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THE EFFECTS OF WEIGHT STANDARDS ON METHODS OF WEIGHT LOSS

AMONG MILITARY PERSONNEL

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# THE EFFECTS OF WEIGHT STANDARDS ON METHODS OF WEIGHT LOSS AMONG MILITARY PERSONNEL

Larissa Lynn O'Connors

A Thesis

Submitted to

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in Partial Fulfillment of the

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August 22, 1995

THE EFFECTS OF WEIGHT STANDARDS ON METHODS OF WEIGHT LOSS

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# VITA

Larissa Lynn (Bozarth) O'Connors, daughter of Edward Everett and Mabel Louise (Elson) Bozarth, was born August 25, 1954, in Tokyo, Japan. She graduated from Wagner High School in 1972. She attended the University of Maryland and graduated in 1987 with an Associate of Arts degree in Liberal Arts. She also received an Associate of Arts degree in Instructor of Technology from the Community College of the Air Force in 1993. After attending Park College, she graduated summa cum laude in 1991 with a Bachelor of Science degree in Social Psychology. She entered Graduate School, Auburn University at Montgomery, in September 1993. She has been a member of the Air Force for 21 years. She married Charles Lee O'Connors, son of Harold Burton and Elsie Crystal (Kepler) O'Connors, on March 28, 1977.

THESIS ABSTRACT

# THE EFFECTS OF WEIGHT STANDARDS ON METHODS OF WEIGHT LOSS AMONG MILITARY PERSONNEL

LARISSA LYNN O'CONNORS
Master of Science, August 22, 1995
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This study was designed to determine if the Air Force's weight standards contributed to unhealthy weight loss practices by military personnel. A survey concerning weight loss practices, the effects of the practices, and feelings about the Air Force weight program was distributed to 338 senior noncommissioned officers attending a professional military education school. The 335 subjects who responded to the survey were divided into five groups based on their perception of their body fat measurement. The groups were as follows: (a) subjects at or within 1% below the maximum allowable body fat measurement; (b) subjects 2 to 3% below the maximum allowable body fat measurement; (c) subjects 4 to 5% below the maximum allowable body fat measurement; (d) subjects more than 5% below the maximum allowable body fat measurement; and (e) subjects who didn't know how close they were to the maximum allowable body fat measurement. Factor analysis of the survey and further

analyses of the data indicated there were significant differences among the groups. Differences were found for the unhealthy weight loss practices, negative effects from the unhealthy weight loss practices, and stress associated with the Air Force's weight management program.

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# I. INTRODUCTION

The purpose of this study was to discern the type of relationship between unhealthy weight loss practices and the Air Force's body fat standards. First, society's role in influencing cultural expectations of thinness and the results of this influence were discussed. Second, the literature on different types of weight loss practices, and their adverse effects on health were reviewed. Third, the Air Force's policy on body fat and the consequences of exceeding the body fat standards were addressed. The question was, is risking the health of military personnel worth satisfying the image expectations decreed upon them by society and sanctioned by the military?

## II. REVIEW OF LITERATURE

### Society's Role in Influencing Body Size

Society has often portrayed overweight people as unattractive and lacking inner discipline (Worsnop, 1992). To add further insult to this portrayal, overweight individuals are often discriminated against in the job market when they are denied promotions. The message is that image is more important than ability.

Society's negative view of overweight individuals has been furthered by advertising, television, magazines and the fashion industry (Worsnop, 1992). To gauge the effect media has on body size, Garner, Garfinkel, Schwartz, and Thompson (1980) studied body size changes from 1959 to 1978. The height, weight, and measurements of 240 centerfold playmates from the Playboy magazine were gathered. Also obtained for the study were the same statistics from the winners of the Miss America contests for the same period of time. In both cases, the averages of the women's measurements had decreased. For the same period of time, a review six popular women's magazines found a notable increase in articles concerning dieting.

This conditioning to be slimmer is occurring among adolescents, according to Vivian Meehan, the president and founder of the National Association of Anorexia Nervosa and Associated Disorders (ANAD). Children in the 4th and 5th grade levels are dieting (Worsnop, 1992). Brewerton (as cited in Worsnop, 1992) arrived at similar results. A survey of questions concerning weight was given to 3,100 5th through 8th graders. More than 40 percent of the students responding believed they were overweight, when in actuality less than 20 percent of the students were overweight.

## Studies Examining Dieting Costs

Society's focus on leaner, slimmer people has convinced millions of people that being overweight is bad and weight must be lost at any cost. The Carnegie Nutrition Laboratory Experiment (1919), and the Minnesota Experiment (1944) examined the costs of dieting (Keys, Brozek, Mickelsen, & Taylor, 1950). The goal of the Carnegie Nutrition Laboratory Experiment (Keys et al., 1950) was to humanely simulate famine and semi-starvation conditions. Researchers believed that reducing the individual's weight by ten percent over four months would result in changes to their body's metabolism and other functions that are characterized by famine and semi-starvation.

Subjects for the experiment were male students attending the International Young Men's Christian Association College in Springfield, Massachusetts. Squad A, consisting of 12 subjects, was on a restricted controlled diet for 120 days. Squad B, consisting of 15 subjects, three of whom served only part time, was used as a normal control group. Squad B was placed on a restricted diet of 1400 calories for 20 days. All subjects ate college mess hall food, but were restricted as to the amounts eaten.

In both squads, a sensitivity to cold was reported. The wearing of heavier clothing, additional bed clothing and the tendency to gather around steam heaters, seemed to validate self reports of increased sensitivity to cold. Performing chin-ups was the measurement of endurance. Eleven of the 12 subjects in squad A experienced a decrease in the number of chin-ups they could perform. Because of complaints of weakness, fatigue, and the loss of pep, the working reports from subjects reflected a general decline in the will to work. There was a marked increase in irritability during the period of starvation and a decrease in interest in sexual activities.

The Minnesota Experiment (Keys et al., 1950) reproduced the conditions of severe semi-starvation to explore the effects of semi-starvation on an individual's physical

and psychological well being. Volunteers were solicited from the civilian Public Service camps. Subjects were examined and found to be physically and psychologically fit to endure the experiment. Between the project work, the educational program, and the testing schedule, subjects were occupied 48 hours each week. Subjects resided in the Laboratory of Physiological Hygiene for the entire 12 month period of the experiment, from November 1944 to October 1945. The experiment was divided into segments such that for three months the subjects received normal nutritional conditions, then six months of semi-starvation to lose 25 percent of their body weight, and that was followed by three months of rehabilitated eating.

The 32 subjects were divided into three sub-groups. Each sub-group had a different caloric, vitamin, and protein content as their rehabilitation diet. During the semi-starvation period, the subjects were served two meals a day with three basic menus consisting of turnips, cabbage, whole wheat breads, potatoes and cereals. Only small amounts of dairy products and meats were provided to the subjects.

One area of interest to the researchers was the effect semi-starvation would have on the subjects' ability to work. Because food creates the energy necessary for the performance of physical work, when the intake is restricted, and the output of energy is not decreased, available fat stores are used. Once the fat stores are exhausted, protein catabolism takes place and essential cellular constituents are used as a source of energy. Once a drain in the constituents occurs, it results in a lowering of the reserve capacity of energy, and a decrease in the individual's ability to accomplish physical work. As this process occurred, the subjects' body weight was reduced by 24 percent, and their activity reduction was at least 50 percent.

To determine the effects of semi-starvation on physical fitness, the treadmill version of the Harvard Fitness Test was used. Prior to starting the semi-starvation phase,

the 32 men were evaluated on the motor-driven treadmill. The test consisted of running on the treadmill, at seven miles an hour, with an 8.6 percent grade, until exhausted, or not to exceed five minutes. The results of the first test indicated that 12 men were classified as in "good" health, 17 were in "average" health and three men were in "poor" health. When tested at the end of the semi-starvation period, all of the men scored in the "poor" physical condition range.

Self-reports from subjects indicated a decrease in strength, gross coordination and endurance. Lifting became more difficult. The ability to quickly maneuver when walking in crowds was lost. Many experienced clumsiness when walking, dressing or doing other normal daily activities. Climbing stairs became a tiring task. The self-reports reflected a marked decrease in their motor capacity. Dizziness was another common complaint. The feeling described varied from a dimming of vision to almost experiencing blackouts. Some reported feeling faint when rising from a chair or when suddenly transitioning from one position to another. Others felt faint while accomplishing chores. Still others reported feeling faint after remaining on their feet for long periods of time.

To measure respiration, two standardized types of work were used. The first type, aerobic, consisted of walking on a treadmill at a 10% vertical slant, at 3.5 miles per hour. The anaerobic work consisted of running on a treadmill at 5 to 12.5% vertical slant, at seven miles per hour. The results indicated that semi-starvation caused the respiratory muscles to lose strength and the subject's respiratory efficiency, both at rest and at work, declined. Although the vision of the subjects was not impacted by the experiment, their response reaction times increased. They exhibited delays in movement which could result in making them accident prone.

In addition to physiological changes, researchers were interested in psychological changes that were brought on by semi-starvation. While their mental capabilities did not decrease, many subjects complained of the loss of the ability to concentrate. Some reported that their judgment and comprehension abilities were impaired. Hunger pangs and constant thoughts about food distracted them from their studies, physical activities and cultural pursuits. Because of their preoccupation with food, the subjects experienced few original thoughts. Instead of coming up with new ideas and carrying them out, they found themselves easily sidetracked. They also experienced a blunting of perception and a dulling of consciousness. They found it difficult to think of several things at one time. They often wrote notes to themselves as reminders so as not to forget anything. Reading was more difficult, as the passages appeared to be unclear and needed to be re-read for better comprehension.

Two trait inventories, the Guilford Inventory of Personality Traits and the Guilford-Martin Inventory of Personality Traits assessed changes in the subjects' personalities. The inventories indicated a significant increase in scores for the scales representing social introversion, and depression. There was a decrease in the scores for social leadership, self-confidence, and the freedom from nervous tenseness scales. The Minnesota Multiphasic Personality Inventory (MMPI) was administered to subjects periodically throughout the experiment. During the period of semi-starvation, there was a significant increase in the scores associated with hypochondriasis, depression, and hysteria.

Subjects reported experiencing periods of depression. Stress, induced by semi-starvation, caused irritability, apathy, temper flare-ups, and loss of emotional control. A notable change that occurred was in the sociability of the men. Conversations with others and among the subjects themselves decreased. Often the humor of slapstick comedy was

lost on them. They no longer enjoyed "belly-laughs". Their loss of desire for social contacts also effected their sexual contacts. Subjects reported less desire for dating, less frequent fantasies and sex dreams.

## Weight Loss Practices

Losing weight is not limited to controlled studies where the subjects are closely monitored. The majority of Americans, in their lifetimes, have participated in some form of dieting to shed unwanted weight. Although most diets succeed in a loss of weight during the first several weeks, the loss is usually due to a decrease in body water. If the individual does not continue a reduced intake for a considerable amount of time, weight will be regained. Katch (1983) surveyed the effectiveness of obesity clinics in managing weight control, and determined that over a ten year period the dropout rate varied from 20 to 80 percent. Of the individuals who remained with the program, only five percent lost 40 pounds or more, and only 25 percent lost 20 pounds. The author concluded that long term commitment to diet is difficult.

Novelty diets promise weight reduction by selectively oxidizing body fat, inhibiting voluntary food intake, removing the toxic metabolic products or by increasing the metabolic rate. Weight reduction is due to the decrease of food intake. Normally, less food is eaten due to the monotony of the foods dictated by the novelty diet, and not due to the many promises made by these diet programs.

One novelty diet that gained popularity in the "80's" was the Beverly Hills diet (Newmark, 1983). This diet advocated eating enzyme rich fruits to counter weight gain. It has been reported that strenuous exercise, combined with this diet, has resulted in dehydration, cardiac arrhythmias, and severe muscle cramps. In addition to these side effects, the diet is deficient in calcium, iron phosphorus, riboflavin and vitamin D and the

menus for the six week cycle are nutritionally imbalanced. Barrett (1993) reported severe diarrhea, dizziness, and muscle weakness were symptoms experienced by individuals on the diet. Another novelty diet (Newmark, 1983), the Dolly Parton diet is a low protein, low-fat diet. Weight loss occurs due to reduced calorie intake and diuresis. If continued for a long duration, this nutritionally unbalanced diet could result in severe protein-calorie malnutrition.

The American Medical Association Council on Food and Nutrition criticized the popular Atkins high-fat diet, because the diet is without scientific merit (Katch, 1993). Proper experimentation to validate the claims of weight loss were not performed. The advocates of this diet argue that with restricted intake of carbohydrates, the body must metabolize fat stores for energy. According to this argument, the unused calories would be discarded through the urinary functions. In actuality, any weight loss through this method is usually due to dehydration caused by the loss of sodium and the additional load on the kidneys. A side effect of low-carbohydrate diets is the potential of losing large amounts of lean tissue. Other possible effects of a high-fat, low-carbohydrate diet, is the increase of uric acid levels, and the lowering of potassium levels can initiate cardiac arrhythmias. The rise of blood lipids increases the risk for heart disease and, because of the additional strain on the renal system, it aggravates kidney problems (Katch, 1993).

Variations of the high-protein diet are equally dangerous. One type of diet, where the protein is in liquid form, has received attention from the Food and Drug Administration (FDA). In 1979, the FDA reported that liquid protein diets were associated with 58 deaths. Sixteen of the victims were obese women who had lost an average of 83 pounds over a two to eight month period. None of these women had histories of heart disease. They all died while on the diet or shortly after completing it. In addition to these deaths, 165 individuals filed formal complaints concerning the

various side-effects they were experiencing. The complaints included fatigue, nausea, constipation, muscle weakness, and hair loss (Katch, 1993). Because of the serious adverse side effects of liquid protein diets, the FDA proposed placing warning labels on the products which the labels would inform the consumer of the possibility of illness or death associated with the use of very low calorie diets. The consumer would also be reminded to use these diet products while under medical supervision (Newmark, 1983; Williamson, 1983).

Diets consisting of very few or no carbohydrates adversely affect work performance. In one study Bogert (1973) compared diets containing five percent carbohydrates with diets with over 90 percent of energy as carbohydrates. The high fat diet reduced the capacity to work by one half while the high-carbohydrate diet increased the capacity for hard physical work by one fourth. Both were compared with performance during a normal dieting period. A study of the Canadian Army in World War II reported the effects on performance of individuals after being on a carbohydrate free diet (Council on Foods and Nutrition, 1973). After only three days, their performance deteriorated and the men were fatigued and listless. Several men complained of nausea and vomiting. After carbohydrates were added to the men's diets, they recuperated.

The Zen Macrobiotic diet is another fad diet. It focuses on natural and organic foods (Council on Foods and Nutrition, 1971) This diet is comprised of seven levels. The lower levels include cereals, vegetables, soups, animal products, salads, fruits and desserts. Followers of the diet recommend starting at one of the lower levels of the diet, and then progress to level seven. Level seven consists of 100 % cereals. Fluids, according to this diet, should be avoided as much as possible. Advocates of this diet profess that the macrobiotic diet is a cure for all disease and that medical consultation is

unnecessary. This thinking has proved to be dangerous. As followers of this diet progress to the highest level, they risk nutrition deficiencies. Cases of anemia, hypoproteinemia, hypocalemia, and scurvy have been reported. In addition to these forms of malnutrition, loss of kidney function caused by the restriction of fluid intake has resulted in death in some cases.

After receiving reports of several deaths associated with the use of very low calorie weight reduction diets, the FDA and the Centers for Disease Control investigated the matter. They looked at 17 deaths that fit the pattern of sudden death or death caused by intractable ventricular arrhythmia. The 17 individuals studied had been dieting for a prolonged period of time, from two to eight months, and had lost large amounts of weight, 10 to 50 kgs. The individuals died between July 1977 and the first week of January 1988. They were morbidly obese and had histories of unsuccessful attempts at losing weight. They did not have prior symptoms of cardiac decompensation and in fact reported feeling well. Some reported hair loss and an intolerance to cold. Six of the 17 individuals died suddenly, seven suffered from cardiac arrest and never regained consciousness, and the remaining six died while under observation for syncope at the hospital (Sours, Frattali, Brann, Feldman, Forbes, Swanson, & Paris, 1981).

Dieting, and all the dangers associated with it, is not limited to adults. In 1985, (Killen, Taylor, Telch, Saylor, Maron, & Robinson, 1986) 1,728 10th grade students, from four northern California high schools, participated in a survey to detect risk factor behaviors associated with the presence of coronary heart disease. The students were administered an 85 page questionnaire that addressed attitudes, behaviors, intention, and knowledge concerning nutrition and diet, physical activity, stress, and substance abuse. Questions relating to attitudes about weight control, and eating, dieting history, and purging behaviors, were addressed in the nutrition and diet element. The results indicated

13 percent of the students had purged. Of the girls in this study, 10.6 percent reported vomiting, 6.8 % indicated the use of laxatives and 3.6 % used diuretics to lose weight.

Weight loss efforts can lead to bulimia. Individuals wanting to lose weight, restrict their diets which results in hunger. To combat hunger, some individuals will binge. Guilt and weight gained from the binge can result in self-induced vomiting. This begins the vicious binge/purge cycle (Killen et al., 1986). Gastric juices, intestinal fluids, and electrolytes necessary for the body to function properly, are expelled during purging. To compensate for this loss, the body borrows those chemicals from other parts of the body which results in a loss of potassium. When this occurs the individual may experience a weakening of muscles throughout the body (Byrne, 1987). There is a wide range of side effects from vomiting. They range from anemia to the rupture of the esophagus or heart. Other reported effects of vomiting are stomach cramps, ulcers, dizziness, apathy, irritability and general ill health. Irreversible tooth damage is one of the most common effects of self-induced vomiting. The acid/alkaline balance in the saliva aids in protecting teeth from decay. Often this balance is affected by dehydration and electrolyte imbalances (Cauwells, 1983). Repeated vomiting exposes the teeth to stomach acid, which may result in the eroding of the tooth enamel. Often individuals who use vomiting as a method to lose weight notice that their teeth become sensitive to hot or cold foods. Although crowns can be used to replace damaged teeth, the crown may eventually erode with continued vomiting (Byrne, 1987).

While purging is frequently used as a method to lose weight, other methods can be just as dangerous. In another study to determine weight loss practices, Crowther (1985) surveyed girls in the 9th to the 12th grades. The results indicated that 11.2% used vomiting and 4.7 percent used laxatives as a method to lose weight. If laxatives are abused they can cause too much fluid to be lost from the body and ultimately create

electrolyte imbalances. Chronic usage of laxatives speeds the food through the digestive system, failing to allow important nutrients to be absorbed by the body. It can also lead to vitamin and mineral loss and possibly change the body's electrolyte content, which can be dangerous. Constant diarrhea, the result of laxative abuse can lead to dehydration. Exhaustion, unconsciousness and a weakening of resistance to infection are all possible effects of fluid loss due to dehydration (Samz, 1988).

Besides causing infections and disorders, overusing laxatives can result in benign and malignant bowel tumors. When dehydration occurs, it can disrupt normal bowel functioning as the body can quickly become dependent on laxatives. The body can also become tolerant and resistant to laxatives, which may cause an individual to increase the dosage (Cauwells, 1983; Byrne, 1987).

Using and abusing diuretics is another method to lose weight and reduce swelling. The weight is reduced by the loss of water, but sodium, potassium, and chloride are also lost. If too much water is lost, blood volume may decrease, and can result in low blood pressure and fainting. Kidney failure can also occur if the body's water supply is decreased and less urine is produced (Samz, 1988; Cauwells, 1983).

Prescription and over-the-counter diet (OTC) pills may be used to suppress appetite in an effort to lose weight. Although weight loss can occur while taking the pills, as soon as the individual ceases taking the pills, normal eating habits return, and weight will be regained. Diet pills, like amphetamines, are habit forming and have unpleasant side effects (Winick, 1983). Adverse side effects include constipation or diarrhea, dizziness, headaches, high blood pressure, nervousness, and tachycardia. High doses of amphetamines may result in confusion, hallucinations, anxiety and panic attacks, arrhythmia, rapid breathing, vomiting, and high or low blood pressure. Convulsions, coma, and death can be the results of an overdose of amphetamines. Amphetamines are

also addictive if abused. Individuals start relying on the pills emotionally and physically. Withdrawing from amphetamines can cause fatigue, sleepiness, and in some cases even depression (Samz, 1988).

Phenylpropanolamine (PPA) is a substance in most OTC diet pills. Although drug companies profess the drug is safe, in 1981 there were approximately 10,000 people complaining of adverse affects, such as insomnia, nausea, and nervousness, after taking diet pills or cold medication containing PPA. In some cases, taking larger than recommended doses, combining diet pills with cold medication containing PPA, or drinking caffeine may have contributed to the bad reactions (Samz, 1988).

A major concern about OTC diet pills is that individuals can take the pills without consulting medical authorities. Existing medical conditions may be aggravated by PPA. Also, individuals may increase the recommended dose for increased benefits. Possible side effects of PPA are insomnia, nausea, nervousness, palpitations of the heart, and tightness in the chest (Samz, 1988).

Fasting is still another weight loss practice that, if abused, is dangerous. Because the body is stressed during fasting it may react to radical behavior changes by attempting to produce extra fat. Based on animal research, instead of losing weight, fasting may encourage the body to make more fat, resulting in weight gain. For example, Bailey (1977) used 50 rats divided into two groups. Group A, the "nibblers," had access to food all day. Group B, the "one big mealers," were given the same quantity of food as the "nibblers," but only had access to the food once a day for half an hour. The quantity of food for both groups was small and all fifty rats lost approximately the same amount of weight. After six weeks, all of the rats returned to the normal amount of food and access to the food all day. Both groups of rats gained weight, but Group B gained more weight than Group A. Enzymes responsible for depositing fat had increased by tenfold in the

Group B rats, while Group A rats did not experience an increase in these enzymes. It took 18 weeks for the enzymes in the Group B rats to return to normal. Eating only one meal a day equates to fasting for 23 hours a day. As soon as the diet ends, a larger weight gain can be expected.

Using saunas or steam baths to lose weight can both be dangerous if used excessively. These methods manipulate the body's temperature. If an individual's body is trying to fight off an infection or virus, the body temperature is already elevated. Also, any weight lost is water, not fat, and thus will be quickly regained (Bailey, 1977).

Exercise, in moderation, is a healthy method to reduce fat because it increases the metabolism and increases caloric expenditure. Overexercising causes the muscles to use too much glucose, resulting in less glucose going to the brain. Individuals attempting to lose weight may overstress their muscles and cause damage from exercising too much. When the brain experiences a shortage of glucose, symptoms such as feeling woozy, dizzy, and blurring vision can occur (Bailey, 1977).

Most weight loss practices are unhealthy if abused, and are often unsuccessful. In 1966, a study, by the Public Health Service (Pollack, 1978) indicated that of the population over 30 years of age, 25 to 46% are 20% or more above their ideal weight. To reduce the number of overweight people in the military, weight standards have been developed.

## Military Weight Standards

Inadequate body weight, not overweight or over fat, was the concern for the enlistees prior to World War II (WWII). The condition of being overweight was considered to be correctable, by training and diet, once the enlistee was in the service. The Army established a maximum allowable weight for enlistees in 1960, but it wasn't until 1976 that another standard was established for individuals after enlisting. In 1980

President Carter asked the Department of Defense (DoD) to study military fitness (Sakuma, 1990).

On June 29, 1981, the DoD directed the military services to adopt the following physical fitness policy:

> Physical fitness is a vital component of combat readiness and is essential to the general health and well-being of armed forces personnel. Individual service members must possess the stamina and strength to perform successfully any potential mission. These qualities, together with weight control, form the basis of the DoD physical fitness program (DoD Directive 1308.1, 1981, p. 91).

In order to comply with this directive, the services were asked to establish standards to ensure the attainment and retention of general health, physical fitness, and a trim military appearance (Sakuma, 1990).

The Army and Navy weight standards were originally based on height-weight actuarial tables developed from data accumulated by insurance companies (Campbell, 1981). The standards developed by the Air Force were different because they were based on graduated tables such that the weight standard increased for older individuals (Air Force Times, 1978; Campbell, 1981).

Medical and military weight standards differ due to the purpose of each. Medical standards are designed to screen individuals based on health risks. Military standards are based on screening individuals who potentially will not be able to meet the demanding physical requirements of military service (Buddin, 1989).

To comply with the Air Force standards, Air Force recruits had to weigh less than recruits for the other military services. According to Air Force officials, surveys

indicated that heavier individuals were less likely to complete their service commitment than were individuals weighing less. Because of this survey, it was believed that the Air Force was recruiting more individuals likely to complete their service commitment than the other military services. In 1978, Defense Secretary Harold Brown directed the Air Force to lower the maximum weight standards for recruits (Air Force Times, 1978).

The Air Force revised the weight management program effective May 1991. The new program was implemented to switch the focus from the body's weight, to the percentage of fat carried by the body. Height and weight standards were to be used initially. If an individual exceeded those standards, body fat percentages were to be calculated (D'Agostino, 1991).

Measuring key body circumferences is how fat percentages are determined. For men, the neck and abdomen are measured, and for women, the neck, waist, and hips are measured. Results from the measurements are compared to a chart that has computed body fat based on the measurement and height (Burlage, 1993). For men age 29 and younger, the maximum allowable body fat standard is 20 %; and for women the same age it is 28 %. For men 30 and older the standard is 24 %, and 32 % for women in that age group. Individuals with genetic characteristics, such as short and stocky, could be at a disadvantage according to Captain David Pennington, health coordinator at Andrews Air Force Base (D'Agostino, 1991). The measurements may be effected by timing. A large meal prior to the measurement could make a difference. A woman's body fat measurement may also be altered at various points in her menstrual cycle (Burlage, 1993).

Other methods that are better measures of body fat are the hydrostatic weighing and the skin fold technique. Both methods are more costly than the body fat

measurement using a tape measure, and both require the skills of specialists (Burlage, 1993).

When the weight standards originally changed, the Army based its standards on criteria from objective physical fitness scores on a three event physical fitness test. The Navy based its new standards on health criteria, and the Marines on health and appearance requirements. The Air Force based its new weight standards on appearance (Vogel, 1992). According to Air Force Regulation 35-11 (1991, p. 7), "Being overfat detracts from military image and body fat management is linked to self-image and self-esteem." Air Force Regulation 35-10 (1994, p. 6) states "The American public and its elected representatives draw certain conclusions on military effectiveness based on the image Air Force members present." In the Air Force Times (Famiglietti, 1976, p. 2), Vice Chief of Staff, General William V. McBride stated, "The American public, or stockholder, draw conclusions concerning military readiness based on partly what they see." In a letter to a Canadian officer (Famiglietti, 1976, p. 2), a former Chief of Staff General David C. Jones, said "Military effectiveness is tied to public opinion, and the public thinks of the American fighting man as lean and strong."

Judging an individual's weight by military appearance is subjective. To test the subjectiveness of this approach, Hodgdon, Fitzgerald, and Vogel (1990) selected a panel of 11 Army headquarters staff to rate 1,075 male and 251 female US Army individuals that were dressed in their service uniforms. They were rated on military appearance. The ratees had their body fat percent determined by underwater weighing. The correlation between weight and body fat was .86. The correlation between the rating for appearance and the body fat percent was .53 for men and .46 for women. This study indicated that military appearance is subjective and fatness is not a key indicator of military appearance. Although the military admits that military image is subjective (Famiglietti, 1976), they

feel weight standards are necessary because the public draws conclusions on the military's effectiveness based on the public's image of what military individuals should look like.

Researchers (Buddin, 1989) have determined that the individuals denied enlistment due to weight, are often scoring higher on pre-enlistment tests in the areas of math, electricity, and science. High-quality is defined as the individual having a high school diploma and scoring at least in the 50th percentile on the Armed Forces Qualification Test, thus tighter weight standards for the enlisted pool could result in a reduction of better qualified individuals who exceed the standard. Navy researchers asked the question if the services were interested more in appearance than ability. Military researchers that appeared at the 12th Psychology DoD Symposium, reported that military services were excluding individuals from the service by applying arbitrary weight standards that do not always reflect a person's capability, or ability to do the required job. David Robertson, of the San Diego Navy research group, said they had found that heavier people can often perform duties, such as lifting and moving heavy objects, better than lighter individuals (Maze, 1990).

According to Air Force Instruction 40-502 (Department of the Air Force, 1994), commanders are encouraged to administer no-notice weigh-ins of the individuals assigned to their units. Commanders may also direct individuals appearing to be overfat to be weighed. Individuals are also weighed at event related weigh-ins such as permanent change of station (PCS), temporary duty (TDY), and professional military education (PME). In addition to these situations, commanders are encouraged to weigh or measure body fat percentage for individuals prior to recommending them for promotion, assignment to noncommissioned officer status, selecting an officer for selective continuation, and other like situations.

Individuals exceeding their maximum body fat measurement will be entered into the Weight Management Program (WMP). The Air Force policy states:

> The Weight Management Program (WMP) minimally consists of a medical evaluation and diet counseling, a 90-day exercise program, monthly body fat measurements, a loss of 2 percent body fat (both men and women) each month. It also consists of the commander taking at least one administrative action for each occurrence of failure to progress satisfactorily while in the WMP (Air Force Weight Program, 1991, p. 11).

The WMP consists of two phases. The first phase is the initial entry into the program and the period of weight loss. Once the individual no longer exceeds the weight standard, they are placed into Phase II of the WMP, the observation period to ensure the individual does not again exceed body fat standards.

There are adverse consequences to being in the WMP. Individuals in Phase I of the WMP are not eligible to reenlist. They are eligible to test for promotion, but will not be promoted to the next higher grade, if selected, until the body fat standards have been met.

Individuals who arrive at a PME school exceeding the body fat standards will be returned to their duty station. According to G. Rogers, an administrative technician at the Air Force Senior Noncommissioned Officers Academy, from August 1990 to March 1995, 23 senior noncommissioned officers have been released from the Academy, and returned to their home base (personal communication, March 23, 1995). As required by Air Force Regulation 35-11, they were entered into the WMP and administrative actions were taken.

Air Force Instruction 40-502 covers a full spectrum of administrative actions available to be used on individuals failing to comply with the WMP (Famiglietti, 1980). Commanders are encouraged to select an administrative action or actions for each period of unsatisfactory progress in the WMP. Administrative options for officers that fail to progress the first month of Phase I include: (a) verbal counseling, (b) letter of admonition, (c) letter of reprimand (which is a harsher nature than an admonition), (d) establishment of an unfavorable information file, (e) limit the individual's supervisory responsibilities, and (f) comment on the officer's performance report concerning the lack of progress.

Administrative actions that can be exercised against enlisted individuals are the same except for the item concerning the comment on the enlisted performance report concerning the failure to progress in the WMP. If an individual has a second period of failure to progress in the WMP, the commander has the same options of administrative actions as mentioned before, plus a few more. An officer may be placed on a control roster. A control roster is a management tool for tracking unsatisfactory behavior. An enlisted individual may receive a non-recommendation for promotion, be denied or vacate noncommissioned officer status (this is for senior airmen and sergeants). With the third failure to progress, for an officer the action to delay, remove or be considered non-qualified for promotion is added to the list of administrative actions. Further options, for the enlisted individual who has failed to comply with the standards, are establishing a control roster and administrative discharge. If an officer or enlisted individual fails to meet Air Force body fat standards for a fourth period, administrative actions, such as administrative separation or retention with further continuation on the WMP with the same actions listed for the third failure to progress, are available.

Being separated from the military is not an idle threat to be used as a deterrent. It is a reality that 9,622 Air Force individuals that have been separated from fiscal years 1978 to 1994, have realized (Dalton, 1982, 1988, 1986; Moore, 1995). Because of this reality, Air Force individuals may feel pressured to lose weight, to comply with the standards, at any cost. Individuals may be paying the cost of losing weight by risking their health.

## The Present Study

The purpose of this study was to determine if body fat standards used by the Air Force contribute to unhealthy weight loss practices. The study evaluated the weight loss practices of individuals in relation to their maximum allowable body fat. For the purpose of this study, healthy weight loss was defined as decreasing caloric intake, but still eating three nutritionally balanced meals a day, and increasing caloric expenditure with a sensible exercise program. Unhealthy weight loss practices are defined as attempting to, or losing weight using methods that can be construed as dangerous to one's health, such as novelty diets, vomiting, laxatives, diuretics, OTC diet pills, fasting, saunas, and over exercising.

The hypothesis was that the closer the group was to their maximum body fat allowance, the frequency of unhealthy weight loss practices reported would be increased because of the threat of being separated from the military. Also, the further the group was from their maximum allowable body fat the lower the frequency of reported uses of unhealthy weight loss practices. It was predicted that group 1 would report participating in more unhealthy weight loss practices than the other groups because they were closer to their maximum allowable body fat measurement. Group 2 would report participating in more unhealthy weight loss practices than groups 3 , 4, and 5, but fewer than group 1. Group 3 would report participating in more unhealthy weight loss practices than groups 4

and 5, but fewer than groups 1, or 2. Group 4 would report participating in fewer unhealthy weight loss practices than groups 1, 2, and 3, but less than group 5. Group 5 consisted of individuals that were not aware of their body fat measurement because they had never been measured. These individuals probably stayed within weight standards either because they did not have weight problems, or they successfully controlled their weight. Some of those who successfully controlled their weight may have used unhealthy weight loss practices, however.

# III. METHOD

## Subjects

The 338 subjects were students attending a PME school for the United States Air Force. Their age range was from 27 to 59 years old and they were from different geographical locations throughout the world. The ranks of the subjects were master sergeants and senior master sergeants. Attending the PME school is mandatory to progress in rank, although subjects were both volunteers and non-volunteers for attending the PME school. Permission to survey the students was obtained from the commandant of the school. Participating in the survey was voluntary and anonymous. Anonymity allowed the subjects to provide honest responses to the survey and not be intimidated by any perceived repercussions. As the subjects were attending an Air Force school, it was paramount that the subjects understand that the survey was a separate entity, and not part of the school's curriculum. To ensure anonymity, the students were requested to report their perceptions of their body fat measurement. Although measuring the body fat of all of the subjects would have provided true measurements, the loss of anonymity could have affected the responses to the survey.

Because of the higher ratio of men to women in the Air Force and in the senior noncommissioned officer ranks, more men were surveyed than were women. It was determined by the researcher that since the sample size for women was N=47a factor analysis for each of the genders' responses to the survey, using the five groups would be impractical. The N for each group would not be large enough to obtain meaningful results.

## Instrument

Based on the literature a survey was developed to examine unhealthy weight loss practices, the effects of the practices on the respondents, and the feelings of the subjects concerning the current Air Force weight policy. A self-report survey was administered to the subjects, and participation was voluntary. The survey consisted of 26 questions with responses divided into categories for analysis such that questions 1 through 4 were used to determine the demographics of the subjects. For question 5, response (a) comprised group 1, the subjects at or within 1% of their allowable body fat standard; response (b) comprised group 2, subjects 2 to 3% below their maximum body fat standard; response (c) comprised group 3, subjects 4 to 5% below their allowable body fat standard; response (d) comprised group 4, subjects more than 5% below their maximum allowable body fat standard; and response (e) comprised group 5, subjects not aware of their maximum allowable body fat measurement. Another area of consideration was group 5. One unexpected finding from this study was that of the 335 subjects responding to the survey, 106 were not aware of their current body fat measurement. Had this group been aware, they could have been separated into one of the other groups. In most cases, this group was significantly different from the two groups closer to their maximum allowable body fat measurement. It is possible that not knowing their body fat measurement could be associated with their use of unhealthy weight loss practices in an effort to avoid exceeding their maximum allowable body fat measurement. In most cases, this group was significantly different from the two groups closer to their maximum allowable body fat measurement. It is possible that not knowing their body fat measurement could be associated with their use of unhealthy weight loss practices in an effort to avoid exceeding their maximum allowable body fat measurement.

Using a 5 point Likert scale, for questions 6 through 25, response choices were "almost never", "seldom", "sometimes", "often", and "almost always". Questions 6-15 pertained to unhealthy weight loss practices; questions 16-21 pertained to effects of unhealthy weight loss practices; questions 22-25 pertained to attitudes towards weight, weight loss practices, and the Air Force's policy toward weight; and question 26 was provided for any additional comments concerning dieting. Data from the five groups were analyzed to determine if individuals closer to their maximum allowable body fat measurement participated in unhealthy weight loss practices more frequently.

## Procedure

A scanner answer sheet, a comment form, and a pencil were provided to each subject. The survey, printed on a view graph, was projected on a screen in each seminar room. Although instructed to administer the survey at 0735 on the fifth academic day, academic instructors for each seminar administered the survey at times convenient to their schedule on the fourth or fifth academic day of the course. The subjects were located at a PME school and divided into 27 seminar rooms, 11-14 students per seminar room.

# IV. RESULTS

The survey item concerning age included five responses ranging from 30 to 55 years of age. For the age range 30-35 N=57, for the range 36-40 N=157, for the range 41-45 N=103, for the range 46-50 N=15, and N=3 for the age range 51-55. Forty-six subjects had been in the military 12-15 years, 179 for 16-20 years and 107 had been in the military for 21-24 years.

Subjects were divided into 5 groups based upon their response to survey item 5. This item concerned the individuals' perception of their own body fat. The percentage of body fat that separated each group was determined by theorizing the closer a subject was to their maximum allowable measurement (1 to 5%) the more likely they would have been body fat measured and would be aware of their measurement. Subjects more than 5% below their maximum allowable measurement would probably never have been measured and may not be concerned with their body fat measurement. Group 1 (N=21) were individuals reporting to be at, or within 1% below the maximum allowable body fat measurement. Group 2 (N=48) consisted of individuals who reported they were 2 to 3% below the maximum allowable body fat measurement. Group 3 (N=53) reported to be 4 to 5% below the maximum body fat measurement. Group 4 (N=92) believed that they were more than 5% below the maximum allowable body fat measurement. Group 5 (N=106) reported that they were not aware of their body fat measurement. Items 5-25 were assigned numbers. Response (a) was assigned 1 point; response (b) 2 points; response (c) 3 points; response (d) 4 points; and response (e) 5 points. Responses "almost never" and "seldom" were considered as non-use of unhealthy weight loss practices, and

the responses "sometimes", "often", and "almost always", were considered as use of unhealthy weight loss practices

The results of the analysis will be presented and discussed in three sections. The first section includes a factor analysis of the survey items and analysis of the rationally derived scales. Next, an analysis of the five groups using factor scales and the rationally derived scales will be discussed. Finally, gender differences using factor analysis and analyses of variances for the rationally derived scales are reported.

Scale Construction

A principle component analysis with varimax rotation was performed on survey items 6-25 to determine factors with an eigenvalue greater than one. Five orthogonal factors were identified, but only four factors had an eigenvalue greater than 1. The four factors were labeled as follows: Factor I - Psychological and Physical Stress; Factor II - Rapid Weight Loss; Factor III - Medical; and Factor IV - Purging. The percent of the total variance explained by rotated components was 62.20 % . (Factor I = 24.70%; Factor II = 17.67%; Factor III = 13.35%; and Factor IV = 6.48%.) A list of the items separated into the four factors is shown in Table 1.

Table 1

Principle Components Analysis With Varimax Rotation

| Factor I - Psychological and Physical Stress |
|---|
| Item 19. difficulty in concentrating |
| Item 20. less productive at work |
| Item 21. generalized weakness |
| Item 16. negative effects on behavior |
| Item 18. preoccupation with food |

Table 1 Cont.

Item 17. dizziness

Item 24. negative impact on health

Item 25. weight standards cause stress

Factor II - Rapid Weight Loss

Item 8. 50% fewer calories consumed prior to PME

Item 6. 50% fewer calories consumed prior to weigh-ins

Item 7. 50% fewer calories consumed prior to TDY

Item 9. fasted more than 24 hours at a time

Item 14. over-exercised prior to weigh-ins

Factor III - Medical Techniques

Item 11. diuretics

Item 10. OTC diet pills

Item 23. unhealthy weight loss practices

Factor IV - Purging

Item 12. laxatives

Item 13. vomiting

---

Factor I was composed of 8 items which measured the outcomes of psychological and physical stress, such as concentration and weakness. Factor II was composed of 5 items which measured rapid weight loss due to fasting. This factor also included a component related to exercising. Factor III was composed of 3 items which measured use of medicines to lose weight. And Factor IV was composed of 2 items which measured use of vomiting and laxatives.

The survey items were derived from previous literature on individual behaviors associated with unhealthy weight loss practices and the effects of those practices. It was anticipated that 10 items would measure the weight loss practices of the subjects, 6 items would measure the effects of the practices, and 4 items would measure the feelings toward the Air Force's policy on weight standards. These three areas were rationally derived categories used to elicit responses among the five groups of subjects. Table 2 lists the survey item numbers in the three categories: Practices, Effects and Feelings.

Table 2

Survey Items for the Rationally Derived Scales

Practices

Item 6. 50% fewer calories consumed prior to weigh-ins

Item 7. 50% fewer calories consumed prior to TDY

Item 8. 50% fewer calories consumed prior to PME

Item 9. fasted more than 24 hours at a time

Item 10. OTC pills

Item 11. diuretics

Item 12. laxatives

Item 13. vomiting

Item 14. over-exercise prior to weigh-ins

Item 15. use sauna for more than recommended times

Effects

Item 16. negative effects on behavior

Item 17. dizziness

Table 2 Cont.

Item 18. preoccupation with food

Item 19. difficulty in concentrating

Item 20. less productive at work

Item 21. generalized weakness

Feelings

Item 22. satisfied with weight loss practices

Item 23. number of times engaged in unhealthy weight loss practices

Item 24. negative effect on overall general health

Item 25. Air Force's policy on weight standards caused undue stress

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Factor Analysis of Scales

A one-way analysis of variance (ANOVA) using the five groups derived from the percentage of body fat and Factor I (Psychological and Physical Stress) indicated a significant difference, $F$ (4, 306) = 16.12, $p < .001$. A Tukey HSD post hoc multiple comparison test indicated that groups 1 and 2 were equal and higher than groups 3, 4, and 5 which did not differ. This was expected because groups 1 and 2 reported their body fat measurements as being closer to their maximum allowable measurement than did groups 3, 4, and 5.

A one-way ANOVA using the five groups derived from the percentage of body fat and the dependent variable Factor II (Rapid Weight Loss) revealed no significant differences. It appeared that almost none of the subjects had participated in extreme fasting to lose weight.

A one-way ANOVA using the five groups derived from the percentage of body fat and the dependent variable Factor III (Medical) indicated a significant difference, $F$ (4,

325) = 7.82, $p < .001$. A Tukey HSD post hoc multiple comparison test indicated that groups 1 and 2 were equal and reported using more diuretics and OTC diet pills, and participating in unhealthy weight loss practices more than did the other groups.

A one-way ANOVA using the five groups derived from the percentage of body fat and the dependent variable Factor IV (Purging) revealed a significant difference, $F$ (4, 329) = 4.96, $p < .01$. A Tukey HSD post hoc multiple comparison test revealed significant differences among group 1 and groups 4 and 5 which did not differ. Group 1 reported using more purging techniques than groups 4 and 5. This was expected as group 1 was closer to their maximum allowable body fat measurement.

In summary, groups 1 and 2, who reported that they were closer to their maximum allowable body weight, also reported more psychological and physical stress, and reported using more unhealthy weight loss techniques such as diuretics OTC pills, and purging than did groups 3, 4, and 5. Findings for groups 1 and 2 were similar and the findings for groups 3, 4 and 5 were similar. The five groups tended to divide into two different categories; one category included those subjects who were between their maximum body allowance and 3% below the maximum allowable body measurement (groups 1 and 2). The second category was comprised of subjects that were 4% or more below their maximum allowable body measurement (groups 3, 4, and 5).

Analysis of Rationally Derived Scales

A one-way ANOVA using the five groups derived from the percentage of body fat and the rationally derived category Practices indicated a significant difference, $F$, (4, 330) = 10.46, $p < .001$. A Tukey HSD post hoc multiple comparison test indicated that groups 1 and 2 were the same and higher than groups 3, 4, and 5 which did not differ. It was predicted and confirmed that groups 1 and 2 would report practicing more unhealthy weight loss practices than the other groups.

A one-way ANOVA using the five groups derived from the percentage of body fat and the rationally derived category Effects reflects a significant difference, $F$ (4, 323) = 13.29, $p < .001$. A Tukey HSD post hoc multiple comparison test revealed that both groups 1 and 2 were equal and higher than 3, 4, and 5 which did not differ. Thus, groups 1 and 2 reported experiencing more negative effects such as weakness and inability to concentrate, caused by unhealthy weight loss practices than did the rest of the groups.

A one-way ANOVA using the five groups from the percentage of body fat and the rationally derived category Feelings indicated a significant difference, $F$ (4, 330) = 17.73, $p < 001$. A Tukey HSD post hoc multiple comparison test indicated that groups 1 and 2 reported similar feelings and were higher than the negative feelings of groups 3, 4, and 5 which did not differ.

As predicted, the rationally derived scales indicated that groups 1 and 2 reported more unhealthy weight loss practices, more negative effects from the practices and more negative feelings toward the weight standards than did the other groups. Although it was predicted that group 1, because they perceive themselves to be closer to their maximum allowable measurement, would be significantly different than group 2 for Practices, Effects and Feelings, the findings did not support this. Both groups were close to their maximum allowable measurement which could explain the lack of difference. The means and standard deviations for the factor scales and the rationally derived scales are shown in Table 3.

Table 3

Means and Standard Deviation for Analysis of Factor Scores and Rationally Derived Scales

| Independent-Variables | Group 1 | Group 2 | Group 3 | Group 4 | Group 5 |
|---|---|---|---|---|---|
| Factor Scales | | | | | |
| I. Psychological and Physical Stress | | | | | |
| M | 16.94 | 16.85 | 12.67 | 10.42 | 11.01 |
| SD | 7.86 | 7.24 | 5.45 | 5.11 | 4.61 |
| II. Rapid Weight Loss | | | | | |
| M | 0.00 | 0.02 | 0.04 | 0.00 | 0.03 |
| SD | 0.00 | 0.14 | 0.19 | 0.00 | 0.17 |
| III. Medical | | | | | |
| M | 4.25 | 4.32 | 3.42 | 3.33 | 3.26 |
| SD | 2.43 | 2.00 | 0.99 | 1.10 | 0.81 |
| IV. Purging | | | | | |
| M | 2.53 | 2.33 | 2.15 | 2.12 | 2.03 |
| SD | 1.11 | 0.93 | 0.54 | 0.61 | 0.22 |

Table 3 Cont.

| | | | | | |
|---|---|---|---|---|---|
| Rational Scales | | | | | |
| Practices | | | | | |
| M | 30.14 | 28.00 | 25.72 | 24.33 | 24.67 |
| SD | 8.63 | 6.85 | 5.33 | 4.72 | 3.74 |
| Effects | | | | | |
| M | 12.54 | 12.35 | 9.62 | 7.92 | 8.17 |
| SD | 5.87 | 5.67 | 4.36 | 4.32 | 3.83 |
| Feelings | | | | | |
| M | 9.03 | 8.50 | 6.42 | 6.03 | 5.87 |
| SD | 3.34 | 2.97 | 2.41 | 2.48 | 2.22 |

Gender Differences

Because the majority of the studies concerning perceived body shape reported that women were more concerned with their body shape and were more likely to practice unhealthy weight loss practices than men, the factor scales and the rationally derived categories were analyzed to determine if there were significant differences between gender. For the female group N = 47, and for the male group N = 288. The means and standard deviations for the factors and the rationally derived scales for both genders are shown in Table 4.

Factor Analysis by Gender

A one-way ANOVA using the two groups, male and female, and the dependent variable Psychological and Physical Stress indicated a significant difference, $F$ (1, 309) =

4.36, $p < .05$. Females reported experiencing more psychological and physical stress than did males.

A one-way ANOVA using the two groups, male and female, and the dependent variable Rapid Weight Loss revealed no significant difference. Thus, both genders reported using rapid weight loss methods.

A one-way ANOVA using the two groups, male and female, and the dependent variable Medical indicated a significant difference, $F(1, 328) = 11.36$, $p < .001$. Females reported using more diuretics and OTC pills than men.

A one-way ANOVA using the two groups, male and female, and the dependent variable Purging indicated a significant difference, $F(1, 332) = 15.11$, $p < .001$. Women reported more purging behaviors, such as using laxatives and vomiting than men.

In summary, the findings reflected a significant difference between the factors Psychological and Physical Stress, Medical, and Purging, with females reporting higher frequencies of each. However, there was no significant difference for the factor Rapid Weight Loss. This was unexpected as prior research reported females being more concerned with their body shape than males are. In this study, possibly both genders reported participating in unhealthy weight loss practices because the subjects were all military personnel and had to comply with body fat standards.

Rationally Derived Scales by Gender

A one-way ANOVA using the two groups, male and female, and the rationally derived variable Practices indicated no significant difference. Both genders reported using unhealthy weight loss practices.

A one-way ANOVA using the two groups, male and female, and the rationally derived variable Effects indicated a significant difference, $F(1, 326) = 5.50$, $p < .05$.

Females reported feeling more negative effects from using unhealthy weight loss practices than males.

A one-way ANOVA using the two groups, male and female, and the rationally derived variable Feelings indicated no significant difference. Both genders reported experiencing negative feelings toward the Air Force's weight standards policy.

Findings indicated that females reported more incidences of negative effects such as dizziness and difficulty in concentrating, from their unhealthy weight loss practices than males. There were no significant differences between the genders for the rationally derived scales Practices and Feelings which could suggest that unhealthy weight loss practices and negative effects from the practices are not associated with gender, but rather based on how close the subjects are to their maximum allowable body weight.

Table 4

Means and Standard Deviations for Factor Analysis and Rationally Derived Scales by Gender

| Independent-Variable | Males | Females |
|---|---|---|
| Factor Scales | | |
| I. Stress | | |
| M | 12.36 | 14.48 |
| SD | 6.20 | 6.50 |
| II. Rapid Weight Loss | | |
| M | .02 | .02 |
| SD | .13 | .15 |

Table 4 Cont.

| | | |
|---|---|---|
| III. Medical | | |
| M | 3.46 | 4.22 |
| SD | 1.27 | 2.12 |
| IV. Purging | | |
| M | 2.12 | 2.51 |
| SD | .49 | 1.25 |
| Rationally Derived Scales | | |
| Practices | | |
| M | 25.74 | 26.17 |
| SD | 5.54 | 6.93 |
| Effects | | |
| M | 9.15 | 10.96 |
| SD | 4.86 | 5.07 |
| Feelings | | |
| M | 6.64 | 7.17 |
| SD | 2.81 | 2.83 |

# V. DISCUSSION

The results of this study indicated that military individuals were using unhealthy weight loss practices, were experiencing negative effects from the practices, and feeling undue stress caused by the Air Force's policy on weight standards. Stress may have a significant impact on eating habits. It is possible that the more stress the individual feels, the less the chance of obtaining the goal of losing weight. Military individuals having problems losing weight may see body fat standards as unrealistic and unachievable, which can cause distress for the individual. Of the individuals surveyed, 26% professed to feeling undue stress caused by the Air Force's policy on weight standards. Dealing with this stress or distress may be accomplished by different coping methods.

Coping methods and reasons for failing to lose weight have been studied and theorized about. One model proposed by Heatherton and Baumeister (1991) purported that binge eating was an escape from self-awareness. Binge eaters and dieters fall short of the high standards and high expectations they set for themselves and that are set by others. According to the escape model, bulimics and dieters use bingeing to escape negative thoughts and self-perceptions. Bulimics have reported a reduction in mood states while bingeing. The researchers determined that when bulimics and dieters try not to eat, or to restrict their diets, they sometimes engage in self-defeating behavior patterns such as binge eating. Also according to the escape model, dieters experience a greater emotional response to distress than do non-dieters. Heatherton and Baumeister used previous research to support their escape model. Davis et al. (as cited in Heatherton & Baumeister, 1991) suggested when a dieter is in a distressed mood, continued dieting becomes unimportant and appears to be unattainable. Also, according to Rosenthal and

Marx (as cited in Heatherton & Baumeister, 1991), eating then becomes a pleasurable experience that tends to block out negative emotions; thus, cognitive narrowing occurs. Other research used to support the escape model is Chiodo's study (as cited in Heatherton & Baumeister, 1991) that purports that fears of criticism, negative evaluations, and social rejection are motivating factors for many individuals desiring to be thin. In the military, when body fat measurements are exceeded, negative repercussions, that were addressed in the review of the literature, can be expected.

Also indicated in this study were that some subjects were stressed by the Air Force's body fat standards. Failing to meet the body fat standard may be inducing further stress. Baucom and Aiken (1981) noted that after inducing distress in the form of failure into a concept-formation task, dieters ate significantly more crackers than they did when they successfully completed a task. Non-dieters ate more crackers after successfully completing a task than they did after experiencing failures. Military individuals who are distressed because of failing to comply with the military body fat measurement standards may be increasing their eating as a way to cope with their stress or depression.

Besides coping with stress, food is also used for coping with other problems. Lehman and Roden's study (1989) suggests that bulimics, dieting restrainers, and nonrestrainers use food as a psychological nurturance. Food is used to comfort, reward and support individuals when negative events occur. Schotte, Cools and McNally (1990) also used negative events, induced by frightening films, to study the effects on restrainers and nonrestrainers. Their results indicate that negative events trigger overeating in restrained eaters. For military individuals, the consequences of exceeding the body fat standards and failing to lose weight may be considered a negative event and may result in overeating. Although the actions of overeating are counterproductive, overeating may

provide temporary comfort. As the comforting is only temporary, once it is gone many individuals look for methods to reduce weight rapidly.

The findings of this study indicate that many of the subjects attempt to lose weight by using rapid weight loss methods and experience psychological and physical stress. Hart's (1991) research suggested that suppressing eating habits, or dieting, increased thoughts about food and eating. Instead of concentrating on work, individuals who are dieting may be distracted by thoughts of food. In military jobs this distraction can range from a mere inconvenience to being hazardous to the individual and to others.

Overeating also occurs according to Stanfil (USA Today, 1989), an associate professor of dietetics at the University of Oklahoma Health Sciences Center, when individuals are feeling depressed or stressed. Feelings of depression may lead to distorted thinking, which may lead to self-destructive behavior such as overeating. Because of the 'all or nothing' attitudes of many Americans, once the diet has been broken, failure to lose weight is seen as a foregone conclusion, and overeating continues. When an individual is trying to stop the self-destructive behavior of overeating, support from others can be invaluable. Support groups such as Overeaters Anonymous provide positive reinforcement to overeaters in contrast to the punishment applied by the military for individuals who fail to meet body fat standards. Overweight individuals are faced with punitive actions as opposed to the positive support they need.

Although weight problems are not gender specific, women are more inclined to suffer from eating disorders. A report by Garner and Garfinkel (1980) reported that there is an evolution in American society toward a thinner ideal body shape for women. Because of this, many women feel pressured to diet, regardless of the possible negative physical or emotional outcomes. Women tend to be more dissatisfied with their current weight and body size. Zellner, Harner and Adler's study (1989) determined that although

men are relatively satisfied with what they perceive their weight to be, women desire to be thinner than they perceive themselves to be. After conducting a thorough search of literature concerning males and eating disorders, Carlat and Camargo (1991) concluded that males make up only 10 to 15 percent of the bulimic population that have been identified in community based studies. Of the clinic based studies, 1 to 11 percent of the subjects are male. The findings of this study concerning gender differences is mostly consistent with prior research.

As this study was limited to only senior noncommissioned officers attending a PME, further research should include all military ranks and services. A larger sample size will determine the full scope of the problem identified in this study. Also, research should not be limited to the military, as discrimination toward overweight individuals is not limited to the military, but is also prevalent in the civilian work force.

The researcher chose a convenient sample unit to participate in the survey. Because of the population surveyed, there were inherent limitations to the study. Limitations related to the age, rank and sex of the individuals. The survey was distributed only to individuals attending a PME school. Individuals attending this school ranged in age from at least 30 years old to not older than 55. Only individuals holding the rank of master sergeant and senior master sergeant were surveyed. Individuals with the ranks of airmen through technical sergeant, chief master sergeant and officer ranks were also excluded from the survey as they are not eligible to attend this school. Because of the higher ratio of men to women in the Air Force and in the senior noncommissioned officer ranks, more men were surveyed than were women. The method used to gather information was self-reports which, may be subject to bias and distortion

The United States military is becoming a smaller force. The Air Force has already begun reductions in force. According to Captain R. J. Gonzales, the Chief of

Public Affairs at Maxwell Air Force Base (personal communication, July 7,1995), in 1986 there were 608,000 active duty members. In October 1993 the numbers were down to 434,000 and the projected number of active duty members for year 2000 is 375,000. Although the force is becoming smaller, the mission has not decreased. In essence, the remaining military individuals must accomplish the same tasks as previously accomplished, but with fewer people to do it. At some point the military must decide if image is worth the sacrifice of expertise and experience.

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FACULTY CONDUCTED SURVEY

1. This survey has been approved for use under control number 95D01.

2. Participation is voluntary. Names and SSANs will not be used.

3. Purpose: To study the weight loss practices of Air Force Senior Non-commissioned Officers.

4. Return procedures: After completion, please return to your AI. AIs please send surveys to SMSgt O'Connors, seminar 22.

5. Completion instructions: Please mark your answers on the scanner answer sheet with a number two pencil. Please complete the survey and return the scanner answer sheet to SMSgt O'Connors Seminar 22 NLT COB 2 Jun 95.

Air Force Students Only

1. Age

a.30-35 b.36-40 c.41-45 d.46-50 e.51-55

2. Sex

a. female b. male

3. Total active duty

a. 12-15 yrs b. 16-20 yrs c. 21-24 yrs

4. Rank

a. E-7 b. E-85. I am

a. at my maximum allowable body fat measurement, or within 1% below that measurement

b. within 2 to 3% below my maximum allowable body fat measurement

c. within 4 to 5% below my maximum allowable body fat measurement

d. more than 5% below my maximum allowable body measurement

e. don't know my maximum allowable body measurement

6. Prior to random weigh-ins I have consumed 50% or fewer calories than I usually do

a. almost never b. seldom c. sometimes d. often e. almost always

7. Prior to going TDY I have consumed 50% or fewer calories than I usually do

a. almost never b. seldom c. sometimes d. often e. almost always

8. Prior to attending Professional Military Education (PME) Schools I have consumed 50% or fewer calories than I usually do

a. almost never b. seldom c. sometimes d. often e. almost always

9. I have fasted for more than 24 hours at a time to lose weight

a. almost never b. seldom c. sometimes d. often e. almost always

10. I have taken over-the-counter diet pills to lose weight

a. almost never b. seldom c. sometimes d. often e. almost always

11. I have taken water pills (diuretics) to lose weight

a. almost never b. seldom c. sometimes d. often e. almost always

12. I have used laxatives to lose weight

a. almost never b. seldom c. sometimes d. often e. almost always

13. I have vomited to lose weight

a. almost never b. seldom c. sometimes d. often e. almost always

14. I over exercise prior to weigh-ins to lose weight

a. almost never b. seldom c. sometimes d. often e. almost always

15. I have used the sauna for more than the recommended time to lose weight

a. almost never b. seldom c. sometimes d. often e. almost always

16. I believe that dieting affects my behavior negatively

a. almost never b. seldom c. sometimes d. often e. almost always

17. I have experienced dizziness when dieting

a. almost never b. seldom c. sometimes d. often e. almost always

18. When dieting, I have become preoccupied with food

a. almost never b. seldom c. sometimes d. often e. almost always

19. When dieting, I have found it difficult to concentrate

a. almost never b. seldom c. sometimes d. often e. almost always

20. When dieting, I have been less productive at work

a. almost never b. seldom c. sometimes d. often e. almost always

21. When dieting, I have experienced generalized weakness

a. almost never b. seldom c. sometimes d. often e. almost always

22. I am satisfied with my weight loss practices

a. almost never b. seldom c. sometimes d. often e. almost always

23. In the last year the number of times that I have engaged in unhealthy weight loss practices is

a. 0-9 b. 10-20 c. 21-30 d. 31-40

24. I believe that my weight loss practices have had a negative impact on my overall general health

a. almost never b. seldom c. sometimes d. often e. almost always

25. I believe that the Air Force's policy on weight standards causes me undue stress.

a. almost never b. seldom c. sometimes d. often e. almost always

26. Please write any comments concerning dieting, on a blank sheet of paper, and turn it in to your academic instructor with your scanner answer sheet.