

BODY PERCEPTION AND OBESITY

by

Robert Leroy Cox, Jr.

A Thesis Submitted to the Faculty of the
COLLEGE OF NURSING
In Partial Fulfillment of the Requirements
For the Degree of
MASTER OF SCIENCE
In the Graduate College
THE UNIVERSITY OF ARIZONA

1 9 7 9

STATEMENT BY AUTHOR

This thesis has been submitted in partial fulfillment of requirements for an advanced degree at The University of Arizona and is deposited in the University Library to be made available to borrowers under rules of the Library.

Brief quotations from this thesis are allowable without special permission, provided that accurate acknowledgment of source is made. Requests for permission for extended quotation from or reproduction of this manuscript in whole or in part may be granted by the head of the major department or the Dean of the Graduate College when in his judgment the proposed use of the material is in the interests of scholarship. In all other instances, however, permission must be obtained from the author.

SIGNED:

Robert L. Cox

APPROVAL BY THESIS DIRECTOR

This thesis has been approved on the date shown below:

Alice J. Longman

ALICE J. LONGMAN

Associate Professor of Nursing

March 21, 1949

Date

ACKNOWLEDGMENTS

The author would like to express his gratitude to Dr. Alice Longman, Chairman of the Thesis Committee, and to Dr. Jessie Pergrin and Mrs. Helen Navin for their cooperation, assistance and encouragement with this study. A very special thanks is extended to Mr. Charles B. Wheelock, Coordinator of the Biological Studies Laboratory, without whose engineering expertise and personal concern this study would not have been possible.

And, finally, recognition and praise to my wife Doris who had the most difficult job of all--enduring me while I endured this task.

TABLE OF CONTENTS

	Page
LIST OF TABLES.	vi
ABSTRACT.	vii
CHAPTER	
1. INTRODUCTION.	1
Statement of the Problem.	2
Purpose of the Study.	2
Significance of the Problem	3
Conceptual Framework.	4
Definition of Terms	7
Assumptions	7
2. SELECTED REVIEW OF THE LITERATURE	9
Anorexia Nervosa.	10
Obesity	12
Obesity Defined	14
3. RESEARCH METHODOLOGY.	18
Design.	18
Setting	19
Subject Population.	20
Measurement Instruments and Operations.	21
Visual Size Estimation Apparatus.	21
Body-Width Calipers	23
Lange Skin-Fold Calipers.	24
Statistical Analysis.	26
4. PRESENTATION AND ANALYSIS OF DATA	28
Characteristics of the Sample.	28
Correlational Analysis.	28
Comparison Analysis	31
Additional Determinations	34
Summary	36

TABLE OF CONTENTS--Continued

	Page
5. DISCUSSION OF FINDINGS.	38
Relationship of Findings to Conceptual Framework and Review of the Literature.	38
Conclusions	41
Recommendations	42
APPENDIX A: SUBJECT'S CONSENT FORM.	43
APPENDIX B: DATA COLLECTION SHEET	45
REFERENCES	46

LIST OF TABLES

Table	Page
1. Physical characteristics of the subjects (N=24)	29
2. Correlation between body-image indices and triceps skin-fold thickness measurements (N=24)	30
3. Physical characteristics of the non-obese group (N=18) and the obese group (N=6)	31
4. Real size and perceived size measurements of the non-obese group (N=18) and the obese group (N=6)	32
5. Body-image indices for the non-obese group (N=18) and the obese group (N=6)	33
6. Correlation between weight/height indices and triceps skin-fold thickness measurements of the subjects (N=24)	35
7. Correlation between weight/height indices and overall body-image indices of the subjects (N=24)	35

ABSTRACT

This was a descriptive study the purpose of which was to determine whether there was a difference in the way that obese individuals visually perceive their own body size as compared to the way in which non-obese individuals visually perceive their own body size.

Twenty-four female subjects, six fulfilling the criterion for obesity, participated. Perceived size was measured at three specific body width areas using the visual size estimation apparatus. Real size for these body width areas was determined anthropometrically. Body size disturbance was calculated as the difference observed between measurements of perceived size and real size. The triceps skin-fold thickness measurement was obtained as an index of obesity.

The Pearson product-moment correlation coefficient revealed a significant negative correlation at the 0.05 level between the index of obesity and degree of body-image disturbance. As degree of obesity increased, body-image indices decreased indicating a tendency toward underestimation in obese subjects.

Comparison analyses showed significant differences at the 0.05 level in the way that non-obese subjects and obese subjects viewed their own body size. While this group of obese subjects did not actually underestimate their body sizes, their estimations were consistently and significantly smaller relative to the way in which the non-obese subjects perceived themselves.

CHAPTER 1

INTRODUCTION

One of the most prevalent and perplexing problems, markedly visible in the present-day affluent, but sedentary, American society is obesity. Obesity is a hazard to health, a detriment to well-being and a complex medical dilemma. It is as yet an unsolved puzzle, the dimensions of which have also propelled it into a billion-dollar industry. On the basis of its high incidence, its significant disposition to both mortality and morbidity, and its extensive socio-economic impact, obesity constitutes a major public health problem warranting closer examination and intensified scientific investigation.

Obesity appears to be an incurable disorder exceedingly difficult to treat successfully with the present arsenal of modalities. Losing unwanted pounds is relatively easy. Keeping them off, however, is virtually impossible except for a scant two percent of those who try (Mackenzie, 1976). In fact, within two years of successful weight loss, almost all individuals will not only have regained the lost pounds but will have added even more (Abramson, 1977; Mackenzie, 1976; Penick and Stunkard, 1973; Stuart, 1973; Stunkard and McLaren-Hume, 1977).

The phenomenon of obesity contains multiple facets for consideration--genetic, physiological, biochemical, behavioral, cultural

and socioeconomic. Of the many behavioral disturbances manifested by obese individuals, one of the most common, based upon clinical experience with over 350 obese women enrolled in a weight control program, was a distortion of body image. Specifically, this disturbance was an inability to see themselves, their true body size, accurately. These obese persons did not seem to see themselves, their mirror images, as they actually appeared or as others saw them. Observations were that many obese individuals, particularly the ones unsuccessful at attaining a weight loss, those who appeared as chronic repeaters in weight reduction attempts and those who verbally denied a real need to lose weight, seemed to view themselves as being much smaller than they actually were.

Statement of the Problem

Do obese individuals exhibit a distortion between "real size" and "perceived size"?

1. Does this distortion vary from the difference between "real size" and "perceived size" in non-obese individuals?
2. Is this distortion consistently in the direction of over-estimation or underestimation?

Purpose of the Study

The purpose of this study was to determine whether there was a difference in the way that obese individuals visually perceived their own body size as compared to the way that non-obese individuals visually perceived their own body size.

Significance of the Problem

Hard, consistent data on the prevalence of obesity in the United States today are lacking. Estimates of the prevalence range from a conservative 30 percent (Bruch, 1973; Stuart, 1973) to a staggering figure of 58 percent (Kordel, 1971) of adults suffering from obesity to some degree. Wollersheim (1973) reported a range of from 23 percent to 68 percent of adult women alone in this country that are affected by obesity. This places, at the minimum, over 30 million the number of adults who are 20 percent or more over their ideal body weight (Asher, 1974). The number of children and especially adolescents who are likewise significantly obese would more than double this already profound total (Forbes, 1973). It is reasonable to project that an appreciable number of these obese children and adolescents will maintain their present patterns of behavior and become the obese adults of the future, thus perpetuating the scope of the problem.

Petit (1974, p. 84) stated, "the obese tend to be a sickly lot--the more obese, the more sickly." Obesity has been found to be a significant factor in cardiovascular disease, hypertension, diabetes mellitus, gout, arthritis, cholecystitis and respiratory insufficiency (Craft, 1972; Petit, 1974; Waxler and Liska, 1975). Obesity compounds many medical conditions, increases the risk in the majority of surgical cases and is a definitive hazard in pregnancy. Add to these the despair, psychological pain and the associated liabilities of the social stigma of obesity in our cosmetically oriented culture and the scope of the problem begins to materialize dramatically.

Kordel (1971, p. 9) warned that "as your weight goes up, your life expectancy goes down." Insurance statistics indicate that the general mortality among obese men and women increases emphatically with each 10 percent of weight increase above the ideal standard. Waxler and Liska (1975) noted that when the level of 30 percent above ideal body weight is reached in the 40 to 70 age group, the mortality in males increased to 42 percent above average and in females to 36 percent above average.

Thus, the fairly common condition of obesity makes a potent contribution to the misery, sickness and death of mankind. In nursing practice a commitment is made to the preservation of our own species-- to the comfort, health, well-being and dignity of the human being. The practitioner must be cognizant of each potential force that may exert a pernicious influence upon the client. The practitioner must likewise be acutely aware of the dynamics of these forces and their interplay with the dynamics operational within the client if comprehensive health care is to be realized. This appropriately applies to the phenomenon of obesity and the concept of body image in that any alteration in basic body structure or function will influence the individual's concept of himself and his relationships with his environment and with others in that environment.

Conceptual Framework

Body image, or body identity, is part of the self-concept. Body image has been classically described by Schilder as "the picture of our own body which we form in our mind, that is to say in which

the body appears to ourselves" (Bruch, 1973, p. 87). Rubin (1970) described it as a conglomerate of both unconscious and conscious images. This conceptualization is formulated through perceptions, thoughts, feelings and body actions and the ego integration of this input in relation to the actual physical structure. Body image is also strongly influenced through input and feedback from social and cultural agents within the individual's environment.

Disturbances in body image have been noted in individuals suffering from obesity by a number of investigators (Bruch, 1973; Cappon and Banks, 1968; Garner, et al., 1976; Glucksman and Hirsch, 1969; Slade and Russell, 1973a, -b). These disturbances range from feelings of self-consciousness and contempt toward oneself to denial or distortion of one's appearance. Stunkard and Mendelson (1967) further divide these manifestations of body image disturbance into three areas: views of the self, self-consciousness in general and self-consciousness in relation to members of the opposite sex. They reported that a disturbance in one area usually meant a disturbance in the other two. It is the first area delineated--views of the self--that is the concern of this study.

The integral component of how the individual views himself is reflected by the way in which he perceives his own body size. The simplest and most straightforward method of assessing a person's visual body perception is to question how he sees himself in a mirror. The "mirror test" is elementary, indirect and is the standard reference tool for anyone who desires to see what he himself looks

like. This simple approach, however, is not pragmatically sound. There is a need to submit this concept to a technique for actually measuring the mirror image perceived and comparing the size of that image to the actual real size as determined anthropometrically. Then, if a perceptual distortion exists in regard to weight-related appearance, the extent to which the individual perceives himself as thin, normal or obese will be demonstrable. The distortion will indicate the degree of subjectivity involved in the perception of body size-- that is to what extent the internal frame of reference is affecting perception and interfering with the individual's ability to see himself from an external frame of reference (Bruno, 1972).

Visual effect, presented as a mirror image, serves as both an appraisal tool and a motivational factor. What one sees in the reflection dictates the subsequent activities relative to that specific aspect of his life style. The closer the images conform to reality the more realistic and appropriate the associated behaviors will be. The further removed the images are from reality the more inappropriate and maladaptive the behaviors (Rubin, 1970). Before an individual is likely to engage in any weight reduction activities he must first realize, or see, that he has a weight problem. This normally requires personal scrutiny before a mirror to determine whether or not one is obese. The accuracy of the perception, the ability to view oneself from an external frame of reference, can provide inducement for proper weight control whereas a distortion of perception, with the focus from an internal frame of reference, will result in

inappropriate behavior, specifically, failure to lose weight or to maintain body weight at an acceptable level.

Definition of Terms

1. Obesity: That bodily state marked by excessive generalized deposition and storage of fat. In this study obesity was designated as possession of a triceps skin-fold thickness of 23 millimeters and above.
2. Perceived size: Measurement of bodily width as determined by use of the visual size estimation apparatus. Perceived size was expressed as a discrete measurement on a metric scale of centimeters.
3. Real size: Measurement of bodily width as determined anthropometrically using a body width caliper attached to the same measurement scale on the visual size estimation apparatus. Real size was also expressed as a discrete measurement in centimeters.
4. Body-size disturbance: The mathematical difference between "real size" and "perceived size". This difference, for certain statistical purposes, was converted into a body-image index calculated by use of the formula: $(\text{perceived size}/\text{real size}) \times 100$.

Assumptions

1. Visual body-size perception is an important component of body image and can be evaluated quantitatively.

2. Body-size perception is related to degree of obesity.
Individuals toward either pole of the body-size continuum, extremely thin or obese, exhibit a disturbance in body-size perception measurable as a difference between "real size" and "perceived size".
3. Obese individuals, from a non-clinical population and not actively involved in weight-reduction programs, tend to distort body size in the direction of underestimation.

CHAPTER 2

SELECTED REVIEW OF THE LITERATURE

A multitude of investigatory methods have been employed to estimate the individual's perception of his own body image. These include such projective techniques as the use of Rorschach inkblots, the Rotter Incomplete Sentence Test, Draw-a-Person Test, questionnaires assessing satisfaction with the body and its various parts, semantic differential tools and other psychometric evaluation motifs. These techniques, as with all projective approaches, are subject to many problems of interpretation and the results tend to become somewhat obscure.

Other methods, objective in nature, have also been developed and implemented to actually measure visual perception of one's self and estimation of one's size. These techniques include the use of a distorting mirror (Shipman and Sohlkhan, 1967; Traub and Orbach, 1964), a distorting slide photograph technique (Glucksman and Hirsch, 1969), and the Persona-Test of Gottschaldt (Meyer and Tuchelt-Gallwitz, 1968) which utilizes a series of distorted photographs. Allebeck, Hallberg and Espmark (1976) implemented a similar, but more sophisticated, technique for assessment using a closed circuit television system.

Slade and Russell (1973a, -b) utilized a modification of the visual size estimation task originated by Reitman and Cleveland

(1964). It is from Slade and Russell's work (1973a, -b) that this study is modeled. This method involved the determination of "real size" and "perceived size" as measured at various body width areas. This seems to be more consistent with what the obese individual would see from an external frame of reference as he views himself in a mirror whereas the photograph and television methods deal with a more global base of body size perception.

Anorexia Nervosa

Many of the significant studies correlating body size perception with actual body size involve the opposite extreme from that of obesity--patients suffering from anorexia nervosa. These pathologically thin individuals represent the pole opposite obesity on a body weight continuum.

Slade and Russell (1973b) compared a group of 14 female anorexia nervosa patients with a group of 20 female normal weight controls. The results indicated that the normal weight female controls were remarkably accurate in the estimated assessment of their own body widths. The anorexia nervosa patients, however, markedly overestimated their own sizes at all body-width index sites. This tendency toward overestimation was discovered not to extend to perception of the size of inanimate objects when submitted to the same evaluatory techniques. An additional study segment also showed that the tendency toward overestimation of body width was much less marked when the anorexia nervosa patients were requested to estimate the widths of a normal-sized female model. The anorexia nervosa

patients were also found to be extremely accurate in the assessment of physical height, both their own and that of the model.

The fact that this tendency toward overestimation of body dimensions principally related to the patient's own body and not to either inanimate objects or to other living beings indicated that the perceptual disturbance is a personal one and not a generalized dysfunction. Since the distortion was confined to the estimation of lateral dimensions of body width as opposed to the vertical dimension of height, the disturbance becomes more specific and significant as being weight related. It is this faulty perception, that of possessing an exaggerated body girth that constitutes the anorexic's ideation that they are unduly obese, even when it is apparent that they are not, and motivates the further reduction by starvation to an advanced state of emaciation.

The extensive observations by Bruch (1973) in multiple clinical cases and the study by Garner et al. (1976) further supported the findings that the distortion between "real size" and "perceived size" in patients with anorexia nervosa is in the direction of consistent overestimation. Garner et al. (1976) tested 18 female subjects with primary anorexia nervosa using both a distorting photograph apparatus and a version of the visual size estimation task in conjunction with a battery of psychometric personality tests. Also included in this study was a control group composed of 16 "thin normals", individuals weighing the same as the anorexia nervosa patients, but with no history of psychiatric eating disorder. The tendency toward overestimation of body size was not observed in this control group, however.

Obesity

If the anorexia nervosa patient is driven to lose weight because she perceives herself to be larger than real, how do obese individuals who are at the opposite pole of the body-weight continuum perceive their own physical size? The results elicited from studies of obese subjects are variable and not nearly as consistent as the data collected from anorexia nervosa subjects.

Cappon and Banks (1968), using a visual size estimation apparatus, tested a group of 23 obese subjects and a control group of 23 normal-sized individuals. The obese sample was composed of three males and 20 females and the control group was composed of six males and 17 females. Both the obese subjects and the control subjects exhibited a general tendency to overestimate both body width and thickness. The degree of distortion, however, was significantly greater in the obese subjects.

Glucksman and Hirsch (1969), using a body-sizing anamorphic lens slide distortion method, reported on a 27-week study involving six severely obese adult patients, three male and three female, hospitalized for weight reduction in a behavioral-metabolic unit of a University Health Science Center. The mean admission weight of these subjects was 334 pounds. All six had been obese since childhood and unsuccessful with multiple attempts at weight reduction. The findings showed that obese subjects increasingly overestimated their own body size both during and following weight loss. However, during a weight maintenance period prior to the actual implementation of the weight

reduction regimen, it was reported that these extremely obese subjects slightly underestimated their actual body size. And, in contrast to the progressive overestimation tendency during and following weight loss, these individuals did not make the same perceptual errors with regard to either an inanimate object or a normal-sized model of either sex.

Slade and Russell (1973a), using a visual size estimation apparatus, reported briefly on seven obese patients who were tested similarly to the anorexia nervosa sample. The results indicated a corresponding tendency toward overestimation. However, the authors stated that there may be contributory factors influencing these results. These obese subjects were viewed as a select population in the sense that they were all people who had come to the investigators asking for help in losing weight. Slade and Russell (1973a, p. 362) stated that, "insofar as they have this desire to lose weight, they are obviously similar to the anorexic patients."

Garner et al. (1976) reported that approximately one-half of a group of 16 individuals suffering from juvenile onset obesity and not participating in a weight-reduction program, tested by an adjustable distorting photograph technique, overestimated their body size while the remaining one-half underestimated their actual proportions. Neither of these subgroups displayed significant deviance with either an inanimate object or other human model. This same divergent sample, when tested using the visual size estimation apparatus, all overestimated their body size at all index regions. Two control groups, one composed of 16 "thin normals" referred to earlier and the other

composed of 16 subjects who had never received psychiatric treatment, had no history of weight-related problems and were within 10 percent of the average weight for their age and height, consistently underestimated their body size at all index points.

Upon reflection, the disparity of results in the studies with obese subjects seem to indicate that an essential factor warranting closer scrutiny is the choice of population from which the subjects were selected. All of the obese individuals in the various studies were from either clinical or weight reduction environments. Cappon and Banks (1968) utilized obese subjects taken from physicians with a bariatric caseload and from local Take Off Pounds Sensibly clubs. Glucksman and Hirsch (1969) dealt with the six severely obese patients hospitalized for a 27-week period of treatment. Garner et al. (1976) likewise worked with a hospitalized population. These facts support the comments quoted earlier by Slade and Russell (1973a) as to this constituting selectivity that results in biased data.

Obesity Defined

Since this study is concerned with body perception and obesity, a principal requisite is to operationally define the concept of obesity. Obesity has been comprehensively defined by Craft (1972, p. 677) as "that bodily state in which there is an excessive accumulation of fat in both the relative and absolute sense; that is, the percentage of body weight present as fat is greater than normal and the total body weight also is abnormally high."

Thus, by definition, obesity is a problem of fat content, not just of bodyweight. In addition, a distinction may also be made between overweight and obesity. Overweight individuals are not necessarily overfat, or obese, as in those persons who possess an excess of lean muscle mass such as trained athletes, subjects involved in heavy manual labor and even in some sedentary people with a genetically determined large skeletal framework or very efficient metabolism.

The most common, readily available and practical parameter for determination of obesity is the measurement of gross body weight. Obesity is a relative concept, clinically expressed in degrees--percentage of body weight increase over a scale of desirable, "ideal" weights related to height, sex and frame size. The standard table of reference for these ideal figures is that presented by the Metropolitan Life Insurance Company (1959). This chart, which correlates the above factors for people over the age of 25, is based upon actuarial statistics and has been internationally accepted since it represents the largest body of data which also correlates weight to mortality. All of the studies reviewed previously based their definition of obesity upon this system or upon systems directly extrapolated therefrom.

The Metropolitan table is limited, however, in that it subdivides the height and weight ranges into expressed limits for three different body frames. That creates a problem in that no criteria are available for determination of what exactly constitutes a small, medium or large frame. Since classification criteria are not specified, it is impossible to sort individuals according to that variable

with any reliability. Another limitation of these charts is that they measure the subject in both shoes and clothing. This can add approximately one inch or more to the actual height of the men and up to two inches or more to that of the women. The weight of the clothing can also add an appreciable and highly variable amount depending upon climate, season, activity level, current fashion or personal tastes of the subject. These variables are highly significant and make it virtually impossible to compensate effectively for in a scientific study (Bray, 1973).

With the inherent weaknesses of these charts any estimate of "degree of obesity" computed from height and weight still leaves considerable amount of uncertainty in estimating actual body fat content. An acceptable alternate method of determining obesity based upon adiposity rather than proportions is indicated. The most practical, appropriate and accurate method for estimation of obesity for use in community studies is the measurement of skin-fold thickness (Bray, 1976; Department of Health and Social Security Medical Research Council, 1976; Seltzer and Mayer, 1965 and 1967; Steel, 1977).

Various authorities have recommended a number of sites for skin-fold thickness measurement, including the triceps, subscapular, abdominal, hip, pectoral, calf areas and assorted combinations of these. Seltzer and Mayer (1965; 1967) suggested the triceps skin-fold thickness as the single best criterion of obesity for several reasons:

1. This skin fold in obese individuals shows the highest correlation with body-density values obtained by underwater weighing.
2. This skin-fold site is the easiest to measure and provides highly reproducible results.
3. It involves the least inconvenience and embarrassment to the subject as far as disrobing is concerned.
4. From clinical observations, the triceps skin-fold appears to be the most representative of total body fatness regardless of disproportionate distribution of adipose tissue in various parts of the body.

The Fogarty Study (Bray, 1973) and the Department of Health and Social Security Medical Research Council (1976) concur with Seltzer and Mayer (1967) that any individual less than 30 years of age whose triceps skin-fold thickness is greater than 23 millimeters may be considered to be obese.

CHAPTER 3

RESEARCH METHODOLOGY

This chapter includes a description of the design of the study, methodology used in conducting the study and the methods used in analyzing the data.

Design

This was a descriptive study designed to explore how obese individuals perceived their own body size and to compare the obese individual's self-perception to that of non-obese individuals. The technique utilized for observation of self body size perception was a modification of the study presented by Slade and Russell (1973b).

This method involved the determination of "perceived size" and "real size" as measured at three various body-width areas. The three specific index areas of body width selected were: shoulders, at the widest point; waist, at the narrowest point; and hips, at the widest point. These sites corresponded to common reference points for evaluation of proportions and were areas of most concern in individuals with weight related complaints. Slade and Russell (1973a; -b) utilized four specific body width areas in their study--face, chest (axilla to axilla), waist and hips. This study excluded the face measurement. Since the subjects were requested to view themselves in a mirror prior to the observation procedure as a means of orienting

themselves to estimating body width, it was felt that the facial reflection would incorporate a personalized impression and possibly result in biased readings involving significantly more influence from the subject's internal frame of reference. The shoulder area (lateral deltoid to lateral deltoid) was selected over the chest area since this study dealt specifically with body-width size. Chest size, measured from axilla to axilla, seemed to be indicative of an index of body girth or circumference whereas the shoulder measurement, taken from lateral deltoid to lateral deltoid, is a more accurate index of the concept of body width.

"Perceived size" was obtained through the use of the visual size estimation apparatus. "Real size" was determined anthropometrically using the body width caliper device attached to the visual size estimation apparatus. The body-size disturbance, or degree of distortion, was calculated as the mathematical difference between "perceived size" and "real size". The index of obesity was then obtained by measurement of the subject's triceps skin-fold thickness.

Setting

This study was conducted in a college of nursing building of a university in the Southwest. An unoccupied office space was obtained through the Coordinator of the Biological Studies Laboratory and made available for the three-week duration of data collection. The arrangement of this space contributed to the collection of data. Being unoccupied and empty, except for a desk and the measurement tools for this study, the potential for distraction, interference or

objects for perceptual reference were minimized. The fact that the room was windowless allowed it to be completely darkened during the estimation segment of the observation so that the only objects visible to the subject were the two lights on the visual size estimation apparatus. Under these conditions even the investigator, standing behind the apparatus, was invisible and unavailable as a source of reference.

Subject Population

The following criteria were employed in selection of the subject population for this study:

1. Female
2. Twenty to 30 years of age
3. No acute or chronic mental or physical illness
4. No history of perceptual disorder
5. Not actively involved in a weight-reduction program.

The subjects were all volunteers from the student population of the College of Nursing. Twenty-four individuals meeting the desired specifications agreed to participate; 19 from the undergraduate ranks and five from the graduate programs.

The purpose and procedures involved in this study were explained to the subjects a number of times. First, the procedures were presented in a general fashion to the group at the time of request for volunteers, then individually, in detail, prior to the scheduled measurement session, and again, in writing, on the

consent form (Appendix A). It was required that the consent form be read completely then signed by the subject and the signature witnessed before the individual was allowed to participate in the study. It was made clear to each subject that she could withdraw from the study at any time with no threat of ill will and without affecting her university standing. Confidentiality was assured by coding the data collection sheet (Appendix B) instead of using subjects' names. It was also made clear to the subject that the signed consent form would be filed in an area designated by the Human Subjects Committee with access restricted to the principal investigator or authorized representative of the College of Nursing, and that the data obtained would not be used for any other project other than this study.

Of the total number of 24 subjects, six met the criterion for the definition of obesity established for this study. It would have been optimum to have the obese subgroup larger; however, due to the method for obtaining subjects, more efficient control was not possible. Therefore, in this study a group of six obese individuals will be compared to a group of 18 non-obese individuals.

Measurement Instruments and Operations

Visual Size Estimation Apparatus

This apparatus consisted of a movable horizontal bar, approximately 105 centimeters in length and 7.5 centimeters in width, mounted on a vertical stand, approximately 183 centimeters in height. Two red light-emitting diodes, independent and battery powered, were attached

to sliding frames fashioned to fit over the horizontal bar and capable of being moved outwards from and inwards toward the center point. The rear of each of these sliding light fixtures was fitted with a marker precisely corresponding to the center of the light. A solid steel measuring instrument was attached to the rear of the horizontal bar directly beneath the level of the marker so that the exact distance between the lights could be read off from a rear position.

The subject being tested was placed in the windowless, unoccupied experimental room at a distance approximately 152 centimeters from the apparatus. At a 90-degree angle from the subject, also approximately 152 centimeters away, was placed a full-length, non-distorting mirror. The subject was first requested to orient herself to the concept of body width being measured by viewing her body reflection in the mirror. The subject was then asked to face the apparatus and the room was totally darkened. The horizontal bar was positioned at a height coinciding to the subject's shoulder level and the two light-emitting diodes turned on. The only things visible to the subject were the small red lights on the horizontal plane. The subject were requested to estimate the distance across her shoulder width by stopping the investigator, who moved the lights gradually outwards from the central point, when the subject felt that the distance between the lights corresponded to the distance across her shoulders at the widest span, extending from lateral deltoid to lateral deltoid. Two trials were performed in this manner as the lights were moved divergently from one another. Then, applying the method of limits (D'Amato, 1970; Guilford, 1954), the subject was

asked to make the estimation of shoulder width in the same manner as the investigator moved the lights gradually inwards from the outer tips of the horizontal bar. Two trials were also performed as the lights were moved convergently toward one another. A similar procedure, taking four readings, two divergent and two convergent, was employed as the horizontal bar was positioned level with the other two designated body width index areas--waist at the narrowest point and hips at the widest point. Immediately after each individual trial the investigator recorded the estimated distance as the span between the markers on the steel tape attached to the rear of the horizontal bar. The unit of measurement was centimeters.

All measurements, both estimated and actual, were obtained from the subjects in their normal daily clothing in order to provide the most natural conditions for studying body-image perception.

Body Width Calipers

Attached to each of the movable slides on the horizontal bar of the visual size estimation apparatus was a forward extension made of solid, inflexible metal, approximately 36 centimeters in length. These extensions were securely attached at 90-degree angles to the horizontal bar and coincided exactly to the center of the lights, in line with the marker at the rear of the horizontal bar. This formed a unique set of body width calipers utilizing the same measurement scale as in the estimation segment of the procedure. Independent calibrations were performed to cross-check the accuracy of these calipers.

The determination of "real size" of the subjects was obtained in two ways for each of the three body width areas--one measurement taken while the subject was facing the apparatus and one taken while the subject was facing away from the apparatus. Verbal collaboration was attained between the subject and the investigator to assure that the exact spot being measured was what both felt was the specified reference point for that particular body-width area.

Lange Skin-fold Calipers

The Lange Skin-fold Thickness Caliper is a specialized, standardized instrument manufactured by the Cambridge Scientific Industries, Incorporated of Cambridge, Maryland. It fulfills the accepted national recommendations for skin-fold thickness measurement instrumentation as established by the Committee on Nutritional Anthropometry of the National Research Council. Specifically, the instrument must be so designed as to present a contact surface on each arm of the pincers of 20 to 40 square millimeters and to exert a pressure on the face of the contact surface of 10 grams per square millimeter (Seltzer and Mayer, 1965).

The specific site for measurement of the triceps skin-fold thickness is located at the back of the right upper arm midway between the acromium and olecranon processes. The midpoint was determined using a steel tape measure with the arm flexed at a 90-degree angle. The arm was then released and allowed to hang freely during the measurement with the calipers.

The measurement was obtained in a standard manner. The investigator pinched up a full fold of skin, double thickness, with the attached subcutaneous tissue, between the thumb and forefinger at a distance approximately one centimeter above the site at which the caliper was to be applied, as determined previously. This entire fold was gently, but firmly, pulled away from the underlying muscle tissue. The caliper was then applied to the fold at the designated site so that the pressure on the skin-fold at the point of application was exerted solely by the instrument and not by the fingers of the investigator. The handle of the caliper was then released to permit full force of the arm pressure to be employed and the dial read to the nearest 0.5 millimeter. Caliper application was performed and recorded for two separate trials approximately 30 seconds apart.

This entire measurement procedure, both the estimation segment and the real determinations, required approximately 12 to 15 minutes with each subject. In this study the estimation segment always preceded the actual measurement of body widths. This was done to prevent the development of any degree of reference in the subject's perceptual field due to exposure to the apparatus during the real measurement part since the body-width calipers were directly attached to the visual size estimation apparatus. No talking, other than directional, was allowed during the estimation stage in order to prevent the subject from establishing any degree of reference based upon verbal feedback. The skin-fold thickness measurement was always performed last to avoid the formation of a mind set in the subject due to realization of the skin-fold thickness readings.

Statistical Analysis

The data collected in this study were grouped, coded and analysed for demographic characteristics using the standard measures of central tendency and the standard measure of variability. These functions were performed for the entire sample and then for each of the two subgroups that were contrasted.

The body-size estimation measurements were attained by figuring the mean of the four trials acquired through use of the visual size estimation apparatus. This was done for the estimation at each of the three body width areas and for an overall body image index. The actual measurements of the body widths and of the triceps skin-fold thickness were attained by figuring the mean of the two trial measurements taken. The body size disturbance, or degree of distortion of perception, was converted into a body-image index, calculated by using the formula: $\text{body-image index} = (\text{perceived size}/\text{real size}) \times 100$.

To determine the degree of linear relationship between the body-image indices and the degree of obesity, the Pearson product-moment correlation coefficient was calculated for each of the four index areas and the triceps skin-fold thickness measurements.

To compare data from the obese subjects and the non-obese subjects, the t test for independent groups was figured for the two sets of sample measurements. A 0.05 level of significance was used.

Additional determinations of the Pearson product-moment correlation coefficient were performed between three indices of

obesity based upon weight-height ratios and the triceps skin-fold thickness measurements and between the three weight-height indices and the overall body-image indices.

CHAPTER 4

PRESENTATION AND ANALYSIS OF DATA

The findings of this study and the analysis of the data are presented in this chapter. The findings are presented relative to the characteristics of the sample, a correlational analysis, a comparison analysis between the non-obese and obese subjects and additional determinations.

Characteristics of the Sample

The findings of this study were based upon a sample of 24 female subjects from the student population of a college of nursing 19 from the undergraduate program and five from the graduate program. The physical characteristics of age, height, weight, real shoulder width, real waist width, real hip width and triceps skin-fold thickness are shown in Table 1 according to the functions of range, mean and standard deviation.

Correlational Analysis

For statistical purposes, the difference between the real size and the perceived size was converted into a body-image index, calculated by using the formula: $\text{body-image index} = (\text{perceived size}/\text{real size}) \times 100$. Using this index, a value of 100 corresponds to accurate perception; a value less than 100 indicates that the physical size was underestimated; and a value greater than 100 indicates that physical

Table 1. Physical characteristics of the subjects (N=24)

Characteristic	Range	Mean	S.D.
Age (years)	20-30	23.46	3.28
Height (cm)	154.90-185.40	166.40	7.57
Weight (kg)	45.40- 83.90	60.28	11.10
Shoulder width (cm)	36.50- 48.20	41.21	3.66
Waist width (cm)	21.25- 34.00	25.26	3.82
Hip width (cm)	29.40- 44.50	36.41	3.84
Triceps skin-fold thickness (mm)	11.75- 32.00	20.57	5.05

size was overestimated. The difference between the figured body-image index and the set value of 100 expresses the degree of distortion as a percentage.

The body-image index was figured for each of the three separate body-width index areas--shoulders, waist and hips--and an overall body-image index formulated from the summation of the parts. These four body-image indices were then analysed for linear relationship to the triceps skin-fold thickness measurements using the Pearson product-moment correlation coefficient (Table 2). The correlation coefficient was negative for all four body-image indices. The correlation coefficient was not significant for the three individual body-image index areas of shoulders, waist and hips but was significant at the 0.05 level for the overall body-image index. The correlation coefficient between the triceps skin-fold thickness measurements and the overall body-image index calculations was -0.51.

Table 2 also shows that the subjects underestimated shoulder width a mean of 7.23 percent, overestimated waist width a mean of 20.55 percent, overestimated hip width a mean of 5.41 percent, and overestimated overall body size a mean of 6.56 percent.

Table 2. Correlation between body-image indices and triceps skin-fold thickness measurements (N=24)

Triceps Skin-fold Thickness	Body-image Indices			
	Shoulder	Waist	Hips	Overall
11.75mm	97.48	133.33	124.49	118.43
13.75	102.20	135.39	107.63	115.07
15.75	94.81	120.48	100.85	105.38
16.50	78.41	102.20	94.22	91.61
17.00	101.55	141.25	129.73	124.18
17.00	95.89	128.00	95.80	106.56
18.00	89.13	150.00	125.88	121.67
18.00	102.19	130.20	114.88	115.76
18.00	92.64	102.94	108.25	101.28
18.50	99.40	122.55	102.80	108.25
19.00	103.12	128.73	115.56	115.80
19.00	99.63	126.53	103.28	109.81
19.00	90.50	122.81	107.84	107.05
21.00	92.00	131.86	113.17	112.34
21.00	87.38	116.38	103.48	102.41
21.00	73.96	92.36	80.21	82.18
22.00	97.65	154.32	100.92	117.63
22.00	91.88	117.35	96.40	101.88
24.00	111.51	129.62	111.06	117.40
24.00	85.59	115.58	104.77	101.98
25.00	82.99	110.64	104.86	99.50
30.00	76.78	107.24	90.16	91.39
30.50	88.72	99.85	96.97	95.18
32.00	91.13	96.71	96.51	94.78
Mean	92.77	120.55	105.41	106.56
S.D.	9.08	16.81	11.52	10.76
r	- 0.35	- 0.45	- 0.45	- 0.51*

*p<0.05 = significance level

Comparison Analysis

Since the purpose of this study was to determine whether there is a difference in the way that obese individuals perceive themselves as compared to the way in which non-obese individuals perceive themselves, the sample was divided into two groups based upon a determination of obesity as a triceps skin-fold thickness measurement in excess of 23 millimeters. Group I, the non-obese, was composed of 18 subjects and Group II, the obese, was composed of six subjects. Table 3 presents the descriptive characteristics of these two groups for comparison purposes.

Table 3. Physical characteristics of the non-obese group (N=18) and the obese group (N=6)

Characteristic		Group I Non-obese	Group II Obese
Age (years)	Mean	23.22	24.17
	S.D.	3.12	3.97
Height (cm)	Mean	165.60	168.80
	S.D.	8.17	5.23
Weight (kg)	Mean	55.38	75.00
	S.D.	7.07	7.09
Shoulder width (cm)	Mean	39.57	46.13
	S.D.	2.33	2.16
Waist width (cm)	Mean	23.59	30.29
	S.D.	1.76	4.00
Hip width (cm)	Mean	34.77	41.34
	S.D.	2.26	3.41
Triceps skin-fold thickness (mm)	Mean	18.24	27.58
	S.D.	2.74	3.64

Table 4 shows the comparison of the real size measurements of the two groups together with the results of the t tests which were performed for each of the three body-width areas. A like comparison of the perceived size measurements of the two groups with t tests is also shown in this table. The obese subjects were significantly larger on average than the non-obese subjects at all three body-width areas. Also, the mean perceived sizes of the obese subjects were larger than those of the non-obese subjects for all three body-width areas and although the measurements are statistically significant at the 0.05 level, the difference between the mean perceived sizes of the groups is much less than the differences between the mean real

Table 4. Real size and perceived size measurements of the non-obese group (N=18) and the obese group (N=6)

	Group I Non-Obese		Group II Obese		t test
	Mean	S.D.	Mean	S.D.	
Real size (cm)					
Shoulders	39.57	2.33	46.13	2.16	6.07*
Waist	23.59	1.76	30.29	4.00	5.78*
Hips	34.77	2.26	41.34	3.41	5.47*
Perceived size (cm)					
Shoulders	37.04	2.70	41.07	3.60	2.92*
Waist	29.43	3.22	32.97	2.31	2.48*
Hips	37.06	3.76	41.52	3.13	2.61*

*p<0.05 = significance level

sizes. Both groups underestimated their body width at the shoulders, the non-obese subjects by 2.53 centimeters and the obese by 5.06 centimeters. At the waist area both groups overestimated their body width, the non-obese subjects by 5.84 centimeters and the obese by 2.68 centimeters. At the hips both groups also overestimated their body width, the non-obese subjects by 2.29 centimeters and the obese by 0.18 centimeters.

Table 5 shows the comparison of the body-image indices for the two groups at each of the three separate body width areas and for the overall body-size calculation with results of the t tests performed on these data. The body-image indices of the obese subjects is less in all four parameters, although statistical significance at the 0.05 level is attained for only the shoulder width and the overall

Table 5. Body-image indices for the non-obese group (N=18) and the obese group (N=6)

Body-image Indices	Group I Non-obese		Group II Obese		t test
	Mean	S.D.	Mean	S.D.	
Shoulder	93.88	8.04	89.45	11.89	^a 1.04
Waist	125.37	15.83	109.94	11.86	^b 2.19
Hips	106.97	12.35	100.72	7.53	^a 1.16
Overall	108.74	10.55	100.04	9.29	^b 1.81

a = not significant

b = $p < 0.05$ = significance level

body-image index. Both groups underestimated their shoulder width, the non-obese subjects by 6.12 percent and the obese subjects by 10.55 percent. Both groups overestimated their waist widths, the non-obese subjects by 25.37 percent and the obese subjects by 9.94 percent. At the hip area both groups also overestimated their body widths, the non-obese subjects by 6.97 percent and the obese subjects by 0.72 percent. For the integrated overall body-image index, the non-obese subjects overestimated their body sizes by 8.74 percent and the obese subjects overestimated their total body sizes by 0.04 percent.

Additional Determinations

An additional statistical analysis that was performed on the data collected in this study was a correlation coefficient determination to discern the degree of relationship between an index of obesity based upon height and weight measurements and the index that was selected for use in this study, triceps skin-fold thickness measurement. The three most common ratios utilized in describing and predicting degree of obesity are: weight/height; weight/height², or body-mass index; and the cube root of weight/height, or ponderal index. Table 6 shows the Person product-moment correlation coefficient for each of these three indices with the triceps skin-fold thickness measurements of the 24 subjects in this study. All three indices based upon height-weight ratios correlated positively and strongly with the triceps skin-fold thickness measurements.

Table 6. Correlation between weight/height indices and triceps skin-fold thickness measurements of the subjects (N=24)

		W/H	W/H ²	$\sqrt[3]{W/H}$
Triceps skin-fold thickness	r =	+0.84	+0.83	+0.84

All of these height/weight indices were then correlated with the overall body-image index calculations of the 24 subjects observed in this study. The figures arrived at are presented in Table 7. The correlation between the height/weight indices and the overall body-image indices was negative and slightly stronger than the correlation between the triceps skin-fold thickness measurements and the overall body-image indices.

Table 7. Correlation between weight/height indices and overall body image index images of the subjects (N=24)

		W/H	W/H ²	$\sqrt[3]{W/H}$
Overall body-image index	r =	-0.59	-0.52	-0.59

Summary

The correlational analysis indicated a negative linear relationship between the index of obesity, triceps skin-fold thickness measurement, and the four body-image indices with statistical significance at the 0.05 level attained for the overall body-image calculation. The Pearson product-moment correlation coefficient of -0.51 indicated that 26 percent of the variability in the overall body-image index is attributable to variability in the triceps skin-fold thickness measurements. This is not a strong relationship but does indicate a trend. The negative relationship means that as the triceps skin-fold thickness increased in size the overall body-image index decreased. As the degree of obesity increased the body-image index had a tendency to move toward underestimation.

The comparison analysis of real and perceived size measurements showed that both the non-obese subjects and the obese subjects underestimated their body widths at the shoulder area. The degree of underestimation was two times as great in the obese subjects as in the non-obese subjects. Both groups overestimated their body widths at both the waist and hip regions. The degree of overestimation in these two areas was significantly less in the obese subjects. These findings indicated that the obese subjects perceive themselves as much smaller relative to the way in which the non-obese subjects perceive themselves.

The comparison of body-image indices showed that both groups underestimated their shoulder widths while overestimating waist widths, hip widths and overall body-image sizes. The obese subjects

were again less inclined toward overestimation, the degree of distortion being greater at the shoulders and less at the waist, hips and for the overall body-image index than the non-obese subjects.

In the additional determinations performed, a strong positive correlation was discovered between the triceps skin-fold thickness measurements and the three indices of obesity calculated upon ratios of weight to height. The indices of obesity based upon weight/height ratios correlated negatively with the overall body-image indices slightly stronger than did the triceps skin-fold thickness measurements.

CHAPTER 5

DISCUSSION OF FINDINGS

The relationship of the findings of this study to the conceptual framework and the selected review of the literature are discussed in this chapter. The conclusions of the study and recommendations for further study are also presented.

Relationship of Findings to Conceptual Framework and Review of the Literature

This study was designed to determine if obese individuals visually perceive themselves differently than non-obese individuals visually perceive themselves and to determine if this difference is consistently in the direction of either underestimation or overestimation. Body image was defined as a complex, multi-dimensional conceptualization, one facet of which was how the person views her own body in a mirror, that is, the person's physical self-perception. The visual size estimation apparatus was constructed to accurately measure the perceived size of the subject's body width at various index areas. Any distortion in perception would be demonstrable as a difference between perceived size and real size as determined through discrete measurements on a mathematical scale.

Body size was presented as a continuum extending from the pathologically thin individuals suffering from anorexia nervosa at

one pole through normal sized individuals in the mid-range to the morbidly obese at the other pole.

The studies dealing with anorexia nervosa patients (Bruch, 1973; Garner et al., 1976; and Slade and Russell, 1973a, -b) were consistent in reporting that these subjects significantly overestimated their body sizes. Normal-sized controls in these studies either slightly overestimated their own body sizes or were relatively accurate in perception. The studies dealing with obese subjects (Cappon and Banks, 1968; Garner et al., 1976; Glucksman and Hirsch, 1969; and Slade and Russell, 1973a) showed that there was a tendency toward variance in either direction, underestimation and overestimation. Where the subjects did overestimate their body size, it was to much less a degree than with either normal-sized individuals or anorexic patients. A contributory factor spoken to with obese subjects in these studies was that they were, in essence, a select population. They were all from either clinical or weight reduction oriented environments and had asked for help in losing weight. In this way these obese subjects were similar in psychological set to anorexic patients. Glucksman and Hirsch (1969) showed, with a group of severely obese patients, that they overestimated their body size both during and following a weight-loss program. However, in a six-week maintenance period prior to actual implementation of the reduction regimen, these same obese subjects markedly underestimated their actual body size and the mean weight of these individuals was 334 pounds.

The review of the literature implied that on the body-weight continuum those individuals toward the thin pole would tend to

overestimate their body size while toward the mid-range fairly accurate estimations would occur and then, as the individuals approached the heavy pole, the tendency would be toward underestimation, particularly with a non-clinical population. The present study supports these assumptions. The correlational analysis indicated a negative relationship, a definite trend; that as the obesity level increased the body-image index decreased. While this study was not specifically concerned with the thin side of the continuum, the 18 subjects in the non-obese group did include some very thin subjects (lowest triceps skin-fold thickness of 11.75 mm). The non-obese group did exhibit overestimation on three of the four body-image indices and on the one that this group underestimated, it was still an estimation significantly in excess of that of the obese group for the same area.

While the obese subjects did not actually underestimate their body sizes, except at the single index of shoulder width, their body-image indices were lower than those of the non-obese subjects at all four areas. This parallels the studies of Cappon and Banks (1968), Garner et al. (1976), Glucksman and Hirsch (1969), and Slade and Russell (1973a). The data in this study were influenced by the fact that there were only six subjects in the obese group. A larger number of subjects fulfilling the criterion for obesity would provide a better and more valid base for analysis. Table 2 (p. 30) shows that four of the six obese subjects displayed overall body-image indices below 100 whereas only two of the 18 non-obese subjects were below the 100 level.

The correlational analysis performed between the triceps skin-fold thickness measurements and the various weight/height indices supports the contentions of Seltzer and Mayer (1965) that the triceps skin-fold thickness determination is a fairly accurate and simple criterion of obesity. The higher correlation of the weight/height indices with the overall body-image indices, however, could indicate that visual perception of the physical body is more relative to a ponderal computation based upon proportional manifestations rather than to a true measure of body fat content.

Conclusions

This study did determine that there was a difference in the way obese individuals visually perceive their own body size as compared to the way in which non-obese individuals visually perceived their own body size.

The body-image index, which represented the difference between perceived size and real size, was negatively correlated to the index of obesity utilized in this study--the triceps skin-fold thickness measurement. This correlation was significant at the 0.05 level and indicated a trend toward underestimation as the degree of obesity increased.

The comparison analyses showed that the obese subjects did perceive themselves smaller relative to the way in which the non-obese subjects perceived their own body sizes. These findings add support to the directionality implied in the correlational analysis.

Recommendations

Based upon the findings of this study, the following recommendations are made:

1. Replication of this study utilizing a larger sample, particularly increasing the number of obese subjects. A matched group sample would be optimum.
2. Replication of this study utilizing a three-group analysis--thin, normal and obese.
3. Replication of this study using a sample of male subjects to determine whether sex is a variable in body-image perception.
4. Replication of this study using a skin-fold thickness measurement and a weight-height ratio as the indices of obesity and perform a comparison analysis.
5. Replication of this study using a sample of subjects who are larger in body size than normal but who have a normal or lower body fat content (e.g., athletes).

APPENDIX A

SUBJECT'S CONSENT FORM

I am Bob Cox, R.N., a graduate student. I am requesting volunteers to take part in a study designed to determine accuracy in perceiving body size. The degree of accuracy will then be related to an index of body fat content. The study will consist of an estimation segment and an actual body measurement segment.

You will be requested to estimate your body width at three specific areas--shoulders, waist and hips. This estimation will be accomplished using a tool called the "visual size estimation apparatus". This consists of a movable horizontal bar mounted on a vertical stand. Two lights are mounted on the horizontal bar and can be moved outwards from or inwards toward the central point. The horizontal bar will be positioned at a level corresponding to that of the body width area being estimated and as I move the lights gradually outwards or inwards I will ask you to stop me when the distance between the lights is equal, in your eyes, to the distance across that body width area.

The actual measurements will involve exact determination of the three body width areas that were previously estimated and a measurement of triceps skin-fold thickness. The triceps skin-fold thickness measurement will be taken at the back of your right upper arm using a special device called "calipers". The attainment of these measurements is a painless procedure with no risk of injury.

This entire process will take approximately 20 minutes of your time and will be performed in the second floor Biological Studies Laboratory, College of Nursing building. Although the investigator cannot afford to pay you for participating, your cooperation in this study may contribute to a better understanding of the concept of body perception and how it relates to both body image formulations and to the phenomenon of body fatness.

In order to assure confidentiality, your name will not appear on the data collection sheet or anywhere in the publication of the study. Complete anonymity will be maintained and the data obtained will not be made available for any other project than that already specified. You may feel free to ask questions at any time during the study and I will make an effort to provide you with the answer to the best of my ability. The results of this study will be made available

to you personally upon request. You may withdraw from the study at any time if you so desire with no threat of ill will and without affecting your university standing.

The nature, demands, risks and benefits of this study have been explained to me, _____, and I understand what my participation involves. I also understand that this consent form will be filed in an area designated by the Human Subjects Committee with access restricted to the principal investigator or authorized representative of the College of Nursing.

Subject's signature: _____ Date: _____

Witness's signature: _____ Date: _____

APPENDIX B

DATA COLLECTION SHEET

Date: _____

Code: _____

Sex: _____

Height: _____

Age: _____

Weight: _____

Acute illnesses: _____

Chronic illnesses: _____

Perceptual disorders: _____

Any large weight changes within past year: _____

Actively involved in any weight reduction program at present: _____

Body size estimation:

<u>Area</u>	<u>Trial #1</u>	<u>Trial #2</u>	<u>Trial #3</u>	<u>Trial #4</u>
Shoulders	_____	_____	_____	_____
Waist	_____	_____	_____	_____
Hips	_____	_____	_____	_____

Actual body size measurement:

<u>Area</u>	<u>Trial #1</u>	<u>Trial #2</u>
Shoulders	_____	_____
Waist	_____	_____
Hips	_____	_____
Triceps skin-fold thickness	_____	_____

REFERENCES

- Abramson, Edward E. "A Review of Behavioral Approaches to Weight Control," in J. P. Foreyt (ed.), Behavioral Treatments of Obesity, New York: Pergamon Press, 1977, pp. 45-56.
- Allebeck, P., D. Hallberg, and S. Espmark. "Body Image--An Apparatus for Measuring Disturbances in Estimation of Size and Shape," Journal of Psychosomatic Research, 20:583-589 (1976).
- Asher, W. L. Treating the Obese. New York: MedCom Press, 1974.
- Bray, George A. (Ed.). Obesity in Perspective, Vol. 2, Part 1, Bethesda, Md.: National Institute of Health, 1973.
- Bray, George A. The Obese Patient, Philadelphia: W. B. Saunders, 1976.
- Bruch, Hilde. Eating Disorders, New York: Basic Books, Inc., 1973.
- Bruno, Frank J. Think Yourself Thin, Los Angeles: Nash Publishing Corporation, 1972.
- Cappon, D. and R. Banks. "Distorted Body Perception in Obesity," Journal of Nervous and Mental Disease, 146:6:465-467 (1968).
- Craft, Carol. "Body Image and Obesity," Nursing Clinics of North America, 7:4:677-685 (December, 1972).
- D'Amato, M. R. Experimental Psychology--Methodology, Psychophysics and Learning, New York: McGraw-Hill Book Company, 1970.
- Department of Health and Social Security Medical Research Council. Research on Obesity. W. P. T. James (ed.). London: Her Majesty's Stationery Office, 1976.
- Forbes, G. B. "Prevalence of Obesity in Childhood," in G. A. Bray (ed.), Obesity in Perspective, Vol. 2, Part 2, Bethesda, Md.: 1973, pp. 205-207.
- Garner, D. M., P. E. Garfinkel, H. C. Stancer, and H. Moldofsky. "Body Image Disturbance in Anorexia Nervosa and Obesity," Psychosomatic Medicine, 31:1:1-7 (1976).
- Glucksman, M. L. and J. Hirsch. "The Response of Obese Patients to Weight Reduction," Psychosomatic Medicine, 31:1:1-7 (1969).

- Guilford, J. P. Psychometric Methods, New York: McGraw-Hill Book Company, 1954.
- Kordel, Lelord. Secrets for Staying Slim, New York: G. P. Putnam's Sons, 1971.
- Mackenzie, Margaret. "Obesity as Failure in the American Culture," Obesity/Bariatric Medicine, 5:4:132-133 (1976).
- Metropolitan Life Insurance Company. Statistical Bulletin, 40:2-3 (1959).
- Meyer, J. E. and A. Tuchelt-Gallwitz. "A Study on Social Image, Body Image and the Problem of Psychogenetic Factors in Obesity," Comprehensive Psychiatry, 9:2:148-154 (March, 1968).
- Penick, S. B. and A. J. Stunkard. "Newer Concepts of Obesity," in N. Kiell (ed.), The Psychology of Obesity, Springfield, Ill.: Charles B. Thomas, Publishers, 1973.
- Petit, D. W. "The Ills of the Obese," in Bray and Bethune (eds.), Treatment and Management of Obesity, Hagerstown, Md.: Harper and Row, 1974, pp. 84-90.
- Reitman, E. E. and S. E. Cleveland. "Changes in Body Image Following Sensory Deprivation in Schizophrenic and Control Groups," Journal of Abnormal and Social Psychology, 68:168-176 (1964).
- Rubin, Theodore I. Forever Thin, New York: Bernard Geis Associates, 1970.
- Seltzer, C. C. and J. Mayer. "A Simple Criterion of Obesity," Postgraduate Medicine, 38:2:101-107 (August, 1965).
- Seltzer, C. C. and J. Mayer. "Greater Reliability of the Triceps Skin Fold over the Subscapular Skin fold as an Index of Obesity," American Journal of Clinical Nutrition, 20:9:950-953 (September, 1967).
- Shipman, W. G. and N. Sohikhan. "Body Image Distortion in Obese Women," Psychosomatic Medicine, 29:540 (1967).
- Slade, P. D. and G. F. M. Russell. "Experimental Investigations of Bodily Perception in Anorexia Nervosa and Obesity," Psychotherapy and Psychosomatics, 22:359-363 (1973a).
- Slade, P. D. and G. F. M. Russell. "Awareness of Body Dimensions in Anorexia Nervosa: Cross-Sectional and Longitudinal Studies," Psychological Medicine, 3:188-199 (1973b).

- Steel, Judith M. "Measurement of Triceps Skinfold Thickness During the Treatment of Obesity," Obesity/Bariatric Medicine, 6:1: 20-22 (1977).
- Stuart, Richard B. "A Three-Dimensional Program for the Treatment of Obesity," in N. Kiell (ed.), The Psychology of Obesity, Springfield, Ill.: Charles B. Thomas, Publishers, 1973, pp. 169-182.
- Stunkard, A. and M. Mendelson. "Obesity and the Body Image: I. Characteristics of Disturbances in the Body Image of Some Obese Persons," American Journal of Psychiatry, 123:10:1296-1300 (April, 1967).
- Stunkard, A. and M. McLaren-Hume. "The Results of Treatment for Obesity," in J. P. Foreyt (ed.), Behavioral Treatments of Obesity, New York: Pergamon Press, 1977, pp. 5-14.
- Traub, A. C. and J. Orbach. "Psychological Studies of Body Image: I. The Adjustable Body-Distorting Mirror," Archives of General Psychiatry, 11:53-66 (1964).
- Waxler, S. H. and E.S. Liska. "Obesity and Self-Destructive Behavior," in A. Roberts (ed.), Self-Destructive Behavior, Springfield, Ill.: Charles B. Thomas, Publishers, 1975, pp. 188-210.
- Wollersheim, Janet P. "Effectiveness of Group Therapy," in N. Kiell (ed.), The Psychology of Obesity, Springfield, Ill.: Charles Thomas, Publishers, 1973, pp. 245-262.

2 3386 5