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Daye, Shirley Watford

EFFECT OF A JUNIOR HIGH SCHOOL WEIGHT CONTROL PROGRAM ON WEIGHT LOSS, SELF-CONCEPT, KNOWLEDGE, AND RELATED BEHAVIORS

The University of North Carolina at Greensboro PH.D. 1985

EFFECT OF A JUNIOR HIGH SCHOOL WEIGHT CONTROL PROGRAM ON WEIGHT LOSS, SELF-CONCEPT, KNOWLEDGE, AND RELATED BEHAVIORS

by

Shirley Watford Daye

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Approved by

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APPROVAL PAGE

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DAYE, SHIRLEY WATFORD, Ph.D. Effect of a Junior High School Weight Control Program on Weight Loss, Self-Concept, Knowledge, and Related Behaviors. (1985) Directed by Dr. Barbara N. Clawson. 102 pp.

The major purpose of this study was to determine the effect of a weight reduction program on weight, nutrition knowledge, self-concept, and behaviors related to overeating and weight gain of obese junior high school students. A total of 46 junior high school females who were 15% above their recommended weight were included in the study.

An experimental nonrandomized control group pre-posttest design was used in this study. Components of the treatment included behavior modification, nutrition, exercise, and improving self-concept. The program lasted 18 weeks with sessions occurring once a week.

Instruments developed for the study included a 16-item Likert-type scale intended to assess eating behaviors related to weight gain and a 46-item nutrition knowledge test. The Piers Harris Self Concept scale was also used. Pre- and posttest responses for the experimental group indicated that the weight control program participation significantly increased nutrition knowledge and self-concept. In addition, favorable weight control behaviors increased, unfavorable behaviors decreased, and weight was lost.

An analysis of covariance was used to test four of the five hypotheses which stated that there were no statistically significant differences between weight loss, behavior related to overeating and weight gain, self-concept and nutrition knowledge between obese students who participated in the weight reduction program and those who did not participate in the program. Pretest scores were used as the covariate. Results of the analysis of covariance resulted in the rejection of all four hypotheses.

The hypothesis which stated that there was no relationship between weight loss and class attendance was not rejected. A Pearson production moment correlation coefficient showed no significant relationship between the two variables.

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Special gratitude is expressed to my husband Wayne and two sons C. Lemonte and Channing, who needed me and did without. A special acknowledgement is given to my loving parents Arliss and Louise Watford who taught me to be diligent.

This dissertation is fondly dedicated to my oldest son C. Lemonte Smith.

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CHAPTER I

INTRODUCTION

Obesity is a major health and social problem in the United States. Being overweight may influence the progression of coronary heart disease, hypertension, and diabetes. Obesity increases the risk of early death and may affect the economic, social, and psychological well-being of individuals (Zakus, Chin, Cooper, Jr., Makovsky, & Merrill, 1981).

A generalized definition of obesity is stated as the excessive accumulation of body fat resulting in body weight greater than 15% to 20% above ideal weight. A person whose weight is less than 15% to 20% but more than ideal is considered overweight (Hoerr, 1985; Springer, 1982; Storz, 1982).

Blackburn and Pavlou (1983) reported that between 15% and 40% of the United States population can be classified as obese. The situation was described as "a national, nutritional problem that has been expanding to epidemic proportions rather than diminishing in recent years" (p. 1). In data reported by Jaqua, Holland and Farone (1979), they claimed that cases of obesity included 15% of individuals from adolescence to 30 years of age and 25% to 30% of adults over 30 years of age. Simonson (1982) described obesity as "the most prevalent, chronic, and money-making condition in this country" (p. 1).

Obesity has been described as a common nutritional problem in childhood (Springer, 1982; Zakus, Chin, Keown, Hebert, & Held, 1982). It is estimated that approximately 10% to 35% of the adolescent population is obese, depending upon the criteria used to define obesity. Although no significant mortality rate is associated with being obese during teenage years, continuing obesity into adult life may result in serious handicaps. Obese teenagers have problems in social and emotional adjustment related to defective body image, low self-esteem, social isolation, depression, and feelings of rejection. Adolescence is a critical time period for the treatment of obesity (Brownell & Kaye, 1982; Zakus et al., 1981).

In a study which addressed weight loss, Brandt, Maschhoff, and Chandler (1980) discussed the lack of adolescent weight control programs. In certain areas of the county where the study was conducted, there were numerous weight control programs which met the needs of adults but the number offered for adolescents was seen as less than adequate. The few programs available focused on rigid dieting, the exercise of will power, and self denial. The researchers described information provided to participants on identifying and changing habits that support the weight problem, the importance of physical activity in weight and appetite control, and ways to handle feelings in appropriate non-food related ways as limited.

Considerable research suggested that the school provides an appropriate setting for assisting the obese adolescent (Nelson, Catchings, & Pendleton 1983; Storz, 1982; Zakus et al., 1981). Since

obesity is a complex problem which requires a multifaceted approach, school personnel need to be careful in their selection of a program. Behavioral techniques combined with dietary management and physical activity may be the most effective treatment method. This type of multicomponent program emphasizes treating obesity by changing such factors as eating and exercise habits (Brownell, & Kaye, 1982; Zakus et al., 1981).

Educators in the Charlotte-Mecklenburg school system expressed concern about the number of obese students. A principal in one of the junior high schools in the Charlotte-Mecklenburg school system requested that a comprehensive weight control program be offered to students. The purpose of this research was to explore the effectiveness of a junior high school weight reduction program which placed emphasis on variables that possibly affect weight reduction: nutrition education, behavior modification, self-concept, and physical activity(Springer, 1982).

Statement of the Problem and Objectives

The major purpose of this study was to determine the effect of a weight reduction program on weight loss, nutrition knowledge, self-concept, and behaviors related to overeating and weight gain of obese junior high school students. The information could provide the basis for developing other weight reduction programs in the Charlotte-Mecklenburg school system.

Specific objectives of the study were as follows:

1. To determine if there was a difference in weight loss between the control and treatment groups as a result of the weight control program.
2. To determine if there was a difference in self-concept between the treatment and control groups using pre-and post measures.
3. To determine if there was a difference in behaviors related to overeating and weight gain between the treatment and control groups using pre-and post measures.
4. To determine if there was a difference in nutrition knowledge between the control and treatment groups using pretest and posttest data.
5. To determine if there was a relationship between class attendance and weight reduction.

Hypotheses

For statistical analysis of data, the following null hypotheses were investigated:

1. There is no statistically significant difference in weight reduction between the obese junior high school students who participate in the weight reduction program and the obese junior high school students who do not participate in the weight reduction program.
2. There is no statistically significant difference in responses on a self-concept measure between obese students who participate in the

weight reduction program and those who do not participate in the weight reduction program at the beginning and end of the treatment.

3. There is no statistically significant difference in behaviors related to overeating and weight gain between subjects who participate in the weight reduction program and those who do not participate in the weight reduction program at the beginning and end of the treatment.
4. There is no statistically significant difference in responses on a nutrition knowledge test between the junior high school students who participate in the weight reduction program and those who do not participate at the beginning and end of the treatment.
5. There is no relationship between weight reduction and class attendance.

Definition of Terms

Obesity: body weight which is 15% above ideal weight as recommended by accepted weight tables.

Behavior modification: techniques and procedures used to change inappropriate behavior related to overeating and weight gain to behavior appropriate for weight loss and maintenance.

Self-concept: an individual's perception of himself/herself.

Physical activity: "exercise which causes a steady elevation of the pulse above a minimum level, depending on age, of 110-140 beats per minute" (Ullyot, 1984, p. 1).

CHAPTER II

REVIEW OF LITERATURE

Obesity creates health and social problems for many people. Adolescents are not immune to these problems. A comprehensive school based weight reduction program may improve weight reduction and self-concept for concerned adolescents.

The purpose of this study was to determine the effect of a weight reduction program on weight loss, nutrition knowledge, self-concept, and behavior of obese junior high school students. This chapter, which presents a review of literature and research findings related to planning, implementing and evaluating weight reduction programs, is divided into three sections: (1) factors related to obesity, (2) recommendations for weight reduction programs, and (3) research on weight control programs.

Factors Related to Obesity

Liebman (1983) defined obesity as simply the excessive enlargement of fat tissue; whereas, Nelson, Catchings, and Pendleton (1983) presented a definition of obesity in comparison to overweight. Overweight, as distinct from obesity, was defined in relation to tables of desirable weight, usually prepared from insurance company information. Most assessments of obesity are based on anthropometric measurements, including skinfold thickness. Overweight can be expressed in many ways, one of which is relative weight, or ratio

of percentage of actual to desirable weight. Using the National Academy of Science's tables, Nelson, Catchings, and Pendleton (1983) defined overweight as "body weight above the upper weight recommended for each height, and obesity as the weight giving a body mass index of 30 or more" (p. 380).

Little (1983) realistically stated that a universal operational definition of obesity was nonexistent. Whaley and Wong (1979) described obesity as "an increase in body weight resulting from an excessive accumulation of fat, or the state of being too fat" (p. 440). It was concluded that, however defined, the extent of the problem of obesity was significant.

Excess body fat accumulates only when calories are eaten beyond those needed for the day's metabolic, muscular, and digestive activities. In other words, obesity results from overeating. This fact, however, neither explains the cause of obesity nor indicates the cure (Hamilton & Whitney, 1979).

Many causes of obesity have been presented; some of them related, others quite different. Hamilton and Whitney (1979) addressed a number of theories related to causes of obesity. The theories were as follows:

1. Hunger, appetite, and satiety. Hunger is said to be an inborn instinct or physiological, whereas, appetite is a learned response to food or psychological. Possibly, obese people have learned to enjoy eating for reasons other than to satisfy the hunger drive. The satiety theory suggests that for the obese person the point of fullness

regulated by the brain is set too high or is malfunctioning and the person goes on eating after the body's physiological need has been fulfilled.

2. External cues. Rather than responding only to internal hunger cues some people respond helplessly to external factors such as time of day, or the availability, sight, and taste of food. This is the basis of the external cue theory.

3. Psychological and emotional needs. Some authorities believe that food is widely used for non-nutritive purposes. For example, an emotionally insecure person, who feels unsure of acceptance by other people, might eat as a substitute for seeking love and friendship. Eating is often used, especially by adolescent girls, to relieve boredom.

4. Response to stress. Some people may substitute one behavior with another one when they are threatened. Rather than fight or flight, the activity selected may be to eat. Under stress, hormones which favor the rapid metabolism of energy nutrients to fragments which fuel the muscular activity of fight or flight are secreted. If a person does not use the fuel in violent physical exertion, the body turns the fragments to fat. If blood glucose is used this way, the lowered glucose level will signal hunger and the person will soon eat again. Some people go on an eating binge during an emotional crisis.

5. Metabolic obesity. A few cases of obesity could be due to a greater inherited tendency of some people to accumulate body fat than others.

6. Insulin insensitivity. Once a person has become obese, the situation tends to perpetuate itself. Insulin promotes glucose uptake into cells and its conversion to fat. Enlarged fat cells become resistant to insulin. Therefore, excess glucose stays in the bloodstream and stimulates the insulin-producing cells of the pancreas to multiply and secrete more insulin which promotes further fat storage. Enlarged fat cells are also less sensitive to other hormones that promote fat breakdown.

7. Inactivity. The causes of obesity previously described all refer to the input side of weight gain. Individuals may be too fat not only because they eat too much but also because they use too little energy. Obese people under close observation are often seen to eat less than lean people, but they are sometimes so extraordinarily inactive that they still manage to have a calorie surplus.

Forbes (1981) claimed that with rare exceptions, obesity results from an energy imbalance. He charged that society fosters such imbalance because food is abundant, palatable, and readily obtainable for the vast majority of Americans.

Garn (1981), in a discussion of causes of obesity, stated that "among the factors known to affect fatness and the level of obesity, none have been so extensively detailed as socioeconomic status" (p. 1). He cited studies which suggested that for most countries affluent children tended to be fatter than poorer children from later infancy up to adolescence. Poverty-level males were leaner than middle income males who were more often obese. However, for adult American women

the reverse seemed apparent. It was the woman at the lowest educational level, with the least per-capita income, who was most often obese. In adolescent girls and in adult women, fatness levels and the probability of obesity decreased with increasing income and the socioeconomic status of the family.

The inverse relationship between socioeconomic status and the level of fatness for females has no easy explanation. Suggested reasons were as follows:

1. Low-caloric density foods are expensive, less accessible, and less a part of their food world.

2. Employment in food preparation resulting in continued access to calories.

3. No purchase of magazines that feature low-calorie diets.

4. No identification with thin females seen on television.

Of course, not all low-income women are either fat or obese and some high income women are rich but not thin.

There are data which suggest that a tendency to obesity is inherited. It is not possible to do breeding experiments in man but a number of heredity syndromes have been identified in mice and rats. Through selective breeding experiments carried out over many generations, it has been possible to segregate obese and thin groups of mice. When the fertilized egg from animals in one group was transplanted into the other, the result was that the offspring genotype was more important in determining body size and fatness than was the foster mother's genotype. As for humans and body fat, in the absence

of parental obesity, the incidence of obesity in their children was about 14%; if one parent was obese, this rose to 40% and if both were obese, the incidence was still higher, 80% (Forbes, 1981). Simonson (1982) concisely stated causes of obesity as "hormonal, psychological, genetic, nutritional, environmental, and drug related" (p. 1).

The many discussions on aspects of obesity add to the mystery of its true causes. The solution may be as Hamilton and Whitney (1979) stated that "no two people are alike either physically or psychologically and the causes of obesity are probably as varied as the people who are obese" (p.19).

Recommendations for Weight Control Programs

Research has suggested that the school provides an appropriate setting for assisting the obese adolescent (Brownell, 1984; Seltzer & Mayer, 1970). One decision school personnel have to make in planning a weight control program is to determine the criteria for identifying the obese adolescent. Obesity does not refer to those teenagers who diet because it is the thing to do or because they are dissatisfied with their shapes. Nor does it refer to the temporary chubby stage which occurs for many adolescents for a few months just prior to the beginning of the spurt of growth in height. Instead, obese adolescent refers to the teenager who will remain obese into adulthood. The adolescent has probably been overweight most of his/her life and social characteristics of adolescence may prompt the individual to deal with obesity for the first time (Gifft, Washbon, & Harrison, 1972).

Little (1983) stated that there were several ways to determine obesity, however, for a large school weight control program, determination of obesity by observation of the students, combined with height and weight according to any growth chart, would be more feasible for screening than anthropometric measurements and tests like the pinch ruler, and belt line tests. Children above the 95th percentile could then be the focus of attention.

Little (1983) continued with a discussion of steps in implementing a weight control plan. The teacher should meet with school administrators and other teachers, measure and evaluate all of the children, and send permission slips home with children who were identified as being obese. The letter should discuss the purposes of the program, recommend that the student see a doctor, secure the parent's permission for the child to participate, and ask the parents to become involved.

Another decision the school personnel might have to make would be the appropriate size for the group. The size of group recommended to obtain the best results was discussed by Rogers (1965). Groups consisting of six people and the teacher have been most successful. This number fosters personal interaction and is still cost effective. A group larger than six increases the chance that some members of the group will withdraw and not participate.

Components of Weight Reduction Programs

In the weight reduction program the techniques to be used must be carefully selected. Hudiburgh (1984) stated that no single technique has been consistently successful and encouraged the use of a multidisciplinary approach. Lifestyle, extent, and cause of obesity are factors to consider in deciding the approach or approaches to be used. Many obese people cannot successfully lose and maintain weight loss using only one technique, especially those who have been overweight since childhood. A multifaceted approach involving nutrition education, behavior modification, and exercise promises the greatest chance of success (Springer, 1982).

Nutrition Education

In educating students on the value of good nutrition, it is important to give correct, up-to-date information as a basis for deciding whether or not to change their eating behaviors (Holt, 1984). The lack of accurate nutrition knowledge among teenagers and poor dietary practices of many teenagers have been topics of concern for several decades. Skinner and Woodburn (1984) designed a study to investigate the following questions important in implementing an effective nutrition education program for teenagers:

> "What do teenagers need to learn about nutrition based on their physiological needs and current dietary practices?
>
> What do teenages already know about nutrition? What don't they know?
>
> How well does existing nutrition education meet the needs identified in the previous questions"? (p. 71)

In response to the question about previous sources of nutrition information, 67% of the teenagers in the study (Skinner & Woodburn, 1984) had taken health or home economics classes which had a nutrition component. Students also had learned about nutrition from parents (80%), other family members (93%), television (70%), magazines (60%), books (54%), coaches (33%), and friends (31%).

In the study by Skinner and Woodburn (1984), several test items directly or indirectly focused on weight control. Too many calories was correctly identified by 54% as a common problem in American diets. Almost all of the teenagers recognized that reducing the daily intake of calories was a safe and more effective way to lose weight than eating only foods high in protein, eliminating carbohydrates, or eating only one meal a day. When asked to apply these concepts to selection of foods and meals low in calories, they scored poorly. Only 15% selected two tablespoons of mayonnaise as higher in calories than a medium potato, one hamburger bun, or 2/3 cup of cooked rice. Less than one half of the teenagers correctly identified the most nutritious meal for a teenager who needed to lose 5 pounds and recognized that excess protein can become body fat. When planning nutrition education programs, one should consider what teenagers need to know about food and nutrition to make informed food choices. Teens probably already know the Four Food Groups, the importance of protein in the diet, and a commonly known best food source of many nutrients (Skinner & Woodburn, 1984). In an investigation of attitudes toward weight control expressed in popular magazines, Parham, Frigo, and Perkins (1982) suggested that

magazines could be a valuable resource in weight control campaigns. A varying range of quality of content was found in magazines. Most of the content about weight control was factual and reliable, suggesting that it is not always appropriate to dismiss contribution of popular magazines to weight control as usually being miracle diets. It was suggested that nutrition educators use magazine articles and encourage dieters in groups to share articles found to be interesting and helpful.

Holt (1984) studied students' reactions to the concept of nutrition as it relates to good health, the importance of exercise, food choices, and weight control. A large number of the students (91.8%) responded that exercise was important to good health. Holt stated that students may have developed their interest in exercise by participation in physical education classes. Holt also believed that if students had as much exposure to nutrition education as is the case with exercise, perhaps positive attitudes toward nutrition and eating habits would be more prevalent.

Self-Concept

Obese individuals are often described as greedy, weak, and self-indulgent. They are also stigmatized because of their failure to conform to society (Steele, 1980). Those working with obese teenagers should address self-concept and interpersonal relationships. Occasionally, obese teenagers who lose weight have problems seeing themselves as thin and tend to expect others to interact with them as obese people. Others expect loss of weight to be the answer to all of

their problems. Obese teenagers may expect weight loss to fulfill desires for success and achievement (Steele, 1980).

Findings have shown that obese subjects expressed feelings of inferiority or dissatisfaction due to their size (Storz, 1982). In a study conducted to estimate the incidence of disordered eating habits among adolescents and to examine relationships between binge eating habits and feelings of psychosocial constraint, the results showed that while binge eating as a cycle was not a major behavioral pattern among high school students, dieting and compulsive eating were related to feelings of failure (Kagan & Squires, 1984).

Obese adolescents need to develop realistic goals including realistic expectations for the amount of weight loss and realistic expectations of what weight loss will accomplish. They need the encouraging support of parents, teachers, physicians, and peers. It is important that obese adolescents learn to live with themselves by gaining a better insight into the reasons for lack of success in weight control and by developing more outgoing social skills (Gifft, Washbon, & Harrison, 1977).

Physical Activity

Physical activity is an important part of a weight reduction program (Brownell, 1984; Hoerr, 1985; Little, 1983; Wadden et al., 1984). Brownell (1984) cited several authors' discussions of advantages of physical activity. Although it was evident that obese persons were generally less active than thin persons, it was not clear whether obesity was the cause or consequence. Among the benefits of

exercise are that it may increase energy expenditure, increase metabolic rate, decrease loss of lean tissue, change blood lipid levels, increase self-esteem, and may help suppress appetite.

Behavior Modification

Behavior modification appears to be effective for weight loss as well as for weight maintenance when included in a weight reduction program (Leon, 1979; Perri, Sharpiro, Ludwig, Twentyman, & McAdoo, 1984; Wadden et al., 1984; Zakus et al., 1981). Martin and Pear (1983) stated that defining behavior modification was quite difficult because experts differed in their definitions. The most important characteristic of behavior modification is the strong emphasis on defining problems in terms of behavior, with behavior defined as anything a person does or says. Another characteristic of behavior modification is that its treatment procedures and techniques are ways of rearranging an individual's environment and daily activities to help that individual function more fully in society. The ultimate test of any behavior modification method is whether it is effective in changing behavior in a desired manner.

Leon (1979) stated that behavior modification procedures are system oriented and aimed at teaching persons suffering from obesity how to modify behaviors in relation to inappropriate food consumption. The following procedures may be used:

1. Self-monitoring. A daily record is kept by the obese person of various behaviors in relation to personal eating. The record includes eating environment, what, and how much food is eaten.

2. Stimulus control and environmental management. The person changes surroundings in order to break the learned association between the particular environmental cues and food intake.

3. Positive reinforcement. A reward is given following the occurrence of a specified behavior.

4. Contingency contracting. An agreement is made between the therapist and the individual with a weight problem which specifies behaviors to be changed and consequences if changes are not made.

5. Aversive Conditioning. The procedure develops in the individual a negative or unpleasant association to a previously neutral or positively conditioned stimulus, such as carrying out a particular problem-eating behavior. This procedure is usually not successful with persons who have weight problems because of the large number of bad eating habits.

6. Self-Control strategies. This procedure uses behavioral and cognitive techniques which help the individual refrain from eating when there is an urge or temptation to eat.

Many tools can be used to analyze the effect of weight control programs. Parental surveys can provide content about learned information and changed attitudes. Objective testing of obese adolescents can evaluate knowledge gained on diet, exercise, and psychological aspects. Observation can enable assessment of skills learned. Tests can measure changes in self-esteem and attitudes. Measurements can identify accurate weight loss, and longitudinal studies can follow students throughout the school years (Little, 1983).

The importance of using food diaries in a weight control program was supported by Russ, Ciaverella, and Atkinson (1984) and Strohmeyer, Massey, and Davidson (1984). Patterns identified by use of the diaries that were helpful in developing a weight loss program were skipping meals, frequent snacking, binge eating, rapid intake of food, lack of sufficient fruits and vegetables, high fat and sugar intake, consumption of soft drinks and fast foods in excess, little knowledge of caloric value of foods, and eating in response to external stimuli (Russ, Ciaverella, & Atkinson, 1984).

Research on Weight Control Programs

In a study of girls whose average age was 14 years, Zakus et al. (1981) validated the impression that obesity is frequently a problem that needs to be addressed in the public school setting. A pilot course titled "Why Weight" had a positive effect on the participating girls. The comparison group of girls who did not participate in the course gained weight; whereas, the experimental group lost weight.

Ikeda, Fujii, Fong and Hanson (1982), as part of a community weight control program for 14- to 16-year-old adolescents, offered two different programs. One was a behavioral approach combined with energy restriction, and the second was a behavioral approach without energy restriction. All treatment group meetings included three kinds of activities: (1) group integration and relaxation exercises, (2) body awareness and physical activity exercises, and (3) nutrition education and behavioral change activities. Comparison of pre- and posttest results revealed significant improvement in knowledge about weight

control among those who completed the program. A strong positive correlation was found between gain in cognitive knowledge and drop in percentage overweight. Participants indicated that the program had been most helpful in increasing individual awareness of eating and exercise habits.

Interrelationships among body weight, body image, and perceived desirability of fad diets in a study of 203 adolescent girls found that all subjects used more negative than positive adjectives in describing their appearance. It was recommended that teachers should encourage a concept of body as a renewable energy unit by emphasizing the roles that nutrients may play as sources of body processes and by prompting fitness and physical activity. It was also recommended that teachers stress nutrition in relation to health and dental care, personal attractiveness, appropriate food selection, and an active lifestyle. The self-conscious and body-conscious adolescent should be allowed to talk about his/her feelings (Storz & Greene, 1983).

Leonard, D'Augelli, and Smiciklas-Wright (1984) conducted a quasi-experimental study on the importance of parental support in the weight control of children. The study examined the efforts of a program called Eating Patterns Program which placed emphasis on habit changes for the entire family rather than targeted individuals. The program was designed as an overweight prevention program. The experimental sessions covered nutrition and the etiology of weight problems, an examination of family eating and activity patterns, planned behavioral changes, and an evaluation of the effectiveness of

planned behavior changes such as food selection, eating habits, and activity levels.

The program was evaluated using a pretest, posttest design. A paper-and-pencil checklist was used to determine whether behaviors associated with healthful eating and weight control increased during the program. Written responses to a series of ten simulated food-related situations involving children were used to assess whether parents' responses promoted or discouraged healthful eating habits. The frequency of parental responses encouraging healthful and unhealthful eating habits were assessed by rating recorded statements by parents during meals.

A statistical analysis of the data suggested that respondents' scores in the experimental group improved more than scores in the control group. Leonard, D'Augelli, and Smiciklas- Wright (1984) stated that as a result of the investigation it seemed that an educationally oriented preventive strategy was a promising one; however, assessment as to weight reduction in students requires observation of participating children in a longitudinal study comparing program participants with a similar population of children whose families did not experience the program.

A small group experience project to treat adolescent obesity utilized behavior modification, nutrition education, peer group socialization, and the help of significant others. The project, which was held in a multidisciplinary medical setting, resulted in tentative

findings. The participating girls titled the program "Freedom From Fat Figures." Meetings were held on Saturday mornings for one-and one-half hours for 25 consecutive weeks. Of the 10 girls who signed up for the program only five returned for the second session. The five remaining girls had a mean percentage of 88.1 above their ideal weight. All had made unsuccessful attempts to lose weight. Food diaries showed the girls had large intakes of simple carbohydrates which decreased as the meetings progressed. Deficiencies of calcium, vitamin A, vitamin D, and iron were also lessened as the girls improved eating habits.

The girls in the program gained and lost, which is typical of the yo-yo pattern. They gained an average of 17.9 pounds and lost an average of 20 pounds. The net average loss was 2.1 pounds. The five dropouts visited the clinic for other reasons during the time of the program; weight records showed an average gain of 8.1 pounds. This suggested that girls who remained in the program were more likely to lose than those who did not.

Weight of the girls who participated in "Freedom From Fat Figures" was compared to weight recorded during previous individual contacts. Over a comparable six-month span they gained a net average of 13.4 pounds as compared with the average loss of 2.1 pounds while in the program. This demonstrated that a group behavior modification approach was effective for treatment of severe obesity in the participating girls.

Wadden et al. (1984) conducted a study which explored the use of decreased calories combined with behavioral techniques and nutrition

education to reduce weight and then maintain weight loss. The behavior therapy addressed maintenance of weight loss and included cognitive restructuring, relapse prevention training, avoidance of excessive dietary restraint, and strategies for handling weight regain. The 16 subjects who completed the program did not experience increased depression or anxiety as subjects had in other studies suggesting that group behavioral treatment protects subjects from the adverse consequences of very low calorie dieting.

Ross (1984) cited other researchers who favored group weight reduction programs. It was concluded that group therapy for obesity was superior to individual therapy and possibly enhanced the behavior modification approach. Group support is most valuable for the teenager who may not be successful in a weight reduction program without the group support.

A study with 129 subjects using behavior therapy was conducted because behavior therapy had been shown to be more effective than other weight loss treatments (Perri et al., 1984). The study addressed the problem of weight maintenance since most people involved in weight loss programs often abandon behavioral techniques after the treatment period ends. The purpose of the study was to evaluate the effectiveness of two strategies designed to enhance the durability of behavior therapy for obesity. The strategies were relapse prevention training and post-treatment contact by telephone and mail. The results showed that the type of initial treatment clients received affected the success of post-treatment contact. Groups that received the behavior therapy plus

relapse prevention training were more successful in maintenance of weight loss than were groups who received only behavior therapy.

Hudiburgh (1984) described the content of a college weight modification course for 20 females which used a multidisciplinary approach including nutrition education, behavior modification, and exercise. Other activities included weighing students weekly, student presentations on influences on eating behavior, recipe modification for weight reduction diets, and comparing fad weight loss diets with the Basic Four Food Groups. At the beginning of the course weight ranged from 120% of ideal weight to 180% of ideal weight. Upon completion of the course weight reduction ranged from 20% to 100% of expected weight loss. Expected weight loss was defined as a percentage of 26 pounds, which was 2 pounds per week for the 13 weeks the course was taught or as a percent of total excess weight if the student was initially less than 26 pounds overweight. Hudiburgh (1984) stated that the results compared favorably with those of other studies in which behavior modification was used. It was suggested that to increase motivation and compliance with the diet and behavior modification techniques a reward or penalty system should be included.

Atkinson et al. (1984) described a comprehensive weight maintenance program at the University of Virginia Medical Center. The program included nutrition education, behavior modification, increased activity, and psychological support. The population for the study consisted of all obese patients who attended the weight program during a four year period. The random sample consisted of 20% of the

population. Weight loss for patients who remained active in the program was 21.4 kg compared to 14.6 kg for those who did not remain active. It was noted that a maintenance of weight loss requires major changes in the person's life style. The changes, which include eating habits, activity levels, and psychological factors, should be addressed gradually over a significant period of time. The necessary changes are possible only in the context of a comprehensive weight reduction program.

Researchers and specialists in the field of nutrition have stated that obesity is difficult to treat and that success rate in losing and maintaining weight loss by obese individuals is not very encouraging (Atkinson et al., 1984; Hudiburgh, 1984; Wadden et al., 1984). Because of the lack of success, individuals must be careful in selecting components for a weight reduction program (Abernathy, 1984).

The results of the review of literature indicated that a well-planned, school-based, multifaceted approach for weight loss showed promise for success with adolescents. Thus, the researcher decided to implement an adolescent weight control program in a junior high school which included the components of nutrition education, behavior modification, self concept, and exercise.

CHAPTER III

METHODS AND PROCEDURE

The major purpose of this study was to determine the effect of a weight control program on weight loss, nutrition knowledge, behavior related to overeating and weight gain, and self-concept of obese junior high school students. Information to be presented in this chapter includes the design of the study, selection of subjects, description of the weight reduction program, instrumentation, and data analysis.

Design of the Study

An experimental nonrandomized control group pre-posttest design was used in this study. The dependent variables were weight gain, nutrition knowledge, self-concept, and behavior. The independent variable was participation in the weight reduction program. Data were collected using pre- and post measures.

Selection of Subjects

The Charlotte-Mecklenburg school system requires that data collected in the school system for research receive approval from the following: Director of the Charlotte-Mecklenburg schools Systems and Evaluations Division, the area superintendent for the schools involved in the study, and the principals of the two junior high schools involved. Permission from these individuals was granted.

The Charlotte-Mecklenburg school system, Charlotte, North Carolina, is a large, consolidated metropolitan system. There are 21 junior high schools with a total population of 18,901. The population

for the study included the ninth grade students from two junior high schools who were identified as obese. J.T. Williams Junior High School served as the experimental group because of the request by the principal for a weight control program. J.T. Williams Junior High School had a total of 984 students with 328 in grade nine. Of the 328 students, 134 were female with about equal percentages of black and white. The school is located on the edge of uptown Charlotte and the majority of the students are middle income. Cochrane Junior High School, which is located in the inner suburbs of Charlotte, had a student population similar to that of J.T. Williams. Cochrane, with a student population of 1150 and 382 ninth graders, served as the control group.

Homeroom teachers for the eighth and ninth grades at J.T. Williams Junior High were asked to compile a list of students who visually appeared to be overweight. The students were asked by teachers and the principal if they were interested in participating in the program. An announcement was also made concerning the weight control program. After receiving written permission (Appendix A) from their parents these students were assessed for obesity based on 15% above the weight range given in the 1983 Metropolitan Life Insurance Company height and weight tables chart (Weigley, 1984). The investigator performed assessments by determining weight in pounds and height in inches with a detecto- -media scale. Bone structure was determined by wrist measurement in inches using a tape measure.

The experimental group for the study included the 23 students from the original 34 who started the program at J. T. Williams. They

completed the weigh-in at the beginning and at the end of the program. The principal at Cochrane, the control school, requested that the purpose of the pretest, posttest, and weigh-in be kept from the students due to the sensitivity of junior high students toward their appearance. Therefore, all students in the eighth and ninth grade homerooms were given the pre-and posttest measures and their weight recorded. A group of 23 students were randomly selected, from a total of 42 who had been identified as obese, to serve as controls in the study.

Description of Weight Reduction Program

The weight reduction program consisted of 18 sessions over a period of five months which dealt with nutrition education (six sessions), behavior modification techniques (four sessions), and self-concept (four sessions). Four sessions were used to collect the pre- and post data. Physical activity was conducted during the first half of each lunch period for two months. The first session was held for an hour and the remaining 17 sessions were held for 35 minutes each week to allow students to return to their regular classes and obtain homework assignments. The time and day of the weight control sessions were rotated each week for minimum student time out of regular classes. Each month teachers were given the schedule in advance. A roll of students attending the sessions was left in the office at the end of each session.

The lesson plans for the sessions are included in Appendix B. The researcher, a systemwide nutritionist, taught the nutrition education and behavior modification classes. The nutrition education

sessions included information about use of the four food groups in a weight loss and maintenance diet. Emphasis was placed on snacking, portion control, and daily requirements for adolescents from the basic four food groups with a reduction in high fat and high sugar foods. Low calorie foods and low calorie food preparation methods were also discussed. Students kept food diaries and identified patterns of inappropriate food and eating behavior. Students were given summary sheets of the information presented.

A computer program titled Nutrition Volume I and II (1982) was made available to students for use in the library. The program analyzes diets providing information on nutrient deficiencies, caloric intake, and calories used according to physical activity. Basic nutrition information is also provided.

Behavior modification information was taken from Join The Trim Team developed by Joanne Ikeda, R.D. (1977), a researcher in the field of adolescent weight reduction (Ikeda, Fujii, Fong, & Hamson, 1982). Behavior modification lessons included defining personal behavior that contributed to excessive weight gain, self-monitoring, stimulus control strategies, self-reinforcement, procedures to slow the pace of eating, suggestions for exercise, and contracts for behavior change.

The original plan was for three junior high school teachers to conduct the aerobic classes using popular music selected by the students, twice a week for 20 minutes, but after two months the exercise at school ended for lack of support by students. The first part of the students' lunch period was used for the aerobic classes during that two month period.

The first session on self-concept was conducted by the school counselor using Skills for Living (Kirschenbaum & Glaser, 1978) as a resource. The researcher conducted the remaining 3 sessions using the same resource.

The school nurse took blood pressures of students participating in the program as a precautionary measure. This served as a referral for needed health care. Participants were encouraged to lose one pound each week or until the goal they set was met. The participants were allowed to name the weight reduction program and decided to call it the Nutrition Awareness Club.

Instrumentation

Data collected during the study were weight, nutrition knowledge, self-concept, and behaviors related to overeating and weight gain. Weight was measured by the researcher before and after treatment in pounds on a weight scale. The maximum weight stated in the 1983 Metropolitan Life Insurance Company height and weight tables was used to determine standard weight for each student. Bone structure was determined by wrist measurements in inches using a tape measure.

Nutrition knowledge was measured by a paper-and-pencil test developed by the investigator (Appendix C). The test contained 46 items which were related to the objectives for the nutrition education component of the program. Test items in the teachers' guide for Nutrition Concepts and Controversies (Hamilton and Whitney, (1979) and Teens, Foods, Fitness, Sports (N.C. Department of Public Education, 1984) provided ideas for items in the test.

A homeroom class at Piedmont Junior High School was used to pilot test the instrument to assess its readability and clarity. Three home economics educators, one dietitian, and one nutritionist rated the readability, clarity, and content validity of the test. Items which appeared confusing were removed and those all students knew were omitted. The same nutrition test was used at the beginning and end of the weight reduction program.

Self-concept was measured by responses to the Piers-Harris Children's Self Concept Scale (Piers & Harris, 1969) (Appendix C). The scale consists of 80 yes-no items, with six subclasses, including physical appearance, social popularity, extent of happiness, anxiety, intellectual and school status, and behavior. Results on the scale are judged to have good internal consistency and adequate stability. Application of scores for tenth-grade girls to the Kuder- Richardson Formula 21 resulted in coefficients ranging from .78 to .93 and use of the Spearman-Brown odd-even formula resulted in coefficients of .90 and .87. A test-retest coefficient of .77 was obtained. Validity was tested by comparing scores for 98 special education students 12 - 16 years of age with those on Lipsitt's Children's Self-Concept Scale which resulted in a correlation of .68.

Changes in behavior related to overeating and weight gain were measured by a behavior modification checklist developed by the investigator (Appendix C). The checklist included 16 items to which the participants responded always, often, sometimes, seldom, and never and

was based on similar checklists found in research done by Hudiburgh (1984), Kagan and Squires (1984), Ross (1984), and Tyndall (1983). Scoring was reversed for negatively stated items with a possible score of 80. The checklist was given to a ninth grade homeroom at Piedmont Junior High School to assess readability, clarity, and response patterns. Three home economics educators, one dietitian, and one nutritionist also evaluated the checklist. As a result, several items in the checklist were eliminated and others reworded to provide clarity. The same checklist was used for pre- and post measures.

Data Analysis

Analysis of covariance was used to test for statistically significant differences in weight loss and in mean scores on the nutrition knowledge test, behavior modification checklist, and self-concept scale with pretest measurements used as the covariates. The Pearson product moment correlation procedure was used to test the relationship between weight loss and class attendance.

CHAPTER IV

RESULTS AND DISCUSSION

The major purpose of this study was to determine the effect of a weight reduction program on weight, nutrition knowledge, self-concept, and behaviors related to overeating and weight gain of obese junior high school students. Weight was measured as pounds lost, self-concept by the Piers-Harris Children's Self Concept Scale, behavior by a Likert-type scale developed by the researcher, and nutrition knowledge by an objective test developed by the researcher. All data were collected both before and after participation in the weight control program which was titled Nutrition Awareness Club. This chapter presents the results of the study.

Description of the Sample

A total of 46 junior high school females who were 15% above the weight range for their height and body frame as suggested by the Metropolitan Life Insurance Company were included in the study. The experimental group consisted of the 23 students who completed the weight control program. Twenty-three females were randomly selected from a group of 42 obese students to serve as the control group. The experimental group contained 13(57%) black, 10(43%) white, 7(30%) eighth grade and 16(70%) ninth grade females. Of the 23 in the experimental group, 12 were 15% to 25% above Metropolitan weight range for their height and weight, 4 were 26% to 35% above and 7 were above 35% before the treatment. The control group contained 12(52%) black,

10(44%) white, 1(4%) hispanic, 9(39%) eighth grade, and 14(61%) ninth grade females. The pretreatment measures for the control group showed 15 students were 15% to 25% above the Metropolitan weight range for their height and weight, 2 students were 26% to 35% above and 6 students were above 35%. Body frame sizes for the experimental group were 8 small, 13 medium, and 2 large. The control group body frame sizes were 12 small, 9 medium, and 2 large.

Pre- and Postweight Data

Pre- and post weights for the experimental and the control groups were measured on a balance scale. Analysis of covariance was used to test for differences in the pre- and postweights for each school. There was a significant difference between pre- and postweights for the experimental group ($p = .0001$), as well as for the control group. By comparison, the experimental group lost weight and the control group gained. The mean difference in pre- and postweights for the experimental group was -6.55 pounds and for the control group 6.99 pounds. The experimental group had a preweight range of 142 pounds to 247 pounds with a postweight range from 137 pounds to 240 pounds. All students in the experimental group lost weight, with the exception of one student who remained the same. The control group was sporadic with a preweight range of 140 pounds to 265 pounds and a postweight range of 137 pounds to 280 pounds (Appendix D).

Pre- and Posttest Eating Behavior

Students in the experimental and control groups responded to 16 items on the Eating Habits Questionnaire using a five-point

Likert-type scale with response categories ranging from "always" to "never". Scoring was reversed for negatively stated items with a possible score of 80 (Appendix E & F). The reliability coefficient was .45.

Analysis of covariance was used to test for differences in the pre- and posttest results for each school. There was a significant difference between pre- and post scores for the experimental group ($p = .0001$), but not for the control group. The mean difference in pre- and post scores for the experimental group was 14.79 and for the control group 2.38. Changes occured in the desired direction for the experimental group for all items; however, the amount of change for items varied. Pretest responses indicated that the percentage of students (34.7%) "always" or "often" eating fast changed on the posttest to only 17.3% "always" or "often" eating fast. Responses to "always" eating dessert decreased 30.5%, indicating that students may have been consuming fewer calories at the end of the study. Favorable responses for "never" using food as a reward increased 100% from 26.1% to 52.2%. None of the students responded "often" on the pretest to item five, "I snack on low calorie food," but 43.5% indicated this response at the posttest. On the pretest the majority of students responded "never" (34.8%) to keeping a record of the food eaten; whereas, on the posttest the majority (60.9%) responded "sometimes" to this item. Responses indicated that twice as many students discontinued eating when full (17.4% to 43.5%) following the treatment. According to pretest results, 47.8% "never" walked a mile a day; at the

posttest students had increased their exercise so that only 8.7% responded "never" to this item. A high increase in responses from 13% to 65% for "often" exercising other than at school, not including walking, was also a significant increase. Other items showing substantial increases were "never" asking friends to help (44% to 8.7%) and "never" asking family to help (39% to 0%). Overall, students in the experimental group decreased behaviors which encouraged overeating and weight gain and increased behaviors which tended to reduce overeating and weight gain (See Appendix E).

Pre- and Posttest Nutrition Awareness Test

Students in the experimental and the control groups responded to a 46-item nutrition knowledge test. A correct answer received a value of two points, with 92 as the highest possible score. The reliability coefficient was .45.

Analysis of covariance was used to test for differences in the pre- and post results for both schools. There was a significant difference between pre- and posttest scores for the experimental group ($p = .0001$) as well as for the control group, but the mean difference increase for the experimental group was almost six times greater, 28.74 versus 4.99. The number of students in the experimental group selecting the correct response on the nutrition posttest verses the pretest increased for all but three items. The percentage of students responding correctly to item 8, selection of lowest calorie cooking method, decreased from 91.3% to 78.3% and the correct responses to item 12, which addressed correct number of servings for the fruit and

vegetable group, decreased by 4.2%. Those who identified carbohydrates as providing calories decreased from 78.3% to 62.2%.

The percentage of correct responses to each item on the Nutrition Awareness Test for the experimental and the control groups are shown in Appendix G. The following discussion of correct responses to statements on the nutrition test by the experimental group are summarized in three categories: those which increased substantially, those with low pretest correct responses which remained low at the posttest, and those which the majority of students already knew although some improvements were made. Nine items received a substantial increase in correct responses from the pretest to the posttest. The items with the greatest increase in correct answers were selecting the activity using the most calories (52.2%); defining the basal metabolic rate (52.2%); defining obesity (47.9%); identifying vitamin A (47.8%), iron (47.8%) and, vitamin C as not providing calories (69.6%); selecting raisins (69.6%) and bananas (56.5%) as not being appropriate snacks for obese people; identifying grapefruit (87%) as not able to burn up fat; identifying rubber waist band as not able to shrink inches (56.5%); and recognizing that decreasing calories by 2,000 to lose a pound is false (65.3%) were the behaviors with the greatest change in correct answers. Only five items showed a low increase in correct responses. They were selecting food containing the most calories (26.1%), identifying calcium as not providing calories (4.3%) identifying burning 2,500 more calories than needed as causing a pound loss (21.8%). Items which received high correct responses on the

pretest resulting in low gain at the posttest were selecting oranges and carrot strips as a low calorie snack (91.3% to 91.3%); selecting ice cream as not being a low calorie snack (91.3% to 100%); selecting potato chips (87 % to 95.7%), margarine (82.6% to 91.3%) and regular soda (82.6% to 100%) as not being low calorie snacks; and identifying four Food Group Plan as a balanced diet plan (91.3% to 100%) (Appendix G).

Pre- and Posttest Self Concept

Twelve of the 80 items included in the Piers-Harris Self Concept Rating Scale dealt with perceptions which were directly related to body size. Analysis of covariance was used to test for differences in pre- and posttest results for both schools. There was a significant difference between pre- and postscores for the experimental group ($p = .0001$); however, the control group did not change ($p = .7610$). The mean difference in pre- and post scores for the experimental group was 8.62 and for the control group -.45. All items relevant to the study showed an increase in favorable responses for the experimental group. Item 8, "My looks bother me," showed a small increase in favorable responses from 60.9% to 65.2% as did item 43 "I wish I were different" from 56.5% to 60.9%. Responses of "yes" for "I am good looking" increased from 60.9% to 78.3% and item 57, "I am popular with boys", from 52.2% to 69.6%. There were larger increases in favorable responses for the remaining four items. The percentage of students who believed they were unpopular decreased from 82.6% on the pretest to 4.3% on the posttest. The percentage was similar for believing they give up easily. There was a 30.4% increase in "no" responses to item

58, "People pick on me," and a 43.5% increase in the number of "no" responses for item 59, "I am different from others". Responses indicated that the Nutrition Awareness Club influenced students self concepts favorably for the experimental group. More detailed information is found in Appendix H.

Tests of Hypotheses

Five hypotheses were tested in this study. The data and statistical analyses used to determine their acceptance or rejection are presented in this section.

Weight Loss

Hypothesis 1: There is no statistically significant difference in weight reduction between the obese junior high students who participate in the weight reduction program and the obese junior high school students who do not participate in the weight reduction program.

The data used as evidence to test the first hypothesis were pre- and post weight in pounds. A 2X2 analysis of covariance (ANCOVA) was used to compare difference in mean weight with Group (control vs experimental) as the between subjects factor and pretest weight as the covariate (Tables 1 & 2).

The mean difference in weight between groups at the pretest (experimental = 171.87; control = 173.22) was statistically significant ($F = 5.49$, $p = .0001$). There was, however, also a statistically significant difference in mean weights (experimental = 165.39; control = 180.13) at the posttest after the effect of the covariate had been

Table 1

Analysis of Covariance Tests for Differences

Source	df	MS	F	p
		Weight		
Preweight	1	515.09	5.49	.02
Group	1	2107.80	22.47	.0001
Error	43	93.82		
		Self-Concept		
Pretest Score	1	340.21	6.95	.0116
Group	1	942.94	19.27	.0001
Error	43	48.94		
		Eating Habits		
Pretest Score	1	710.47	14.06	.0005
Group	1	1730.95	34.25	.0001
Error	43	50.53		
		Nutrition Knowledge		
Pretest Score	1	484.27	8.71	.0051
Group	1	6344.77	114.06	.0001
Error	43	55.63		

Table 2

Pre- and Post Means and Standard Deviations by Group for Dependent Variables

Group	Pre		Post	
	mean	s.d.	mean	s.d.
Experimental				
Weight	171.87	24.46	165.39	24.42
Nutrition Knowledge	49.39	7.30	77.65	9.24
Self-concept	52.70	10.49	61.17	7.13
Eating Habits	41.17	9.34	56.57	7.59
Control				
Weight	173.22	35.70	180.13	32.70
Nutrition Knowledge	47.04	8.80	52.52	8.30
Self-concept	51.65	9.87	51.35	12.43
Eating Habits	43.48	5.67	45.26	8.29

removed (F = 22.47, p = .001). Hypothesis 1, therefore, was rejected.

Self-concept

Hypothesis 2: There is no statistically significant difference in responses on a self-concept measure between obese students who participate in the weight reduction program and those who do not participate in the weight reduction program at the beginning and end of the treatment.

The data used as evidence to test the second hypothesis was difference in means on the Piers-Harris Self Concept Scale for the two groups. Table 1 presents the results of a 2X2 analysis of covariance used to compare difference in mean self-concept scores with Group (control vs experimental) as the between subjects factor and pretest score as the covariate. The mean difference (experimental = 52.70; control = 51.65) in scores between groups at the pretest was statistically significant (F = 6.95, p = .01). Since there was, however, also a significant difference in mean scores (experimental = 61.17; control = 51.35) at the posttest after the effect of the covariate had been removed (F = 19.27, p = .001), the hypothesis was rejected.

Eating Habits

Hypothesis 3: There is no statistically significant difference in behaviors related to overeating and weight gain between subjects who participate in the weight reduction program and those who do not participate in the weight reduction program at the beginning and end of the treatment.

A 2X2 analysis of covariance was performed to assess differences between the pre- and post means on the Eating Habit Likert scale between the experimental and control groups. Group was used as the between subjects factor and pretest score was used as the covariate (Table 1). The mean difference in scores (experimental = 41.17; control = 43.48) between groups on the pretest was statistically significant ($F = 14.06$ $p = .0005$). The statistically significant difference in Group mean scores (experimental = 56.57; control = 45.26) on the Eating Habits scale at the posttest, after the effect of the covariate had been removed ($F = 34.25$ $p = .0001$), led to the rejection of hypothesis 3.

Nutrition Knowledge

Hypothesis 4: There is no statistically significant difference in responses on a nutrition knowledge test between the junior high school students who participate in the weight reduction program and those who do not participate at the beginning and end of the treatment.

Students in the experimental group and the control group responded to a 46- item nutrition test. A correct answer received a value of two points, with 92 as the highest possible score. The data used as evidence to test the fourth hypothesis were pre- and post means for the groups on the nutrition knowledge test. A 2X2 analysis of covariance was used to compare differences in mean scores with Group as the between subjects factor and pretest score as the covariate (Table 1). The mean difference in scores (experimental = 49.39; control = 47.04)

between groups at the pretest was statistically significant (F = 8.71, p = .005). There was, however, also a statistically significant difference in Group mean scores (experimental = 77.65; control = 52.52) on the posttest after the effect of the covariate had been removed (F = 114.06, p = .0001). Thus, hypothesis 4 was also rejected.

Absenteeism

Hypothesis 5: There is no relationship between weight reduction and class attendance.

A Pearson product moment correlation coefficient was computed between number of days attended and weight loss. The coefficient was -.02, indicating no relationship between these two variables; the hypothesis was not rejected.

Discussion of Findings

A multifaceted program was used in the Nutrition Awareness Club which involved behavior modification, nutrition education, self-concept, and exercise. The results of this study showed consistent patterns of change in the data observed before and after the weight reduction program. The weight loss results compared favorably with those of other weight reduction studies which included similar program components (Atkinson et al., 1984; Hudiburgh, 1984; Nelson, Catchings & Pendleton, 1983). Pretreatment weights ranged from 142 pounds to 247 pounds and posttreatment weights ranged from 137 pounds to 240 pounds for the experimental group with a mean weight loss of 6.52 lbs.

Successful weight reduction programs have used group treatment and benefitted from the support that members of the group provided each

other (Brandt, Maschoff & Chandler, 1980; Hudiburgh, 1984). The researcher encouraged students to discuss successes and slip-ups. The junior high school students in this study exhibited the attitudes and behaviors characteristic of this age group and sometimes talked about each other's sizes and made various comments which created some sensitive situations. This behavior may have been responsible for some students dropping out of the program. The sessions might have been more favorable if smaller groups had been planned as suggested by Rogers (1965) and employed by Brandt, Maschhoff and Chandler (1980) and Hudiburgh (1984). Emphasis by the school system on class attendance and other responsibilities of the researcher made this approach not feasible at the time of the research.

Planned physical activity at school during the first 30 minutes of the students' lunch hour was unsuccessful. Several teachers planned exercise sessions during 30 minutes of their lunch periods to provide staggered sessions which would meet the needs of the students who had lunch at three different periods. Due to the school schedule, teachers were not always able to meet with the students. Teachers reported that students did not always attend. After two months teachers and students ceased the exercise program. The failure of students to continue the exercise class may have been due to the intensity of the exercise routine. Students were told to exercise at their own pace, yet, they complained about the fast pace of the aerobic music and exercise. As suggested by Brownell (1984), the students probably needed to start far

below an exercise program geared for coronary conditioning. An exercise program which was attainable and enjoyable may have enhanced the continuance by the students. Students were encouraged to walk a mile a day with a friend, as did the participants in a comprehensive approach to obesity management conducted by Atkinson et al. (1984). This activity suggests that "despite the well-known benefits of exercise, adherence to exercise programs is surprisingly poor" (Brownell, 1984).

Research results have indicated that the inclusion of parents in weight reduction programs has increased weight loss (Leonard, D'Augelli, & Smiciklas-Wright, 1984). The students who participated in this research were insistent that they did not want their parents to attend sessions. Instead, they preferred to share the information with their parents. The researcher, however, with the knowledge of the students discussed the program with some of the parents by telephone. Some mothers reported walking and exercising with their daughters, cutting back on the amount of sweets and high calorie snacks at home, and occasionally reminding students of goals they had set. Many parents reported that after elementary school their children stopped inviting them to school activities. A letter explaining the program was sent to the parents at the beginning of the program to obtain permission from the parents for the students to participate. Parents were asked to contact the researcher if they had questions. No parent responded.

Results of studies using behavior modification in weight loss programs have been significant (Perri et al., 1984). In the author's

study the experimental group experienced statistically significant positive changes in behaviors that led to weight gain and overeating. For each of the 16 items on the eating habit Likert-type scale favorable responses increased. Similar findings were reported by Zakus et al. (1979) in a study of five obese girls who used a group behavior modification approach and lost an average of 2.1 pounds. Subjects in this study, however, had a net average loss of 6.48 pounds. Hudiburgh (1984) reported an average weight loss for a group of 20 college students of 10.3 pounds. The reported weights in Hudiburgh's study ranged from a gain of 2.5 pounds to a loss of 34 pounds. In this study of junior high school females the average weight loss was less, but none of the students gained weight. In addition to weight changes students showed the most interest in lessons that dealt with behavior modification changes.

Kagan and Squires (1984) reported compulsive eating was related to feelings of failure. An objective of the Nutrition Awareness Program was to determine the effect of a weight control program on the self-concept of participants. The Piers-Harris Self Concept Questionnaire was used to gather information used to test the hypothesis that no difference existed between the experimental and the control group in self-concept. The results showed a statistically significant difference between the two groups. There was also a statistically significant difference between the pre-and posttest scores for the experimental group. These findings were similar to those of Brandt, Maschhoff, and Chandler (1980) who found significant

changes in test scores using the Wahler Self-Descriptive Inventory to measure favorable and unfavorable attitudes toward themselves. Results showed significant differences in favorable and unfavorable pre-and post scores. Mean favorable post scores exceeded for the experimental group those of the control group. The unfavorable scores also showed change in a positive direction.

As a part of the Nutrition Awareness Club the students were encouraged to keep daily food diaries to analyze and change patterns of inappropriate eating, such as, skipping breakfast, eating unbalanced meals, and eating when depressed or lonesome. This was recommended by Liebman (1983) and included in a similar study conducted by Atkinson et al. (1984).

A program conducted by Brandt, Mashhoff,and Chandler (1980) contained analogous components, with pre- and posttest results showing that, out of a possible 20 correct answers, participants improved their performance by increasing mean scores from 9 to 12. Nutrition pre- and posttest means for participants in the Nutrition Awareness Program increased from 49.39 to 77.65 out of a possible 92. In contrast to the conclusion stated by Skinner and Woodburn (1984) that the Four Food Groups did not need to be included, the students did not know the Basic Four Food groups at the time of the pretest; however, correct responses increased for the posttest.

This study supported other research that a multifaceted weight control program has potential for decreasing behaviors which lead to overeating and weight gain. It is the opinion of this researcher that

as those concerned with education become more concerned with the effect of obesity on the health, self-concept and quality of life of students, more programs dealing with weight control will be developed and demanded.

CHAPTER V

SUMMARY AND RECOMMENDATIONS

Summary

The major purpose of this study was to determine the effect of a weight control program on weight loss, nutrition knowledge, behavior related to overeating and weight gain, and self-concept of obese junior high school students. The relationship between program attendance and weight reduction was also determined. Data were collected at the beginning of the program and again at the end of the program five months later.

Five null hypotheses were tested in the study:

H_1: There is no statistically significant difference in weight reduction between obese junior high students who participated in the weight reduction program and obese junior high school students who did not participate in the weight reduction program.

H_2: There is no statistically significant difference in responses on a self-concept measure between obese students who participated in the weight reduction program and those who did not participate in the weight reduction program at the beginning and end of the treatment.

H_3: There is no statistically significant difference in behaviors related to overeating and weight gain between subjects who participated in the weight reduction program and those who did not participate in the weight

reduction program at the beginning and end of the treatment.

H_4: There is no statistically significant difference in responses on a nutrition test between the junior high school students who participated in the weight reduction program and those who did not participate at the beginning and end of the treatment.

H_5: There is no relationship between weight reduction and class attendance.

Three of the four instruments used in the study were developed by the reseacher. The instruments included a chart for attendance, a 16-item eating habits Likert-type scale, a 46-item nutrition knowledge test and the 80-item Piers-Harris Self Concept Inventory. The Nutrition Awareness Club was the title given to the five-month 18 session weight control program. The program focused on nutrition knowledge, behavior modification and improvement of self-concept. The days and times of the sessions were rotated, each session lasting approximately 45 minutes. Data were collected at the beginning of the program and again at the end of the program five months later.

The sample consisted of 46 eighth and ninth grade junior high school females who were 15% above the weight range for height and body frame according to the Metropolitan Life Insurance charts. The experimental group included 23 females who completed the weight control program. The control group consisted of 23 females randomly drawn from obese 42 female students in the control school. Preweight ranged

from 142 to 247 pounds for the experimental group and 140 to 265 for the control group.

In order to test the hypothesis that there was no relationship between weight reduction and class attendance a Pearson-product moment correlation coefficient was computed between number of days attended and weight loss. The coefficient was -.02, which indicated that there was no relationship between class attendance and weight loss.

A 2X2 analysis of covariance (ANCOVA) was used to compare difference in means with Group (Control vs Experimental) as the between subjects factor and pretest scores as the covariate for each of the dependent variables. There was a statistically significant difference in means for all dependent variables for the premeasures; however, after the effect of the covariates had been removed there was also a statistically significant difference in the postmeasures. The analyses of covariance resulted in the rejection of the four null hypotheses related to differences in weight, self-concept, nutrition knowledge, and behaviors related to overeating and weight gain. In all cases the scores for the treatment group were higher than for the control group. Thus, one may conclude that the weight control program (Nutrition Awareness Club) used in this study was effective.

Recommendations for Future Research

As a result of the methods used and the findings of this study, the following recommendations are offered for development and study of school-based weight control programs:

1. The number of school based studies that include male participants appear more limited than studies that include females. It

is recommended that studies concerning obese males be conducted.

2. In view of the limitations imposed by the large size of the group, it is recommended that research focus on smaller groups for adolescents. Smaller group size may result in higher mean weight loss and less attrition.

3. Future weight control research for obese students could include all grade levels to possibly increase the development and maintenance of eating habits and behaviors that increase appropriate weight maintenance at an earlier age.

4. Various approaches to school based weight control programs for obese students that do not stigmatize them could be explored.

5. School systems are limited in the amount of time spent on experiences other than basic courses; therefore, the recommendation is made to study weight control programs which require less time than one meeting a week.

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APPENDIX A

CORRESPONDENCE

Dear Parent or Guardian of _____:

A group has been formed at J. T. Williams Junior High School for girls who are interested in weight control. Your daughter has expressed a desire to be a part of this group.

Major objectives of the 18 week weight control sessions are to provide:

1. A support group to discuss feelings associated with weight.

2. Information to help change behavior which encourages overeating and weight gain.

3. Physical activity.

4. Nutrition information.

5. Two parent discussion sessions.

We would like _____ to be a part of this group. Your co-operation and support will be appreciated. If you have any questions regarding this group or your child's participation in it, please call me at 392-3287 ext. 243.

Thank you very much.

Shirley Daye
Nutritionist

Detach and Return

_____ has my permission to participate in the weight control group. The group meets thirty-five (35) minutes a week on a rotating basis.

_____
Parent or Guardian

APPENDIX B

COURSE DESCRIPTION: MAJOR TOPICS AND OBJECTIVES

Lessons/Objectives

1. Introduction - Nutrition Pretest - Weigh-in
2. The Newest Way to Lose Weight - My Eating Habits Pretest

   Objectives

   -define behavior modification

   -identify the purpose of a food diary

   -keep a food diary for two days

   -discuss major causes of obesity
3. Pretest - Piers - Harris Self-Concept Scale
4. The Weight Control Equation (Basic Four -3/4 X The Fifth = Pounds Loss)

   Objectives

   -state the purpose of the five food groups

   -state the food groups, number of servings needed daily and amount of a serving

   -analyze three meals eaten, and determine if the Basic Four requirements were met for a day
5. Keeping Track - The Food Diary

   Objectives

   -identify eating habits that are leading to overeating

   -adopt one new behavior which encourages weight loss a week

   -practice avoiding tempting contacts with food
6. -Self-concept session - Feel good about yourself

7. Move It, Move It, Move It (Weigh-In)

Objectives

-define exercise

-discuss the importance of exercise in a weight control program

-identify at least three appealing activities requiring vigorous energy expenditure

-participate in aerobic exercise

-apply knowledge of the importance of exercise when selecting physical activities

8. Fad Diets = Failing Diets

Objectives

-select criteria for nutritious reducing diet

-evaluate a reducing diet using a listing of criteria provided

-evaluate an ad for weight reduction products to determine whether or not the products would help a person lose weight

9. Self-concept session - Handling stress

10. Tip Toe Through Temptation

Objectives

-identify positive ways to reward oneself for appropriate eating behavior

-apply principles of self control over eating

11. The Calorie Pack - Protein, Carbohydrates, Fats

    Objectives

    -define calories

    -define basal metabolic rate

    -identify nutrients which provide calories

    -compare number of calories that stated nutrients provide per serving

    -identify major food sources of stated nutrients

    -identify major functions of stated nutrients in the body

    -apply principles of low calorie food preparation to meal planning

12. Self-concept session - Let's Talk

13. Calorie Pack - (continued)

    -compare the caloric value of various foods

    -calculate the number of calories needed a day to gain, maintain or lose weight

14. Terrific Snacks - Low Calorie/High Nutrient

    Objectives

    -identify nutrients which do not provide calories

    -select snacks which are best for weight control

15. Self-concept session - What losing weight can mean socially

16. This is Your Life - Weight Related Disease

    Objective

    -identify health hazards of obesity

17. Piers-Harris - Posttest

    My Eating Habits Posttest

18. Program Evaluation - Weigh-in

APPENDIX C

INSTRUMENTS

MY EATING HABITS

Directions: Circle the number which describes how often you do the things listed below, please circle a number for each item.

1. I keep a record of food I eat.

Always	Often	Sometimes	Seldom	Never
1	2	3	4	5

2. I participate in other activities while I eat, such as watching TV.

Always	Often	Sometimes	Seldom	Never
1	2	3	4	5

3. I keep serving dishes on the table while I eat.

Always	Often	Sometimes	Seldom	Never
1	2	3	4	5

4. I put down my fork between bites.

Always	Often	Sometimes	Seldom	Never
1	2	3	4	5

5. I eat every time I think of food.

Always	Often	Sometimes	Seldom	Never
1	2	3	4	5

6. I walk a mile a day (besides at school).

Always	Often	Sometimes	Seldom	Never
1	2	3	4	5

7. I exercise other than at school.

Always	Often	Sometimes	Seldom	Never
1	2	3	4	5

8. I eat fast.

Always	Often	Sometimes	Seldom	Never
1	2	3	4	5

9. I use the Basic Four Food Groups to select my diet.

Always	Often	Sometimes	Seldom	Never
1	2	3	4	5

10. I snack on low calorie foods.

Always	Often	Sometimes	Seldom	Never
1	2	3	4	5

11. I keep on eating when I am full.

Always	Often	Sometimes	Seldom	Never
1	2	3	4	5

12. I eat desserts.

Always	Often	Sometimes	Seldom	Never
1	2	3	4	5

13. I ask my family to help me lose weight.

Always	Often	Sometimes	Seldom	Never
1	2	3	4	5

14. I reward myself with food.

Always	Often	Sometimes	Seldom	Never
1	2	3	4	5

15. I keep food in my room.

Always	Often	Sometimes	Seldom	Never
1	2	3	4	5

16. I ask my friends to help me lose weight.

Always	Often	Sometimes	Seldom	Never
1	2	3	4	5

NUTRITION AWARENESS

Directions: Read the following statements and circle the letter in front of the appropriate response.

1. Which of the following best defines behavior modification?
   a. techniques used to teach weight loss
   b. techniques used to change eating habits
   c. techniques used to describe weight loss diets

2. Why is keeping a food diary important in a weight loss program?
   a. to identify behaviors which lead to overeating
   b. to help one count calories
   c. to identify favorite foods and disliked foods

3. Which of the following activities will use the most calories?
   a. bicycling at 5½ miles per hour
   b. walking at 2½ miles per hour
   c. swimming ¼ mile per hour

4. A calorie is defined as
   a. the process of gaining weight
   b. the measure of energy that food produces
   c. the amount of fat that food produces

5. Basal metabolic rate is
   a. the amount of energy needed for the body to work
   b. the energy that food produces
   c. the time it takes for food to digest

6. Which of the following servings of food would be better for a low calorie diet?
   a. rice
   b. raw broccoli and 2 tablespoon mayonnaise dip
   c. baked potato

7. Which of the following is a major cause of the overweight problem in America?
   a. heredity
   b. overeating
   c. lack of exercise

8. Which cooking method for meat would be best for a low calorie meal?
   a. broiling
   b. deep frying
   c. pan frying

9. Directions: The following is a list of foods. Underline the one food which contains the most calories per serving.
   1. green peas
   2. pear
   3. tangerine
   4. string beans
   5. carrots

10. Jane, who is 14 years old, ate the following foods for breakfast, lunch, and dinner.

(at home) Breakfast	(at school) Lunch	(at a fast food place) Dinner
3/4 cup of orange juice	3/4 cup of corn	a large serving of french fries
2 pancakes with syrup	2 slices of pizza	a quarter pounder (hamburger)
1 cup of milk	1 carton of milk	a large coke

Directions: The following statements refer to the meals Jane ate listed above. Read each statement and circle T if the statement is true, circle F if the statement is false.

T F 1. Jane ate the exact number of required servings from the bread and cereal group.
T F 2. Jane ate 4 ounces more of meat than the Basic Four Food Group guide suggests.
T F 3. Jane ate 1 more serving of fruits and vegetables than the basic four food guide suggests.
T F 4. Jane had the exact number of servings required by the dairy group.

11. Directions: The following is a list of nutrients. Circle T if the nutrient provides calories, circle F if the nutrient DOES NOT provide calories.

T F 1. Water
T F 2. Protein
T F 3. Vitamin A
T F 4. Carbohydrates
T F 5. Calcium
T F 6. Iron
T F 7. Vitamin C

12. Directions: The following statements refer to characteristics of a safe nutritious weight loss diet. Read each statement and circle T if the statement is true and circle F if the statement is false.

T F 1. You will eat most foods you do not like.
T F 2. You will eat a variety of foods.
T F 3. You will eat no more than 2 meals a day.
T F 4. You will lose 1 to 2 pounds a week.
T F 5. Your health will not be in danger.

13. Directions: Below is a list of foods, circle T if the food would be a good snack for a person concerned with losing weight, circle F if the food would not be a good snack for the same person.

T F 1. whole milk
T F 2. sliced oranges
T F 3. peanuts
T F 4. ice cream
T F 5. carrot strips
T F 6. raisins
T F 7. potato chips
T F 8. margarine
T F 9. banana
T F 10. regular soda

14. The following weight loss diet appeared in the newspaper:
You can eat all the grapefruit and steak you want whenever you want. You are not allowed to eat any other food. You will lose 10 pounds in 2 weeks.

Directions: The following statements refer to the newspaper advertisement above. Read each statement and circle T if the statement is true, circle F if the statement is false.

T F 1. The above diet is a safe diet for losing weight.
T F 2. The grapefruit in the diet will burn up fat.
T F 3. If the diet limited the amount of steak it would be more appropriate.

15. An advertisement states the following:
This rubber waist band will shrink inches from your waist in hours, wear it while you jog.

Directions: The following statements refer to the above advertisement. Read each statement and circle T if the statement is true, circle F if the statement is false.

T F 1. The rubber band described in the ad will not shrink inches from the waist.

T F 2. The jogging mentioned in the ad is what causes the weight loss if any weight is loss.

16. Mary is 15 years old, 5 ft. 4 in. tall, with a medium frame, and weighs 175 pounds.
Directions: The following statements refer to comments Mary made about her weight. Circle T if the comment if true, circle F if the comment is false.

T F 1. To lose a pound a week I would need to exercise and use 2,500 more calories than my body needs.

T F 2. To lose a pound a week I could decrease the number of calories I eat by 2,000.

T F 3. To remain the same weight I need to eat the same number of calories my body uses.

17. Directions: Read the following statements, circle T if the statement is true circle F is the statement is false.

T F 1. The Four Food Group plan can serve as a guide for selecting foods which provide a nutritionally balanced diet.

T F 2. Teenagers who are overweight do not always eat more than teenagers who are not overweight.

T F 3. It is acceptable to eliminate a nutrient from the diet because nutrients do not depend on each other to work properly.

Piers Harris Children's Self Concept Scale

Here are a set of statements. Some of them are true of you and so you will circle the yes. Some are not true of you and so you will circle the no. Answer every question even if some are hard to decide, but do not circle both yes and no. Remember, circle the yes if the statement is generally like you, or circle the no if the statement is generally not like you. There are no right or wrong answers. Only you can tell us how you feel about yourself, so we hope you will mark the way you really feel inside.

1.	My classmates make fun of me.	Yes	No
2.	I am a happy person.	Yes	No
3.	It is hard for me to make friends.	Yes	No
4.	I am often sad.	Yes	No
5.	I am smart.	Yes	No
6.	I am shy.	Yes	No
7.	I get nervous when the teacher calls on me.	Yes	No
8.	My looks bother me.	Yes	No
9.	When I grow up, I will be an important person.	Yes	No
10.	I get worried when we have tests in school.	Yes	No
11.	I am unpopular.	Yes	No
12.	I am well behaved in school.	Yes	No
13.	It is usually my fault when something goes wrong.	Yes	No
14.	I cause trouble to my family.	Yes	No
15.	I am strong.	Yes	No
16.	I have good ideas.	Yes	No

17.	I am an important member of my family.	Yes	No
18.	I usually want my own way.	Yes	No
19.	I am good at making things with my hands.	Yes	No
20.	I give up easily.	Yes	No
21.	I am good in my school work.	Yes	No
22.	I do many bad things.	Yes	No
23.	I can draw well.	Yes	No
24.	I am good in music.	Yes	No
25.	I behave badly at home.	Yes	No
26.	I am slow in finishing my school work.	Yes	No
27.	I am an important member of my class.	Yes	No
28.	I am nervous.	Yes	No
29.	I have pretty eyes.	Yes	No
30.	I can give a good report in front of the class.	Yes	No
31.	In school I am a dreamer.	Yes	No
32.	I pick on my brother(s) and sister(s).	Yes	No
33.	My friends like my ideas.	Yes	No
34.	I often get into trouble.	Yes	No
35.	I am obedient at home.	Yes	No
36.	I am lucky.		

37.	I worry a lot.	Yes	No
38.	My parents expect too much of me.	Yes	No
39.	I like being the way I am.	Yes	No
40.	I feel left out of things.	Yes	No
41.	I have nice hair.	Yes	No
42.	I often volunteer at school.	Yes	No
43.	I wish I were different.	Yes	No
44.	I sleep well at night.	Yes	No
45.	I hate school.	Yes	No
46.	I am among the last to be chosen for games.	Yes	No
47.	I am sick a lot.	Yes	No
48.	I am often mean to other people.	Yes	No
49.	My classmates in school think I have good ideas.	Yes	No
50.	I am unhappy.	Yes	No
51.	I have many friends.	Yes	No
52.	I am cheerful.	Yes	No
53.	I am dumb about most things.	Yes	No
54.	I am good looking.	Yes	No
55.	I have lots of pep.	Yes	No
56.	I get into a lot of fights.	Yes	No

57.	I am popular with boys.	Yes	No
58.	People pick on me.	Yes	No
59.	My family is disappointed in me.	Yes	No
60.	I have a pleasant face.	Yes	No
61.	When I try to make something, everything seems to go wrong.	Yes	No
62.	I am picked on at home.	Yes	No
63.	I am a leader in games and sports.	Yes	No
64.	I am clumsy.	Yes	No
65.	In games and sports, I watch instead of play.	Yes	No
66.	I forget what I learn.	Yes	No
67.	I am easy to get along with.	Yes	No
68.	I lose my temper easily.	Yes	No
69.	I am popular with girls.	Yes	No
70.	I am a good reader.	Yes	No
71.	I would rather work alone than with a group.	Yes	No
72.	I like my brother(sister).	Yes	No
73.	I have a good figure.	Yes	No
74.	I am often afraid.	Yes	No
75.	I am always dropping and breaking things.	Yes	No
76.	I can be trusted.	Yes	No

77.	I am different from other people.	Yes	No
78.	I think bad thoughts.	Yes	No
79.	I cry easily.	Yes	No
80.	I am a good person.	Yes	No

Piers, E., & Harris, D. (1969). The Piers-Harris Children's Self Concept Scale. Nashville, TN: Acklen Station.

APPENDIX D

INDIVIDUAL WEIGHT DATA FOR THE EXPERIMENTAL AND CONTROL GROUPS

Table 3

Individual Weight Data for the Experimental and Control Groups

Subject	Standard Weight[a]	Percentage Over-Weight	Pretreatment Weight	Posttreatment Weight	Cumulative Weight Change
			Experimental Group		
1	144	23	177	175	-2
2	124	41	175	168	-7
3	124	18	146	137	-9
4	130	15	149	137	-12
5	130	15	150	140	-10
6	127	43	181	179	-2
7	129	16	149	141	-8
8	127	17	148	140	-8
9	144	15	166	160	-6
10	127	43	182	176	-6
11	132	35	178	177	-1
12	113	26	142	142	0
13	144	36	196	181	-15
14	147	43	210	205	-5
15	138	38	191	178	-13
16	132	17	155	153	-2
17	167	48	247	240	-7
18	144	15	165	164	-1
19	141	16	163	159	-4
20	155	23	190	183	-7
21	123	26	155	147	-8
22	141	16	163	154	-9
23	138	28	176	168	-8

(Table continued)

		Control Group			
1	118	22	144	150	+6
2	138	16	160	161	+1
3	121	20	145	155	+10
4	150	25	188	173	-15
5	124	17	145	137	-8
6	135	85	235	230	-15
7	121	16	140	155	+15
8	141	17	162	177	+15
9	127	20	152	169	+17
10	121	45	175	166	-9
11	144	18	170	175	+5
12	150	77	265	280	+15
13	163	59	259	230	-29
14	144	40	202	220	+18
15	138	17	162	170	+8
16	141	37	193	205	+12
17	127	32	167	175	+8
18	133	20	160	185	+25
19	124	16	140	175	+35
20	124	23	153	160	+7
21	127	23	156	176	+20
22	138	16	160	167	+7
23	118	28	151	152	+1

Note. n=23

[a]Highest weight for height and body frame as recommended by the Metropolitan Life Insurance Company

APPENDIX E

PRE- AND POSTTEST RESPONSES TO MY EATING HABITS QUESTIONNAIRE FOR THE EXPERIMENTAL GROUP

Table 4

Pre- and Posttest Responses to My Eating Habits Questionnaire for the Experimental Group

Statements	Pre					Post				
	A	O	S	S	N	A	O	S	S	N
(-) 1. I eat fast.	13.0	21.7	47.8	8.7	8.7	4.3	13.0	65.2	17.4	0
(-) 2. I eat dessert.	34.8	26.1	8.7	26.1	4.3	4.3	13.0	34.8	34.8	13.0
(-) 3. I keep food in my room.	0	4.3	30.4	13.0	52.2	0	0	8.7	13.0	78.3
(-) 4. I reward myself with food.	13.0	13.0	26.1	21.7	26.1	0	4.3	13.0	30.4	52.2
(+) 5. I snack on low calorie food.	4.3	0	39.1	21.7	34.8	4.3	43.5	26.1	17.4	8.7
(+) 6. I keep a record of the food I eat.	0	4.3	13.0	4.3	34.8	4.3	4.3	60.9	17.4	13.0
(+) 7. I exercise other than at school.	8.7	13.0	47.8	17.4	13.0	4.3	65.2	13.0	17.4	0
(-) 8. I eat every time I think of food.	13.0	17.4	17.4	30.4	21.7	4.3	8.7	13.0	39.1	34.8

(Table continued)

	A	O	S	S	N	A	O	S	S	N
(-) 9. I keep on eating when I am full.	0	13.0	43.5	26.1	17.4	0	0	26.1	30.4	43.5
(+) 10. I put down my fork between bites.	8.7	4.3	26.1	26.1	34.8	8.7	3.0	65.2	13.0	0
(+) 11. I walk a mile a day (besides at school).	8.7	8.7	13.0	21.7	47.8	17.4	30.4	39.1	4.3	8.7
(+) 12. I ask my friends to help me lose weight.	8.7	17.4	4.3	26.1	43.5	4.3	43.5	30.4	13.0	8.7
(+) 13. I ask my family to help me lose weight.	13.0	13.0	30.4	4.3	39.1	43.5	30.4	13.0	13.0	0
(+) 14. I use the Basic Four Food Groups to select my food.	4.3	4.3	34.8	17.4	39.1	4.3	8.7	56.5	13.0	17.4
(-) 15. I keep serving dishes on the table while I eat.	8.7	17.4	21.7	26.1	26.1	0	4.3	17.4	47.8	30.4

(Table continued)

	A	O	S	S	N	A	O	S	S	N
(-) 16. I participate in other activities while I eat such as watching TV.	30.4	26.1	34.8	8.7	0	8.7	13.0	47.8	30.4	0

Note. n = 23
(+) and (-) indicate positive or negative statements for scoring purposes. Numbers represent percentages.
A = Always O = Often S = Sometimes S = Seldom N = Never

APPENDIX F

PRE- AND POSTTEST RESPONSES TO MY EATING HABITS QUESTIONAIRE FOR THE CONTROL GROUP

Table 5

Pre- and Posttest Responses to My Eating Habits Questionnaire for the Control Group

Statements	Pre					Post				
	A	O	S	S	N	A	O	S	S	N
(-) 1. I eat fast.	0	0	13.0	21.7	65.2	0	0	4.3	13.0	82.6
(-) 2. I eat dessert.	30.4	52.2	13.0	4.3	0	26.1	30.4	30.4	13.0	0
(-) 3. I keep food in my room.	8.7	0	17.4	26.1	47.8	8.7	8.7	13.0	21.7	47.8
(-) 4. I reward myself with food.	26.1	17.4	34.8	17.4	4.3	8.7	4.3	30.4	26.1	30.4
(+) 5. I snack on low calorie food.	0	13.0	30.4	34.8	21.7	13.0	0	13.0	52.2	21.7
(+) 6. I keep a record of the food I eat.	21.7	26.1	34.8	8.7	8.7	0	8.7	34.8	21.7	34.8
(+) 7. I exercise other than at school.	4.3	21.7	17.4	26.1	30.4	30.4	34.8	13.0	13.0	8.7
(-) 8. I eat every time I think of food.	0	17.4	47.8	17.4	17.4	8.7	4.3	34.8	21.7	30.4

(Table continue)

	A	O	S	S	N	A	O	S	S	N
(-) 9. I keep on eating when I am full.	4.3	43.5	17.4	34.8	0	4.3	13.0	13.0	43.5	26.1
(+) 10. I put down my fork between bites.	21.7	30.4	43.5	4.3	0	0	8.7	39.1	26.1	26.1
(+) 11. I walk a mile a day (besides at school).	3.5	34.8	21.7	0	0	0	0	17.4	21.7	60.9
(+) 12. I ask my friends to help me lose weight.	4.3	8.7	26.1	34.8	26.1	26.1	21.7	34.8	17.4	0
(+) 13. I ask my family to help me lose weight.	8.7	0	0	21.7	69.6	4.3	4.3	4.3	13.0	73.9
(+) 14. I use the Basic Four Food Groups to select my food.	39.1	30.4	21.7	8.7	0	0	0	17.4	34.8	47.8
(-) 15. I keep serving dishes on the table while I eat.	4.3	4.3	8.7	17.4	65.2	0	4.3	8.7	8.7	78.3

(Table continue)

	A	O	S	S	N	A	O	S	S	N
(-) 16. I participate in other activities while I eat such as watching TV.	8.7	0	4.3	17.4	69.9	0	0	0	13.0	87.0

Note. n = 23
(+) and (-) indicate positive or negative statements for scoring purposes. Numbers represent percentages.
A = Always O = Often S = Sometimes S = Seldom N = Never

APPENDIX G

RESPONSES TO THE NUTRITION AWARENESS TESTS FOR THE EXPERIMENTAL AND CONTROL GROUPS

Table 6

Nutrition Awareness Tests Results for the Experimental and the Control Group

Statement	Correct Responses			
	Pretest		Posttest	
	E[a]	C[a]	E	C
1. Selected behavior modification definition.	43.5	30.4	78.3	52.2
2. Selected importance of a food diary.	43.5	26.1	73.9	43.5
3. Selected activity using the most calories.	8.7	26.1	60.9	56.2
4. Selected calorie definition.	47.8	17.4	73.9	47.8
5. Selected basal metabolic rate definition.	21.7	17.4	73.9	47.8
6. Selected lowest calorie food.	26.1	47.8	43.5	26.1
7. Selected major cause of obesity.	30.4	43.5	78.3	26.1
8. Selected lowest calorie cooking method.	91.3	73.9	78.3	82.6
9. Selected food containing the most calories.	21.7	30.4	47.8	34.8
10. Selected correct servings from the bread and cereal group.	52.2	56.5	69.6	56.5
11. Selected correct serving from the meat group.	34.8	43.5	52.2	26.1
12. Selected correct servings from the fruit and vegetable group.	69.6	47.8	65.2	56.5
13. Selected correct servings from dairy group.	43.5	47.8	82.6	69.6
14. Identified water as not providing calories.	82.6	52.2	95.7	78.3

(Table continued)

15. Identified protein as providing calories.	73.9	52.2	87.0	62.2
16. Identified vitamin A as not providing calories.	43.5	47.8	91.3	43.5
17. Identified carbohydrates as providing calories.	78.3	73.9	62.2	91.3
18. Identified calcium as not providing calories.	26.1	47.8	30.4	82.6
19. Identified iron as not providing calories.	43.5	56.5	91.3	52.2
20. Identified vitamin C as not providing calories.	21.7	52.2	91.3	60.9
21. Identified not eating liked foods on a safe weight loss diet as false.	56.5	56.5	82.6	78.3
22. Identified eating a variety of food on a safe weight loss diet as true.	82.6	60.9	91.3	78.3
23. Identified no more than two meals a day for a safe weight loss diet as true.	52.2	56.5	82.6	52.2
24. Identified 1 to 2 pounds of weight loss a week as safe.	47.8	39.1	87.0	60.9
25. Identified health not being in danger when on a safe weight loss diet as true.	73.9	43.5	82.6	62.2
26. Selected whole milk as not being a low calorie snack.	73.9	26.1	78.3	39.1
27. Selected sliced oranges as a low calorie snack.	91.3	91.3	91.3	91.3

(Table continued)

28. Selected peanuts as not being a low calorie snack.	78.3	34.8	100.0	47.8
29. Selected ice cream as not being a low calorie snack.	91.3	82.6	100.0	82.6
30. Selected carrot strips as a low calorie snack.	91.3	73.9	91.3	78.3
31. Selected raisins as not being a low calorie snack.	13.0	34.8	82.6	13.0
32. Selected potato chips as not being a low calorie snack.	87.0	78.3	95.7	78.3
33. Selected margarine as not being a low calorie snack.	82.6	91.3	91.3	78.3
34. Selected bananas as not being a low calorie snack.	00.0	13.0	56.5	30.5
35. Selected regular soda as not being a low calorie snack.	82.6	73.9	100.0	78.3
36. Identified a specified diet as not safe.	69.6	56.5	95.7	60.1
37. Identified grapefruit as not able to burn up fat.	8.7	21.7	95.7	30.5
38. Identified limiting steak as not enough to make diet appropriate.	56.5	52.2	78.3	52.2
39. Identified rubber waist band as not able to shrink inches.	43.5	56.5	100.0	34.8
40. Identified jogging as what caused weight loss.	60.9	65.2	91.3	69.6
41. Identified burning 2,500 more calories than needed as causing a pound lost as false.	47.8	43.5	69.6	52.2

(Table continued)

42. Identified decreasing the number of calories eaten by 2,000 to a pound as false.	21.7	39.1	87.0	52.2
43. Identified eating the same number of calories used to remain the same weight as true.	43.5	60.9	87.0	73.9
44. Identified statement that the Four Food Group plan is a balanced diet guide.	91.3	56.5	100.0	82.6
45. Identified statement that overweight teenagers do not always eat more as true.	78.3	65.2	78.3	43.5
46. Identified statement that it is acceptable to eliminate nutrients from the diet as false.	60.9	52.2	78.3	39.1

Note. n = 23
Numbers represent percentages.
[a]Experimental Group
[a]Control Group

APPENDIX H

RESPONSES TO THE PIERS-HARRIS SELF CONCEPT RATING SCALE FOR THE EXPERIMENTAL AND CONTROL GROUPS

Table 7

Responses to Piers-Harris Self Concept Rating Scale for the Experimental and Control Groups

Statement	Correct Responses			
	Pretest		Posttest	
	Yes	No	Yes	No
Experimental				
1. My classmates make fun of me.	56.5	43.5	17.4	21.7
2. I am a happy person.	82.6	17.4	95.7	4.3
3. It is hard for me to make friends.	95.7	4.3	4.7	95.7
4. I am often sad.	52.2	47.8	30.4	69.6
5. I am smart.	60.9	39.1	82.6	17.4
6. I am shy.	56.5	43.5	26.1	73.9
7. I get nervous when the teacher calls on me.	69.6	30.4	21.7	78.3
8. My looks bother me.	39.1	60.9	34.8	65.2
9. When I grow up, I will be an important person.	87.0	13.0	100.0	0
10. I get worried when we have tests in school.	39.1	60.9	43.5	56.5
11. I am unpopular.	82.6	17.4	4.3	95.7
12. I am well behaved in school.	69.6	30.4	87.0	13.0
13. It is usually my fault when something goes wrong.	82.6	17.4	0	100.0
14. I cause trouble to my family.	73.9	26.1	8.7	91.3
15. I am strong.	69.6	30.4	87.0	13.0
16. I have good ideas.	91.3	8.7	95.7	4.3

(Table continued)

17.	I am an important member of my family.	82.6	17.4	87.0	13.0
18.	I usually want my own way.	8.7	91.3	56.5	43.5
19.	I am good at making things with my hands.	43.5	56.5	43.5	56.5
20.	I give up easily.	82.5	17.4	8.7	91.3
21.	I am good in my school work.	87.0	13.0	91.3	8.7
22.	I do many bad things.	65.2	34.8	21.7	78.3
23.	I can draw well.	30.4	69.6	26.1	73.9
24.	I am good in music.	73.9	26.1	69.6	30.4
25.	I behave badly at home.	73.9	26.1	4.3	95.7
26.	I am slow in finishing my school work.	60.9	39.1	17.4	82.6
27.	I am an important member of my class.	60.9	39.1	60.9	39.1
28.	I am nervous.	56.5	43.5	17.4	82.6
29.	I have pretty eyes.	87.0	13.0	91.3	8.7
30.	I can give a good report in front of the class.	47.8	52.2	47.8	52.2
31.	In school I am a dreamer.	43.5	56.5	34.8	65.2
32.	I pick on my brother(s) and sister(s).	39.1	60.9	52.2	47.8
33.	My friends like my ideas.	78.3	21.7	100.0	0
34.	I often get into trouble.	78.3	21.7	30.4	69.6
35.	I am obedient at home.	78.3	21.7	69.6	30.4
36.	I am lucky.	56.5	43.5	69.6	30.4

(Table continued)

37.	I worry a lot.	52.2	47.8	52.2	47.8
38.	My parents expect too much of me.	47.8	52.2	30.4	69.6
39.	I like being the way I am.	60.9	39.1	69.6	30.4
40.	I feel left out of things.	52.2	47.8	34.8	65.2
41.	I have nice hair.	60.9	39.1	87.0	13.0
42.	I often volunteer at school.	60.9	39.1	73.9	26.1
43.	I wish I were different.	43.5	56.5	39.1	60.9
44.	I sleep well at night.	73.9	26.1	91.3	8.7
45.	I hate school.	82.6	17.4	17.4	82.6
46.	I am among the last to be chosen for games.	69.6	30.4	30.4	69.6
47.	I am sick a lot.	52.2	47.8	17.4	82.6
48.	I am often mean to other people.	60.9	39.1	13.0	87.0
49.	My classmates in school think I have good ideas.	82.6	17.4	91.3	8.7
50.	I am unhappy.	69.6	30.4	8.7	91.3
51.	I have many friends.	78.3	21.7	91.3	8.7
52.	I am cheerful.	73.9	26.1	95.7	4.3
53.	I am dumb about most things.	82.6	17.4	13.0	87.0
54.	I am good looking.	60.9	39.1	78.3	21.7
55.	I have lots of pep.	69.6	30.4	78.3	21.7
56.	I get into a lot of fights.	69.6	30.4	8.7	91.3

(Table continued)

57.	I am popular with boys.	52.2	47.8	69.6	30.4
58.	People pick on me.	56.5	43.5	26.1	73.9
59.	My family is disappointed in me.	60.9	39.1	17.4	82.6
60.	I have a pleasant face.	78.3	21.7	87.0	13.0
61.	When I try to make something, everything seems to go wrong.	65.5	34.8	26.1	73.9
62.	I am picked on at home.	43.5	56.5	26.1	73.9
63.	I am a leader in games and sports.	34.8	65.2	17.4	82.6
64.	I am clumsy.	60.9	39.1	17.4	82.6
65.	In games and sports, I watch instead of play.	60.9	39.1	21.7	78.3
66.	I forget what I learn.	73.9	26.1	17.4	82.6
67.	I am easy to get along with.	91.3	8.7	100.0	0
68.	I lose my temper easily.	56.5	43.5	39.1	60.9
69.	I am popular with girls.	69.6	30.4	91.3	8.7
70.	I am a good reader.	82.6	17.4	73.9	26.1
71.	I would rather work alone than with a group.	78.3	21.7	26.1	73.9
72.	I like my brother(sister).	91.3	8.7	87.0	13.0
73.	I have a good figure.	39.1	60.9	30.4	69.6
74.	I am often afraid.	82.6	17.4	17.4	82.6
75.	I am always dropping and breaking things.	73.9	26.1	8.7	91.3
76.	I can be trusted.	100.0	0	100.0	0

(Table continued)

77. I am different from other people.	30.4	69.6	73.9	26.1
78. I think bad thoughts.	47.8	52.2	27.7	78.3
79. I cry easily.	43.5	56.5	60.9	39.1
80. I am a good person.	91.3	8.7	95.7	4.3

Control

1. My classmates make fun of me.	47.8	52.2	30.4	69.6
2. I am a happy person.	87.0	13.0	87.0	13.0
3. It is hard for me to make friends.	82.6	17.4	8.7	73.9
4. I am often sad.	65.2	34.8	17.4	52.2
5. I am smart.	87.0	13.0	82.6	17.4
6. I am shy.	30.4	69.6	60.9	39.1
7. I get nervous when the teacher calls on me.	43.5	56.5	60.9	39.1
8. My looks bother me.	60.9	39.1	34.8	65.2
9. When I grow up, I will be an important person.	82.6	17.4	73.9	26.1
10. I get worried when we have tests in school.	30.4	69.6	65.2	34.8
11. I am unpopular.	56.5	43.5	47.8	52.2
12. I am well behaved in school.	82.6	17.4	78.3	21.7
13. It is usually my fault when something goes wrong.	78.3	21.7	39.1	60.9
14. I cause trouble to my family.	78.2	21.7	30.4	69.6

(Table continued)

15.	I am strong.	56.5	43.5	56.5	43.5
16.	I have good ideas.	100.0	0	95.7	4.3
17.	I am an important member of my family.	95.7	4.3	73.9	17.4
18.	I usually want my own way.	34.8	65.2	52.2	47.8
19.	I am good at making things with my hands.	69.6	30.4	56.5	43.5
20.	I give up easily.	78.3	21.7	21.7	78.3
21.	I am good in my school work.	78.3	21.7	78.3	21.7
22.	I do many bad things.	60.9	39.1	21.7	78.3
23.	I can draw well.	39.1	60.9	39.1	60.9
24.	I am good in music.	69.6	30.4	65.2	34.8
25.	I behave badly at home.	78.3	21.7	21.7	78.3
26.	I am slow in finishing my school work.	78.3	21.7	30.4	69.6
27.	I am an important member of my class.	43.5	56.5	56.5	43.5
28.	I am nervous.	34.8	65.2	60.9	39.1
29.	I have pretty eyes.	91.3	8.7	78.3	21.7
30.	I can give a good report in front of the class.	34.8	65.2	43.5	56.5
31.	In school I am a dreamer.	34.8	65.2	47.8	52.2
32.	I pick on my brother(s) and sister(s).	39.1	60.9	65.2	34.8
33.	My friends like my ideas.	39.1	60.9	73.9	26.1
34.	I often get into trouble.	73.9	26.1	39.1	60.9

(Table continued)

35.	I am obedient at home.	69.6	30.4	69.9	30.4
36.	I am lucky.	65.2	34.8	56.5	43.5
37.	I worry a lot.	47.8	52.2	60.9	39.1
38.	My parents expect too much of me.	47.8	52.2	69.6	30.4
39.	I like being the way I am.	82.6	17.4	69.6	30.4
40.	I feel left out of things.	60.9	39.1	39.1	60.9
41.	I have nice hair.	87.0	13.0	91.3	8.7
42.	I often volunteer at school.	43.5	56.5	30.4	26.1
43.	I wish I were different.	47.8	52.2	56.5	43.5
44.	I sleep well at night.	73.9	26.1	87.0	13.0
45.	I hate school.	47.8	52.2	47.8	52.2
46.	I am among the last to be chosen for games.	47.8	52.2	52.2	47.8
47.	I am sick a lot.	82.6	17.4	13.0	87.0
48.	I am often mean to other people.	91.3	8.7	34.8	65.2
49.	My classmates in school think I have good ideas.	56.5	43.5	56.5	43.5
50.	I am unhappy.	82.6	17.4	17.4	82.6
51.	I have many friends.	82.6	17.4	87.0	13.0
52.	I am cheerful.	82.6	17.4	87.0	13.0
53.	I am dumb about most things.	91.3	8.7	8.7	91.3
54.	I am good looking.	65.2	34.8	60.9	39.1
55.	I have lots of pep.	78.3	21.7	69.6	30.4

(Table continued)

56.	I get into a lot of fights.	78.3	21.7	21.7	78.3
57.	I am popular with boys.	60.9	39.1	39.1	60.9
58.	People pick on me.	47.8	52.2	39.1	60.9
59.	My family is disappointed in me.	73.9	26.1	39.1	60.9
60.	I have a pleasant face.	78.3	21.7	73.9	26.1
61.	When I try to make something, everything seems to go wrong.	73.9	26.1	34.8	65.2
62.	I am picked on at home.	69.6	30.4	21.7	78.3
63.	I am a leader in games and sports.	21.7	78.3	34.8	65.2
64.	I am clumsy.	87.0	13.0	8.7	91.3
65.	In games and sports, I watch instead of play.	56.5	43.5	39.1	60.9
66.	I forget what I learn.	78.3	21.7	26.1	73.9
67.	I am easy to get along with.	100.0	0	95.7	4.3
68.	I lose my temper easily.	56.5	43.5	56.5	43.5
69.	I am popular with girls.	60.9	39.1	69.6	30.4
70.	I am a good reader.	82.6	17.4	73.9	26.1
71.	I would rather work alone than with a group.	43.5	56.5	39.1	60.9
72.	I like my brother (sister).	52.2	47.8	56.5	43.5
73.	I have a good figure.	26.1	73.9	13.0	87.0
74.	I am often afraid.	60.9	39.1	39.1	60.9

(Table continued)

75.	I am always dropping and breaking things.	82.6	17.4	13.0	87.0
76.	I can be trusted.	100.0	0	91.3	8.7
77.	I am different from other people.	30.4	69.6	87.0	13.0
78.	I think bad thoughts.	65.2	34.8	34.8	65.2
79.	I cry easily.	60.9	39.1	39.1	60.9
80.	I am a good person.	100.0	0	91.3	8.7