to them	☐	☐
2.	☐	☐	Some people do not feel that maintaining a high level of physical conditioning is very important to them	BUT	Others feel that maintaining a high level of physical conditioning is extremely important to them	☐	☐
3.	☐	☐	Some people believe that having an attractive physique or figure is vitally important to them	BUT	Others believe that having an attractive physique or figure is not all that important in their lives	☐	☐
4.	☐	☐	Some people believe that being physically strong is not so important to them	BUT	Others feel that it is extremely important to them to be physically strong	☐	☐
5.	☐	☐	Some people feel that having very good sports ability and skill is not so important to them	BUT	Others feel that having a high level of sports ability is really important to them	☐	☐
6.	☐	☐	Some people feel that maintaining regular vigorous exercise is vitally Important to them	BUT	Others feel that keeping up regular vigorous exercise is not of prime importance to them	☐	☐
7.	☐	☐	Some people do not feel it so important to them to spend a lot of time and effort maintaining an attractive body	BUT	Others think that it is vitally important to spend time and effort maintaining an attractive body	☐	☐
8.	☐	☐	Some people feel that being strong and having well developed/toned muscles is vitally important to them	BUT	Others feel that being strong and having well developed/toned muscles is not so important to them	☐	☐