A LONGITUDINAL INVESTIGATION OF DIFFERENT EXERCISE MODALITIES ON SOCIAL PHYSIQUE ANXIETY

THESIS

Presented to the Graduate Council of the University of North Texas in Partial Fulfillment of the Requirements For the Degree of

MASTER OF ARTS

By

Nancy S. Diehl, B.S.
Denton, Texas
August, 1995
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Despite the physiological and psychological benefits inherent in regular exercise, many people choose not to participate. Reasons for not exercising were considered in relation to social physique anxiety (SPA), a type of social anxiety that occurs as a result of the prospect of evaluation of one's physique. The current study investigated longitudinal changes in SPA as a result of involvement in different exercise modalities (swimming, racquetball, weightlifting and non-exercise control). Results indicated that groups differed early in the semester, suggesting physique anxiety is related to self-selection of exercise participation. Social physique anxiety decreased over time, suggesting exposure to a non-evaluative group may result in decreased anxiety. A gender main effect was found, which is consistent with prior research. Clinical implications are discussed.
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Introduction

Industrialization has dramatically changed the experience of human living. Most people tend to believe that life has been made significantly easier, and that all of the so-called progress has been positive. However, as machines have taken over most manual labor including switching channels on the television, the population has become increasingly sedentary (ACSM, 1993; Blair, 1988). Many people simply perceive exercise as hard work for minimal reward, even though the positive effects of exercise, both physiologically and psychologically, have been well documented.

Although several recommendations concerning exercise involvement exist (Bouchard, Shephard, Stephens, Sutton, & McPherson, 1990; Dubbert, 1992), those presented by the American College of Sports Medicine (ACSM) have been particularly influential and are frequently used in research settings. The ACSM suggested that physical activity (i.e., exercise) of 20-30 minutes at least three times per week at 60%-90% of age estimated maximum heart rate can result in desired physical and psychological benefits (ACSM, 1990). Although the 1990 ACSM recommendation has been widely accepted as the lower limit at which the majority of
physical and psychological benefits of exercise can take place, some exercise is more beneficial than no exercise. In fact, the newest ACSM guidelines recognize the importance of regular physical activity. They read "Every American adult should accumulate 30 minutes or more of moderate intensity physical activity over the course of most days of the week...Activities that can contribute to the 30 minute total include walking up stairs, gardening, raking leaves,..." (ACSM, 1994, p. 7). These guidelines suggest gains may occur at much lower levels of physical fitness or exercise than espoused by the 1990 version. For example, studies of older adult populations have shown physiological and psychological benefits from seated exercise (McMurdo & Rennie, 1993; Netz, Tenebaum, & Sagiv, 1988).

Physical and Physiological Benefits of Exercise

Regular exercise has been found to improve physical health throughout the lifespan, specifically reducing the risk of coronary heart disease, osteoporosis and certain cancers, decreasing hypertension and percentage of body fat, improving metabolism, and aiding in controlling diabetes. Although most research has been conducted on subjects in the 18-30 year age range, recent efforts have established the benefits of exercise in older adults (McMurdo & Rennie, 1993; Netz et al., 1988) as well as children (Hinkle, 1992).

Regular exercise has been found to reduce the risk of coronary heart disease (Adams, Yanowitz, & Fischer, 1981;
Landry, 1985; Oberman, 1985) which is the foremost cause of death in the United States ("Public Health," 1993). In fact, a meta-analysis of the controlled trials of cardiac rehabilitation in post myocardial infarction patients showed a 20% reduction in mortality rate associated with regular exercise (Froelicher, 1990). Exercise also reduces atherosclerosis, or fatty streaks in the inner lining of the arteries (Wood & Stefanick, 1990), and improves the metabolism of carbohydrates and fats (Lennon et al., 1983).

Hypertension, or high blood pressure, also has been identified as a serious health problem that can be reduced by exercise (Blair, Goodyear, Gibbons, & Cooper, 1981). The expected rate of hypertension in Western societies is 15-25% overall, and as high as 50%-60% in persons over age 60 (Kaplan, 1986). In sportsmen and sportswomen aged 14-37, however, the prevalence was only one percent (Kral, Chrastek, & Adamirova, 1966). In addition, regular physical activity helps reduce the insulin requirements for Type 1 (insulin dependent) and improves glucose tolerance in Type 2 (non-insulin dependent) diabetes mellitus (Rosenthal, Haskell, Solomon, Widstron, & Reavan, 1983; Vranic & Wasserman, 1990).

Exercise has been placed on the short list of lifestyle habits that reduce the risk of osteoporosis (Harrison & Chow, 1990). Without habitual activity, bone mass may decrease. Although genetic predisposition plays a large
role in the development of osteoporosis, there are lifestyle changes such as optimal exercise and nutrition that can help prevent this disease.

The impact of AIDS on the United States population has resulted in increased awareness and attention to immune functioning and related diseases. According to Simon (1984), there is no question that exercise can affect immunologic functioning. Although the evidence continues to be somewhat controversial, it appears that exercise strengthens the immune system, and can even decrease the likelihood of lymphatic system cancers (Calabrese, 1990). There also have been recent suggestions that exercise may be protective against colon cancer in men (I-Min, Paffenbarger, & Hsieh, 1991), and may reduce the risk of certain reproductive cancers in women (Kohl, LaPaorte, & Blair, 1988).

Surprisingly, exercise in obese individuals is not directly related to weight loss (Garfinkel & Coscina, 1990). The heterogeneous nature of obesity, however, may be responsible for the lack of detection of a relationship. It may be that when more homogenous groups are considered, the relationship of exercise to a specific type of obesity will become clear. There is strong evidence supporting the fact that exercise can alter body composition by acting to decrease percentage of body fat (Pacy, Webster, & Garrow,
1986), indicating the benefits of exercise in relation to weight control.

There are, however, costs associated with exercise that must be considered (Kirkcaldy & Shephard, 1990). Some possible negative side effects include musculoskeletal injuries, less time available to participate in other hobbies or activities, and an immediate increase in the risk of cardiac arrest and sudden death, despite the long term reduction of this risk (Appenzeller, 1981).

**Psychological benefits of exercise**

In addition to the many physical and physiological benefits, exercise has been identified as providing important psychological benefits, such as increased ability to effectively deal with stress (Brown, 1991; Dyer & Crouch, 1988; Holmes & Roth, 1985). Exercise may also help to decrease depression and anxiety (Hatfield, 1991; King, Taylor, Haskell, DeBusk, 1989; Morgan, 1985; Morgan & O’Conner, 1988).

One of the main psychological benefits of exercise is its effect as a moderator of life stress. Most researchers have hypothesized that the physiological adaptation (e.g., cardiovascular efficiency) associated with regular exercise influences physiological reactivity to and recovery from stressful psychological, psychosocial, and physical events (Plante & Rodin, 1990). Crews and Landers (1987) conducted a meta-analysis which demonstrated that athletes had lower
physiological arousal in response to stress than did non-athletes. Furthermore, athletes were able to recover faster than were their non-athletic counterparts.

Thus, physical fitness appears to act as a buffer, softening the negative effects of life stress. For example, Brown (1991) found that individuals with lower levels of physical fitness exhibited more physical ailments, even when psychological distress was controlled, than did aerobically fit individuals. Unfortunately, the quasi-experimental design used (lack of random assignment) by Brown does not allow causal relationships to be inferred. Another quasi-experimental study conducted by Dyer and Crouch (1988) found that undergraduates who participated in aerobic activity over the course of a semester were better able to cope with life stress and reported a generally more positive feeling of well-being than non-exercisers. Adding further evidence to the relationship between exercise and stress, Holmes and Roth (1985) found high fitness participants had lower elevations in heart rate when subjected to a moderately stressful psychological test (repeating digits backward) compared with their less fit counterparts. Wilfley and Kunce (1986) suggest that beginning exercise moderates high levels of stress, but as fitness improves there is a plateau in the effect of exercise on stress.

Although the majority of the literature demonstrates the positive effect of exercise on stress responsivity,
other studies have not replicated these results (Berger & Owen, 1992b; de Geus, van Doornen, Orlebeke, 1993; Plante & Karpowitz, 1987). A possible explanation for this discrepancy is that Plante and Karpowitz (1987) did not manipulate levels of exercise, but simply used an exercise self-report measure that may have lacked accuracy. de Geus et al. (1993) did not have acceptable levels of power and thus may have been unable to detect an effect even if it truly did exist. Although Berger and Owen (1992b) suggested exercise is beneficial when done in moderation, extremely intense exercise may negate the positive relationship between exercise and stress.

Sime (1984) suggested that anxiety is a potential outcome of life stress. Exercise, however, has been related to reductions on both self-report and physiological measures of anxiety, even following a single session of aerobic exercise (Tuson & Sinyor, 1993). In middle-aged psychologically healthy women, increased fitness was associated with decreased ratings of tension and anxiety (King et al., 1989). Since anxiety and depression covary so strongly, it may be that the anxiety-reducing effects of exercise are also relevant to the antidepressant effects of exercise (Morgan, 1987).

Exercise has been shown to be as effective as cognitive therapy in lessening symptomatology for mild to moderately depressed adults (Freemont & Craighead, 1984). Greist et
al. (1979) conducted research evaluating the effectiveness of time-limited versus time-unlimited psychotherapy versus exercise, and found that exercise was most effective in decreasing depressive symptomatology. These results should be interpreted with caution due to the methodological flaws noted by the authors in their research. Furthermore, exercise has been shown to reduce dysphoric mood in a non-clinical sample (King et al., 1989).

Although exercise has been shown to alleviate symptoms of depression, the physiological aspects of aerobic exercise may not be responsible for the changes. Most early studies used jogging or running as the exercise manipulation, but recent studies have shown similar effects for weight lifting or even relaxation training. For example, jogging and weight lifting were equally effective in reducing depression in women over the course of an eight week period with benefits being maintained at one year (Doyne et al., 1987).

A time out hypothesis has been suggested to explain the beneficial effects of exercise on depression. Morgan (1985) suggested that the positive benefits of exercise may be related to time away from life stressors. If that were true, the same amount of benefit would be derived from any activity, controlling for time involved. Research, however, has produced equivocal results regarding this hypothesis. For example, McCann and Holmes (1984) found the effect of exercise to be greater than that of meditation or no-
treatment over the course of time. Yet, Weinberg and Jackson (1988) found the effects of meditation to be equally as effective as running, but not as effective as other athletic activities (swimming, tennis, and racquetball) in a single session study.

Although the ACSM provides guidelines for exercise, it is unclear whether any specific activity or type of activities may be more effective (and potentially more enjoyable) as a method for obtaining the physical and psychological benefits of exercise. Similarly, there has been a recent call in the psychological literature to further explore and clarify the types of exercise that enhance psychological functioning (Plante & Rodin, 1990). The present study examined the relationship between type of exercise and psychological gain. Although little research has been conducted related to type of exercise, there have been some studies that address this issue. Berger and Owen (1988) compared swimming, body conditioning (weight training), Hatha Yoga, and fencing. Results suggested that only swimmers experienced more positive mood states both before and after exercise. In a later study Berger and Owen (1992a) investigated only the relationship between Yoga, swimming, and a control condition, and found that mood elevation was significantly greater for both activity groups, when compared to the controls.
Although methodological flaws exist, the resounding conclusion of the research consistently demonstrates the important benefits of regular exercise on physical and psychological health. Specifically, regular exercise reduces risk of coronary heart disease, hypertension, and osteoporosis, increases metabolism of carbohydrates and fats, and decreases stress, depression, and anxiety. Nonetheless, many people choose not to exercise, and thus, a primary issue is to clarify the factors associated with that choice.

Exercise and Social Anxiety

Despite the number of benefits inherent in exercise, approximately 40% of North Americans are completely sedentary (Stephens, Jacobs, & White, 1985). The Canada Fitness Survey (1983) gathered specific information on reasons people listed for not exercising. Reasons included lack of time due to work (about 50%), lack of interest or motivation (over 30%), inadequate facilities (about 30%), lack of time due to other leisure activities (about 18%), and needing more encouragement (about 12%). It seems that the rewards are often too distant, and the cost too proximate. Many people listed more than one reason thus percentages add up to more than 100%.

Leary (1992) suggested that one possible reason for not exercising is that some individuals have self-presentational concerns. In developing an impression of a person, one
takes into account the other's abilities, attributes, and motives (Leary, 1992). Thus, it is in one's best interest to convey the self in a way that will be acceptable, and even appealing to others. This method of self-presentation is not a calculated manipulative technique, but occurs even when people are not consciously trying to make an impression (Leary & Kowalski, 1990). Thus, at a conscious or tacit level, people monitor their behavior based on the reactions (real or imagined) of those around them. It is appropriate to be somewhat in tune with the requirements of the observing group, but attention, in the extreme, can lead to social anxiety. Social anxiety is "anxiety resulting from the prospect or presence of interpersonal evaluations in real or imagined social settings" (Schlenker & Leary, 1982, p.642), and results from the belief that one is not able to make a good impression.

Social anxiety encompasses a plethora of distinctive subtypes. Many people are only socially anxious when a specific behavior is being measured. For example, it is common for many people to become anxious when they are forced to speak in public. This speech anxiety may even result in stuttering or excessive sweating, which may increase anxiety by way of a positive feedback loop. Other people may be particularly anxious when their bodies are being evaluated, or seen, by others (Hart, Leary, & Rejeski, 1989). Social physique anxiety is the "subtype of social
anxiety that occurs as a result of the prospect or presence of interpersonal evaluation involving one’s physique" (Hart et al., 1989, p. 96).

Because they believed social physique anxiety might be useful in explaining the exercise behaviors of sedentary individuals, Hart et al. (1989) developed the 12 item Social Physique Anxiety Scale (SPAS). In the first of three studies, they established the final format of the questionnaire, investigated loadings of particular questions on the scale, and determined a single factor structure. Results suggested gender differences: specifically, males’ average scores were significantly lower than females’ scores. In study two, they demonstrated the construct validity (discussed further in the methods section). Study three examined the criterion validity by comparing the reactions of low and high physique anxious people undergoing an actual physical evaluation of their physique, including an interview and a measure of body fat. Results of this third study indicated that high scorers demonstrated greater apprehension and tension than their less anxious counterparts. In addition, social physique anxiety accounted for 23% more variance in reported stress experienced during the evaluation than was explained by standard measures of physique and fitness, such as body self-rating, weight, and body fat. The findings from Hart et al.’s initial investigation suggest that social physique
anxiety is a measurable, meaningful construct that may help explain why some people choose not to exercise. Since the introduction of social physique anxiety (Hart et al., 1989) few studies have been completed although researchers have acknowledged the importance of the construct for explaining exercise behavior.

One study that has been conducted examined the relationship between location of exercise (public versus private) and social physique anxiety in female Canadian nursing students. In this study, Spink (1992) found that high physique-anxious women, when compared with low physique-anxious women, were more likely to exercise in private than in public. Although this finding suggests that there are situations in which highly physique anxious women might exercise, it is difficult to find modes of exercise that are completely private. Exercise equipment for the home is generally expensive and likely prohibitive for most, and exercising outside in an area perceived as deserted might be dangerous.

Although Spink's findings (1992) are theoretically consistent, methodological limitations did exist. The categories of high and low physique anxiety were determined using a mean split. It is clear that this differentiation is somewhat arbitrary and influenced by extreme scores. A median split or even a tertiary or quartile split would have been more meaningful, although the latter two would have
resulted in decreasing the sample size even further. In spite of these limitations, the findings do suggest that there are differences in the behaviors of higher versus lower physique anxious people.

McAuley and Burman (1993) further examined the psychometric properties of the SPAS adding evidence to support its single factor structure. Participants were female adolescent gymnasts, who completed a demographic questionnaire, the SPAS, and the Physical Self-Efficacy Scale. Analyses revealed support for the SPAS' original factor structure and further demonstrated its construct validity through the strong inverse relationship between physical self-efficacy and degree of social physique anxiety. These results increased the evidence that the Social Physique Anxiety Scale is a valid and useful measure for adolescents as well as adults.

Crawford and Eklund (1994) examined social physique anxiety in relation to attitudes toward exercise settings in college females. The women viewed two videotapes of an aerobics class, one in which participants were wearing tights and thong leotards, and one in which they wore t-shirts and shorts. After each viewing, subjects reported their attitudes toward the exercise setting. Results indicated social physique anxiety was negatively associated with the setting emphasizing physique, and positively related to the setting minimizing physique. High physique
anxiety women had more negative attitudes toward the exercise setting in which people displayed their physique (i.e., tights and thong leotards). Low physique anxious women, however, preferred a setting where they could display theirs. These results suggest that women with relatively high physique anxiety may not participate in certain exercise settings, thus limiting their options. Although this study provided important additional information about the construct and its relation to exercise, the authors noted the importance of extending this line of investigation to field settings.

The authors furthered their work in this area with a sample of college women (Eklund & Crawford, 1994). They measured SPA, weight satisfaction, percent body fat, reasons for exercise, exercise behaviors and preferences and attitudes toward the aerobic videos mentioned above. Results indicated that self presentational reasons for exercise were positively correlated with SPA. However, SPA was not positively correlated with attitudes toward either of the video presentations. The authors suggested that other variables may moderate or mediate self presentational anxiety in exercise settings.

Social anxiety theory suggests that people who are physique anxious would be unlikely to exercise, not wanting to subject themselves to the anxiety that they would feel in a public exercise setting. Results of existing empirical
investigations add indirect support for this assertion. If, however, social physique anxiety could be decreased, two important related events might occur. First, these individuals might be more willing to be seen in exercise settings. Second, with the increased number of options, these individuals might increase their overall level of exercise activity. Because the effects of exercise on psychological and physical functioning are well documented, any increases in exercise would likely prove beneficial.

The results of these social physique anxiety studies demonstrate the validity of the construct as well as its potential usefulness in explaining exercise choice, frequency, and location. What is not known, however, is the stability of the construct and whether it can be changed through exercise involvement. If it can be changed it is important to examine the possible agents of change such as aerobic benefit, changes in body shape or possibly desensitization by wearing somewhat revealing exercise attire.

Most longitudinal studies examining the psychological benefits of exercise have utilized measurement at only two points in time (e.g., pre and post), thus limiting researchers' ability to determine the process of change (King et al., 1989). Another potential problem is the selection of the measurement interval. Ford, Puckett, Blessing, and Tucker (1989) measured effects of exercise
class participation on both physical measures (step test, flexibility test, sit-up test and body composition) and psychological measures (self-esteem and body cathexis). During the eight week interval the groups changed only on the number of sit-ups they were able to complete, suggesting that the effects of exercise on the other variables may require more time, if they exist at all. To address these limitations, the current study proposed to explore changes over a 15 week period using multiple measurement times.

Given the unaddressed questions surrounding social physique anxiety, the purposes of this study were twofold. First, the current study examined if students' levels of social physique anxiety vary depending on the type of exercise setting they select. Specifically, male and female undergraduates from four different co-educational exercise classes (cycling, swimming, racquetball, and weight lifting) and a developmental psychology class (control) were compared on levels of social physique anxiety at the beginning of the semester. Because swimming requires wearing revealing athletic wear (i.e., bathing suit), swimmers would expect their physiques to be evaluated. Thus, people who self-selected swimming were expected to have lower anxiety than all other participants in this study. In addition, gender was considered because past research has demonstrated differences between males and females on the SPAS. It was hypothesized that women would expected to score higher than
men, and swimmers would have the lowest SPAS scores. No interaction between gender and exercise setting was expected.

Second, the study determined the degree to which social physique anxiety changed over the course of semester-long involvements in different exercise settings. Marks and Mishan (1988) demonstrated that the desensitization effects of exposure have been effective in reducing anxiety and avoidance in individuals with disturbed body perceptions. Thus, the anxiety-reducing effects of exposure may be demonstrated in relation to social physique anxiety as well. Crawford and Eklund (1994) have suggested that differences may exist based on the type of clothing worn by participants. That is, wearing relatively revealing clothing (e.g., bathing suit) may desensitize individuals to the effects of social evaluation and thus lower anxiety about presenting physique in a social setting. Given that four different exercise modalities were incorporated, the relative effects of type of exercise setting and exposure could be addressed. It was hypothesized that the exercise groups' social physique anxiety would decrease over the course of the semester compared with the control group. In addition, it was expected that swimmers would evidence the lowest social physique anxiety at time four due to their involvement in an aerobic exercise setting with the highest
level of body exposure. Gender also was considered as an independent variable given the findings of past research.

Method

Participants

Participants were 102 undergraduates (49 males, 53 females) from a large, southern state university who enrolled in either co-ed physical education (PE) activity classes or a Developmental Psychology class during the Fall semester of 1994. Prior to graduation, all students at this university are required to complete 4 credit hours of PE activity classes. Participants were recruited from the following classes: bicycling (8 male, 3 female; which were later removed from the sample—see results section), beginning swimming (7 male, 16 female), weight lifting (20 male, 19 female), beginning racquetball (16 male, 7 female), and Developmental Psychology (6 male, 11 female) (the control group). Each class met two hours and 40 minutes per week.

Although 271 participants completed the questionnaire at the first administration only 102 completed the study across all four times and only these individuals are included in subsequent analyses. Those who did not complete all four administrations did not differ from those who did complete all four times on age, gender, race, year in school, or social physique anxiety at the beginning of the semester. Upon examination of a box and whisker plot and
age variability among experimental conditions, 4 subjects were excluded because they were significantly older than the rest of the sample. As determined prior to data collection, 5 control subjects who were currently enrolled in P.E. classes for the semester also were excluded.

Most participants were between 19 and 25 years old (M = 23.33, SD = 4.38). The mean body mass for men was 23.15, SD = 2.97; for women mean body mass was 22.59, SD = 4.46. Participants were primarily Caucasian (n = 78) although 4 identified themselves as Asian American, 5 African American, 1 Native American, 9 Hispanic, and 4 as Other; one did not provide information on his/her racial/ethnic background.

Participants responded to a 5 point Likert-type scale "Compared to the usual amount you exercised in the past six months, how much do you do now?" anchored by "much more" and "much less." They reported exercising about the same amount (M = 2.76, SD = 1.03) as they did during the 6 months prior to the Fall 1994 semester, thus enrolling in a P.E. class does not seem to indicate a change from regular exercise habits. Respondents indicated that they participated in exercise activities such as walking, jogging, bicycling, weight lifting, swimming, aerobics, racquetball, dance, rollerblading, golf, tennis, basketball, softball, and volleyball. Participants exercised a mean of 2.84 hours (SD= 2.52) per week outside of their PE class participation. Most participants (71%) identified themselves as
recreational or weekend athletes and 19% reported they were not athletes.

**Instruments**

**Physique Anxiety.** The 12-item Social Physique Anxiety Scale (SPAS; Hart et al., 1989) measures the trait-like degree of anxiety individuals experience when their physique is, or is perceived to be, evaluated by others. On items such as "In the presence of others, I feel apprehensive about my physique/figure," and "I am comfortable with the appearance of my physique/figure," individuals indicate the degree to which the statement is characteristic of themselves on a 5 point Likert type scale ranging from 1 "not at all" to 5 "extremely." Internal consistency (Cronbach’s alpha) and 8-week test-retest reliability/stability were shown to be .90 and .82, respectively, for undergraduates (Hart, Leary, & Rejeski, 1989). Support for the Social Physique Anxiety Scale’s construct validity was provided by Hart et al. (1989) in their initial investigation. The SPAS was correlated with public self consciousness ($r = .30$), fear of negative evaluation ($r = .35$), interaction anxiousness ($r = .33$), body cathexis ($r = -.51$), and uncorrelated with social desirability ($r = -.07$). Social physique anxiety also has been found to have a strong relationship (positive correlation) with negative perceptions of physical
conditioning and weight in elite figure skaters (Martin, Wirth, & Engels, 1993; See Appendix A).

Hart, Leary, and Rejeski (1989) conducted a principal components analysis and found support for a single factor latent structure. McAuley and Burman (1993) conducted a confirmatory factor analysis using adolescent females. All items had statistically significant loadings with the exception of item two "I would never worry about wearing clothes that might make me look too thin or overweight." Based on their statistical analyses (goodness of fit tests and internal consistency of 11 item and 12 item scales), they decided to base subsequent analyses on the better fitting 11 item scale. For the purposes of this study, the original 12 item scale was given to participants. However, the same item caused some confusion with participants commenting on the poor wording. No other items on the scale elicited any like response. When an alpha reliability analysis was calculated, the corrected item-total correlation of this item was .11. This item reduced the overall reliability of the instrument and, based on current results as well as those of McAuley and Berman (1993), this item was excluded from all analyses. The resulting 11 item scale had a Cronbach's alpha reliability (at Time 1) of .92. The resulting scale was examined using unweighted least squares factor analysis. The scree plot of eigenvalues indicated a single factor structure. Total scores on the 11
item, 5 point Likert-type scale are obtained by reverse scoring items 1, 5, 8, and 11 and then summing all items, and can vary from 11 (low social physique anxiety) to 55 (high social physique anxiety).

**Demographic data** Participants provided demographic information, including age, gender, height, weight, and race/ethnicity. In addition, they were asked to identify their current level of exercise involvement in relation to their exercise habits in the recent past. Level of exercise involvement was defined as the average number of hours per week participants reported exercising during the past four weeks outside of their physical education class. Exercise, in this context, was defined as anything subjects perceived as exercise above and beyond the requirements of everyday living (e.g., soccer, tennis, jogging, walking specifically for exercise). Because the primary research question was related to the relationship of athletic activity to physique anxiety, exercise outside of class was a potential confound. Data regarding exercise outside of class was gathered so that external exercise could be statistically controlled if there was a significant correlation between exercise time outside of class and social physique anxiety. In addition, a 7 point Likert-type scale was used to determine past exercise involvement to better describe the exercise habits of the participants. Participants rated how their current level of athletic involvement (number of hours) related to
their typical level of activity in the past six months (See Appendix B).

Design and Procedure

Using a longitudinal design, participants were administered questionnaires at four different times throughout the semester: the second (baseline), sixth, tenth, and fourteenth weeks of the 15 week semester. These administration dates were evenly distributed across the semester, and generally did not coincide with major exam periods.

The first administration occurred at the beginning of the first class period during the second week of the semester. This time was chosen because the class roster was more stable than during the first week of the semester when students were adding and dropping classes. At this administration, participants were informed of the purpose of the study, signed consent forms (See Appendix C), and completed the demographic and exercise questionnaire as well as the SPAS.

At subsequent administrations, participants completed the SPAS at the beginning of the first class period of the designated week and reported the average number of hours (outside of class) they had exercised per week since the previous administration (See Appendix D). The final administration included two additional questions which were completed after all other measures had been finished (See
Appendix E). Participants who were absent on scheduled administrations completed the SPAS at the beginning of the subsequent class. The teachers' attendance records were used to gather information about overall class attendance. Participants who did not attend class regularly (75% of the time) were excluded from the analysis; only one respondent was excluded based on this criterion. In fact, the modal number of exercise classes missed over the course of the semester was 3.

Results

Although data were initially analyzed using 5 quasi-experimental conditions, one group was discarded for both theoretical and statistical reasons. All classes were selected on their introductory level status, yet one class did not fit this designation. The cycling class required expensive equipment, and those in the class indicated they were experienced cyclers, suggesting a more advanced class. Additionally, there were a limited number of men (n = 8) and women (n = 3) who completed questionnaires at all four administrations. Thus, for these reasons, data from cycling classes were removed from the analyses.

Tables 1 and 2, respectively, present the correlations and mean scores for male and female body mass, and SPAS scores at each administration. Body mass is correlated with SPAS only for women. The correlation matrix indicates that
there is no relationship between SPAS scores and exercise time outside of class.

To address the first hypothesis, a 4 (Class Designation) x 2 (Gender) analysis of covariance (ANCOVA) was calculated using body mass as a covariate and Time 1 SPAS scores as the dependent variable. The covariate, as expected accounted for a significant portion of the variance. No interaction ($F(4, 93) = .56, p = .74$) was found. However, there was a main effect for gender ($F(1, 93) = 4.48, p < .03$), with females' scores ($M = 33.85$, $SD = 9.99$) being higher than males' ($M = 29.18$, $SD = 7.66$), and for exercise setting ($F(3, 93) = 2.68, p \leq .05$). Scheffe post hoc analyses of exercise setting revealed that the racquetball group reported lower SPAS scores than the weight training group; no other mean differences emerged.

To address the second research question, a 4 (Class Designation) x 2 (Gender) x 4 (Number of administrations) repeated measures analysis of covariance (MANCOVA) was conducted; body mass again was used as the covariate. Analyses revealed no three or two-way interactions although main effects for time, ($F(3, 93) = 4.67, p < .01$) and gender, ($F(1, 93) = 7.59, p < .01$) emerged. There was no main effect for exercise setting. Contrast analysis (reverse Helmert) revealed that social physique anxiety was higher at the beginning of the semester, and decreased between Times 1 and 2, and again between Times 2 and 3; but
no differences occurred after Time 3. For gender, collapsed across all four time periods, women’s (M = 32.78, SD = 9.31) SPAS scores were higher than the men’s (M = 27.69, SD = 6.53).

Data were collapsed across exercise conditions to determine if exercise per se, rather than any specific type of activity, had an effect on social physique anxiety. The resulting 2 (Exercise or Non Exercise Condition) X 2 (Gender) X 4 (Number of Administrations) MANCOVA indicated no three-way or two-way interactions. The expected main effects for gender (F (1, 97) = 4.49, p < .05), and time (F (3, 97) = 3.98, p < .01) were found, though no main effect was found for exercise condition.

Stability of the SPAS was evaluated across the four measurement times by examining the correlations between SPAS scores of the control group, given that their level of social physique anxiety would not be expected to change over the course of the semester. It was expected SPAS would remain stable because no intervention occurred, and SPAS is considered to be a trait-like measure. Thus, analysis of data from the control group can address temporal stability issues. Test-retest reliability and stability over time can be noted by inspecting Table 3. The data suggest that the SPAS is a relatively stable measure. These results, however, should be considered cautiously as the control group had only 17 participants.
Discussion

Despite the numerous physiological and psychological benefits of exercise, many people still do not participate in exercise (ACSM, 1993; Canada fitness survey, 1983). Numerous theories have been offered to explain lack of involvement in exercise (such as lack of time, interest, motivation or inadequate facilities), yet some researchers (e.g., Hart, Leary, & Rejeski, 1989; Spink, 1992) recently have suggested that social physique anxiety may be a useful construct to consider when addressing exercise avoidance. The current study was conducted to longitudinally examine the relationship of social physique anxiety to involvement in different exercise modalities. Because of the quasi-experimental nature of this research, it was expected that the groups (swimming, racquetball, weight training, and control) would differ on initial levels of SPA. Results indicated that the groups did differ but not in the hypothesized direction. Participants in the racquetball condition had lower SPA than those in weight training; no other between group differences were found.

One possible explanation for the differences in initial levels of social physique anxiety may be found in the actual content of the course work for each class. As results indicated, the only difference in social physique anxiety at Time 1 was that students in racquetball classes had significantly less anxiety than students in weight training.
classes. The racquetball class, in particular, focused more on skill development than aerobic activity. Students spent a great deal of course time listening to instructions, observing demonstrations, and then practicing specific skills. Pappas, Golin, and Meyer (1990) demonstrated that a racquetball group received less aerobic benefit and more instruction than an aerobic class, and suggested that a self-selection process might explain differences in these groups. Those who selected racquetball may have done so to learn the skill rather than for the aerobic or physique changing benefits.

Of all classes, participation in weight training seemed the most likely to actually change one’s physique as research has demonstrated that weight training interventions have been particularly effective in that regard (Melnick & Mookerjee, 1991; Tucker & Mortell, 1993). In addition, body shape satisfaction has been found to be significantly related to social physique anxiety ($r = .78$; Hart, Leary & Rejeski, 1989). Taken together, these results suggest that individuals who chose weight lifting classes may have been most dissatisfied with their bodies and, relatedly, had higher anxiety about how they looked. Given these findings, it is consistent that the weight training class reported the highest SPA scores.

It was hypothesized that, at Time 1, the swimming class would have the lowest physique anxiety because they chose to
wear a bathing suit in a social setting. The assumption was that choosing to wear revealing clothing would suggest low physique anxiety. Swimming, however, was not statistically different from any of the other classes. Thus, wearing a bathing suit in public may be more likely to cause anxiety for some people, but not for everyone. Markee, Carey, and Pedersen (1990) found that less clothing was related to lesser body satisfaction. There are reasonable explanations for swimmers having either high or low physique anxiety: the mechanisms of social physique anxiety in this group remains unclear.

In regard to the second hypothesis (the longitudinal effects of exercise, social physique anxiety, and gender), social physique anxiety did, in fact, decrease over time for the combined group of exercise classes and controls. Social physique anxiety was the highest at the beginning of the semester and decreased until Time 3, when it appeared to reach a plateau. Because no further data were gathered, the implications of the equality between Times 3 and 4 remain unclear. The "plateau" may have occurred because of a floor effect, indicating that social physique anxiety may be unlikely to drop below a certain point, or that the magnitude of change decreases after a certain point.

This possible explanation of the plateau effect should be considered in relation to other SPAS research with college populations. No previous research has been
conducted with this population longitudinally, although Time 1 means of this study were comparable to previous research. Because no research of this type has been conducted previously, additional research needs to be done to determine which explanation is valid. It is important to consider the main effect found in the current study of SPA decreasing over time. This decrease resulted in lower scores than have been previously reported (See Table 4). By Time 4, means for both men and women were lower than have been found in prior research. Thus, SPA can change over time, although the extent of the decrease in SPA is not yet clear. If there is a level below which SPA is unlikely to go (a floor), than there are implications for intervention. It may be that there is a meaningful cut-off point below which decreases in physique anxiety can not be changed due to exercise behavior. This explanation suggests that if a floor exists, the interventions may only be effective up to a certain point.

In a related vein, it is important to consider the mechanisms that may be responsible for the decrease in SPA revealed in this study. Eklund and Crawford (1994) suggested the possibility that individuals may be somewhat desensitized to self-presentational concerns through exposure to the exercise setting, and this exposure effect may be partially responsible for the decrease in anxiety. The treatment of choice for many types of anxieties is
either imaginal or in vivo exposure, and the effectiveness of these strategies has been well documented (e.g., Barlow, 1988; Linden, 1981). SPA is anxiety related to perceived evaluation by others. Consistent experiences with people in which negative evaluational outcomes do not occur would be likely to decrease their fear of negative evaluations by others. Participants in each condition of the current study were consistently exposed to the same group of people, thus exposure seems to be a viable explanation for the physique anxiety decrease.

Another possible explanation for the reduction in social physique anxiety over time may be an effect of the time of year data were collected. In September, when data collection began, people wear lighter clothing outside of class than they do when the weather gets cold, typically around late October or early November (Time 3). Markee, Carey, and Pedersen (1990) found that women's body satisfaction increased positively relative to the amount of clothes they were wearing. They suggested that clothing people wear may bring peoples' view of their bodies closer to their perception of the norm. Thus, it is possible that lowered social physique anxiety occurred in part as a function of change in overall body satisfaction because of increased clothing. Additional research needs to be conducted to investigate this potential time of year effect. Assuming time of year is important, the reverse trend would
be expected from January to May, that is, anxiety would increase as the weather warms and amount of clothing worn decreases.

Alternatively, participation in exercise programs may effectively decrease social physique anxiety. In this study low statistical power confounded this explanation. Despite selecting an exercise measure used in previous SPAS research (Crawford & Eklund, 1994), it did not provide meaningful information in this study. When data were collapsed across exercise conditions and compared with the control group, no main effect for exercise was found. When the means were examined, however, differences existed in the hypothesized direction (see Figure 1). The women in the control group have an oscillating SPAS score, but the women in the exercise condition's SPAS seems to consistently decrease over time. For men, both groups decreased in social physique anxiety over time (see Figure 2). This study lacked the power to detect a possible difference that did exist (with power for this interaction calculated to be .11). Low power made the results of the current research more difficult to interpret. In summary, decreasing physique anxiety over time may be an exposure effect, an exercise effect, a time of year effect, or some interaction of the three. As mentioned previously, additional controlled studies will need to be conducted to determine the viability of each explanation.
As expected, women scored higher than men at the beginning of the study, as well as when SPA scores were collapsed over time. Only one previous study used the Social Physique Anxiety Scale with both males and females. Hart, Leary and Rejeski (1989) found that women scored higher on this scale than did men. This finding makes sense when one considers that the prevalence of clinical-level anxiety is greater in women: DSM-IV (APA, 1994) indicates there is a 3:2 ratio. In addition, body mass was correlated with social physique anxiety only for women, with greater body mass being associated with higher levels of anxiety. Sociocultural theory suggests that looks are highly valued in women and the media and other cultural influences exert pressure to conform with physical ideals, especially for women (Nemeroff, Stein, Diehl, & Smilack, 1994; Striegel-Moore, Silberstein, & Rodin, 1986). When individuals become overly concerned about their appearance, social anxiety seems a probable outcome (Striegel-Moore, Silberstein, & Rodin, 1993). As social physique anxiety is a special category of social anxiety, the sociocultural influence seems to be significant.

Limitations

The current study was limited by a number of methodological reasons. First, the quasi-experimental design allowed neither for random assignment of subjects to
conditions, nor for control of what went on during class time. The lack of random assignment precludes the ability to make causal statements about the effects of different types of activity on social physique anxiety. Although groups were comparable on a number of demographic measures, it was impossible to consider every potential confound.

Additionally, the level of activity and participation was highly variable across days and treatment conditions. The skills class (racquetball) had a much greater educational component than did the other activity classes. Another possible confound was the difference between course content and course description for the weight training class. It was anticipated that the weight training class would consist of a brief aerobic warmup followed by weight training. In fact, the students were able to choose to use either or both the aerobic or anaerobic equipment (nautilus type machines).

A second limitation concerned the relatively small number of subjects in each condition who completed all four administrations. For example there were only 7 male swimmers and 7 female racquetball players. Although optimal subject number is usually indicated by effect size and power, a random survey of 122 treatment outcome studies found the mean number of subjects per cell to be 40 (Lipsey, 1985). The small sample size decreased the power to detect an actual effect, thus increasing the likelihood of Type II
error. Although at Time 1 there were ample subjects per cell, the strikingly high attrition rate reduced this number considerably. As noted in the results, over 150 of the original 271 participants did not complete all administrations. Although our analysis suggests that, on demographic data, those who failed to complete the study were not different from those who did, we again note the limitation of relying solely on demographics to identify such potential differences.

Finally, as was considered in the conceptualization of this project, exercise outside of class would confound the quasi-experimental manipulation. Our attempt to measure exercise and control for this variable, however, was not effective. The self-report measure of the total number of minutes and hours exercised outside of class was unreliable, resulting in a highly variable statistic which did not correlate with SPAS. In general, historical self-report measures are suspect because of the "perils of retrospective introspection": individuals may over- or under-report for a variety of reasons (Brewer, Van Raalte, Linder, & Van Raalte, 1991, p. 227). For example, participants in the current study may have had difficulty accurately remembering their behaviors. Furthermore, participants may have felt pressure to report exercise participation and thus misrepresented the actual extent of their participation. Finally, this self-report measure of out of class exercise
did not allow for determination of exercise intensity. Thus, a person walking slowly for 4 minutes would be equated with someone who is sprinting for the same amount of time.

**Directions for Future Research**

Because of the dearth of studies examining social physique anxiety, directions for future research are many and varied. Most immediately, it would be useful to experimentally study the effects of exercise on SPA. This approach offers the ability to more accurately manipulate the intervention variables, exercises, and to randomly assign participants to conditions. It would be especially important to control for (or limit) exercise outside the research setting, as exercise outside may confound the effect.

Results of this study indicate that SPA decreased over time until the 12th week of intervention, when it appeared to plateau. Thus, it will be important to determine the exact temporal relationship between SPA and exercise involvement. When conducting such research it will also be important to determine if repeated administration of the scale results in lower scores without any intervention (i.e., if change may be a result of demand characteristics).

Finally, sociocultural theory and the current understanding of eating disorders suggest that SPA may play a role in the relations among body image, social anxiety, and eating disorders. Future research should examine the
relation between SPAS and eating disorders as well as the role SPA may play in predicting eating disordered behavior.

Conclusions

Results of this investigation indicate that social physique anxiety decreased over time and that people who self-select different types of exercise have different initial levels of social physique anxiety. In addition, this study supports the findings of previous studies which indicated that women generally are more physique-anxious than are men. The suggestion that people have specific exercise preferences and these preferences may be related to physique anxiety has implications for examining physique anxiety in relation to type of exercise setting (e.g., health clubs, tennis centers, etc.).

Over the long term, the SPAS may be identified as one of many screening devices for people who may not exercise because of physique anxiety. People with high physique anxiety may overcome their anxiety in a group of familiar people. Intervention may include early group meetings so that exposure to the group will decrease the anxiety related to exercise. Once social physique anxiety has been decreased by participation in the intervention group setting, generalization and maintenance issues can be addressed.

Overall, social physique anxiety continues to demonstrate an important role in self-presentation concerns.
Despite the limitations of the current research, results suggest that social physique anxiety can be decreased, and future research should pursue a more thorough understanding of the mechanisms of this change.
APPENDIX A

SOCIAL PHYSIQUE ANXIETY SCALE
For each item, please indicate the degree to which the statement is characteristic or true of you.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th>Not at all</th>
<th>Slightly</th>
<th>Moderately</th>
<th>Very</th>
<th>Extremely</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>I am comfortable with the appearance of my physique/figure</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>I would never worry about wearing clothes that might make me look too thin or overweight</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>I wish I wasn’t so uptight about my physique/figure</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>There are times when I am bothered by thoughts that other people are evaluating my weight or muscular development negatively</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>When I look in the mirror I feel good about my physique/figure</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Unattractive feature of my physique/figure make me nervous in certain social settings</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>In the presence of others, I feel apprehensive about my physique/figure</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td>I am comfortable with how fit my body appears to others</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>It would make me uncomfortable to know others were evaluating my physique/figure</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10.</td>
<td>When it comes to displaying my physique to others, I am a shy person</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11.</td>
<td>I usually feel relaxed when it is obvious that others are looking at my physique/figure</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12.</td>
<td>When in a bathing suit, I often feel nervous about the shape of my body</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Please check to make certain that you have answered all 12 of the questions. Thank you.
APPENDIX B

DEMOGRAPHIC QUESTIONNAIRE
Demographic Questionnaire

Please write your social security number here ____________________________

If you are currently enrolled in a physical education class, please indicate the class. ____________________________

What is your age? __________ (years)

What is your gender? (Please Circle) 1=Male 2=Female

What is your class standing? (Please circle number)
   1=Freshman 2=Sophomore 3=Junior 4=Senior 5=Other __________

Do you currently have a bachelors degree? (Please circle) 1=Yes 2=No
   If yes, please indicate the year the degree was awarded: __________

What is your major, or intended major? ____________________________

What is your mother’s highest level of education? (Please circle number)
   1=grade school 2=middle school 3=high school 4=college 5=graduate school
   6=9=10=11=12=13=14=15=16=17=18=20+ grade school

What is your father’s highest level of education? (Please circle number)
   1=grade school 2=middle school 3=high school 4=college 5=graduate school
   6=9=10=11=12=13=14=15=16=17=18=20+ grade school

What is your racial/ethnic background? (Please circle number)
   1=Caucasian 2=African American 3=Hispanic 4=Asian American 5=Native American 6=Other __________

What is your yearly personal income? That is the money you earn yourself or college loans that you
   yourself take out, not money from your family. (Circle number)
   0=0-$9,999 1=$10,000-$19,999 2=$20,000-$29,000
   3=$30,000-$39,000 4=$40,000 or more

What is your yearly family income? That is the combined income of you and your spouse (if you are
   married) or your partner. Or the income of your parents if they support you. If you are unsure, please
   estimate. (Please circle number)
   0=$10,000-$19,999 1=$20,000-$29,000 2=$30,000-$49,000
   3=$50,000-$69,000 4=$70,000 or more

What is your current weight? __________ pounds

What is your height? __________ feet __________ inches

What is your ideal weight? __________

How comfortable do you feel when your physique/figure is being evaluated? (Please place an X on the
   line which best indicates your feelings)

Uncomfortable __________ Comfortable
Demographic Questionnaire-2

You consider yourself to be a _______ athlete (Please circle)
1=Elite  2=Intercollegiate  3=Recreational  4=Weekend  5=Not an athlete

Over the last four weeks, what is the average number of hours and minutes per week have you spent exercising? This includes anything above and beyond the requirements of everyday living such as jogging, weight lifting, aerobics, walking for exercise, etc. Please round to the nearest 15 minutes.

______ hours _______ minutes

When you have exercised over the last four weeks, what type of exercise have you primarily participated in? Please place a 1 by the most frequent, and a 2 by the second most frequent:
- jogging  ___ walking  ___ bicycling  ___ swimming  ___ golf
- tennis ___ racquetball ___ badminton ___ squash  ___ fencing
- aerobics ___ wt lifting ___ dance ___ rollerblading ___ yoga
- basketball ___ volleyball ___ softball ___ soccer ___ other ______

On the average, what do you perceive your rate of exertion to be on a scale of 
1 (not much exertion) to 10 (maximum exertion)? ____

Compared to the usual amount you exercised in the past six months, how much do you do now? (Please circle)
1=Much more  2=Somewhat more  3=About the same  4=Somewhat less  5=Much less

How often do you spend at least five (5) minutes stretching? (Please circle)
1=Twice a day or more  2=Once a day  3=Daily  4=Weekly  5=Less than once a week

How often do you spontaneously stretch one or more joints in the context of another activity (e.g. class)?
1=Twice a day or more  2=Once a day  3=Daily  4=Weekly  5=Less than once a week

If you are a Varsity athlete, what team are you a member of? _______

Is there any physical reason keeping you from exercise? (Please circle) 1=Yes 2=No  If yes, please explain: ________________________________
APPENDIX C

INFORMED CONSENT
Informed Consent for the Study of Students in Kinesiology Classes

I, ____________________________ agree to participate in the study of the effects of exercise. The information from this study will be used to further understand people's attitudes toward exercise participation. I understand that I will fill out questionnaires on four occasions during class over the course of the semester. The questionnaires will concern general information about me as well as my experiences in relation to my exercise and physical appearance. I further understand and consent to allowing the investigator to review my attendance record for this class, and this class only.

I understand there is minimal risk and/or discomfort involved with this study and that I am free to withdraw my consent and discontinue participation at any time without penalty. I understand that I am to complete the three follow-up questionnaires over the course of the semester. If I have any questions or problems that arise in connection with my participation in this study, I should contact Nancy Diehl, the principal investigator, or Trent A. Petrie, Ph.D., the research supervisor at the Department of Psychology at (817) 565-4718.

In addition to signing and returning a copy of the Informed Consent, I have received a copy for my records.

(Signature of Participant) (Today's Date)
APPENDIX D

LATER DEMOGRAPHIC QUESTIONNAIRES
Demographic Questionnaire for Times 2, 3, and 4

What is your current weight? _________ pounds

What is your height? _____ feet _____ inches

What is your ideal weight? ___________ pounds

Since the last time you filled out this questionnaire, what is the average number of hours and minutes per week have you spent exercising? This includes anything you do for exercise above and beyond the requirements of everyday living such as jogging, weight lifting, aerobics, walking specifically for exercise, etc. Please round to the nearest 15 minutes.

___________ hours __________ minutes
APPENDIX E

ADDITIONAL QUESTIONS AT TIME 4
Additional Questions asked at Time 4

Compared to the beginning of the semester, how comfortable do you currently feel when your physique is being evaluated?

Currently more negative ______ ______ ______ ______ ______ ______ ______ ______ Currently, more positive

_________ no change

Is there any information you feel is missing from this study? If so, please add your own comments below:

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

Thank you very much for your participation in this project.
Table 1

Correlations, Means and Standard Deviations of Exercise outside of class (minutes), Body Mass Index (BMI) and Social Physique Anxiety Scores for Men (n = 49)

<table>
<thead>
<tr>
<th></th>
<th>BMI</th>
<th>SPAS 1</th>
<th>SPAS 2</th>
<th>SPAS 3</th>
<th>SPAS 4</th>
<th>ExerMean</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMI</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SPAS 1</td>
<td>.03</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SPAS 2</td>
<td>-.04</td>
<td>.83**</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SPAS 3</td>
<td>.16</td>
<td>.78**</td>
<td>.70**</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SPAS 4</td>
<td>.06</td>
<td>.78**</td>
<td>.73**</td>
<td>.77**</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ExerMean</td>
<td>.54*</td>
<td>.13</td>
<td>.17</td>
<td>.14</td>
<td>-.09</td>
<td>1.00</td>
<td>733.85</td>
<td>616.19</td>
</tr>
</tbody>
</table>

Note. ExerMean is the mean number of minutes per week which subjects self reported exercising.

Note. SPAS 1, 2, 3, and 4 refer to SPAS scores at Time 1, 2, 3 and 4, respectively.

Note. BMI = weight (kg) / [height (meters) squared].

Note. * indicates p < .01; ** indicates p < .001.
Table 2

Correlations, Means and Standard Deviations of Exercise outside of class (in minutes), Body Mass Index (BMI) and Social Physique Anxiety Scores for Women (n = 53)

<table>
<thead>
<tr>
<th></th>
<th>BMI</th>
<th>SPAS 1</th>
<th>SPAS 2</th>
<th>SPAS 3</th>
<th>SPAS 4</th>
<th>ExerMean</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMI</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SPAS 1</td>
<td>.38*</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SPAS 2</td>
<td>.41*</td>
<td>.87**</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SPAS 3</td>
<td>.35*</td>
<td>.86**</td>
<td>.93**</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SPAS 4</td>
<td>.35*</td>
<td>.82**</td>
<td>.91**</td>
<td>.91**</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ExerMean</td>
<td>-.27</td>
<td>.03</td>
<td>.20</td>
<td>.23</td>
<td>.18</td>
<td>1.00</td>
<td>629.75</td>
<td>601.15</td>
</tr>
</tbody>
</table>

Note. ExerMean is the mean number of minutes per week which subjects self reported exercising.

Note. SPAS 1, 2, 3, and 4 refer to SPAS scores at Time 1, 2, 3 and 4, respectively.

Note. BMI = weight (kg)/ [height (meters) squared].

Note. * indicates p < .01; ** indicates p < .001.
Table 3

Correlations between SPAS scores for the control group (N = 17)

<table>
<thead>
<tr>
<th></th>
<th>Time1 SPAS</th>
<th>Time2 SPAS</th>
<th>Time3 SPAS</th>
<th>Time4 SPAS</th>
</tr>
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<tbody>
<tr>
<td>Time 1 SPAS</td>
<td>1.000</td>
<td></td>
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<tr>
<td>Time 2 SPAS</td>
<td>* .8138</td>
<td>1.000</td>
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<tr>
<td>Time 3 SPAS</td>
<td>* .7622</td>
<td>* .9068</td>
<td>1.000</td>
<td></td>
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<tr>
<td>Time 4 SPAS</td>
<td>* .6660</td>
<td>* .8418</td>
<td>* .7900</td>
<td>1.000</td>
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</tbody>
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Note. * indicates p < .01
Table 4

Means and Standard Deviations for the SPAS (by gender) in this study and from Hart, Leary and Rejeski, 1989.

<table>
<thead>
<tr>
<th></th>
<th>Women</th>
<th></th>
<th>Men</th>
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<tbody>
<tr>
<td></td>
<td>N</td>
<td>M</td>
<td>SD</td>
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<tr>
<td>Hart et al.</td>
<td>97</td>
<td>37.9</td>
<td>9.78</td>
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<td>53</td>
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<td>36.09</td>
<td>9.01</td>
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<td>9.53</td>
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Table 5

Means and Standard Deviations of SPAS scores (by gender) across Times and Conditions

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<th></th>
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<td></td>
<td>M</td>
<td>SD</td>
<td>M</td>
<td>SD</td>
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<tr>
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<td>8.8</td>
<td>31.7</td>
<td>10.0</td>
</tr>
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<td>Female</td>
<td>33.4</td>
<td>7.6</td>
<td>34.4</td>
<td>7.7</td>
</tr>
<tr>
<td>Total</td>
<td>32.2</td>
<td>7.6</td>
<td>32.5</td>
<td>8.4</td>
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<td>26.4</td>
<td>5.8</td>
</tr>
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<td>12.4</td>
<td>27.4</td>
<td>10.6</td>
</tr>
<tr>
<td>Total</td>
<td>26.9</td>
<td>8.4</td>
<td>26.7</td>
<td>7.3</td>
</tr>
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</tr>
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<td>7.7</td>
<td>30.4</td>
<td>7.2</td>
</tr>
<tr>
<td>Female</td>
<td>37.5</td>
<td>10.9</td>
<td>35.3</td>
<td>10.1</td>
</tr>
<tr>
<td>Total</td>
<td>34.1</td>
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<td>32.8</td>
<td>9.0</td>
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<td>24.0</td>
<td>6.3</td>
</tr>
<tr>
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<td>8.2</td>
<td>32.0</td>
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</tr>
<tr>
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<td>7.4</td>
<td>27.9</td>
<td>6.9</td>
</tr>
<tr>
<td>Female</td>
<td>34.0</td>
<td>10.6</td>
<td>32.7</td>
<td>9.6</td>
</tr>
<tr>
<td>Total</td>
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<td>9.5</td>
<td>30.3</td>
<td>8.6</td>
</tr>
</tbody>
</table>

Note: Combined scores are the combined scores of the exercise conditions including racquetball, weight training and swimming.
APPENDIX G

GRAPHS
Longitudinal SPAS Scores of Men in an Exercise versus a Control Group

![Graph showing Longitudinal SPAS Scores of Men in an Exercise versus a Control Group]

Administration time (Each number is a 4 week increment)
Longitudinal SPAS Scores of Women in an Exercise versus a Control Group

![Graph showing SPAS scores over time for an exercise group and a control group. Each point represents a 4-week increment in administration time. The exercise group shows a decrease in SPAS scores, while the control group shows an increase.](image-url)
REFERENCES


activities on health related fitness and psychological well-being. Psychological Reports, 64, 203-208.


Lennon, D. Stratman, F. W., Shrags, E., Nagle, F. J., Hanson, P. G., Maddon, M., & Spennetta T. (1983). Total cholesterol and HDL cholesterol changes during acute,
moderate intensity exercise in men and women. *Metabolism*, 32, 244-249.


and self-presentation: A conceptualization and model.

Psychological Bulletin, 92, 641-669.


