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The Relationship between Body Mass Index and Subjective Well-Being in Females during Early Young Adulthood

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The Relationship between Body Mass Index and Subjective Well-Being in Females during Early Young Adulthood.

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"Being busy does not always mean real work. The object of all work is production or accomplishment and to either of these ends there must be forethought, system, planning, intelligence, and honest purpose, as well as perspiration. Seeming to do is not doing."

-Thomas Alva Edison

I had a choice of doing a thesis or an internship. I chose the later, of course, but there were many times over the past year and a half that I questioned my choice. Focusing on the light at the end of the tunnel that was at times extremely dim helped me overcome the trials and tribulations that are associated with completing a long-term and arduous task.

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There is no one in particular to which this thesis is dedicated. This project is an example of what can be accomplished through hard work, persistence, and determination. If that description embodies you in any way, then this thesis is dedicated to you.

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Abstract

This study investigated the relationship between body mass index (BMI) and subjective well-being (SWB) in females during early young adulthood. Seventy-three Caucasian females 18-25 years of age participated in the study. Two groups were identified: normal (18.5-24.9 kg/m^2) BMI (n=53) and overweight/obese (25.0-39.9 kg/m^2) BMI (n=20). The Satisfaction with Life Scale (SWLS) and the Psychological General Well-Being Index (PGWB) were used to assess subjective well-being levels. There was no difference found in SWB levels between the 2 groups (significance level = .05; PGWB: $p = 0.76$; SWLS: $p = 0.13$). Clinicians cannot always assume that being overweight or obese is associated with low levels of well-being. It is important to assess other internal and external factors of an individual rather than only focusing on weight.

Chapter I

Introduction

Obesity is a serious public health problem that affects millions of Americans yearly (Allison, Fontaine, Manson, Stevens, & VanItallie, 1999). Obesity has been linked to increased rates of diseases such as cardiovascular disease, diabetes, hypertension, and some types of cancer (Berke & Morden, 2000). When relating obesity to well-being, health-related quality of life (HRQoL) is linked to both psychological and physical aspects of an individual (Kaplan & Anderson, 1988). When a person is overweight and shows signs of psychological distress, the motivation to change their health habits on their own can be nonexistent, and if present, weight cycling can occur which is shown to be just as harmful on the body as having an elevated BMI (a BMI greater than 25.0 kg/m^2) (Brownwell & Rodin, 1994).

Of all of the age ranges, young adulthood is a period of rapid weight gain, and over a 10-year time span, young women (25-34 years of age) show a 3.5 kg weight gain (Williamson, 1991). When there is early detection of an elevated BMI and low HRQoL and intervention occurs, the chance of these individuals developing diseases such as heart disease and diabetes in middle and late adulthood can be lowered (Brownwell & Wadden, 1992). When the risk factors of diseases linked to obesity are present in young adulthood, they can predetermine whether or not there will be long-term effects (e.g. a decreased HRQoL from middle-age to old age) (Daviglus, et al., 2005). An individual's cognitions can either have a negative or positive effect on their physical state, and in this situation, a

low HRQoL (negative cognitions and health perceptions towards one's state) can cause a downward spiral in terms of the overall health of the individual.

If prevention or intervention is to take place, an increase in quality of life (QoL) has to be a priority for the individual so as he/she moves through the life-span, an inverse relationship does not occur between age and QoL. One of the most important interventions is exercise which has shown to be an effective method of weight management for young adults, especially for women (Donnelly et al., 2003). Also, weight loss early in life is important for the prevention/intervention for hypertension (Neter, Stam, Kok, Grobbee, & Geleijnse, 2003). Another study found an association between young adults who achieved a healthy weight during young and middle adulthood and lower Medicare costs in old age due to a favorable cardiovascular risk profile (Daviglus et al., 2005). Williamson, Kahn, Remington, and Anda (1990) stated that obesity prevention should begin in early adulthood, especially for those who may already be overweight.

Research in this field has focused on groups such as the elderly and middle-aged males and females. Recently, the focus has shifted to children, adolescents, and young adults, although the subject matter is not as extensive as the elderly and middle-aged groups (Biro, Striegel-Moore, Franko, Padgett, & Bean, 2006; Franklin, Denyer, Steinbeck, Caterson, & Hill, 2006; Hughes, Farewell, Harris, & Reily, 2007; Wardle & Cooke, 2005). One important area of interest, therefore, is to examine the relationship between BMI and subjective well-being in females during early young adulthood.

Subjective Well-Being

Although the terms quality of life and subjective well-being (SWB) are sometimes used interchangeably, these are the two terms in the field of psychology that "attempt to understand people's evaluations of their lives" (Diener, Suh, & Oishi, 1997, p. 25). A person can evaluate their life in the form of cognitions (thoughts) or affect (moods). The examination of well-being does not just look at one state over the other; it examines the full range of well-being ranging from hopelessness to happiness. The study of well-being is not just limited to what causes a person to show depressive symptoms but also what can cause an extremely happy person to be more happy than a slightly happy person. Another important factor of well-being is that it only focuses on an individual's internal state rather than examining their external experiences. Although much emphasis is given to the respondent's long-term mood rather than a momentary mood, a concrete evaluation of an individual's mental health cannot be given because even a disordered individual can be happy. Further measures would have to be used in order to correctly identify mental health status (Diener, Suh, & Oishi, 1997).

The three main components of well-being are satisfaction, pleasant affect, and unpleasant affect. Each of these components can be broken up into subdivisions according to different domains. For example, domains that can be associated with satisfaction are love, marriage, and friendship. Pleasant affect can be associated with joy and pride. Unpleasant affect can be associated with sadness and anxiety. Global measures usually examine life satisfaction whereas narrower topics may only examine satisfaction with relationships. Although the type of measure that is used depends on the goal of the

researcher, narrower measures are more sensitive to causal relationships (Diener, Suh, & Oishi, 1997).

Why is studying subjective well-being important? As stated earlier, this field of research focuses on "understanding the complete range of well-being from utter despair, to elation and total life satisfaction" (Diener, Suh, & Oishi, 1997, p. 38). An individual's goals, cognitions, and personal activities can influence their well-being rather than external situations, mainly because external situations can be adaptable over time. Most people are not in negative moods a majority of the time, so by studying positive well-being as well as negative well-being, researchers can determine what factors can cause an individual to have either an elevated QoL or lower QoL levels (Diener, Suh, & Oishi, 1997).

Hypothesis

The research hypothesis of the study was that females who have a BMI of 25.0-39.9 kg/m^2 will score differently on the subjective well being scales than females who have a BMI of 18.5-24.9 kg/m^2 (H_a: $\mu_1 \neq \mu_2$). Participants were divided into two groups. Those with normal BMI (18.5-24.9 kg/m^2) and overweight/obese BMI (25.0-39.9 kg/m^2). To assess subjective well-being, the following was used: an overall Psychological General Well-Being Index (PGWB) score ranging from 0 to 110 based on six domains: anxiety, depressed mood, positive well-being, self-control, general health, and vitality; an overall Satisfaction with Life Scale (SWLS) score ranging from 5 to 35 (See Table 1).

Table 1

Research Design

BMI 18.5-24.9 kg/m^2 n=53	SWB scores
and	
BMI 25.0-39.9 kg/m^2 n=20	

Note. N total = 73. SWB= Subjective Well-Being. BMI= Body Mass Index.

Research Question

Will there be a significant difference in subjective well being scores between young females having a BMI of 18.5-24.9 kg/m^2 vs. a BMI of 25.0-39.9 kg/m^2?

Limitations

1. A lack of volunteers could affect the power of the statistical analysis.
2. A lack of integrity on the part of the survey respondents could impact the results.
3. A lack of willingness of the survey respondents to follow directions when filling out the questionnaire could occur.
4. In terms of assessing body composition, using BMI as an estimate of being a normal weight, overweight, or obese could be seen as slightly inaccurate because it does not factor in muscle or bone mass but, more or less, BMI is used to measure the level of disease risk.

Delimitations

1. The sample consisted of 73 Caucasian females.
2. The age range of the participants was between 18 and 25 years.
3. The participants were from the University of Central Oklahoma located in Edmond, Oklahoma.
4. Chronic diseases were excluded so that subjective well-being scores would not be associated with a comorbidity.
5. BMI was the measure used to assess disease risk.

Assumptions

1. The researcher assumed that the participants are being honest and forth coming when completing the questionnaires.

2. BMI is a valid method for assessing disease risk ("Agency for Healthcare Research and Quality," 2003).
3. The mean scores for the PGWB and SWLS were normally distributed and independent.

Significance of the Study

The purpose of this study was to examine the relationship between BMI and subjective well-being in females during early young adulthood. Research was somewhat minimal in this subject area, especially in early young adulthood (18-25 years of age). Past research has shown that an early detection of obesity and a low HRQoL in young adults can lower the risk of obesity-related diseases in middle and late adulthood when intervention is present (Manson et al., 1995; Daviglus et al., 2005; Williamson, Kahn, Remington, & Anda, 1990; Neter, Stam, Kok, Grobbee, & Geleijnse, 2003).

Definitions

Adipose. "Fatty. Adipose tissue is composed of fat-containing cells arranged in lobules" (Mosby's, 2002, p. 43).

Amphetamines. A chemical compound that is structurally a sympathomimetic amine, considered a psychostimulant, an approved by the FDA to treat narcolepsy and ADHD; acts primarily by triggering release of norepinephrine, dopamine, and serotonin from presynaptic neurons. Because of its potential for abuse, it is scheduled by the FDA in the most restrictive classification for a drug with medical usefulness (Stedman's, 2006, p. 65).

Basal energy expenditure. The amount of energy used in a unit of time by a fasting, resting subject to maintain vital functions. The rate, determined by the

amount of oxygen used, is expressed in calories consumed per hour per square meter of body surface area or per kilogram of body weight (Mosby's, 2002, p. 184).

Biliary calculi. "A concretion formed in the gallbladder or bile ducts" (Taber's, 2003, p. 808).

Binge eating. "A disorder characterized by an insatiable craving for food, often resulting in episodes of continuous eating and often followed by purging, depression and self-deprivation" (Mosby's, 2002, p. 204).

Body image disturbance. "The condition is defined as a disruption in the way one perceives one's body. The cause of a disturbance in body image may be a biophysical, cognitive, perceptual, psychosocial, cultural, or spiritual factor" (Mosby's, 2002, p. 223).

Body mass index (BMI). "A formula for determining obesity. It is calculated by dividing a person's weight in kilograms by the square of the person's height in meters" (Mosby's, 2002, p. 223-224).

*Calorie***.** "A unit of heat. A calorie can be equated to work or other units of heat measurement" (Taber's, 2003, p. 307).

Cardiac arrhythmia. "An abnormal cardiac rate or rhythm. The condition is caused by a failure of the sinus node to maintain its pacemaker function or by a defect in the electrical conduction system" (Mosby's, 2002, p. 282).

Cardiac output. "The volume of blood expelled by the ventricles of the heart with each beat (the stroke volume) multiplied by the heart rate" (Mosby's, 2002, p. 290).

Cohort study. "A study concerning a specific subpopulation, such as the children born between December and May in 1975 and those born in the same months in 1955" (Mosby's, 2002, p. 390).

Congestive heart failure. "Inability of the heart to circulate blood effectively enough to meet the body's metabolic needs" (Taber's, 2003, p. 900).

Coronary heart disease. An abnormal condition that may affect the heart's arteries and produce various pathologic effects, especially reduced flow of oxygen and nutrients to the myocardium. The most common kind of coronary artery disease is coronary atherosclerosis, now the leading cause of death in the Western world (Mosby's, 2002, p. 434).

Diabetes. A complex disorder of carbohydrate, fat, and protein metabolism that is primarily a result of a deficiency or complete lack of insulin secretion by the beta cells of the pancreas or of defects of the insulin receptors… Type I diabetes mellitus in this classification scheme includes patients with diabetes caused by an autoimmune process, dependent on insulin to prevent ketosis…Patients with Type II diabetes mellitus are those previously designated as having Type II, non-insulin-dependent diabetes mellitus (NIDDM), maturity-onset diabetes, ketosis-resistant diabetes, or stable diabetes (Mosby's, 2002, p. 511).

Energy intake. "A unit, equal to the large calorie, used to denote the heat expenditure of an organism and the fuel or energy value of food" (Mosby's, 1998, p. 248).

Ephedrine. A synthetic sympathomimetic alkaloid originally obtained from species of *Ephedra*; first isolated in 1887. In ancient Chinese medicine it was used

> as a diaphoretic and antipyretic. Its action is similar to that of epinephrine. Its effects, although less powerful, are more prolonged, and it exerts action when given orally, whereas epinephrine is effective only by injection. Ephedrine dilates the bronchial muscles, contracts the nasal mucosa, and raises the blood pressure. It is chiefly used for its bronchodilating effect in asthma, and for its constricting effect on the nasal mucosa in hay fever (Taber's, 2003, p. 690).

(Fat cell) hypertrophy. "An increase in the size of an organ (fat cells) caused by an increase in the size of the cells rather than the number of cells" (Mosby's, 2002, p. 851).

Gallstone. "A concretion formed in the gallbladder or bile ducts" (Taber's, 2003, p. 809).

Gastric bypass surgery (also called Roux-en-Y). "An anastomosis (connection between two organs) of the small intestine in the shape of the letter Y. The proximal end of the divided intestine is anastomosed end-to-side to the distal loop, and a part of the distal loop is anastomosed to another part of the digestive tract, such as the esophagus" (Mosby's, 2002, p. 1522).

Hazard (ratio). "A condition or phenomenon that increases the probability of a loss that may result in injury or illness" (Mosby's, 2002, p. 782).

Heart attack. "Necrosis of a portion of the cardiac muscle caused by an obstruction in a coronary artery through either atherosclerosis, a thrombus, or a spasm" (Mosby's, 2002, p. 787).

Hyperlipidemia. "An increase of lipids in the blood" (Taber's, 2003, p. 985).

Hypertension. A common disorder characterized by elevated blood pressure persistently exceeding 140/90 mm Hg. Essential hypertension, the most common kind, has no single identifiable cause, but the risk of the disorder is increased by obesity, high serum sodium level, hypercholesterolemia (high cholesterol), and a family history of high blood pressure (Mosby's, 2002, p. 849).

Hypoxia. "Inadequate oxygen tension at the cellular level, characterized by tachychardia, hypertention, peripheral vasoconstriction, dizziness, and mental confusion" (Mosby's, 2002, p. 860).

Insulin. "A hormone secreted by the beta cells of the pancreas that controls the metabolism and cellular uptake of sugars, proteins, and fats" (Taber's, 2003, p. 1062).

Intra-abdominal. "Situated within the cavity of the abdomen" (Mosby's, 2002, p. 917).

Laxative. "Pertaining to a substance that causes evacuation of the bowel…by increasing the bulk of the feces, softening the stool, or lubricating the intestinal wall" (Mosby's, 2002, p. 981).

Lipase. "A lipolytic or fat-splitting enzyme found in the blood, pancreatic secretion, and tissues. Emulsified fats of cream and egg yolk are changed in the stomach to fatty acids and glycerol by gastric lipase" (Taber's, 2001, p. 1191).

Metabolic rate. "The amount of energy liberated or expended in a given unit of time. Energy is stored in the body in energy-rich phosphate compounds and in proteins, fats, and complex carbohydrates" (Mosby's, 2002, p. 1085).

Myocardial infarction. "The loss of living heart muscle as a result of coronary artery occlusion" (Taber's, 2003, p. 1346).

Noradrenergic (or norepinephrinergic). “Pertaining to the action of norepinephrine or to neural or metabolic pathways in which it functions as a neurotransmitter” (Stedman’s, 2006, p. 1330).

Obesity. An abnormal increase in the proportion of fat cells, mainly in the viscera and subcutaneous tissues of the body. Obesity may be exogeneous or endogenous. Hyperplastic obesity is caused by an increase in the number of fat cells in the increased adipose tissue mass. Hypertrophic obesity results from an increase in the size of the fat cells in the increased adipose tissue mass (Mosby’s, 2002, p. 1206).

Quality of life. “A measure of optimum energy or force that endows a person with the power to cope successfully with the full range of challenges encountered in the real world” (Mosby’s, 2002, p. 1451).

Roux-en-Y. Any Y-shaped anastomosis in which the small intestine is included; after division of the small intestine segment, the distal end is implanted into another organ, such as the stomach or esophagus, and the proximal end into the small intestine below the anastomosis to provide drainage without reflux. (Dorland’s, 2003, p. 74).

Serotonergic. “Relating to the action of serotonin or its precursor L-tryptophan” (Stedman’s, 2006, p. 1754).

Sleep apnea. “A sleep disorder characterized by periods in which respiration is absent. The person is momentarily unable to contrace respiratory muscles or to maintain airflow through the nose and mouth” (Mosby’s, 2002, p. 1592).

Stroke volume. "The amount of blood ejected by a ventricle during contraction" (Mosby's, 2002, p. 1641).

Tricep skinfold. "The thickness of a fold of skin around the triceps muscle. It is measured primarily to estimate the amount of subcutaneous fat" (Mosby's, 2002, p. 1747).

Vertical banded gastroplasty (VBG). "For treatment of morbid obesity in which an upper gastric pouch is formed by a vertical staple line, with a band applied at the outlet into the main pouch to prevent dilation" (Stedman's, 2006, p. 793).

Visceral. "Pertaining to or derived from the gill arches of vertebrates" (Taber's, 2003, p. 2240).

Weight cycling. "The process of chronically alternating between dieting and regular eating, leading to successive weight gains and losses; over time, yo-yo dieters increase their chances of becoming obese by altering their underlying metabolism" (Taylor, 2003, p. 535).

Xanthines. "Oxidation product of guanine and hypoxanthine, precursor of uric acid; occurs in many organs and in the urine, occasionally forming urinary calculi; elevated in molybdenum cofactor deficiency and in xantinuria" (Stedman's, 2006, p. 2157).

Yo-yo dieting. "The process of chronically alternating between dieting and regular eating, leading to successive weight gains and losses; over time, yo-yo dieters increase their chances of becoming obese by altering their underlying metabolism" (Taylor, 2003, p. 535).

Chapter II

Review of Literature

The Epidemic

An elevated BMI – prevalence among the United States population.

Obesity is a very serious health problem that affects millions of Americans annually. Allison et al. (1999) examined the deaths that were attributed to obesity in 1991. The data from five other cohort studies (Alameda Community Health Study, Framingham Heart Study, Tecumseh Community Health Study, American Cancer Society Prevention Study I, & the National Health and Nutrition Examination Study I Epidemiological Follow-up Study) were examined, and the results showed that an estimated 280,000 deaths were based on the hazard ratio; 325,000 were also based on the hazard ratio who happened to be nonsmokers and people who never smoked. Over 80% of the deaths were attributed to individuals whose BMI was greater than 30. This study showed that the relationship between obesity and mortality in the United States was immensely high. Besides death, obesity was associated with many other diseases and a low quality of life. This study also pointed out that obesity was a major public health problem and will continue to worsen unless prevention and intervention increase.

The study by Gortmaker, Dietz, Sobol, and Wehler (1987) examined the increase in pediatric obesity in the United States. Obese children had an increased risk for diseases such as hypertension, psychosocial dysfunction, respiratory disease, diabetes, and several orthopedic conditions. The participants and the surveys used included: the National

Health Examination Survey (NHES) examined 7,119 children aged 6 to 11 years; cycle 3 of the NHES examined 6,710 children aged 12 to 17 years; and the National Health and Nutrition Examination Survey I and II (NHANES) examined 4,151 children aged 6-17 years and 3,700 children aged 6 to 17 years, respectively. The obese children were identified as having triceps skinfolds greater or equal to the 85th percentile of children of the same age and sex, whereas superobese children were in the 95th percentile. The results showed that obesity and superobesity in children had increased between 17 percent and 306 percent, respectively over the last two decades. Television watching has been linked to obesity, and the evidence suggested that the relationship may be causal. Data gathered by A.C. Nielsen Co., Northbrook, IL, showed that television watching for children 12 to 17 years of age had increased from 18.8 hours per week in 1968-1970 to 24.4 hours per week in the 1976-1980 study (Gortmaker, Dietz, Sobol, & Wehler, 1987). Other explanations that were noted were change in diet and decrease in physical activity over time. The authors concluded that the increase in obesity will have a negative impact on the health status of children as they get older. There will be a higher prevalence of disease such as diabetes (Type II), heart disease, and orthopedic diseases as well as developing adult obesity. This is a problem that cannot be ignored, and the use of prevention programs can be essential in controlling this disease (Gormaker, Dietz, Sobol, & Wehler, 1987).

Obesity – Weight Loss Inhibitors, Health Risks, and Treatment

Weight loss inhibitors.

The article by Brownwell and Wadden (1992) examined the etiology of obesity, discussed the establishment of a reasonable weight, and highlighted unrealistic goals that

dieting can create for individuals. In terms of intervention, the establishment of a program designed for the individual is very important. This article discussed some of the problems individuals had with treatments (e.g. relapse) and stressed the need for more permanent behavior change. Obesity stems from factors such as a "decrease in physical activity, an increase in high-fat diets, and food-intake patterns" (p. 506). Obesity was also linked to genetic factors, a low resting metabolic rate, or fat cell hypertrophy; however, practitioners should not allow patients to believe that they cannot do anything about their weight problem just because it happens to run in their family. Individuals can alter their environmental factors by increasing their physical activity and lowering their intake of foods high in fat. There were behavioral factors that were potentially risks for individuals such as eating habits and psychological status. In terms of eating habits, overeating and binge eating were major problems. During weight loss programs, individuals may feel the need to binge eat because of the dietary deprivation they experience while participating in the program. Binge eating occurs when individuals cannot control their urge to overeat. They do not purge themselves or use laxatives, which was common in bulimia nervosa. Instead, these individuals may feel a high amount of psychological distress. So they continue to gain weight as a result of the overeating and travel through the downward spiral of yo-yo dieting (Brownwell & Wadden, 1992).

There were many beliefs about weight and dieting. In the United States, especially for women, an extremely lean body was seen as the ideal shape for women (Brownwell & Wadden, 1992). Society seems to be obsessed with the idea that a thinner a person is a healthier person, which some of the time is not the case. Should people stop dieting

because of the mindset of society? Brownwell and Wadden (1992) noted that people needed to figure out what type of diet worked for them. Some morbidly obese individuals get fed up with dieting and turn to surgery, which for some was the only option. But once the surgery was complete, establishing a dietary regimen was crucial to lower the risk of relapse. Others may say that dieting is dangerous to one's health. This does have some truth to it in terms of yo-yo dieting which is just as harmful to one's health as staying overweight. One way to diet was to reevaluate the goals of a treatment to find the safest and most effective way to lose weight and maintain weight loss (Brownwell & Wadden, 1992).

One of the biggest problems with weight loss was that individuals often set their weight loss goals too high for the amount of time allotted to lose the weight (Brownwell & Wadden, 1992). Then, when the goal was not met, resentment of treatment programs soon followed. Brownwell and Wadden (1992) found that even a 10% loss of body weight can aid in decreasing blood pressure for those who are hypertensive. There are approaches that get in the way of selecting a weight loss treatment plan such as choosing a program that is popular or choosing a program that states it is less demanding on the body, but often very expensive and dangerous. The approach that seemed to be the most practical was choosing a treatment program that best suits the individual. Once this occurred, practitioners can help individuals maintain weight loss by extending the treatment period, increasing the focus on exercise, teaching patients coping skills, providing treatment for body image disturbances and eating disorders, emphasizing the importance of a low-fat diet, and even exploring the technological developments of

weight loss such as handheld computers in weight loss programs (Brownwell & Wadden, 1992).

Health risks.

There are many health risks associated with having a BMI greater than 30.0 kg/m^2. Kopelman (2000) identified diseases that were associated with obesity: Type II diabetes, certain forms of cancer, sleep and breathing disorders, and cardiovascular disease. He explained these health problems, prevention techniques, and appropriate interventions which should take place for weight management. Kopelman (2000) stated:

> Generalized obesity results in alteration in total blood volume and cardiac function, whereas the distribution of fat around the thoracic cage and abdomen restricts respiratory excursion and alters respiratory function. The intra-abdominal visceral deposition of adipose tissue, which characterizes upper body obesity, is a major contributor to the development of hypertension, elevated plasma insulin concentrations and insulin resistance, diabetes mellitus and hyperlipidaemia (p. 639-640).

In terms of the cardiovascular system, circulation of the blood volume in the body has to be in proportion to the person's body weight. The more a person weighs, the harder the cardiovascular system has to work to reach a larger individual's frame, which ultimately increases the resting cardiac output and an increased stroke volume. This places more stress on the heart because the left ventricle works harder to circulate blood to the body. This is due to an increase in peripheral resistance which can lead to a person developing a hypertensive state. If the weight remains unchanged, this can lead to congestive heart failure. In terms of sleep and breathing abnormalities, a high distribution

of fat around the thoracic cavity can put pressure on the chest wall which reduces lung volume when an obese person lies on their back. This causes breathing abnormalities which can lead to severe hypoxia (which causes sleep apnea) and cardiac arrhythmias. Although there are many severe problems associated with obesity, steps can be taken to improve health. Programs that promote physical activity and healthy eating can aid in the prevention of obesity and also with intervention for those who are in need of weight management (Kopelman, 2000).

In the study by Manson et al. (1990), researchers examined the association between obesity and coronary heart disease among women in the United States. There were 115,886 females who were a part of the initial study in 1976, and at that time, they were 18 years of age when they completed the questionnaires about their health history, health habits, and lifestyles. Follow-up questionnaires were given in 1978, 1980, 1982, and 1984. There were five categories that were used in this study to classify BMI levels: category one: < 21 kg/m^2, category two: 21-23 kg/m^2, category three: 23-25 kg/m^2, category four: 25-29 kg/m^2, and category five: > 29 kg/m^2. The results of the study show that women who reported having hypertension, diabetes, and elevated serum cholesterol levels were in categories four and five. The risks for a nonfatal myocardial infarction, fatal coronary heart disease, and angina pectoris are associated with higher BMI levels (categories four and five). Women who were in the fourth BMI category were 80% more likely to develop coronary heart disease than women in the lower categories. Overall, the data in this study support the notion the obesity can lead to the development of coronary heart disease.

Manson et al. (1990) found that women who are mildly overweight (25.0-28.9 kg/m^2) still have an 80% chance of developing heart disease, and health risks associated with an elevated BMI subsided with weight loss but increased with weight gain. Intervention can play an important role in weight management. Increasing physical activity and decreasing dietary fat content can aid in lowering BMI. There was a relationship between a high BMI at age 18 and the risk of developing coronary heart disease in middle adulthood. As a result, early prevention for those women at a young age (while their metabolism still permits them to lose weight at a reasonable rate) can be rewarding to their health (Manson et al., 1990).

Mortality.

Manson et al. (1995) examined the relationship between body mass index and mortality among women. The participants were 115,195 women (about 98% of the participants being Caucasian) enrolled in a Nurses' Health Study who ranged in age from 30 to 55. After the initial visit, there was a sixteen-year follow-up in which death, cardiovascular disease, and cancer were documented. The women answered questionnaires concerning their health history and health status. The results show that women who had never smoked, had a recent stable weight, and were lean (BMI less than 19 kg/m^2) showed the lowest mortality rate. The mortality rate among the obese women (BMI greater than or equal to 29 kg/m^2) was twice as high as the lean women. Along with a higher mortality rate, there was a trend of developing cardiovascular disease and cancer. Also, a BMI level of $22kg/m^2$ or higher at the age of 18 was associated with having a higher risk of developing cardiovascular disease. In this study, an elevated BMI (those who not only obese, but mildly overweight as well) was strongly associated with

deaths due to cardiovascular disease as well as the following diseases as well: nonfatal myocardial infarction, diabetes, hypertension, and gallstones. This study shows that body weight is a good indicator of mortality in middle-aged women.

Treatment.

Berke and Morden (2000) identified the problems that obesity caused and identified steps that a person could take to manage their weight. The World Health Organization (WHO) defines BMI as height in meters squared divided by weight in kilograms. A normal BMI ranges from 18.5 to 24.9 kg/m^2, 25.0 to 29.9 kg/m^2 being overweight, and 30kg/m^2 or greater being obese ("World Health Organization," 2008). There are several different treatments that patients can use to lose weight which start from the obvious: proper diet, exercise, and behavior modification. Other treatment methods that are available to patients and can be incorporated with proper diet, exercise, and behavior modification are medications and surgical interventions (Berke & Morden, 2000).

In terms of medications for weight loss, there were several different categories. First, there were the drugs that reduce energy intake which are noradrenergic agents and serotonergic agents. These medications mirrored the effects that amphetamines had on the body but have a lesser chance for addiction and acted as a weaker stimulant. Second, there were nutrient partitioning medications, which acted as lipase inhibitors and decreased fat absorption in the gastrointestinal tract (Berke & Morden, 2000). Another type of medication are agents which increase energy expenditure such as ephedrine and the xanthines but have a high risk of side affects such as cardiac complications from hypertension, increased heart rate (HR), increased myocardial oxygen consumption and

increased cardiac output (Berke & Morden, 2000). The surgical interventions were set aside for those that were morbidly obese (BMI 40 kg/m^2 or higher) and had co-existing conditions such as sleep apnea, cardiovascular disease, or diabetes. The two most common procedures that can result in up to a 25% weight loss were the vertical banded gastroplasty and the Roux-en-Y gastric bypass (Berke & Morden, 2000).

Obesity – A Refractory Disorder

There are many issues dealing with the risks and benefits of dieting. Brownell and Rodin (1994) assessed the challenges that were associated with dieting: individuals who will be helped and harmed; making sure the benefits exceed the costs; having a better understanding of why certain individuals have difficulties with dieting (cognitively); and developing an effective method for individuals to lose weight and have better control of weight management. Dieting techniques range from altering one's food intake and making healthy choices to making a drastic reduction in caloric intake. But for many, soon after the change is made and they experience dietary deprivation, they fall back into their old habits, and all the weight that they have managed to lose comes back. Society does not help much in terms of how a person should physically look, especially for women. There has always been an attempt to have the 'perfect body' and until one gets there, individuals are faced with cognitive battles. Society has put a stigma on weight (e.g. the thinner a person has more control over their life and the heavy individual is a depiction of "personal failing") because people are taught to be responsible for their actions and lives; someone who is overweight seems to have lost that control (Brownwell & Rodin, 1994, p. 782). One of the biggest problems with dieting is weight cycling, or the common term being yo-yo dieting. There has been a lot of debate about this issue

because of the potential damaging effects weight cycling can have on the cardiovascular system.

What some people failed to understand was that biological factors could have a strong influence on body weight and the shape of an individual (Brownwell & Rodin, 1994). Researchers were not saying that because genetics could predetermine body weight and shape, individuals should just give up dieting all together because no matter what, the weight is going to come back. However, a realization had to occur for the individual. People must understand that it was very possible for them to lose weight in order to be healthy. They may not reach the goal of looking like a runway model but going from obese to overweight can have a positive effect on their health status before they encountered biological resistance. An accepted process in behavior change was relapse. Some individuals who experienced this often may want to just give up on dieting all together and go the surgical route in order lose high amounts of weight, but there needed to be an understanding that not all diets fail. Besides cutting caloric intake in half, there needs to be some type of behavioral intervention and modification to aid individuals who were dieting. Individuals needed to realize that even modest amounts of weight loss could have positive effects on health such as improvements with blood pressure, blood glucose control, and blood lipid control (Brownwell & Rodin, 1994).

Can dieting be harmful? This question could be answered both positively and negatively. In terms of being helpful, preliminary amounts of weight loss could help decrease blood pressure and blood glucose levels. As for being harmful, individuals who dieted but were not obese could suffer from aliments such as bulimia nervosa, binge eating, and weight cycling because there was not a substantial amount of weight that

needs to be lost. Although more research needed to be done with the prevention and delaying of weight gain in individuals who were not obese, one factor that affected all types of body types is weight cycling. Studies have shown that after an individual has lost weight, there was an increased need for dietary fat in the their diet (due to the dietary deprivation), and those that gave in to the temptation experience the yo-yo dieting effect (Gerardo-Gettens et al., 1991). The literature for weight cycling pointed to a high mortality rate due to cardiovascular disease, but more research needs to be done in order to validate these findings (Brownwell & Rodin, 1994). Also, a preoccupation with body image and body dissatisfaction can lead to the development of depression, but weight loss appeared to help subdue depressive symptoms (Brownwell & Rodin, 1994).

The inferences that can be made from the information about dieting was that it could be harmful or beneficial depending on the individual. Practitioners will have to battle with the psychosocial effects that are involved with obesity, which can lead to either a resistance to intervention or a relapse during intervention. Practitioners should express the importance of being at a healthy weight to their patients and try different behavior modification techniques and promote health education to help patients understand that the image that society portrays as acceptable may not be ideal for certain individuals. Individuals who are overweight had an increased risk for developing health problems, so it was crucial that these individuals chose the appropriate, safe, and effective methods in order to lose weight (e.g. consulting a dietitian, seeing a physician, joining a weight management program, etc.) (Brownwell & Rodin, 1994).

Additional Factors Contributing to the Risk of Obesity

Childhood obesity.

Dietz (1983) investigated the management of obesity in childhood. The diagnosis for obesity was the triceps skinfold thickness in excess of the 85th percentile or by a weight that is 120% of the ideal controlled for age and sex. Around 80% of obese children developed obesity as adults. Some of the main causes of obesity in children were excessive energy intake, reduced energy expenditure, or an impairment of the regulation of energy balance. There were environmental issues that also influenced the onset of childhood obesity such as physical environment, ethnicity and family environment. In terms of physical environment, obesity was more prevalent in urban areas rather than areas that are under populated. As for ethnicity, the levels of childhood obesity were slowly rising in immigrants (Dietz, 1983).

In terms of family environment, the risk of obesity was greater in children whose parents were also obese. The article stated that the following steps should be taken when getting treatment for obesity: an initial evaluation from a pediatrician, a patient history and a physical examination should be done, counseling, dietary therapy, surgery (such as gastric bypass), and compliance (Dietz, 1983). From this information, the author hoped this will improve the understanding of childhood obesity and better the ability to treat patients.

Mossberg (1989) examined 504 overweight children (ages 0.5 to 5.5 years of age) from 1921 to 1947 and followed up for 40 years administering a questionnaire every ten years. The 35-item questionnaire assessed health, degree of overweight, dietary habits, social situation, children, and illness (p. 491). A correlation was found between the

degree of obesity in the parents and the weight of the child both in childhood and adult life. The results confirmed that obesity in childhood was associated with high morbidity and mortality in adulthood. Heredity and the degree of obesity in the child can also influence the prognosis in adulthood.

Garn and LaVelle (1985) did a two-decade follow-up of “fatness” in 383 infants and preschool children through early adulthood (p. 181). The examination periods were between 1959 to 1960 and 1978 to 1979. The participants were part of the Community Health Survey and were 0.5 to 5.5 years of age at the time of the first examination. Skinfold measurements were taken of the subscapular and triceps according to the Committee of Nutritional Anthropometry protocol. The fitness categories were low (lean), medium (overweight), and high (obese). The results show that 26.5% of initially obese infants and children were still obese two decades later as opposed to the 15% chance that was expected. It was also found that 74% were less obese during adulthood. The researchers noted that the family context can also play a large role in the likelihood of the child becoming an obese adult. Therefore, intervention that includes the entire family can aid in the management of obesity (p. 184).

Sørensen and Sonne-Holm (1988) examined a population of 93,800 Danish males, ages 18 to 26 years, to determine the risk of developing obesity in adulthood. The study found that thirteen year old overweight children who had either decreased or increased in the percentile level for BMI since seven years of age had an increased risk for developing obesity in adulthood than children who maintained a steady percentile level.

Decrease in physical activity.

A determining factor for the development of obesity in adulthood was lack of exercise. Studies showed that the maladaptive health behaviors, such as lack of physical activity, adapted in childhood can carry over into adulthood. In the study by Sallis et al. (1993), different environmental variables were examined in Mexican-American and Anglo-American preschool children in terms of the variables' relationship to physical activity. Some of the variables used were time spent outdoors, prompts to be active (encouragement) and beliefs and attitudes towards physical activity. The measures that were used were: observations that took place during the four home visits that lasted approximately one hour; interviewer-administered questionnaires that assessed psychological behavior; and physiological characteristics were assessed once (p. 391). When the children were evaluated in their homes, the main system that was used was the Behaviors of Eating and Activity for Child Health Evaluation System (BEACHES), which is used to characterize the "child's physical environment, social environment, physical activity level, ingestion of food, and interactions relating to physical activity and eating behaviors" (p. 391). Other variables that were measured were the amount of television the family viewed, the mother's physical activity levels (Seven-day Physical Activity Recall interview), and how supportive the family was in terms of cohesion (Family Relationship Index).

The results showed that high amounts of physical activity were associated with the time the child spent outdoors (Sallis et al., 1993). Also, the more encouragement the child received (from parents or other children) the better the behavior. From the results, the effective way to get a child to be physically active was to send them outside, but other

factors influenced their outdoor play. While playing with other children, a child may shout, “run faster” when playing tag or other games involved with running. This type of social prompt can increase the amount of physical activity the child receives. Another important finding was that although children from different ethnic groups were exposed to different levels of influences (i.e. Mexican-American children had more structured rules for play than Anglo-American children, but Anglo-American children had more toys and participated in more organized activities) there was not a large difference between Mexican-American children and Anglo-American children in terms of social and environmental influences on physical activity. All in all, this study suggested different intervention strategies that could be developed to encourage physical activity among young children, which would also decrease the risk of obesity (Sallis et al., 1993).

The study by Kleges, Eck, Hanson, Haddock, and Kleges (1990) examined how childhood obesity can affect the relationship between social environment, physical environment and physical activity. The study population consisted of 222 Caucasian preschoolers ages 3-6 years. The measures that were used to assess the children were one hour of playtime in the child’s home, and observations were recorded using the Studies of Children’s Activity and Nutrition Children’s Activity Timesampling Survey (SCAN CATS) (Kleges, Eck, Hanson, Haddock, & Kleges, 1990). This survey was used to record body movements along with assessing the physical and social environmental factors that relate to the body movement. Family risk was assessed placing the children into three groups based on the number of overweight parents in the family (e.g. zero, one, or two). The results of the study showed that the family risk for obesity, physical environment, and the child’s relative weight were predictors of the child’s physical

activity level (Kleges, Eck, Hanson, Haddock, & Kleges, 1990). In conclusion, overweight parents were linked with lower levels of physical activity in the child. This also adds to the ongoing cycle of the lack of physical activity in childhood that could eventually lead to lack of physical activity in adulthood.

Binge eating.

The study by Lingswiler, Crowther, and Stephens (1987) examined the mood changes during eating in normal and overweight binge and nonbinge eaters (p. 287). The study consisted of 56 female college students. The weight categories that were used were ±10% of their ideal body weight being the normal weight and ±15% of their ideal body weight being classified as overweight. The participants were placed in weight groups and further categorized as binge or nonbinge eater based on their response to the question, "Do you ever engage in periods of uncontrolled, excessive eating commonly called binge eating or binging?"(Lingswiler, Crowther, & Stephens, 1987, p. 290) The categories consisted of 12 normal weight binge eaters, 17 overweight binge eaters, 13 normal weight nonbinge eaters, and 14 overweight nonbinge eaters. The measures used were the Multiple Affect Adjective Checklist (MAACL) and the Daily Food Schedule. The MAACL is a 132-item survey that measured anxiety, depression, and hostility and the Daily Food Schedule was a chart that the participants used to record their dietary intake daily (Lingswiler, Crowther, & Stephens, 1987).

A key result of the study showed that the binge eaters had higher negative moods during eating episodes than the nonbingers who experienced higher neutral moods during eating episodes (Lingswiler, Crowther, & Stephens, 1987). The study indicated that binge eaters experienced mood changes due to anxiety and depression regardless if the person

was normal weight or overweight. Past research insisted that besides negative mood, other factors such as stress, fatigue, hunger, degree of restraint, preoccupation with thoughts of food, and cognitive control over eating can affect binge eating (Lingswiler, Crowther, & Stephens, 1987). This study illustrated the relationship between mood and eating habits, which can be factored into intervention strategies for obesity.

Body Image in Caucasian Females

An individual's self-perception of their body size can have an affect on their cognitions and behavior. This was especially the case for females (Paeratakul, White, Williamson, Ryan, & Bray, 2002). One study showed that Caucasian women showed a lesser amount of acceptance for being overweight and reported more pressure to be slim than African-American women. Paeratakul et al. (2002) examined the self-perception of being overweight according to sex, race/ethnicity, socioeconomic status, and BMI. Three BMI groups were assessed: in the normal group (18.5-24.9 kg/m2), 18% reported that they were overweight; in the overweight group (25.0-29.9 kg/m2), 60% reported that they were overweight; and in the obese group (≥30.0 kgm2), 87% reported that they were obese. From all of the ethnic groups that were assessed, the negative self-perception of Caucasian females was the highest in all of the BMI categories. The authors noted that this could be due to the unrealistic ultra-thin body images that are prevalent in Western societies. The messages that society gives are "messages that say to be fat is a sign of poor self-control, and obese individuals, especially women, tend to be dissatisfied and preoccupied with their physical appearance" (p. 348). Those who were in the normal weight category who saw them as overweight could be prone to psychological and health risks such as eating disorders and depression while those in the overweight category

could be at a higher risk of obesity because they felt no need to control their weight (Paeratakul et al., 2002; Grabe & Hyde, 2006).

A study by Fitzgibbon, Blackman, and Avellone (2000) examined the relationship between body image discrepancy and body mass index across ethnic groups (Caucasian, African American, and Hispanic). The results showed that Caucasian women experienced body dissatisfaction at lower BMI levels than African American or Hispanic women. Although the study was not examining a treatment-seeking sample, the authors noted that a higher level of body dissatisfaction could relate to the desire to take part in weight loss activities. The reasoning for the high body dissatisfaction levels were similar to the study by Paeratakul et al. (2002) – trying to achieve the unattainable perfect body which has fallen into the Western cultural ideal. When females adhered to this type of ideal, it could make them more vulnerable to behavioral problems such as eating disorders (Fitzgibbon, Blackman, & Avellone, 2000).

The conclusive and common theme that was prevalent throughout the body dissatisfaction research with this population is that Caucasian women seemed to be less satisfied with their bodies than the other ethnic groups in which they were compared. The problem seemed to begin in adolescence when girls were dealing with their biological changes and while it is natural for them to gain small amounts of weight, there was a constant struggle to achieve a low body weight which sometimes was only achieved by extreme dieting (Grabe & Hyde, 2006). Women took this mindset into young adulthood and for many individuals, stayed in a constant weight maelstrom for years. Examining the effects of body dissatisfaction was important because it can lead to a better understanding

of why current treatment methods either are or are not working; also, it can lead to more effective prevention strategies (Grabe & Hyde, 2006).

BMI and Health-Related Quality of Life

How are BMI and quality of life related? Why is this relationship important? Quality of life "measures the amount of energy an individual possesses to be able to successfully cope with the challenges he/she will face during everyday life or ultimately, the ability to be able to enjoy the daily activities of living" (Mosby's, 1998, p. 1370). In terms of HRQoL, the same qualities continue to apply, but now, the dimensions of physiology, social and cognitive functioning, and their general health perceptions are added. Obesity is a morbid disease that is linked to many other life-threatening diseases like Type II diabetes, hypertension, and heart disease. If a person is obese and also contracts another obesity-related disease, it could be clearly seen that their HRQoL scores would be significantly lower than individuals who are overweight or of normal weight that do not have a disease. The obese person would begin to have trouble doing things that they used to be able to do without any trouble. They might even begin to socialize less simply because of the fact that it would be harder for them to maneuver around not only due to their weight, but also because of the newly contracted illness (Hassan et al., 2003; Lopez-Garcia, et al., 2003; Yan et al., 2004; Finkelstein, 2000; Groessl et al., 2004).

There were many other scenarios that could be created to describe how a person's QoL could decrease, but the main point was that the lower an individual's QoL gets, the more difficult it will be for he/she to have a positive and healthy overall well-being. One of the most important things that a person can do is have a positive well-being because an

individual's perceptions can shape who they are. A study by Stice and Whitenton (2002) examined 11-15 year old girls and found that "sociocultural pressure, individual differences in body mass, and deficits in social support contribute to body dissatisfaction among adolescent girls" (p. 676). The studies by Hassan et al. (2003), Lopez-Garcia et al. (2003), Yan et al. (2004), Finkelstein (2000), and Groessl et al. (2004) are in agreement with the idea of the importance of striving to achieve a healthy weight because it can lead to an increase in the person's health status and overall well-being.

The study by Hassan et al. (2003) examined the relationship between obesity and quality of life along with dietary controls/exercise in a national sample in the United States. The Centers for Disease Control and Prevention administered the Behavioral Risk Factor Surveillance Survey (BRFSS) by randomly selecting one adult from each household in each state (Centers for Disease Control, 2000). The BRFSS survey asks questions concerning health behaviors and the health risks associated with different diseases. The survey was administered via telephone to 182,372 respondents using random-digit dialing. To measure health-related quality of life (HRQoL), the BRFSS HRQL questionnaire was used which measures self-reported healthy and unhealthy days. BMI was obtained through self-reported weight and height of the participants. The weight categories that were used were: nonoverweight (BMI less than 24.9 kg/m^2), overweight (BMI between 25 and 29.9kgm^2), obese (BMI between 30 and 34.0 kg/m^2), and severely obese (BMI over 35 kg/m^2).

The results of the Hassan et al. (2003) study showed that in terms of BMI and HRQoL scores, poor physical health was associated with an elevated BMI. It was also found the being severely obese was linked to having 14 or more days of poor mental

health; smoking was also highly associated with poor mental health because smokers were 110% more likely to be linked to having 14 or more unhealthy days. Women were linked to having more unhealthy days than men by 69%. Those who took part in diet and exercise were linked to having better HRQoL scores than those who did not participate in diet and exercise. The conclusion based on the findings presented include that an improved healthy diet and an increase in physical activity should be a health priority in the United States since poor diet and lack of exercise are linked to lower HRQoL scores. A similar study by Jia and Lubetkin (2005) also examined the impact of obesity on HRQoL in the general adult U.S. population, and they also found that those who were obese had lower quality of life levels than those who were in the normal BMI range, even without the presence of an obesity-related chronic disease.

The study by López-García et al. (2003) examined the association between body mass index and the physical and mental subsets of HRQoL of the elderly population in Spain. There were 3,605 participants in the study who were 60 years of age and older. Quality of life was assessed using the Spanish version of the SF-36 questionnaire. The SF-36 "is made up of 36 items which assessed the following eight HRQL components or scales: physical functioning, role-physical, bodily pain, general health, vitality, social functioning, role-emotional, and mental health" (p. 703). The questionnaire was administered by trained interviewers who also took weight and height measurements of all the participants. Body mass index was put into three categories: normal weight (18.5-24.0 kg/m^2), overweight (25-29.9 kg/m^2), and obese (BMI greater than 30 kg/m^2). The results showed that in men, there was not a significant difference between the QoL scores. The obese men had similar scores to the normal weight men, and the overweight

men only had a 5-point difference in scores when compared to the normal weight men. In women, as BMI increased, quality of life scores decreased. In both groups, obesity is associated with non-optimal physical functioning. The conclusion made in this study was that extreme BMI levels were associated with poor physical functioning.

In the study by Yan et al. (2004), BMI and HRQoL were assessed in adults 65 years and older. In 1996, The Chicago Heart Association Detection Project mailed health questionnaires to over 13,000 participants, and a total number of respondents was 7,080, 3,981 being men and 3,099 being women. The questionnaire that was used was the 12-item Health Status Questionnaire (HSQ-12), which evaluated physical, social, and mental well-being. To obtain BMI, the participants were asked to report their height and approximate weight so that items on the questionnaire would not be ignored. Other information regarding past and current diseases and covariates (such as age and education level) were also recorded for each participant. The conclusion was that being at either end of the body weight scale (underweight or obese) was associated with poor health perception and physical functioning and notes the importance of achieving a normal body mass index level in old age.

In a study by Finkelstein (2000), BMI and QoL were assessed in primary care patients from the Family Medicine Centre at Mt. Sinai Hospital in Toronto, Canada. There were 564 subjects who participated in the study. Quality of life was assessed via a questionnaire that was mailed home to the patients. The questionnaire consisted of a 103-question survey, which contained the 12-item Short Form (SF-12) of the SF-36 questionnaire and other questions about height, weight, and family income. The SF-12 asks questions about physical and mental health on two scales: the physical component

scale (PCS-12) and the mental component scale (MCS-12). Age, sex, and family income were controlled but other health factors (such as hypertension) were not. The results showed that the QoL scores that were seen as most favorable were associated with BMI levels between 20 and 25 kg per m^2. The study concluded that an individual who had a BMI within the recommended levels will increase their overall wellness level.

A longitudinal cohort study by Groessl et al. (2004) examined the effects of body mass index on health-related quality of life (HRQoL) in older adults. There were a total of 1326 adults from Rancho Bernardo, California, who participated in the study and height, weight, exercise, and smoking status were recorded for each of the participants. Sixty-one percent of the participants were female and the majority of the participants were Caucasian with a mean age of seventy-two years. Health-related quality of life was assessed over the telephone within a week of the clinic visit using the Quality of Well-Being Scale (QWB). The QWB scale is expressed numerically with zero representing death to one representing optimum functioning.

In the analysis, the participants were put into four groups based on their BMI. The four groups, being underweight, normal weight, overweight, and obese, were formed according to the body mass index definitions from the National Heart, Lung, and Blood Institute. After controlling for age, gender, smoking history, and exercise, the results of the study show that the obese participants had lower QWB scores than the participants who were of normal weight and overweight. The conclusion made from this study was that although it was uncertain whether being overweight had an effect on HRQoL, obesity was linked to low HRQoL scores (Groesl et al., 2004).

Summary

All of the information created a solid foundation for the subject area of obesity, from its prevalence among different age groups to its etiology. It was important to have a good understanding of this subject to be able to comprehend why it plagues millions of people in the United States. Since the study population for this research had some college-level courses, it was important to note that a study by Ross (1994) found that an elevated body weight seemed to be more distressing for the well-educated as well as those who tried to fit into society's bodily norms while participating in extreme dieting techniques. The literature surrounding the subject of BMI and subjective well-being was conclusive but weak when relating to individuals in young adulthood. This population has not been heavily studied with respect to just BMI and subjective well-being. Those investigators assumed that the results would be similar but the question had not been definitively answered. The current study attempted to examine the relationship between BMI and subjective well-being in females during early young adulthood.

Chapter III

Methods

Participants

There were 73 participants who were females between the ages of 18 and 25 years. All of the participants were volunteers from the University of Central Oklahoma located in Edmond, Oklahoma, who had a BMI between 18.5-24.9 kg/m^2 and 25.0-39.9 kg/m^2. The students were volunteers from the Healthy Life skills courses taught during the fall semester of 2007.

Participant Recruitment

The participants were recruited in the fall semester of 2007 using the following methods: the researcher coordinated obtaining participants for the study with the Coordinator of the Healthy Life Skills program; the researcher spoke to the Healthy Life Skills classes in the Kinesiology and Health Studies department in the College of Education and Professional Studies, and notified the undergraduate students about the need of participants for the study; students who wished to participate filled out the recruitment form and were contacted by the researcher to confirm study place and time (Appendix B). Follow-up letters containing the results of the study were sent to each participant through electronic mail during the following semester, April 2008 (if requested by the participant). Data entry, analysis, and storage of the study data took place at the residence of the researcher.

Instruments

Body measurements (anthropometry) were taken according to procedures prescribed by the National Health and Nutrition Survey from the Center for Disease Control and Prevention for 53 normal BMI participants and 20 overweight/obese participants (see Table 2):

1. Weight (in kilograms) was measured using the SECA Model 703 Digital Column Scale. The participant stood on the scale and weight was recorded onto the participant data collection sheet (Appendix A). Prior to the study, the scale was calibrated and set at zero and also set at zero prior to each participant's measurements. Each day the scale was used, it was calibrated before participant measurements were taken.
2. Height (in meters) was measured with the SECA Model 703 Digital Column Scale. Prior to the study and prior to each participant's measurements, the scale was calibrated. The measurements were recorded onto the participant data collection sheet (Appendix A).
3. BMI was assessed using the SECA Model 703 Digital Column Scale because of the integrated BMI function rather than by hand to reduce the rate of error. The World Health Organization (WHO) sets the BMI categories as follows: Normal – 18.5-24.9 kg/m^2, Overweight – 25.0-29.9 kg/m^2, and Obese – 30.0-39.9 kg/m^2.
4. The PGWB Index and the SWLS was used to assess subjective well-being.

Table 2

Participant Assessment.

Day	BMI Category	Assessment
1	Normal (n=53) and Overweight/Obese (n=20)	Height, Weight, BMI, Psychological General Well-Being Index(PGWB), Satisfaction with Life Scale (SWLS)

Note. N= 73. BMI= Body Mass Index.

The Psychological General Well-Being Index

The purpose of this self-administered questionnaire was to assess an individual's "self-representations of intrapersonal affective or emotional states reflecting a sense of subjective well-being or distress" (Dupuy, 1984, p. 170). From this, six domains could be assessed: anxiety, depressed mood, positive well-being, self-control, general health, and vitality. For the six domains, scores can range from 0 to 15, 0 to 20, or 0 to 25 with the higher the score, the better the quality of life. The questionnaire consisted of 22-items with each item having a Likert scale measurement ranging from 0 to 5. There have been numerous studies that have used this questionnaire, and it has been found to be reliable and valid (Dupuy, 1984). For the purpose of the current study, only the PGWB overall score was being assessed which ranges from 0 to 110 (high scores associated with optimum level of functioning). The questionnaire takes approximately 7 to 10 minutes to complete and when taking the questionnaire, the participant was asked to answer every question to the best of their knowledge.

Satisfaction with Life Scale

The purpose of this self-administered questionnaire was to assess the other construct of subjective well-being which is global life satisfaction. This scale differs from the PGWB mainly because it does not focus on constructs such as positive and negative affect (Diener, Emmons, Larsen, & Griffin, 1985). The questionnaire consisted of 5 items which can be assessed by the use of a Likert scale rating ranging from 1 (strongly disagree) to 7 (strongly agree). The overall score being assessed can range from 5 to 35 with higher scores being associated with greater life satisfaction (Pavot & Diener, 1992). There have been numerous studies that have used this questionnaire, and it has been

found to be reliable and valid (Pavot & Diener, 1992; Diener, Emmons, Larsen, & Griffin, 1985). The questionnaire takes approximately 5 minutes to complete and when taking the questionnaire, the participant was asked to answer every question to the best of their knowledge.

Procedure

The participants met the principal investigator at their designated times in the Exercise Physiology Lab of the University of Central Oklahoma Wellness Center. The protocol of the study was explained, and the participants were given an informed consent form to read and sign (Appendix C & E). Prior to the study, the participants were asked in an e-mail to wear light-weight clothing (Appendix E). The participants were advised to remove their shoes before measurements (height and weight) were taken. The participants were left alone in a classroom next to the Exercise Physiology Lab and were given a demographics sheet to complete (Appendix A). Next, participants completed SWLS and PGWB questionnaires (Appendix D) that assessed satisfaction with life and psychological well-being respectively. Once the participants completed the demographics sheet and both questionnaires, they placed their data sheets into a 9” x 12” envelope, sealed the envelopes, and placed them in a box at the front of the classroom. At the end of the study, the participants were debriefed and were given clarification about the study, if needed (Appendix E). As the participants left the classroom, they signed their name on a sheet that corresponded with their Healthy Life Skills course and that sheet was given to their Healthy Life Skills instructor so the participants would receive the 10 points extra credit (Appendix F).

Each participant was given an identification number to maintain confidentiality. The number was placed in the top right corner of all of the forms that corresponded with each particular participant. If a participant wished to receive the results of the study after April, 2008, they contacted the researcher using the contact information provided for them on the informed consent form. All of the data that was collected on the participant data sheets were entered into a Microsoft Office 2007 Excel database for analysis by the researcher. After the information was placed into the database, the data sheets were placed back into the participant file folders and placed in a locked storage cabinet at the residence of the researcher.

Statistical Analysis

The researcher scored the questionnaires by hand using the key provided by the developers of each instrument. Microsoft Office 2007 Excel was used to conduct the appropriate statistical analysis. A two-tailed Independent t-test (Welch's T-test) was used to analyze BMI and subjective well-being questionnaire data. The level of significance was set at 0.05.

Chapter IV

Results

Introduction and Descriptive Data

The purpose of the study was to examine the relationship between body mass index (BMI) and subjective well-being (SWB) in females during early young adulthood. There were two groups: the first group consisted of individuals with a normal BMI (18.5-24.9 kg/m^2) and the second group consisted of individuals with a BMI classified as overweight (25.0-29.9 kg/m^2) or obese (30.0-39.9 kg/m^2). Initially, the second group consisted of individuals with a BMI in the obese category but because of the low number of observations (n=2) in this group, it was changed to include overweight and obese individuals.

Data collection occurred one time during an 8 week period. Height and weight measurements were taken in order to assess BMI. The Satisfaction with Life Scale (SWLS) and the Psychological General Well-Being Index (PGWB) were used to assess subjective well-being levels. The study began with a total of 73 (N=73) females with a mean age of 19.9 years. The mean BMI for the normal group was 21.9 kg/m^2 and the mean for the overweight/obese group was 28.5 kg/m^2 (see Table 3). The mean SWLS and PGWB scores for the normal BMI group were 26.1 and 67.2, respectively. The mean SWLS and PGWB scores for the overweight/obese group were 23.8 and 68.4, respectively (see Table 4 and Figures 1 & 2).

Table 3

Total Participants (N), Age, and BMI

Data	N	Mean	Standard Deviation
Age	73	19.9 (years)	1.98
BMI-Normal	53	21.9 (kg/m^2)	1.72
BMI-Overweight/Obese	20	28.5 (kg/m^2)	3.45

Note. BMI= Body Mass Index.

Table 4

SWLS and PGWB Scores of Weight Groups

Group	Mean-SWLS	Standard Deviation-SWLS	Mean-PGWB	Standard Deviation-PGWB
BMI – Normal	26.1	5.35	67.2	14.08
BMI – Overweight/Obese	23.8	5.99	68.4	15.25

Note. BMI= Body Mass Index. SWLS= Satisfaction with Life Scale. PGWB= Psychological General Well-Being Index.

Figure 1. Score Distribution – SWLS

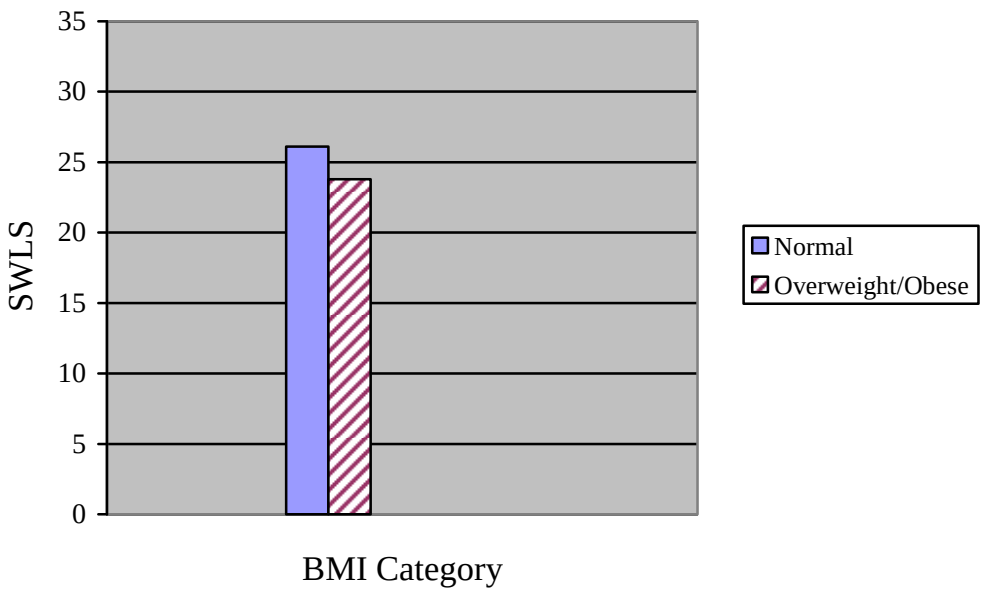
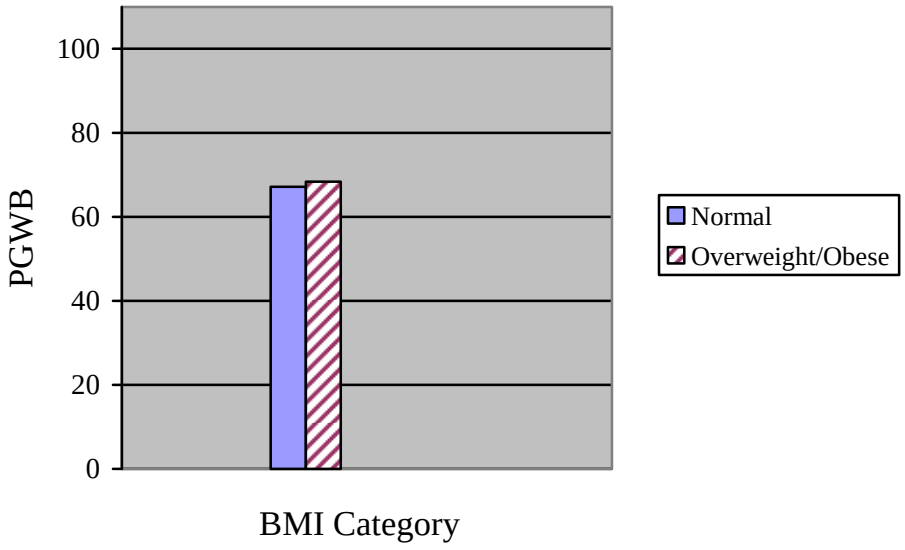


Figure 2. Score Distribution – PGWB



Hypothesis

Females who have a BMI of 25.0-39.9 kg/m^2 will score differently on the subjective well being scales than females who have a BMI of 18.5-24.9 kg/m^2 (H_a: $\mu_1 \neq \mu_2$). A Welch's t-test (two-tailed) was used to analyze the data. Significance was set at the .05 level.

Results of Hypothesis

All of the participants were assessed using the SWLS and the PGWB questionnaires. The purpose of the PGWB was to assess an individual's "self-representations of intrapersonal affective or emotional states reflecting a sense of subjective well-being or distress" (Dupuy, 1984, p. 170). From this, six domains were assessed: anxiety, depressed mood, positive well-being, self-control, general health, and vitality. For the six domains, scores can range from 0 to 15, 0 to 20, or 0 to 25 with the higher the score, the better the quality of life (Dupuy, 1984). The questionnaire consisted of 22-items with each item having a Likert scale measurement ranging from 0 to 5. For the purpose of this study, only the PGWB overall score was being assessed which ranges from 0 to 110 (high scores associated with optimum level of functioning). The PGWB scale was not found to be statistically significant with BMI (p=0.76).

The purpose of the SWLS was to assess the other construct of subjective well-being which is global life satisfaction. This scale differs from the PGWB mainly because it does not focus on constructs such as positive and negative affect (Diener, Emmons, Larsen, & Griffin, 1985). The questionnaire consists of 5 items which can be assessed by the use of a Likert scale rating ranging from 1 (strongly disagree) to 7 (strongly agree). The overall score being assessed can range from 5 to 35 with higher scores being

associated with greater life satisfaction (Pavot & Diener, 1992). The SWLS was not found to be statically significant with BMI ($p=0.13$). When the scale scores were examined using a one-tailed test rather than a two-tailed test, the p value ($p=0.06$) was somewhat closer to reaching significance. The results of Welch's T-test can be seen in Table 5. The research hypothesis was rejected.

Table 5

Independent T-test (Welch's T-test) Table

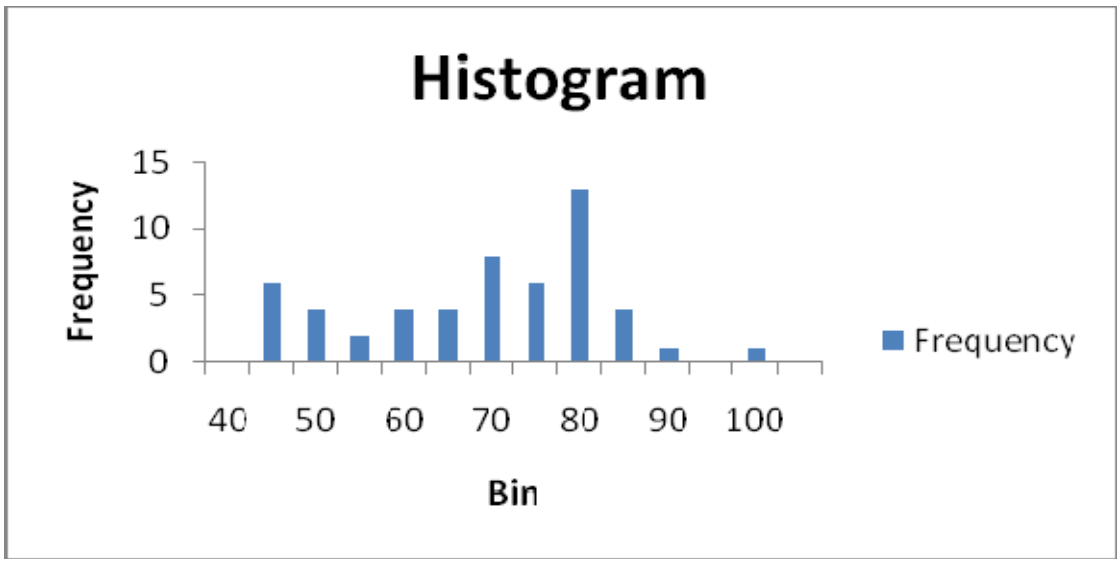
Group	Scale	df	p-value
Normal vs. Overweight/Obese	SWLS	31	0.13
Normal vs. Overweight/Obese	PGWB	32	0.76

Note. SWLS= Satisfaction with Life Scale. PGWB= Psychological General Well-Being Index.

Additional Statistical Analyses

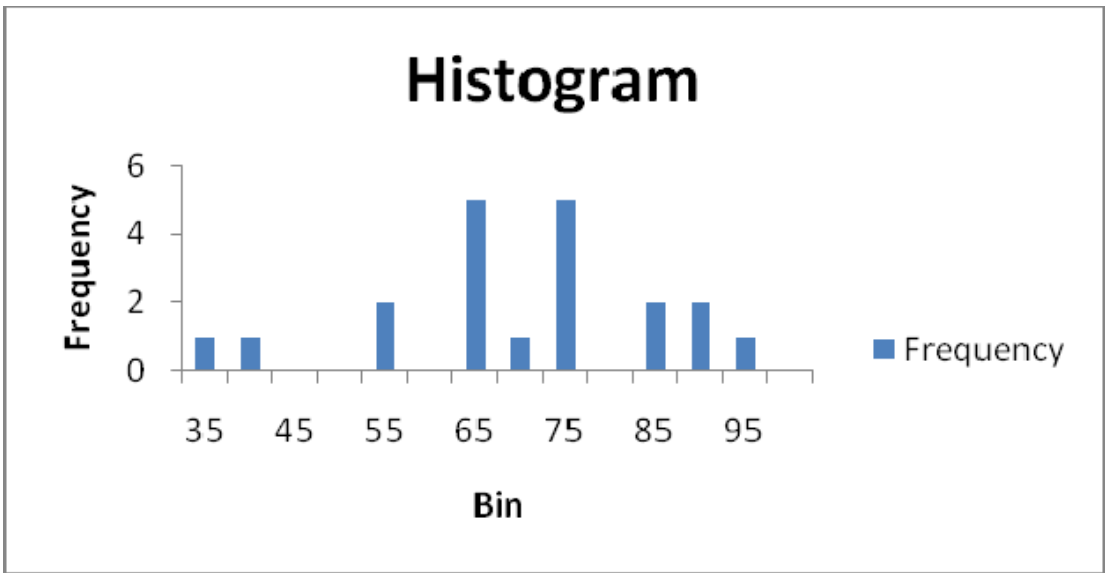
An additional statistical analysis was run to assess the normality of the PGWB and SWLS data. Two of the four histograms (PGWB normal and SWLS overweight/obese) displayed slightly abnormal frequencies so a Mann-Whitney test was used to assess the subjective well-being questionnaire data. The p-values for the PGWB and SWLS were p=.80 and p=.12, respectively. Although this test was run, the data collected from the Welch's t-test was used for the study. Figures 3 and 4 display the score frequencies of the PGWB for the normal and overweight/obese groups, respectively. Figures 4 and 5 display for score frequencies of the SWLS for the normal and overweight/obese groups, respectively.

Figure 3. PGWB Histogram – Normal BMI Group



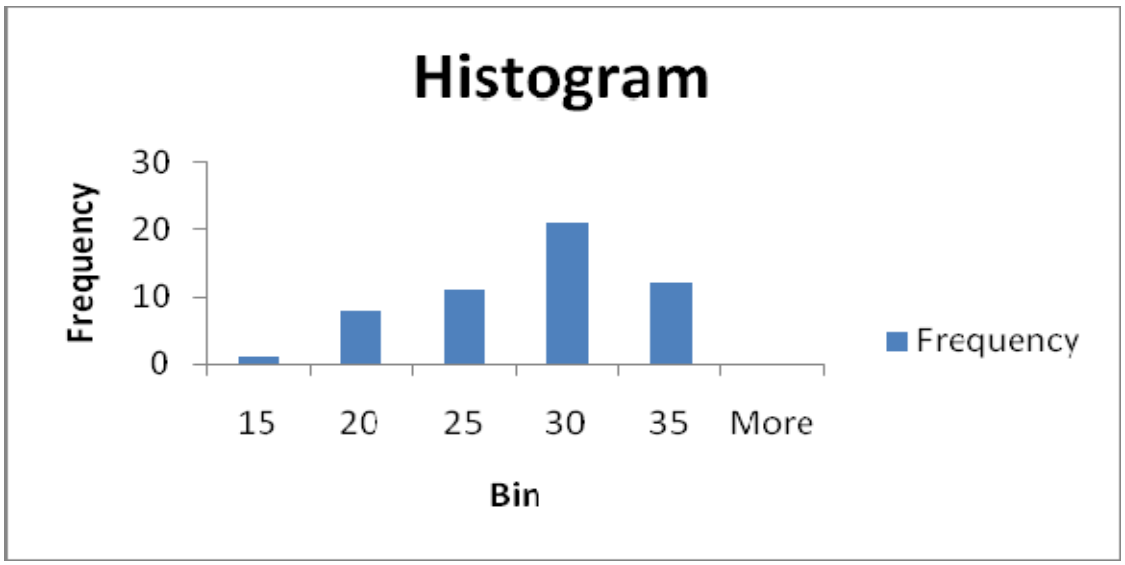
Note. The Y axis is the number of participants. The X axis reflects the range of participant scores for the PGWB.

Figure 4. PGWB Histogram – Overweight/Obese BMI Group



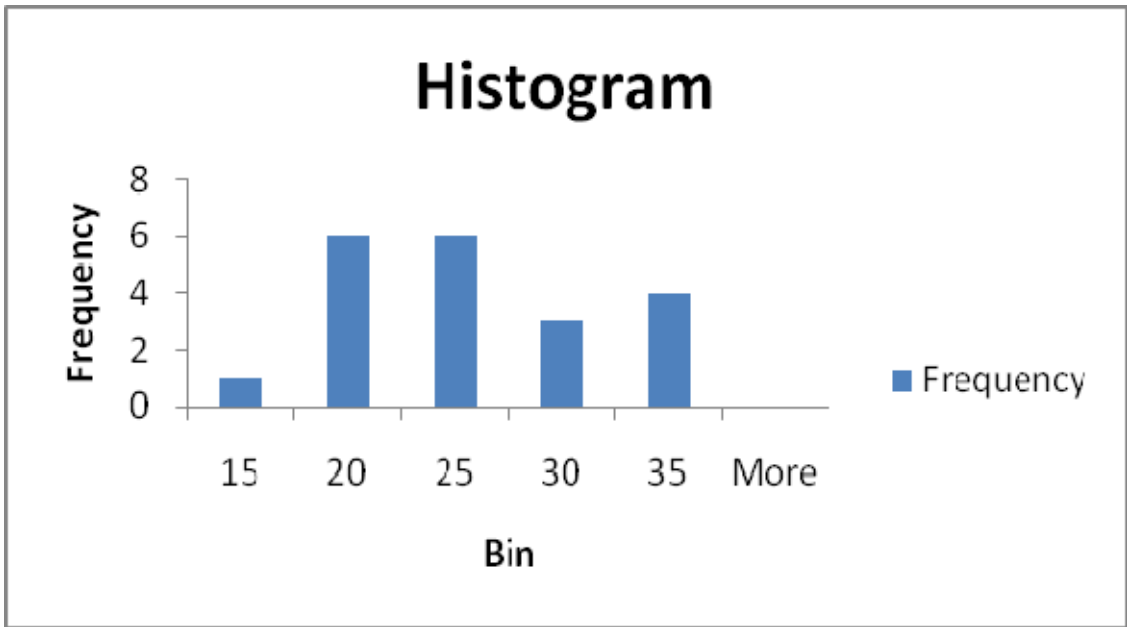
Note. The Y axis is the number of participants. The X axis reflects the range of participant scores for the PGWB.

Figure 5. SWLS Histogram – Normal BMI group



Note. The Y axis is the number of participants. The X axis reflects the range of participant scores for the SWLS.

Figure 6. SWLS Histogram – Overweight/Obese Group.



Note. The Y axis is the number of participants. The X axis reflects the range of participant scores for the SWLS.

Chapter V

Discussion, Conclusions, and Recommendations

The purpose of this study was to examine the relationship between BMI and subjective well-being in females during early young adulthood. The study consisted of two groups: normal BMI (18.5-24.9 kg/m^2) and Overweight/Obese BMI (25.0-39.9 kg/m^2). During the study, the 73 participants (N=73) were administered two questionnaires that assessed subjective well-being: The Satisfaction with Life Scale (SWLS) and the Psychological General Well-Being Index (PGWB). The findings and conclusions were based on data that was gathered from October, 2007, to November, 2007.

One hypothesis was tested to determine if there were significant differences between the two groups. An independent t-test was used to analyze the findings. The following research hypothesis was tested at the .05 level of significance: females who have a BMI of 18.5-24.9 kg/m^2 will score differently on the subjective well being scales than females who have a BMI of 25.0-39.9 kg/m^2(H_a: $\mu_1 \neq \mu_2$). The normal group's mean scores for the SWLS and the PGWB were 26.1 and 67.2, respectively. The overweight/obese group's mean scores for the SWLS and the PGWB were 23.8 and 68.4, respectively. The research hypothesis was rejected.

Discussion and Conclusions

The study was designed to test the relationship between BMI and subjective well-being. While the studies about BMI and quality of life (subjective well-being) in the

review of literature seem to defend the belief that an elevated BMI coincides with low well-being levels, this study yielded no results to support the idea that women who have a normal BMI will score differently than women who are overweight or obese. The findings indicated that BMI alone may not be able to predict an elevated level of subjective well-being. A study by Jorm, Korten, Christensen, Jacomb, Rodgers, and Parslow (2003) stated reasons why it is assumed that those who have an elevated BMI should be at a lower subjective well-being level:

> First, obesity is stigmatized on both health and aesthetic grounds. Given the social undesirability of obesity, it is not surprising that many people are trying to lose weight. Another reason for expecting an association with worse mental health is that obesity is associated with physical health problems that are risk factors for depression. Finally, obesity is associated with lower levels of physical activity and exercise appears to reduce the levels of depression (p. 434).

Wardle and Cooke (2005) examined the impact of obesity on psychological well-being in adolescents in clinical and community samples and found that very few obese adolescents suffered from low levels of mental health. The reasoning for this is that individuals may receive some reassurance from family and friends which could help lessen the impact of the severity of their physical state in terms of how others view it, although these researchers note that this notion is an under-studied area. Also, Wardle and Cooke (2005) noted that a reason why there is a stereotype about obese individuals having a low subjective well-being level is because of the social stigma that is placed on the obese (i.e. obese individuals are seen as unhappy because of their appearance while thin individuals

are seen as happy because they possess an appearance that is approved by society); clinicians see psychological problems because they expect to see them (p. 436).

Studies have determined different theories as to why individuals who have a normal BMI and individuals who have an overweight or obese BMI show no differences in terms of their subjective well-being levels. The first theory came from the dynamic-equilibrium model of well-being and psychological distress. “According to this model, a person’s levels of well-being and psychological distress tend to be stable over time and are influenced by personality traits” (Jorm et al., 2003, p. 441). Even though individuals can be affected by negative and positive life events, they will usually return back to their equilibrium state. Also, individuals will learn to adapt to long-term situations (e.g. obesity or a chronic disease such as asthma). So overtime, the individual’s state will not affect their well-being and psychological distress equilibrium.

A second theory came from Hughes and Degher’s (1993) five generic coping strategies that obese individuals use when handling obesity-related problems: avoidance, compliance, reaction formation, compensation, and accounts. Avoidance involves avoiding situations “…where being fat is a problematic…” or “…blocking or ignoring the condition…” (Hughes and Degher, 1993, p. 301). Compliance involves “complying with one or more of the social stereotypes of a ‘fat’ person (stereotype compliance) or agreeing to diet in order to “…silence the demands from significant others…,” but there is no true commitment to lose weight (p. 304). Reaction formation involves “a rejection and even a reversal of societal definitions of appropriate behavior” (e.g. the individual will eat more) (p. 302). Compensation involves the individual “offsets the negative consequences of being fat by overachieving in other areas” (p. 303). And lastly, accounts

involves stories that individuals tell either to explain how they became fat or why they remain fat (Hughes and Degher, 1993). Accounts can also be viewed as excuses. Although both theories may have been factors which resulted in there being no difference between the normal and overweight/obese groups, the second theory may better explain an occurrence in the current study.

Originally, the two study groups were to consist of a normal BMI group (18.5-24.5 kg/m^2) and an obese group (30.0-39.9 kg/m^2). Once the data collection for the study was completed, there were 53 participants (n=53) in the normal BMI group and only 2 participants (n=2) in the obese BMI group. Because of the low number of observations in the obese group, the participants who were overweight had to be added into the obese to have a larger number of observations (n=20). Although there are 20 participants in overweight/obese group, only 2 of those individuals are truly obese (BMI between 30.0-39.0 kg/m^2). This could be due to the coping strategy known as avoidance. The participants in the current study knew ahead of time that their height and weight measurements were going to be recorded before coming to take part in the study. In this case, although being obese would not necessarily be a problem (as it is in other situations that some obese individuals may avoid), being obese would be highlighted because height and weight measurements were taken by the researcher in order to calculate BMI. Since the BMIs of the two groups were close in range, it could be difficult to see true differences in subjective well-being scores.

Practical Implications

There are important implications for practice. Health professionals need to understand that maintaining a healthy weight is important but be mindful of other factors that can have an effect on subjective well-being levels. Implications include:

1. Clinicians should not assume that low levels of subjective well-being are a direct consequence of obesity;
2. When designing health programs for young adults, initially, plan to assess well-being, body satisfaction and self-esteem levels as well as altering negative self-talk that focuses on appearance;
3. Also when designing health programs and weight loss programs for young adults, besides focusing on maintaining a healthy weight, plan to focus on positive behaviors that can increase self esteem, body satisfaction, as well as overall well-being.

Recommendations for Future Studies

Although this study did not yield statistically significant results, BMI and subjective well-being should remain a topic of investigation since the body of evidence is inconclusive. Some studies find a significant difference between groups in well-being scores while other studies do not. Either way, it is important to examine what makes some individuals have higher levels of well-being than others because clinicians will be able to help individuals re-examine their priorities and better understand how to construct an environment that enhances their well-being.

Recommendations for future studies include:

1. A similar study needs to be conducted using a larger sampling of females so that the findings can be applicable to various demographics;
2. A study that has a significant amount of individuals that have a BMI classified as "obese" is recommended;
3. A study that examines self-esteem levels, body satisfaction, dieting habits, as well as subjective well-being is recommended;
4. A study should be conducted that examines social skills and social support of different BMI groups in relation to self-esteem, body satisfaction, dieting habits, as well as subjective well-being;
5. A study should be conducted that examines the specific subscales of the Psychological General Well-Being Index (PGWB) as well as the overall score.

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Appendix A: Data collection sheets

Demographics Sheet

Please do not write your name or any other identifiable information on the questionnaire. Your answers will remain anonymous and will be used with other survey participants to form a composite picture.

General Information

What is your date of birth? _____/_____/_____

Gender?

- ❑ Female
- ❑ Male

How would you describe your race/ethnicity?

- ❑ Black/African/African-American
- ❑ Hispanic
- ❑ Asian/Pacific Islander
- ❑ Native American
- ❑ White/Caucasian
- ❑ Other (please describe: _____)

Current year in school:

- ❑ Freshman
- ❑ Sophomore
- ❑ Junior
- ❑ Senior
- ❑ Other (please describe: _____)

Current school status:

- ❑ Full-time student (at least 12 credit hours)
- ❑ Part-time student (less than 12 credit hours)

Health Information

Do you currently smoke?

- ❑ Yes
- ❑ Yes, occasionally
- ❑ No

If no, skip next question.

If yes, how many cigarettes do you smoke daily?

- 1 to 5
- 5 to 10
- 10 to 15
- 15 to 20
- 20 or more

Are you currently dieting (i.e. eating or drinking in a regulated manner with the goal of losing weight or maintaining one's current weight)?

- Yes
- No

If no, skip the next 3 questions.

If yes, what are your influences for dieting?

- Personal (e.g. health issues, personal choice)
- Social (e.g. friends, peers)
- Family (e.g. family members)
- Societal Influences (e.g. media)

How much time did you spend researching in order to find out accurate information about your current diet?

- Less than one hour
- 2 to 4 hours
- 4 to 6 hours
- 6 to 8 hours
- More than 8 hours

Have you had difficulties with dieting in the past? (i.e. yo-yo dieting)

- Yes
- No

What is your physical activity level during leisure time?

- Inactive
- Lightly active (walking slowly, vacuuming, gardening)
- Moderately active (walking briskly, weight lifting, recreational swimming)
- Intensely active (jogging/running, swimming laps, moving/pushing furniture)

How often do you exercise (gym, jogging, walking, team sports)?

Average: _____ hr(s)/week

How often do you consume alcoholic beverages?

- ❑ Never
- ❑ Light (1-2 times per week)
- ❑ Moderate (3-4 times per week)
- ❑ Heavy (more than 5 times per week)

Do you have a chronic disease? If so, please check the appropriate box.

- ❑ No, I do not have a chronic disease
- ❑ Diabetes mellitus
- ❑ Hypertension
- ❑ High cholesterol
- ❑ Heart disease
- ❑ Other (please describe:_____)

Participant Data Sheet

Date:

Weight (lb):_____

Height (in):_____

BMI (kg/m^2):_____

PGWB:_____

SWLS:_____

Notes:

Dear Participant,

Thank you for taking part in the Body Mass Index and Well-Being study. Recorded below is your body mass index value as measured today while taking part in this study. You may find helpful information regarding body mass index and health by accessing information on the website of the National Institutes of Health at the following web address: http://www.nhlbisupport.com/bmi/. If you have questions or concerns about your personal health status or body mass index, you are urged to discuss these results with your health care provider.

Date:_____

Height:_____

Weight:_____

BMI:_____

BMI Categories:

- Underweight = <18.5
- Normal weight = 18.5-24.9
- Overweight = 25-29.9
- Obesity = BMI of 30 or greater

Appendix B: Recruitment

Participant Recruitment Form

Class:_____**CRN#**:_____

Professor:_____

Name (please print clearly)	**E-mail Address (please print clearly)**

Permission for the Recruitment of Participants from a Course

I, _____, hereby grant permission to Stacy Ogbeide ____ to gather data from the Healthy Life Skills sections in the Department of Kinesiology and Health Studies for her Masters thesis project.

****

_____ _____
Healthy Life Skills Coordinator Date

_____ _____
Name of Researcher Date

Permission for the Recruitment of Participants from a Course

I, _____, hereby grant permission to Stacy Ogbeide____ to gather data from my Healthy Life Skills Course (HLTH 1112), section # _____ in the Department of Kinesiology and Health Studies for her Masters thesis project.

****

_____ _____

Healthy Life Skills Instructor Date

Appendix C: Informed consent

UNIVERSITY OF CENTRAL OKLAHOMA -CONSENT TO INVESTIGATIONAL PROCEDURE

Research Project Title: The Relationship between Body Mass Index (BMI) and Subjective Well-Being (SWB) in Females during Early Young Adulthood.

Researcher (s): Stacy Ogbeide

A. Purpose of this research: The purpose of this study is to examine the relationship between BMI and SWB in females during early young adulthood. Research is somewhat minimal in this subject area, especially in early young adulthood. Past research has shown that an early detection of obesity and a low health-related quality of life (HRQoL) in young adults can lower the risk of obesity-related diseases in middle and late adulthood when an intervention is present (Manson et al., 1995; Daviglus et al., 2005; Williamson, Kahn, Remington, & Anda, 1990; Neter, Stam, Kok, Grobbee, & Gelejinse, 2003).

B. Procedures/treatments involved: This study involves one visit to the UCO Wellness Center Laboratory lasting approximately 20 minutes. When I arrive, the procedure will be explained to me and any questions that I may have will be answered. Measurements of my height and weight will be obtained. I will also fill out 2 questionnaires: the Satisfaction with Life Scale and the Psychological General Well-Being Index. Then, my participation will be complete and I will be debriefed.

C. Expected length of participation: approximately 20 minutes

D. Potential benefits: If requested, I may receive a report describing my BMI value while in the study. I may also receive a brief report of the results of the study after data collection is complete by contacting Stacy Ogbeide (ucohealthstudy@hotmail.com) after April 1, 2008. I will also receive 10 points extra credit for my Healthy Life Skills course. Finally, my participation may help the researchers to learn more about the relationship between BMI and SWB and how individuals can protect themselves from developing weight-related diseases in the future.

E. Potential risks or discomforts: The main risks in the study are they you may feel somewhat uncomfortable disclosing your measurements. Also, you may feel uncomfortable answering some of the questions on the questionnaires (e.g. questions referring to suicide or other related subjects which might be considered sensitive in nature). Remember that if the discomfort becomes too great, you may discontinue the study without penalty at any time.

F. Medical/mental health contact information: If you experience adverse or uncomfortable feelings as a result of participation in this study, please contact the Student Counseling Center at the number listed below. If you would like to learn more information concerning your chronic disease, please contact the Student Health Center at the number listed below.

Student Counseling Center: 405-974-2215
Student Health Center: 405-974-2317

G. Contact Information for researchers:

Dr. Diane Rudebock
405-974-5216
crudebock@ucok.edu

Stacy Ogbeide
405-974-5216
ucohealthstudy@hotmail.com

H. Explanation of confidentiality and privacy: I understand that all data from this study will be numerically coded so that my personal data will not be identifiable to others. I understand that all data from this study will be stored in a locked office and accessible only to researchers involved in this study.

I. Assurance of voluntary participation: I understand that signing the consent form means that I agree to voluntarily take part in the study. I have the right to terminate the study at any time without penalty if I feel that I am unable to go on.

Affirmation by Research Subject

I here voluntarily agree to participate in the above listed research project and further understand the above listed explanations and descriptions of the research project. I also understand that there is no penalty for refusal to participate, and that I am free to withdraw my consent and participation in this project at any time without penalty. I have read and fully understand this Informed Consent Form. I sign it freely and voluntarily. I acknowledge that a copy of this Informed Consent Form has been given to me to keep.

Research Subject's
Name:_____

Signature:_____Date:_____

Appendix D: Questionnaires

THE GENERAL WELL-BEING SCHEDULE

Please do not write your name or any other identifiable information on the questionnaire. Your answers will remain anonymous and will be used with other survey participants to form a composite picture.

READ: This section of the examination contains questions about how you feel and how things have been going with you. For each question check [ ] the answer which best applies to you.

1. How have you been feeling in general during the past month?
(Check one box)

In excellent spirits	☐ 5
In very good spirits	☐ 4
In good spirits mostly	☐ 3
I have been up and down in spirits a lot	☐ 2
In low spirits mostly	☐ 1
In very low spirits	☐ 0

2. How often were you bothered by any illness, bodily disorder, aches or pains during the past month?
(Check one box)

Every day	☐ 0
Almost every day	☐ 1
About half of the time	☐ 2
Now and then, but less than half the time	☐ 3
Rarely	☐ 4
None of the time	☐ 5

3. Did you feel depressed during the past month?
(Check one box)

Yes - to the point that I felt like taking my life	☐ 0
Yes - to the point that I did not care about anything	☐ 1
Yes - very depressed almost every day	☐ 2
Yes - quite depressed several times	☐ 3
Yes - a little depressed now and then	☐ 4
No - never felt depressed at all	☐ 5

4. Have you been in firm control of your behavior, thoughts, emotions or feelings during the past month?
(Check one box)

Yes, definitely so	☐ 5
Yes, for the most part	☐ 4
Generally so	☐ 3
Not too well	☐ 2
No, and I am somewhat disturbed	☐ 1
No, and I am very disturbed	☐ 0

5. Have you been bothered by nervousness or your "nerves" during the past month?
(Check one box)

Extremely so - to the point where I could not work or take care of things	☐ 0
Very much so	☐ 1
Quite a bit	☐ 2
Some - enough to bother me	☐ 3
A little	☐ 4
Not at all	☐ 5

6. How much energy, pep, or vitality did you have or feel during the past month?
(Check one box)

Very full of energy - lots of pep	☐ 5
Fairly energetic most of the time	☐ 4
My energy level varied quite a bit	☐ 3
Generally low in energy or pep	☐ 2
Very low in energy or pep most of the time	☐ 1
No energy or pep at all - I felt drained, sapped	☐ 0

7. I felt downhearted and blue during the past month.
(Check one box)

None of the time	☐ 5
A little of the time	☐ 4
Some of the time	☐ 3
A good bit of the time	☐ 2
Most of the time	☐ 1
All of the time	☐ 0

8. Were you generally tense or did you feel any tension during the past month?
(Check one box)

Yes - extremely tense, most or all of the time	☐ 0
Yes - very tense most of the time	☐ 1
Not generally tense, but did feel fairly tense several times	☐ 2
I felt a little tense a few times	☐ 3
My general tension level was quite low	☐ 4
I never felt tense or any tension at all	☐ 5

9. How happy, satisfied, or pleased have you been with your personal life during the past month?
(Check one box)

Extremely happy - could not have been more satisfied or pleased	☐ 5
Very happy most of the time	☐ 4
Generally satisfied - pleased	☐ 3
Sometimes fairly happy, sometimes fairly unhappy	☐ 2
Generally dissatisfied or unhappy	☐ 1
Very dissatisfied or unhappy most or all the time	☐ 0

10. Did you feel healthy enough to carry out the things you like to do or had to do during the past month?
(Check one box)

Yes - definitely so	☐ 5
For the most part	☐ 4
Health problems limited me in some important ways	☐ 3
I was only healthy enough to take care of myself	☐ 2
I needed some help in taking care of myself	☐ 1
I needed someone to help me with most or all of the things I had to do	☐ 0

11. Have you felt so sad, discouraged, hopeless, or had so many problems that you wondered if anything was worthwhile during the past month?
(Check one box)

Extremely so - to the point that I have just about given up	☐ 0
Very much so	☐ 1
Quite a bit	☐ 2
Some - enough to bother me	☐ 3
A little bit	☐ 4
Not at all	☐ 5

12. I woke up feeling fresh and rested during the past month.
(Check one box)

None of the time	☐ 0
A little of the time	☐ 1
Some of the time	☐ 2
A good bit of the time	☐ 3
Most of the time	☐ 4
All of the time	☐ 5

13. Have you been concerned, worried, or had any fears about your health during the past month?
(Check one box)

Extremely so	☐ 0
Very much so	☐ 1
Quite a bit	☐ 2
Some, but not a lot	☐ 3
Practically never	☐ 4
Not at all	☐ 5

14. Have you had any reason to wonder if you were losing your mind, or losing control over the way you act, talk, think, feel or of your memory during the past month?
(Check one box)

Not at all	☐ 5
Only a little	☐ 4
Some - but not enough to be concerned or worried about	☐ 3
Some and I have been a little concerned	☐ 2
Some and I am quite concerned	☐ 1
Yes, very much so and I am very concerned	☐ 0

15. My daily life was full of things that were interesting to me during the past month.
Check one box)

None of the time	☐ 0
A little of the time	☐ 1
Some of the time	☐ 2
A good bit of the time	☐ 3
Most of the time	☐ 4
All of the time	☐ 5

16. Did you feel active, vigorous, or dull, sluggish during the past month?
(Check one box)

Very active, vigorous every day	☐ 5
Mostly active, vigorous - never really dull, sluggish	☐ 4
Fairly active, vigorous - seldom dull, sluggish	☐ 3
Fairly dull, sluggish - seldom active, vigorous	☐ 2
Mostly dull, sluggish - never really active, vigorous	☐ 1
Very dull, sluggish every day	☐ 0

17. Have you been anxious, worried, or upset during the past month?
(Check one box)

Extremely so - to the point of being sick or almost sick	☐ 0
Very much so	☐ 1
Quite a bit	☐ 2
Some - enough to bother me	☐ 3
A little bit	☐ 4
Not at all	☐ 5

18. I was emotionally stable and sure of myself during the past month.
(Check one box)

None of the time	☐ 0
A little of the time	☐ 1
Some of the time	☐ 2
A good bit of the time	☐ 3
Most of the time	☐ 4
All of the time	☐ 5

19. Did you feel relaxed, at ease or high strung, tight, or keyed-up during the past month?
(Check one box)

Felt relaxed and at ease the whole month	☐ 5
Felt relaxed and at ease most of the time	☐ 4
Generally felt relaxed but at times felt fairly high strung	☐ 3
Generally felt high strung but at times felt fairly relaxed	☐ 2
Felt high strung, tight, or keyed-up most of the time	☐ 1
Felt high strung, tight, or keyed-up the whole month	☐ 0

20. I felt cheerful, lighthearted during the past month.
(Check one box)

None of the time	☐ 0
A little of the time	☐ 1
Some of the time	☐ 2
A good bit of the time	☐ 3
Most of the time	☐ 4
All of the time	☐ 5

21. I felt tired, worn out, used up, or exhausted during the past month.
(Check one box)

None of the time	☐ 5
A little of the time	☐ 4
Some of the time	☐ 3
A good bit of the time	☐ 2
Most of the time	☐ 1
All of the time	☐ 0

22. Have you been under or felt you were under any strain, stress, or pressure during the past month?
(Check one box)

Yes - almost more than I could bear or stand	☐ 0
Yes - quite a bit of pressure	☐ 1
Yes, some - more than usual	☐ 2
Yes, some - but about usual	☐ 3
Yes - a little	☐ 4
Not at all	☐ 5

Please do not write your name or any other identifiable information on the questionnaire. Your answers will remain anonymous and will be used with other survey participants to form a composite picture.

SATISFACTION WITH LIFE SCALE (SWLS)

Diener, Emmons, Larson & Griffin

Below are five statements with which you may agree or disagree. Using the 1-7 scale below, indicate your agreement with each item by circling the number that corresponds to it.

1 – Strongly Disagree
2 – Disagree
3 – Slightly Disagree
4 – Neither Agree Nor Disagree
5 – Slightly Agree
6 – Agree
7 – Strongly Agree

	Strongly Disagree						Strongly Agree
1. In most ways my life is close to my ideal.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
2. The conditions of my life are excellent.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
3. I am satisfied with my life.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
4. So far I have gotten the important things I want in life.	**1**	**2**	**3**	**4**	**5**	**6**	**7**
5. If I could live my life over, I would change almost nothing.	**1**	**2**	**3**	**4**	**5**	**6**	**7**

Response Sheet

Satisfaction With Life Scale

1. _____
2. _____
3. _____
4. _____
5. _____

The General Well-Being Schedule

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____
11. _____
12. _____
13. _____
14. _____
15. _____
16. _____
17. _____
18. _____
19. _____
20. _____
21. _____
22. _____

Appendix E: Protocol

Protocol Introduction

(read to participants before beginning study)

In this study, I am studying the effect of body mass index (BMI) on subjective well-being.

Before we begin, I want to explain to you what we will be doing do that you know what to expect.

First, we will go over the consent form and I will ask you to sign the form if you wish to continue. Then I will measure your height using a stadiometer (researcher points to stadiometer). I will also take your weight measurements using a digital scale (researcher points to scale). Then you will fill out the demographics sheet and two questionnaires that assess subjective well-being which should take about 15 minutes to complete. You will be given an identification number to maintain confidentiality. The identification number will be placed in the top right corner of all of the forms that corresponded with each particular participant. The purpose of the identification number is for the researcher to keep track of all of the data sheets that are collected (e.g. if data sheets accidentally get out of order, the researcher will be able to place the correct data sheet with its corresponding set). Identification numbers will not be created until the data sheets are collected by the researcher in order to maintain anonymity. After you complete the questionnaires, your participation will be complete. We will go over the debriefing, and you will be free to go. Do you have any questions so far?

Now I want to tell you about the risks and benefits of the study. The main risks in the study are that you may feel somewhat uncomfortable disclosing your measurements. Also, you may feel uncomfortable answering of the questions on the questionnaires. Remember that if the discomfort becomes too great, you may discontinue the study without penalty at any time.

Here are some of the benefits of the study: If you wish, you may receive a report describing your BMI value while in the study. You may also receive a brief report of the results of the study after data collection is complete by contacting Stacy Ogbeide after April 1, 2008. Also, you will receive 10 extra credit points for your Health Life Skills course. Finally, your participation may help the researchers to learn more about the relationship between BMI and well-being and how people can protect themselves from developing weight-related diseases in the future.

Now, if you would like to participate in this study, I would like for you to read and sign the consent form. Signing the consent form means that you agree to voluntarily take part in the study. However, you have the right to terminate the study at any time without penalty if you feel you are unable to go on. What questions do you have?

Debriefing Script

(read to participants after completion of the study)

This was a study in the field of health psychology. One thing researchers in health psychology are interested in is how our cognitions and behaviors affect our health and vice versa. A particular area of interest in this subject area is the relationship between body mass index and an individual's quality of life.

In general, most studies have shown that the more elevated the BMI is, the lower the quality of life score. This can be due to a variety of reasons: acculturation to Westernized cultures, low self-esteem, comorbidities with other weight-related (or non weight-related) diseases, or dissatisfaction with one's body image. Many studies have examined this in middle and late adulthood, but there is not very much literature that focuses on early young adulthood. If a low quality of life score (along with an elevated BMI) is detected early in life, the individual has more time for behavior modification and lifestyle changes in order to prevent weight-related illnesses later in life (such as hypertension, cardiovascular disease, or type II diabetes), either completely or having a later onset.

Do you have any questions?

If you would like, you may receive a summary of your BMI measures while in the study. Also, if you wish to receive a summary of the results of this study, you may contact Stacy Ogbeide after April 1, 2008. If you have any other questions after you leave today, you can contact Stacy Ogbeide at the e-mail address on the consent form.

Thank you for you time.

Class Introduction/E-mail to participants

Hi everyone,

Thanks for your interest in the health and well-being study here at the University of Central Oklahoma. Although I have explained the study to you when I visited your class, I have written out a description of the study and what it involves as a reminder.

****

The purpose of this project is to study the effect of body mass index on subjective well-being. I am interested in measuring information regarding height, weight, and subjective well-being. Your participation may help the researchers to learn more about how the relationship between BMI and well-being and how people can protect themselves from developing weight-related diseases in the future.

If you decide to take part in the study, you will then visit the UCO laboratory one time, lasting about 20 minutes. **Please be sure to wear light-weight clothing because your height and weight will be measured** and you will also fill out two questionnaires that assess subjective well-being. **Also, please remember the name of your Healthy Life Skills instructor and the day and time you meet for the purposes of recording your extra credit opportunity.** If you participate, you will be given 10 extra credit points for your Healthy Life Skills course.

THE AVAILABLE DAYS TO PARTICIPATE IN THE STUDY ARE LISTED BELOW. THE TIMES PRESENTED WILL BE THE ONLY TIMES THAT ARE AVAILABLE TO PARTICIPATE. ONLY UP TO 15 STUDENTS WILL BE PLACED IN EACH HOUR TIME SLOT. SIGN-UP WILL BE A FIRST COME FIRST SERVE BASIS SO WHOEVER REPLIES SOONER WILL HAVE A BETTER CHANCE AT RECEIVING THEIR DESIGNATED TIME SLOT.

Please pick up to 3 different days and time slots that will work for you:
October:
8th: 2pm, 3pm, or 4pm
10th: 2pm, 3pm, or 4pm
12th: 9:30am, 10:30am, or 11:30am
15th: 2pm, 3pm, or 4pm
17th: 2pm, 3pm, or 4pm
22nd: 2pm, 3pm, or 4pm
24th: 2pm, 3pm, or 4pm
29th: 2pm, 3pm, or 4pm
31st: 2pm, 3pm, or 4pm
November
2nd: 9:30am, 10:30am, or 11:30am
5th: 2pm, 3pm, or 4pm
7th: 2pm, 3pm, or 4pm
9th: 9:30am, 10:30am, or 11:30am

12th: 2pm, 3pm, or 4pm
14th: 2pm, 3pm, or 4pm
16th: 9:30am, 10:30am, or 11:30am
19th: 2pm, 3pm, or 4pm
26th: 2pm, 3pm, or 4pm
28th: 2pm, 3pm, or 4pm
30th: 9:30am, 10:30am, or 11:30am

***Remember: Be sure to include your first and last name in the e-mail when responding back to me. Also, please be sure to e-mail your chosen times by October 1st by 5pm (at the latest) to ensure that you will be placed in a time slot.**

I will e-mail you your time slot as soon as possible to make sure that the time and day still work for you.

If you have any questions, please email me.

Again, thank you for your interest. I look forward to working with you.

Thanks,

Stacy Ogbeide
Graduate Student, Department of Kinesiology and Health Studies
University of Central Oklahoma
ucohealthstudy@hotmail.com

Reminder E-mail to Participants

Dear participants,

I just want to thank you again for agreeing to participate in this study. Please be sure to arrive at room 127 in the Wellness Center* **10 minutes** before 2pm. It is important that you arrive to your time slot on time because the study will begin promptly at 2pm. **The consent form will be reviewed at the beginning of the study and if you are not there, you cannot participate at that given time (for Institutional Review Board purposes).** If you are late, you can either return for the next time block or if that does not work for you, you can reschedule for another date (if other dates are open). If you have other questions, please feel free to ask.

Please be sure to wear light clothing and also be sure that you know the name of your Healthy Life Skills professor and the time and day your class meets (this is to ensure that the extra credit is recorded correctly).

***Directions to the UCO Wellness Center**: Once you enter the front of the building, you will be in the lobby. Turn left (if you look right, there will be an information desk there) and follow the hallway to classroom127 (it is on the right side of the hallway across from the Student Health Center). You will pass the men's and women's restrooms on the right side before you reach the classroom.

If parking is a problem at the front of the Wellness Center, there is additional parking behind the Wellness Center and there is also a back entrance to the Wellness Center. If you come through the back entrance, follow the hallway and the classroom will be on the left. If you reach the lobby, you've gone too far.

If you need more specific directions, please let me know.

Thanks again,

Appendix F: Miscellaneous

HLTH 1112 – Healthy Life Skills; Day: M T W R Time:_____

Instructor:_____

Name (please print clearly)