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PERSONALITY, PSYCHOPATHOLOGY, AND OBESITY
IN FEMALES: A DESCRIPTIVE STUDY

DISSERTATION

Presented in Partial Fulfillment of the Requirements for
the Degree Doctor of Philosophy in the Graduate
School of The Ohio State University

By
Daniel Lee Phalen, B.A., M.A.

* * * * *

The Ohio State University
1977

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Chapter I

INTRODUCTION

Obesity has been "the companion of mankind" (Christakis, 1967) for over 12,000 years as evidenced by the plump figure of the "Venus of Willendorf," a small carving dating from the Stone Age. Obesity has risen and fallen as a function of social customs, declining in the days of the Old Testament when the scriptures forbade the eating of animal fat, rising with the gluttony of the Roman Empire, and undulating thereafter as a function of richness or poverty in what Wyden (1965) has not so facetiously termed the "thorn of plenty." At the present time it is estimated that there are some 40 to 80 million obese Americans, depending upon the criteria used. Furthermore, despite warnings by the prestigious Public Health Service that obesity "is one of the most prevalent health problems in the United States today" (U.S. Public Health Service, undated) and by noted English authorities such as Dr. I. McLean Baird (1969) that "obesity is one of the cardinal challenges of our times," the spread of obesity continues unabated.

A definition of obesity is obviously desirable, but one that is precise and generally accepted does not exist (MacDonald, 1970). The term 'obesity' is derived from the Latin word, obesus, meaning to devour. It has many definitions, principally stated in
terms of relationship between skeletal size and body weight (Kennedy and Foreyt, 1968). Thus Pargman (1969) states females who exceeded the upper limit of their appropriate weight range, according to the Metropolitan Life Insurance Company's Desirable Weights of 1959, were considered obese; males were classified as obese if they exceeded their appropriate weight by 20 per cent. MacBryde (1964) defines obesity as that bodily state in which there is excessive accumulation of fat in both the relative and absolute sense. Becker (1960) says that obesity is a state of having more weight that is consistent with the bodily build. On the other hand, Bychowski (1950) observes that obesity is a somatic manifestation of a personality disturbance, as does Bruch (1958). Sperling (1972) states that "overeating and excessive gratification of oral instincts in reality are common." Thus, she does not consider obesity a psychosomatic disorder but would place it, together with drug addicts and alcoholics, in the category of impulse-ridden characters.

However obesity may be defined, there is now general agreement that persistence in overeating has its basis in unresolved emotional problems and that overeating serves as a substitute for other satisfactions. This finding is comparatively recent. One of the road-blocks to the understanding of obesity has been the failure to acknowledge the psychological aspect involved. The mind-body dichotomy that permeated so much of pre-Freudian medical thinking, and is still clung to by doctors more comfortable with the
palpable soma than the spooky psyche, is much in evidence when it comes to obesity.

A recent editorial in the Journal of the American Medical Association (1970) emphasizes the need to utilize psychology in the treatment program for adiposity.

Studies published from several different laboratories would indicate that obese individuals respond to their environment in a manner which is quite different from that of people of normal weight. Obese individuals are frequently hostile, frustrated, and often severely depressed. The goal of weight loss is seen as a panacea to alleviate the multiple problems in their psychosocial and vocational lives. Weight reduction per se frequently causes these feelings to surface so that the thinned obese individuals find adjusting to their feeling extremely difficult and control of weight almost impossible. Clearly, achievement of weight loss should not be utilized as the sole end-point for therapy, but rather treatment of the basic underlying emotional problems must be incorporated into the treatment program.

Thus, obesity is presented as a disturbance of the whole person, with due recognition to the importance of psychological intervention. "The proper therapeutic approach," wrote Bruch as long ago as 1948, "is not through drugs or endocrine products, and not so much through diets as through an understanding and treatment of the emotional problems of the obese, their frustrations and anxieties."

Purpose of Study

The nature and degree of maladjustment in any population is very difficult to determine. In the past, attempts at identifying the psychological aspects of obesity have met with
conflicting and inconclusive results. Berblinger (1970) has emphasized the need for continued research to answer the following question: Does obesity reflect psychiatric illness and emotional trauma?

This research project will examine the relationship between percentage of body fat (obesity) in women and various psychological indicators of the Minnesota Multiphasic Personality Inventory. Hopefully, this study will add to a growing body of theory and research regarding obesity and its psychological correlates.

Hypothesis

Groups of women defined in terms of low, medium and high percentage of body fat will not differ significantly on mean factor scores representing various weighted combinations of criterion variables defined by the subscales of the MMPI and age.

Need for Study

Obesity as a multi-phasic clinical problem with a wide range of etiological factors has remained essentially unresponsive to a broad range of therapeutic approaches (Bruch, 1957; Craddock, 1969). Whether one focuses primarily upon clinical obesity--generally defined as 10% above the desirable weights listed in the Metropolitan Life Insurance tables (1970)--or on excessive obesity, which is diagnosed when weight is 20% above the desirable weight levels, the incidence in Western society continues to increase, and therapeutic or educational approaches directed toward either
prevention or correction remain dramatically unsuccessful (Mayer, 1968). The long-term results with traditional treatment methods are just as discouraging at present as they were in the late 1950's (Feinstein, 1960; Stunkard and McLaren-Hume, 1959). Indeed, in 1971 Penick et al. concluded that the weight reduction results in the medical literature indicate that "no more than 25% of obese individuals entering treatment will lose as much as 20 pounds, and only 5% will lose as much as 40 pounds." A review of group attempts at weight reduction yielded nearly identical results (Suczek, 1957). The discouraging outcomes of traditional treatments have been summarized by Stunkard (1958): "Most obese persons will not remain in treatment. Of those that remain in treatment, most will not lose weight, and of those who do lose weight, most will regain it."

In recent years, intensive investigations into the personalities of obese individuals reveal that a number of them have concomitant serious emotional problems, frequently involving anxiety, depression, or obsessive-compulsive features (Bruch, 1957; Glomset, 1957; Tudkin, 1959). In some instances, diagnostic evaluation and psycho-dynamic considerations rather clearly reflect the fact that obesity is indeed a symptomatic manifestation of underlying psychopathology (Wick, Sigman, and Kline, 1971).

It has been generally acknowledged that psychological problems are often associated with obesity, but the nature of these problems is poorly documented (Bruch, 1971). Previous attempts have
not succeeded in identifying a specific personality profile for the obese person (Bruch, 1964; Weinberg, Mendelson, and Stunkard, 1961). The understanding of emotional factors in obesity has changed substantially since Richardson in 1946 began an earlier contribution on this topic with the comment that "in publications on obesity comparatively little attention has been given to its psychological aspects." Since the early publications of Bruch (1940), Rennie (1940), and Richardson (1946), the trickle of papers on the psychological aspects of obesity have increased greatly. However, mixed evidence on whether obese persons are emotionally disturbed (Shocket, 1962) or should be considered as physically unhealthy, but psychologically sound (Bruch, 1964; Crumpton et al., 1966; Goldblatt, Moore, and Stunkard, 1965) is found in the literature.

As early as 1959 Stunkard noted: "Indeed it has not been possible to define the psychological characteristics of obese persons which will consistently distinguish them from non-obese persons." Stunkard further indicates a continued need to identify the etiology of the phenomenon before treatment can be optimally effective.

A number of research studies (Suczek, 1957; Kotkov and Murawski, 1953; Moore, Stunkard, and Strole, 1962; Johnson, Swenson, and Gastiniaux, 1976; and McCall, 1976) have attempted to identify specific psychological correlates of obese females with varying degrees of success. To date, the Moore et al. study is the only
research dealing with the obese woman that reported appropriate controls for age and social class. Furthermore, in none of the above studies was skinfold thickness used to measure obesity.

The present research was undertaken to study the psychological make-up of the obese female taking into consideration the need for more precise and interpretable statistical procedures, utilization of a more exact measurement technique to determine the degree of adiposity and inclusion of appropriate controls.

Limitations of the Study

Several limitations of the present study need to be mentioned at the outset. First, this study is limited to a sample of 44 volunteers from the population of 8 Diet Centers located throughout Franklin County, Ohio. Second, the sample consists of white, middle to upper class females that may not reflect a true sampling of the total population of obese persons. Third, the sample consists of those who were willing to take the time to respond to the instruments and return the results to the researchers. Fourth, a statistical limitation of the study lies in the number of Ss within each group, and the total N of forty-four (44).

Definitions of Terms

**Obesity**: An increase in body weight beyond the limitation of skeletal and physical requirement, as the result of an excessive accumulation of fat in the body. Obesity was operationally defined in this study as levels of percentage body fat.
Body Fat: Adipose tissue; a white or yellowish tissue which forms soft pads between various organs of the body, serves to smooth and round out bodily contours, and furnishes a reserve supply of energy. In this study an estimate of the percentage of body weight that is fat gives an indication of the individual's detrimental excess weight and thus of the extent of his obesity.

Low Percentage of Body Fat: Low percentage of body fat is operationalized as that group of Ss falling into the range of 18% to 30% body fat.

Medium Percentage of Body Fat: Medium percentage of body fat is operationalized as that group of Ss falling into the range of 31% to 36% body fat.

High Percentage of Body Fat: High percentage of body fat is operationalized as that group of Ss falling into the range of 37% to 47% body fat.

Psychological Adjustment and Stress: Psychological adjustment and stress are operationalized as that which is measured by the subscales of the Minnesota Multiphasic Personality Inventory. Elevations on subscales, in combination, will be considered indicators of psychological stress.
Chapter II

REVIEW OF LITERATURE

A review of relevant theory and supporting research may help orient the reader to the context in which this study was conceived. Facets of obesity literature reviewed here include the prevalence of obesity, measurement of adiposity, the etiology of obesity, current directions in the treatment of obesity and personality correlates of obese persons.

Prevalence of Obesity

Obesity is the most important nutritional disease in the United States. The problems of obesity and weight control are receiving recognition by many health officials in the United States who voice their concern that Americans are "overfed but undernourished." However, the actual average weights and standard deviations for clinically healthy persons of specified sex and height in the United States at present are still largely unknown (Keys and Grande, 1973). Present reports of the prevalence of obesity are based on deviations from tables of desirable weights for height and body build formulated by the Metropolitan Life Insurance Company (1970). The usefulness of weight to height ratios in estimating obesity is limited and a more direct measurement of adiposity, skinfold
thickness, has been used by Seltzer and Mayer (1965) with standards for the normal population determined by Young and Blondin (1963) and Novak (1963).

At the present time the incidence of obesity in the United States is alarmingly high and on the increase. Irwin (1964) found that 20 million Americans were 10% or more overweight and 5 million were at least 20% overweight. Rauh, Schumsky and Witt (1967) conservatively estimated that 10% of all children in the United States, Canada and Great Britain were obese. The metropolitan figures describe from 23% to 68% of the population as being at least 10% above their best weight. Mayer (1973) recognizes at least 16% of the population as obese by skinfold criteria. Stuart and Davis (1972) estimate that there are currently between 40 and 80 million obese individuals in the U.S. alone. The magnitude of the problem has led the U.S. Public Health Service (undated) to classify obesity as "one of the most prevalent health problems in the United States today."

Measurement of Adiposity

For many decades the most commonly used standards for assessing obesity were the life insurance standards based on the Medico-Actuarial investigations of insurance policyholders who had bought their policies from 1885 to 1908. The two tables, one for each sex, listed the average weights for various heights and ages for men and women.
In 1943 the Metropolitan Life Insurance Company Actuarians introduced a new standard table based on different principles. First, they recognized the undesirability of continued increase in weight during adulthood past the termination of growth and, secondly, they realized, at least in theory, that people have different builds. Accordingly, the age scale was eliminated and the new table was based on averages obtained from younger age groups. Furthermore, the single average weight values were replaced by weight ranges corresponding to three classes of frame size—small, medium and large.

The "Build and Blood Pressure Study, 1959" of the Society of Actuaries provided the basis for the latest (and currently most used) "average" and "desirable" weight tables. The average weight tables are based on data obtained by 26 United States and Canadian life insurance companies on several million policyholders. Body frame was classified as small, medium or large on the basis of chest breadth and hip width; no data or description of method was given. Furthermore, the significance of these measures for proper body build assessment is extremely limited. In addition, the Metropolitan Life Insurance Company followed with a new table of desirable weights based on the pooled experience of greatest longevity.

The standards derived from the "Build and Blood Pressure Study, 1959" contain several weaknesses. First, there is some question as to how representative the insurance data are for the
general population of the United States. Seltzer (1965) has shown that average weights in Metropolitan Life tables are 9 to 10 pounds less for men and 3 to 4 pounds less for women than the average values obtained in the National Health Examination Survey of the United States Public Health Service on a stratified, non-institutionalized random sample of men and women from all classes and areas of the country from 1960 through 1962 (Seltzer, 1965). Secondly, the Metropolitan Life Insurance Company tables give no definitions of frames, so that the user is unable to characterize his frame in the same ways as the authors of the tables. Brozek and Keys (1951) have felt that, while a definite relationship exists between body weight and fat, it was not possible to make a reliable prediction of obesity of an individual from body height and weight.

Measurement of skin-fold thickness appears to be the simplest and most practical available method of determining the extent of obesity. Skinfold measurements, first suggested in 1918 by Matiegka, became feasible in 1929 with the invention of constant-tension calipers by Frazer in the United States. Skinfolds have become established as the easiest and most direct measure of body fat available in the doctor's office, the clinic, or in large-scale population surveys. Two instruments have become standard--the Lange caliper in the United States and the Harpenden caliper in Britain. Skinfold calipers measure subcutaneous fat, which constitutes about 50% of the total body fat in young adults.
Skinfolds permit a closer estimate of body fat than do tables of relative weight, whether based on average or "ideal" weights for age, sex and height, since total body weight includes tissues other than fat.

Various workers have used a number of sites, including the triceps, subscapular, abdominal, hip, pectoral and calf areas. For the general population, the committee on Nutritional Anthropometry of the National Research Council has recommended the triceps and the subscapular skinfolds as good indices of an individual's overall fatness (Brozek, 1956).

In the Damon and Goldman (1964) study, the percentages of body fat predicted from 10 anthropometric formulas were compared with those determined by densitometry of 13 athletic young men. The closest predictions of densitometrically determined fat were obtained from two standard skinfold sites, triceps and subscapular, by the equations of Pascale et al. (1956) or Brozek and Keys (1951). The difference between predicted and densitometric fat percentages averaged ± 2.0% for the Pascale formula. Almost as good was Brozek's (1955) formula based on the endomorphic (round "soft") component of the somatotype. Predictions from formulas of Matiegka, Dupertuis, Hunt, Chinn and Allen, and Behnke were unsatisfactory. Individual subjects whose fat was predicted poorly were at the extremes of age, height and weight for the group. Ease of prediction varied with the difference between endomorphy and mesomorphy (squareness, muscularity) and inversely with their sum.
Sloan, Burt and Blyth (1962) examined the relative validities of various skinfold and girth measurements as indices of the proportion by weight of fat in the bodies of 50 healthy obese women. Of the skinfold thicknesses and girths measured, the vertical skinfold thickness over the iliac crest was found to be the best single predictor of body density. This finding is in accord with that of Garn (1957) who concluded on the basis of soft-tissue X-rays that this site gives the best index of total body fat in women. Young et al. (1961) found a correlation of -.60 between the skinfold thickness at this site and the body density. In the Sloan et al. investigation the only other measure which improved the accuracy of prediction was the skinfold thickness of the back of the arm. This, together with the iliac crest skinfold, gave a multiple correlation of -.74 with body density. This correlation is of the order found by other investigators both in male (Brozek and Keys, 1951) and in female subjects (Young et al., 1960). Although low, it is significant (p < .001) and allows a rough prediction of body fat from the simple measurement of skinfolds. The additional error introduced into the determination of body fat by estimating body density from these two skinfold measures is of the order of ±3% of body weight.

In conclusion, early recognition and assessment of obesity, as of other dangerous conditions, are important. The traditional method of assessing obesity by comparing the individual's weight with the mean weight for the same age, sex, and height has been
shown to be unsound (Keys and Brozek, 1953). By this method an
individual with good muscular development but little fat may be
classified as obese (Welham and Behnke, 1942). Of the available
methods for estimating the proportion of fat in the living body,
the determination of body density by underwater weighing (Behnke,
Feen, and Welham, 1942) is probably the most reliable but requires
heavy and expensive apparatus. Other methods used include the
measurement of skinfold thickness (Best, 1953), estimation of total
body water (Osserman, Pitts, Welham and Benke, 1950) or of total
body water and extracellular fluid (McCance and Widdowson, 1951),
and estimation of lean body mass from basal oxygen consumption
and urinary creatinine (Miller and Blyth, 1952). Of these the
simplest and the one showing the best correlation with body
density is the measurement of skinfolds (Brozek and Keys, 1951).
Many estimations of body fat by one or more of these methods have
been performed on men. Much less information is available about
women, although some valuable work has already been done in this
field (Jorgensen and Hatlestad, 1940; Edwards, 1950; Brozek,
Chen, Carlson, and Bronczyk, 1952; Von Dobeln, 1956; Garn, 1957;
Young, Gehring, Merrill, and Kerr, 1960; and Young, Martin, Chihan,

Etiology of Obesity

Despite a high degree of awareness in both lay and pro-
fessional communities of the prevalence of the obese condition,
no effective means of dealing with the obese individual has been developed. The reasons for this phenomenon are clearer when the complex area of the etiology of obesity is investigated.

Mayer (1968) underlines the contribution of culture, activity and diet to the etiology of obesity. He thinks the availability of concentrated sources of calories in the present day United States and the difficulty of exercising sufficiently in the city play at least a permissive role in the development of obesity.

The popular idea that obesity is usually the result of overeating is not supported in the literature. Johnson et al. (1956) studying 28 obese high school girls and controls found significantly lower average calorie intake among the obese girls. In their study comparing 14 obese adolescent boys with controls, Stefanik et al. (1959) discovered that the obese group ate less than the nonobese group. Hutson et al. (1965), reporting on 161 adults, found a lower mean calorie intake for the group with the highest percentage of body weight as fat. Huenemann et al. (1966) in their report of 73 adolescent boys and 86 adolescent girls found that the mean calorie intake of 17 boys classified as obese was below the average for all boys and, similarly, the mean calorie intake of 7 girls classified as obese was below the mean calorie intake for all the girls. In comparing 63 obese adult women in Trinidad with 26 normal weight controls, McCarthy (1966) learned that the mean calorie intake among the obese women was not higher
than that of the controls. Maxfield and Konishi (1966) after studying 25 pairs of obese women versus controls reported that the obese group consumed no more calories than the controls. Rose and Williams (1961) selected from 40 men, 6 pairs whose members differed as widely as possible in calorie intake but as little as possible in body weight and found the heavy eaters weighed less than the lighter eaters, even though the heavy eaters consumed twice as many calories.

There appears to be less agreement with respect to the contribution of inactivity to obesity. Johnson et al. (1956) concluded that the obese girls were significantly less active than the controls. Bullen et al. (1964) using a motion picture technique to compare the activity of obese and nonobese adolescent girls who were engaged in three different sports at a summer camp, reported a striking degree of inactivity among the obese girls. Dorris and Stunkard (1957) found from pedometer measurements that 15 obese women walked less than one half as much as 15 nonobese controls. Bloom and Eidex (1967), comparing 7 obese housewives with 6 lean housewives, found that the lean housewives averaged approximately 3 more hours a day on their feet than did the obese ones.

On the other hand, McCarthy's (1966) study of Trinidad women reported that the obese group was as active as the control group. Maxfield and Konishi (1966), estimating physical activity patterns from pedometer readings, found no significant differences
between their obese and nonobese subjects. In reviewing the literature, Miller and Mumford (1966) concluded that there was a prima facie case to look for factors causing obesity other than overeating and inactivity.

Studied by Stunkard and Koch (1964) have produced evidence in support of the proposition that obese persons are less responsive to internal physiological cues indicative of hunger or satiety. Cabanac and Duclaux (1970) have shown a deficiency in satiation response to sucrose in obese subjects. A group of obese subjects and a normal-weight control group were given sucrose taste tests before and after glucose ingestion. The difference in the normal weight subjects responses before and after glucose was significant. In obese subjects, the change in sucrose response after glucose was much less marked and the stimulus did not become unpleasant at any concentration.

In examining the effect cognitive factors have on satiety and food intake, Wooley (1972) manipulated independently the actual nutritional value and the apparent nutritional value of foods eaten by 16 obese and 16 normal subjects in order to evaluate their individual effects on subsequent intake. Results indicated that obese and normal subjects did not differ in their response to the experimental variables. Neither group ate more after consuming the true low-calorie drink than after consuming the high-calorie one. Both groups ate significantly less ($p < .025$), and reported feeling fuller, after drinking the mixtures which appeared to be
high in calorie. Wooley believed his findings reflected the importance of belief in the experience of satiety.

Schachter (1971) has reported that environmental cues play a key role in conditioning the feeling of hunger in obese persons and that their eating is under situational control. In two lengthy review articles, Schachter (1968, 1971) has described a series of studies demonstrating the susceptibility of human eating to environmental cues. In an early study, obese subjects tended to eat either one or three sandwiches depending upon the number (one or three) presented on a table in front of them, even though they were told that there were many more sandwiches in a conveniently placed refrigerator. A second study revealed what has been called dietary "finickiness" in lower animals with some forms of experimental obesity. When distracted from the purpose of the experiment, obese persons ate far more of a creamy, delicious ice cream than of an acrid, quinine-adulterated one. A third study utilized a clock that could be manipulated to run twice as fast or twice as slow as real clocktime. Obese subjects ate twice as many crackers in the former instance as they did in the latter.

Nisbett and Kanouse (1969) examined the food-buying behavior of obese and normal-weight individuals in a supermarket. As predicted, increased food deprivation heightened the attractiveness of the food for the normal-weight individuals but not the latter. In a second study in the natural environment, Schachter, Friedman and Handler (1974) observed in oriental restaurants the
number of obese and normal-weight occidentals who attempted to eat with chopsticks. As predicted, the obese as compared with the normals were significantly less likely to use the chopsticks when eating because, according to the externality theory, in the presence of food the obese are loath to tolerate any delay in getting the food eaten.

The hypothesis that the eating behavior of the obese is under external control may be only a special case of the broad hypothesis that "any stimulus, above a certain intensity level, is more likely to evoke an appropriate response from an obese than from a normal subject" (Schachter, 1971b). Using a series of tasks, including a tachistoscopic recognition of words, disjunctive reaction time and short-term recall (each designed to "tell something about the likelihood that a stimulus will trigger a response"), Rodin, Herman and Schachter (1970) found obese subjects to be more responsive to highly salient stimuli than normals. Pliner (1973) using a time estimation task and Rodin (1970) using a proofreading task also found that obese subjects were more responsive to highly salient external cues than normals, although they were less responsive to cues low in salience.

The psychosomatic hypothesis of obesity views nonnutritive eating as a learned coping response associated with anxiety reduction, usually established in childhood (Kaplan and Kaplan, 1957). In later life, when personal and social difficulties associated with excess weight gain lead to increasing anxiety, the overweight
individual is thought to resort to the behavioral coping response that has been established in the past—eating. Unfortunately, this mode of anxiety reduction leads into a cycle of greater obesity, more anxiety and continued overeating.

McKenna (1972) examined experimentally the Schachterian and psychosomatic conceptions of obesity. Food preloaded subjects, believing themselves participants in a market research study of a new product which they were to taste and evaluate, provided food consumption data relevant to three independent variables: subject weight, food cue valence and anxiety level. Analyses of the amount of test food eaten revealed a significant interaction between weight status and anxiety level; overweight subjects ate more under high anxiety, whereas normal weight subjects ate less. This finding was consistent with the traditional psychosomatic account of the role of internal cues (anxiety) in the eating behavior of the overweight individual. No significant interaction between weight status and test food valence was observed, as would have been expected according to Schachter's formulation of the role of external cues in the eating of the obese.

On the other hand, Schachter, Goldman and Gordon (1968) reported that obese individuals eat approximately the same amount of food when they are calm as when they are subjected to experimental treatments designed to arouse fear of electric shock. Abramson and Wunderlich (1972) subjected 33 obese and 33 normal-weight male college students to control, interpersonal anxiety or objective fear
treatments. The subjects then completed the Multiple Affect Adjective Check List and took a digit span test. Food consumption was measured by having the subjects eat crackers for 15 minutes under the guise of making taste discriminations. Although there were indications that the experimental treatment had been successful in arousing anxiety for obese subjects, no significant differences in cracker consumption were found.

Advocates of the biochemical basis of obesity have generally looked to studies of laboratory animals in support of their views. Genetic determinants of overeating in certain strains of mice have been documented (Danforth, 1927; Rytand, 1943; Mayer, 1953). The presence of genetically transmitted obesity in rats has led to the ongoing investigations of a possible genetic factor of obesity in man (Mayer, 1973; Newman, Freeman and Holzinger, 1937).

Withers (1964) studied adopted children and found their weight patterns to be correlated to those of their biological parents and not correlated to their adoptive parents suggesting that the tendency to be obese has genetic associations. There is also evidence that body types or somatotypes are inherited and that, while endomorphs (tall, long-limbed, slim-muscled individuals) rarely are obese, the mesomorphs (muscular, athletic, stocky-built individuals) sometimes are and ectomorphs (individuals with rounded contours, small hands and feet) frequently are (Mayer, 1973).
Recent studies by Knittle and Hirsch (1970) and Knittle (1974) investigating the cell count of adipose tissue in obese and nonobese individuals have brought additional evidence of physical factors that may predispose an individual to excessive gains in weight. Such predisposing factors may be genetically determined, but there is also evidence that excessive nutrition early in life may produce an unusually high adipose cell count. The number of adipose cells appears not to change after adolescence, but the size of the adipose cells may vary widely throughout life depending on changes in energy balance.

Metabolic disorders that cause an increase in lipogenesis over that seen in normal animals have been reported by Zucker and Zucker (1961). Regulatory disturbances that result in obesity may be traced to disturbances in the hypothalamus which may be traced to immobilization and extreme sedentariness (Mayer, 1968). Furthermore, hypothalamic lesions surgically induced or produced through massive doses of gold thioglucose can precipitate a tendency to overeat (Brobeck, Tepperman and Long, 1942; Miller, Bailey and Stevenson, 1950; Anlinder and Mayer, 1956; Mayer, 1953, 1968).

The possibility that insulin might play a causative role in the development of obesity has been raised by an interesting series of studies in laboratory animals. When insulin is given on a daily basis, animals become grossly obese and often double their weight. When the ventromedial hypothalamic nucleus (the satiety center in the brain) is destroyed, experimental animals develop
hyperinsulinemia almost immediately, even before increased food intake or weight gain is evident (Martin, Konijnendijk and Bouman, 1974). Thus, hyperinsulinism appears in part to be a consequence of the hypothalamic lesion. Moreover, obesity can be prevented by a pancreatectomy. Recent data in cases of hypothalamic obesity in man suggest that hyperinsulinism precedes the development of obesity and may be the primary defect (Bray, Davidson and Drenick, 1972).

In well-documented reviews of the medical literature, several authors (Richardson, 1946; Hamburger, 1951; Mendelson, 1966) have emphasized the irrelevance of organic factors in the usual case of obesity. Instead, they have argued that the state of being overweight is a manifestation of neurosis and have opted for formulations of a psychodynamic nature.

Alexander (1934) has pointed out that when the Adult ego, because of an inability to find gratification in normal life relationships, rejects strong desire to love and depend upon others, there is a reversion to earlier types of behavior. In these cases the desire to love and be dependent is expressed in terms of "being fed," and a strong wish to receive food develops. Alexander (1941) further brings out that "during early infancy the wish for love, the striving for security, the feeling of insecurity, possessiveness, greed, jealousy, and envy all become deeply linked with the hunger drive and the process of nutrition."
Obesity is thought by some to be the result of an impulsive disorder rooted early in character formation prior to full development of superego function (Bruch, 1957). Therefore, obese persons are said to have little conscious anxiety in regard to obesity and to use denial to an excessive degree. It is often stated that obesity is a "mask for depression" or that there is an "underlying depression" defended against by the obesity. On the other hand, there is frequent allusion to the concept of the "happy fat girl." Food is said to have an exaggerated and highly symbolic value to the obese person. It is thought to be used as a means of allaying anxiety and as an equivalent or substitute for security and love (Werkman and Greenberg, 1967).

Richardson (1946) pointed out that many obese patients experience anxiety, guilt or depression, resort to eating either to diminish these tensions or as a substitute gratification when more pertinent and realistic gratifications are unavailable and in extreme cases, acquire the characteristics of an addict.

Bychowski (1951) has explained the obese person's compulsive urge to overeat on the basis of fixation at or regression to the oral stage of psychosexual development. This is the developmental phase when the infant's satisfactions are centered around his mouth and when the ingestion of food becomes unconsciously equated with feelings of well-being and emotional security.

According to Blazer (1951), "the obese character is a stock character: the core of the problem is that the compulsive eater
unconsciously has given up the struggle to preserve a nonderoga-
tory attitude toward himself." Reeve (1942) attributed obesity
to a sadomasochistic defensive system. Rascovky (1948) felt that
the family environment of the obese child is characterized by an
over-protecting and domineering mother who stimulates in an
exaggerated fashion the relation of dependence on the child. Hammar
(1964) reported that, even in the case of clinical problems which
are generally regarded as constitutional in origin, there is
evidence that modeling after the parents sometimes plays a major
part in establishing the dysfunction. Lemieux and Martel (1948)
found that overeating by adolescents is a deficiency in emotional
maturity.

Bruch (1957) has paid attention to the early development
and the family interaction of obese children. Bruch found that
mothers of obese children tended to be unusually overconcerned
and anxious about them, while at the same time extraordinarily
domineering. This compulsive domination of the child coincided
with an exaggerated emphasis placed on food and eating.

A factor sometimes found to be associated with the onset
of obesity is physical or emotional trauma or periods of stress
(Mayer, 1968). Bruch (1941) terms this form of obesity "reactive
obesity" and notes that it usually follows situations that provide
overeating and a decrease in activity. Such situations are akin
to those accompanied by grief or severe depression, such as the
death of a family member, separation from home or situations that
involve fear of loneliness or desertion--divorce, for example.

The fact that eating behavior can be modified by its consequences provides the basis for a learning theory explanation and treatment of the obesity phenomenon (Horan, 1973). Support for a behavioral approach to the topic of obesity has been garnered by Stunkard (1968, 1970). In Stunkard's concise review (1968) of a number of studies which included the work of Hollingshead and Redlick (1958); Nisbett (1968); Schachter (1967); Ferster, Nurnberger and Levitt (1962); and Stuart (1967), pointed out that parental socio-economic status, ethnic background and specific environmental influences such as the availability of food, the palatability of food and the time of day dictate the eating behavior of overweight subjects to a far greater extent than subjects of normal weight.

Through an ingenious series of experiments, Premack (1959, 1962, 1965) has illustrated the reversibility of the reinforcement relationship. In one study (Premack, 1962) the drinking behavior of rats was reinforced by rewarding them with the opportunity to run, and running behavior was reinforced by rewarding the rats with the opportunity to drink. Using children in a 1959 study, Premack showed that the opportunity to play a pinball machine could reinforce the eating of candy, and vice versa. Premack concludes that eating and drinking base rates are subject to the same modification by environmental consequences as any other operant pattern.
In no more than 10 years the influence of the social environment on the production of obesity has been investigated. Stunkard and his co-workers have reanalyzed the data from the famous Midtown Manhattan study (data obtained from 1,660 persons selected as representative of 110,000 inhabitants of a residual area of New York City). One relevant observation is the finding of Goldblatt, Moore and Stunkard (1965) that there is a strong negative correlation between socioeconomic status and obesity. Obesity was six times more common among women of low status as compared to those of high status. Furthermore, upwardly mobile females were less obese (12%) than the downwardly mobile (22%). Finally, the longer a woman's family had been in this country, the less likely she was to be obese. Similar but less marked trends were obtained for the men. Suggestive relationships between ethnic and religious factors and obesity were also found for both sexes.

Two reports from England describe the same kind of relationship between socioeconomic status and obesity among women that had been discovered earlier in Manhattan. Silverston et al. (1966) discovered nearly twice the prevalence of obesity in women of lower socioeconomic status as in those of upper socioeconomic status. Among men, prevalence of obesity increased as one descended the socioeconomic ladder from upper to middle status. It fell again, however, among lower class men. Study of the older, lower class men revealed that every member of this group was engaged in
very heavy manual labor, therefore accounting for the lower prevalence of obesity among this group. In a survey of 1,334 Londoners, McLean Baird (1974) recently confirmed the relationship between social class and obesity in London.

A study of 3,344 white school children in three Eastern cities provided conclusive evidence for the influence of social class upon obesity in children (Stunkard, 1972). At age 6, the lower socioeconomic group contained 8% obese girls, while the upper class group had no obese girls at either age 6 or 7. This difference was maintained until age 18, with an increase in the prevalence of obesity as age increased in both groups. A similar pattern was obtained with the lower and upper class boys.

Studying 1,000 teenagers in Berkeley, California, Huenemann (1969) found an inverse relationship between socioeconomic status and obesity well established by adolescence. Obesity was defined as 30% of total body weight as fat in girls and 25% in boys.

Whitelaw (1971) also found a decrease in obesity with increasing social class in London schoolboys who were age 7-15. Skinfold thickness measures revealed that 8.5% of lower class boys were obese, as compared with 5.1% prevalence of obesity in middle class boys and 4.9% among upper class boys. Interestingly, he found no relationship between social class and mean skinfold thickness, suggesting that there is no general increase in fatness among lower class boys, but rather an increased proportion of definitely obese individuals.
Current Directions in the Treatment of Obesity

The initial development in the treatment of obesity with techniques derived from learning theory occurred when Ferster, Nurnberger, and Levitt (1962) reported on an operant method for developing self-control of eating behavior. Their procedure was based on the theory that lengthening the chain of responses leading to food intake will weaken the disposition to start that chain. Stuart (1967) developed a behavioral treatment program for overeating that required the client to monitor the quantity of food and drink intake and the circumstances in which this consumption occurred. The client was instructed to interrupt the meal for predetermined periods of time and just sit at the table, thus enabling him or her to experience control over the process of eating behavior. The client was also asked to record body weight at specific periods each day, and a step-by-step behavioral curriculum was established to modify eating patterns. Eight persons were seen individually for 12 interviews and subsequently attended monthly follow-up sessions. Weight loss ranged from 26 to 47 pounds over a 12-month period.

Harris (1969) evaluated two groups of overweight persons who met twice a week for approximately two months. He also assessed a control group. The participants monitored their eating behavior and were instructed in stimulus control procedures (i.e., how to limit the present situations and stimuli that were associated with food intake). After approximately 2½ months, each experimental
group was subdivided into aversive counterconditioning (one to three sessions) and continuation subgroups. All of the participants lost a statistically significant amount of weight at the end of $2\frac{1}{2}$ months (mean weight loss = 7.5 pounds). However, there were no significant differences in weight loss as a function of the aversive counterconditioning procedure.

Wollersheim (1970) compared the effectiveness of behaviorally oriented groups with those employing more traditional group procedures. Overweight persons were placed in either a group using social pressure for weight reduction, an insight-oriented group, a group taught relaxation and eating control techniques derived from learning theory or a no-treatment waiting list control group. The learning theory group manifested a significantly greater mean weight loss than did the other groups at the termination of the 12-week treatment period (mean loss = 8.61 pounds). The learning group also showed a significantly greater reduction of eating in situations unrelated to meal times.

Hagen (1974) assessed the effect of Wollersheim's learning theory procedure presented in three different forms: focal group therapy, manual only and focal group therapy and manual combined. All treatment groups demonstrated significantly greater changes in eating patterns and more weight loss (approximately 12.98 pounds) than did the control group at the end of a 10-week period. Further, a 4-week follow-up showed no significant changes in weight.
Penick, Filion, Fox and Stunkard (1971) compared the weight loss over a 3-month period of persons in a behavior modification group with persons treated with traditional group therapy. Due to subject variability, the overall weight loss differences between the two groups were generally not statistically significant. However, the behavior modification group had the largest percentage of persons losing substantial amounts of weight (30 pounds or more). Further, a 3 to 6 month follow-up demonstrated a continued greater weight loss in the behavior modification group.

A reinforcement system administered by a therapist can be effective in producing weight loss in persons in a controlled environment. Bernard (1968) employed a caloric restriction and a token system to reinforce a 102-pound weight loss in a grossly obese, hospitalized, schizophrenic woman. Foxx (1972) and Moore and Crum (1969) reported the successful use of social reinforcement to produce weight loss in an institutionalized person (79 pounds and 35 pounds, respectively). Upper and Newton (1971) obtained effective weight reduction in two hospitalized, schizophrenic patients by means of tokens, privileges and social approval (63 pounds and 31 pounds, respectively). Dinoff, Rickard and Colwock (1972) successfully used a series of contracts to produce a 30-pound weight loss in an emotionally disturbed youngster. Since the rewards were provided by the therapist and no penalty system was used, their procedure was essentially one of positive reinforcement rather than contingency contracting.
Abrahms and Allen (1974) found that overweight women lost significant amounts of weight over a 9-week period when a control group was compared to a social reinforcement (mean weight loss = 8.09 pounds), situational management-social reinforcement (mean weight loss = 12.19 pounds) or a situational eating management-monetary reward group (mean weight loss = 11.57 pounds). Weight loss in the two eating management groups was significantly greater than the weight loss in the social reinforcement group. Since all three groups maintained their weight loss at an 8-week follow-up, the addition of monetary rewards did not enhance the effectiveness of the behavioral management program.

Hall (1972) compared the relative effectiveness of a self-control or experimenter-controlled behavioral program, each program in effect for a 5-week period in a reversal experimental design. The self-control procedure included teaching the participants to modify their eating patterns, while in the second condition the experimenter controlled the dispensing of the reinforcers and told the individual how much weight to lose. The mean weight loss during the experimenter-controlled conditions was greater (approximately .56 pounds per week). There was no report of whether these group differences were statistically significant.

Harris and Bruner (1971) compared the weight change of persons in a group employing behavioral self-control measures, a group using a contingency contract with no information given about altering eating habits and an attention-placebo control group.
The self-control and contact groups both lost a significant proportion of weight over the 12-week treatment period in comparison to the control group, and the contract group subjects showed a significantly greater mean weight loss (13.4 pounds) than did the self-control subjects (7.41 pounds). However, at the 10-month follow-up, both treatment groups had regained weight and there were no significant differences among the three groups.

Jeffrey and Christensen (1973) compared the relative effectiveness of weight reduction in groups employing behavior therapy, willpower and a no-treatment control. The behavior therapy techniques included the modification of eating habits, daily monitoring of weight and contingency management for weight loss and attendance. The behavior therapy subjects who completed the 18-week treatment program showed a significantly greater weight loss (mean loss = 16.31) than did the persons in the other 2 groups; while willpower and control groups were not significantly different from each other. The weight loss of the behavior therapy group was maintained at an 18-week follow-up. However, one cannot assess the independent contribution of contingency contracting to the treatment results.

Mahoney, Moura and Wade (1973), in a 4-week treatment program, studied the relative efficacy of self-reward (monetary), self-punishment (monetary), self-reward and self-punishment (monetary), self-monitoring of weight and eating patterns and an information control group. All groups were given information of stimulus
control techniques for weight loss, and the self-reward and self-punishment groups were also instructed to self-monitor. The subjects in the self-reward group lost significantly more weight (mean loss = 6.4 pounds) than did the self-monitoring or control group subjects, but none of the other groups differed significantly from one another. At a 4-month follow-up, the 2 groups using self-reward (self-reward, and self-reward and self-punishment) had lost significantly more weight (11.5 pounds and 12.0 pounds, respectively) than did the self-punishment or control groups.

Romancyzk (1974) assessed the effect of self-monitoring daily weight and recording caloric intake, as well as various combinations of behavior management and stimulus control instructions, over a 6-week treatment program. There were no significant differences in weight loss between the no-treatment control group and the group that periodically mailed in a daily weight record. However, the group instructed to self-monitor daily weight and caloric intake in the absence of therapist contact was not significantly less effective in producing weight loss than the groups receiving the comprehensive-treatment program. The mean weight loss at the end of 4 weeks of treatment was: self-monitoring, 5.30 pounds; behavior management and stimulus control, 6.0 pounds; and behavior management, stimulus control, and self-monitoring, 8.0 pounds. The addition of self-monitoring of daily weight and caloric intake did not add to the treatment effectiveness of the 2 groups that had received instruction about either behavior management
or stimulus control, and both of these groups maintained their weight loss at a 4- and a 13-week follow-up.

Meyer and Crisp (1964) reported on the treatment of two hospitalized obese patients who were placed on a diet and presented with an electric shock whenever there was an approach toward a craved-for food. One patient remained on her diet and continued to lose weight 20 months after treatment; however, the second patient, who was very concerned about avoiding the shock, gained weight upon release from the hospital. Stollak (1967) compared the effectiveness of aversive conditioning and monitoring food intake and found that shock procedures were ineffective in producing weight loss but the group that kept a food record and attended group discussions for 8 weeks exhibited a significant amount of weight loss (8.5 pounds). However, this loss was not maintained at an 8- to 10-week follow-up.

Kennedy and Foreyt (1968) reported a 30-pound weight loss in a hyperobese woman over a 22-week treatment period when her favorite foods were paired with a highly noxious odor. Foreyt and Kennedy (1971) used a similar avoidance conditioning procedure and found that persons in the treatment group lost a significant amount of weight at the end of 9 weeks (average loss = 13.33 pounds) in comparison with a no-treatment control group. However, since the persons in the experimental group were asked to limit their caloric intake and were also instructed to keep a record of their eating behavior, which was reviewed at each session, one is unable
to judge whether the weight loss was due to the aversive conditioning or the recording of food intake. Further, this weight loss was not statistically significant at the follow-up.

Cautela (1967) described a method for treating maladaptive behavior, including overeating, which he termed "covert sensitization." The client is placed in a state of relaxation and develops an avoidance response through imagining the undesirable stimulus (eating) paired with an extremely aversive stimulus.

Janda and Rimm (1972) assessed the weight reduction of persons in a covert sensitization, realistic attention control (weight monitoring and relaxation) group and a no-treatment control group. There were no statistically significant differences in weight loss between the groups at the end of the treatment period. However, the three persons in the covert sensitization condition who reported the highest degree of arousal showed the greatest amount of weight loss. At the 6-week follow-up, the mean weight loss of the entire covert sensitization group was significantly greater than that of the other 2 groups (mean loss = 11.7 pounds).

Manno and Marston (1972) evaluated the efficacy of covert sensitization and covert reinforcement in weight reduction over 8 sessions. Both groups showed significantly greater weight loss than did the control group but were not significantly different from each other (covert sensitization mean weight loss = 4.13 pounds; covert reinforcement = 5.1 pounds). At the 3-month follow-up, both groups showed a further weight loss (mean total weight
loss (mean total weight loss = 8.9 pounds for both groups).

Foreyt and Hagen (1973) compared a covert sensitization group with a placebo group instructed to imagine pleasant scenes with food and eating, and a no-treatment control group. The covert sensitization procedures were comparable to those used in the studies by Harris (1969), Janda and Rimm (1972), and Manno and Marston (1972). There were no significant differences in weight change among the 3 groups (all groups lost some weight), and the investigators suggested that previous results obtained with covert sensitization may be due to the factors of suggestion and attention.

The application of covariant conditioning to weight reduction involves the systematic use of thoughts, images and reflections to modify eating behavior (Homme, 1965). Tyler and Straughan (1970) compared the weight loss of persons trained in covariant control, breath holding or relaxation when tempted to eat high-calorie foods. The mean weight loss was less than a pound in all 3 groups over a 9-week treatment period. Horan and Johnson (1971) found that overweight female college students in a reinforced covariant control condition exhibited greater weight loss than persons in a delayed-treatment control group. The reinforced covariant control weight loss was not significantly different from the weight loss obtained in the information and the scheduled covariant groups. The mean weight loss in the reinforced covariant control group over the 8-week treatment period was 5.66 pounds, with
the major weight changes occurring during the first few weeks of the program.

Various types of groups have focused directly or indirectly on the issue of weight reduction. The group processes have included insight-oriented psychotherapy, emotional support, task orientation to weight reduction and social pressure for self-help.

Mees and Keutzer (1967) demonstrated that short-term group psychotherapy which focused on problems in adhering to a diet, as well as on personal issues, resulted in some degree of weight loss in obese women but was ineffective with obese adolescents. Successful weight reduction occurred in a group of 7 women who discussed their diet problems in an emotionally supportive atmosphere (Kornhaber, 1968). However, Wick et al. (1971) found that obese women in a supportive group oriented around changing eating patterns and emotional ventilation made progress in weight reduction as long as the group sessions were held, but showed marked weight gains when the group was temporarily terminated.

Cormier (1972) found no significant differences in rate of weight loss over a 12-week period between persons seen in a supportive group in which weekly performance was discussed and those seen individually by a dietician. Mean weight loss was 1.61 pounds per week; 38% of the persons lost 20 pounds or more over the 12-week treatment program. London and Schreiber (1966) reported a significantly greater weight loss over a 6-month period for persons in group discussion sessions providing support and
pressure to diet (mean weight loss = 16.1 pounds) than those receiving a combination amphetamine-tranquilizer drug (mean weight loss = 10.0 pounds).

A number of voluntary and commercial self-help weight reduction groups have recently become popular. The procedures employed by the TOPS (Take Off Pounds Sensibly) groups have been reported by Wagonfeld and Wolowitz (1968) and Stunkard, Levine and Fox (1970), and other self-help groups have been described by Bumbalo and Young (1973). These organizations typically provide strong group pressure to lose weight by publicly announcing the member's weight status at each meeting. Stunkard et al. evaluated the effectiveness of 22 TOPS chapters and found that the members (predominantly women) stayed in the group for an average period of 16½ months. Mean weight loss was 15 pounds over that time period, and 28% of the members lost more than 20 pounds. A 2-year follow-up of the same chapters indicated a change in the rank order of the effectiveness of the individual chapters, but the mean weight loss of 14.2 pounds across chapters was similar to the weight loss results found 2 years previously (Garb and Stunkard, 1974; Stunkard, 1972b). However, only 28% of the members remained in TOPS over the 2-year period, and relatively heavier members who lost more weight tended to remain in the group for a longer period of time.

Psychotherapeutic procedures for treating obesity have focused on the uncovering of the conflicts assumed to have caused
the symptom of overseating. The literature on the use of psychotherapy for treating obesity consists primarily of case reports (e.g., Bruch, 1964b; Crisp and Stonehill, 1970a, 1970b; Garma, 1968; Rosenthal, 1963; Schonfeld, 1964) or the mention of the use of psychotherapy in a discussion of other aspects of obesity (Stunkard and Mendelson, 1967). Specific information on weight loss and follow-up statistics were presented only in the papers by Crisp and Stonehill (1970a, 1970b), in which 6 of the 7 patients (who participated in both individual and group psychotherapy) gained back a substantial amount of weight at follow-up.

Psychotherapy was used as an adjunct to therapeutic starvation by Rowland (1968), but the independent contribution of psychotherapy to the process of weight loss and weight maintenance was not evaluated.

Wick et al. (1971) presented the case study of a hyperobese patient treated for a year through hypnoanalysis and hypnotherapy. The authors indicated that weight control was secondary to a presenting emotional disturbance, and there was no progress in weight reduction. Kroger (1970) described a behavioral conditioning technique for treating obesity in which the client is hypnotized and told to imagine feelings of satiation or aversion to particular foods and autosuggestion is used at a later stage. Kroger stated that a high percentage of his patients were able to maintain a weight loss over a period of years, but no specific weight reduction information was presented.
Since obesity is caused by the ingestion of a greater number of calories than that person requires, a reduction in caloric intake and an increase in caloric expenditure should result in weight loss (Bray, 1972).

Glennon (1966) reported on a follow-up, ranging from 12 to over 24 months, of persons who had been hospitalized and placed on an 800-1,200 calorie reducing diet. All persons lost weight in the hospital (range = .3 to 5.0 pounds per day), but at follow-up only 23% were able to achieve and maintain a 20-pound weight loss and only 6% a 40-pound weight loss.

Alley, Narduzzi, Robbins, Weir, Sabeh and Danowski (1968) evaluated a weight reduction program with 50 overweight youngsters, ages 6-17, who were placed on a 1,000-calorie-per-day diet on an outpatient basis. The entire group was observed over a period of one to five years. Although 28% of the group were successful weight losers (defined as a 5-66 pound loss at the end of the observation period), 82% of the total group were still above the 90th percentile for body weight at follow-up.

Hammar, Campbell and Woolley (1971) assessed the long-range effectiveness of either diet, individual supportive counseling or group treatment for obese adolescents. A group of 221 individuals was contacted 1 to 8 years after their initial clinic evaluation, and 65 responded to the questionnaire. Although 44.6% of the respondent group showed a weight loss while attending the clinic, at follow-up 70% were still obese and only 17% had maintained
their initial weight loss. Dietary counseling and a weight reduction diet appeared more effective than supportive counseling and group treatment in producing and maintaining weight loss. However, the extremely large number of persons who did not respond to the questionnaire (70.5%), the lack of statistical comparisons and the use of a 10-pound weight loss as the criterion of success (irrespective of initial percentage above ideal weight) makes it difficult to draw firm conclusions from the data presented.

A number of reports with human subjects have suggested that weight reduction and the maintenance of weight loss is more effective if the individual consumes five to six small meals per day (Fabry and Tepperman, 1970; Fabry, Fodor, Hejl, Braun and Zvolankova, 1964; Gordon, Goldberg and Chosy, 1963; Lewis and Doyle, 1970; Munro, Seaton and Duncan, 1966).

Investigations in which food intake was carefully monitored and comparison groups were used failed to demonstrate any differences in weight loss on the basis of meal frequency (Finkelstein and Fryer, 1971; Young, Frankel, Scanlan, Simko and Lutwak, 1971; Young, Scanlan, Topping, Simko and Lutwak, 1971). Finkelstein and Fryer evaluated differences in weight loss on a 6-versus 3-meal-per-day, restricted calorie diet over a 60-day period. Moderately obese young women showed no significant differences in weight loss, nitrogen balance, total serum lipids or serum cholesterol as a function of meal frequency. The mean weight loss was approximately 6.4 pounds. Young Frankel, Scanlan,
Simko, and Lutwak and Young, Scanlan, Topping, Simko and Lutwak studied moderately obese young men over a period of 14 weeks. This was divided into a baseline period followed by 2 periods of eating regimens of either 1, 3 or 6 meals per day, thus obtaining paired comparisons for each subject. There were no significant differences in weight loss according to meal frequency, although persons on the 1-meal-per-day pattern had higher serum cholesterol values. Weight loss over the 12-week period ranged from 21.7 to 49.5 pounds.

Rowland (1968) evaluated the psychological functioning of 6 hyperobese persons who participated in individual psychotherapy while undergoing a 10-51 day total starvation regimen in a hospital. Weight loss ranged from 30 to 100 pounds. Five of the patients were male, and the entire group had been obese since childhood. All of the patients showed marked mood fluctuations and other indications of psychological stress, and 2 persons experienced near-psychotic episodes.

Swandon and Dinello (1970b) studied 25 severely obese persons (24 males) over a course of extensive dietary restriction, including starvation periods of 8 to 85 days. Weight loss ranged from 22 to 124 pounds. None of the patients became overtly psychotic or manifested severe personality disorders. However, overt psychopathology was observed in 68% of the patients, consisting of paranoid trends, characterological trends, depression, and anxiety. A 1-50 month follow-up (Swanson and Dinello, 1970a)
indicated that none of the patients continuously maintained his or her weight loss, and within a year all but 4 were at a weight equal to or exceeding his or her admission weight.

Rooth and Carlstrom (1970) compared a group of patients on a total fasting program with a group receiving 200 calories per day over a period of 14-110 days and found that it was less stressful for the patients to eat a small amount each day than to eat nothing at all. Physical complications including weakness, hair loss and polyneuritis were manifested in some patients during total fasting, but no physical complications were observed in the diet group.

Stunkard and Rush's (1974) review of the literature on fasting concludes that persons on short-term fasts (no longer than 2 weeks) generally did not show significant emotional disturbance, but a marked increase in psychological distress occurred with long-term fasting. Short-term inpatient fasting also appeared less stressful than outpatient dieting.

A variety of anorexigenic and metabolic stimulating drugs have been used to produce weight loss. A survey of the drug literature is beyond the scope of this paper. However, reviews on the treatment of obesity by Stunkard and McLaren-Hume (1959) and Feinstein (1960) indicate that the long-term results of appetite-suppressant drugs were uniformly poor, and indeed, there was no treatment technique at that time that was particularly successful in maintaining weight loss.
Asher and Dietz (1972) compared the records of patients treated by a number of "diet pills" with the results of studies using various diets and concluded that weight reduction was more effective in the medication group. However, there was no evaluation of the adequacy of the studies reviewed, nor was there a consideration of long-term weight maintenance.

Recently, ileo-jejunal by-pass has been introduced (Bliss, 1973) as a surgical treatment for obesity. Most commonly the operation involves the anastomosis of 14 in. of proximal jejunum to 4 in. of terminal ileum. With this procedure undesirable malabsorption is kept to a minimum while major absorption of calorific foodstuffs apparently occurs.

A jejunocolic shunt procedure was found to produce marked weight loss (e.g., 115 pounds in 9 months, Wills, 1970), but serious problems have occurred, such as electrolyte imbalance, nutritional deficiencies, and severe diarrhea (Lewis, Turnbull and Page, 1966; Payen, DeWind and Commons, 1963).

The 6-month average weight reduction with jejunointestinal bypass surgery in 4 males was 22%-26%, and in 5 females 16%-47% (Lanier, Younger, Scott and Law, 1969). Initial weights ranged from 350 to 550 pounds. Payne, DeWind, Schwab and Kern (1973) reported an average 6-month weight loss of 10.5 pounds in persons at least 100 pounds overweight. Additional reports (cited in Buchwald, Schwartz and Varco, 1973) indicated a 35% average weight loss over time. The major weight loss occurred in
the first year post-surgery, with a plateau reached between the second and third years. Persons with higher initial weights tended to lose more weight after the by-pass operation.

Payne et al. (1973) reviewed their 16 years of experience with the surgical treatment of 165 massively obese patients whose average weight was 318 pounds. The mortality rate was 6%. Liver changes due to fatty infiltration during the process of weight reduction was a serious complication, although there was some evidence that these changes were reversible over time.

Since numerous physical problems do result from intestinal by-pass surgery, it has been suggested that this procedure be discontinued (Drastic Cures for Obesity, 1970) or used with caution only in cases of intractable massive obesity (Welch, 1973).

Personality Correlates of Obese Persons

Weinberg, Mendelson and Stunkard (1961) examined 18 markedly obese men, aged 19 to 60, who were matched for age, educational level, race and referral source with 18 men of normal weight. All subjects were tested individually with a wide range of standard psychological tests: (1) Four subtests of the Wechsler-Bellevue Adult Intelligence Scale--two Verbal tests (Information and Vocabulary) and two Performance tests (Block Design and Digit Symbol); (2) The California Psychological Inventory; (3) The Leary Interpersonal Check List; (4) The Taylor Test for Manifest Anxiety; (5) The Thematic Apperception Test; and (6) The Draw-a-Man Test. The psychological tests did not reveal differences
of any kind between those who were obese and those who were not.

Suczek (1957) applied a number of psychologic measures (Minnesota Multiphasic Personality Inventory, the Interpersonal Check List and 10 specifically selected Thematic Apperception Test pictures) to over 300 obese women who volunteered to participate in an experimental weight reduction program. The data were obtained from a sample of 100 of these women, ranging in age from 18 to 72, with a median age of 42 years. The degree of overweight varied from $\%$ to $14\%$, with a median of 42%. In their attitudes about themselves these women were distinguished by an extreme emphasis on psychologic strength, hypernormality and narcissistic pride and by a denial of weakness. Comparing the grossly obese to the mildly obese revealed some interesting findings. The most overweight were more power-oriented in their interpersonal orientation and were also more likely to be anxious, introspective neurotics. The mildly overweight, on the other hand, have a less intense need to be strong and less free-floating anxiety. They also have a tendency to see problems as being external to themselves.

Kotkov and Murawski (1953) contrasted group Rorschach protocols of obese women with ideal weight women controls to determine those characteristics which statistically held up through both pilot and experimental groups of 51 and 80 subjects, respectively. Results indicated a tendency for the obese women to show less interest in people (less "Human" responses), a greater state of tension and anxiety (higher "Form" %), a tendency for displaying a
more blurred sense of reality (more Form-minus responses), and a
tendency to present a greater disturbance in body image (more
obese did not tend to give "clothing" responses).

In reanalyzing data obtained from the Midtown Manhattan
study, Moore, Stunkard and Strole (1962) examined scores made
by obese and normal respondents on eight mental health indices
(Immaturity, Suspiciousness, Rigidity, Frustration-Depression,
Withdrawal, Tension-Anxiety, Neurasthenia, Psychiatric Rating and
Childhood Anxiety). In seven out of the eight indices the obese
subjects had higher scores for pathology. However, when appropriate
controls for age and social class are introduced, the differences
between obese and normal-weight persons decrease dramatically.
The differences for three of the items ("Immaturity," Rigidity"
and "Suspiciousness") retain respectable levels of statistical
significance, but the introduction of controls markedly decreases
the overall effects.

Crumpton, Wine and Groot (1966) compared MMPI profiles
of 29 obese men with profiles of general medical and surgical
patients, unselected neuropsychiatric patients, schizophrenics,
depressives, alcoholics and patients with anxiety reactions. Each
group contained 29 male Ss averaging about 40 years of age, for a
total N of 203. All Ss were given the MMPI soon after hospital
admission, the group of obese patients being hospitalized for
treatment of obesity. The mean profile of the obese group peaked
at D and Pd, with a marked low at Pa, but was otherwise relatively
flat. Mean T scores ranged from 53 to 67. The profile suggested a level of psychopathology within the normal range.

McCance (1961) and Silverstone and Solomon (1966) have reported that obese patients attending medical clinics were characterized by normal levels of neuroticism as measured by the Cornell Medical Index. Silverstone (1968) also reported that male subjects who were 45% or more above 'ideal' weight and sampled from the general population reported lesser amounts of such neuroticism than others, and Simon (1963) had earlier found significantly less depression amongst a group of obese service personnel than amongst their normal-weight colleagues. Crisp and McGuinness (1974) examining alternate middle-aged subjects with a 10,000 general practice population in southwest London (Crisp and Priest, 1971) found massive obesity to be associated with significantly less anxiety and depression.

Werkman and Greenberg (1967) compared 88 obese adolescent girls at a medically oriented camp for overweight girls with 42 normal-weight girls at an ordinary summer camp on a number of personality and interest measures (MMPI, Strong, Semantic Differential, and Sentence Completion). Statistically significant differences were found on all measures used. The obese girls showed unusual narcissism, difficulty in impulse control, considerable social anxiety, behavioral immaturity and depression. They were less imaginative and ambitious in their life goals and seemed to live within a pattern of ego restriction.
Wunderlich, Johnson and Ball (1973) administered the Adjective Check List (ACL) and the Edwards Personal Preference Schedule (EPPS) prior to beginning weight reduction. The patients were from 64.6% to 214.7% overweight. As predicted, the obese group was lower on the Achievement, Dominance, Endurance, Order, Personal adjustment and Self-control scales, while scoring higher on the Aggression, Exhibitionism, Heterosexuality and Intraception scales. In addition, the obese sample checked a significantly fewer number of Favorable Adjectives than did the normative group and more descriptive adjectives pertaining to Autonomy.

Wunderlich (1974) compared responses of 23 superobese (13 female and 10 male) Ss with standardization groups from the California Psychological Inventory. Females scored significantly different from the norm group on 6 of the 15 predicted scales, males on 9. A characteristic personality of the obese could not be described from the data.

Johnson, Swenson and Gastinibau (1976) compared the MMPI profiles of 116 obese subjects (26 males and 90 females) to those of a general medical population of 50,000 patients seen in the Department of Internal Medicine at the Mayo Clinic. Obese male subjects had significantly higher scores on the F and MA scales. Obese female subjects had significantly higher scores on the F, Pd, Pa, Sc and Ma scales and a significantly lower score on the Q scale than the reference population. The authors' findings pointed out the presence of diverse behavior patterns among obese persons.
rather than a single personality pattern characteristic of obesity.

McCall (1976) obtained data from an extensive test battery that included the Mooney Problem Check List (MPCL), the Michill Adjective Rating Scale (MARS), the WAIS Vocabulary subtest, the MMPI and a specially devised Personal History Questionnaire (PHQ) from a group of 169 refractory obese women and a group of 81 remediated obese women. On 6 of 9 scales, the differences were significant at the .01 level; on 3 scales the level of significance was .05. From the 6 scales on which the relative differences were greatest, the refractory obese women, compared to the remediated obese, exhibited more body concern (Hs), psychic "hurting" (D), somatization (Hy), rebelliousness (Pd), compulsive and ruminative tendencies (Pt) and bizarre or confused thinking (Sc). The refractory obese were also somewhat more femininely dependent (Mf), touchy (Pa) and psychologically restless (Ma).

In a study of the relationship between locus of control-field dependence and cognitive activity, internal individuals were rated as having thinner physiques than their external counterparts (Lefcourt, Gronnerud and McDonald, 1973). Gormanous and Lowe (1975) administered Rotter's I-E scale to 126 females and 90 male undergraduates, whose weight and height measurements were then recorded by Es. On the basis of this screening, four groups were selected: (1) 20 obese females; (2) 44 normal females; (3) 30 obese males; and (4) 26 normal males. Comparison of I-E scores on normal and obese female students showed no significant
differences. No significant differences were found between I-E scores for male groups.

Stunkard and Mendelson (1967) studied the relationship between obesity and body image. The obtained data based upon 1-hour interviews with 74 randomly selected obese persons in the general medical and psychiatric clinics of the Hospital of the University of Pennsylvania, plus a background obtained by psychotherapy of about 20 obese persons for periods of from 1 to 10 years. Stunkard and Mendelson found that 3 factors predisposed an obese person to the development of a disturbed body image: onset of obesity in childhood or adolescence (the so-called "juvenile obesity"), presence of emotional disturbance and negative evaluation of the obesity by others during the formative years. Three other factors did not seem important: gender, extent of overweight and intelligence.

In a follow-up study Stunkard and Burt (1967) sought to determine whether body image disturbance was present before adolescence. For this purpose the 20 most obese girls in grades four through six of a large suburban school were examined by means of structured interviews and were compared with 20 matched normal-weight girls. Their findings suggest that adolescence, rather than childhood or adulthood, is the critical period for the development of disturbances in body image of obese persons.

Currently, there is a wave of interest in the problems of the obese individual. The literature discloses a high incidence of the disorder, the need for more precise measurement techniques
(i.e., skinfolds) of adiposity, the complex array of theorizing concerning the etiology of the phenomenon, inconsistent treatment effects and a need for continued understanding of the personality structure of the obese person.
Chapter III

METHOD

This chapter will consist of five sections. The first section, selection of instrument, will briefly describe the instrument used, cite references and explain the rationale behind the use of the instrument. Second, I will illustrate the sample used in the study, including numbers and categories of subjects. The third part looks at the procedure for data collection. Next, I will focus upon the equations used for the conversion of the skinfold measurements. The fifth section will describe the research design. The sixth part will discuss the computer program and statistical procedures used to analyze the data. Lastly, I will provide a summary statement pertaining to the method as a whole.

Selection of Instrument

--Minnesota Multiphasic Personality Inventory--

The MMPI is designed to provide an objective assessment of some of the major personality characteristics that affect personal and social adjustment (Hathaway and McKinley, 1967). It is for this reason that the MMPI is selected for inclusion of this study. It consists of 566 statements to be answered in a True-False-Cannot Say manner. The time needed for administration of the
The instrument is between 45 and 90 minutes.

There are ten clinical scales on the MMPI: D (depression), M (hypomania), S1 (social introversion), Hs (hypochondriasis), Hy (hysteria), Pd (psychopathic deviate), Mf (masculinity-femininity), Pa (paranoia), Pt (psychasthenia) and Sc (schizophrenia). There are three validating scales as well: L (lie), F (validity) and K (correction). These scales state the authors, "provide a means for measuring the personality status of literate adolescents and adults together with a basis for evaluating the acceptability and dependability of each test record. The ten clinical scales are not expected to measure pure traits nor to represent discrete etiological or prognostic entities, but they have been shown to possess meaning within the normal range of behavior and will be considered in that manner (Hathaway and McKinley, 1967). For detailed descriptions of each scale, the reader is referred to Marks, Seeman and Haller (1974).

The MMPI offers flexibility both in terms of the number of scales available for descriptive research and the vast amount of research which has already been accomplished using this instrument. Extensive bibliographies are available in Dahlstrom and Welsh (1960) and in an Atlas for the Clinical Use of the MMPI by Hathaway and Meehl (1951).

Test-retest correlations for each scale of the MMPI have been reported by Hathaway and McKinley and are listed below.
<table>
<thead>
<tr>
<th>Scale and Abbreviation</th>
<th>Test-retest reliability coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lie (L)</td>
<td>.46</td>
</tr>
<tr>
<td>Validity (F)</td>
<td>.75</td>
</tr>
<tr>
<td>K (K)</td>
<td>.76</td>
</tr>
<tr>
<td>Hypochondriasis (Hs)</td>
<td>.81</td>
</tr>
<tr>
<td>Depression (D)</td>
<td>.66</td>
</tr>
<tr>
<td>Hysteria (Hy)</td>
<td>.72</td>
</tr>
<tr>
<td>Psychopathic deviate (Pd)</td>
<td>.80</td>
</tr>
<tr>
<td>Masculinity-femininity (Mf)</td>
<td>.91</td>
</tr>
<tr>
<td>Paranoia (Pa)</td>
<td>.56</td>
</tr>
<tr>
<td>Psychasthenia (Pt)</td>
<td>.90</td>
</tr>
<tr>
<td>Schizophrenia (Sc)</td>
<td>.86</td>
</tr>
<tr>
<td>Hypomania (Ma)</td>
<td>.76</td>
</tr>
<tr>
<td>Social Introversion (Si)</td>
<td>.93</td>
</tr>
</tbody>
</table>

During the scale development period, Hathaway and McKinley choose a non-statistical criterion of validity. "The chief criterion of excellence of valid prediction of clinical cases was compared with the neuropsychiatric staff diagnosis, rather than statistical measures of reliability and validity" (Hathaway and McKinley, 1967, 8). McKinley and Hathaway (1943) indicate high validity for the MMPI stating:

A high score on a scale has been found to predict positively the corresponding final clinical diagnosis or estimate in more than 60% of new psychiatric admissions—even in cases in which a high score is not followed by a corresponding diagnosis, the presence of the trait to an abnormal degree in the symptomatic picture will nearly always be noted.

Selection of Sample

Each subject in this research was selected from 8 of the 14 Diet Centers located throughout Franklin County, Ohio. There are approximately 400 dieters attending the 8 Diet Centers that were selected for the population. All dieters were on a low fat,
low carbohydrate, high protein diet. None were receiving any psychological counseling other than daily contacts with diet counselors concerning problems in following the diet. The sample included Ss with varying degrees of body fat (18% to 47%). Forty-four subjects who were white, middle to upper class females and encompassed age ranges of 18 to 64 years were used.

The sampling took place during the month of March, 1977, and participation in this study was completely voluntary. All Ss were in the beginning phase of the weight reduction program. Seventy-seven Ss agreed to participate in this research. Out of the 77 Ss; 60 test packets were returned. Ten test packets were not completed and of no use in the research. Another 6 Ss responded to the personality inventory (MMPI) in an invalid manner and were not included. A profile was considered invalid if the difference between the F scale and K scale was greater than twelve (F - K > 12).
Table 1

SAMPLE CHARACTERISTICS

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Mean</th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Age</td>
<td>37.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Sex (F)</td>
<td></td>
<td>44</td>
<td>100.0</td>
</tr>
<tr>
<td>3. Marital Status</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Married</td>
<td>36</td>
<td></td>
<td>81.8</td>
</tr>
<tr>
<td>b. Single</td>
<td>4</td>
<td></td>
<td>9.1</td>
</tr>
<tr>
<td>c. Divorced</td>
<td>4</td>
<td></td>
<td>9.1</td>
</tr>
<tr>
<td>4. Educational Level</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. 13 years of school and over (college)</td>
<td>22</td>
<td></td>
<td>50.0</td>
</tr>
<tr>
<td>b. High school</td>
<td>22</td>
<td></td>
<td>50.0</td>
</tr>
<tr>
<td>5. Socioeconomic Status*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Upper-middle class</td>
<td>44</td>
<td></td>
<td>100.0</td>
</tr>
<tr>
<td>b. Lower-middle class</td>
<td>0</td>
<td></td>
<td>0.0</td>
</tr>
<tr>
<td>6. Age of onset of obesity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Childhood</td>
<td>12</td>
<td></td>
<td>27.3</td>
</tr>
<tr>
<td>b. Adolescence</td>
<td>5</td>
<td></td>
<td>11.4</td>
</tr>
<tr>
<td>c. Adulthood</td>
<td>27</td>
<td></td>
<td>61.3</td>
</tr>
</tbody>
</table>

*Adler (1973) used two formal criteria to determine an individual's social position—educational level and occupation. Based upon Adler's formal criteria, upper-middle class includes high school or over and professional, managerial or trade occupations. Lower-middle class includes 9 years or less and unskilled laborer or welfare aid.
**Procedure**

Those who participated in the research study were told that they were cooperating in a project dealing with the psychological characteristics of obesity. The subjects were assured that all information thus obtained would remain confidential. Skinfold measures were then taken on each subject by a student in medical dietetics who had administered over 300 skinfolds on women in the past and possessed 3 years experience in the use of skinfold calipers. The instrument used was the Lange Skinfold Caliper. The use of the Lange Skinfold Caliper is an agreed upon method of determining the total body fat among adults (Brozek and Keys, 1951; Mayer and Stare, 1966; Meredith and Stuart, 1947). The skinfold measurements were taken on the dorsum of the arm at the midpoint between the tip of the acromion process and the tip of the olecranon process and at the iliac crest in midaxillary line.

The folds were taken in the manner described by Brozek and Keys (1951) and Consolazio et al. (1963). Each fold was taken twice and the mean value was then computed to enhance the reliability of the measurement. The folds were taken quickly to insure accuracy and maximum comfort for the subject. All folds were taken on the right side of the body in the vertical plane. A double thickness of skin was grasped between the thumb and index finger. Care was taken to see that only skin and subcutaneous fat were included in the fold, not muscle or fascia. The calipers were applied one centimeter from the fingers and at a depth
approximately equal to the thickness of the fold.

Following the skinfold measurements each subject was given a packet containing a cover letter (See Appendix A) which explained the nature and purpose of the research, the personal data sheet (See Appendix B) requesting information about the person (age, educational level, socioeconomic status, etc.) and the Minnesota Multiphasic Personality Inventory. Each subject was asked to self-administer the Minnesota Multiphasic Personality Inventory. Each subject was also asked to take the packet home and return it within a week to allow sufficient time for completion of the packet.

**Skinfold Conversion**

The folds decided upon for the study were the skinfold thickness over the iliac crest and the skinfold thickness of the back of the arm. The location and means of taking the folds have been discussed previously. These folds were chosen because they have been found in combination to be the most accurate predictor of total body fat in obese women (Sloan, Burt and Blyth, 1962).

The regression equation used for the conversion of the skinfold measurements to an estimation of body density was the equation given by Sloan, Burt and Blyth. The regression equation for women is:

\[ X_1 = 1.0764 - 0.00081X_2 - 0.00038X_3 \]

where \( X_1 \) = density (g/ml), \( X_2 \) = skinfold thickness over the iliac crest (mm), and \( X_3 \) = skinfold thickness on the back of the arm (mm).
The standard error of estimation for this equation is +0.0082 g/ml.

The regression equation of Sloan et al. represents a figure for body density (or specific gravity). To convert body density into percentage of body fat Sloan and Weir (1970) favor the equation derived by Brozek and his colleagues (1963) from chemical analysis of 3 cadavers. The regression equation for women is:

\[ F = 100 \left( \frac{4.570}{D} - 4.142 \right) \]

where \( F = \) body fat (percent of body weight) and \( D = \) density (g/ml).

Research Design

A one-way factorial design with 3 levels was used in analyzing the data. All subjects were assigned to 1 of 3 groups according to their relative standing along the percentage of body fat continuum (See Graph 1). The first 15 Ss were assigned to group 1 (low percentage of body fat), the second 15 Ss were assigned to group 2 (medium percentage of body fat) and the final 14 Ss were assigned to group 3 (high percentage of body fat).

Statistical Analysis

The raw data collected in this study were first analyzed by common factor analysis. For this purpose, a program was selected from the Soupac program package (Soupac Program Description, 1974). The common factor analysis employed the varimax method first proposed by Kaiser (1956). Varimax is now generally accepted as
FIGURE 1

HISTOGRAM OF DISTRIBUTION OF BODY FAT OF SAMPLE

Percentage of body fat

LOW: MEDIUM: HIGH

Number of subjects

10 -
9 -
8 -
7 -
6 -
5 -
4 -
3 -
2 -
1 -

18 21 24 27 30 33 36 39 42 45 48

The orthogonality restriction ensures that factors will delineate statistically independent variation. The orthogonal factors themselves are a mathematically simple description of the data and are amenable to subsequent mathematic manipulation and analysis (Rummel, 1970 pp. 385-86).

The squared multiple correlation (SMC) was selected for the communality estimate. Rummel (1970 p. 320) states that the best estimate on theoretical and empirical grounds appears to be the SMC for each variable. Howard and Cartwright (1962) found that, of 3 communality estimates investigated (unities, $h^2$, resulting from a factor analysis with unities in the diagonal, and SMC's), the SMC estimate was most stable and that it was the one toward which other estimates tended to converge.

Outputs for the Soupac program consists of means and standard deviations, a correlation matrix, communality estimates, varimax rotated factors and tables of the calculated factors for all observations.

Significant extracted factors were then analyzed by a 1-way factorial analysis of variance using mean factor scores representing various weighted combinations of the criterion variables. The Newman Keuls test, a post hoc analysis, was used to compare all possible combinations of factor score means following significant F ratios for main effects.
One final statistical analysis was undertaken to determine the predictive power of the factor scores and thus facilitate interpretation of the data. To determine the predictive power of the factor scores, significant extracted factors were submitted to a stepwise multiple regression analysis via the Soupac program Stepwise Multiple Linear Regression (Soupac Program Description, 1974). This offered meaningful information on the factors as predictor variables, therefore establishing a kind of predictive profile of a woman who was most likely to have an excessive accumulation of body fat.

Summary

Chapter III has presented the rationale for the selection of the MMPI and a brief description of the psychometric instrument, citing pertinent references; a description and method of selecting the sample; the process of data collection; the method of skinfold conversion; and the research design, computer program and statistical analysis used to analyze the data. Chapter IV will present the analysis of the data and the findings of the study.
Chapter IV

ANALYSIS OF THE DATA

The analysis of data will be presented in this chapter. This study was undertaken to test the hypothesis stated in Chapter I. Of primary concern was how mean factor scores, as determined by common factor analysis, change across low, medium and high percentages of body fat groups.

The hypothesis of this study was tested by a 1-way factorial analysis of variance with 1 categorical variable (3 levels). The 3 levels were low percentage of body (first 15 subjects), medium percentage of body fat (second 15 subjects) and high percentage of body fat (final 14 subjects). Individual $F$ ratios were completed on all significant and interpretable factors. The 1-way analysis of variance was used to compute $F$ ratios for each main effect. Subsequent to $F$ ratios, the Newman Keuls test was used in post hoc analysis (Winer, 1962; Kirk, 1968).

There were 13 variables included in this study. All MMPI scales were included in the research except the L scale. This scale was dropped because it is the weakest of all the scales and gives information readily picked up by the K scale (Webb, 1973). Age was included in the analysis due to its affect as a moderator variable (Lachar, 1974). The other moderator variable,
socioeconomic status, was controlled for since all Ss were in the middle to upper socioeconomic range.

A common factor analysis was performed on all 13 variables. The Soupac factor analysis program was employed to analyze the 13 x 13 intercorrelation matrix (See Table 9). Instead of extracting all the factors existing in the data, factoring usually stops at the point where no additional significant or meaningful variance remains. Kaiser (1960) has suggested that the number of common factors extracted should run from 1/6 to about 1/3 of the total number of variables. In determining the best number of factors, the residual correlations, distribution of loadings, distribution of eigenvalues and interpretability of the factors were considered.

Three separate computer runs were conducted using the Soupac program (Common factor analysis with a varimax solution). On the first computer run, 2 factors were extracted; the second run, 3 factors; and on the final computer run, 4 factors were extracted. It was not until the 4 factor solution (See Table 10) that I was able to maximize the communality estimate (7.7252) and account for 100% of the estimated common variance.

The percentage of variance and communality estimate (h²) for each of the 4 extracted factors are reproduced on Table 11. Factor I accounted for 36.09% of the variance (h² = 2.7882), Factor II, 26.75% of the variance (h² = 2.0669), Factor III, 19.95% of the variance (h² = 1.5416) and Factor IV, 17.20% of the variance (h² = 1.3286).
An examination of Factor I (See Table 10) revealed that Schizophrenia, Psychasthenia, F and Paranoia contained the highest varimax loadings (.8654, .7359, .6476 and .6470, respectively). This profile suggests chronic personality difficulties with a schizoid adaptation (Lachar, 1974). The high factor loadings of these variables would indicate the existence of a general factor labeled Schizoid Social Adaptation. Items comprising schizophrenia, psychasthenia, paranoia and F scales were: (a) I am never happier than when alone—True, (b) I believe my sins are unpardonable—True, (c) I believe in law enforcement—False, (d) I am sure I am being talked about—True, (e) I have certainly had more than my share of things to worry about—True, (f) I feel anxiety about something or someone almost all of the time—True, (g) I am inclined to take things hard—True, (h) I believe I am a condemned person—True, (i) I have strange and peculiar thoughts—True, (j) I am so touchy on some subjects that I can't talk about them—True.

Factor II was labeled Depressive-Distress Syndrome. The highest factor loadings were found on the following scales: Hypomania (-.7717), Depression (.7339), Social Introversion (.6512) and Psychasthenia (.5345). Lachar (1974) states that this profile represents multiple neurotic manifestations, including the distress syndrome (nervousness, anxiety and depression), the neurasthenia syndrome (weakness, fatigue, lack of initiative) and a pervading lack of self-esteem and self-confidence. Items
comprising hypomania, depression, social introversion and psychasthenia scales were: (a) I don't care what happens to me--True, (b) I usually feel that life is worthwhile--False, (c) I wish I could be as happy as others seem to be--True, (d) I cry easily--True, (e) I am neither gaining nor losing weight--False, (f) At times I am all full of energy--False, (g) Sometimes some unimportant thought will run through my mind and bother me for days--True, (h) People often disappoint me--True, (i) When I get bored I like to stir up some excitement--False.

Analyzing Factor III indicated that Hypochondriasis and Hysteria contained the highest varimax loadings (.7495 and .6657, respectively). This profile suggests the presence of a histrionic character disorder. These individuals present themselves as physically ill, while denying that their symptomatology is an expression (i.e., a conversion) of psychological conflict (Marx, Seeman and Haller, 1974). The high factor loadings on these 2 variables would support a label for the factor Histrionic. Items comprising hypochondriasis and hysteria scales were: (a) I have a great deal of stomach trouble--True, (b) I feel weak all over much of the time--True, (c) I have numbness in one or more regions of my skin--True, (d) I have periods of such great restlessness that I cannot sit long in a chair--True, (e) I frequently notice my hand shakes when I try to do something--True, (f) I have never had a fainting spell--False, (g) I wake up fresh and rested most mornings--False.

Factor IV was labeled Defensive-Feminine. The highest factor loadings were on the following scales: K (.7270), Masculinity-
Femininity (-.5694) and Social Introversion (-.4375). Lachar (1974) states that this profile indicates the presence of mild to moderate defensiveness and a lack of insight. These individuals are also seen as femininely dependent and warm and outgoing in a superficial fashion. Items comprising K, masculinity-femininity and social introversion scales were: (a) At times I feel like smashing things--False, (b) I certainly feel useless at times--False, (c) I frequently find myself worrying about something--False, (d) I think that I feel more intensely than most people do--True, (e) I enjoy reading love stories--True, (f) Whenever possible I avoid being in a crowd--False, (g) I am a good mixer--True, (i) I am not unusually self-conscious--True.

Analysis of variance for the 4 factors revealed a significant F ratio for Factor II (See Table 2). Factors I, III and IV did not attain significance (See Tables 4, 5 and 6).

The ANOVA summary table for Factor II appears in Table 2. Factor II was labeled Depressive-Distress Syndrome. The summary table reveals a significant (p < .05) F ratio for the main effect of groups. This suggests that the observed mean Factor II scores for Ss were significantly different than might be expected.
Table 2

ANALYSIS OF VARIANCE FOR FACTOR II

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Groups (A)</td>
<td>2</td>
<td>7.682</td>
<td>3.841</td>
<td>3.469*</td>
</tr>
<tr>
<td>Ss w/in groups (S/A)</td>
<td>41</td>
<td>45.392</td>
<td>1.107</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>43</td>
<td>53.075</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p < .05

The Newman Keuls tests presented on Table 3 reveal a significant pairwise comparison between group means on Factor II.

Table 3

RESULTS OF NEWMAN KEULS TEST ON ALL ORDERED PAIRS OF MEANS FOR FACTOR II

<table>
<thead>
<tr>
<th></th>
<th>Group 1</th>
<th>Group 2</th>
<th>Group 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1</td>
<td>- - -</td>
<td>.485</td>
<td>1.030*</td>
</tr>
<tr>
<td>Group 2</td>
<td></td>
<td>- - -</td>
<td>.545</td>
</tr>
<tr>
<td>Group 3</td>
<td></td>
<td></td>
<td>- - -</td>
</tr>
</tbody>
</table>

*p < .05
The Group 1 mean is significantly different ($p < .05$) from the Group 3 mean. There were no statistically significant differences between Group 1 and Group 2 means, nor were there significant differences observed between Group 2 and Group 3 means.

Tables 4, 5 and 6 present complete analysis of variance summary tables for Factors I, III and IV where statistical significance was not observed. These factors were labeled Schizoid Social Adaptation, Histrionic and Defensive-Feminine, respectively,

Table 4

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Groups (A)</td>
<td>2</td>
<td>6.107</td>
<td>3.053</td>
<td>2.702</td>
</tr>
<tr>
<td>$S_s$ w/in groups (S/A)</td>
<td>41</td>
<td>46.329</td>
<td>1.130</td>
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<tr>
<td>Total</td>
<td>43</td>
<td>52.434</td>
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<td></td>
</tr>
</tbody>
</table>

$p < .10$
Table 5

ANALYSIS OF VARIANCE FOR FACTOR III

<table>
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<tr>
<th>Source</th>
<th>df</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Groups (A)</td>
<td>2</td>
<td>2.079</td>
<td>1.039</td>
<td>0.070</td>
</tr>
<tr>
<td>Ss w/in groups (S/A)</td>
<td>41</td>
<td>60.592</td>
<td>1.478</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>43</td>
<td>62.671</td>
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</table>

Table 6

ANALYSIS OF VARIANCE FOR FACTOR IV

<table>
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<tr>
<th>Source</th>
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<th>MS</th>
<th>F</th>
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</thead>
<tbody>
<tr>
<td>Groups (A)</td>
<td>2</td>
<td>1.861</td>
<td>0.930</td>
<td>0.644</td>
</tr>
<tr>
<td>Ss w/in groups (S/A)</td>
<td>41</td>
<td>59.288</td>
<td>1.446</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>43</td>
<td>61.149</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Due to the small size of the sample \((N = 44)\) and the fact that Factor I attained statistical significance at the .10 level, results of Newman Keuls tests on all ordered pairs of means are presented on Table 7. Analysis of Factor I will avoid the likelihood of committing a type II error and offer suggestive information to be explored in future research.
Table 7

RESULTS OF NEWMAN KEULS TEST ON ALL ORDERED PAIRS OF MEANS FOR FACTOR I

<table>
<thead>
<tr>
<th></th>
<th>Group 1</th>
<th>Group 2</th>
<th>Group 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1</td>
<td>.685</td>
<td></td>
<td>.863</td>
</tr>
<tr>
<td>Group 2</td>
<td>.179</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group 3</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

To determine the predictive power of the factor scores it was decided to submit the 4 factors to a stepwise multiple regression analysis via the Soupac program Stepwise Multiple Linear Regression (Soupac Program Description, 1974). Draper and Smith (1966) state the stepwise multiple regression is the best of the variable selection procedures available. This will offer meaningful information on the factors as predictor variables and thus establish a kind of predictive profile of a woman who is most likely to have an excessive accumulation of body fat.

Examination of the regression analysis (See Table 11) indicated that 2 predictor variables (Factors I and II) were selected before the addition of variables dropped the F ratio below 1.00. Factor I was entered in regression and accounted for 41.08% of the variance ($R^2 = .4108, F = 8.256, p < .01$). In fact, it was a slightly better predictor variable than Factor II. Entering
the combination of Factors I and II in regression was able to account for 58.59% of the total variance ($R^2 = .5859$, $F = 10.892$, $p < .01$). This would indicate that 58.59% of all the variance in percentage of body fat is being determined by the combination of Factors I and II. This would indicate that high varimax loadings on these 2 factors, in combination, would be the best predictors of percentage body fat and offer significant clinical information to be considered in the treatment of the obese female.

Summary of Results

The major purpose of this study is to examine the relationship between percentage of body fat (obesity) in women and various psychological indicators of the Minnesota Multiphasic Personality Inventory. On the basis of data collected from 44 female dieters, 13 variables have been selected for analysis. A factor analysis (Common factor analysis with a varimax solution) was conducted on all 13 variables which yielded 4 significant and interpretable factors. These factors were:

1. Schizoid Social Adaptation (Factor I)
2. Depressive-Distress Syndrome (Factor II)
3. Histrionic (Factor III)
4. Defensive-Feminine (Factor IV)

Analysis of variance for mean Factor II scores (Depressive Syndrome) revealed a significant $F$ ratio ($P < .05$). The highest varimax loadings within Factor II were found on the following scales: Hypomania ($-.7717$), Depression ($0.7339$), Social Introversion ($0.6512$)
and Psychasthenia (.5345). Post hoc analysis revealed statistically significant differences between Group 1 and Group 3. There were no statistically significant differences between Group 1 and Group 2, nor were there significant differences observed between Group 2 and Group 3.

Therefore, depressive rumination, low energy level and social withdrawal would seem to be important psychological correlates of women with an excessively high accumulation of body fat.

To determine the predictive power of the factor scores it was decided to submit the 4 factors to a stepwise linear regression analysis. While Factor I did not attain a statistically significant level via the analysis of variance, it did increase the total percentage of variance (58.59%) accounted for when combined with Factor II. This would indicate that not only are women with a high percentage of body fat significantly depressed, anxious, rigid, fatigued and withdrawn but also exhibit signs of personality disorganization.
Table 8

MEAN AND STANDARD DEVIATION FOR 13 DEPENDENT VARIABLES*

<table>
<thead>
<tr>
<th>Number</th>
<th>Variable</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Age</td>
<td>37.659</td>
<td>10.259</td>
</tr>
<tr>
<td>2.</td>
<td>F</td>
<td>59.477</td>
<td>6.410</td>
</tr>
<tr>
<td>3.</td>
<td>K</td>
<td>53.114</td>
<td>7.111</td>
</tr>
<tr>
<td>4.</td>
<td>Hypochondriasis</td>
<td>53.705</td>
<td>8.998</td>
</tr>
<tr>
<td>5.</td>
<td>Depression</td>
<td>54.341</td>
<td>11.999</td>
</tr>
<tr>
<td>6.</td>
<td>Hysteria</td>
<td>55.136</td>
<td>8.429</td>
</tr>
<tr>
<td>7.</td>
<td>Psychopathic Deviate</td>
<td>58.705</td>
<td>9.444</td>
</tr>
<tr>
<td>8.</td>
<td>Masculinity-Femininity</td>
<td>45.205</td>
<td>10.973</td>
</tr>
<tr>
<td>9.</td>
<td>Paranoia</td>
<td>58.500</td>
<td>10.767</td>
</tr>
<tr>
<td>10.</td>
<td>Psychasthenia</td>
<td>54.682</td>
<td>10.819</td>
</tr>
<tr>
<td>12.</td>
<td>Hypomania</td>
<td>56.568</td>
<td>11.053</td>
</tr>
<tr>
<td>13.</td>
<td>Social Introversion</td>
<td>53.182</td>
<td>11.271</td>
</tr>
</tbody>
</table>

*Means and standard deviations for the 13 dependent variables by groups are available upon request.
Table 9

CORRELATION MATRIX FOR 13 DEPENDENT VARIABLES

<table>
<thead>
<tr>
<th>Variable</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
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<td>0.05626</td>
<td>0.11718</td>
<td>0.52173</td>
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<td>-0.01917</td>
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Table 9 continued

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<td>Factor I</td>
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<td>Factor III</td>
<td>Factor IV</td>
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</tr>
<tr>
<td>-------------------------------</td>
<td>----------</td>
<td>-----------</td>
<td>------------</td>
<td>-----------</td>
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</table>
Table 11

PERCENTAGE OF VARIANCE AND COMMUNALITY ESTIMATE
ON 4 EXTRACTED FACTORS

<table>
<thead>
<tr>
<th>Extracted Factor</th>
<th>( h^2 )</th>
<th>PCT VAR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factor I</td>
<td>2.7882</td>
<td>36.09</td>
</tr>
<tr>
<td>Factor II</td>
<td>2.0669</td>
<td>26.75</td>
</tr>
<tr>
<td>Factor III</td>
<td>1.5416</td>
<td>19.9549</td>
</tr>
<tr>
<td>Factor IV</td>
<td>1.3286</td>
<td>17.1987</td>
</tr>
</tbody>
</table>
Table 12

SUMMARY TABLE FOR REGRESSION COEFFICIENTS, MULTIPLE R AND F RATIO

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
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<td>.4108</td>
<td>8.256 (1,42)**</td>
</tr>
<tr>
<td>Factor I</td>
<td>2.810</td>
<td>.4359</td>
<td>.5859</td>
<td>10.892 (2,41)**</td>
</tr>
<tr>
<td>Factor II</td>
<td>2.681</td>
<td>.4185</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**p < .01
Chapter V

SUMMARY AND CONCLUSIONS

This final chapter is divided into three sections: (a) a summary of the research study, (b) a discussion of the findings of this study and their implications, and (c) conclusions and recommendations. The recommendations will be presented in two parts: (a) recommendations for further research, and (b) a suggestion for treatment of the obese woman.

Summary

The purpose of this study was to examine the relationship between percentage of body fat (obesity) in women and various psychological factors, generally considered to be sources of emotional stress.

The review of the literature was undertaken in five areas: (a) The Prevalence of Obesity, (b) Measurement of Adiposity, (c) The Etiology of Obesity, (d) Current Directions in the Treatment of Obesity and (e) Personality Correlates of Obese Persons. The search of the literature revealed a need for more accurate measures of obesity and continued exploration into the psychological-personal make-up of the obese woman. This provided a rationale for the present study.
The setting for this research was 8 Diet Centers located within the Central Ohio area, represented by the city of Columbus and numerous suburban communities. There are approximately 400 dieters attending these centers. All dieters were on a low fat--low carbohydrate--high protein diet.

The sample included Ss with varying degrees of body fat (18% to 47%). Forty-four subjects who were white, middle to upper class females and encompassed age ranges of 18 to 64 years were used. The sampling took place during the month of March, 1977. All Ss were in the beginning phase of the weight reduction program. Subjects consisted of those who were willing to participate in the study and devote the one hour necessary to complete the instruments.

Skinfold measurements were taken on each subject by a dietician who had previously administered over 300 skinfolds on women. The instrument used was the Lange Skinfold Caliper. The instruments used in data collection were selected based on the following rationale. First, a Personal Data Questionnaire (Appendix B) was devised to extract the needed demographic data (age, educational level, socioeconomic status, etc.). Secondly, a personality inventory, the Minnesota Multiphasic Personality Inventory, was used to assess the psychological-profiles of the participants.

All of the data was recorded on IBM cards in accordance with the format instructions contained in the selected computer program (Scoopac Program Descriptions, 1974). MMPI scores were converted to T scores adjusted for K. All MMPI scales, excluding the L scale, were included in the analysis. Due to its affect as
a moderator variable, age was added to the 12 MMPI scales to be factor-analyzed.

Common factor analysis with a varimax solution on all 13 variables yielded 4 significant and interpretable factors. These were: (a) Schizoid Social Adaptation, (b) Depressive-Distress Syndrome, (c) Histrionic and (d) Defensive-Feminine.

The research design consisted of a 1-way factorial design with 3 levels. All subjects were assigned to 1 of 3 groups according to their relative standing along the percentage of body fat continuum. The first 15 subjects were assigned to Group 1 (low percentage of body fat), the second 15 subjects were assigned to Group 2 (medium percentage of body fat) and the final 14 Ss were assigned to Group 3 (high percentage of body fat).

Results of a 1-way analysis of variance across low, medium and high percentage of body fat women on the Depressive-Distress Syndrome Factor revealed a statistically significant (p < .05) F ratio. The Newman Keuls test, a post hoc analysis, indicated a statistically significant (p < .05) difference between high and low percentage of body fat women on this factor. The remaining 3 factors: Schizoid Social Adaptation, Histrionic and Defensive-Feminine did not attain a statistically significant F ratio. Since the Schizoid Social Adaptation Factor attained statistical significance at the .10 level, a post hoc analysis was computed to offer suggestive information for future research. The Newman Keuls test revealed no statistically significant group differences on this
factor.

To determine the predictive power of the factor scores it was decided to submit the 4 factors to a stepwise multiple linear regression. Examination of the regression analysis (See Table 11) revealed that Factors I and II, in combination, were able to account for 58.59% of the total variance. This would indicate that 58.59% of all the variance in percentage of body fat is being determined by the combination of Factors I and II.

Discussion and Implications

This was a descriptive study. The results represent a selection process wherein relationships between variables could be established. Any conclusions drawn here are not intended to suggest or establish cause and effect relationships. Because obesity is presented as a disturbance of the whole person, the findings of this study may therefore be meaningful.

The findings of this study offer meaningful information in light of the fact that: (a) more precise and interpretable statistical procedures were employed; (b) appropriate controls for age and socioeconomic status were considered; (c) skinfolds permit a closer estimate of body fat than do tables and relative weight, whether based on average or "ideal" weights for age, sex and height (See "Measurement of Adiposity," Chapter 2); and (d) this is one of the few studies conducted within a general population. Thus, research of this kind on a population of obese women is a relatively new consideration.
The findings of this study were that women with a high percentage of body fat were characterized by depressive-anxious rumination, rigidity, neurasthenia and social withdrawal. This would tend to integrate the somewhat disparate findings of Suczek (1957), Kotkov and Murawski (1953), Moore et al. (1962) and McCall (1976) and indicate a primary characteristic factor labeled Depressive-Distress Syndrome.

The fact that statistically significant differences were observed between Group 1 (low body fat) and Group 3 (high body fat), but not between Group 1 and Group 2 (medium body fat), and Group 2 and Group 3, is possibly a result of the way in which the Ss were assigned to groups. Due to a lack of established references for categorization, the extreme groups (1 and 3) were likely to reflect normality and obesity. However, Group 2 probably included both clinically normal and obese women and thus accounted for the statistically insignificant differences. Since this study is not intended to suggest or establish cause and effect relationships, it is impossible to discern whether the Depressive-Distress Syndrome is the cause of the obese condition or merely a symptomatic manifestation of the state of being obese.

The findings that women with a high percentage of body fat are more likely to experience depressive-anxious rumination, behavioral inflexibility, low energy level and social withdrawal offers support for the psychosomatic hypothesis of obesity.

The psychosomatic hypothesis of obesity views nonnutritive eating as a learned coping response associated with anxiety reduction
In later life, when personal and social difficulties associated with excess weight lead to increasing anxiety, the overweight individual is thought to resort to the behavioral coping response that has been established in past eating. Unfortunately, this mode of anxiety reduction leads into a cycle of greater obesity, more anxiety, increased depression, reduced energy level and continued overeating.

Richardson as early as 1946 pointed out: "Many obese patients experience anxiety, guilt, or depression; that they resort to eating to diminish these tensions or as a substitute gratification when more pertinent and realistic gratifications are unavailable; and that in extreme cases, eating takes on the proportions of an addiction. This would indicate that obesity is a "mask for depression" or that there is an "underlying depression" defended against by the obesity. Food is said to have an exaggerated and highly symbolic value to the obese person. It is thought to be used as a means of allaying anxiety and depression, and as an equivalent or substitute for security and love (Werkman and Greenberg, 1967). In addition, the finding of a low energy level would offer support for the inactivity theory of obesity (Johnson et al. 1956; Bullen et al. 1964; Dorris and Stunkard, 1957; and Bloom and Eidex, 1967).

The finding that Factor I (Schizoid Social Adaptation) and Factor II (Depressive-Distress Syndrome), in combination, were the best predictors of percentage of body fat is interesting.
While Factor I did not attain a statistically significant level via the analysis of variance, it did increase the total percentage of variance accounted for when combined with Factor II. In fact, Factor I was a slightly better predictor variable than Factor II. This would indicate that not only are women with a high percentage of body fat significantly depressed, anxious, rigid, fatigued and withdrawn, but also exhibit signs of personality disorganization. Factor I loaded most heavily on schizophrenia, psychasthenia, F and Paranoia. This would represent a rigid, distrustful view of the world, with tendencies for disorganized thinking and general maladjustment. This would suggest a more severe (psychotic) form of adjustment.

Recommendations

Recommendations derived from this study will be presented in two parts. The first set of recommendations are for future research into the psychological correlates of obese women. Secondly, a recommendation will be made for clinicians for possible implementation of these findings.

In this dissertation a broad descriptive study has been conducted which, while providing some answers, has generated more questions. The following are suggested areas of further research.

(1) There is a need to conduct controlled experiments in order to establish some cause-effect relationships in obesity. This would necessitate a need for longitudinal studies.
(2) Further obesity studies should properly control for age and socioeconomic status (moderator variables) as these are related to psychological indicators.

(3) There is a need for utilizing skinfolds to measure degree of obesity as this measure provides a more accurate assessment of percentage of body fat (obesity). This will allow for a better comparison of obesity studies and, also, accurate replications of previous research.

(4) Due to the small sample size (N = 44) employed in this study, there is a need for replication of the present study. This would allow for a better understanding of the importance of each psychological variable.

(5) There is a need to identify psychological correlates of obesity in children as this is an area where little research has been conducted.

(6) Obesity should be regarded as a multiphasic clinical problem with a need to determine the relationship between environmental, personal and physiological factors.

After reading the literature (Chapter II) and analyzing the findings (Chapter IV) of this study, the following recommendation for treatment is made:

Clinicians should adopt a holistic approach in treating the obese woman. Achievement of weight loss should not be utilized as the sole end-point for therapy, but rather treatment
of basic underlying emotional problems should be incorporated into the treatment program.

Since the obese female exhibits heightened levels of anxiety and depression, compulsive and ruminative tendencies, and movement towards personality disorganization, a broad spectrum, cognitive behavior therapy approach, might be a viable treatment modality.

A central component of cognitive behavior therapy is the view that psychological problems arise from faulty or irrational patterns of thinking. Therapy then becomes a method of clarifying and restructuring irrational thinking towards more rational ways of thinking, feeling and behaving. Numerous researchers have corroborated the notion of cognitive mediation in the induction of emotions both pleasant and unpleasant (Schachter, 1966; Zeisset, 1968; Raimey, 1975). Furthermore, Meichenbaum and Cameron (1974) have demonstrated the clinical potential of modifying a client's self-verbalizations in a variety of clinical disorders. It would seem likely that inordinate levels of negative emotions such as depression and anxiety, compulsive and ruminative tendencies and personality disturbance could be sufficiently affected through a cognitively oriented approach based on cognitive restructuring of irrational belief systems.

Tosi (1974) cites several techniques, both cognitive and behavioral, which may be used within a cognitive (rational) framework. These include: Utilization of the Premack principle of reinforcement (Tosi, Briggs and Morley, 1971); modeling based on
Bandura (1969); assertive training; thought control (Lazarus, 1971);
aversive imagery (Cautela, 1972), and written homework assignments.
These therapy techniques would be useful adjuncts to the cognitive
restructuring process in facilitating and/or maintaining weight
reduction.

Zimbardo (1969,1972) and his associates have suggested that
hypnosis may have a great potential for use within a cognitive
behavioral therapeutic framework. They stated that: "Hypnosis:
(a) is a state in which the effects of cognitive processes on
bodily functioning are amplified; (b) enables the subject to
perceive the locus of causality for mind and body control as more
internally centered and volitional; (c) is often accompanied by a
heightened sense of visual imagery; and (d) can lead to intensive
concentration and elimination of distractions." Hypnosis would
be useful in heightening awareness and increasing feelings of self-
control over cognitive--affective--physiological--behavioral
processes.

Recently, Tosi and Marzella (1975) have developed a
Rational Stage Directed Therapy (RSDT) approach which offers a
strategic approach to the restructuring of the cognitive appraisal
of a variety of situations or events. In addition, RSDT offers
the added potential benefits of cognitively induced relaxation or
hypnosis, heightened imageric process, behavioral rehearsal and a
reduction of tension and anxiety which significantly facilitates
learning and results in greater treatment generalization.
In Rational Stage Directed Therapy the client is directed through various growth stages. These include self-awareness, exploration, commitment to rational action, implementation of rational action, internalization of rational action and change-redirection. In each stage, the client is acquiring, developing and refining behavioral modifying skills. These stages provide the client with a logical strategy to use in approaching problematic internal or environmental situations or events. They also enable him to monitor his progress in therapy and to more clearly recognize his acquisition of greater skills in rational and behavioral self-management.

A number of studies (Marzella, 1975; Reardon, Gwynne and Tosi, 1975; Boutin and Gwynne, 1975) have found RSDT to have considerable potential for modifying behavior and ameliorating pathology.

In summary, a broad spectrum approach employing a variety of cognitive behavioral techniques might be useful in treating female obesity. Rational Stage Directed Therapy, with its utilization of a variety of cognitive, affective, physiological and behavioral techniques, would offer a wide range of intervention strategies to reduce emotional stress and pathology associated with female obesity. Such a broad spectrum approach should not to be considered a panacea for the treatment of the obese female condition, but rather would be a much needed start toward the development of more comprehensive treatment modalities.
APPENDIX A

The purpose of this research is to measure the psychological characteristics among the obese. We are asking you to respond to two instruments: (a) Personal Data Questionnaire and (b) the Minnesota Multiphasic Personality Inventory. The Personal Data Questionnaire is brief and will require less than five minutes of your time. The Minnesota Multiphasic Personality Inventory is a longer instrument and will require approximately forty-five minutes to self-administer. For this instrument please use the answer sheet provided and do not mark on the test booklet. Please respond to each inventory as the questions pertain to you and attempt to answer all questions.

Your name is not required on any of the instruments and all data will be handled CONFIDENTIALLY. Your participation in this research project is greatly appreciated.

Thanks again for your participation,

231-4004 (at home)
APPENDIX B

Please answer all questions. All answers to the questionnaire and personality inventory will remain STRICTLY CONFIDENTIAL.

tricep skinfold thickness
iliac-crest skinfold thickness

(1) Male____Female____
(2) Age____
(3) Married____Single____Divorced____Separated____
(4) Educational level:
   ____ 13 years of school and over (college)
   ____ high school
   ____ 6 to 9 years (elementary school)
   ____ 0 to 5 years (only some or no elementary)
(5) Based on education of the head of the household:
   ____ 13 years of school and over (college)
   ____ high school
   ____ 6 to 9 years (elementary school)
   ____ 0 to 5 years (only some or no elementary)
(6) Based on the occupation of the head of the household:
   ____ (professional, managerial)
   ____ (trade)
   ____ (laborer)
   ____ (chronic welfare)
Appendix B continued

(7) Age of onset of obesity:

____ childhood (0 to 12)
____ adolescence (13 to 17)
____ adulthood (18 and over)
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