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THE EFFECTS OF A LACK OF HUNGER PERCEPTION ON WEIGHT  
MAINTENANCE

THE UNIVERSITY OF ARIZONA

M.S. 1984

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THE EFFECTS OF A LACK OF HUNGER PERCEPTION  
ON WEIGHT MAINTENANCE

by

Victoria Janina A. Alwin

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A Thesis Submitted to the Faculty of the  
DEPARTMENT OF NUTRITION AND FOOD SCIENCE  
In Partial Fulfillment of the Requirements  
For the Degree of

MASTER OF SCIENCE  
WITH A MAJOR IN DIETETICS

In the Graduate College  
THE UNIVERSITY OF ARIZONA

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APPROVAL BY THESIS DIRECTOR

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## PREFACE

As a sixteen year old girl, I once explained to my physician that I could fast for days without feeling any physical discomfort. The doctor told me that what I said was impossible; hunger was instinctively felt by everyone. Eleven years later another doctor admitted somewhat reluctantly that it was indeed possible that I did not experience what was commonly thought as hunger. I began talking to others to see what was their definition of this common instinct. Most perceived it in different ways, employing diverse terms, but somehow describing the same entity. On rare occasions and after reflection, a person might disclose that they ate only according to appetite, not hunger. One woman stated that if it were not for clocks she would starve to death and indeed had gone for days without eating or feeling any inclination, in much the same way I had done.

Her observation became the foundation of numerous disquieting questions. Given the appropriate circumstances, could a person without a perception of hunger starve themselves into a severely depleted state, if not literally to death? Or choosing the opposite tack, could such an individual eat using appetite as a stimulus of less physically pertinent and restrictive nature than true hunger, becoming perpetually overweight? Then there was always the gnawing curiosity concerned with the number or at least the proportion of people in the general population that were affected by a lack or diminished perception of hunger.

It was the primary purpose of this study to explore the need for more extensive research in this area by documenting the existence of individuals with a diminished sense of hunger, as well as comparing them to those who felt hunger. Such verification appeared necessary since the only research statements found were vague references to patients who seemed to have no perception of hunger. These vague sources appeared to be inadequate background to answer any questions concerning the matter.

## ACKNOWLEDGMENTS

This study could not have been conducted without the help of many knowledgeable and understanding people. I wish to take this opportunity to thank those at Good Samaritan Medical Center and the Southwest Bariatric Nutrition Center where the pilot studies took place for their patience and courtesy in participating in the survey. It was through the kindness of June Huddleston, manager of the Glendale International Fitness Center, that the primary research was conducted at that establishment. Of course, without the cooperation of the thirty-four women this study could not have been completed.

I desire to acknowledge the support and constructive suggestions of those on my committee, namely Dr. Maryann Kight and Dr. Paul Pearson. Also included in that committee was my advisor Dr. Edward Sheehan. It is with much appreciation for his patience, confidence in me and my project, as well as his courage for undertaking with me the research of what could have been a nebulous and impossible topic, that Dr. Sheehan is acknowledged here as the main driving force in my completion of this study.

Finally but not least importantly, I wish to express my gratitude to my family, especially my mother, who gave me both emotional and financial support, in addition to their words of encouragement, when I needed them most. Without my family none of this research could ever have taken place.

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## ABSTRACT

Vague references have been made in some research that certain patients do not interpret hunger sensations. In this study, thirty-four women from a fitness center answered a questionnaire to determine what influence, if any, one's hunger perception or lack of it would have on eating behavior and weight maintenance. There were thirty subjects who perceived hunger and four subjects with a diminished hunger perception. The results disclosed a significant correlation between eating patterns and hunger perception among the hunger perceiving group; however there was no significant correlation among the diminished perceivers. Also, there was no significant difference between the degree of hunger perception and weight maintenance. Further research in the area is suggested.

## CHAPTER 1

### INTRODUCTION

Obesity in the United States is a major health concern, not only in itself, but in conjunction with its subsequent complications of diabetes mellitus, atherosclerotic heart disease, and hypertension to name a few. When body fat exceeds that which is normal for height, age, and sex, obesity occurs. Although it is used interchangeably with the term "overweight", the two are not synonymous. Overweight describes a condition in which the person weighs more than one's desired maximum weight according to given standards and may be due to the possession of more lean body mass which is heavier than fat.

Steiner (1) wrote that obesity was "the most common form of malnutrition in North America today." The question posed is what causes the malnutrition that results in the over storage of fat? Theoretically the dual regulation by the hunger and satiety centers should control human intake according to physiological needs of the body, unless dominated to an extent by appetite. Hunger, according to Mayer (2), "is the complex of unpleasant sensations felt after prolonged deprivation which will impel a man to seek, work, or fight for immediate relief by ingestion of food." Appetite on the other hand is the psychological desire or craving for food. Steiner proposed that the majority of obese patients may have lost their ability to recognize the internal cues known as hunger, and therefore may have a diminished perception of it. It was the concept of a diminished perception of hunger on which this study was based.

Various experiments have been conducted to manipulate the manifestation of hunger, that is eating patterns. Animal studies (3, 4, 5) were performed to experiment with the affects of brain lesions in the dorsomedial and lateral amygdalar or ventromedial and lateral hypothalamic regions on eating. The lesions resulted in the production of aphagia to hyperphagia, depending on the area affected. In the experiment by Singh (5), in addition to the ventromedial hypothalamic lesions, rats were trained to work for food in order to distinguish hyperphagia from hunger motivated consumption. She concluded that while the rats were hyperphagic, they were not motivated by hunger, therefore differentiating between an overeating behavior and the hunger stimulus.

Another set of rat studies were done by Leibowitz (6, 7, 8) examining the relationship of drugs, mostly amphetamines, on appetite/hunger. She found that certain chemicals injected into specific areas of the brain altering given pathways did produce changes in appetite or anorexia. Jain and Kyriakedis (9) performed a similar experiment on humans to compare the results with those produced in animal studies. It was concluded that the findings were inconclusive for proper comparison. However, it was shown that hunger perception could be changed by a dose of 10 milligrams of amphetamine. If the lack of hunger in humans could be correlated with the anorexic behavior produced in rats, either chemically or surgically, then it may explain a mechanism for a diminished perception of hunger in patients, whether obese or underweight. Thompson and Campbell (10) appeared to support this premise by using 2-deoxy-D-glucose to decrease the hunger felt by their human volunteers.

Coddington and Bruch (11) and Stunkard and Fox (12) both studied the perception of hunger in different groups of people, for example obese, non-obese, schizophrenic, etc. They concluded that different subjects, mostly the obese, had difficulty perceiving the physical sensation of hunger and that almost all the subjects had trouble even defining the concept of hunger.

In addition to the physiological aspects of eating, some had explored the psychological side. Rodin (13, 14) studied the influence of external and internal cues on eating behavior. Nesbit (15), Schachter and Gross (16), Goldman, Jaffe, and Schachter (17) and Schachter, Goldman, and Gordon (18) conducted experiments examining the same area as Rodin. Each group basically found that for the obese subject in particular external stimuli, for example the sight and smell of food, time of day, etc. were more incentives to eat than was the internal motivation of hunger.

If a person had difficulty perceiving hunger and therefore could not regulate their intake according to their physiological need, then they might have equal difficulty maintaining a desired weight. In addition their eating patterns might be different from those with hunger sensation.

#### Statement of Hypotheses

For this research it was hypothesized that:

1. there would be a significant difference between the weight maintenance ability of those who could perceive hunger and those who had difficulty perceiving; specifically that hunger perceivers would have more control over their weight than diminished hunger perceivers;

2. there would be a significant difference between the eating patterns of the hunger perceiving subjects and those of the subjects with a diminished hunger perception; specifically, that the hunger perceivers would respond more to internal cues by eating than the diminished hunger perceivers who would eat more according to appetite and less in response to hunger.

The null hypotheses were that:

1. there would not be a significant difference between the ability of hunger perceivers and diminished hunger perceivers to maintain their weight;
2. there would not be a significant difference between the eating patterns of the hunger perceiving subjects and those of the subjects with a diminished hunger perception.

#### Definitions

For the purposes of this study, the definitions of certain terms used in the research were as follows:

Hunger- the physiological or internal cues reflecting one's need for nourishment;

Appetite- the psychological craving for food triggered mostly by external stimuli;

Hunger perceiver- a person who possesses a reliable system for detecting their physiological need for nourishment;

Diminished hunger perceiver- a person who apparently lacks a reliable system for detecting their physiological need for nourishment.

## CHAPTER 2

### METHODS AND DATA ANALYSIS

Two pilot studies were conducted before the main research survey commenced in order to field test the questionnaire. The procedures used for the interviewing of the subjects were the same as were employed later with the only exception being the follow-up interview. A second inquiry occurred within approximately one week after the primary contact with the pilot study group. Each follow-up was as similar to the first interview as possible. Due to certain characteristics of the main research group which will be explained later, follow-up interviews were not conducted with this group.

#### Subjects

The subjects were female volunteers between the ages of twenty-five and forty years. This age range was selected because it was felt that the group would be more stable in their eating patterns, hunger perceptions, and weight than those younger, who were still growing and might be more easily influenced by peer behavior, or older women whose bodies and habits might have reflected a physiological accommodation to increasing age.

In the pilot studies, prospective subjects were asked if they were willing to participate in a survey researching eating habits, hunger perceptions, and weight histories. Good Samaritan Medical Center in Phoenix was the site of the first pilot study. Four of the six participants

were clinical dietitians and two were secretaries at the facility. Because of the medical nature of their work, it was thought that their background might prejudice their responses, especially those of the dietitians whose responsibilities included direct contact with various disorders of eating patterns and hunger perceptions.

The second location of a pilot study was the Southwest Bariatric Nutrition Center in Scottsdale. There nine women were interviewed using a slightly modified version of the original questionnaire. Obesity was a common denominator in the majority of the subjects at the facility. The bariatric center was intended to be the site of the main body of research for the study. However it was discovered during the survey that many of the women questioned were on a severely calorie restricted, protein supplemented diet which might have altered their perceptions and physiological stimuli. Also, the women were learning new behavior patterns which for this purpose created an artificial consumption habit. Not wishing to introduce more variables into the research, data gathered was utilized as pilot study information.

Primary research was conducted at the International Fitness Center in Glendale where the population was characterized by women conscious of their weight and general body condition. Knowledge of one's weight was encouraged by counselors, the training program itself, and an everpresent weight scale. Attendance was suggested, but not mandatory and therefore ranged by participants from coming every available day to sporadic visits throughout the year. Some subjects were out-of-state residents visiting friends and using the facility as guests. The transitory nature of the

fitness center clientele, as opposed to the more stable attendance of those in the pilot studies, make follow-up research impractical for the present circumstance and purposes.

#### Procedure

Upon their entrance to or exit from the facility, members were asked by the researcher to participate in a survey. If they tentatively agreed, they were asked to disclose their age in order to determine their acceptability. The women who qualified by age were then given a typed sheet introducing the researcher and the general theme of the survey. A copy of the introduction is included as Appendix A.

Once the subject consented to answer the questionnaire, she was given an index card with the possible responses to the survey printed on it. Each woman was then read the questionnaire, including the directions, by the researcher. Responses were recorded by the researcher as well. If any particular item on the questionnaire created doubt or confusion, it was discussed with the woman until the matter was clearer in her mind and a more accurate reflection of her perceptions could be transcribed. For this reason questions were encouraged.

#### Instrument

The questionnaire consisted of three main sections dealing with perceptions of hunger and appetite, eating habits, and a weight history. Almost all perception inquiries commenced with "I know I am hungry when..." Characteristics of hunger and appetite cues which served as foundations for the questions were gleaned from the literature (2, 11, 12) and from previous interviews. The majority of eating pattern inquiries were designed

to translate a given perception into a corresponding behavior pattern. The questions of this section started with the phrase "I eat when ...." Extra questions were included which might complete the picture of the subject's habits. In the section on perceptions, inquiries were grouped so that the first half described the physiological cues and the remainder were concerned with the external stimuli of appetite. The order of questions was more randomized in the second part of the questionnaire centering on eating habits in an attempt to avoid matching of perceptions with eating patterns by the subjects, which might have influenced their answers.

The weight history section consisted of a few inquiries concerning childhood and adolescent weight patterns, as well as focusing on weight fluctuations within the past five years. This period of time was selected because it would still fall within the subject's adult years, for the most part, and thereby not be affected by age dependent characteristics.

Answers corresponding to the inquiries were listed as : "most often", "often", "sometimes", "rarely", and "never". Subjects were first directed to settle in their minds their concept of hunger as it pertained to them. They were told to answer "most often" when the characteristic stated reflected most closely the way they felt when hungry. When related to eating patterns, subjects were instructed to consider the given descriptor and how often they had responded to it by eating. For example if every time the subject felt a headache coming, she would eat something, then here answer would be "most often". However, if in the same situation only occasionally was the food sought, then "sometimes" or "rarely" was used.

### Data Analysis

All answers were assigned a point value ranging from one to five, with the exception of the weight history responses. For the first nine questions describing hunger cues, the answers were given the following points: "most often"- five points, "often"- four points, "sometimes"- three points, "rarely"- two points, and "never"- one point. In order to avoid using double negatives in the questions or alerting the subject to a change from hunger to appetite descriptors, the scoring was reversed on all questions focusing on appetite so that "most often" would be worth one point instead of five and "never" was assigned five points. The scheme of having all physiological or hunger answers having maximum credit and all psychologically or appetite induced responses being given minimum points was utilized not only for the perception part of the questionnaire, but also in the behavior section where, though the order of questions was more indiscriminate, the scoring technique remained constant. A copy of the questionnaire and the subsequent values of the responses is located in Appendix B.

To generate the weight history, there were three questions designed to obtain a general view of the past, specifically whether the subject maintained an average weight for age during childhood (ages three to twelve) and adolescence (ages thirteen to nineteen). Also, the last multiple choice question in this section asked whether the subjects had experienced the "yo-yo" pattern of weight fluctuations. Although these responses had the same possible answers of the preceding questions, no numerical values were assigned to them.

In addition to the multiple choice responses, a weight history was obtained through the use of open-ended questions in which the subjects were asked for the most and least amount that they have weighed in the past five years, not including pregnancy weight, also their usual or current weight, the approximate dates of the weights, and the number of times their weight had fluctuated more than ten pounds.

Assignment of the subjects into the categories of either a hunger perceiver or a diminished hunger perceiver was made on the basis of the responses in the first half of the section on hunger perception which attempted to define various sensations of hunger. A response of "most often" or "often" to any one of the questions corresponding to hunger placed the subject in the hunger perceiving group. Those who did not answer in this manner, whose most frequent response to any one question was "sometimes" or less, was designated as a diminished hunger perceiver.

The criteria for the classification included the belief that because hunger perception was measured by frequency and not intensity, one who felt any sign of it at least often should be categorized as a perceiver. Other rationale was rooted in the two pilot studies where it was discovered that all the subjects not only perceived physiological hunger but often misconstrued appetite as hunger. Once it became apparent that a subject was a candidate for the diminished hunger perceiving group, she was interviewed by the researcher in more depth by the use of open-ended questions in order to ascertain if she sensed any physical cues of sufficient frequency to constitute hunger. Only after this interview was final assignment to a sample group made.

In order to illustrate any possible perception pattern which might have further differentiated the two levels of hunger perceptions, a record was made of the frequency with which the subject used each given answer ("most often", "often", "sometimes", "rarely", "never") in response to the nine hunger descriptors in the first section of the questionnaire. In a similar manner, data were calculated for the number of responses given by each woman for the appetite characteristics. A listing of each set of frequencies may be found as Appendix C and Appendix D. For interpretation of the data, each type of response was totaled for the entire sample population, the hunger perceivers, and the diminished hunger perceivers in accordance with the criteria established for classifying the subjects as described earlier. In an attempt to equalize any variations because of sample size differences, the percentage of possible answers per type by group was figured for both hunger and appetite statements.

Other frequencies of responses were used in regard to the weight history. As opposed to the method utilized previously, totals were recorded for each of the five possible answers per question, thereby reflecting the number of subjects in each group who responded in the same way to the three statements on weight background.

The criteria used for the division of subjects into maintenance of weight or non-maintenance was whether the woman had within the past five years remained within ten percent of their present or usual weight. Greater than a ten percent gain or loss was construed as non-maintenance. The percentage used was chosen somewhat arbitrarily based on the premise that the average American gained one pound per year, plus one extra pound

per year as a safety margin. These pounds would add up to about ten pounds after five years or approximately ten percent of the ideal body weight of the average American female. The percent of weight change was based on the formula: greatest weight minus least weight, divided by subject's usual or present weight.

Another measure of weight maintenance used was the number of times a subject fluctuated ten pounds or more within the five year period. The second measurement was employed in order to examine the concept of weight maintenance from another direction in which there was a consideration of the subjects who had gained and lost a great deal of weight as compared to their usual weight only one time during the five years and would be incorrectly categorized as not being able to maintain their weight.

The ten pound minimum was chosen to avoid inclusion of those women who periodically, and sometimes frequently, oscillated comparatively small amounts of weight due to physiological or seasonal cycles. For this definition of weight maintenance, the criteria of classification was that fluctuation of five times or less during the five years was considered as maintenance; non-maintenance was more than five times. Rationale for the distinction originated from a relatively arbitrary decision that, given various holidays and other events, an average person could fluctuate at most once per year in five years and still maintain a given weight for the remainder of the time.

In summary, subjects were classified into their respective groups according to the following criteria:

1. hunger perceivers-answered "most often" or "often" to at least one descriptor in the hunger perception section of the questionnaire;
2. diminished hunger perceivers-did not answer "most often" or "often" to any hunger descriptors;
3. weight maintenance- a. subject remained within 10 percent of of their usual or present weight for the past five years or  
b. subject's weight fluctuated at least ten times within the last five years.

In order to examine the relationship, if any, between degree of hunger perception and either measure of weight maintenance, "two-by-two" chi-square tests were employed.

The correlation between degree of hunger perception and eating behavior was first calculated on the basis of the total points received according to the previously described system for the questionnaire section on hunger and appetite perceptions and for that portion concerned with eating behavior. The two sets of sums per subject became the scores from which the Pearson correlation coefficient for each designated group was derived. To decide the significance of the correlation for each group, the coefficient was converted into a Student's  $t$  - score. In order to ascertain any significance of the calculated correlations between the two groups, Fisher's  $Z'$  equivalents of the Pearson correlation coefficients were utilized to find the  $Z$  - score.

The second set of correlations were derived from matched pair scores. Instead of totals from each section, those behavior questions which corresponded directly to a perception characteristic were isolated together from the other questions (see Appendix E). The point values assigned to the responses given by the subjects, once summed, became another set of raw scores from which a cumulative Pearson correlation coefficient was derived to compare each of the following relationships: 1) hunger perception and corresponding eating habits for the entire sample population; 2) the same traits for each subgroup, namely the hunger and diminished hunger perceivers; 3) appetite perceptions and matched behavior for the entire study sample, as well as for each designated subdivision; 4) the combined perceptions with their paired eating response for the total group, its two branches, and the pilot studies; and 5) hunger perception and eating patterns to appetite perception and behavior within each group.

The same formulae were used to convert these correlation coefficients into Student's  $t$  - scores and Fisher's  $Z'$  equivalents as were employed for the previously described correlations in order to interpret the significance of the individual group's coefficients and its relationship to the other study group's correlations.

For the purpose of achieving a more complete profile of the subjects, ranges and means were calculated for the ages, usual weights, weight extremes, number of fluctuations, and percent of weight change for each group in addition to the entire sample population.

## CHAPTER 3

### RESULTS

Thirty-four women volunteered to answer the questionnaire. They ranged in age from twenty-five years to forty years, with the average being thirty-three years old. Summarized in Table 1 is the general information on the weight fluctuations, as well as the age domain. Usual weight for the sample population was between 90 - 216 pounds, averaging 138.9 pounds. The lowest mean weight mentioned for the five years was approximately 128 pounds in a range from 90 - 197 pounds. Their weight peaked between 90 and 230 pounds with a mean of 154 pounds.

From the sample population drawn, thirty subjects were categorized as hunger perceivers and four women were designated as diminished hunger perceivers. The average hunger perceiver was  $34.0 \pm 4.3$  years old and weighed  $141 \pm 26.4$  pounds. She oscillated between  $130 \pm 22.2$  and  $155.8 \pm 37.5$  pounds. Her counterpart among the diminished hunger perceivers was approximately  $31.0 \pm 3.3$  years of age. This average subject ranged in weight from 112.8 to 136.5 pounds with the standard deviations being 19.5 and 33.8 pounds respectively. She usually weighed  $120 \pm 20.6$  pounds.

The weight history questions yielded information about the subject's backgrounds in addition to their current fluctuations. As seen in Table 2, 50 percent of both the hunger perceivers and diminished perceivers were of normal weight during most of their childhood, to the best of their memories. The other half of the diminished hunger group were not within that range at

TABLE 1  
 COMPARISON OF AGES AND WEIGHTS  
 BETWEEN HUNGER PERCEIVERS AND  
 DIMINISHED HUNGER PERCEIVERS

	Total Group	Hunger Perceivers <sup>a</sup>	Diminished Hunger Perceivers <sup>b</sup>
N	34	30	4
<u>Age</u> (years)			
Mean $\pm$ standard deviation	33 $\pm$ 7.0	34 $\pm$ 4.3	31 $\pm$ 3.3
Range	25 - 40	25 - 40	26 - 35
<u>Usual Weight</u> (pounds)			
Mean $\pm$ standard deviation	138.9 $\pm$ 26.7	141.4 $\pm$ 26.4	120.0 $\pm$ 20.6
Range	95 - 216	107 - 216	95 - 135
<u>Least Weight</u> (pounds)			
Mean $\pm$ standard deviation	128.0 $\pm$ 22.6	130.0 $\pm$ 22.2	112.8 $\pm$ 19.5
Range	90 - 197	102 - 197	90 - 135
<u>Highest Weight</u> (pounds)			
Mean $\pm$ standard deviation	153.6 $\pm$ 37.6	155.8 $\pm$ 37.5	136.5 $\pm$ 33.75
Range	100 - 230	114 - 230	100 - 175

<sup>a</sup>Hunger Perceiver- a person who possesses a reliable system for detecting their physiological need for nourishment.

<sup>b</sup>Diminished Hunger Perceiver- a person who apparently lacks a reliable system for detecting their physiological need for nourishment.

TABLE 2

FREQUENCY OF RESPONSES TO EACH WEIGHT HISTORY OBJECTIVE QUESTION  
AND PERCENTAGES OF RESPONSES TO TOTAL POSSIBLE RESPONSES  
FOR HUNGER PERCEIVERS AND DIMINISHED  
HUNGER PERCEIVERS

	N	Most Often	Often	Some- times	Rarely	Never
<u>Question 41:</u>						
Normal weight as child						
Hunger Perceivers	30	15(50%)	2(7%)	4(13%)	4(13%)	5(17%)
Diminished Hunger Perceivers	4	2(50%)	0	0	0	2(50%)
<u>Question 42:</u>						
Normal weight as teenager						
Hunger Perceivers	30	14(47%)	4(13%)	7(23%)	2(7%)	3(10%)
Diminished Hunger Perceivers	4	2(50%)	1(25%)	0	0	1(25%)
<u>Question 43:</u>						
"Yo-Yo" syndrome						
Hunger Perceivers	30	5(17%)	2(7%)	3(10%)	8(27%)	12(40%)
Diminished Hunger Perceivers	4	0	1(25%)	1(25%)	1(25%)	1(25%)

all during their early years, being either overweight or considerably underweight. In the hunger perceivers, similar to the diminished perceivers, the majority of the remainder of subjects rarely (13 percent) or never (17 percent) were of average weight as children.

This distribution changed as the subjects experienced adolescence. Approximately half in both groups retained their average weight, while in the hunger perceiving group twice as many women were often in the normal range (from 7 percent up to 13 percent) and 10 percent more were sometimes of average weight. Among the diminished hunger perceivers during adolescence, one woman changed from never being in this range to more often.

The majority of hunger perceivers answered "rarely" (27 percent) or "never" (40 percent) to the "yo-yo" effect of weight fluctuations. Diminished hunger perception were equally distributed among "often", "sometimes", "rarely", and "never" responses.

Once the frequencies of responses to hunger descriptors were recorded (see Table 3), as well as the percentage of responses to total possible answers, a pattern emerged differentiating the hunger perceivers from the diminished perceivers. Only with the diminished hunger group did a block of answers create an obvious pattern for frequencies by having an absence of response documented in both the "most often" and "often" categories and, for the most part, the remainder of the choices had almost equally distributed frequencies. Two other subjects had response patterns similar in that only one response was given in the "often" classification and no "most often" answers. For this study, these women were designated as hunger perceivers according to the criteria presented earlier. A listing of the response frequencies to hunger questions is located in Appendix C.

TABLE 3

COMPARISON OF FREQUENCIES AND PERCENTAGES OF RESPONSES TO HUNGER  
 DESCRIPTORS<sup>a</sup> BETWEEN HUNGER PERCEIVERS AND DIMINISHED  
 HUNGER PERCEIVERS

	N	Most Often	Often	Some- times	Rarely	Never
Total Group	34	61(20%)	38(12%)	72(24%)	68(22%)	67(22%)
Hunger Perceivers	30	61(23%)	38(14%)	60(22%)	53(20%)	58(21%)
Diminished Hunger Perceivers	4	0	0	12(33%)	15(42%)	9(25%)

<sup>a</sup>For hunger descriptors, see Appendix B - Questionnaire, numbers 1 - 9.

Another observation was made about the percentages of responses. For the hunger perceivers and the total groups with one exception in each for the "often" answers, the percentages calculated were within a narrow range (20 - 24 percent), whereas, there was a broader distribution for the diminished perceivers ( 25 - 42 percent).

Inspection of Table 4 regarding the frequency pattern of appetite replies demonstrated considerably fewer responses by the diminished hunger perceivers in the "most often" and "often" groupings, than by their counterparts. The observation appeared to be supported further by the percentages of total possible appetite responses where there was more consistency in four of the five categories for hunger perceivers in that the number of responses remained within seven percentage points of each other, than appeared in the same classifications for the diminished perceivers where the percentage of total possible points swung between 22 and 44 percent.

Fluctuations in weight, the criteria for weight maintenance, are summarized in Table 5. The percent of weight change did not vary greatly between the groups. Within the five year limitation hunger perceivers changed between 4 and 47 percent, the mean was 17.73 percent, from their usual or present weight. Diminished hunger perceivers deviated an average of 18.75 percent and ranged 9 to 30 percent from their present amount.

Regarding the number of weight fluctuations, for the entire group weight increased or decreased between zero and twenty times, the average being 2.88 times. For the hunger perceivers, the mean number of oscillations was 2.67 times as compared to almost twice that, 4.5 times, for their

TABLE 4

COMPARISON OF FREQUENCIES AND PERCENTAGES OF RESPONSES TO APPETITE  
 DESCRIPTORS<sup>a</sup> BETWEEN HUNGER PERCEIVERS AND DIMINISHED  
 HUNGER PERCEIVERS

	N	Most Often	Often	Some- times	Rarely	Never
Total Group	34	21(8%)	50(18%)	72(26%)	74(27%)	56(21%)
Hunger Perceivers	30	21(9%)	49(20%)	58(24%)	64(27%)	49(20%)
Diminished Hunger Perceivers	4	0	1(3%)	14(44%)	10(31%)	7(22%)

<sup>a</sup>For appetite descriptors, see Appendix - Questionnaire, numbers 10 - 17.

TABLE 5

COMPARISON OF PERCENT OF WEIGHT CHANGE AND NUMBER OF WEIGHT FLUCTUATIONS  
BETWEEN HUNGER PERCEIVERS AND DIMINISHED HUNGER PERCEIVERS

	Total Group	Hunger Perceivers	Diminished Hunger Perceivers
N	34	30	4
<u>Percent of Weight Change Within Last 5 Years<sup>a</sup></u>			
Mean	17.85	17.73	18.75
Range	4 - 47	4 - 47	4 - 47
<u>Number of Weight Fluctuations Within Last 5 Years<sup>b</sup></u>			
Mean	2.88	2.67	4.5
Range	0 - 20	0 - 20	0 - 10

<sup>a</sup>Percent of weight change equals highest weight minus lowest weight, divided by usual or present weight.

<sup>b</sup>Number of weight fluctuations is the number of times subjects gained and lost more than ten pounds.

counterparts in the diminished hunger group. Both subdivisions had members whose weight remained within ten pounds for the five year period. Also in common, there were women in each sample group whose weight had changed often, from ten to twenty times.

These figures were translated into number of subjects in each group that could be subdivided into those who could maintain a consistent body weight and those who did not. As shown in Table 6, eleven hunger perceivers maintained their weight within 10 percent of their usual body weight over the period of five years, nineteen subjects within this group had fluctuated over 11 percent of their weight. Within the diminished hunger perceivers, one subject had maintained her weight and three others had exceeded the guidelines for maintenance. The calculated chi-square was 0.0098 and demonstrated no significant difference between the ability of each sample to maintain their weight.

Included as Appendix D is the record of the weight fluctuations by subject. The classification of maintenance using five times as the dividing point, though originally chosen arbitrarily, did follow a natural break once the data was collected.

Summarized in Table 7 are the results of the second measurement of hunger perception and weight maintenance based on number of fluctuations. There were twenty-eight hunger perceivers who changed their weight less than five times within the period specified and two others in the same group whose weight fluctuated considerably more than six times. Among diminished hunger perceivers, the group was evenly divided with two representatives in each group. The calculated chi-square was 2,892, which showed a significant

TABLE 6

COMPARISON OF WEIGHT MAINTENANCE BETWEEN HUNGER PERCEIVERS AND  
DIMINISHED HUNGER PERCEIVERS BASED ON PERCENT WEIGHT CHANGE

	N	Wt. Maintenance at 0 - 10%	Non-Weight Maintenance at >10%	Calculated Chi-Square Value	Level of Signifi- cance <sup>a</sup>
Hunger Perceivers	30	n = 11	n = 19		
Diminished Hunger Perceivers	4	n = 1	n = 3	0.0098	NS

<sup>a</sup>Chi-square test,  $p < .05$

TABLE 7

COMPARISON OF WEIGHT MAINTENANCE BETWEEN HUNGER PERCEIVERS AND  
DIMINISHED HUNGER PERCEIVERS BASED ON NUMBER OF WEIGHT CHANGES

	N	Wt. Maintenance: 0-5 Changes	Non-Weight Maintenance: 6-20 Changes	Calculated Chi-Square Value	Calcu- lated Z Score
Hunger Perceivers	30	n = 28	n = 2		
Diminished Hunger Perceivers	4	n = 2	n = 2	2.892 <sup>a</sup>	1.701 <sup>b</sup>

<sup>a</sup>Chi-square test,  $p < .10$

<sup>b</sup> $p < .05$

difference between factors at the .10 level. Similarly, using a corresponding Z score calculated from the chi-square value, there was a significant difference between the four factors found at the .05 level. What was most striking was that 93 percent of the hunger perceivers had maintained their weight as compared to 50 percent of the diminished hunger perceiving group.

The analysis of comparisons between hunger perceivers and diminished hunger perceivers with respect to internal and external cues perception as related to eating behavior are summarized in Table 8. Pearson correlation coefficients for the hunger and diminished hunger perceivers were + 0.525 and + 0.381 respectively. Student t-scores were utilized to aid the interpretation of the correlation coefficients. At the .05 level of significance for their respective degrees of freedom, a t - score of 2.048 was required for the hunger perception group and 4.303 was needed by the diminished perceivers. The calculated t-score of 0.581 was considerably less than the critical t which was required; therefore there was insufficient evidence to prove a significant correlation between perception and behavior for this group. On the other hand, the calculated t-score of 3.26 for the hunger perceivers exceeded its critical t-score, thereby being a significant correlation for the hunger group between cue perception and eating habits.

In order to determine if there was any significant difference between the correlation of the two sample groups, a Fisher's Z' equivalent of each coefficient was calculated with results as seen in Table 9. The subsequent Z-score was 0.180. To be significant at the .05 level, a

TABLE 8

ANALYSIS OF THE CORRELATION BETWEEN HUNGER-APPETITE PERCEPTION  
AND EATING PATTERNS FOR HUNGER PERCEIVERS AND  
DIMINISHED HUNGER PERCEIVERS

	N	df	Correlation Coefficient	Student's t - Scores
Hunger Perceivers	30	28	+ 0.525	3.26 <sup>a</sup>
Diminished Hunger Perceivers	4	2	+ 0.381	0.581

<sup>a</sup>p < .05

TABLE 9

COMPARISON OF THE CORRELATION OF HUNGER-APPETITE PERCEPTION  
AND EATING PATTERNS FOR HUNGER PERCEIVERS AND  
DIMINISHED HUNGER PERCEIVERS

	N	df	Fisher's Z' Equivalent	Z - Scores	Level of Significance <sup>a</sup>
Hunger Perceivers	30	28	0.583		
Diminished Hunger Perceivers	4	2	0.400	0.180	NS

<sup>a</sup>p < .05

critical Z-score of + 1.96 was necessary, but greater than the calculated Z. For that reason, there was so significant difference demonstrated between the correlation of cue perception and eating habits for the hunger perceivers and the correlation of the diminished perceivers.

Because the sample size of the diminished hunger group was small ( $n = 4$ ), the confidence interval of the correlation coefficient of the group was compared to the intervals established for the pilot studies whose sample sizes were comparatively small ( $n = 6$  and  $n = 9$ , respectively) and where all the subjects qualified as hunger perceivers. The results are represented in Table 10. There was no significant correlation between the perception and the behavior demonstrated in these pilot studies where the correlation coefficients were + 0.445 and - 0.430. No explanation was found for the appearance of the negative correlation of the second pilot study.

When the data from the calculations of matched pairs for hunger perception and eating behaviors were analyzed, as illustrated in Table 11, they appeared to agree with the previous results. Pearson correlation coefficients for the entire group and the hunger perceivers were + 0.5965 and + 0.4944, which when converted into Student's t-scores of 4.204 and 3.0097 were significant at the .05 level. The correlation between the factors in the diminished hunger perceiving group was 0.1291, with the corresponding Student's t-score being 0.1841. This correlation coefficient was not significant at the .05 level where a critical t-score of 4.303 was required.

TABLE 10

ANALYSIS OF THE CORRELATION BETWEEN HUNGER PERCEPTION  
AND EATING PATTERNS IN THE PILOT STUDY GROUPS

	N	df	Correlation Coefficient (r)	"r" Required for Sig- nificance at $p < .05^a$
Pilot Study # 1	6	4	+ 0.445	$\pm 0.811$
Pilot Study # 2	9	7	- 0.430	$\pm 0.666$

<sup>a</sup>Source: Edward W. Minium, Statistical Reasoning in Psychology and Education, 2nd. ed. (New York: John Wiley and Sons, 1978), pp.539-40.

TABLE 11

ANALYSIS OF THE CORRELATION BETWEEN MATCHED PAIRS<sup>a</sup> OF HUNGER PERCEPTION  
AND CORRESPONDING EATING PATTERNS FOR HUNGER PERCEIVERS AND  
DIMINISHED HUNGER PERCEIVERS

	N	df	Correlation Coefficient	Student's t - Scores
Total Group	34	32	+ 0.5965	4.202 <sup>b</sup>
Hunger Perceivers	30	28	+ 0.4944	3.0097 <sup>b</sup>
Diminished Hunger Perceivers	4	2	+ 0.1291	0.1841

<sup>a</sup>For matched pairs of perception and eating pattern, see Appendix E.

<sup>b</sup> $p < .05$

Again using a conversion to Fisher's Z' equivalents, a Z-score was calculated to determine if there was significant difference between the correlation of the two subgroups. As seen in Table 12, the Fisher's Z' equivalents of the hunger perceivers and the diminished perceivers were 0.543 and 0.131 respectively, which in turn became a Z-score of 0.7512. Because this score was less than the needed 1.960 for significance at the .05 level, there was no evidence that there was a demonstrative relationship between the two groups regarding hunger perception and resultant consumption.

In examining the data for the scores of appetite perceptions and corresponding eating behaviors as summarized in Table 13, the Pearson correlation coefficients for the total research group, hunger perceivers, and diminished hunger perceivers were as follows: + 0.971, + 0.923, + 0.983 respectively. Corresponding Student's t-scores, in the same order, were 22.97, 28.33, and 3.39. The correlation coefficients of the first two groups were significant at the .05 level and the coefficient for the diminished hunger perceivers was significant at the .10 level.

As demonstrated before, the Fisher's Z' equivalents of the correlation coefficients were used to detect a relationship between the correlations of the two research groups. The results shown in Table 14 were Fisher's Z' equivalents of 2.371 for the hunger group and 1.606 for the diminished hunger group, both of which became a Z-score of 0.7512. Again there was no significant difference found between the two groups at the .05 level; therefore, there appeared to be a relationship between appetite and eating habits.

TABLE 12

COMPARISON OF THE CORRELATION BETWEEN MATCHED PAIRS<sup>a</sup> OF HUNGER  
 PERCEPTION AND CORRESPONDING EATING PATTERNS FOR HUNGER  
 PERCEIVERS AND DIMINISHED HUNGER PERCEVIERS

	N	df	Fisher's Z' Equivalents	Z - Scores	Significance at p <.05
Hunger Perceivers	30	28	0.543		
Diminished Hunger Perceivers	4	2	0.131	0.4045	NS

<sup>a</sup>For matched pairs of perception and eating pattern, see Appendix E.

TABLE 13

ANALYSIS OF THE CORRELATION BETWEEN MATCHED PAIRS<sup>a</sup> OF APPETITE  
 PERCEPTION AND CORRESPONDING EATING PATTERNS FOR HUNGER  
 PERCEIVERS AND DIMINISHED HUNGER PERCEIVERS

	N	df	Correlation Coefficient	Student's t - Scores	Level of Significance
Total Group	34	32	+ 0.971	22.97	p <.05
Hunger Perceivers	30	28	+ 0.923	28.33	p <.05
Diminished Hunger Perceivers	4	2	+ 0.983	3.39	p <.05

<sup>a</sup>For matched pairs of perception and eating pattern, see Appendix E.

TABLE 14

COMPARISON OF THE CORRELATION BETWEEN MATCHED PAIRS<sup>a</sup> OF APPETITE  
 PERCEPTION AND CORRESPONDING EATING PATTERNS FOR HUNGER  
 PERCEIVERS AND DIMINISHED HUNGER PERCEIVERS

	N	df	Fisher's Z' Equivalentents	Z - Scores	Significance at p <.05
Hunger Perceivers	30	28	2.371		
Diminished Hunger Perceivers	4	2	1.606	0.7512	NS

<sup>a</sup>For matched pairs of perception and eating pattern, see Appendix E.

As illustrated in Table 15, the combination of matched pairs scores for the combined hunger and appetite perceptions and their corresponding eating behaviors yielded correlation coefficients of + 0.622 for the entire group, + 0.562 for the hunger perceivers, and + 0.559 for the diminished perceivers. When translated into Student's t-scores, the values became in the same order 4.494, 3.595, and 0.953, with the first two group showing a significant correlation between perceptions and behavior at the .05 level, but no such significant relationship for the diminished hunger perceivers.

Fisher's Z' equivalents were calculated in order to detect any connection between the correlations of the two sample subgroups. Seen in Table 16 are the results which were the values of 0.636 and 0.632 for the hunger perceivers and the diminished hunger group. The subsequent Z-score of 1.018 demonstrated no significant difference between the correlations of the subgroups.

For the purpose of investigating the possible influence of sample size on the results, the correlation of combined perceptions with the matching eating pattern was calculated for the pilot studies with their small number of hunger perceivers only. The results, as shown in Table 17, were correlations of + 0.910 for the first pilot study and + 0.370 for the second pilot study. Their corresponding Student's t-scores were 4.323 for pilot one which was significant at the .05 level and pilot two with 1.054 which was not significant at the .05 level. The finding was different from the previous examination of perception to non-matched eating response in the pilot studies in that the smallest pilot with only two more subjects than the diminished hunger group did show a significant relationship between the factors considered.

TABLE 15

ANALYSIS OF THE CORRELATION BETWEEN MATCHED PAIRS<sup>a</sup> OF COMBINED  
PERCEPTIONS AND CORRESPONDING EATING PATTERNS FOR HUNGER  
PERCEIVERS AND DIMINISHED HUNGER PERCEIVERS

	N	df	Correlation Coefficient	Student's t - Scores
Total Group	34	32	+ 0.622	4.494 <sup>b</sup>
Hunger Perceivers	30	28	+ 0.562	3.595 <sup>b</sup>
Diminished Hunger Perceivers	4	2	+ 0.559	0.953

<sup>a</sup>For matched pairs of perception and eating pattern, see Appendix E.

<sup>b</sup>p <.05

TABLE 16

COMPARISON OF THE CORRELATION BETWEEN MATCHED PAIRS<sup>a</sup> OF COMBINED  
PERCEPTIONS AND CORRESPONDING EATING PATTERNS FOR HUNGER  
PERCEIVERS AND DIMINISHED HUNGER PERCEIVERS

	N	df	Fisher's Z' Equivalentents	Z - Scores	Significance at p <.05
Hunger Perceivers	30	28	0.636		
Diminished Hunger Perceivers	4	2	0.632	1.018	NS

<sup>a</sup>For matched pairs of perception and eating pattern, see Appendix E.

TABLE 17

ANALYSIS OF THE CORRELATION BETWEEN MATCHED PAIRS<sup>a</sup> OF  
 COMBINED PERCEPTIONS AND EATING PATTERNS  
 FOR EACH PILOT STUDY

	N	df	Correlation Coefficient	Student's t - Scores
Pilot Study # 1	6	4	+ 0.910	4.323 <sup>b</sup>
Pilot Study # 2	9	7	+ 0.370	1.054

<sup>a</sup>For matched pairs of perception and eating patterns, see Appendix E.

<sup>b</sup> $p < .05$

The data summarized in Table 18 illustrated that within the hunger perceiving group the correlation between types of perception and their corresponding consumption patterns, once translated into Fisher's Z' equivalents of 0.543 for hunger perception and 2.371 for appetite perceptions as well as the resultant Z-score of 6.716, was found to be significantly different at the .005 level. There was no significant difference discovered between the hunger perception-eating habits correlation (+ 0.1291) and the appetite perception-eating behavior correlation (+ 0.983) for the diminished hunger perceivers. The lack of difference represented the results of the conversion to Fisher's Z' equivalents of 0.131 and 1.606, as well as the subsequent Z-score of 1.404.

Because of the possible influence of widely differing sample size between the groups studied that might have been exerted on the statistical analysis, the calculated Pearson correlation coefficients were also evaluated against correlation coefficients already adjusted to accommodate various degrees of freedom, even small sized samples. As shown in Table 19, the required correlation as compared to the calculated coefficients yielded the same fundamental conclusions of the previous tests, with one minor exception being that according to these data, the correlation between appetite perception and its corresponding eating behavior for the diminished perceivers was significant at the .05 level instead of the .01 level of the Student's t-scores.

TABLE 18

COMPARISON OF THE CORRELATION BETWEEN MATCHED PAIRS<sup>a</sup> FOR EACH SET  
OF PERCEPTION-EATING PATTERN RESPONSES WITHIN HUNGER PERCEIVERS  
AND DIMINISHED HUNGER PERCEIVERS

	N	df	Fisher's Z' Equivalents	Z - Scores	Level of Significance
<u>Hunger Perceivers</u>	30	28			
Hunger Perception: Eating Pattern			0.543		
Appetite Perception: Eating Pattern			2.371	± 6.716	p <.005
<u>Diminished Hunger Perceivers</u>	4	2			
Hunger Perception: Eating Pattern			0.131		
Appetite Perception: Eating Pattern			1.606	± 1.04	NS

<sup>a</sup>For matched pairs of perception and eating patterns, see Appendix E.

TABLE 19  
 ANALYSIS OF THE CORRELATION COEFFICIENTS  
 AS ADJUSTED FOR SAMPLE SIZE

	N	df	Calculated Correlation Coefficient (r)	"r" Required for .05 Level of Significance <sup>a</sup>
<u>Hunger Perception: Eating Patterns</u>				
Hunger Perceivers	30	28	+ 0.525 <sup>b</sup>	± 0.361
Diminished Hunger Perceivers	4	2	+ 0.381	± 0.950
Pilot Study # 1	6	4	+ 0.445	± 0.811
Pilot Study # 2	9	7	- 0.430	± 0.666
<u>Matched Pairs<sup>c</sup>: Hunger Perception: Eating Patterns</u>				
Total Group	34	32	+ 0.5965 <sup>b</sup>	± 0.339
Hunger Perceivers	30	28	+ 0.4944 <sup>b</sup>	± 0.361
Diminished Hunger Perceivers	4	2	+ 0.1292	± 0.950
<u>Matched Pairs<sup>c</sup>: Appetite Perception: Eating Patterns</u>				
Total Group	34	32	+ 0.971 <sup>b</sup>	± 0.339
Hunger Perceivers	30	28	+ 0.923 <sup>b</sup>	± 0.361
Diminished Hunger Perceivers	4	2	+ 0.983 <sup>b</sup>	± 0.950

TABLE 19-Continued

	N	df	Calculated Correlation Coefficient (r)	"r" Required for .05 Level of Significance <sup>a</sup>
<u>Matched Pairs<sup>c</sup>:</u>				
<u>Combined Perceptions:</u>				
<u>Eating Patterns</u>				
Total Group	34	32	+ 0.622 <sup>b</sup>	± 0.339
Hunger Perceivers	30	28	+ 0.562 <sup>b</sup>	± 0.361
Diminished Hunger Perceivers	4	2	+ 0.559	± 0.950
Pilot Study # 1	6	4	+ 0.910 <sup>b</sup>	± 0.811
Pilot Study # 2	9	7	+ 0.370	± 0.666

<sup>a</sup>Source: Edward W. Minium, Statistical Reasoning in Psychology and Education, 2nd. ed. (New York: John Wiley and Sons, 1978), pp. 539-40.

<sup>b</sup>Significant at the  $p < .05$ .

<sup>c</sup>For matched pairs of perception and eating patterns, see Appendix E.

## CHAPTER 4

### DISCUSSION

The reflection of either group's ability to maintain weight appeared to depend heavily on the criteria used. When the percent of weight change was used which illustrated the amount that the weight had ranged, 63 percent of the diminished hunger perceivers and 75 percent of the hunger perceivers demonstrated their difficulty in retaining a given weight for the five years in question. It could be said therefore that both groups had trouble maintaining their weight, regardless of the degree of hunger perception experienced. The predominance of this type of weight discrepancy in the study population may have been a reflection of the environment from which the samples were drawn, that is a fitness-exercise center. As proposed earlier in such a place many patrons came to resolve these difficulties. Of course many others participated in the same or similar activities to maintain the fitness level and weight they have had in past years. Perhaps it was this lattermost reason that when weight maintenance was based on number of fluctuations, there was a clear difference between the 93 percent of hunger perceivers who had few changes in weight as compared to 50 percent of diminished perceivers in the same category. Unfortunately the sample size of four diminished hunger perceivers was too small to lead to a dependable conclusion that those with hunger perception had controlled their weight more successfully than those without a reliable hunger detection system.

In a similar manner, when hunger and appetite perceptions were compared to eating behavior in general, the data seemed to illustrate that hunger perceivers had a greater relationship between the two factors than did diminished perceivers. However this finding could have been considerably influenced by the disparity of sample sizes as evidenced by the statistics which compared the two sample groups where there was found a significant correlation between factors for one group, but obviously lacking such significance for the other group, and yet these analyses found that there was no significant difference between the same correlations, based on statistics which admittedly lost their precision with small samples.

It was thought that by comparing the results of the two pilot studies to the main study that the effect of sample size would be apparent because the former groups consisted of hunger perceivers in numbers just slightly larger than the diminished hunger group. The results showed what appeared to be concrete proof of the affect of sample size. However, when hunger and appetite perceptions were matched directly with eating patterns, again hunger perceivers demonstrated a more significant correlation between the two factors than did diminished perceivers, and again the influence of sample size came into question. To ascertain an answer the comparison with the pilot studies was used as before. Unlike the previous trial in which there was no significance of correlations for either pilot group, the second time revealed a significant relationship between perception and eating behavior for the smaller pilot group, but not for the larger sample.

Instead of clarifying the matter, more uncertainty was created by the second evaluation and comparison of the pilot studies data. Possible rationale for the turnabout could be that those unique characteristics that prevented the subjects of the pilot studies from participating in the main study contributed to the discrepancy between correlation coefficients. Also, perhaps the small sample sizes of the pilot studies created unreliable statistics for analysis.

The one main difficulty in interpreting the data was the potential influence that having only four or six subjects in one sample would have on the statistical formulation. There could have been three main reasons for catching only four women with diminished hunger and not more. First, there was the possibility of the existence of more diminished perceivers who answered the questionnaire, but because of faulty instrument design were incorrectly designated as hunger perceivers. Although this was a plausible answer, it was the intention of the researcher at the time of the interview to minimize this possible weakness by having face-to-face interviews with the subjects; the only contact person for the subjects was the same and only researcher; and by discussing with each subject items on the questionnaire as well as the topics of perception, weight, and eating habits in general in order to obtain information from the women which may not have been addressed by the instrument.

Another origin of the sample size could have been that the subjects responded to the questionnaire incongruently with their actual perceptions and behavior in order to please or impress the researcher. Certain amount of error was expected in general because of the dependence on the subject's

memory and ability to represent perceptions in a somewhat concrete manner, however this was predicted to be a common enough characteristic between the women so as not to pose an insurmountable variable. Attempts were made by the researcher to inform the subjects that there were no preferred responses, in addition to trying to put them at ease so that tension or experimenter bias would not have influenced the survey. The success or failure of these attempts could have affected their answers, and could have been reflected in the classification of the women.

The third possibility for the small sample size could have been that in the sample population only a comparatively few people were characterized by a diminished perception of hunger. One of the primary goals of this study was to document the existence of the condition and to establish some proportion of its occurrence in the sample population. According to the data, the diminished hunger perceivers made up 12 percent of the study population. As compared to the incidence of its mention in the literature, even this amount could have been inflated by a skewed sample population. One observation which may have lent support to this rationale was that although the pilot studies were small in size, not one woman interviewed even remotely qualified as a diminished perceiver, albeit the techniques and the instrument used were basically the same as were later employed in the main study. In short, perhaps the sample size of the diminished hunger perceivers was inconveniently statistically small because it depicted a comparatively rare characteristic. Only further research into this area with considerably more subjects could clarify the information gathered in this study.

Assuming that sample size deficits did not modify the accuracy of all the results, some interesting data emerged. Both groups responded more to appetite as a stimulus for eating, regardless of their degree of hunger perceptions or weight. This appeared to agree with the hypotheses of external versus internal cues as proposed by Rodin (13, 14) and the other researchers (15-18). The results of the survey differed from its predecessors in that the strength of external stimuli was demonstrated by obese and non-obese subjects alike.

In addition, both groups were similar in that the subjects were within the same weight range and had oscillated about the same percent of weight change. Through childhood and adolescence, the majority of women regardless of their perception of internal cues remained within a normal weight range.

The groups differed in their display of a unique pattern of responses to hunger descriptors that was evident upon inspection of the questionnaires. To a lesser extent but no less important was the characteristic distribution of responses to appetite questions which belonged to each sample group.

Finally, of the four women who had difficulty perceiving internal stimuli with any consistency, two had a history of being overweight, one was habitually underweight, and another strictly controlled her intake in order to maintain her ideal body weight or slightly below it. Additional research could assist in providing a profile of a diminished hunger perceiver that could more accurately predict which people might fall into this group, as well as improving therapy for those with weight and eating disorders.

## CHAPTER 5

### CONCLUSION

The null hypotheses for this research were that weight maintenance ability was not different for diminished hunger perceivers than for those who could detect their internal cues and that the eating behavior in response to both hunger and appetite cues, especially hunger, was equivalent between hunger perceivers and those lacking dependable hunger perception. For this study, the null hypotheses were retained because there was insufficient statistical evidence to reject them. The only instance of a significant difference between the groups was for the second measurement of weight control based on number of fluctuations; however, even in this case there was not enough data to establish whether the resulting difference was between the degrees of hunger perception or between the degrees of weight control. Therefore the null hypothesis for this case was retained because of insufficient direction of difference.

As stated in the discussion, further research into the area of a lack of hunger perception is indicated. First, if a large enough population could be found to yield a substantial number of non-perceivers, then perhaps a true proportion of perceivers to non-perceivers could be revealed. Also once a larger sample size of diminished hunger perceivers was located, a longitudinal study could be conducted in order to record the group's weight history and progress. An examination of hospitalized patients to

determine their sensations of hunger, or the absence of them, might prove beneficial in planning their therapy since the consumption of nutrients is essential to recovery and anorexia in the hospitalized person is too commonplace of an occurrence. The purpose of this study was to answer some questions on this topic, but in its course more inquiries were raised which only more research can resolve.

## APPENDIX A

### INTRODUCTION OF RESEARCHER TO SUBJECTS

Hello. My name is Victoria Alwin. I am a graduate student from the University of Arizona trying to get a Master of Science degree in dietetics. In order to accomplish this I need your cooperation. The questionnaire you have volunteered to answer should take about 10 - 15 minutes to complete. I will read it to you and record your responses. In order to make sure that the questionnaire is reflecting your ideas, I must ask you to complete this interview twice, once today and again at a time in the near future when it will be convenient for you. The questions you will be answering will concern your perceptions of hunger. There are no correct or incorrect responses. All of your answers will remain confidential. If you have any questions regarding the purpose of this survey, please ask. What I can answer now, I will; what I cannot answer now, I will after the second interview is completed. If you need to contact me, please call the Nutrition Center. Thank you for your help; it is sincerely appreciated.

APPENDIX B

QUESTIONNAIRE ON HUNGER PERCEPTION

SUBJECT'S NAME \_\_\_\_\_

AGE \_\_\_\_\_ DATE OF INTERVIEW \_\_\_\_\_ 1 2

Directions:

To the following questions, which one of these responses (direct the subject to the card in front of them) best reflects your answer. Please take your time in answering the questions, be as accurate as you can, and listen carefully to what I am saying, not what you may think I am saying. If you have any questions or reservations, please inform me. First, I want you to settle in your mind what you think of as hunger. The first set of questions deal with the statement "I know I am hungry when ...". For those responses which come the closest to your perception of hunger, I would like you to use the response "Most Often."

MO- MOST OFTEN  
 O - OFTEN  
 S - SOMETIMES  
 R - RARELY  
 N - NEVER

- |  |                         |
|--|-------------------------|
| 1. I know I am hungry when my stomach growls.  | 5 4 3 2 1<br>MO O S R N |
| 2. I know I am hungry when I feel a cramp in my stomach.   | 5 4 3 2 1<br>MO O S R N |
| 3. I know I am hungry when I feel fatigued.  | 5 4 3 2 1<br>MO O S R N |
| 4. I know I am hungry when my stomach feels empty.   | 5 4 3 2 1<br>MO O S R N |
| 5. I know I am hungry when I become "shaky."   | 5 4 3 2 1<br>MO O S R N |
| 6. I know I am hungry when my mood changes for no apparent reason (e.g. become irritable).         | 5 4 3 2 1<br>MO O S R N |
| 7. I know I am hungry when I have a very strong urge to eat, that just will not go away with time. | 5 4 3 2 1<br>MO O S R N |
| 8. I know I am hungry when I feel a headache coming on.  | 5 4 3 2 1<br>MO O S R N |
| 9. I know I am hungry when I start to feel nauseated.  | 5 4 3 2 1<br>MO O S R N |

10. I know I am hungry when I see a food item I like.	1 2 3 4 5 MO O S R N
11. I know I am hungry when I start to crave a certain food.	1 2 3 4 5 MO O S R N
12. I know I am hungry when it is a given time of day.	1 2 3 4 5 MO O S R N
13. I know I am hungry whenever I am in the mood to eat.	1 2 3 4 5 MO O S R N
14. I become hungry while doing certain activities (e.g. watching T. V., reading, studying, etc.)	1 2 3 4 5 MO O S R N
15. I become hungry whenever I am nervous.	1 2 3 4 5 MO O S R N
16. I become hungry after smelling food.	1 2 3 4 5 MO O S R N
17. I become hungry if I see someone eating.	1 2 3 4 5 MO O S R N
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18. I eat when my stomach growls.	5 4 3 2 1 MO O S R N
19. I eat when stomach feels empty.	5 4 3 2 1 MO O S R N
20. I eat when I feel shaky.	5 4 3 2 1 MO O S R N
21. I eat when I become moody.	5 4 3 2 1 MO O S R N
22. I eat when I start to get a headache.	5 4 3 2 1 MO O S R N
23. I eat when I desire a specific food.	1 2 3 4 5 MO O S R N
24. I eat whenever I want to eat.	1 2 3 4 5 MO O S R N
25. I eat whenever I am bored.	1 2 3 4 5 MO O S R N
26. I eat whenever I watch television, not including meals in front of the T. V.	1 2 3 4 5 MO O S R N
27. I eat only when I am hungry.	5 4 3 2 1 MO O S R N
28. I eat when I smell food.	1 2 3 4 5 MO O S R N
29. I eat after I feel my stomach cramp.	5 4 3 2 1 MO O S R N
30. I eat when I feel tired, but not sleepy.	5 4 3 2 1 MO O S R N
31. I eat when I have a very strong urge to eat.	5 4 3 2 1 MO O S R N
32. I eat when I see something that looks appetizing,	1 2 3 4 5 MO O S R N
33. I eat when according to the clock it is time to eat.	1 2 3 4 5 MO O S R N

34. I eat whenever I read or study. 1 2 3 4 5  
MO O S R N
35. I eat whenever I am upset. 1 2 3 4 5  
MO O S R N
36. I eat whenever I feel sleepy, but don't want  
to sleep. 1 2 3 4 5  
MO O S R N
37. I eat if I see someone else eating. 1 2 3 4 5  
MO O S R N
38. I eat whenever I am out shopping. 1 2 3 4 5  
MO O S R N
39. I eat when I drive long distances.(Not including  
meal stops) 1 2 3 4 5  
MO O S R N
40. I eat after an argument. 1 2 3 4 5  
MO O S R N
- 
41. As a child, I was within a normal weight range. MO O S R N
42. I was of average weight when I was a teenager. MO O S R N
43. My weight goes up and down like a yo-yo. MO O S R N
44. What is your usual weight? \_\_\_\_\_
45. When did you last weigh that? \_\_\_\_\_
46. Not including pregnancies, in the past five years, what was the MOST  
that you weighed? \_\_\_\_\_ When was that? \_\_\_\_\_
47. In the last five years, what was the LEAST that you weighed? \_\_\_\_\_  
When was that? \_\_\_\_\_
48. Within the last five years, how many times have you gained and lost  
more than ten pounds? \_\_\_\_\_

\_\_\_\_\_ % net weight change

Telephone \_\_\_\_\_

APPENDIX C

FREQUENCY OF RESPONSES TO HUNGER DESCRIPTORS AS  
GIVEN BY EACH SUBJECT

Subject	Most Often	Often	Sometimes	Rarely	Never
1	7	0	1	0	1
2	6	2	1	0	0
3	5	1	1	2	0
4	5	0	2	2	0
5	5	0	2	1	1
6	4	1	1	3	0
7	3	1	1	1	3
8	3	0	2	2	2
9	2	3	3	1	0
10	2	3	3	1	0
11	2	1	4	0	2
12	2	1	3	2	1
13	2	1	3	0	3
14	2	0	5	1	1
15	2	0	2	1	4
16	2	0	1	6	0
17	1	2	3	2	1
18	1	2	0	2	4
19	1	1	4	2	1
20	1	1	3	4	0
21	1	1	1	3	0
22	1	1	1	1	5
23	1	0	1	2	5
24	0	5	3	0	1
25	0	3	3	2	1
26	0	2	1	5	1
27	0	2	1	2	4
28	0	2	1	0	6
29	0	1	2	1	5
30	0	1	1	1	6
31 <sup>a</sup>	0	0	4	3	2
32 <sup>a</sup>	0	0	3	3	3
33 <sup>a</sup>	0	0	3	3	3
34 <sup>a</sup>	0	0	2	6	1

<sup>a</sup>Denotes those subjects classified as "Diminished Hunger Perceivers."

APPENDIX D

WEIGHT RANGES AND FLUCTUATIONS BY SUBJECT

Subject	Percent of Weight Change	Number of Changes in Weight	Highest Weight (pounds)	Lowest Weight (pounds)	Usual/Present Weight (pounds)
1	9	1	127	115	127
2	12	1	114	102	107
3	15	5	170	145	170
4	10	1	126	114	118
5	14	4	216	185	216
6	28	3	210	158	185
7	29	20	170	125	153
8	8	0	130	120	120
9	42	1	158	103	130
10	17	3	190	160	180
11	10	1	144	130	136
12	44	3	284	197	200
13	13	0	125	110	110
14	7	1	140	129	150
15	6	0	148	139	142
16	30	0	165	125	135
17	24	1	180	145	147.5
18	4	0	127	122	125
19	47	1	230	150	170
20	18	0	130	108	120
21	14	1	150	130	146.5
22	7	0	145	135	137.5
23	11	1	138	124	127.5
24	8	0	122	113	116
25	8	1	125	115	122.5
26	22	20	148	118	136
27	15	4	150	130	134
28	15	5	157	135	134
29	7	1	116	108	112
30	36	1	140	110	135
31 <sup>a</sup>	11	1	100	90	95
32 <sup>a</sup>	30	10	175	135	135
33 <sup>a</sup>	9	0	106	97	105
34 <sup>a</sup>	25	7	165	129	145

<sup>a</sup>Denotes those subjects clasified as "Diminished Hunger Perceivers."

APPENDIX E

MATCHED PAIRS OF PERCEPTION-EATING PATTERNS QUESTIONS

Hunger Descriptor Questions		Corresponding Eating Pattern Questions	
Numbers:	1	Numbers:	18
	2		29
	3		30
	4		19
	5		20
	6		21
	7		31
	8		22

Appetite Descriptor Questions		Corresponding Eating Pattern Questions	
Numbers:	10	Numbers:	32
	11		23
	12		33
	13		24
	16		28
	17		37

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