2011-03-16

# The Relationship Between Source of Self-Esteem and Body Composition in College Women

Breckann Faun Moncur

*Brigham Young University - Provo*

Follow this and additional works at: https://scholarsarchive.byu.edu/etd

Part of the Exercise Science Commons

The Relationship between Source of Self-esteem and Body Composition in College Women


Breckann Moncur


A thesis submitted to the faculty of
Brigham Young University
in partial fulfillment of the requirements for the degree of

Master of Science


Bruce Bailey, Chair
James Lecheminant
Barbara Lockhart


Department of Exercise Sciences

Brigham Young University

April 2011

ABSTRACT

The Relationship between Source of Self-esteem and Body Composition in College Women

Breckann Moncur
Department of Exercise Sciences, BYU
Master of Science

Purpose: The purpose of the study was to determine the relationship between achievement self-esteem, self acceptance self-esteem and body composition in college women. Methods: One-hundred and fifty eight college women were recruited to participate in the study. Participants were healthy, between the age of 18 and 25 yrs, not taking medication that would alter metabolism, and able to participate in physical activity without restriction. As part of the study the participants filled out the Worth Index, which measured level of self-acceptance and achievement self-esteem. The questionnaire included four subscales: basic human worth, performance factor, personal security and appearance. Body composition was assessed using the BOD POD. Results: Participants in the study were $19.9 \pm 1.7$ yrs, had a BMI of $22.5 \pm 3.2$ kg/m² and a percent body fat of $26.4 \pm 6.4$. Source of self-esteem was primarily self-acceptance self-esteem with participants on average scoring $65 \pm 11$ out of 84 (high moderate) compared to an achievement self-esteem score of $35 \pm 10$ out of 84 (low moderate). When evaluating the subscales a similar trend appears with the exception of the performance factor, which was more normally distributed. Achievement self-esteem in appearance was positively correlated to percent body fat ($p<0.05$). Global self-esteem was not related to percent body fat in this population. BMI was negatively related to performance factor and appearance with self-acceptance self-esteem ($p<0.05$). Global self-esteem was significantly lower for individuals in the highest BMI category. Conclusion: College women who identified less with achievement self-esteem in the subscale of appearance had a lower percent body fat than women who identified more with achievement self-esteem in the subscale for appearance. Also, women who had a higher BMI identified less with self-acceptance self-esteem in the subscales of appearance and performance. Women who had a higher BMI had lower overall self-esteem.

ACKNOWLEDGEMENTS

I would like to thank my committee chair, Bruce Bailey, for his endless hours of work and dedication to make this thesis possible. I am grateful for his constant encouragement and patience to help me succeed. I am also, grateful to Barbra Lockhart, whose teaching and ideas gave rise to this thesis and who put in so much effort to help me understand how meaningful this thesis topic is. I am grateful to Dr. Lecheminant for feedback and willingness to help where he could. I am thankful to all of my family and friends who helped read my paper, and believed in me and encouraged me along in this journey. Most of all, I am thankful to my Heavenly Father who has blessed me to know what questions to ask and has inspired me all along the way.

Table of Contents

List of Tables

Tables

**Introduction**

One of the biggest health concerns in our society today is the increasing prevalence of overweight and obesity. Being overweight and/or obese has a negative influence on health, and mortality,[1] and more than 2/3rds of the adult population is obese or overweight.[2] Because of the increasing number of obese and overweight individuals, prevention of unhealthy weight gain is of great concern.

Across college campuses, students are facing problems of weight gain and obesity. According to the Behavioral Risk Factor Surveillance System, obesity rates are increasing at the fastest rate for adults ages 18-30 yrs.[3] Unfortunately, weight gain is much more common than weight stability or weight loss in young adults.[4] This is specifically true of college students where the average weight gain for freshmen ranges from 1.6 lbs to 8.8 lbs.[5-6]

One factor that may influence weight gain in college students is the positive or negative regard students have for themselves. This favorable or unfavorable opinion of oneself is referred to as self-esteem.[7-10]

Self-esteem may come from one of two sources.[11, 12] One source of self-esteem is unconditional and is referred to as self-acceptance self-esteem. In this source of self-esteem individuals believe their value is inherent and is not earned or produced by any action or achievement. Deci calls this source of self-esteem true self-esteem.[11] "True self-esteem represents a sound, stable sense of oneself, built on a solid foundation of believing in one's worth as a human being".[11] This source of self-esteem is more stable and doesn't change based on personal behavior or events in one's life.

The other source of self-esteem, achievement self-esteem, results from a feeling that worth is achieved or merited. Deci calls this source of self-esteem contingent self-esteem and states that it is "less stable, less securely based in a fundamental sense of worth".[11] It is not constant and changes under different circumstances. This inconsistency leaves individuals uncertain and self-derogatory.[11]

Studies looking at self-esteem and body composition/weight generally demonstrate a negative relationship.[13-27] However, the questionnaires developed to evaluate self-esteem focus primarily on achievement self-esteem. In addition, the research evaluating the relationship between self-esteem and body composition/weight has not looked at the source of self-esteem. There is a need to evaluate the source of self-esteem because basing one's worth on achievements, comparisons, and other criteria may actually be harmful to the individual; as Ryan and Brown explain it leaves individuals vulnerable psychologically.[11, 12, 28, 29] This is specifically true of body composition/weight, since appearance is often intimately related with an individual's self-esteem.[16, 19, 26]

Therefore, the purpose of this study was to investigate the relationship between body composition and source of self-esteem (i.e., self-acceptance self-esteem or achievement self-esteem) in undergraduate college females. We also looked at the relationship between body composition and overall self-esteem.

**Methods**

*Design*

A cross-sectional design was used for this study.

*Participants*

This study was conducted using college women, ages 18-25. One-hundred and fifty-eight undergraduate women were recruited. Participants were recruited through word of mouth, facebook groups, fliers, posters, visits to general education classes, and campus information tables. Each participant was screened prior to participation to determine if she was eligible. Any individuals who were pregnant or planning to become pregnant, currently taking depression, anxiety, or metabolism altering medication, or who were unable to participate in physical activity were excluded from the study. Institutional Review Board (IRB) approval was received prior to beginning the study. All participants gave written consent prior to participating in the study.

*Procedures*

Before participants were accepted into the study, they were screened to ensure that eligibility criteria were met. Participants who met all inclusion criteria were invited to be part of the study. The testing for the study took about an hour and participants were asked to fill out a questionnaire, and complete measurements of height, weight, and body composition.

Upon completion of the testing all participants received compensation for their participation. Each subject received $15 in cash and their body composition results.

*Measurements*

The measurement used in the study assessed body composition and source of self-esteem. Participants were instructed to not eat, drink, or exercise three hours prior to their assessment.

*The Worth Index.* The Worth Index (WI) was used to measure the source of an individual's perceived self-esteem and the overall level of their self-esteem. The WI incorporates questions representing achievement self-esteem and self-acceptance self-esteem, as well as overall self esteem. It also includes four subscales: basic human worth, personal security, performance, and appearance. For each subscale an achievement self-esteem score as well as a self-acceptance self-esteem score was obtained. The questionnaire consists of 24 questions, each subscale asking six questions: three questions measuring self-acceptance self-esteem and three questions measuring achievement self-esteem. At the end of the questionnaire there are two more questions that measured the participant's overall level of self-esteem and stability of self-esteem. The WI was validated against the Rosenberg Self-esteem Scale and a correlation between overall self-esteem of 0.82 was found.[12] The test-retest reliability was 0.57 and the 12 questions regarding self-acceptance self-esteem were negatively correlated with the 12 questions regarding achievement self-esteem with a correlation of -0.82.[12]

*Body Composition and Anthropometric Measurements.* Participants were provided a tight fitting one-piece swimsuit and swim cap, and were instructed to use the restroom before any measurements were taken. Height was measured to the nearest 0.1 cm using a wall mounted stadiometer (Seca, Chino, CA, USA). Weight was measured to the nearest 0.1 kg using a calibrated digital scale (Tanita Corporation, Japan).

Body composition was measured using the BOD POD (Life Measurement Instruments, Concord, California, USA). The BOD POD was calibrated according to instruction from the

manufacturer. Numerous studies have demonstrated the validity of the BOD POD in measuring body density.[30-33]

*Data Analysis*

The purpose of this study was to determine the relationship between percent body fat and BMI and source of self-esteem. The independent variables were the Worth Index scores including overall scores on achievement self-esteem and self-acceptance self-esteem, scores for the four subscales, and the score for overall self-esteem. The dependent variables were percent body fat and BMI. To compare source of self-esteem in women with higher and lower levels of body fat and BMI, percent body fat and BMI quartiles were created and the middle two quartiles were collapsed. We controlled for overall self-esteem. Analysis of variance using general linear model was used to evaluate differences in source of self-esteem and subscales between percent body fat and BMI groups. Prior to any analysis, the data was checked for normality. Data was reported using means and standard deviations for all independent and dependent variables. The stepwise regression was used to assess relationships between criterion and predictor variables. Bivariate relationships were analyzed using a Pearson Correlation. Partial correlation was used to determine how potential confounding variables influence primary relationships. Analysis was performed using PC-SAS (version 9.12). Alpha was set at $p \leq 0.05$.

**Results**

The average ($\pm$SD) age of participants was $19.9 \pm 1.7$ yrs. The average BMI was $22.5 \pm 3.2$ kg/m² and the average percent body fat was $26.4 \pm 6.4$. BMI showed that 84% of the women were normal weight, 12% were overweight, and 4% were obese. Total self-esteem for

individuals in the study was 6.24 ± 1.12. Overall, the women were high moderate in overall self-acceptance self-esteem and were low moderate in achievement self-esteem (see tables 1, 2, & 3).

Pearson correlation showed that there was a positive relationship between achievement self-esteem in appearance and percent body fat (r = 0.20) (see table 4). BMI demonstrated a positive relationship with achievement self-esteem in appearance (r = 0.17) and a negative relationship with self-acceptance self-esteem in performance (r = -0.20) and total self-acceptance self-esteem (r = -0.18).

Regression analysis demonstrated that the best model for predicting % body fat was achievement self-esteem in appearance (positive) and self-acceptance self-esteem in performance (negative; F=7.31; $p$=0.003). Similarly, regression analysis showed that the best model for predicting BMI was achievement self-esteem in appearance (positive), achievement self-esteem in performance (negative) and overall self-esteem (negative; F=3.99, $p$=0.0091).

Data was also analyzed by dividing participants into quartiles and collapsing the middle two quartiles. There were 41 women in the lowest body fat quartile, 77 in the middle two quartiles, and 40 in the highest body fat quartile. Individuals in the lowest quartile for percent body fat had significantly lower achievement self-esteem in appearance than did individuals in the higher quartiles ($p \leq 0.05$; see table 2).

Individuals in the highest quartile for BMI scored significantly lower on self-acceptance self-esteem in performance than the individuals in the lowest quartile for BMI ($p \leq 0.05$; see table 3). Individuals in the highest quartile for BMI also scored significantly lower on self-acceptance self-esteem in appearance than the middle two quartiles ($p \leq 0.05$).

**Discussion**

Literature looking at overall self-esteem and body composition has generally demonstrated a negative relationship.[13-27] The data from this study showed a similar trend; women in the highest quartile for BMI had lower overall self-esteem than women in the middle two quartiles. Looking just at overall self-esteem, however, doesn't show a complete picture of the relationship and more is understood when we look at source of self-esteem.

Data from this study demonstrated that participants had higher overall self-acceptance self-esteem and lower achievement self-esteem. It is difficult to ascertain whether the participants in this study had higher or lower self-acceptance self-esteem or achievement self-esteem compared to other populations since there are very few studies that have examined source of self-esteem. Several studies conducted by Lockhart et al. on similar populations showed that scores on overall self-acceptance self-esteem and achievement self-esteem were similar to the scores from this study.[34, 35]

When subscale scores were analyzed for participants in this study they were very similar for percent body fat quartiles versus BMI quartiles. Two differences exist, however. First, there was a significant difference between individuals in the highest quartile for BMI and individuals in the lowest quartile for BMI for performance factor, whereas there was no difference demonstrated when examining percent body fat and performance factor. This was true as well for BMI and overall self-esteem; there was no difference seen with overall self-esteem and percent body fat. We speculate that one cause might be that size of the body, more than percent body fat, affects the way women feel about themselves. Many women do not know what their percent body fat is, so even if they have a high percent body fat, but are relatively thin it doesn't affect

how they feel about their performance or their overall self-esteem. Women may feel more pressured about the size of their body than their percent body fat.

When assessing the individual subscales, the data showed some interesting trends. Although the women in this study were higher in overall self-acceptance self-esteem than in achievement self-esteem, when asked about their appearance those who were in the highest quartile for body fat and BMI showed lower self-acceptance self-esteem for this subscale. Percent body fat or BMI outside of the norm may alter a woman's perception and she may see her worth as less inherent. Studies have shown that appearance is tied closely with self-esteem and Deci explains that when individuals have less self-acceptance self-esteem the view of their worth is less consistent.[11, 16, 19, 26]

A similar trend was seen with performance factor and BMI. Women with a higher BMI had lower self-acceptance self-esteem in the area of performance. The questions asked regarding performance involve ideas about one's position, abilities, and success in the eyes of others. It is interesting to note that BMI would affect the way these women felt about their abilities and performance. Ryan and Brown suggest that when worth is measured individuals are left vulnerable and unstable when they think their worth is based on comparisons with others or societal standards.[29] The women with the higher BMI demonstrated lower self-acceptance self-esteem and perceived themselves less capable than women of normal weight. They may also believe that because they have higher BMI, others will deem them less able to succeed.

In this study we have identified psychological issues of high percent body and BMI as they relate to self-esteem and source of self-esteem. Deci describes self-acceptance self-esteem as being of a more stable nature where individuals do not base their worth on actions or

outcomes.[11]   This, of course, is the ideal; however, due to societal pressures, individuals often have areas of vulnerability. For example, in a study done on men and women athletes it was found that athletes perceived that their worth was attributed to their athletic success, even though they believed each human being has inherent worth.[35] The women in this study generally believed that each human being has inherent worth regardless of their percent body fat or their BMI, but when asked about appearance and performance we saw a contradiction. Initially, they answered that worth isn't contingent on anything, but when asked about appearance and performance some women with higher percent body fat or BMI answered that worth is contingent on these factors.

There are limitations within this study that affect the generalizability and establishment of cause and effect. All participants in the study were recruited from a private, religiously sponsored university, the sponsoring church of which teaches that God is no respecter of persons and all individuals are of equal worth. The fact that this study was cross sectional means that cause and effect cannot be established.

Despite the limitations in the study, we believe that the results would be similar for individuals in other college populations who are taught similar principles. The results showed that there were important relationships between body composition and self-esteem. Clearly, from this study, even when individuals are taught their worth is inherent, when bombarded from outside pressures, they perceive their worth is undermined because of their weight.

The fact that percent body fat and BMI may distort women's perceptions of inherent worth asserts the importance to address not only the physical effects of high percent body fat and BMI, but also to address the psychological effects. The findings of this paper are important

because it showed that women with higher body fat and BMI may be less likely to see their worth as inherent. The psychological pressures felt from being overweight can influence a woman's beliefs and consequently she may doubt her worth. Therefore, weight management interventions may be improved by focusing on psychological factors related to obesity in addition to the physical consequences.

Future research should examine these relationships in other populations and also track individuals over time to determine the direction of the relationship between percent body fat and BMI and self-esteem. Additionally, future research should evaluate potential interventions to help women develop a concept of self worth that is inherent and stable under all circumstances.

**Conclusion**

According to Ryan and Brown, achievement self-esteem, high or low, is detrimental to the individual and promotes or demonstrates psychological deficiencies.[29] The women in this study had high self-acceptance self-esteem in basic human worth, but when performance and appearance were measured, those with higher percent body fat or BMI tended to have lower self-acceptance self-esteem in these areas, displaying a possible contradiction of beliefs or they possibly lost sight of their beliefs. Women who had higher percent body fat or BMI tended to exhibit this contradiction, perceiving their worth as both inherent and contingent. The rate of obesity is climbing rapidly for college students and with this relationship between percent body fat and BMI and self-esteem in college women, there is a greater need to evaluate how to help these individuals maintain a stable view of their worth in spite of their weight. Body fat and BMI are psychologically distressing for many women, and if they can acquire a greater sense of

self-acceptance self-esteem they may be less vulnerable to the constant pressures and stresses

from circumstances and social criteria.

# References

1.      Flegal KM, Graubard BI, Williamson DF, Gail MH. Excess deaths associated with underweight, overweight, and obesity. Jama-Journal of the American Medical Association. 2005;293:1861-1867.
2.      Flegal KM, Carroll MD, Ogden CL, Curtin LR. Prevalence and Trends in Obesity Among US Adults, 1999-2008. JAMA: The Journal of the American Medical Association. 2010;303:235-241.
3.      Mokdad AH, Serdula MK, Dietz WH, Bowman BA, Marks JS, Koplan JP. The spread of the obesity epidemic in the United States, 1991-1998. JAMA: The Journal Of The American Medical Association. 1999;282:1519-1522.
4.      Lewis CE, Jacobs DR, Jr., McCreath H, et al. Weight gain continues in the 1990s: 10-year trends in weight and overweight from the CARDIA study. Coronary Artery Risk Development in Young Adults. American Journal of Epidemiology. 2000;151:1172-1181.
5.      Brown C. The information trail of the 'Freshman 15'--a systematic review of a health myth within the research and popular literature. Health Information And Libraries Journal. 2008;25:1-12.
6.      Vella-Zarb RA, Elgar FJ. The 'Freshman 5': A Meta-Analysis of Weight Gain in the Freshman Year of College. Journal of American College Health. 2009;58:161-166.
7.      Coopersmith S. The antecedents of self-esteem. San Francisco: W.H. Freeman and Company; 1967.
8.      Gergen KJ. The concept of self. New York: Holt, Rinehart and Wintson; 1971.
9.      Rosenberg M. Society and the adolescent self-image. Connecticut: Wesleyan University Press; 1989.
10.     Psychological perspectives on the self. Hillsdale: Lawrence Erlabaum Associates, Inc; 1993.
11.     Deci EL. Why we do what we do. New York: G.P. Putnam's Sons; 1995.
12.     Lockhart BD, Rencher AC. Worth Index. Perceptual and motor skills. 1997;85:827-834.
13.     Akan GE, Grilo CM. Sociocultural Influences on Eating Attitudes and Behaviors, Body Image, and Psychological Functioning: A Comparison of African-American, Asian-American, and Caucasian College Women. International Journal of Eating Disorders. 1995;18:181-187.
14.     Crocker J, Cornwell B, Major B. The stigma of overweight: Affective consequences of attributional ambiguity. Journal of personality and social psychology. 1993;64:60-70.
15.     Delinsky SS, Wilson GT. Weight gain, dietary restraint, and disordered eating in the freshman year of college. Eating Behaviors. 2008;9:82-90.
16.     French SA, Story M, Perry CL. Self-esteem and obesity in children and adolescents: a literature review. Obesity research. 1995;3:479-490.
17.     French SA, Perry CL, Leon GR, Fulkerson JA. Self-esteem and change in body mass index over 3 years in a cohort of adolescents. Obesity research. 1996;4:27-33.
18.     Guinn B, Semper T, Jorgensen L, Skaggs S. Body image perception in female Mexican-American adolescents. The Journal of school health. 1997;67:112-115.
19.     Hill AJ, Williams J. Psychological health in a non-clinical sample of obese women. International Journal of Obesity & Related Metabolic Disorders. 1998;22:578.

20. Holm-Denoma JM, Joiner TE, Vohs KD, Heatherton TF. The "freshman fifteen" (the "freshman five" actually): predictors and possible explanations. Health psychology : official journal of the Division of Health Psychology, American Psychological Association. 2008;27:S3-9.

21. Jones SL, Moulton MA, Moulton P, Roach S. Self-esteem differences as a function of race and weight preoccupation: findings and implications. Women's Health Issues: Official Publication Of The Jacobs Institute Of Women's Health. 1999;9:50-55.

22. Megel ME, Wade F, Hawkins P, et al. Health promotion, self-esteem, and weight among female college freshmen. Health Values: The Journal of Health Behavior, Education & Promotion. 1994;18:10-19.

23. Phillips RG, Hill AJ. Fat, plain, but not friendless: self-esteem and peer acceptance of obese pre-adolescent girls. International Journal Of Obesity And Related Metabolic Disorders: Journal Of The International Association For The Study Of Obesity. 1998;22:287-293.

24. Pingitore R, Spring B, Garfield D. Gender differences in body satisfaction. Obesity research. 1997;5:402-409.

25. Rubinstein G. The big five and self-esteem among overweight dieting and non-dieting women. Eating Behaviors. 2006;7:355-361.

26. Shaw JM, Ebbeck V, Snow CM. Body composition and physical self-concept in older women. Journal of women & aging. 2000;12:59-75.

27. Tiggemann M. Dietary restraint and self-esteem as predictors of weight gain over an 8-year time period. Eating Behaviors. 2004;5:251-259.

28. Abdollahi P, Mnan P. Eating disorder symptoms and body image concerns in Iran: comparisons between Iranian women in Iran and in America. International Journal of Eating Disorders. 2001;30:259-268.

29. Ryan RM, Brown KW. Why We Don't Need Self-Esteem: On Fundamental Needs, Contingent Love, and Mindfulness. Psychological Inquiry. 2003;14:71-76.

30. Lowry R, Galuska DA, Fulton JE, Wechsler H, Kann L, Collins JL. Physical activity, food choice, and weight management goals and practices among US college students. American Journal of Preventive Medicine. 2000;18:18-27.

31. Fields DA, Hunter GR, Goran MI. Validation of the BOD POD with hydrostatic weighing: Influence of body clothing. International Journal of Obesity & Related Metabolic Disorders. 2000;24:200.

32. Ellis AGR. Handbook of rational-emotive therapy. New York: Springer Publishing Company Inc.; 1977.

33. Miyatake N, Nonaka K, Fujii M. A new air displacement plethysmograph for the determination of Japanese body composition. Diabetes, obesity & metabolism. 1999;1:347-351.

34. Lockhart BD, Merrill RM, Bird JS. Perceptions of unconditional and conditional worth among college students. Perceptual and motor skills. 2002;94:489-498.

35. Lockhart BD, Black N, Vincent WJ. Perceptions of self of Division I team and individual sport athletes. Perceptual and motor skills.110:517.

Table 1
Meaning of scores for total self-acceptance self-esteem and total achievement self-esteem and the four subscales

|  | Measure | Self Acceptance self-esteem | Achievement self-esteem |
|---|---|---|---|
| Scale | High | 70-84 | 70-84 |
|  | High Moderate | 56-69 | 56-69 |
|  | Moderate | 42-55 | 42-55 |
|  | Low Moderate | 29-41 | 29-41 |
|  | Low | 12-28 | 12-28 |
|  |  |  |  |
| Subscales | High | 18-21 | 18-21 |
|  | High Moderate | 14-17 | 14-17 |
|  | Moderate | 11-13 | 11-13 |
|  | Low Moderate | 8-10 | 8-10 |
|  | Low | 3-7 | 3-7 |

Table 2
Source of self esteem scores and subscale scores by percent body fat quartiles

| Variables | Lowest % BF quartile | Middle % BF quartiles | Highest % BF quartile | Total | Min score | Max score |
|---|---|---|---|---|---|---|
| Total self- acceptance self-esteem | 64.21 ± 11.48 | 66.74 ± 9.85 | 64.38 ± 9.06 | 65.49 ± 10.13 | 12 | 84 |
| Basic Human worth | 18.39 ± 3.56 | 19.11 ± 3.00 | 18.47 ± 2.99 | 18.76 ± 3.15 | 3 | 21 |
| Performance Factor | 13.51 ± 3.58 | 13.77 ± 3.71 | 12.87 ± 3.68 | 13.48 ± 3.66 | 3 | 21 |
| Appearance | 17.29 ± 3.31 | 17.80 ± 2.98 | 17.40 ± 2.95 | 17.56 ± 3.05 | 3 | 21 |
| Personal Security Factor | 15.02 ± 3.11 | 16.03 ± 2.96 | 15.66 ± 2.85 | 15.68 ± 2.98 | 3 | 21 |
| | | | | | | |
| Total achievement self-esteem | 35.32 ± 10.04 | 34.11 ± 10.29 | 36.50 ± 9.07 | 35.03 ± 9.92 | 12 | 84 |
| Basic Human Worth | 8.90 ± 4.51 | 7.29 ± 4.09 | 8.22 ± 4.25 | 7.94 ± 4.27 | 3 | 21 |
| Performance Factor | 11.73 ± 2.72 | 11.11 ± 3.09 | 11.05 ± 2.19 | 11.25 ± 2.79 | 3 | 21 |
| Appearance | 7.75 ± 4.16 | 8.58 ± 3.86* | 9.72 ± 3.82* | 8.66 ± 3.97 | 3 | 21 |
| Personal Security Factor | 7.24 ± 2.99 | 7.11 ± 2.93 | 7.5 ± 2.84 | 7.24 ± 2.91 | 3 | 21 |

*Significantly different from the lowest quartile ($p \leq 0.05$)

Table 3
Source of self esteem scores and subscale scores by BMI quartiles

| Variables | Lowest BMI quartile | Middle BMI quartiles | Highest BMI quartile | Total | Min score | Max score |
|---|---|---|---|---|---|---|
| Total self-acceptance self-esteem | 66.50 ± 11.97 | 66.39 ± 8.73 | 62.66 ± 10.42 | 65.49 ± 10.13 | 12 | 84 |
| Basic Human Worth | 19.07 ± 3.43 | 18.84 ± 2.81 | 18.30 ± 3.50 | 18.76 ± 3.15 | 3 | 21 |
| Performance Factor | 14.15 ± 4.12 | 13.62 ± 3.46 | 12.52 ± 3.44† | 13.48 ± 3.66 | 3 | 21 |
| Appearance | 17.62 ± 3.57 | 18.00 ± 2.35 | 16.67 ± 3.56‡ | 17.56 ± 3.05 | 3 | 21 |
| Personal Security Factor | 15.65 ± 2.94 | 15.92 ± 3.02 | 15.23 ± 2.97 | 15.68 ± 2.98 | 3 | 21 |
| | | | | | | |
| Total achievement self-esteem | 33.77 ± 10.72 | 35.10 ± 9.20 | 36.15 ± 10.52 | 35.03 ± 9.92 | 12 | 84 |
| Basic Human Worth | 7.45 ± 4.59 | 7.89 ± 4.03 | 8.55 ± 4.43 | 7.94 ± 4.27 | 3 | 21 |
| Performance Factor | 11.30 ± 2.72 | 11.41 ± 2.93 | 10.92 ± 2.61 | 11.25 ± 2.79 | 3 | 21 |
| Appearance | 7.85 ± 4.38 | 8.76 ± 3.67 | 9.27 ± 4.05 | 8.66 ± 3.97 | 3 | 21 |
| Personal Security Factor | 7.17 ± 3.05 | 7.20 ± 2.79 | 7.40 ± 3.07 | 7.24 ± 2.91 | 3 | 21 |

† Significantly different from the lowest quartile ($p \leq 0.05$)
‡ Significantly different from the middle two quartiles ($p \leq 0.05$)

Table 4
Pearson Correlation of percent body fat and BMI with self-acceptance self-esteem, achievement self-esteem and subscales

| | % Body Fat | | | | |
| | Basic Human Worth | Personal Security Factor | Performance factor | Appearance | Total |
|---|---|---|---|---|---|
| Achievement self-esteem | 0.00 | 0.06 | -0.09 | 0.20* | 0.09 |
| Self acceptance self-esteem | -0.07 | 0.00 | -0.11 | -0.08 | -0.09 |

| | BMI | | | | |
| | Basic Human Worth | Personal Security Factor | Performance Factor | Appearance | Total |
|---|---|---|---|---|---|
| Achievement self-esteem | 0.04 | 0.06 | -0.09 | 0.17* | 0.09 |
| Self acceptance self-esteem | -0.10 | -0.08 | -0.20* | -0.15 | -0.18* |

*Significant $p<0.05$

Prospectus

**Introduction**

One of the biggest health concerns in our society today is the increasing prevalence of overweight and obesity. Being overweight and/or obese has a negative influence on health, and mortality (Flegal, Graubard, Williamson, & Gail, 2005), and more than 66% of the adult population are obese or overweight (Ogden, Carroll, Curtin, McDowell, Tabak, & Flegal, 2006). Because of the increasing number of obese and overweight individuals, prevention of unhealthy weight gain is of great concern.

Obesity and overweight bring with them an array of health problems (Flegal et al., 2005; Thompson, Edelsberg, Colditz, Bird, & Oster, 1999). According to the Centers for Disease Control and Prevention (CDC) (2008), having an excess of weight can lead to or influence: hypertension, osteoarthritis, dyslipidemia, type 2 diabetes, coronary heart disease, stroke, gallbladder disease, sleep apnea, respiratory problems, and some cancers. Similarly, Thompson et al. (1999) found that the risk of hypertension, hypercholesterolemia, and type 2 diabetes mellitus increased significantly as BMI stage increased.

Across college campuses, students are also facing problems of increased weight gain and obesity (Brown, 2008; Delinsky, 2008; Economos, 2008; Lewis, 2000; Megel, 1994; Mokdad, 1999; O'Dea, 1999; Wardle, 2006; Wharton, 2008). According to the Behavioral Risk Factor Surveillance System, those adults ages 18-30 years increased in obesity prevalence almost 70% from 1991-1998, whereas those ages 40-49 years increased 34% (Mokdad et al., 1999). Lewis et al. (2000) found after a 10 year follow up in young adults (ages 18-30) that weight gain was much more common than weight stability and weight loss. The average increase in weight gain for college freshmen is about 4.6 lbs the first year (Brown, 2008).

In response to this increasing weight gain, many have turned to diets and other treatments, but studies have shown that the treatment of overweight and obesity can be very difficult and many individuals who lose weight are not successful in keeping it off (Anderson, Konz, Frederich, & Wood, 2001; Wing &Phelan, 2005). Prevention, then, becomes an important component in obesity and overweight research.   Prevention of diseases involves understanding what factors contribute to it.  The CDC (2009) reported on some environmental factors that contribute to obesity and have put forth a document of what communities can do to help to prevent obesity.  Factors contributing to obesity in college students may be different and warrant further investigation.

Psychological factors may be associated with weight and body composition.  Research examining the association between body image, depression, anxiety, and other body perceptions with weight/body composition has found there to be some significant relationships (Jorm, Korten, Jacomb, Rodgers, &Parslow, 2003; McLaren & Gauvin, 2002; Rivenes, Harvey, Mykletun, 2008;  Zhao, Ford, Dhingra, Li, Strine, & Mokdad,  2009). Zhao et al. found that women who were overweight or obese were more likely to have depression or experience lifelong depression and anxiety than women who were normal weight and McLaren et al. found that those who had always been overweight had significantly lower body esteem than those who were normal weight.

Self-esteem is another psychological factor that has been looked at frequently in relationship to weight and body composition (Akan & Griol, 1995; Crocker, Cornwell, & Major, 1993; Delinsky & Wilson, 2008; French, Story, & Perry, 1995; French, Perry, Leon, & Fulkerson, 1996; Guinn, Semper, Jorgensen, & Skaggs, 1997; Hill & Williams, 1998; Holm-Denoma, Joiner, Vohs, &Heatherton, 2008; Jones, Moulton, Moulton, & Roach, 1999; Megel et

al., 1994; Phillips & Hill, 1998; Pingitore, Spring, & Grafield, 1997; Rubinstein, 2006;  Shaw, Ebbeck & Snow, 2000; Tiggemann, 2004). The concept of self-esteem is confusing in the literature because it is defined many different ways (Coopersmith, 1967; Gergen, 1971; Rosenberg, 1989; Suls, 1993).  Rosenberg defines self-esteem as whether an "individual [has] a favorable or unfavorable opinion of himself" (15).  For the purpose of this study, the definition of self-esteem will use Rosenberg's idea and will define it as the overall opinion an individual has of himself or herself.

Self-esteem or opinions about one's self may come from one of two sources.  One source is when the opinion of one's self is based on certain criteria. Individuals who define their worth on conditional aspects of their life use this source to determine their self-esteem. The other source of self-esteem  is based upon the belief that worth is a given with life and that it does not change; it is unconditional.  Each individual bases their worth using one, or usuall,y a combination of these two perspectives (Lockhart & Rencher, 1997).

Most measurements of self-esteem focus on the conditional belief, that an individual's worth is contingent upon something. This source of self-esteem has many different names, but for the purpose of this paper will be called achievement self-esteem (Deci, 1995; Ellis & Grieger, 1977). Ellis and Grieger say that this source of self-esteem is based on the idea that "the individual values himself because he has behaved intelligently, correctly or competently" (101). Another author calls it "contingent self-esteem" or self-esteem that is based on or controlled by certain outcomes (Deci).

The other source of self-esteem is based on the idea that worth is inherent and that it will not change (Lockhart & Rencher, 1997). For the purpose of this study, this perception of worth will be termed self-acceptance self-esteem. Ellis and Grieger (1997) define self-acceptance self-

esteem to mean "that individual[s] fully and unconditionally accepts [themselves] whether or not [they] behave intelligently, correctly, or competently and whether or not other people approve, respect, or love [them]" (101).

There are many studies that have looked at self-esteem in relation to weight/body composition (Akan & Grilo, 1995; Crocker et al., 1993; Delinsky & Wilson, 2008; French et al., 1995; French et al., 1996; Guinn et al., 1997; Hill & Williams, 1998; Holm-Denoma et al., 2008; Jones et al., 1999; Megel et al., 1994; Phillips & Hill, 1998; Pingitore et al., 1997; Rubinstein, 2006; Shaw et al., 2000; Tiggemann, 2004; Viner & Cole, 2006), but most measurements of self-esteem measure more heavily achievement self-esteem and focus very little on self-acceptance self-esteem.  There are some who argue that there is a need to focus more on self-acceptance self-esteem and that basing one's worth on achievements, comparisons, and other criteria can actually be harmful to the individual (Deci, 1995; Ellis & Grieger, 1977; Lockhart & Rencher, 1997; Ryan & Brown, 2003). Ellis supports this idea by saying that if educators could teach individuals to not have self-images and to not label themselves as either good or bad, they would have much less emotional conflict.  If this is the case, then those who base their worth upon self-acceptance self-esteem may have better health in other areas as well.

Because of this argument, it is important to differentiate between which source individuals base their worth upon.  The Worth Index (WI) was formed to do just that.  It was created by Lockhart and Rencher (1997) to determine whether an individual's worth is based upon achievements and other conditional aspects or whether individuals believe that worth is inherent.  Lockhart states that learning more about the source of an individual's self-esteem will help us to better understand overall self-esteem.  This, in turn, may be beneficial in understanding further the relationship of weight and body composition with self-esteem.

The studies looking at overall self-esteem (and therefore, looking mainly at achievement self-esteem) and weight have found significant negative correlations between the two (Crocker et al., 1993; French et al., 1995; French et al., 1996; Guinn et al., 1997; Hill & Williams, 1998; Jones et al., 1999; Phillips & Hill, 1998; Pingitore et al., 1997; Shaw et al., 2000; Tiggemann, 2004). Jones et al. found that the higher the weight of an individual, the lower their self-esteem scores.

Self-acceptance self-esteem, on the other hand, has been studied much less than achievement self-esteem, especially as it pertains to obesity and weight change. Studies suggest that there could be a correlation between self-acceptance self-esteem and weight because of associations observed between self-acceptance self-esteem and other health issues that relate to weight such as depression and anxiety (Chamberlain & Haaga, 2001a, 2001b; Jorm et al., 2003; Rivenes et al., 2008; Roberts, Deleger, Strawbridge, & Kaplan, 2003; Strine, Mokdad, Dube, Balluz, Gonzalez, Berry et al., 2008; Zhao et al., 2009).

Because of the relationship between self-acceptance self-esteem and other health issues it is important to look at how it is related to weight and body composition. Overall self-esteem appears to be related to weight/body composition and therefore looking at the source of self-esteem and weight/body composition will hopefully open up some doors for further research and investigation that may eventually result in more effective prevention strategies and interventions for college students.

*Purpose Statement*

The purpose of this study is to investigate the relationship between weight/body composition and source of self-esteem (i.e., self-acceptance self-esteem or achievement self-

esteem in undergraduate college females.  We will also look at the relationship between weight/body composition and overall self-esteem.

*Hypothesis*

1. Higher scores on self-acceptance self-esteem will be related to more favorable weight and % body fat.

2. Individuals with high overall self-esteem will have more favorable weight and % body fat.

*Null Hypothesis*

We will find no relationship between self-acceptance self-esteem or overall level of self-esteem and weight and % body fat.

*Delimitations*

This study will be conducted using undergraduate college females, therefore, the findings can only be generalized to this specific population.

*Limitations*

1. Due to the large number of participants in this study, it will take 1-2 months to measure them all

2. There is some possibility of differences in participants because of the change over time

3. The Worth Index is a self-report questionnaire and therefore there is possible self-report bias.

4. Because of the cross-sectional design causality cannot be inferred from the data and the direction of the relationship will be unknown.

*Definitions*

Self-esteem- The overall opinion an individual has of himself or herself (Rosenberg, 1989).

Achievement self-esteem- An individual values himself because he has behaved intelligently, correctly or competently (Ellis & Grieger, 1977).

Self-acceptance self-esteem- Individuals fully and unconditionally accept [themselves] whether or not [they] behave intelligently, correctly, or competently and whether or not other people approve, respect, or love [them] (Ellis & Grieger, 1977).  The perception of one's worth is inherent and does not change; worth comes with life (Lockhart & Rencher, 1997).

**Review of the Literature**

According to the National Center for Health Statistics, more than 30% of adults are obese and more that 66% are overweight or obese (Ogden et al., 2006). Being overweight or obese contributes to a number of health issues and diseases that result in a loss of quality life and possibly premature death (World Health Organization, 2006). Thompson (1999) found that as BMI stage increases the risk of hypertension, hypercholesterolemia, and type 2 diabetes mellitus increased significantly.

During the college years, in particular, weight and weight change is of great interest. During these formative years weight appears to fluctuate significantly, with the majority of studies showing a significant increase in weight (Brown, 2008; Economos et al., 2008; Megel et al., 1994; Wharton et al., 2008). Economos et al. found that weight increases for college women on average was 5.49 lbs over 8 months. In a review of the literature Brown found that freshman, on average, gained 4.6 lbs during their first year in school. Because of this rapid weight gain during college, there is a need identify predictors of weight gain in this population.

Studies looking at weight change in college students have focused on several different issues that may be associated with obesity/weight gain including: gender, age, stress, family issues, physical activity, and diet (Butler, Black, Blue, & Gretebeck 2004; Economos et al., 2008; Malik, Schulze, & Hu, 2006; Marron & Kayson, 1984; Racette, Deusinger, Strube, Highstein, & Deusigner, 2008). One major area of research in relation to weight/ body composition focuses on psychological factors such as depression, anxiety, and body image (Jorm et al., 2003; McLaren & Gauvin, 2002; Rivenes et al, 2008, Zhao et al, 2009). Rivenes et al. found that those who had high BMI had higher rates of depression and Zhao et al. found that

women who were overweight were much more likely than women who were normal weight to have lifelong anxiety and depression.

Another significant psychological factor that has been looked at in relation to weight and body composition is self-esteem.  Many studies have shown that lower scores of self-esteem are related to being overweight, gaining weight, or having a high BMI (Crocker et al., 1993; French et al., 1995; French et al., 1996; Guinn et al., 1997; Hill & Williams, 1998; Jones et al., 1999; Phillips & Hill, 1998; Pingitore et al., 1997; Shaw et al., 2000; Tiggemann, 2004). This has also been seen specifically in college students (Crocker; Jones; Pingitore; Tiggemann).  Tiggemann found that after a year in college, those individuals who scored high on self-esteem and low on dietary restraint gained the least amount of weight.

Although there is research focusing on self-esteem and weight/ body composition, the concept of self-esteem is still not clearly understood.  Rosenberg (1989) defines self-esteem as whether an "individual [has] a favorable or unfavorable opinion of himself" (15), whereas, Coopersmith (1967) says self-esteem "expresses an attitude of approval or disapproval, and indicates the extent to which the individual believes himself to be capable, significant, successful, and worthy" (4-5). There are many different definitions of self-esteem that make the understanding of it difficult (Coopersmith; Gergen, 1971; Rosenberg; Suls, 1993).

To add further to the confusion regarding self-esteem, some argue that self-esteem is not just a separate and distinct measurement, but that an individual's self-esteem is based upon one of two different beliefs or perceptions (Ellis & Grieger, 1977; Lockhart & Rencher, 1997; MacInnes, 2006).  One source of self-esteem is based on the idea that individuals regard themselves as valuable or not based upon certain criteria; it is conditional upon some

achievement or standard (Coopersmith, 1967; Ellis & Grieger, 1977; Lockhart & Rencher, 1997). The other belief is that worth is inherent and comes with life; it is not based upon achievements or meeting any certain criteria and is therefore, unconditional (Deci, 1995; Ellis & Grieger; Lockhart & Rencher).

Few measurements of self-esteem differentiate between the source of self-esteem and most questions on those measurement tools base perceptions of worth on conditional aspects or on achievements (Lockhart & Rencher, 1997). Some argue that basing self-worth on successes, comparisons, and contingent items can be misleading and detrimental (Deci, 1995; Ellis & Grieger, 1977; Lockhart & Rencher, 1997; Ryan & Brown, 2003). Ryan and Brown state "…the fact that one's esteem is in question suggests a psychological vulnerability… In contrast, optimal health is more likely when self-esteem is not a concern because the worth of the self is not an issue" (71). Lockhart & Rencher suggest that by differentiating between the two sources of self-esteem, more will be learned about overall self-esteem.

Because there is little differentiation between self-esteem terms in the literature each term will be defined and given a specific name and it will be referred to as such throughout the remainder of this review. Overall self-esteem will be defined similarly to how Rosenberg defines it and will be defined as the overall opinion an individual has of himself or herself. The conditional or "contingent self-esteem" (Deci, 1995) perspective will be referred to as achievement self-esteem and will be defined as by Ellis and Grieger to mean "an individual values himself because he has behaved intelligently, correctly or competently" (1977, 101). The unconditional perspective will be termed self-acceptance self-esteem and will be defined also by Ellis to mean that "individual[s] fully and unconditionally accept [themselves] whether or not

[they] behave intelligently, correctly, or competently and whether or not other people approve, respect, or love [them]" (101).

This review will exam the current state of the literature for self-esteem and weight/body composition with special emphasis on college populations. Included in this review will be an examination of research related to self-esteem as well as an evaluation of studies examining the source of self-esteem, specifically self-acceptance self-esteem and achievement self-esteem.

*Overall self-esteem*

Numerous studies have looked at the relationship between overall self-esteem levels and weight/ body composition (Akan & Grilo, 1995; Crocker et al., 1993; Delinsky & Wilson, 2008; French et al., 1995; French et al., 1996; Guinn et al., 1997; Hill & Williams, 1998; Holm-Denoma et al., 2008; Jones et al., 1999; Megel et al., 1994; Phillips & Hill, 1998; Pingitore et al., 1997; Rubinstein, 2006; Shaw et al., 2000; Tiggemann, 2004, Viner & Cole, 2006), many of which have focused on college populations (Akan & Grilo; Crocker et al.; Delinsky & Wilson; Holm-Denoma et al.; Jones et al.; Megel et al.; Pingitore et al.; Rubinstein; Tiggemann; Viner & Cole). Jones et al. found that there was a negative correlation between weight and self-esteem in undergraduate college females and also found that greater preoccupation with weight and diet were shown to be predictive of self-esteem scores.

Tiggemann (2004) followed students over eight years and found that the majority gained significant weight (6 kg) over that time period. They also found that those who gained the least amount of weight were those who had high self-esteem and low dietary restraint. Crocker et al. (1993) found from the initial self-esteem measurement of their study, that the college students who were overweight had lower self-esteem than students who were normal weight. They also

looked at state self-esteem and found there to be a significant association between state self-esteem and weight when looking at the appearance sub-scale score. One study looked at the relationship between BMI and importance of weight on self-concept (or self-esteem) and they showed that in college females as BMI increased they expressed weight as being of greater importance to self-concept (Pingitore et al., 1997). Therefore, the authors suggest that women who are overweight will have a negative impact on their self-esteem.

Interestingly, a study looking at two groups of freshmen females found that there was no significant relationship between weight gain and self-esteem, but they did find that those with high self-esteem were more satisfied with their weight (Megel et al., 1994). Another study looking at women, some of which were college students, found that overweight women who were not dieting had lower self-esteem scores than normal weight women and overweight women who were dieting. However, this study found no significant differences in self-esteem between overweight women who were dieting and normal weight women (Rubinstein, 2006).

Some studies, on the other hand, found no significant relationship between self-esteem and weight in college students. One study looked at BMI in relationship to a few psychological factors, body image, and eating attitudes and behaviors, and although they found that self-esteem was negatively correlated with some of these other measured factors, there was no significant association between BMI and self-esteem (Akan & Grilo, 1995). One study followed students for a year and did not find self-esteem to be a significant predictor of weight change in females (Holm-Denoma et al., 2008). Delinsky and Wilson (2008) also followed college students for a year and did not find self-esteem to be a significant predictor of weight change. One study looked at what predicted BMI changes from adolescents to adulthood. They measured self-

esteem at age 16 and found nothing that suggested it was a predictor to an increase in BMI at age 30 (Viner & Cole, 2005).

*Source of self-esteem*

As has been discussed, many studies have looked at the relationship between self-esteem and weight/ body composition. Not many studies, however, have looked at the source of self-esteem specifically. The research looking at self-esteem measures overall self-esteem and yet the majority of the questions focus on achievement self-esteem, therefore there are no studies really looking at achievement self-esteem independently. Self-acceptance self-esteem, on the other hand, has been looked at separate from overall self-esteem, but not as it pertains to weight/body composition. The review of the literature in regards to source of self-esteem will stress what is known about these two different sources and need for future research.

*Achievement self-esteem*. According to the studies looking at overall self-esteem, there are mixed views on how it relates to weight and body composition. Crocker et al. (1993) found that college students who were overweight had lower self-esteem than students who were normal weight. Also, when they looked at the appearance subscale score there was a significant association between weight and self-esteem (Crocker et al.). This suggests that perceptions of students' worth were somewhat analyzed using achievement self-esteem and that some based their self-esteem on conditional aspects seeing as overweight women scored lower self-esteem on the appearance sub-scale.

Findings from another study also suggest worth based upon conditional aspects for women who are overweight. Rubinstein (2006) found that women who were overweight and

were part of a dieting program did not have statistically different self-esteem scores than women who were normal weight. But, women who were overweight and not dieting had lower self-esteem than both groups. This suggests that achievement self-esteem played a role in their overall self-esteem levels, for the overweight women who took action to be a more normal weight improved their levels of self-esteem (Rubinstein).

*Self-acceptance self-esteem.* Unlike overall self-esteem and achievement self-esteem, much less has been researched on the relationship between self-acceptance self-esteem and weight/ body composition. There are no studies that we are aware of that look at self-acceptance self-esteem and weight/body composition. There are, however, some studies that suggest that self-acceptance self-esteem may be associated with weight because of self-acceptance self-esteem's association with other known risk factors for weight gain.

A few studies have looked at self-acceptance self-esteem in college students specifically and Lockhart, Merrill, & Bird (2002) found that in undergraduate students, women tended to have lower self-acceptance self-esteem than men, which had to do with being more concerned about weight, wishing they had a better body, and wishing they were someone else. They also found that the self-acceptance self-esteem items were negatively correlated with the achievement self-esteem items and that those who had higher self-acceptance self-esteem had higher overall self-esteem (Lockhart et al.). Another study looking at college students found that self-acceptance self-esteem scores were negatively associated with depressive symptoms and anxiety (Chamberlain & Haaga, 2001b).

Other studies looking at self-acceptance self-esteem not in college students have found other significant findings. One study looked at self-acceptance self-esteem and psychological

health in clients at two different mental health units and found that higher levels of self-acceptance self-esteem were associated with general psychological well being (MacInnes, 2006). Chamberlain and Haaga (2001a) found, using the Unconditional Self-Acceptance Questionnaire, that self-acceptance self-esteem was negatively correlated with depression proneness. Because of the associations seen between self-acceptance self-esteem and other health issues that have been shown to be associated with weight (Jorm et al., 2003; Rivenes et al., 2008; Roberts et al., 2003; Strine et al., 2008; Zhao et al., 2009), there may be a relationship between self-acceptance self-esteem and weight.

*Conclusion*

Studies have shown that there is a relationship between overall self-esteem, achievement self-esteem and weight/body composition; there are a few studies that have shown no relationship. Other studies have shown that self-acceptance self-esteem has some association to health issues that are related to weight. There are no studies looking at self-acceptance self-esteem and weight specifically as most studies don't differentiate between the sources of self-esteem. This study will look at these relationships so as to better understand self-esteem and also its role in weight and body composition in college females.

**Methods**

*Design*

The proposed study will employ a cross-sectional design.

*Participants*

This study will be conducted using female college students, ages 18-24, from the Brigham Young University campus. Two-hundred undergraduate women will be recruited, with roughly equal numbers from (66 participants) each of four grade levels (freshmen, sophomores, and juniors). An over the phone screening will take place to ascertain if any individuals are unable to participate. Any individuals who are pregnant or planning to become pregnant, currently taking depression, anxiety, or metabolism altering medication, or who are unable to participate in physical activity will be excluded from the study. Institutional Review Board (IRB) approval will be sought and received through Brigham Young University before the study is conducted.

Recruitment will occur through word of mouth, facebook groups, fliers, and posters. Additional recruitment strategies will include contacting dorm resident assistants, visiting general education classes, and setting up campus information tables..

*Procedures*

Before participants are accepted into the study, they will be screened over the phone to ensure that they are eligible to participate based upon the inclusion/exclusion criteria and will be scheduled for testing. The screening will be done using a screening form that asks about all inclusion and exclusion criteria. Each participant will take part in one test day in late September, October, or early November. Testing of all participants will take eight weeks to complete and each participant will be given a scheduled day to come into the lab. The testing period will take

about an hour and will require the participant to fill out a questionnaire, complete measurements of height, weight, waist circumference, and body composition. On the test day, all participants will sign an approved consent form and be asked to fill out the Worth Index (WI) using a scantron bubble sheet. Once the questionnaire is completed the researcher will check the scantron for completeness. Following the completion of the WI questionnaire, each participant will have their height, weight, waist circumference and body composition measured.

Upon completion of the testing all participants will receive compensation for their participation. Each subject will receive $15 in cash and will also receive their results from the BOD POD testing.

*Measurements*

*The Worth Index.* The Worth Index (WI), as compiled and validated by Lockhart and Rencher (1997), will be used to measure the source of an individual's perceived self-worth and the level of their overall self-esteem. The WI incorporates questions representing achievement self-esteem and self-acceptance self-esteem, as well as overall self esteem. It also includes four subscales: basic human worth, personal security, performance, and appearance. For each subscale an achievement self-esteem score as well as a self-acceptance self-esteem score will be obtained. The questionnaire consists of 24 questions, each subscale asking six questions: three questions measuring self-acceptance self esteem and three questions measuring achievement self-esteem. At the end of the questionnaire there are two more questions that measure the participant's overall level of self-esteem. The WI was tested against the Rosenberg Self-esteem Scale and found a correlation of 0.82 showing the WI to be a valid measure of self-esteem (Lockhart & Rencher, 1997). The test-retest reliability was 0.57 and the 12 questions regarding

self-acceptance self-esteem were negatively correlated with the 12 questions regarding

achievement self-esteem with a correlation of -0.82

     *Body composition and anthropometric.* Prior to a participant's testing day they will be

instructed to not eat, drink, or exercise three hours before coming into the lab.  On the test day,

participants will be provided with a tight fitting swimsuit and swim cap that they will wear for all

measurements, and will be instructed to use the restroom before any measurements are taken.

Once in their swim suit and cap, participants will have their height measured using a wall

mounted stadiometer and their circumference measured using a nonelastic measuring tape.  Their

weight will be measured during the BOD POD test using a calibrated digital scale.  The BOD

POD will be calibrated according to instruction from the manufacturer and then the test will be

administered. All BOD POD data will be entered in to an Excel spreadsheet and stored on a

password protected computer.

1. *Height-* Height will be measured to the nearest 0.1 cm using a wall-mounted
   stadiometer.
2. *Weight-* Weight will be measured to the nearest 0.1 kg using a digital scale (Tanita
   Corporation; Japan).
3. *Circumferences-* Circumference measurements will be taken in duplicate around the
   waist. The waist circumference will be measured around the narrowest portion of the
   abdomen to the nearest 0.1 cm. Measurements must be within 5 mm of each other and
   an average of the two measurements will be used (Whaley, & Brubaker, & Otto
   2006).
4. *Body Composition-* Body composition will be measured using the BOD POD (Body
   Composition System; Life Measurement Instruments, Concord, California, USA),

where fat mass and fat free mass will be measured. Numerous studies have

demonstrated the validity of the BOD POD in measuring body density (Collins &

McCarthy, 2003; Fields, Hunter, & Goran, 2000; Fields, Higgins, & Radely, 2005;

Miyatake, Nonaka, & Fujii, 1999). Miyatake et al. found the BOD POD to be a valid

measure of body fat, and when compared to dual energy X-ray absorptiometry (DXA)

it had a correlation of .91 (1999).

### Data Management and Analysis

*Database Management.* All hard copies of data will be stored in a secure room in a

locked filing cabinet and all data stored digitally will be kept on a password protected computer.

Each participant will be given an ID number and any data put into a data spread sheet will be

entered using these ID numbers. Files that attach the names of participants with their ID numbers

will be stored in a separate file from lab data.

*Variables.* The purpose of this study is to determine the relationship between body

composition, the source of one's self-esteem, and their overall levels of self-esteem. The

independent variables are the Worth Index scores including overall scores on achievement self-

esteem and self-acceptance self-esteem, scores for both for each of the four subscales, and the

score for overall self-esteem. The dependent variables are body composition and weight. We

will control for possible confounding variables such as overall self-esteem, number of children,

year in school, and marital status.

*Statistics.* Prior to any analysis the data will be checked for normality. Data will be

reported using means and standard deviations for all independent and dependent variables. The

general linear model will be used to assess relationships between criterion and predictor

variables. Partial correlation will be used to determine how potential confounding variables

influence primary relationships. Analysis will be performed using PC-SAS (version 9.12).

Alpha will be set at *p≤0.05*.

**References**

Akan, G. E., & Grilo, C. M. (1995). Sociocultural influences on eating attitudes and behaviors, body image, and psychological functioning: A comparison of African-American, Asian-American, and Caucasian college women. *International Journal of Eating Disorders, 18*(2), 181-187.

Anderson, J. W., Konz, E. C., Frederich, R. C., & Wood, C. L. (2001). Long-term weight-loss maintenance: A meta-analysis of US studies. *The American Journal of Clinical Nutrition,* 74(5), 579-584.

Brown, C. (2008). The information trail of the 'freshman 15'--a systematic review of a health myth within the research and popular literature. *Health Information and Libraries Journal, 25*(1), 1-12.

Butler, S. M., Black, D. R., Blue, C. L., & Gretebeck, R. J. (2004). Change in diet, physical activity, and body weight in female college freshman. *American Journal of Health Behavior, 28*(1), 24-32.

Chamberlain, J. M., & Haaga, D. A. F. (2001a) Unconditional self-acceptance and Responses to negative feedback. *Journal of Rational-Emotive & Cognitive-Behavior Therapy,* 19(3), 177-189.

Chamberlain, J. M., & Haaga, D. A. F. (2001b) Unconditional self-acceptance and Psychological health. *Journal of Rational-Emotive & Cognitive-Behavior Therapy*, 19(3), 163-176.

Coopersmith, S. (1967). *The antecedents of self-esteem*. San Francisco, W.H. Freeman and Company.

Crocker, J., Cornwell, B., & Major, B. (1993). The stigma of overweight: Affective consequences of attributional ambiguity. *Journal of Personality and Social Psychology, 64*(1), 60-70.

Deci, E. L. (1995). *Why we do what we do*. New York, G.P. Putnam's Sons.

Delinsky, S. S., & Wilson, G. T. (2008). Weight gain, dietary restraint, and disordered eating in The freshman year of college. *Eating Behaviors, 9*(1), 82-90.

Economos, C. D., Hildebrandt, M. L., & Hyatt, R. R. (2008). College freshman stress and weight change: Differences by gender. *American Journal of Health Behavior, 32*(1), 16-25.

Ellis, A. & Grieger, R. (1977). *Handbook of rational-emotive therapy*. New York, Springer Publishing Company. Inc.

French, S. A., Perry, C. L., Leon, G. R., & Fulkerson, J. A. (1996). Self-esteem and change in body mass index over 3 years in a cohort of adolescents. *Obesity Research, 4*(1), 27-33.

Fields, D. A., Higgins, P. B., & Radely D. (2005). Air-displacement plethysmography: here to stay. *Current Opinion in Clinical Nutrition and Metabolic Care, 8*(6), 624-629.

Fields, D. A., hunter, G. R., & Goran, M. I. (2000). Validation of the BOD POD with hydrostatic weighting: Influence of body clothing. *International Journal of Obesity & Related Metabolic Disorders, 24*(2), 200.

Flegal, K. M., Graubard, B. I., Williamson, D. F., & Gail, M. H. (2005). Excess deaths associated with underweight, overweight, and obesity. *Journal of the American Medical Association, 293*(15), 1861-1867.

French, S. A., Perry, C. L., Leon, G. R., & Fulkerson, J. A. (1996). Self-esteeem and change in body mass index over 3 years in a cohort of adolescents. *Obesity Research, 4*(1), 27-33.

French, S. A., Story, M., & Perry, C. L. (1995). Self-esteem and obesity in children and adolescents: A literature review. *Obesity Research, 3*(5), 479-490.

Gergen, K. J. (1971). *The concept of self*. USA: Holt, Rinehart, and Winston, Inc..

Guinn, B., Semper, T., Jorgensen, L., & Skaggs, S. (1997). Body image perception in female Mexican-American adolescents. *The Journal of School Health, 67*(3), 112-115.

Hill, A. J., & Williams, J. (1998). Psychological health in a non-clinical sample of obese women. *International Journal of Obesity & Related Metabolic Disorders, 22*(6), 578.

Holm-Denoma, J. M., Joiner, T. E., Vohs, K. D., & Heatherton, T. F. (2008). The "freshman fifteen" (the "freshman five" actually): Predictors and possible explanations. *Health Psychology. 27*(1 Suppl), S3-S9.

Jones, S. L., Moulton, M. A., Moulton, P., & Roach, S. (1999). Self-esteem differences as a function of race and weight preoccupation: Findings and implications. *Women's Health Issues. 9*(1), 50-55.

Jorm, A. F., Korten, A. E., Christensen, H., Jacomb, P. A., Rodgers, B., & Parslow, R. A. (2003). Association of obesity with anxiety, depression and emotional well-being: A community survey. *Australian and New Zealand Journal of Public Health, 27*(4), 434-440.

Lewis, C. E., Jacobs, D., Jr, McCreath, H., Kiefe, C. I., Schreiner, P. J., Smith, D. E., et al. (2000). Weight gain continues in the 1990s: 10-year trends in weight and overweight from the CARDEA study. coronary artery risk development in young adults. *American Journal of Epidemiology, 151*(12), 1172-1181.

Lockhart, B. D., Merrill, R. M., & Bird, J. S. (2002). Perceptions of unconditional and conditional worth among college students. *Perceptual and Motor Skills, 94*(2), 489-498.

Lockhart, B. D., & Rencher, A. C. (1997). Worth index. *Perceptual and Motor Skills, 85*(3), 827-834.

MacInnes, D. L. (2006). Self-esteem and self-acceptance: An examination into their relationship and their effect on psychological health. *Journal of Psychiatric and Mental Health Nursing, 13*(5), 483-489.

Malik, V. S., Schulze, M. B., & Hu, F. B. (2006). Intake of sugar-sweetened beverages and weight gain: A systematic review. *American Journal of Clinical Nutrition, 84*(2), 274-288.

Marron, J. A., & Kayson, W. A. (1984). Effects of living status, gender, and year in college on college students' self-esteem and life-change experiences. *Psychological Reports, 55*(3), 811-814.

McLaren, L., & Gauvin, L. (2002). The cumulative impact of being overweight on women's body esteem: A preliminary study. *Eating and Weight Disorders. 7*(4), 324-327.

Megel, M. E., Wade, F., Hawkins, P., Norton, J., Sandstrom, S., Zajic, K., et al. (1994). Health promotion, self-esteem, and weight among female college freshmen. *Journal of Health Behavior, Education & Promotion, 18*(4), 10-19.

Miyatake, N., Nonaka, K., & Fujii, M. (1999). A new air displacement plethysmograph for the determination of Japanese body composition. *Diabetes, Obesity & Metabolism*, *1*(16), 347-351.

Mokdad, A. H., Serdula, M. k., Dietz, W. H., Bowman, B. A., Marks, J. S., & Koplan, K. P. (1999). The spread of the obesity epidemic in the United States, 1991-1998. *Journal of the American Medical Assocation, 282*(16), 1519-1522.

O'Dea, J. (1999). Cross-cultural, body weight and gender differences in the body size perceptions and body ideals of university students. *Australian Journal of Nutrition & Dietetics, 56*(3), 144-150.

Ogden C. L., Carroll M. D., Curtin L. R., McDowell M. A., Tabak C. J., Flegal K. M. (2006). Prevalence of overweight and obesity in the United States, 1999-2004. *Journal of the American Medical Association* 295:1549-1555.

Phillips, R. G., & Hill, A. J. (1998). Fat, plain, but not friendless: Self-esteem and peer acceptance of obese pre-adolescent girls. *Journal of the International Association for the Study of Obesity, 22*(4), 287-293.

Pingitore, R., Spring, B., & Garfield, D. (1997). Gender differences in body satisfaction. *Obesity Research, 5*(5), 402-409.

Racette, S. B., Deusinger, S. S., Strube, M. J., Highstein, G. R., & Deusinger, R. H. (2008). Changes in weight and health behaviors from freshman through senior year of college. *Journal of Nutrition Education and Behavior, 40*(1), 39-42.

Rivenes, A. C., Harvey, S. B., & Mykletun, A. (2009). The relationship between abdominal fat, obesity, and common mental disorders: Results from the HUNT study. *Journal of Psychosomatic Research, 66*(4), 269-275.

Roberts, R. E., Deleger, S., Strawbridge, W. J., & Kaplan, G. A. (2003). Prospective association between obesity and depression: Evidence from the Alameda County study. *Journal of the International Association for the Study of Obesity, 27*(4), 514-521.

Rosenberg, M. (1989). *Society and the adolescent self-image*. Middletown, Connecticut: Wesleyan University Press.

Rubinstein, G. (2006). The big five and self-esteem among overweight dieting and non-dieting women. *Eating Behaviors, 7*(4), 355-361.

Ryan, R. M., & Brown, K. W. (2003). Why we don't need self-esteem: On fundamental needs, contingent love, and mindfulness. *Psychological Inquiry, 14*(1), 71-76.

Shaw, J. M., Ebbeck, V., & Snow, C. M. (2000). Body composition and physical self-concept in older women; accession number: *Journal of Women & Aging, 12*(3-4), 59-75.

Strine, T. W., Mokdad, A. H., Dube, S. R., Balluz, L. S., Gonzalez, O., Berry, J. T., et al. (2008). The association of depression and anxiety with obesity and unhealthy behaviors among community-dwelling US adults. *General Hospital Psychiatry, 30*(2), 127-137.

Suls, J. (Ed.). (1993). *Psychological perspectives on the self*. Hillsdale, New Jersey: Lawrence Erlbaum Associates, Inc.

Thompson, D., Edelsberg, J., Colditz, G. A., Bird, A. P., & Oster, G. (1999). Lifetime health and economic consequences of obesity. *Archives of Internal Medicine, 159*(18), 2177-2183.

Tiggemann, M. (2004). Dietary restraint and self-esteem as predictors of weight gain over an 8-year time period. *Eating Behaviors, 5*(3), 251-259.

Viner, R. M., & Cole, T. J. (2006). Who changes body mass between adolescence and adulthood? factors predicting change in BMI between 16 year and 30 years in the 1970 british birth cohort. *International Journal of Obesity (2005), 30*(9), 1368-1374.

Wardle, J., Haase, A. M., & Steptoe, A. (2006). Body image and weight control in young adults: International comparisons in university students from 22 countries. *International Journal of Obesity (2005), 30*(4), 644-651.

Whaley, M. H., & Brubaker, P. H., & Otto, R. M. (Ed.). (2006). *ACSM's guidelines for exercise testing and prescription:* (7th ed.). Baltimore: Lippincott Williams & Wilkins.

Wharton, C. M., Adams, T., & Hampl, J. S. (2008). Weight loss practices and body weight perceptions among US college students. *Journal of American College Health, 56*(5), 579-584.

Wing, R. R., & Phelan, S. (2005). Long-term weight loss maintenance. *American Journal of Clinical Nutrition, 82*(1), 222S-225S.

Zhao, G., Ford, E. S., Dhingra, S., Li, C., Strine, T. W., & Mokdad, A. H. (2009). Depression and anxiety among US adults: Associations with body mass index. *International Journal of Obesity (2005), 33*(2), 257-266.