HEIGHT AND WEIGHT DISCREPANCIES IN THE ELDERLY: IMPLICATIONS FOR NURSING

by

Pamela S. Weldele

A thesis submitted to the faculty of
The University of Utah
in partial fulfillment of the requirements for the degree of

Master of Science

College of Nursing

The University of Utah

December 1983

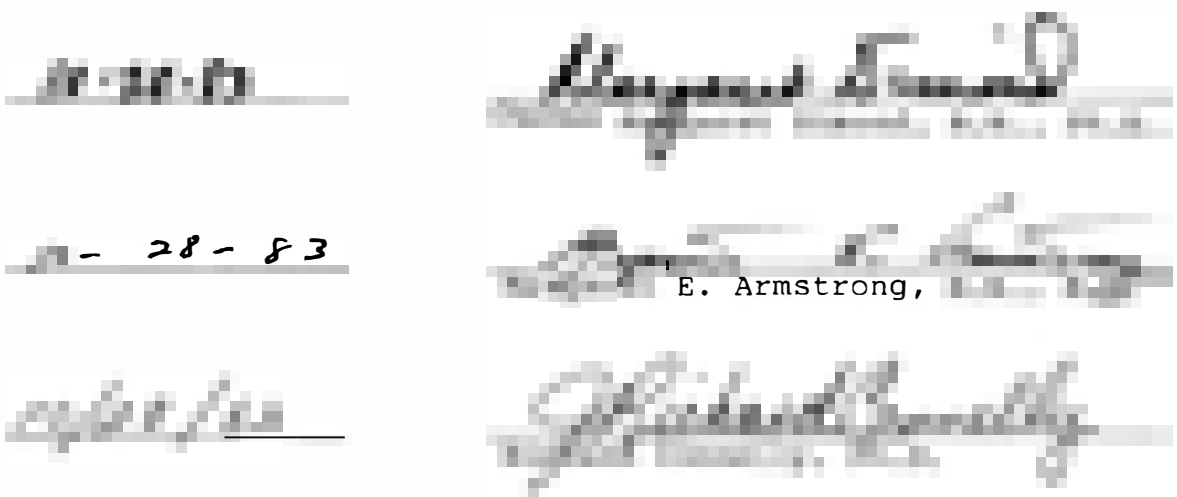
THE UNIVERSITY OF UTAH GRADUATE SCHOOL

SUPERVISORY COMMITTEE APPROVAL

of a thesis submitted by

Pamela S. Weldele

This thesis has been read by each member of the following supervisory committee and by majority vote has been found to be satisfactory.



THE UNIVERSITY OF UTAH GRADUATE SCHOOL

FINAL READING APPROVAL

To the Graduate Council of The University of Utah:

I have read the thesis of Pamela S. Weldele in its final form and have found that (1) its format, citations, and bibliographic style are consistent and acceptable; (2) its illustrative materials including figures, tables, and charts are in place; and (3) the final manuscript is satisfactory to the Supervisory Committee and is ready for submission to the Graduate School.

Date

R.N., Ph.D.

Approved for the Major Department

Chairman Dean

Approved for the Graduate Council

James L.

Dean of The Graduate School

HEIGHT AND WEIGHT DISCREPANCIES IN THE ELDERLY: IMPLICATIONS FOR NURSING

by

Pamela S. Weldele

An abstract of a thesis submitted to the faculty of
The University of Utah
in partial fulfillment of the requirements for the degree of

Master of Science

Margaret Dimond Chairperson, Supervisory Committee

Associate Professor of Nursing

College of Nursing

The University of Utah

December 1983

ABSTRACT

The purpose of this research was to determine relationships between perceived height and weight and measured height and weight in an elderly population. The study sample consisted of 44 male veterans, age 65 or older, who were mentally cognizant, and able to stand for height and weight measurements. A descriptive correlational study design was used to explore the relationships of perceived height and weight to measured height and weight. A data form was used to collect information from subjects about their ages, educational levels, marital status, perceived height and their perceived weight. The subjects were then measured on a balance-beam scale with a vertical steel bar with movable horizontal bar for weight and height.

Correlations were drawn between perceived height and weight and measured height and weight. A significant statistical relationship was found. The subjects' perceived height and weight did correlate highly with their measured height and weight.

ANOVAs were used to test the relationship of variables of age, education and marital status to perceived

height and weight. No significant relationship was found between the variables.

Descriptive statistics were applied to the raw data. It was hypothesized that subjects would have lower values on measured height and weight than perceived height and weight. Statistically, the trend was for the subjects to overestimate their height and underestimate their weight. The underestimation of weight was skewed by subjects with extreme variations from the norm.

Finally, the study looked at standards of height and weight in a 65-95 year-old population in relation to this study. Fifty percent of the study sample fell within the standards.

CONTENTS

LIST OF TABLES

LIST OF FIGURES

ACKNOWLEDGMENTS

I wish to express appreciation to the numerous people who assisted in the completion of this study. Included in this group are the members of the supervisory committee: Margaret Dimond, the Chairperson, Margaret Armstrong and Richard Connelly provided not only their expertise with the research process, but also much encouragement and support during the learning process. Special thanks is extended to Mary Spitzer for the sharing of her knowledge in the area of geriatric nutrition. Thanks is rendered to a friend, Jan Hulbert, for her support during the duration of this study. Finally, special gratitude is given to my colleagues at the Veterans Administration without whose constant support this research could not have been undertaken.

CHAPTER I

INTRODUCTION AND REVIEW OF LITERATURE

Introduction

In 1835, Lambert A.J. Quetelet, a Belgian social scientistist-statistician, wrote A treatise on man and the development of his faculties which laid the groundwork for all subsequent anthropometric work for the nineteenth century (Young, 1979). Quetelet measured height and weight in a small group of children and was the first to observe weight drop of infants immediately after birth. He also tried to determine a "law of growth" by relating height to weight in children and adults (Young, 1979, p. 219).

Later in the century, Benjamin A. Gould, through funds from the United States Sanitary Commission and private insurance companies conducted a study on Union army recruits. His technique, known as the "generalizing method," constructed graphs of average height versus age and average weight versus age, thus establishing the first graphs in anthropometry and statistics (Young, 1979, p. 221).

In the 1870s, Henry Pickering Bowditch directed the

first large scale anthropometrical study on a Boston population of children. He concluded in 1875, that girls surpass boys in weight and stature (height) at puberty (Young, 1979). Similar studies were likewise being conducted in England and Percy Boulton was the physician to follow the height and weight of a group of children longitudinally and construct "normal" tables from his data (Young, 1979). In 1876, he also noted the relationship between "ill health and the slowing of individuals' growth" (Young, 1979, p. 229). In 1880, he wrote, "Arrest of growth, or loss of weight, precedes so many diseases that it may be looked upon as a danger signal, and if the "caution" is noticed before the disease point is reached, catastrophe frequently may be prevented. Changes in height and weight become valuable in preventative medicine (Young, 1979, p. 230).

Dr. William Townsend Porter of the St. Louis Medical College in the 1880s implied that the role of the physician "lay in maintenance of the appropriate symmetry" by equating good health with a "normal relationship between height and other body dimensions" (Young, 1979, p. 237).

As the twentieth century has progressed, height and weight relationships to health and disease are accepted norms. We no longer look at this relationship only in

pediatrics but attribute meaning across the spectrum of life.

As man progresses into the twenty-first century, our elderly population will greatly increase in numbers from 11% of the population today, to 20% of the future population. Around the world, research is being conducted to understand our aging population. One area of this research deals with normal changes in aging. Normal aging not only affects the older adult himself but also the health care providers' clinical practice when they deal with the older adult. Therefore, it is important that as health care providers we understand why simple measurements within our clinical practice be accurately done.

This study looked at one of those simple clinical measurements -- measurement of height and weight. It further explored height and weight discrepancies in the elderly and the implications for nursing. Currently, few studies are available on discrepancies in perceived and measured height and weight across the total age spectrum. Within the elderly population over the age of 65, the researcher found no studies on height and weight discrepancies. Therefore, the purpose of this study was to examine discrepancies in perceived and measured height and weight in a population of elderly persons age

65 or older.

Problem Statement

The problem investigated in this project was: What is the relationship between perceived height and weight and measured height and weight in an elderly population?

Literature Review

In order to investigate the problem statement thoroughly, it is necessary to review the literature on factors influencing body height and weight and how people form perceptions.

Aging in man is defined as a process beginning with conception by some authors and around age 25 by others. It is generally agreed that aging ends with death. This researcher defined "aging" as a term used to describe the progression of biochemical processes that determine structured and functional alterations with age in cells and noncellular tissues and thus, in the whole organism. According to Watkins,

> the aged are those persons in whom at least 65% of the total changes associated wtih biologic aging have already occurred, assuming the life span . . .to be approximately 115 years (Watkins, 1968, p. 1131).

In man, aging is often modified by disease, thus making normal aging characteristics hard to decipher.

We know all systems in the body undergo the aging process. It is not the purpose of this study to discuss all the normal or abnormal aspects of aging, but rather the changes within the aging body specifically related to height and weight will be addressed. Alterations in height will be discussed first.

The elderly population in general is a shorter group. According to Ross (1971), many elderly exhibit kyphosis, tend to flex their knees and hips and undergo posture changes which attributes to diminished stature (height). Trotter and Gleser (1951) reported that American Caucasian males born between 1840 and 1924 increased in stature an average of 3.6 cms. Although man is increasing in height, he becomes shorter with each decade after maturity. Trotter and Gleser (1951) found the rate of decrement for both Caucasians and Blacks of both sexes to be 1.2 cms per 20 years. Similar studies by Meneely, Hayssel, Ball, Weilund and Lorimer (1963) and Pett and Ogilvie (1956) showed loss of stature from maturity to senescence.

Stature reduction is mainly due to shortening of the spinal column, since the long bones do not undergo shortening with age. The disks of the vertebral column thin and the individual vertebrae lose height. The thinning of the disks is more prominent in the middle

years with the vertebrae causing decreasing height thereafter. Osteoporosis is seen in both elderly men and women but is more a factor for women after menopause. Osteoporosis is defined as abnormal rarefaction of bone due to failure of osteoblasts to lay down bone matrix (Davis, 1968). Senile osteoporosis becomes more severe in the elderly in the eighth and ninth decades with the increasing osteoporosis collapse of the spine. On the average, a 2.2 inch loss of height for both males and females from age 20 to 70 can be expected (Rossman, 1971). Stoudt, Damon and McFarland (1960) constructed tables for white Americans from birth to age 89 for males. An adaptation of their table has been developed by the researcher and may be referred to in Table 1.

The combination of kyphosis, osteoporosis, and disk degeneration can cause a reduction in height in the elderly individual, but the round-shouldered, bent-backed, pot-bellied old man may not be as "classic" as we think. Many octogenarians are still straight backed with erect posture and see themselves as "tall" as they were at the age of 20 (Rossman, 1971).

In 1951, Nash was one of the first to study individuals' perceptions of body size. He was working with a prepubescent group and found a high degree of error in height estimation. Later in the 50s,

Table 1

Average Height and Weight Tables

for White American Males

Variable	Age of Males		
	20-30	40-49	50-59
Height (inches)	66.1-71.3	65.4-70.6	64.7-69.9
Weight (pounds)	140-190	140-194	140-190
	60-69	70-79	80-89
Height (inches)	64.4-69.2	64.3-68.7	63.9-68.3
Weight (pounds)	138-186	133-181	127-175

Note. Adapted from Stoudt, H.W. et al. (1960). Heights and weights of white Americans. Human Biology, 32, 4.

Jourard and Secord (1954) developed the Body Cathexis scale. Gunderson (1956) modified the above scale and with records of 670 Navy enlisted men, found that dissatisfaction with either height or weight tended to increase with deviation from the "ideal" value of the group. In a study by Calden, Lundy and Schlafer (1959), one aspect of the data showed that more women were satisfied with their height than men while a similar study by Singer and Lamb (1966) showed short girls wanted to be taller and tall girls wanted to be shorter.

During the 50s, studies that directly related to perceived height and weight were lacking in the literature. Rather, studies on how people looked at their own height and weight in relation to "ideals" were prevalent.

In 1964, Gellert and Stern studied children, ages five to twelve. The 152 boys and 107 girls were asked to estimate their height by use of a pointer. They found accuracy of self-estimated height increased up to the age of ten. Boys also were found to be more accurate in self-estimation than girls. If errors were made they tended to be an underestimation of height for boys and overestimation for girls.

In that same year, Shaffer (1964) embarked on a project with 220 children of height perception. He

found that children underestimated their own heights while girls tended to underestimate themselves in relation to adults more frequently. Girls also tended to overestimate the heights of males in relation to women more frequently.

Phillips (1979) studied 108 elderly (age 60-87) persons in relation to perceptions of body boundaries, personal space and body size, but the literature did not reveal a study that specifically dealt with an elderly population and perceived height and weight versus measured height and weight. Two studies in the literature do address research on this subject in a younger population: the study by Gellert and Stern (1964) mentioned earlier and the following study by Schlicting, Hoilund-Carlsen and Quaade (1981).

In 1981, Schlicting et al. conducted a study of 158 women (age 16-62) anbd 594 men (age 16-66) in which they compared self-reported height and weight to directly measured controlled height and weight. The data showed, for both sexes, a tendency for tall and heavy persons to underestimate both height and weight while small and thin persons in the study overestimated both height and weight.

A second area of consideration in relation to this study concerns weight changes in the elderly. It is

known if abundant calories are available, many elderly maintain an obese state. Hollified and Parson (1959), in their study of 700 elderly (over age 65) found that 16% of the females and 11% of the males were overweight by 20% or more for their height and age. It was noted that a weight plateau occurred between the ages of 65 and 74, with decreasing weight thereafter.

Likewise, Hejda (1963) found moderate to severe obesity in 15% of men and 21% of females in individuals age 82 to 100 years old in a normal population. Hejda (1963) found an average age when maximum weight was reached to be 42. Another study by Master, Laser and Beckman (1960) studied a population ages 65 to 94 years. Their findings indicated that males who were overweight before age 65 tended to form only 10% of the total group by age 94.

On the other hand, underweight men in the study increased over the same period by 20% to 50%. Within the same population, overweight females decreased from 40 to 10% while underweight females increased from 20 to 55%.

Rossman (1971) suggested that this tendency toward male-female weights may be due to the greater shrinkage of muscle mass in the elderly. Subcutaneous fat distribution over the years changes significantly. Lee and

Lasker (1958) found that weights in a 40 and 80 year old population to be about the same, but the distribution of fat varied. There might be a loss of facial subcutaneous fat with a gain of abdominal and pelvic fat in the 80 year old subject. Likewise, Wessel, Ufer, VanHuss and Cedarquist (1963) noted that an increase in skinfold thickness on the pubis and umbilicus between the age of 59 and 69 years occurred. Scapular measurements, on the other hand, decreased during the sixth and seventh decades. There are numerous other areas of the body that have been studied with skinfold measurements decreasing with age (Garn & Young, 1956, Hejda, 1963; Herrmann, 1970).

Skinfold measurements are not a test most elderly would have access to and are not being considered in this study. Likewise, height measurements, as indicated in the literature, are not a generally accurate measure known by the elderly. Weight, however, is a measurement, according to a recent study by Stunkard and Albaum (1981) that was often accurate in self-reported weights for a group of subjects under the age of 60. Several other studies showed similar results (Coates, Jeffery & Wing, 1978; Perry & Leonard, 1963; Wing, Epstein & Ossip, 1976). Schlicting et al. (1981) disagreed with the above results in that they found their subjects

overstated or understated their weight depending upon whether they were underweight or overweight. They also found women seemed to be more accurate in weight estimation than men. Of all the studies mentioned in this paragraph, only the one by Schlicting et al. (1981) and the one by Wing et al. (1976) had subjects over the age of 65.

The third and final area of literature review is how people form perceptions. People cannot fear, hate love, learn or recognize anything or anybody unless they first involve themselves in seeing, hearing, touching, tasting or smelling. Perceptions are the sine qua non of psychological adaptiveness of organisms to their life circumstances (Kidd & Rivoire, 1966, p. 57). Currently, there are approximately 11 modern and 7 classical theories of perception (Kidd & Rivoire, 1966).

The literature does agree that before any perceptual learning takes place, an infant is able to perceive. The infant is able to differentiate figure from ground, can discriminate between certain colors, tastes, odors, and other parts of his environment. In perception development, the child progresses through modes of perceptions. His autistic (affect) mode of perceptions is developed at an early age. As time progresses, this mode becomes extinct or unlearned and a more realistic

mode develops through finer perceptual differentiations (Solley & Murphy, 1960). As children learn and mature within the context of the culture, they come to see things the way adults do.

There has been considerable research into perception of the division between actual body characteristics and what is perceived by the person. But the perceived body is the reality for the person and is a strong force influencing this behavior (Douty, Moore & Hartford, 1974). The mechanisms of psychophysical interactions of inner persons with their physical habitus have been studied extensively by Fisher and Cleveland (1958). Few conclusive findings are evident from their research. The research has yielded a well-developed theoretical base for stating that one's self-image is gradually evolved by inferences based on one's perceptions of others' attitudes toward them (Combs & Snygg, 1959; Gordon & Gergen, 1968). The theory addresses the body as more than a physical object to be perceived and used by the person. It is a social object to which others in the society react positively or negatively. Social stereotypes of unattractiveness or attractiveness, as well as other's reactions to an individual, affect a person's perceptions of their body and the way they feel about their body (Douty et al., 1974).

Studies by Dion (1974) further support this theory by indicating that perception of attractiveness affects social interactions from an early age. Even as we age, the tendency to overrate or underrate those physical characteristics, such as height and weight, which are idealized by society, affect the degree of satisfaction with our body. "Attitudes toward the body," explain Fisher and Cleveland, "may mirror important aspects of his identity and may tell about his manner of relating to other people" (Douty et al., 1974, p. 516). Nicknames such as "fatso," "skinny," "bean-pole," or "shorty" may color one's self concept for an entire lifetime even though the body may change through the years.

In summary, the literature review shows most studies of height and weight perception and measurements have been on pediatrics and adult populations below the age of 65. These studies indicate that actual perceived body characteristics do not always agree with actual measured body characteristics. Fisher states that "all that you perceive, think and believe occurs in the context of your body experiences"(Fisher, 1973, p. 17). For many elderly, height is a body experience that has never been questioned since their young adulthood; therefore, they tend to perceive, think, or believe that

their height has never chagned throughout their life cycle. Weight, on the other hand, is a more noticeable changing aspect of our lives as our clothes become tighter or looser through the years. Thus, it is logical to conclude there is a relationship between perceived height and weight and measured height and weight in an elderly population.

Theoretical Framework

To establish a basis for the research topic a brief overview of the adaptation theory by Roy will follow. In biology, adaptation refers to plant and animal modifications of an organic nature to suit their environment (Helson, 1964). Dolzhansky defines adaptation as follows: "The more one studies living beings, the more one is impressed by the wonderfully effective adjustment of their multifarious body structures and functions to their varying ways of Life" (Helson, 1964, p. 38). White says, "adaptation is something that is done by living systems in interaction with the environment" (Roy, 1981, p. 53).

Helson refers to adaptation as a term "used in a broad, general sense as adjustment to the conditions under which species must live in order to survive" (Helson, 1964, p. 38). He also sees man's adaptability or positive response, depending upon the degree of change

occurring and the coping mechanisms used with the change. If the change is too extreme and the person is unable to cope due to limited ability, the change may not occur or it may occur with difficulty. Thus, the integrity of the person is maintained if a response is adaptive, whereas maladaptive responses do not maintain integrity. One should also remember that adaptation for a person depends on what is important for them and the long-term, behavioral effects versus short-term adaptive actions. Adaptation level is defined by Helson as the condition of the person relative to adaptation (Helson, 1964).

Roy uses adaptation theory as a basis to explain man as a biopsychosocial being (Roy, 1976). She sees man as using adaptive coping mechanisms to cope with the changing environment. Mechanism is defined as the "arrangement of parts to produce an effect" (Roy, 1981, p. 56). Roy postulates that man has a choice of two adaptive or coping mechanisms -- the regulator and the cognator. The adaptation theory is diagrammed in Figure 1 and has been adapted by the researcher for use in this study.

The regulator mechanism consists of inputs/stimuli produced by the external environment and from internal dynamic equilibrium state changes. The inputs/stimuli

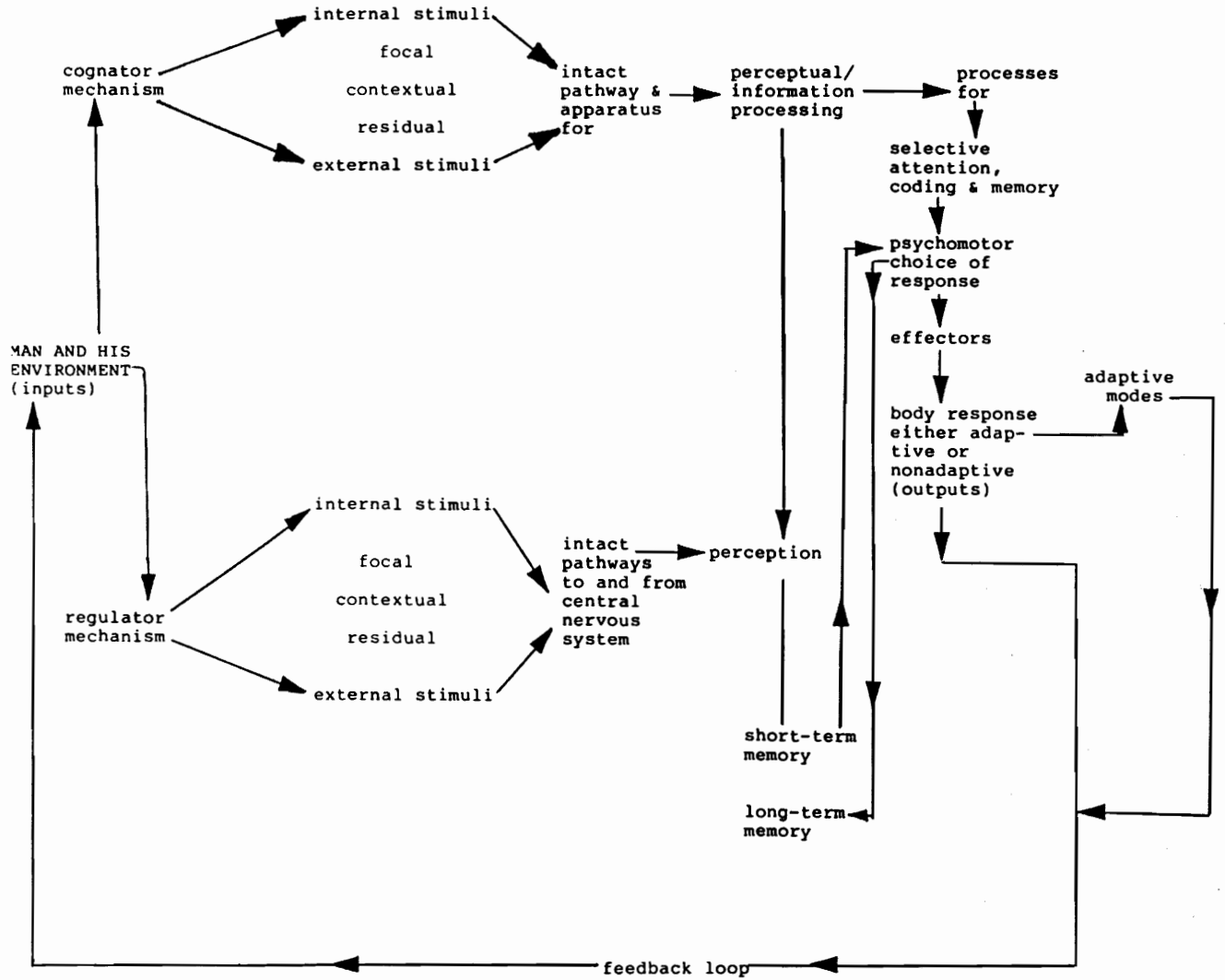


Figure 1. Theoretical model of the adaptation theory. Adapted from Roy, 1976, pp. 58, 61, 64.

may be either positive or negative and include body response information via the feedback loops (Roy, 1981).

One major part of the regulator mechanism is perception. The perceptual portion is the connecting link with the cognator mechanism. The process of perception can be altered by social and cultural factors. Perception is entered into short-term memory where it can either become part of the long-term memory and used in future perceptions or it can become a psychosocial choice of response for the effectors of body response.

The cognator mechanism is described as the internal and external inputs/stimuli of varying intensity with psychological, social, physical, and physiological factors of either a positive or negative nature. The cognator mechanism is postulated to contain the pathways of perceptual formation. The processors of perceptual formation are selective attention, coding and memory. One of the effectors for both the cognator and regulator mechanisms is the musculoskeletal system and it depends upon intact neural pathways to produce psychomotor choice of response to be carried through the effectors. The body response can be either adaptive or maladaptive.

If the body response is adaptive, man enters an adaptive mode. A mode is defined as a way or method

of doing or acting whereas an adaptive mode is a way of adapting (Roy, 1976). These modes, in turn, determine the type of cognator or regulator activity that occurs. The cognator mechanism seems to be related to all the adaptive modes while the regulator mechanism is predominately physiological.

Although Roy's model has several modes, only the physiological mode is of interest to this investigator. It is defined as follows:

> Physiological needs involve the body's basic needs and adaptation means such as fluid and electrolytes, exercise, rest, elimination, nutrition, circulation, oxygen and the regulatory function of the senses, temperature and endocrine function. For example, for exercise, man might be viewed in terms of posture, mobility and body alignment (Roy, 1981, p. 58).

The internal or external inputs/stimuli of either the cognator or regulator mechanism are called focal, contextual or residual. They are defined as follows: a) focal stimuli -- a stimuli immediately confronting a person; b) Contextual stimuli -- all other stimuli present; and c) Residual stimuli -- beliefs, attitudes, experiences or traits which are immeasurable as far as effect on the present situation (Helson, 1964).

Now it is appropriate to explore Roy's adaptation theory as it relates to the problem statement. Each year, the elderly population is growing in America. With the growth comes new challenges for the health care

professionals who care for the growing numbers. Health care professionals are just now on the threshold of understanding some of the normal changes of aging and how the body adapts to the changing status.

Because the health status of the elderly is influenced by multiple physical, physiological, social, and psychological factors, adaptation within the body is a fact of life as we age or homeostasis could not be maintained. Cannon defines homeostasis as a class of adaptations that maintain

> steady physiological states in mammals which enable them to counteract changes both in external environing conditions and in the internal body processes (Helson, 1964, p. 40).

It is fairly well known that the body does adapt as we grow older, better for some than for others. It was discussed that man does become shorter with age and has weight changes with age in most instances. As an example of how the adaptation theory is relevant to this study, a discussion of man's adaptation to height changes will follow.

Man does become shorter with age in most instances. The posture can adapt with age to the kyphosis, thinning of the vertebral disks and vertebral collapse. Man adapts to the various postures and movements indicative of the adaptation facing him at the time. Each bodily

posture is representative of an adjustment to a stimuli. The stimuli thus involve a response. For example, if we apply Roy's adaptation theory to the loss of stature (height) in the elderly, it might occur something like this. The focal stimuli identifies the degree of change that precipitates the adaptive behavior. The focal stimuli is also mediated by the contextual and the residual stimuli, or in other words, as man ages he loses height as part of the normal aging process. Trotter and Gleser (1951) stated it was a rate of 1.2 cm per 20 years.

The body may adapt to a focal stimuli (loss of height) due to disc narrowing, vertebral collapse, and osteoporosis, by developing kyphosis of the upper thoracic spine which can cause a backward tilting of the head producing a reduction of the occiput-to-shoulder distance. Along with the neck shortening, the thyroid gland may descend in relation to the clavicles. The aortic arch may elevate due to the lengthening of the aorta thus causing the innominate artery and the right common carotid artery to come up into the neck and kink thus causing a pulsating, palpable, and occasional visible swelling behind the clavicular portion of the right sterocleidomastoid muscle. Smith (1960) has also described a related change in the left innominate vein.

The rigid, enlarged aorta puts pressure on the left innominate vein which, in turn, causes dilation of the left external jugular vein.

These posture changes cause further changes in the skeletal system by reducing the shoulder width and size of the chest. There are cardiothoracic ratio changes which affect the ribs and the respiratory muscles (Rossman, 1971).

If you have some contextual stimuli, the intensity of the result can vary. For example, women are more prone to osteoporosis and this can intensify the amount of height loss due to aging. The adaptive response to the stimuli is seen as behavior that maintains the integrity of the individual. If maladaptation takes place, the integrity is lost and it is disruptive to the person. For example, the person may require a walker or cane. To further relate the adaptation theory to the problem statement, a look at the regulator and cognator mechanisms is in order.

The regulator input in this situation could be man's position in space, for example. This input is transduced into electrical neural inputs. If the Central Nervous System pathway is intact, these electrical neural inputs travel down the Central Nervous System to the effectors that put up autonomic responses.

These effectors control muscles or glandular structures. If, in our case, the effect is aneurally controlled muscle, the effector exists as an autonomic reflex response and thus, a body response. If the response is adaptive, it might tell the elderly person to bend over further or walk stooped over, for example, to accommodate for the aging changes in posture. This may be a very unconscious adaptation by the body to a change in stature over the years.

If the inputs become conscious, the perception process comes into play. The perception might be that "I am having trouble standing properly and I need a walker to keep upright." This results in a psychomotor response that acts on the effectors to tell the body to use some support (walker) or fall down. If the person decides to use a walker, long-term memory will tell them they should not ambulate without a walker. In conclusion, a theoretical framework was presented using the adaptation theory. It is proposed that a person's body adapts to changing height and weight as aging proceeds, through adaptation. This may or may not be a conscious adaptation.

Conceptual Definitions

The variables presented in the problem statement include: perceived height and weight, measured height

and weight, and elderly population.

Perceived height and weight are conceptually described as the verbalization by the subjects as to how tall they are in feet and inches and how much they weigh in pounds.

Measured height and weight are the height in inches and the weight in pounds as measured by the researcher.

Conceptually, the elderly population is defined as the 44 male veteran subjects, 65 or older, who were mentally cognizant, and able to stand for a height and weight measurement.

Research Hypotheses and Question

Hypotheses

The hypotheses posited in this investigation were:

1. There will be a correlation between perceived height and weight and measured height and weight in an elderly population.
2. Measured height and weight values will be lower than perceived height and weight values.

Research Question

The research question employed in this investigation was:

What variables are associated with perceived height

and weight and measured height and weight?

Assumptions and Limitations

Assumptions

The assumptions made in this project were:

1. That the subjects have lost height with age.

2. That the subjects do not perceive height and weight the same as measured height and weight.

3. That the subjects will respond truthfully to the best of their abilities on their perceived height and weight.

4. That the balance-beam scale is a reliable instrument to measure height and weight.

5. That the use of physicians familiar with the subjects are reliable for assessment of cognizance level of the subjects.

Limitations

The limitations affecting the results of this research investigation were:

1. The findings cannot be generalized beyond the sampling unit due to design and sample size.

2. Absolute control or accuracy of the balance-beam scale and the vertical bar cannot be assured.

3. Contamination of the subjects by previous

hospitalization in which height and weight were measured and communicated to the subject cannot be ruled out.

4. Lack of research control over multiple extraneous variables such as interaction with other subjects in the medical center, age, sex, number of previous hospitalizations, food and water intake before measurement sessions, seasonal variations of Summer and Fall, and slight variations in weight of socks, regulation pajamas may all represent alternative explanations for the results of the research.

Rationale and Significance of the Study

The rationale for this study was based on a need for more information and exploration concerning the relationship of the elderly person's perception of their height and weight versus measured height and weight. It was hypothesized that their perception of height and weight is not always as accurate as it could be, which may or may not be due to correct information they possess about their height and weight. Describing this relationship between perceived and measured height and weight in the elderly is the purpose of this study.

The significance of this study will be to add to the knowledge base of information on the elderly. If a significant relationship is shown by this study, it

could serve as an incentive to health care providers to take actual measurements of height and weight rather than rely on the verbal heights and weights given by the patient. The information on clinical records should be accurate to facilitate proper calculations for ideal body weight, creatinine height-index, anthropometric measurements and medication dosage. If accurate information appears on the records, it is hoped that health care for the elderly. likewise will improve.

CHAPTER II

DESIGN OF THE STUDY

This investigation utilized a descriptive, correlational design in order to explore relationships between perceived height and weight and measured height and weight in an elderly population. No attempt was made to deduce a causal relationship, but rather to establish a significant relationship between the variables. Other influencing variables were examined to ascertain their relationships to perceived and measured height and weight. A convenience sample of subjects was drawn from an elderly population.

Data Collection Procedures

Setting

The setting for the data collection was the Veterans Administration Medical Center in Salt Lake City, Utah.

Population

The population examined was comprised of persons

65 years of age and older, male, mentally cognizant, and able to stand for height and weight measurements. All members of the population were hospitalized in the Veterans Administration Medical Center in Salt Lake City, Utah on either the medical or surgical wards.

Sample

The convenience sample consisted of patients 65 years or older, who were hospitalized in the Veterans Administration Medical Center on a medical or surgical ward. The sample of 44 subjects was limited by age, sex, mental competence, hospital day and ability to stand on a balance beam scale. The sample was not limited by number of previous hospitalizations, diagnoses or previous knowledge of height and weight measurements.

Collection Protocols

Prior to initiation of the investigation, permission was obtained from the subjects, as well as the Veterans Administration Medical Center authorities to conduct the study.

Subjects were initially selected by daily ward rosters from wards IE, IG, IF, 2A, 2C and 2D. Criteria

used for contacting the subjects included age, hospital day one or two, and consultation with the physician in charge of the case on the mental cognizance of the subject. The subject was then contacted and asked to participate. Those subjects who agreed to participate in the research became the study sample.

Each subject was then assigned an identification number. The subject was asked the following questions by the researcher:

1. What is your age?
2. How far did you go in school?
3. Are you single, married, widowed or divorced?
4. How tall are you?
5. How much do you weigh?

The subject was then weighed and measured by the researcher.

The subjects were weighed and measured between 6:30 pm and 9:00 pm between June and October to try and standardize measurements for diurnal and seasonal variations and immediacy food and water intake.

The subjects were measured for height wearing socks, standing with feet together, back and heels against the upright bar of the height scale attached to the balance beam scale, head approximately in the Frankfort horizontal plane (looking straight ahead) and

erect. Subjects were encouraged to "stand up straight" and were given some assistance or a demonstration, if necessary.

The equipment consisted of the level platform of the balance-beam scale from ward 1E to which a movable vertical bar with a perpendicular horizontal bar that fit snugly on the subject's head was attached.

The subjects were measured for weight wearing socks, Veterans Administration regulation pajamas and robe, making sure all extraneous objects were removed from the pockets. The total weights of all clothing worn ranged from 0.20 to 0.62 pounds depending on the size of the pajamas and robe. Clothing weight was insignificant to the study and was not deducted from the totals of measured weight.

The equipment consisted of a balance-beam portable scale from ward 1E. The scale was calibrated by the Biomedical Department of the Veterans Administration Medical Center.

Anonymity and confidentiality of subjects was maintained at all times. All information gathered was coded and the subjects were referred to by their identification numbers only. Throughout the research study, protection of the rights of these human subjects was a priority. As a benefit for participation in the study,

the subjects received teaching on normal height and weight changes of aging at the end of the information gathering session.

Operational Definitions

The three variables in the problem statement were: perceived height and weight, measured height and weight, and elderly population.

Perceived Height and Weight

Perceived height and weight were defined as the response of the subject to the questions: "How tall are you and how much do you weigh?" The questions were asked by the researcher before the subjects were measured for height and weight.

Measured Height and Weight

Measured height and weight were operationalized when the researcher actually weighed and measured the height of the subjects. The measurements were obtained between 6:30 pm and 9:00 pm during the months of June, July, August, September, and October. The subjects were dressed in Veterans Administration pajamas and robe, and wore only socks on the feet. A balance-beam scale with movable vertical bar with a perpendicular horizontal bar

was used to obtain the measurements of height and weight.

Elderly Population

The elderly population can be described as male veterans, age 65 or older, Caucasian, mentally cognizant as determined by the subject's physician, and able to stand for measurement of height and weight. The subjects were in hospital day one or two and were inpatients at the Veterans Administration Medical Center on wards 1E, 1F, IG, 2A, 2C or 2D. The marital status of the subjects varied from single, married, or widowed to divorced. Educational background of the subjects ranged from grade school to completion of a Ph.D.

Instruments

A data collection form (see Appendix A) and a balance-beam scale with a movable vertical bar with a perpendicular horizontal bar were the instruments used in the investigation. The validity and reliability of the instruments will be briefly examined.

The estimation of the data collection form's reliability was obtained through the test-retest method. Initially, ten subjects were seen and asked the questions on the form. At the time the researcher talked with the physician about mental cognizance of the sub-

ject, the physician was asked if the subject would be hospitalized for at least one week. At the end of a week, the subjects were seen again and asked the same questions on the form. All ten subjects were still hospitalized at the time of the retest and the reliability coefficient was 0.96. These ten subjects were not included in the study sample of 44 subjects. The data collection form was determined to demonstrate stability by repeated effectiveness in obtaining the data needed to conduct the research.

The actual validity of the form cannot be tested in this investigation. Content validity will be addressed briefly. The investigator consulted with two dieticians at the Veterans Administration Medical Center on appropriate wording of questions about height and weight. The questions of "How tall are you?" and "How much do you weigh?" were determined the most appropriate to measure a specific content area about height and weight. Likewise, the questions of "How old are you?" "How far did you go in school?" and "Are you single, married, widowed or divorced?" were determined the most appropriate to measure their specific content areas by a physician, a social worker and a Geriatric Nurse Practitioner. The content validity of this tool is strictly judgmental since no objective methods of measuring the accuracy of

content coverage of this instrument are available.

The second instrument in the investigation was a balance-beam scale with a movable vertical bar graduated in increments of one-fourth inches with a perpendicular horizontal bar for measuring height. The reliability of this instrument was determined in the following manner. The scale used throughout the investigation came from a medical ward with limited admissions per day, so that the scale was available to the researcher during the evening hours. Initially, the scale was calibrated by the Biomedical department at the Medical Center with a set of known weights. Future measurements were done by the researcher using a known 20 pound weight at two week intervals. The reliability coefficient for the ten test weights was 0.95. All weight measurements were done by the researcher. Initially, a dietician instructed the researcher on proper weight data collection on a balance-beam scale and a sample of ten subjects consisting of staff members were weighed by the researcher with the dietician present to determine the researcher's reliability in weight measurement. The reliability coefficient was 0.97.

Height measurements were determined by a steel movable, vertical bar graduated in increments of one-fourth inches with a perpendicular horizontal bar that

fit snugly against the subject's head. The vertical bar was attached to the balance-beam scale. Proper posture of the subject and researcher eye-level height readings were essential to accuracy of the height measurement. The dietician used for reliability of weight measurements was again used to determine the researcher's reliability in height measurements. The reliability coefficient was 0.95 in a test of ten staff subjects. The construct validity of this type of instrument has been established by its wide use within the medical field.

CHAPTER III

DATA ANALYSIS

The primary data analysis involved computation of descriptive and inferential statistics, and some correlational analysis. The analysis of data is divided into three sections. The first section uses descriptive statistics to describe relationships between perceived height and weight. Section two looks at the variables of age, educational and marital status and their relationships to perceived and measured height and weight. Finally, the last section describes some additional findings about the study sample in relation to standardized data on height and weight.

Descriptive Statistics of the Relationships between Perceived Height and Weight and Measured Height and Weight

Table 2 illustrates numerous descriptive statistics. A description of the sample population is necessary before further data analysis. As noted in Table 2, the total sample size was 44. The population was all male and ranged in age from 65 to 95 years. Since the variables were grouped by age, marital status

Table 2

Summary of Descriptive Characteristics of Study Sample

Sample	Percent	N	Range	Mean	Mode	Median
Males	100.0	44	--	--	--	--
Caucasian	100.0	44	--	--	--	--
Single	13.6	6	--	--	--	--
Married	54.5	24	--	--	--	--
Widowed	20.5	9	--	--	--	--
Divorced	11.4	5	--	--	--	--
Age-all	100.0	44	65-95	--	65-70	--
65-70	38.6	17	--	--	--	--
71-75	11.4	5	--	--	--	--
76-80	15.9	7	--	--	--	--
81-85	11.4	5	--	--	--	--
86-90	15.9	7	--	--	--	--
91-95	6.8	3	--	--	--	--
Education	--	44	grade 1-17 +	--	1-8	--
1-8 yrs	38.6	17	--	--	--	--

Table 2 continued

Sample	Percent	N	Range	Mean	Mode	Median
9-12 yrs	34.1	15	--	--	--	--
13-16 yrs	25.0	11	--	--	--	--
17+ yrs	2.3	1	--	--	--	--
P Wt.	100.0	44	100-263#	158#	165#	160#
M Wt.	100.0	44	100-296#	159#	180#	160#
P Ht.	100.0	44	60-75"	69"	71"	69"
M Wt.	100.0	44	60-74"	68"	72"	68"

and education, the statistic mode is used to describe the variables of age and education. Modally, the population was 65-70 years old and had 1-8 years of formal education. Over half (54.5%) of the population was married, with the next most frequent category of marital status (20.5%) being widowed. The population was all Caucasian and Anglo-Saxon.

The findings in Table 2 also describe the variables of perceived height (PH), perceived weight (PW), measured height (MH), and measured weight (MW). In analyzing perceived weight, the range was 100 to 293 pounds, with a mean of 158, a mode of 165 and a median weight of 160 pounds. The median for measured weight and perceived weight were the same. The means for both variables were very similar with only one pound variation (perceived weight = 158 lbs/measured weight = 159 pounds). The mode, however, showed a 15 pound variance (perceived weight = 165 pounds/measured weight = 180 pounds). Perceived height findings revealed a range of 60-75 inches, a mean of 69 inches, mode of 72 and a median of 69 inches. Measured height findings ranged from 60-74 inches, with a mean of 68 inches, mode of 72 inches and a median of 68 inches. Tables 3 through 6 further break down this data into frequency of subjects per perceived height, measured height, perceived weight

Table 3

Number of Males, Aged 65-95 Years, By Age and Perceived Height in Inches

Measured Height in Inches	Age of Males in Years						
	All Ages 65-95	65-70	71-75	76-80	81-85	86-90	91-95
	Number of Subjects per Age						
All Heights	44	16	5	8	5	7	3
Less than 60							
60	1				1		
61	1						1
62							
63	1					1	
64							
65	1	1					
66	2	2					
67	6	4				3	1
68	4		2		1	1	1
69	6	1	1	2		1	1
70	3	2		2			
71	10	4	1	3	1	1	
72	3	2		1			
73	1				1		
74	3	1	1		1		
75	2	1				1	
76 or more							

Table 4

Number of Males, Aged 65-95 Years, by Age and Measured Height in Inches

Measured Height in Inches	Age of Males in Years						
	All Ages 65-95	65-70	71-75	76-80	81-85	86-90	91-95
	Number of Subjects per Age						
All Heights	44	16	5	8	5	7	3
Less than 60							
60	1				1		
61	1						1
62	1	1					
63	3	1				2	
64	1	1					
65	2	1		1			
66	7	2			1	4	
67	5	1	1	2	1		
68	8	1	1	3		1	2
69	4	4					
70	2		2				
71	1			1			
72	6	2	1	1	2		
73	1	1					
74	1	1					
75							
76 or more							

Table 5

Number of Males, Aged 65-95 Years, by Age and Perceived Weight in Pounds

Perceived Weight in Pounds	Age of Males in Years						
	All Ages 65-95	65-70	71-75	76-80	81-85	86-90	91-95
All Weights	Number of Subjects per Age						
	44	16	5	8	5	7	3
Less than 100							
100-109	1				1		
110-119	6	1	1	2		1	1
120-129	4	2				1	1
130-139	3			1		1	1
140-149	2					2	
150-159	2	1			1		
160-169	6	3		2		1	
170-179	10	4	3	2	1		
180-189	3			1	1	1	
190-199	2	1		1			
200-209							
210-219							
220-229	2	2					
230-239							
240-249							
250-259							
260-269	1	1					
270-279							
280 or more							

Table 6

Number of Males, Aged 65-95 Years, by Age and Measured Weight in Pounds

Measured Weight in Pounds	Age of Males in Years						
	All Ages 65-95	65-70	71-75	76-80	81-85	86-90	91-95
All Weights	Number of Subjects per Age						
	44	16	5	8	5	7	3
Less than 100							
100-109	3			1	1	1	
110-119	3			1		1	1
120-129	7	3	1	1		1	1
130-139	1						1
140-149	2	1				1	
150-159	5	3			1	1	
160-169	7	3	1	3			
170-179	3	1	1			1	
180-189	5		1	1	2	1	
190-199	3	1		1	1		
200-209	2	1	1				
210-219	1	1					
230-239							
240-249							
250-259							
260-269	1	1					
270-279							
280 or more							

and measured weight.

These elementary descriptive statistics of central tendency were chosen as a means of providing order to a set of raw data and to help clarify any group patterns and characteristics. Because of the range within the category data for age and educational status, mode was used to determine central tendency for this group of raw data. Central tendency was also determined for perceived height, perceived weight, measured height, and measured weight by using mean, mode and median. The central tendency distribution for both perceived height and measured height was symmetrical. In terms of perceived weight and measured weight, a similar distribuiton existed although there was a one to two pound difference between the mean and median. Figures 2 and 3 illustrate the relationships of central tendency indices as skewed distributions. The findings from Figure 2 indicate that there are more subjects below 72 inches (6 foot) than above. The relationships of the mean and median between perceived height and measured height and the modal perceived height and measured height were of interest. The mode and the mean/median of perceived height revealed a two inch difference, whereas the mode and mean/median difference was four inches. The findings depicted in Figure 3 are similar

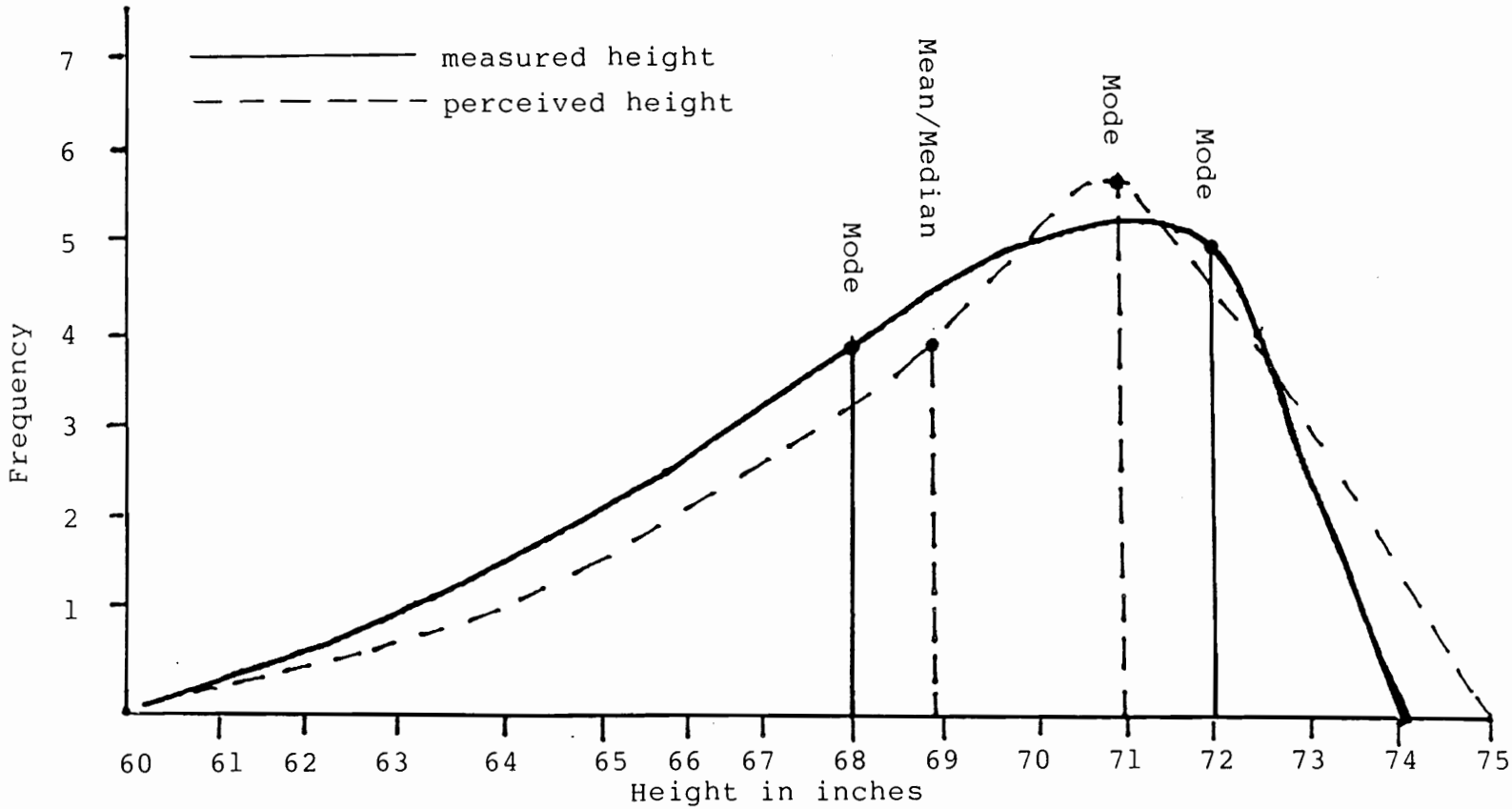


Figure 2. Relationship of central tendency indices in skewed distributions of height.

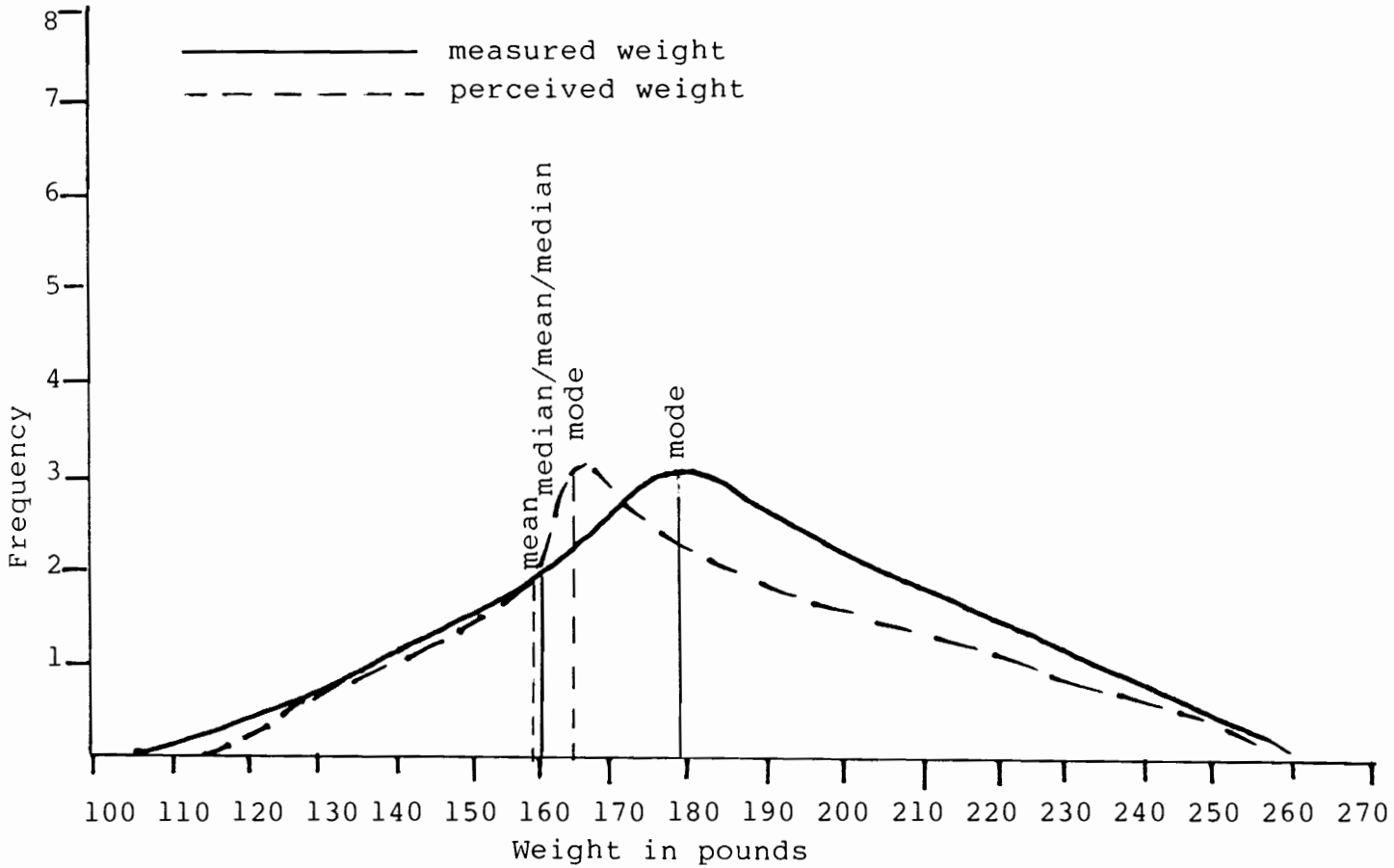


Figure 3. Relationships of central tendency indices in skewed distributions of weight.

for perceived weight and measured weight. The relationship between mode and mean/median is a 5 pound difference while measured weight showed a 20 pound difference.

Hypothesis One

Hypothesis one stated:

> There will be a correlation between perceived height and weight and measured height and weight in an elderly population.

Hypothesis one is partially supported, as revealed by the data reported in Tables 2 through 6 and Figures 2 and 3.

Hypothesis Two

Hypothesis two stated:

> Measured height and weight values will be lower than perceived height and weight values.

Hypothesis two is partially supported when the descriptive data is divided into subpopulations. Tables 7 through 10 summarize perceived height, measured height, perceived weight and measured weight by age. Tables 7 and 8 indicate how age affects the subjects' perceived and measured height. A trend seen in these two tables is that the 91-95 year olds are the shorter subjects in the study.

Likewise, the trend revealed in Tables 9 and 10 shows that the 91-95 year olds weigh less than any other

Table 7

Summary of Perceived Height by Age

Age	N	Mean	Std. Dev.
65-70	17	69.50	2.82
71-75	5	69.74	2.59
76-80	7	70.29	1.15
81-85	5	69.00	5.49
86-90	7	68.50	3.73
91-95	3	65.67	4.16

Table 8

Sumary of Measured Height by Age

Age	N	Mean	Std. Dev.
65-70	17	69.99	3.44
71-75	5	69.24	1.90
76-80	7	68.10	2.38
81-85	5	67.10	4.95
86-90	7	66.69	3.09
91-95	3	65.40	3.81

Table 9

Summary of Perceived Weight by Age

Age	N	Mean	Std. Dev.
65-70	17	167.88	37.24
71-75	5	168.00	31.47
76-80	7	149.93	29.51
81-85	5	163.50	33.51
86-90	7	144.07	22.52
91-95	3	124.17	12.35

Table 10

Summary of Measured Weight by Age

Age	N	Mean	Std. Dev.
65-70	17	171.21	38.16
71-75	5	168.56	36.70
76-80	7	149.64	34.04
81-85	5	165.30	37.28
86-90	7	142.40	29.37
91-95	3	124.50	10.76

age group. Standard deviations for this age group are also noteworthy in comparison to the other age categories indicating the 91-95 year olds are more accurate in knowledge of their weight. A possible explanation for these results could be the small sample size (n = 3).

Partial support for hypotheses one and two is evidenced in these findings from the descriptive statistics. There does seem to be a correlation between perceived weight and measured height and measured weight and values for measured height and measured weight were generally lower.

The final descriptive data from the study are summarized in Tables 11 and 12. These tables collate the differences between perceived and measured height and perceived and measured weight. The predominate trend in Table 11 is that people overestimate their height while Table 12 suggests a trend toward people underestimating their weight. These data only partially support hypothesis two. Lower values are seen only in measured height.

In summary, the first section provided descriptive statistics to support hypotheses one and two. The population primarily was married, male, aged 65-70 with one to eight years of education. Variations were

Table 11

Differences between Perceived Height and Measured Height

Perceived - Measured Height		
# of inches	N	Percentage
-2	1	2
-1	2	5
0	6	14
1	10	23
2	15	34
3	5	11
4	4	9
5	1	2
TOTAL	44	100

Mean = 1.509 inches

Range = -2 inches to 5 inches

Mode = 2 inches

Note. (-) value indicates subject thought he was shorter than he measured to be.

Table 12

Differences Between Perceived Weight and Measured Weight

# of pounds	N
-30	1
-20	1
-18	1
-15	1
-13	1
-11	1
-10	1
-9	1
-8	2
-6	3
-4	5
-3	2
-1	3
0	6
2	3
3	1
4	1
6	3
7	1
9	1
10	1
11	2
23	1
31	1

Mean = -1.264 pounds

Range = -30 to 31 pounds

Mode = 4 pounds

Note. (-) value indicates underestimation of weight in pounds.

greater between perceived weight and measured weight than between perceived height and measured height. The descriptive data did show a correlation between perceived height and perceived weight and measured height and measured weight and thus, helped support hypothesis one. Hypothesis two was partially supported by the descriptive statistics that revealed measured height values to be lower than perceived height values.

Age, Education, and Marital Status and their Relationships to Perceived Height and Weight and Measured Height and Weight

In the following section the relationships between marital status, education, and age are discussed. An analysis of variance (ANOVA) was used to test the significance of differences between means and the *F*-ratio statistic. The data collected from the subjects has some variability due to individual differences in perceptions of height and weight and actual measurements of height and weight. There are also variable differences in age, education, and marital status of the subjects. Analysis of variance was chosen because it decomposes the total variability of the data into the variability of the independent variables and all other variability. Table 13 summarizes the findings and attempts to answer research question one, which states:

Table 13

Summary Table of ANOVAS for Perceived Height/Measured Height and Perceived Weight/Measured Weight and their Relationships to Education, Marital Status and Age

Source of Variation	Sum of Squares	df	Mean Square	F	p
Education/Height					
Between group	4.178	3	1.393	.782	
Within group	71.238	40	1.781		>.05
Total	75.416	43	1.754		
Education/Weight					
Between group	278.732	3	92.911	.847	
Within group	4389.589	40	109.740		>.05
Total	4668.321	43	108.566		
Marital Status/Height					
Between group	0.10	1	0.10	.006	
Within group	75.406	42	1.795		>.05
Total	74.416	43	1.754		
Marital Status/Weight					
Between group	3.805	1	3.805	.034	
Within group	4664.516	42	111.060		>.05
Total	4668.321	43	108.566		
Age/Height					
Between group	14.343	5	2.869	1.785	
Within group	61.073	38	1.607		>.05
Total	74.416	43	1.754		
Age/Weight					
Between group	155.750	5	31.150	.262	
Within group	4512.571	38	118.752		>.05
Total	4668.321	43	108.566		

What variables affect height and weight?

The statistical data presented in Table 13 were arrived at in the following manner: Between group under the heading of Education/Height, for example, indicates the difference between the mean of subjects in the education group 1-8 years as compared with groups 9-12 years, 13-16 years, and 17+ years in relation to height. The within group category looks at the mean of each individual subject within 1-8 years of education in relation to height. This analysis of variance was calculated for each variable presented in Table 13.

Table 13 indicates that no significant relationships exist between how subjects perceive their height and weight in relation to actual measurements of height and weight and how old they are, how far they went in school, or whether they are married or not married.

One of the most common methods of describing a relationship between two measures is correlational procedures. To determine what extent the two variables -- perceived and measured height and perceived and measured weight -- are related to each other, a graphic representation, or scattergram, was executed. Figures 4 and 5 present these scattergrams. Tables 14 and 15 present the statistics for Figures 4 and 5, respectively. Both scattergrams show a high positive

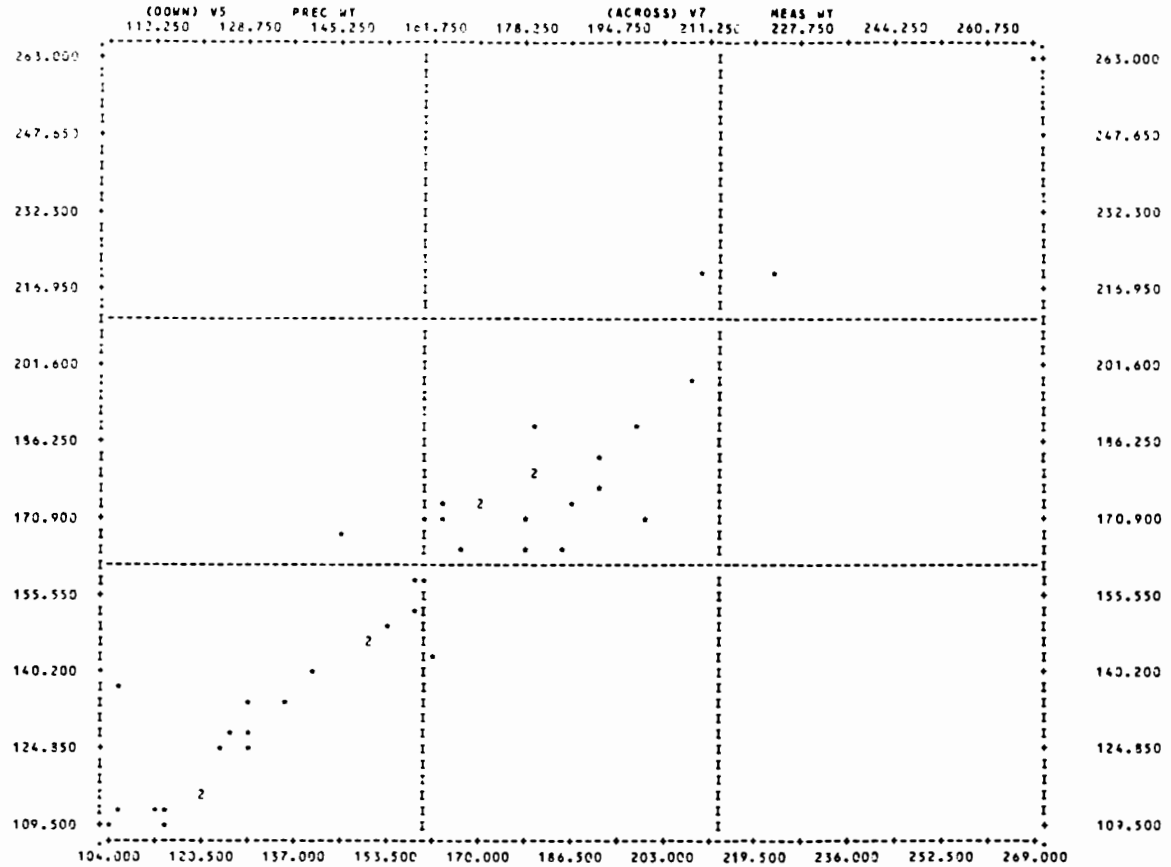


Figure 4. Scattergram of perceived weight and measured weight.

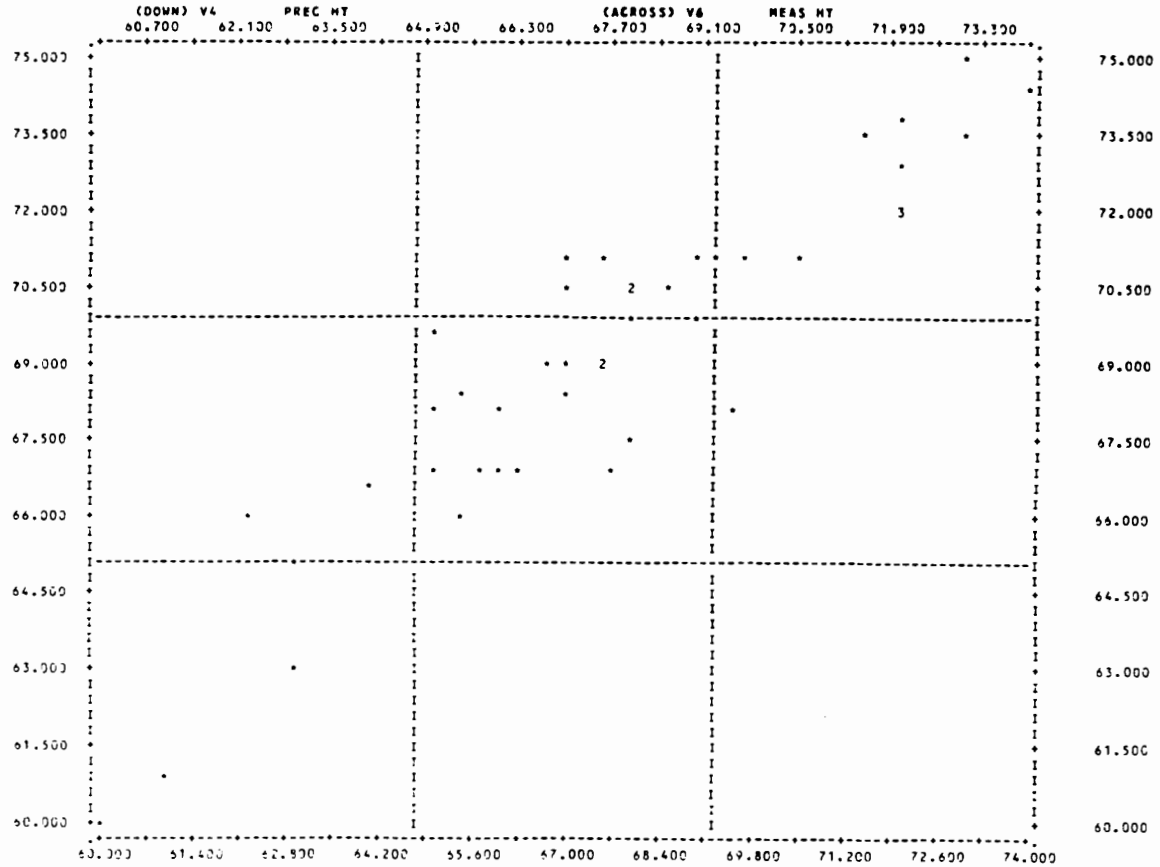


Figure 5. Scattergram of perceived height and measured height.

Table 14

Summary of Statistics of Perceived Weight and Measured Weight

Statistic	Value
Correlation (R)	0.75673
Significance	0.00001
Intercept (A)	16.85896
Slope (B)	0.88605

Note. The data in this table correlate with the scattergram depicted in Figure 4.

Table 15

Summary of Statistics of Perceived Height and Measured Height

Statistic	Values
Correlation (R)	0.91759
Significance	0.00001
Intercept (A)	7.70503
Slope (B)	0.90843

Note. These data correlate with those in the scattergram depicted in Figure 5.

correlation and thus support hypothesis one, that there is a correlation between measured height and perceived height and measured weight and perceived weight.

In summary, hypothesis one was supported when a positive correlation between perceived height and weight and measured height and weight were demonstrated through the use of scattergrams. This section also addressed research question one and produced no significant relationships between how subjects perceived height and weight and age, education, or marital status.

Additional Findings about the Study Sample

The final section deals with the comparison of this study's data to data from an adapted standard weight per inch of height chart published in the Journal of the American Medical Association for a population aged 65-94 years old. The Metropolitan Life Insurance Charts were not used due to the age of the population not being compatible with this study. Table 16 presents the standard heights per standard weights from the 1960 study. Table 17 was generated by this researcher and contains results of height per inch per standard weight for this study's elderly population. Table 18 compares this elderly population with the control group. Findings from Table 18 indicate that 50% of the study

Table 16

Height per Inch per Standard Weight

Control Group - Males

Height In Inches	65-70	71-75	76-80	81-85	86-90	91-95
	Weight in Pounds per Age					
61	128-156	125-153	123-151			
72	130-158	127-155	125-153	122-148		
63	131-161	129-157	127-155	122-150	120-146	
64	134-164	131-161	129-157	124-152	122-148	
65	136-166	134-164	130-160	127-155	125-153	117-143
67	140-172	140-170	136-166	132-162	130-160	122-150
68	143-175	142-174	139-169	136-165	133-163	126-154
69	145-179	146-178	142-174	139-169	137-167	130-158
70	150-184	148-182	146-178	143-175	140-172	134-164
71	155-189	152-186	149-183	148-180	144-176	139-169
72	159-195	156-190	154-188	153-187	148-182	
73	164-200	160-196	158-192			
74						
75						
76						

Note. Adapted from Master et al., 1960, p. 660.

Table 17

Height per Inch per Study Weight

Study Group

Height In Inches	65-70	71-75	76-80	81-85	86-90	91-95
	Weight in Pounds per Age					
60				180		
61						125
62	170					
63	150					
64	160					
65	121/126		106	104	106/151	
66	154		128		154/154	
67	128	180	113/164	158	141	124/135
68	183/183	120	185			
	210					
69	162/168	164/170				
	168					
70			191			
71				199		
72	184/184	208	160	186		
73	191					
74	269					
75						
76						

Table 18

Comparison of Study Group with Control Group

Description	N	%
1. Number of subjects with weights less than standard - Table 16.	8	18
2. Number of subjects with weights more than standard - Table 16.	10	23
3. Number of subjects with weights within normal weights range per age on standard standard - Table 16.	22	50
4. Number of subjects with weights not listed on Table 16.	4	9

population fell within the norms in regard to height and weight and age. Eighteen percent weighed less than standard for their height while 23% were overweight for their height. Nine percent of the subjects could not be compared due to limitations of the data. This basic statistical technique was used for a comparison of the study population to the norm. The findings in Tables 17 and 18 have no significance for either hypotheses one and two or research question one.

CHAPTER IV

DISCUSSION OF FINDINGS

This study did show a relationship between perceived height and weight and measured height and weight. Not surprisingly, a close correlation (r=.92/ height; r=.96/weight) was found between the variables, but in spite of this close correlation, the study did prove people do not report their height and weight correctly. The subjects in the study overestimated their height while underestimating their weight. Hypothesis one was answered in that a correlation was present between perceived height and weight and measured height and weight.

As we age, we generally get shorter as supported by Rossman (1971) and Stoudt et al. (1960). Obesity is likewise seen in 10-15% of males according to Hejda (1963), Hollifield and Parson (1959), and Master et al. (1960). This study did support the literature. Seventy-nine percent of the subjects overestimated their height anywhere from one-half inch to four and one-half inches and 23% of this male population was overweight according to height and age.

Subpopulations of age, education and marital status

were tested to answer research question one,

> What variables are associated with perceived height and weight and measured height and weight?

These variables were not significant to the subjects' answers about either perceived height and weight or measured height and weight. An interesting finding of this study, however, was the relationship in the 91-95 year-old age category to measured height and weight. This age group was the shortest and the thinnest. Hollifield and Parson's study (1959) of 700 elderly found that subjects generally lose weight after the age of 74. The adapted table from Master et al. (1960) likewise indicates decreasing height and weight in the 91-95 age group by their smaller variations for values of height and weight. It is possible that since this age group in this study had the smallest n (3) that it was not representative of the norm, however.

Hypothesis three, which dealt with whether measured height and weight values would be lower than perceived height and weight values was only partially supported. The subjects overestimated their perceived height but underestimated their perceived weight.

A possible explanation for the height discrepancies between perceived height and measured height could be that as people age they do not realize they get shorter

and, therefore, report the height they remember from an earlier period in their lives. The finding of underestimation of weight could be explained by the seven subjects who underestimated their weight by 10 to 30 pounds. These seven subjects, along with the five who overestimated their weight, skewed the findings of the study. Seventy-three percent of the subjects in the study knew their (measured) weight within nine pounds. If the 12 subjects at the extremes were eliminated from the study, the findings of this study would support the literature on accuracy of self-reported weights. According to the article by Stunkard and Albaum (1981), self-reported weight studies are amazingly accurate with correlations of 0.96 and 0.98.

Underestimation of weight could also be explained by the lack of control in the study design for medical conditions that could add weight, i.e., congestive heart failure or edema of the lower extremities.

The overestimation of height supported hypothesis two in that measured heights were lower than perceived heights. Hypothesis two was not supported for the measurement of weight in this study. The subjects underestimated their weights, thus making the measured weight values higher. It should be kept in mind, however, that subjects with variations in perceived

weight from their measured weight and the lack of control for medical diagnoses in the study design, influenced the lack of support for hypothesis two.

The findings of this study support the theoretical framework. Evidence of this study indicates as people age their bodies do adapt to body responses. The study showed the population overestimated their height and underestimated their weight. The perceptions for most of the subjects in relation to height must have been unconscious. Seventy-nine percent of the subjects perceived themselves taller than shown in the measured data. A body response did occur to the loss of height and allowed them to continue to walk and function appropriately. It could be concluded that adaptation to changing height only becomes conscious when the body needs more help than the organism can supply (i.e., a walker or when new information about height gets registered in the brain).

Perceptions about weight were also supported. People like to perceive themselves as "normal" and often see themselves as they want others to see them. Therefore, excluding the earlier explanation concerning no control for medical conditions, people who are over the weight norms may perceive themselves as thinner. An explanation for this discrepancy could be as we age we do

not perceive our weight as changing or we fail to see the importance of knowing our weight after a certain age.

Application of the theoretical framework to this study could occur in the following way: A stimuli (input), such as knowledge about measurements of height and weight, could have been introduced to either the cognator or regulator mechanism. If a stimuli (input) such as height measurement entered the cognator mechanism, the information could have been selected out for use by the body and entered into the psychomotor choice of response. Eventually, this choice would become a body response that resulted in an adaptation (adaptive mode) or maladaptation. The body response to the stimuli would enter the feedback loop. If the response is adaptive, homeostasis between man and his environment would be reestablished. If the same stimuli (input) again entered the cognator mechanism and arrived at the psychomotor choice of response, another pathway choice could have been long-term memory. The new stimuli (input) could have replaced previously known height measurements. Yet another pathway that could have been selected is the throughput between the cognator and regulator mechanism at the level of perceptual/information processing. The stimuli (input) could have traveled down to the percep-

tion portion of the regulator mechanism and entered into short-term memory before becoming a psychomotor choice of response. The stimuli (input) at that point could again make the choice of entering long-term memory for future adaptations or become an adaptive or maladaptive body response.

In summary, this study did show a correlation between perceived height and weight and measured height and weight and thus supported hypothesis one. Hypothesis two -- measured height and weight values will be lower than perceived height and weight values -- was only partially supported because the subjects' perceived weights were underestimated in relation to measured weights. Finally, research question one was answered. Variables such as age, education or marital status have no effect on how subjects perceive their heights and weights.

CHAPTER V

SUMMARY AND IMPLICATIONS FOR NURSING

Mentally cognizant, ambulatory patients in the Veterans Administration Medical Center between the ages of 65 and 95 served as the convenience sample for a descriptive study on the relationship between perceived height and weight and measured height and weight. The 44 subjects were asked to verbalize their height and weight and then be measured for height and weight. Correlations between the specific variables of perceived height and measured height and perceived weight and measured weight and the subpopulations were determined.

The findings were reported as both descriptive and inferential statistics and correlational analysis. Hypothesis one, which stated there would be a correlation between perceived height and weight and measured height and weight was statistically supported. The correlations were significantly high (r=0.95/weight; r=0.91/height). The findings suggest people are generally aware of their bodies. A disadvantage of the study is that it fails to demonstrate the significance that

inaccurate heights of several inches or inaccurate weights by several pounds can have on an elderly population. These implications will be addressed later in the chapter.

Hypothesis two, which said measured height and weight values will be lower than values for perceived height and weight was found to be only partially supported. Instead, with this particular sample, it was found that subjects overestimated their height but underestimated their weight. The overestimation of height was an expected finding due to the lower frequency of height measurements. The underestimation of weight was a surprising finding due to the frequency at which most people are weighed and the fact it did not support the literature on accuracy of self-reported weights. This finding was explained by the seven subjects who underestimated their weight by 10 to 30 pounds and thus skewed the results.

The research question asked what variables were associated with perceived height and weight. Age, education and marital status were found to have no significance to how the subject perceived his height or weight and thus reported them. Though not statistically significant, the oldest age (91-95) group was shorter and thinner than the rest of the sample.

This investigation has stimulated other questions and avenues of exploration. Would similar results be found in populations not contaminated by hospitalization, not all of one race, or one geographic area. If skinfold or long bone measurements on an elderly population were taken, would similar results be reported or would one type of measurement be more accurate than another? The exploration of other variables besides age, education and marital status might yield different results. For example, what effect do health fairs, senior citizen clinics, or reading about aging have on people's perceptions of height and weight?

Development of tables and reference materials specifically for the elderly would be helpful in determining "norms" for the age group and then perhaps more accurate assessments would be obtained in studies done on elderly populations.

Finally, replication of the study with a larger sample size would be helpful. The researcher would then be free to use more powerful statistical measures and be able to draw more definite conclusions.

The implications for nursing from the results of this study can be directed to both the clinical and nursing education areas. Practicing nurses must do comprehensive histories on their patients. Simple measure-

ments, such as height and weight, must be done on patients rather than letting the patients verbally tell the practitioner their height and weight. A simple nutritional history should include a weight history. This history should include weights at intervals of one month, three months, six months, and one year or at specific periods in their lives (i.e., end of high school, marriage, etc.) before admission to determine weight loss or gain. For the nursing home patient, weekly weights should be obtained. Persistent weight loss in the absence of specific identifiable disease can mean impending death for many patients. It is important to weigh patients with special nutritional problems. Rapid weight gain in the patient with low protein status indicates the laying down of protein because fat depositing weight gain is a much slower process.

At the University of Alabama in Birmingham, Prevost audited 80 medical and surgical charts. She found no record of body height in 56% of the cases, no body weight in 23% of the cases hospitalized two weeks or longer, and no body weight in 26% of the cases during the first week of hospitalization. In 43% of the cases, weights were not recorded on a regular basis. Of 36 subjects whose data was available for analysis, 61% had lost an average of 6 kg of weight (Butterworth, 1974).

Accurate height and weight meausrements were also important to the proper interpretations of lab tests. Urinary creatinine is based on body weight and creatinine height index on body height. These tests will help the nurse evaluate the status of her patient's lean body mass.

If calculations are needed by the nurse to classify weight loss, an accurate assessment of weight is needed to figure the patient's ideal body weight and thus the percent of gain or loss from ideal.

Assessments over time can provide valuable information for diagnosis of disease. Albanese, Edelson and Lorenze (1975) showed that women who lose one and one-half inches in height per decade postmenopause may have osteopenia. As nurses, we have the most contact with patients and can alert the physician to such facts as documented height loss.

The use of medications by the elderly is well documented. There are few areas where the uses of the nurse's skill and judgment are of more importance than medication administration. Tolerance to certain drugs is lower in the elderly. Overdose is a major problem in the elderly because of decline in liver function, a decline in physical activity, loss of weight, decline in renal function, and decreased gastrointestinal ab-

sorption. Therefore, with all the possible patterns of absorption, elimination, and metabolism of drugs, it is not surprising the elderly are at greater risk for side effects from drugs. Drug modifications due to age appear most often in those drugs that act on the central nervous system. Thus, some drugs that are innocuous to the younger patient may be very dangerous to the elderly (Petersen, Whittington & Payne, 1979). If, as practicing nurses, we are not accurate in our records of height and weight, the elderly surgical patient could be overdosed when given preoperative medications or when anesthesia, based on height and weight recorded in the chart, is given. Other medications such as steroids in high doses can cause height loss. For example, Prednisone in doses over 10 mg can cause decreased absorption of calcium from the blood or excessive use of Vitamin A can cause reabsorption of bone (Albanese et al., 1975). The importance of the unique pharmacological needs of the elderly cannot be stressed enough and it is important that, as nurses, we provide accurate information to the patient, his family, and our fellow health care providers, so disastrous side effects do not occur.

Education for nurses on the importance of measuring for height and weight is imperative. The nurse of today should be educated in the proper techniques of measure-

ment so he or she can teach the nonprofessionals. Clinically, the nurse can help patients and their families understand the importance of sudden weight gains or losses, what effects immobilization can have on height and bone matrix, why megadoses of vitamins may be harmful, and why intake of protein and calcium are important to health. As a patient advocate, the nurse can help her elderly patients understand normal changes versus disease-related changes of aging.

This research was conducted to add to the base of knowledge about our increasing elderly population. Often, simple measures of our clinical practice that are not properly carried out can have a profound effect on our patients. It is hoped by this researcher that this small piece of research will help our awareness that our elderly population is unique and cannot be judged by the same standards as our younger population.

APPENDIX

INFORMED CONSENT FORM AND DATA

INFORMATION FORM

Informed Consent Form

Our elderly population in the United States is increasing, but little is known about the normal changes of aging. In large part, this is due to a lack of specific knowledge concerning the physically-healthy elderly individual. Many studies are now in progress which will add to the body of knowledge about normal aging.

As a graduate student at the University of Utah, I am currently investigating one aspect of aging -- changes in height and weight in individuals over age 65. For the purposes of obtaining information for this research, I need 60 elderly volunteers who are willing to answer some questions and have their height and weight measured. The only inconvenience you should experience from the information gathering session is the half-hour of your time spent with the researcher.

All data collected will be summarized and, of course, treated as confidential. You will be referred to by a code identification number only. At some future date, I would be willing to discuss the findings with those who might be interested. As a participant in this study, you will receive teaching on normal height and weight changes of aging.

Your consent to participate in this study is completely voluntary and you may withdraw at any time, for any reason, without loss of benefits of care. If at any time you have questions or concerns, the study researcher -- Pamela Weldele -- will be happy to answer your questions completely. Information obtained form this interview will be kept strictly confidential.

Data Gathering Form

A. Identification #_____

B. Sex: Male (1)_____

C. Age:

(1) 65-70
(2) 71-75
(3) 76-80
(4) 81-85
(5) 86-90
(6) 91-95
(7) 96+

D. Educational level

(1) 1-8
(2) 9-12
(3) 13-16
(4) 17+

E. Marital status

(1) Single
(2) Married
(3) Widowed
(4) Divorced

F. Perceived height

(1)_____feet (2)_____inches

G. Perceived weight

(1)_____pounds

H. Directly measured height

(1)_____feet (2)_____inches

I. Directly measured weight

(1)_____pounds

J. Date_____

SELECTED BIBLIOGRAPHY

Albanese, A.A., Edelson, A.H., & Lorenze, E.J. (1975). Problems of bone health in the elderly. New York State Journal of Medicine, 75, 326-336.

Butterfield, C.E. (March-April 1974). The skeleton in the hospital closet. Nutrition Today, 4-8.

Calden, G., Lundy, R.M., & Schlafer, R.J. (1959). Sex differences in body concepts. Journal of Consulting Psychology, 23, 378.

Charney, E., Goodman, H.C., McBride, M., Lyon, B. & Pratt, R. (1976). Childhood antecedents of adult obesity. Do chubby infants become obese adults? New England Journal of Medicine, 295, 6-9.

Coates, T.J., Jeffery, R.W., & Wing, R.R. (1978). The relationships between a person's relative body weights and the quality and quantity of food stored in their homes. Addictive Behavior, 3, 179-184.

Combs, A.W., & Snygg, D. (1959). Individual behavior. New York: Harper and Row.

Davis, B.D., McKusick, V.A., & O'Rahilly, R. (1969). Dorland's pocket dictionary. Philadelphia: W.B. Saunders Company, 1969.

Dion, K. (1969). Physical attractiveness and evaluations of children's transgressions. Journal of Personality and Social Psychology, 24, 207-213.

Douty, H.I., Moore, J.,B., & Hartford, D. (1974). Body characteristics in relation to life adjustment, body-image, and attitudes of college females. Perceptual and Motor Skills, 39, 499-521.

Fisher, S. (1970). Body experiences in fantasy and behavior. New York: Appleton-Century-Crofts, 1970.

Fisher, S. (1973). Body consciousness: You are what you feel. Englewood Cliffs: Prentice-Hall, Inc., 1973.

Fisher, S., & Cleveland, S. (1958). Body image and personality. New York: Dover Publications, Inc.

Garn, S.M., & Young, R.W. (1956). Concurrent fat loss and fat gain. American Journal of Physical

Anthropology, 14, 497-504.

Gellert, E., & Stern, J.B. (1964). Age and sex differences in children's judgments of their height and body proportions. Presented at the Annual Meeting of the American Psychological Association, Los Angeles.

Gordon, C., & Gergen, K.I. (1968). The self in social interaction. New York: Wiley.

Gunderson, E.K. (1956). Body size, self-evaluation and military effectiveness. Journal of Personality and Social Psychology, 2, 902-906.

Hejda, S. (1963). Skinfold in old and long lived individuals. Gerontologia, 8, 201-204.

Helson, H. (1964). Adaptation-level theory. New York: Harper and Row.

Hollifield, G., & Parson, W. (1959). Overweight in the aged. American Journal of Clinical Nutrition, 7, 127-131.

Jourard, S.M., & Secord, P.F. (1954). Body size and body cathexis. Journal of Consulting Psychology, 18, 184.

Kidd, A.H., & Rivoire, J.L. (1966). Perceptual development in children. New York: International Universities Press, Inc.

Lee, M.M. & Lasker, G.W. (1958) The thickness of subcutaneous fat in elderly men. American Journal of Physical Anthropology, 16, 125-134.

Master, A.N., Laser, R.P., & Beckman, G. (1960). Tables of average weight and height of Americans, aged 65 to 94 years. Journal of the American Medical Association, 172, 658-662.

Meneely, G.R., Heyssel, R.M., Ball, C.T., Weiland, R.L., Lorimer, A.R., Constantinides, C., & Meneely, E.U. (1963). Analysis of factors affecting body composition determined from potassium content in 915 normal subjects. Annals of the New York Academy of Sciences, 110, 271-281.

Nash, H. (1951). The estimation of body size in relation

to actual body size, personal ethos and development status. Unpublished doctoral dissertation, the University of California, Berkeley.

Perry, L., & Leonard, B. (1963). Obesity and mental health. Journal of the American Medical Association, 183, 808.

Peterson, D.M., Whittington, F.J., & Payne, B.P. (1979). Drugs and the elderly. Springfield: Bannerstone House.

Pett, L.B., & Ogilvie, G.F. (1956). The Canadian weight-height survey. Human Biology, 28, 177-188.

Phillips, J. (1979). An exploration of perception of body boundary, personal space, and body size in elderly persons. Perceptual and Motor Skills, 48, 299-308.

Rossman, I. (1971). Clinical geriatrics. Philadelphia: J.B. Lippincott Company, 1971.

Roy, C.S. (1976). Introduction to nursing: An adaptation model. New Jersey: Prentice-Hall, Inc.

Roy, C.S., & Roberts, S.L. (1981). Theory construction in nursing: An adaptation model. New Jersey: Prentice-Hall, Inc.

Schlichting, R., Hoilund-Carlsen, P.F. & Quaade, F. (1981). Comparison of self-reported height and weight with controlled height and weight in women and men. Journal of Obesity, 5, 67-76.

Shaffer, J.P. (1965). Fisher's power orientation and concept of self height in men. Perceptual and Motor Skills, 20, 459-460.

Singer, J.E., & Lamb, P.F. (1966). Social concern, body size and birth order. Journal of Social Psychology, 68, 143-151.

Smith, K.S. (1960). The kinked innominate vein. British Heart Journal, 22, 110-116.

Solley, C.M., & Murphy, G. (1960). Development of the perceptual world. New York: Basic Books, Inc.

Stoudt, H.W., Damon, A., & McFarland, R.A. (1960). Heights and weights of white Americans. Human Biology, 32, 331-341.

Stunkard, A.J., & Albaum, J.M. (1981). The accuracy of self-reported weights. American Journal of Clinical Nutrition, 34, 1593-1599.

Trotter, M., & Gleser, G. (1951). Trends in stature of American whites and Negros born between 1840 and 1924. American Journal of Physical Anthropology, 9, 427-440.

Watkin, D.M. (1968). Nutrition for the aging and the aged. In M.G. Wohl & R.S. Goodhart (Eds.), Modern nutrition in health and disease. Philadelphia: Lee and Febiger.

Wessel, J.A., Ufer, A., Van Huss, W.D., & Cedarquist, D. (1963). Age trends of various components of body composition and functional characteristics in women aged 20-69 years. Annals of the New York Academy of Sciences, 110, 608-622.

Wing, J.A., Epstein, L.H., & Ossip, D.J. (1979). Reliability and validity of self-report and observer's estimates of relative weight. Addictive Behavior, 4, 133-140.

Young, J.A. (1979). Height, weight and health: Anthropometric study of human growth in the nineteenth century American medicine. Bulletin of the History of Medicine, 53, 219-243.