

THE RELATIONSHIP BETWEEN BODY IMAGE  
AND BODY COMPOSITION AMONG MALE AND  
FEMALE COLLEGE STUDENTS

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Bachelor of Arts in Psychology

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Wichita, Kansas

2006

Submitted to the Faculty of the  
Graduate College of the  
Oklahoma State University  
in partial fulfillment of  
the requirements for  
the Degree of  
MASTER OF SCIENCE  
May, 2010

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COLLEGE STUDENTS

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## ACKNOWLEDGMENTS

First and foremost, I feel blessed to have been given the opportunity to attend graduate school. I thank God for each day that I am granted and the promises that they bring. I would like to thank my daughter Cheli'ce for being so patient and supportive throughout my graduate school experience. She has been the driving force in my life, and I love her very much. I would also like to thank my parents, Michelle and Guillermo, my siblings, and my extended family who are always there when I need them.

I would like to thank the OSU McNair staff members who are always wonderful. A special thanks to Mike Heppler. You have been there for me from the beginning and I am truly thankful. I would like to thank all of the HHP graduate students with whom I have had the pleasure of getting to know and work with. We have had a lot of fun and interesting times. Thanks to the entire SAHEP faculty who answered my many, many questions throughout this process.

Last, but certainly not least, I would like thank Dr. Smith for all of his guidance and support. Your help and understanding made the transition into graduate education a wonderful experience. Thanks to Dr. O'Brien for all of the long talks and guidance. I appreciate all of your advice. Thanks to Dr. Edwards who helped me whenever I was in need. I could always count on you to lead me in the right direction. Finally, I would like to thank Dr. Patterson. Words cannot express how grateful I am for all of your guidance through the years.

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## CHAPTER I

### INTRODUCTION

#### Introduction

Body image may be characterized as a multidimensional self-attitude toward one's body (Cash & Pruzinsky, 1990). Therefore, body image refers to how people think, feel, and behave with regard to their own physical attributes (Muth & Cash, 1997). According to Cash, Winstead and Janada (1986), society often places pressure on ideal body composition, promoting feelings of dissatisfaction with one's body image.

Dissatisfaction with one's body image may lead to a number of both psychological and physiological issues (Cook, 1999). Because body composition ideal(s) exist for both men and women, it is important to understand to what extent body image may be affected by body composition in both men and women.

Gender is acknowledged as an important factor in body image development (Cash & Pruzinsky, 1990). However, "the vast majority of body image research has focused on adolescents and college-aged women" (Rusticus & Hubley, 2006, p. 827). Drenoski and Yee (1987) found that some men might also experience body image concerns. The obvious gap in research investigating body image concerns across gender, specifically, the potential role body composition plays concerning body image among both males and females, should be addressed.

Body composition is an important consideration when evaluating one's body image. The American College of Sports Medicine (ACSM) defines body composition as, "...the relative percentage of body weight that is fat and fat-free tissue" (200, p. 60). According to the ACSM, techniques for assessing body composition vary in terms of complexity, cost, and accuracy (2006). Thus, research studies conducted assessing the relationship between body image and body composition have varied in the methods utilized to determine body composition, presumably for reasons of convenience and expense. "Most studies that have looked at body image as influenced by varying body weight have restricted their focus to total body weight rather than the extent of fatness" (Huddy, Nieman, & Johnson, 1993, p. 852). Body composition can be estimated using total body weight in addition to height utilizing body mass index (BMI) tables.

This is an important consideration for two detrimental reasons. First, it is possible for one to be overweight according to BMI tables, yet possess a desirable range of percent body fat. This is often the case among athletes who possess a greater amount of muscle mass, which is denser than fat, and may cause them to be classified as overweight according to BMI tables. On the other hand, an individual may possess an excess of body fat yet be classified as underweight according to BMI tables, which is the case in some individuals who possess minimal muscle mass. Consequently, the body composition method utilized for purposes of research should be carefully considered to ensure accuracy and validity of data interpretation. In the present study, the researcher chose

seven-site skinfold measurements to assess percent body fat, in conjunction with BMI tables, in an effort to compare methods.

### Significance of the Study

Research studies comparing body image and body composition among males and females are limited. This is particularly true regarding the method of body composition assessment being limited primarily to BMI tables. This research study assessed body composition using both BMI and skinfold measures. In addition, body image was evaluated using a validated assessment tool among male and female participants. The findings of this study may lead to a shift in how body composition is assessed in body image research.

### Statement of Purpose

The purpose of this study was to examine the relationship between body composition and body image. Researchers have emphasized the need for studies investigating the relationship between body image and body composition utilizing methods other than BMI tables. In addition, there is a gap in research assessing body image and body composition among males and females. This research study assessed body image, BMI, and percent body fat for both male and female participants.

### Research Questions

The purpose of the present research study was to evaluate the relationship between body image and body composition among male and female college students.

The questions posed by the researcher are listed below:

1. Is body image influenced by body composition?
2. Will skinfold measures correspond with BMI values?
3. Will men and women differ in their body image assessments?

### Hypotheses

From the research questions, the following hypotheses were developed:

1. Body image *is* influenced by body composition.
2. Skinfold measures *will not* correspond with BMI values.
3. Men and women *will* differ in their body image assessments.

### Delimitations

The present study was delimited to the following:

1. Male and female college students attending Oklahoma State University.
2. Participation in the study was voluntary.
3. Data collection was limited to the Spring 2008 academic calendar.

### Assumptions and Limitations

The following assumptions were made:

1. It was assumed that each participant answered all body image items honestly.
2. It was assumed that all participants reported an accurate height, weight and age for themselves.
3. It was assumed that all participants refrained from intense exercise prior to skinfold measures.

The following limitations were acknowledged:

1. This research study can only be compared with similar studies.
2. This research study did not utilize a randomized sample.
3. This research study was composed of self-reported data.

### Definition of Terms

Body Image: “A person’s mental concept of how his or her body appears” (Berger, 2000, p. 283).

Body Composition: “Relative percentages of fat and nonfat tissues in the body” (Howley & Franks, 2003, p. 167).

## CHAPTER II

### REVIEW OF LITERATURE

#### Body Image

An early definition of body image provided by Schilder (1935) described body image as “the picture of our own body which we form in our own mind, that is to say, the way in which our body appears to ourselves” (p. 11). Over time, a wide variety of definitions have attempted to encompass the concept of body image and expand on this early definition. McCrea, Summerfield, and Rosen (1982) described body image as “the subjective evaluation of one’s own body and the associated feelings and attitudes” (p. 226). Fisher (1990) suggested that body image is a persons’ psychological experience of their body. Cash (1990) referred to body image as “the view from inside” (p. 53). Cash expanded on this definition by stating, “negative body image is more affected by cognitive beliefs, interpretations, and situations than by actual physical realities.” Similarly, Hensley (1995) stated, “the subjective experience of the body differs considerably from the objective appearance of the body” (p. 2).

The pressure to be attractive and physically fit in the American culture is increasing. Society often places pressure on ideal body composition promoting feelings of dissatisfaction of one’s body image (Cash, Winstead, & Janda, 1986). Body image dissatisfaction can lead to a number of other psychological and sometimes physical problems including depression and eating disorders (Cook, 1999). Other disturbances that may be attributed to body image dissatisfaction are low self-esteem, social anxiety, and sexual dysfunction (Brown, Cash, & Lewis, 1989; Cash & Hicks, 1990). Therefore, it is essential to understand the relationship between body image and body composition.

### *Body Image and Body Composition*

The research investigating the association between body image and body composition has focused predominantly on women. In a study investigating the role of body image and body composition among women, Brodie and Slade (1988) indicated that their study was the first to “combine the measurement of body-fat and body-image variables in the same group of individuals.” The research study by Brodie and Slade found “increasing amounts of body-fat are positively related to...measures of general dissatisfaction.”

In a similar research study exploring body image and body composition among women, Dionne and Davis (2004) found that body composition feedback might affect body dissatisfaction. Interestingly, Dionne and Davis concluded, “research in this area should also include men’s vulnerability to body image modification...” (p. 337).

When examining potential differences that exist between males and females, Muth and Cash (1997) found a linear relationship in women and a curvilinear relationship in men when comparing body image and body weight. According to the results of this study, “Heavier women were especially dissatisfied and distressed about their physical appearance, as was true of men who were either above average *or* below average in their BMI.” An important consideration in the Muth and Cash study is the utilization of BMI values to assess these differences.

A similar research study conducted by Huddy, Johnson, Stone, Proulx, & Pierce (1997) investigated the relationship between body image and percent body fat among male and female college students. Huddy et al. identified an inverse linear relationship between body image scores and percent body fat across all groups.

In the 1993 research study conducted by Huddy, Nieman & Johnson (1993), body image and percent body fat were compared among college male varsity athletes and college male non-athletes. Huddy et al. (1993) concluded that a linear relationship between body image and percent body fat existed for college male non-athletes, but the relationship between body image and percent body fat was “unsubstantiated in both groups of varsity athletes” (p.854). However, in the 1993 Huddy et al. study and in the 1997 Huddy et al. study, body image was assessed using a 20-item inventory that had not been tested for validity at that time.

### *Body Image and Males*

Much of the early body image research centered around women’s desire to become thinner and virtually ignored males body image perceptions (Anderson, Cohn, & Holbrook, 2000). In the past decade, research concerning males and body image has increased substantially (Pope, Phillips, & Olivardia, 2000). This research has indicated a difference in males and females in “overall ideal body composition and shape as well as the specific body areas of concern” (Ridgeway & Tylka, 2005, p. 217). Males tend to indicate a desire to gain muscle in the upper body region, while women tend to indicate a desire to lose fat in the lower body region (Anderson et al.).

While most research studies have indicated a desire to gain muscle mass in men (Anderson et al., 2000), men are not immune to societal pressures to lose weight. Drewnowski and Yee (1987) found “over half (55%) of normal-weight 18-year-old men in the Midwest expressed a desire to lose weight” (p. 632). In fact, Drewnowski and Yee



concluded of the males in the study, "...self-perceptions of overweight were indistinguishable from those of weight conscious women" (p. 632).

Muscle gain and weight loss may not be the only areas of body consciousness for males. Ridgeway and Tylka (2005) found an important characteristic among males in their study was height. Moreover, 5 distinct categories of ideal body type emerged in this study among the males "overall muscularity, overall lean body, tall height, V-shape, and the abdominal region" (Ridgeway & Tylka, p. 213).

While common body image themes exist between males and females, it is obvious that differences exist as well. Given these differences, is it possible to accurately evaluate body image for both males and females with the same assessment tool?

#### *Multidimensional Body-Self Relations Questionnaire*

The Multidimensional Body-Self Relations Questionnaire (Cash, Winstead, & Janda, 1986) was chosen for this research study because it is one of the most widely used assessment tools to approximate body image. The 69 items of the MBSRQ inventory assess cognitive, behavioral, and affective components of body image on a five-point scale (Cash, 2000). The ten subscales that comprise the 69 item inventory include: Appearance Evaluation (AE), Appearance Orientation (AO), Fitness Evaluation (FE), Fitness Orientation (FO), Health Evaluation (HE), Health Orientation (HO), Illness Orientation (IO), Body Areas Satisfaction Scale (BASS), Overweight Preoccupation (OP), and Self-Classified Weight (SCW) (Cash, 1990). The MBSRQ is "one of the few measures developed with men and women of a wide age range" (Rusticus & Hubley, 2006, p. 827).

However, when comparing across age and gender Rusticus and Hubley (2006) found full model configural invariance for only five of the ten subscales, meaning comparisons across both age and gender can be made with these subscales alone: AE, AO, FO, IO, and OP. In addition to the configural variance finding, Rusticus and Hubley found “full model” metric invariance for the AO, FO, and OP subscales, meaning a correlation can be inferred across both age and gender using these subscales.

For purposes of the present study, the researcher will compare all ten subscales of the MBSRQ across gender, paying close attention to the aforementioned subscales identified by Rusticus and Hubley (2006).

### Body Composition

Measures of body composition are as wide-ranging as the accuracy associated with each measure. Body composition can be measured in a laboratory setting or by using field techniques that include densitometry, anthropometric methods, and other methods (ACSM, 2006).

Densitometry is an estimate of body composition derived from a “measurement of whole-body density, using the ratio of body mass to body volume” (ACSM, 2006, p. 64). According to the ACSM, the limiting factor in densitometry measures is “the accuracy of the body volume measurement because body mass is measured simply as body weight” (p. 64). The two most common methods for measuring body volume are hydrostatic weighing and plethysmography.

Hydrostatic, or underwater, weighing compares total body weight with submerged weight to “calculate body volume and subsequently body density and

percentage of body fat” (Howley & Franks, 2003, p. 169). The disadvantages of hydrostatic weighing include the time required to administer, the availability of necessary equipment, the technical expertise necessary to administer, and the expense associated with administering the assessment (ACSM, 2006). The researcher of the present study did not have access to the equipment necessary to administer this test of body composition.

Plethysmography is a measurement of body volume via air displacement. Once body volume is determined, body density and percentage of body fat can also be determined (Howley & Franks, 2003). The disadvantage of plethysmography is the availability of the highly technical (and expensive) equipment necessary to perform the assessment (Howley & Franks). The researcher of the present study did not have access to the equipment necessary to administer this test of body composition.

Anthropometric methods are “measurements of height, weight, circumferences, and skinfolds...to estimate body composition” (ACSM, 2006, p. 57). The Quetelet index, commonly referred to as BMI, gives an estimation of body composition based on a calculation of height and weight. However, the standard error for estimating percent body fat from BMI is “relatively large” and “should not be used to determine an individual’s body fatness during a fitness assessment” (p. 58). The researcher chose to administer this test of body composition because it is often used in body image research despite concerns of accuracy.

Girth measurements recognize the “pattern of body fat distribution” (ACSM, 2006, p. 58). Girth measures include the waist-to-hip circumference and the waist circumference. The researcher did not administer this test of body composition due to the inability of the test to distinguish fat mass from lean mass.

Skinfold measures assess percent body fat using a calculation based on the presence of subcutaneous fat at a given anatomical location. Of the anthropometric methods, skinfold measurements offer a more accurate estimation of percent body fat, or body fatness, than do height, weight, and circumference measurements (ACSM, 2006). The researcher chose to administer this test of body composition due to the accuracy associated with the assessment.

Other methods of assessing body composition include bioelectrical impedance analysis (BIA), dual energy x-ray absorptiometry (DEXA), total body electrical conductivity (TOBEC), and near-infrared interactance (NIR).

Body composition assessment by way of BIA “is an easy-to-administer, noninvasive, and safe method of assessing body composition...” (ACSM, 2000, p. 64), however, the participant must follow the recommended protocol for accurate assessment. Abstaining from food and drink four hours prior to the assessment and avoiding moderate or vigorous activity twelve hours prior to the assessment are among the items listed on the recommended protocol to ensure accurate BIA testing (ACSM). The researcher did not administer this test of body composition due to the inability to monitor the adherence of the recommended protocol by the participants.

A DEXA scan requires a full-body X-ray. DEXA scans were originally designed to measure bone density (Howley & Franks, 1997). Software to allow for percent body fat estimation have since been developed and utilized for this purpose. The researcher of the present study did not have access to the equipment necessary to administer this test of body composition.

NIR testing “is based on the principles of light absorption and reflection using near-infrared spectroscopy to provide information about chemical composition of the body” (ACSM, 2000, p. 67). The researcher of the present study did not have access to the equipment necessary to administer this test of body composition.

Much of the available research examining the relationship between body image and body composition utilized either BMI or skinfold measurements, therefore, the present study assessed body composition using both BMI and skinfold measurements for reasons of comparison.

### *BMI*

Research has shown that weight, height, and overall appearance contribute to feelings one has about his or her body (Cash, 1990). Previous research examining the relationship between body image and body composition has been limited primarily to measures of total body weight, which is used in conjunction with height to determine BMI. This method of body composition assessment is inexpensive and easy to administer, however, scientists and professionals have long debated the accuracy of height-weight tables, i.e., BMI (Ross, Crawford, Kerr, Ward, Bailey, & Mirwald, 1988). Ross, Eiben, Ward, Martin, Drinkwater, & Clarys (1986) concluded that BMI was a very poor predictor of the sum of six skinfolds. Similarly, Durnin, McKay, & Webster (1985) concluded that BMI could result in error when estimating total body fatness. The American Council on Exercise (ACE) (1997) stated the following about BMI:

Since BMI uses total body weight (i.e., not estimates of fat and lean body mass separately) in the calculation, it does not discriminate between the overfat and the athletic, more muscular body type. Therefore, BMI should

ideally be used in conjunction with other body composition assessments. (p.185)

The accuracy of BMI to assess overall body fatness is questionable. Much of the available research investigating the relationship between body image and body composition utilizes this method of body composition assessment. Because body image is associated with ideal body composition (Cash et al., 1986), it is necessary to use an accurate measure of body composition.

### *Skinfold Measurements*

According to the ACSM (2006), “body composition determined from skinfold measurements correlates well ( $r = 0.70 - 0.90$ ) with body composition determined by hydrodensitometry” (p. 59). This is an important consideration when choosing skinfold measurements as a means of body composition assessment, as illustrated by Howley & Franks (1997):

Hydrostatic (underwater) weighing is one of the most common means of estimating body composition in research settings and is often used as the criterion method for assessing body fat percentage. A criterion method provides the standard against which other methodologies are compared. (p. 168)

A seven-site skinfold analysis is a measure of subcutaneous fat storage in specific anatomical locations. Because fat and fat-free mass tissue is stored similarly for individuals of the same gender and approximate age (Housh, Housh, & Devries, 2006), this measurement of body composition may offer a more accurate depiction of body composition among the proposed research population.

Taking the aforementioned statement into consideration, skinfold measurements were used to assess percent body fat among male and female participants in this research

study. Previous studies that utilized skinfold measurements did so using a three-site assessment. This research study utilized a seven-site skinfold measurement, which is presumably a more accurate depiction of subcutaneous fat distribution.

### Summary

Research examining the relationship between body image and body composition, namely the utilization of skinfold measurements in conjunction with a validated body image assessment tool, among both males and females is not prevalent. In the present study, the researcher will utilize the Multidimensional Body-Self Relations Questionnaire (MBSRQ), a widely used and validated body image assessment tool. To assess percent body fat, the researcher will administer a seven-site skinfold. To determine BMI, the researcher will calculate the height and weight of each participant using the

It is crucial to understand the relationship between body image and body composition among different populations. A validated assessment tool, such as the MBSRQ may provide insight into the hypothesized differences that lie between males and females in relation to body composition and body image. The utilization of a seven-site skinfold measurement will provide an accurate depiction of fatness via percent body fat as opposed to the commonly used BMI method. The body composition method utilized is an important consideration in determining one's feelings of negative/positive body image, as perceived fatness typically influences one's body image perception.

## CHAPTER III

### METHODOLOGY

#### Introduction

This chapter will detail the methodology utilized in the completion of the study. It describes participant selection and the instruments and procedures used during data collection. The Oklahoma State University Institutional Review Board approved this research study before data collection procedures took place (Appendix X).

#### Participants

Data was collected in the Applied Musculoskeletal and Human Performance Laboratory in the Oklahoma State University Colvin Recreation Center. All participants signed an informed consent form (Appendix I) and completed a Medical History Questionnaire (Appendix III) prior to taking part in this study. There were a total of 82 apparently healthy, male and female college students at Oklahoma State University who volunteered to participate in this study. Of the 82 participants, 43 were males (mean age =  $22.95 \pm 2.32$ ). The remaining 39 participants were females (mean age =  $21.21 \pm 1.04$ ). Self-report height and weight values taken from the Medical History Questionnaire were calculated for each participant. Male participants averaged a BMI of 26.09 (SD = 3.55) while female participants averaged a BMI of 24.00 (SD = 4.30). Participants were then



asked to complete all MBSRQ items before undergoing a seven-site skinfold measurement. Percent body fat averaged 12.10 (SD = 5.72) for male participants and 24.51 (SD = 6.72) for female participants. The physical characteristics of the participants are presented in Tables 1 & 2.

TABLE 1: Male Participants

<b>Participants (n = 43)</b>	<b>Characteristics</b>
Age	22.95 ± 2.32
BMI	26.09 ± 3.55
BF%	12.10 ± 5.72

TABLE 2: Female Participants

<b>Participants (n = 39)</b>	<b>Characteristics</b>
Age	21.21 ± 1.04
BMI	24.00 ± 4.30
BF%	24.51 ± 6.72

## Assessment Tool

### *Multidimensional Body-Self Relations Questionnaire*

Body image was assessed using the MBSRQ. The self-report items of the MBSRQ are constructed on a five-point Likert scale, allowing participants to indicate their level of agreement/disagreement with the statements that assess body image satisfaction/dissatisfaction. This assessment tool consists of 69 items that make up the ten subscales of the inventory.

The AE subscale of the MBSRQ assesses “feelings of physical attractiveness or unattractiveness” (Cash, 2000, p. 3). High scores on this subscale indicate a general satisfaction with the respondents’ appearance while low scores indicate a general dissatisfaction with appearance (Cash).

The AO subscale of the MBSRQ evaluates the “extent of investment in one’s appearance” (Cash, 2000, p. 3). High scores indicate more investment in respondents’ appearance, grooming behaviors, and how they look. Low scores indicate the respondent does not “expend much effort to ‘look good’” (p. 3).

The FE subscale of the MBSRQ measures “feelings of being physically fit or unfit” (Cash, 2000, p. 3). High scores indicate a perception of being physically fit and athletic competence in addition to being actively involved in activities to maintain or enhance the respondents’ fitness level. Low scores indicate the respondent does not exercise on a regular basis and physical fitness is not valued. In addition, low scores indicate feelings of being physically unfit (Cash).

The FO subscale of the MBSRQ gauges the “extent of investment in being physically fit or athletically competent” (Cash, 2000, p. 3). High scores indicate the respondent is actively involved “in activities to enhance or maintain their fitness” (p. 3). Low scores indicate the respondent does not value physical fitness and he or she does not exercise regularly (Cash).

The HE subscale of the MBSRQ estimates “feelings of physical health and/or the freedom from physical illness” (Cash, 2000, p. 3). High scores indicate the respondent feels his or her body is in good health. Low scores indicate the respondent feels his or her body is not in good health (Cash).

The HO subscale of the MBSRQ approximates the “extent of investment in a physically healthy lifestyle” (Cash, 2000, p. 3). High scores indicate an effort to lead a healthy lifestyle while low scores indicate no such effort is made (Cash).

The IO subscale of the MBSRQ determines the “extent of reactivity to being or becoming ill” (Cash, 2000, p. 3). High scores indicate an awareness of symptoms of physical ailments and the likelihood of the respondent seeking medical attention. Low scores indicate the respondent is not likely to be aware of or react to symptoms of physical illness (Cash).

The BASS subscale of the MBSRQ is “similar to the AE subscale, except that the BASS taps satisfaction with discrete aspects of one’s appearance” (Cash, 2000, p. 3). High scores indicate the respondent is “generally content” with “most areas” of his or her

body while low scores indicate the respondent is “unhappy with the size or appearance of several areas” (p. 3).

The OP subscale of the MBSRQ “assesses a construct reflecting fat anxiety, weight vigilance, dieting, and eating restraint” (Cash, 2000, p. 3).

The SCW subscale of the MBSRQ “reflects how one perceives and labels one’s weight, from very underweight to very overweight” (Cash, 2000, p. 3).

Participants were made aware of the number coding system utilized in this study to ensure anonymity of divulged information and encouraged to answer all items of the MBSRQ honestly and to the best of their knowledge. The MBSRQ is presented in its entirety in Appendix IV.

### Adiposity Measures

#### *BMI*

Each participant documented a self-report height and weight on the Medical History Questionnaire. The researcher chose to use a self-report height and weight for each participant because this method of data collection is common in research examining the relationship between body image and body composition. This information was later used to calculate BMI (Appendix VII) and to determine subsequent BMI classification.

### *Percent Body Fat*

A seven-site skinfold measurement was taken for each of the participants in a private room of the Applied Musculoskeletal and Human Performance Laboratory at Oklahoma State University. A skilled tester took skinfold measurements at exact anatomical locations to ensure the accuracy of the percent body fat estimation for each of the participants. The following seven-sites were tested for both male and female participants: chest, midaxillary, triceps, subscapular, abdomen, suprailiac, and thigh. Participants were made aware of the seven-sites prior to the assessment via the aforementioned figures. Skinfold measurements were taken using calibrated a Lange Skinfold Caliper, (Beta Technology Inc., Santa Cruz CA), to the nearest millimeter. The procedures for conducting seven-site skinfold measurements were practiced by the researcher as indicated by ACSM's Guidelines for Exercise Testing and Prescription (2006):

- All measurements should be made on the right side of the body with the subject standing upright
  - Caliper should be placed directly on the skin surface, 1cm away from the thumb and finger, perpendicular to the skinfold, and halfway between the crest and the base of the fold
  - Pinch should be maintained while reading the caliper
  - Wait 1 to 2 seconds (and not longer) before reading caliper
  - Take duplicate measures at each site and retest if duplicate measurements are not within 1 to 2 mm
  - Rotate through measurement site or allow time for skin to regain normal texture and thickness
- (p. 62)

Percent body fat was estimated using ACSM's sum of seven skinfolds equation for males and females (ACSM, 2006) (Appendices VIII & IX). The percent fat in the equation correlates .96 with hydrostatic weighing. The seven-site skinfold recording form for male and female participants is present in Appendices V and VI, respectively.

### Statistical Analysis

Percent body fat and MBSRQ scores were compared using Pearson Correlation Coefficients among male and female participants. Pearson Correlation Coefficients were also used to compare percent body fat and BMI values among male and female participants. The correlation coefficients were then interpreted and classified. An Independent Samples t-test was used to compare percent body fat and MBSRQ scores between male and female participants.

## CHAPTER IV

### FINDINGS

#### Overview

As indicated by the Medical History Questionnaire, a total of 82 apparently healthy male and female college students volunteered to participate in this study. Each participant completed the MBSRQ and had their percent body fat assessed via a seven-site skinfold measure. The self-report height and weight of each participant was obtained from the Medical History Questionnaire. A BMI value was determined for each participant based on this information.

#### Results

##### *Males*

Body image scores and percent body fat were compared among males using Pearson Correlation Coefficients. Significance was found in the AE, FO, HO, BASS, and SCW subscales of the MBSRQ when compared to percent body fat (Table 3). The AE, FO, and HO subscales were negatively correlated with percent body fat ( $p < 0.01$ ). The BASS subscale was also negatively correlated with percent body fat ( $p < 0.05$ ). The SCW subscale was positively correlated with percent body fat ( $p < 0.01$ ). Percent body fat did not correlate with BMI values among male participants ( $p < 0.01$ ).



### *Females*

Body image scores and percent body fat were compared among females using Pearson Correlation Coefficients. Significance was discovered in both the SCW subscale and the AE subscale of the MBSRQ when compared to percent body fat (Table 4). A positive correlation was found among female participants when comparing SCW with percent body fat ( $p < 0.01$ ). When comparing AE with percent body fat, a negative correlation was found ( $p < 0.05$ ). Percent body fat did correlate with BMI values among female participants ( $p < 0.01$ ).

### *Gender Comparisons*

Body image scores and percent body fat were compared between male and female participants using Independent Samples t-test. Significance was observed in the AE, AO, FE, FO, HE, HO, and the BASS subscales of the MBSRQ ( $p < 0.05$ ) as shown in Figure 1.

TABLE 3: Pearson Correlation Coefficient among Male Participants

MBSRQ Subscale	Score	r
Appearance Evaluation	-.535**	Moderate
Fitness Orientation	-.544**	Moderate
Health Orientation	-.491**	Moderate
Body Areas Satisfaction	-.301*	Low
Self-Classified Weight	.594**	Moderate

\*\*Correlation is significant at the 0.01 level (2-tailed).

\*Correlation is significant at the 0.05 level (2-tailed).

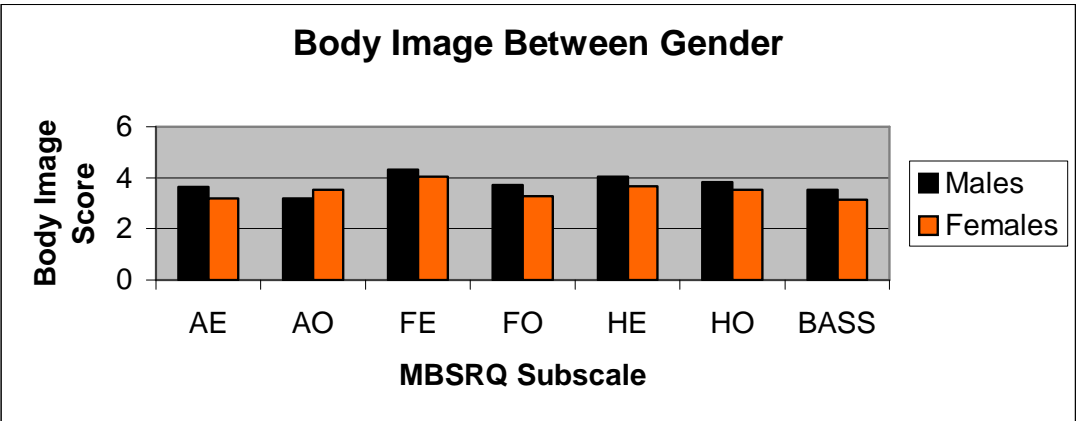
TABLE 4: Pearson Correlation Coefficient among Female Participants

MBSRQ Subscale	Score	r
Self-Classified Weight	.742**	Moderately High
Appearance Evaluation	-.383*	Low

\*\*Correlation is significant at the 0.01 level (2-tailed).

\*Correlation is significant at the 0.05 level (2-tailed).

FIGURE 1: Body Image between Gender



## CHAPTER V

### CONCLUSION

#### Overview

Chapter V summarizes the purpose, methodology, and findings of the present study. The initial hypotheses are then compared to the findings of the present study in detail. Conclusions are then discussed based on these findings. Finally, the chapter is concluded with recommendations for future research.

#### Summary

The purpose of this research study was to evaluate the relationship between body image and body composition among male and female college students. Administering the MBSRQ to each participant assessed his or her respective body image scores. Body composition was assessed two ways. The first way body composition was assessed was through self-report height and weight values, which were later used by the researcher to determine BMI classification. The second way body composition was assessed was by seven-site skinfold measurements of each participant taken by the researcher, which was later used to determine percent body fat.

Significance was found when comparing several of the research variables. When comparing percent body fat and MBSRQ scores among males, a significant correlation existed in the AE, FO, HO, BASS, and SCW subscales. When comparing percent body

fat and MBSRQ scores among females, a significant correlation existed in both the SCW and the AE subscales. When comparing MBSRQ scores between males and females, significant differences were discovered in the following subscales: AE, AO, FE, FO, HE, HO, and BASS. Female participants' percent body fat categorization and BMI classification were statistically similar, indicating that BMI classification was an accurate assessment of body composition among this group. However, percent body fat categorization and BMI classification did not correlate in males, indicating that BMI classification was not an accurate assessment of body composition among this group.

The findings of the present study supported the original hypotheses. Results indicated that body composition might influence body image. In addition, men and women scored statistically different on several of the MBSRQ subscale items. Finally, BMI values did not correspond with percent body fat in male participants.

### Conclusion

The results of this study indicate that body composition may be an important factor in body image development. Previous research has relied on the use of BMI tables to assess body composition. In the present study, BMI values did not correspond with percent body fat in males. This may be true because males tend to have more lean mass than females. Therefore, it may be prudent to use a more accurate method of body composition assessment, particularly among males, when evaluating body image.

In addition, male and female participants were significantly different in their body image assessments. This may be due to different body composition ideals set forth by the larger society. Previous studies have focused primarily on the relationship between body composition and body image among women. More studies similar to the present study are necessary to gain a better understanding of how gender and body composition may influence body image.

Although the importance of the relationship between body image and body composition among males and females has received more attention in recent years, a gap in literature still exists addressing this area of research. It is essential to gain an understanding of the relationship between body image and body composition to identify any possible issues that may develop as a result of a negative body image.

### Recommendations

Further investigation into the relationship between body composition and body image is necessary. BMI tables do not always provide an accurate depiction of lean versus fat mass ratios, which may affect how one perceives his or her body image. For this reason, future research should focus on utilizing more accurate body composition methods. In addition, studies exploring the differences in body image perceptions between males and females in relation to body composition are necessary.

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APPENDIX I  
INFORMED CONSENT

## INFORMED CONSENT FORM

### **PROJECT TITLE: The Relationship between Body Image and Body Composition among Male and Female College Students**

**Purpose:** The purpose of this research study is to determine the relationship between body composition and body image. You were selected to participate in this study because you are currently enrolled as a college student. The researchers of this study are interested in learning the relationship between body composition and body image.

**Procedures:** This study is conducted in conjunction with Oklahoma State University and involves voluntary participation. Participants will be Oklahoma State University students who agree to participate in the study. When the participants arrive for testing, a member of the research team will administer an informed consent. Testing will include a brief Medical History Questionnaire and the Multidimensional Body Self-Relations Questionnaire (MBSRQ) to be completed by each participant. Following these assessments, participants will undergo a seven-site body composition analysis given by the researchers using a Lange Skinfold Caliper. This assessment requires that the researcher pinch the skin at the following anatomical sites to measure subcutaneous fat: chest, midaxillary, triceps, subscapular, abdomen, suprailiac, and thigh. It is recommended that the participant wear athletic clothing to ensure the sites are easily accessible to the researcher.

**Possible Risks:** Risks associated with the study are minimal. When filling out the questions, you may come across a question or answer choice that you find unpleasant, upsetting, or otherwise objectionable. You will be asked to provide anonymous and confidential information about yourself that you may find intrusive. In addition, some participants may be uncomfortable with the skinfold assessment.

**Possible Benefits:** When your participation is complete, you will be given an opportunity to learn about this research, which may be useful to you or in understanding yourself and others.

**Confidentiality:** The records of this study will be kept private. Any written results will discuss group findings and will not include information that will identify you. Research records will be stored securely and only researchers and individuals responsible for research oversight will have access to the records. It is possible that the consent process

and data collection will be observed by research oversight staff for safeguarding the rights and wellbeing of people who participate in research.

**Contacts:** If you need any additional information contact: Dr. Doug Smith, 197 CRC, Oklahoma State University, 405-744-5500 or Crishel Kline 199A CRC, Oklahoma State University, 405-744-7677. If you have any questions about the research and your rights as a research volunteer, you may contact Dr. Sheila Kennison, IRB Chair, 219 Cordell Hall, Stillwater, OK, 74078, 405-744-1676 or [irb@okstate.edu](mailto:irb@okstate.edu).

**Participant Rights:** You have the right to refuse to participate and you may withdraw at any time without penalty. All data will be treated confidentially and all data will be reported in aggregate without participation identifiers.

I have read and fully understand the consent form. I sign it freely and voluntarily. A copy of this form has been given to me.

\_\_\_\_\_  
**Signature of Participant** \_\_\_\_\_  
**Date**

I certify that I have personally explained this document before requesting that the participant sign it.

\_\_\_\_\_  
**Signature of Researcher** \_\_\_\_\_  
**Date**

APPENDIX II  
RECRUITMENT SCRIPT



## Recruitment Script

### **The Relationship between Body Image and Body Composition among Male and Female College Students**

Thank you for your participation in the research project observing the relationship between body composition and body image.

If you choose to participate in the study, you will review and sign a Medical History Questionnaire and informed consent form. You will be asked to complete the Multidimensional Body Self-Relations Questionnaire (MBSRQ). You will then have your body composition measured by the researcher. We suggest you keep this sheet to remind you of the tasks we would like you to complete.

#### **Instructions for Research Participants**

**Step One:** Consent form should be read and all questions answered. The consent form must then be signed prior to completion of the Medical History Questionnaire.

**Step Two:** Complete the MBSRQ in the Applied Musculoskeletal and Human Performance Laboratory in the OSU Colvin Recreation Center, room 192.

**Step Three:** A seven-site skinfold measurement will be given by the researcher in room 192A, a private room accessible only to OSU faculty and staff, of the Applied Musculoskeletal and Human Performance Laboratory in the OSU Colvin Recreation Center. This assessment requires that the researcher pinch the skin at the following anatomical sites to measure subcutaneous fat: chest, midaxillary, triceps, subscapular, abdomen, suprailiac, and thigh. It is recommended that the participant wear athletic clothing to ensure skinfold sites are easily accessible to the researcher.

**Benefits for Participants:** When your participation is complete, you will be given an opportunity to learn about this research, which may be useful to you or in understanding yourself and others.

**Risks for Participants:** Risks associated with the study are minimal. When filling out the questions, you may come across a question or answer choice that you find unpleasant, upsetting, or otherwise objectionable. You will be asked to provide anonymous and confidential information about yourself that you may find intrusive. In addition, you may be uncomfortable with the skinfold assessment.

APPENDIX III  
MEDICAL HISTORY



**OKLAHOMA STATE UNIVERSITY  
APPLIED MUSCULOSKELETAL HUMAN PERFORMANCE LABORATORY**

**Personal Medical History Survey**  
*Please complete the front and back of this form*

Participant ID #: \_\_\_\_\_ Date: \_\_\_\_\_

Age: \_\_\_\_\_ Gender: \_\_\_\_\_ Weight: \_\_\_\_\_ Height: \_\_\_\_\_

1. Have you ever been diagnosed as having (check all that apply):

	<b>Never</b>	<b>In the past</b>	<b>Presently</b>
A. Heart disease	_____	_____	_____
B. Rheumatic fever	_____	_____	_____
C. High blood pressure	_____	_____	_____
D. Other vascular disorders	_____	_____	_____
E. Diabetes	_____	_____	_____
F. Kidney disorder	_____	_____	_____
G. Liver disorder	_____	_____	_____
H. Asthma	_____	_____	_____
I. Allergies	_____	_____	_____
J. Chronic bronchitis	_____	_____	_____
K. Other respiratory illness	_____	_____	_____
L. High cholesterol	_____	_____	_____
M. Anemia	_____	_____	_____
N. Low blood sugar	_____	_____	_____
O. Neuromusculoskeletal disease	_____	_____	_____
P. Sores in mouth	_____	_____	_____
Q. Cavities in teeth	_____	_____	_____
R. Gum disease	_____	_____	_____
S. "Strep" throat	_____	_____	_____
T. Other oral infections	_____	_____	_____
U. Heart Murmur	_____	_____	_____

2. Please indicate any surgery that you have undergone and the approximate date(s):

---



---

---

3. Please indicate recent illnesses or major injuries that you have had. Also list approximate dates:

---

---

4. Do you smoke? \_\_\_\_\_ Packs per day? \_\_\_\_\_

5. Do you use smokeless tobacco (chew or dip)? \_\_\_\_\_ How often? \_\_\_\_\_

6. Please list all medications or supplements (prescription and non-prescription) that you are presently taking:

Medication	Dosage	Duration
------------	--------	----------

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7. Have you ever performed endurance training? Yes \_\_\_\_\_ No \_\_\_\_\_

8. Approximately how many years have you practiced endurance training?  
\_\_\_\_\_

9. On a scale from 1-10 (1 being novice, 10 being expert) rate your experience with resistance training. \_\_\_\_\_

10. Describe exercise or activity program during the last 6 months. Please include the activity, amount per day, days per week, and length of time you have been exercising at this level:

Activity	Time per Session	Days/Week

APPENDIX IV

MULTIDEMENSIONAL BODY-SELF RELATIONS QUESTIONNAIRE

## THE MBSRQ

### INSTRUCTIONS—PLEASE READ CAREFULLY

The following pages contain a series of statements about how people might think, feel, or behave. You are asked to indicate the extent to which each statement pertains to you personally.

Your answers to the items in the questionnaire are anonymous, so please do not write your name on any of the materials. In order to complete the questionnaire, read each statement carefully and decide how much it pertains to you personally. Using a scale like the one below, indicate your answer by entering it to the left of the number of the statement.

#### **EXAMPLE:**

\_\_\_\_\_ I am usually in a good mood.

In the blank space, enter a 1 if you **definitely disagree** with the statement;

enter a 2 if you **mostly disagree**;

enter a 3 if you **neither agree nor disagree**;

enter a 4 if you **mostly agree**;

or enter a 5 if you **definitely agree** with the statement.

There are no right or wrong answers. Just give the answer that is most accurate for you. Remember, your responses are confidential, so please be completely honest and answer all items.

*(Duplication and use of the MBSRQ only by permission of  
Thomas F. Cash, Ph.D., Department of Psychology,  
Old Dominion University, Norfolk, VA 23529)*

1	2	3	4	5
Definitely Disagree	Mostly Disagree	Neither Agree Nor Disagree	Mostly Agree	Definitely Agree

- \_\_\_\_\_ 1. Before going out in public, I always notice how I look.
- \_\_\_\_\_ 2. I am careful to buy clothes that will make me look my best.
- \_\_\_\_\_ 3. I would pass most physical-fitness tests.
- \_\_\_\_\_ 4. It is important that I have superior physical strength.
- \_\_\_\_\_ 5. My body is sexually appealing.
- \_\_\_\_\_ 6. I am not involved in a regular exercise program.
- \_\_\_\_\_ 7. I am in control of my health.
- \_\_\_\_\_ 8. I know a lot about things that affect my physical health.
- \_\_\_\_\_ 9. I have deliberately developed a healthy lifestyle.
- \_\_\_\_\_ 10. I constantly worry about being or becoming fat.
- \_\_\_\_\_ 11. I like my looks just the way they are.
- \_\_\_\_\_ 12. I check my appearance in a mirror whenever I can.
- \_\_\_\_\_ 13. Before going out, I usually spend a lot of time getting ready.
- \_\_\_\_\_ 14. My physical endurance is good.
- \_\_\_\_\_ 15. Participating in sports is unimportant to me.
- \_\_\_\_\_ 16. I do not actively do things to keep physically fit.
- \_\_\_\_\_ 17. My health is a matter of unexpected ups and downs.
- \_\_\_\_\_ 18. Good health is one of the most important things in my life.
- \_\_\_\_\_ 19. I don't do anything that I know might threaten my health.

*continued on the next page*

1	2	3	4	5
Definitely Disagree	Mostly Disagree	Neither Agree Nor Disagree	Mostly Agree	Definitely Agree

- \_\_\_\_\_ 20. I am very conscious of even small changes in my weight.
- \_\_\_\_\_ 21. Most people would consider me good-looking.
- \_\_\_\_\_ 22. It is important that I always look good.
- \_\_\_\_\_ 23. I use very few grooming products.
- \_\_\_\_\_ 24. I easily learn physical skills.
- \_\_\_\_\_ 25. Being physically fit is not a strong priority in my life.
- \_\_\_\_\_ 26. I do things to increase my physical strength.
- \_\_\_\_\_ 27. I am seldom physically ill.
- \_\_\_\_\_ 28. I take my health for granted.
- \_\_\_\_\_ 29. I often read books and magazines that pertain to health.
- \_\_\_\_\_ 30. I like the way I look without my clothes on.
- \_\_\_\_\_ 31. I am self-conscious if my grooming isn't right.
- \_\_\_\_\_ 32. I usually wear whatever is handy without caring how it looks.
- \_\_\_\_\_ 33. I do poorly in physical sports or games.
- \_\_\_\_\_ 34. I seldom think about my athletic skills.
- \_\_\_\_\_ 35. I work to improve my physical stamina.
- \_\_\_\_\_ 36. From day to day, I never know how my body will feel.
- \_\_\_\_\_ 37. If I am sick, I don't pay much attention to my symptoms.
- \_\_\_\_\_ 38. I make no special effort to eat a balanced and nutritious diet.

*continued on the next page*

1	2	3	4	5
Definitely Disagree	Mostly Disagree	Neither Agree Nor Disagree	Mostly Agree	Definitely Agree

- \_\_\_\_\_ 39. I like the way my clothes fit me.
- \_\_\_\_\_ 40. I don't care what people think about my appearance.
- \_\_\_\_\_ 41. I take special care with my hair grooming.
- \_\_\_\_\_ 42. I dislike my physique.
- \_\_\_\_\_ 43. I don't care to improve my abilities in physical activities.
- \_\_\_\_\_ 44. I try to be physically active.
- \_\_\_\_\_ 45. I often feel vulnerable to sickness.
- \_\_\_\_\_ 46. I pay close attention to my body for any signs of illness.
- \_\_\_\_\_ 47. If I'm coming down with a cold or flu, I just ignore it and go on as usual.
- \_\_\_\_\_ 48. I am physically unattractive.
- \_\_\_\_\_ 49. I never think about my appearance.
- \_\_\_\_\_ 50. I am always trying to improve my physical appearance.
- \_\_\_\_\_ 51. I am very well coordinated.
- \_\_\_\_\_ 52. I know a lot about physical fitness.
- \_\_\_\_\_ 53. I play a sport regularly throughout the year.
- \_\_\_\_\_ 54. I am a physically healthy person.
- \_\_\_\_\_ 55. I am very aware of small changes in my physical health.
- \_\_\_\_\_ 56. At the first sign of illness, I seek medical advice.
- \_\_\_\_\_ 57. I am on a weight-loss diet.

*continued on the next page*

**For the remainder of the items use the response scale given with the item,  
and enter your answer in the space beside the item.**

\_\_\_\_\_ 58. I have tried to lose weight by fasting or going on crash diets.

1. Never
2. Rarely
3. Sometimes
4. Often
5. Very Often

\_\_\_\_\_ 59. I think I am:

1. Very Underweight
2. Somewhat Underweight
3. Normal Weight
4. Somewhat Overweight
5. Very Overweight

\_\_\_\_\_ 60. From looking at me, most other people would think I am:

1. Very Underweight
2. Somewhat Underweight
3. Normal Weight
4. Somewhat Overweight
5. Very Overweight

***continued on the next page***



61-69. Use this 1 to 5 scale to indicate how dissatisfied or satisfied you are  
with each of the following areas or aspects of your body:

1	2	3	4	5
Very Dissatisfied	Mostly Dissatisfied	Neither Satisfied Nor Dissatisfied	Mostly Satisfied	Very Satisfied

- 
- \_\_\_\_\_ 61. Face (facial features, complexion)
- \_\_\_\_\_ 62. Hair (color, thickness, texture)
- \_\_\_\_\_ 63. Lower torso (buttocks, hips, thighs, legs)
- \_\_\_\_\_ 64. Mid torso (waist, stomach)
- \_\_\_\_\_ 65. Upper torso (chest or breasts, shoulders, arms)
- \_\_\_\_\_ 66. Muscle tone
- \_\_\_\_\_ 67. Weight
- \_\_\_\_\_ 68. Height
- \_\_\_\_\_ 69. Overall appearance
- 

MBSRQ © Thomas F. Cash, Ph.D.

APPENDIX V

SKINFOLD RECORDING FORM: MALES

Participant #: \_\_\_\_\_

**MALES**  
**Seven Site Skinfold**

	MEASURE #1	MEASURE #2	MEASURE #3
CHEST			
MIDAXILLARY			
TRICEPS			
SUBSCAPULAR			
ABDOMEN			
SUPRAILIAC			
THIGH			

Body Fat Percentage: \_\_\_\_\_

Density: \_\_\_\_\_

Lean Mass: \_\_\_\_\_

Fat Mass: \_\_\_\_\_

APPENDIX VI  
SKINFOLD RECORDING FORM: FEMALES

Participant #: \_\_\_\_\_

**FEMALES**  
**Seven Site Skinfold**

	MEASURE #1	MEASURE #2	MEASURE #3
CHEST			
MIDAXILLARY			
TRICEPS			
SUBSCAPULAR			
ABDOMEN			
SUPRAILIAC			
THIGH			

Body Fat Percentage: \_\_\_\_\_

Density: \_\_\_\_\_

Lean Mass: \_\_\_\_\_

Fat Mass: \_\_\_\_\_

APPENDIX VII

BMI EQUATION: MALES & FEMALES

$$\text{BMI (kg/m}^2\text{)} = \frac{\text{(weight in pounds * 703)}}{\text{(height in inches}^2\text{)}}$$

APPENDIX VIII  
SKINFOLD EQUATION: MALES



Body density =

$$1.112 - 0.00043499 (\text{sum of seven skinfolds}) + 0.00000055 (\text{sum of seven skinfolds})^2 - 0.00028826 (\text{age})$$

APPENDIX IX  
SKINFOLD EQUATION: FEMALES

Body density =

$$1.097 - 0.00046971 (\text{sum of seven skinfolds}) + 0.00000056 (\text{sum of seven skinfolds})^2 - 0.00012828 (\text{age})$$

APPENDIX X  
IRB APPROVAL FORM

**Oklahoma State University Institutional Review Board**

Date: Tuesday, March 18, 2008  
IRB Application No ED0816  
Proposal Title: The Effects of Body Composition on Body Image Among College Students

Reviewed and Expedited  
Processed as:

**Status Recommended by Reviewer(s): Approved Protocol Expires: 3/17/2009**

Principal Investigator(s):

Crishel D. Kline  
199A CRC  
Stillwater, OK 74078

Douglas Smith  
197 Colvin Center  
Stillwater, OK 74078

---

The IRB application referenced above has been approved. It is the judgment of the reviewers that the rights and welfare of individuals who may be asked to participate in this study will be respected, and that the research will be conducted in a manner consistent with the IRB requirements as outlined in section 45 CFR 46.

The final versions of any printed recruitment, consent and assent documents bearing the IRB approval stamp are attached to this letter. These are the versions that must be used during the study.

As Principal Investigator, it is your responsibility to do the following:

1. Conduct this study exactly as it has been approved. Any modifications to the research protocol must be submitted with the appropriate signatures for IRB approval.
2. Submit a request for continuation if the study extends beyond the approval period of one calendar year. This continuation must receive IRB review and approval before the research can continue.
3. Report any adverse events to the IRB Chair promptly. Adverse events are those which are unanticipated and impact the subjects during the course of this research; and
4. Notify the IRB office in writing when your research project is complete.

Please note that approved protocols are subject to monitoring by the IRB and that the IRB office has the authority to inspect research records associated with this protocol at any time. If you have questions about the IRB procedures or need any assistance from the Board, please contact Beth McTernan in 219 Cordell North (phone: 405-744-5700, beth.mcternan@okstate.edu).

Sincerely,



Shelia Kennison, Chair  
Institutional Review Board

## VITA

Crishel D. Kline

Candidate for the Degree of

Master of Science

Thesis: THE RELATIONSHIP BETWEEN BODY IMAGE AND BODY  
COMPOSITION AMONG MALE AND FEMALE COLLEGE STUDENTS

Major Field: Health and Human Performance

Biographical:

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Education:

Graduated Cum Laude with a Bachelor of Arts degree in Psychology from Wichita State University, Wichita, Kansas in May 2006. Completed the requirements for the Master of Science in Health and Human Performance at Oklahoma State University, Stillwater, Oklahoma in December, 2009.

Experience:

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Name: Crishel D. Kline

Date of Degree: May, 2010

Institution: Oklahoma State University

Location: Stillwater, Oklahoma

Title of Study: THE RELATIONSHIP BETWEEN BODY IMAGE AND BODY COMPOSITION AMONG MALE AND FEMALE COLLEGE STUDENTS

Pages in Study: 62

Candidate for the Degree of Master of Science

Major Field: Health and Human Performance

Scope and Method of Study:

The purpose of the present study was to investigate the relationship between body composition and body image among male and female college students. All participants signed an informed consent and completed a Medical History Questionnaire prior to taking part in the study. Participants were then asked to complete the Multidimensional Body-Self Relations Questionnaire (MBSRQ) before undergoing a seven-site skinfold measurement. Body Mass Index (BMI) was calculated using self-report height and weight numbers taken from the Medical History Questionnaire completed by each participant. Statistical analyses were run using the data collected comparing male and female participants.

Findings and Conclusions:

The results of the present study indicated that there was a significant difference for males in the AE, FO, HO, BASS, and SCW subscales of the MBSRQ when compared to percent body fat. The AE, FO, and HO subscales were negatively correlated with percent body fat ( $p < 0.01$ ) among males. The BASS subscale was also negatively correlated with percent body fat ( $p < 0.05$ ) for this group. The SCW subscale was positively correlated with percent body fat ( $p < 0.01$ ) for male participants. Percent body fat did not correlate with BMI values among male participants ( $p < 0.01$ ). Body image scores and percent body fat were compared among females using Pearson Correlation Coefficients. Significance was discovered in both the SCW subscale and the AE subscale of the MBSRQ when compared to percent body fat. A positive correlation was found among female participants when comparing SCW with percent body fat ( $p < 0.01$ ). When comparing AE with percent body fat, a negative correlation was found ( $p < 0.05$ ) in this group. Percent body fat did correlate with BMI values among female participants ( $p < 0.01$ ). The findings of this study suggest that body composition may affect body image in male and female college students. The results also suggest that percent body fat may be a more accurate method of assessing body

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composition than BMI measures.

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