A SURVEY OF THE PRESENT WEIGHT STATUS OF COLLEGE WOMEN - PARTICIPANTS IN WEIGHT REDUCTION STUDIES AT MICHIGAN STATE UNIVERSITY 1950-1960

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Abstract

A Survey of the Present Weight Status of College Women - Participants in Weight Reduction Studies at Michigan State University 1950-1960

By Alma Jean Blake

Subjects who participated in weight reduction studies at Michigan State University 1950-1960 were contacted by mailed questionnaires. Forty-three of the sixty-four questionnaires sent were completed and returned.

The purpose of this survey was to determine the present weight status of the subjects surveyed and to examine factors which may have related to success or failure in weight reduction. Questions were asked concerning physical status, age, marital status, activity, eating habits, history of overweight among family members, and factors which the subjects believed influenced their success or failure.

The success or failure of a subject was based on a predetermined "ideal weight" related to subject's age and height. Subjects were classified as successful or unsuccessful and the data for each group were examined.

Forty-six per cent of the respondents had attained ideal weight at the time of the survey. A higher percentage (56%) of the subjects who were successful in weight reduction in the earlier Michigan State studies had attained ideal

weight at the present time than those who failed (35%) when previously participating in the Michigan State research study.

Results of data examination indicated: (1) thirty-five per cent of the subjects who found sufficient motivation for weight loss in the Michigan State studies continued to practice successful weight reduction; (2) the younger (20-25) unmarried women showed a greater tendency to maintain a successful weight reduction program than did the older married women; (3) a greater percentage of the subjects having an income of $5000-8000 attained ideal weight than those above or below that amount; (4) the successful subjects were more active in sports, household duties, and their jobs than were the unsuccessful; (5) fewer successful subjects purchased "special low calorie foods"; (6) the greatest success (61%) was reported by the group that used low calorie diets only; (7) a higher percentage of the unsuccessful subjects had overweight family members as compared with the group of ideal weight; (8) the percentage of success was slightly higher among the career women; (9) the degree of success attained by the home economics students was 56 per cent as compared with 39 per cent for the non-home economics students.

Seventy-five per cent of the subjects who attained ideal weight and 65 per cent of the overweight subjects seemed to realize that will power is one of the most important factors in weight control.

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By

Alma Jean Blake

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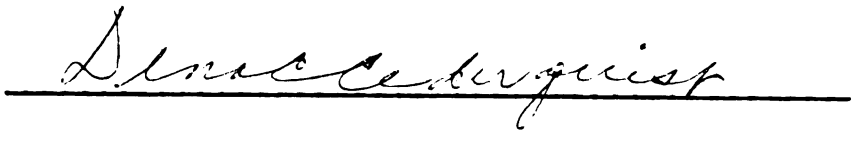
Approved by: 

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INTRODUCTION

Researchers in the field of weight reduction agree that the success of any weight reduction program can be measured only on a long-term basis. According to Cooper et al. (10), to achieve and maintain a desired lower weight is the goal of weight reduction. The two stages for accomplishing reduction are the period of active dieting, during which weight is lost, and the subsequent attempt to maintain the desired level over an extended period. What occurs in the second stage will determine a patient's ultimate success. Long-term performance is the most significant evidence of dietary accomplishment. Berkowitz and Beck (4) stated that although much has been spoken and written on the subject of obesity, the management of the overweight person for a long period is rarely mentioned. These authors emphasized that careful follow-up studies are lacking in an otherwise prolific literature on weight reduction. There is a real need for further study on methods of weight reduction and on effective methods of changing food habits (McCann and Trulson 19).

The almost unanimous opinion of the persons involved in weight reduction programs is that obesity is one of the more serious health hazards of our time. Weight control is a positive approach to the maintenance of health and the

prevention of the major diseases of middle and later life (Cooper, et al. 10, Mayer 21).

Although the definitions of obesity and overweight are vague in many reports, these concepts are basic to this study. Armstrong, et al. (3), in a comprehensive review based on data from a large life insurance company, consider variations within 10 per cent above or below average weight (according to the Metropolitan Life Insurance Company Weight Tables) as normal, 10-20 per cent above as overweight, and more than 20 per cent above as obese.

Leverton (18) indicated there is reason for persons working in the field of weight control to be concerned with the preposterous claims made by some of the faddists concerning their products. Early claims made were so ridiculous that it seemed unnecessary to be concerned with refuting them. However, in recent years misleading claims have played up certain known facts concerning weight control and have made general statements about the beneficial effects of particular items. The food faddists are capitalizing on the public's awareness of the importance of health and on its interest in scientific development. Such misinformation and false claims for special foods tend to complicate rather than to offer long-term aid in the problem of losing weight.

This follow-up study should give relevant information about the way students who have had nutrition education react to the claims of the faddists, indicating whether or not nutrition educated students are more discriminating in choosing methods of weight reduction than the students who are

not nutrition educated.

The present study was designed to:

1. Obtain the current weights of individuals who previously participated in the weight reduction studies at Michigan State University.
2. Compare the present weights of subjects who were successful in the Michigan State studies with those who were not.
3. Compare the recent success of and methods of weight reduction used by subjects who had nutrition education with those who did not.
4. Identify the factors which may have contributed to the maintenance of ideal weight.

The study presented in this thesis is based on data from a survey, by mailed questionnaire, of college women who participated in weight reduction programs at Michigan State University sometime between 1950 and 1960.

REVIEW OF LITERATURE

The Questionnaire as a Survey Technique

Because most subjects included in the survey had left the campus and were scattered over the country, the questionnaire was chosen to obtain the necessary information for the study.

A questionnaire may be defined as a set of questions to be answered by the informant without the personal aid of an investigator or enumerator (Gee 13).

Eigelberner (11) reports that the chief advantages of the questionnaire are range and economy. In range the questionnaire has practically no limitations since it can be sent to anyone served by the mails. It is economical because the cost includes only those of preparation, mailing, and handling of the replies. Also, the questionnaire is often most convenient for those persons from whom the information is desired because it can be filled out at any time suitable to the subject (Gee 13, Eigelberner 11).

The Darmouth Manual on Research and Reports (1) outlines a number of points concerning the use of the questionnaire, cautioning that if such a procedure is to be followed, the document should be constructed with exceptional care. The questionnaire requires an attempt to visualize the persons receiving it and their reaction to every line in it. Eigelberner (11) emphasizes that the questionnaire should be

adequately and competently constructed to make it as foolproof as possible. The Darmouth Manual indicates that the care with which the questionnaire is constructed can do a great deal to safeguard against some of the disadvantages such as the representativeness of replies received, the accuracy and adequacy of replies, and percentage of returns.

Dietary Records

Young, et al. (31) reported that some authorities feel the data obtained about dietary habits will not be accurate unless records of seven consecutive days or twenty consecutive meals are obtained. However, groups such as the United States Public Health nutrition field units (2) believe a larger number of accurate one-day records are as useful as a smaller number of seven-day records. Young, et al. (31) postulated that when the time for collection and analysis of data and the time and cooperation of the participants is of the utmost importance the shorter more expedient 24-hour recall can be substituted for the more time consuming seven-day record if some errors of 10 per cent can be tolerated in calculating the mean intake of fifty or more persons. Also, since considerably less of the participant's time is involved, a more representative sampling of a population should be possible. Young cautioned that interchangable use of the 24-hour recall and the seven-day record applies only when one wishes to describe the mean intake of a group as a whole.

Chalmers, et al. (9) support the above theory for characterizing a group by its mean intake, stating that a

one-day record or a 24-hour recall would appear to be the most efficient method of study. Although the day of the week seems generally to be unimportant, an investigation of a special group such as students, must take into account the "which day effect."

Some researchers, in defending the 24-hour recall, maintain that some persons asked to keep a one-day record of food intake, will tend to eat the foods which will indicate a good balanced diet if aware of the food essentials. In such cases more valid results would probably be obtained by use of a 24-hour recall than by the one-day records. In the investigation reported by Young (31) essentially the same results were obtained for the seven-day record and the 24-hour recall. This again indicated that for the sake of expediency and convenience the 24-hour recall may be justifiably substituted for the seven-day record.

Measurement of Success

In recent years, much interest in the subject of weight reduction has developed. However, of the many types of treatment available and the new techniques which are being reported in obesity therapeutics, few can be objectively evaluated by scientific standards (Feinstein 12).

Such discrepancies as insufficient data, techniques used in describing individual performances, criteria used in stating results, and absence of data on persons who were exposed but did not adhere to treatment, have hampered the evaluation of the programs by scientific standards. These

difficulties seem to have arisen because of the lack of a standard definition of success in the treatment of obesity and the lack of uniform criteria for measuring dietary accomplishment.

The relationship of the patient's initial obese status to the amount of loss desired would appear to be the best measurement of dietary "success." How much time is required or whether the patient adheres to the prescribed diet are of secondary importance as long as loss of weight is achieved. The easiest way to get all the desired factors into a single expression would be to modify the percentage of excess weight loss by some factor which compensates for the degree of overweight. Multiplication by the "relative initial obesity" provides this factor (Feinstein 12).

$$\text{Reduction Index (Feinstein 12)} - \frac{W_L\ (W_I) \times 100}{W_S\ \ W_T}$$

W_L = Weight Loss

W_I = Initial Weight

W_S = Surplus Weight

S_T = Target Weight

Factors Which Affect Body Weight

Researchers in the field of weight control have accepted the theory that the intake of calories in excess of metabolic demands is the basic cause of obesity (Pollack, et al. 23). However, many factors such as calorie intake, energy expenditure, and metabolism relate to body weight.

According to Proudfit and Robinson (24), food intake may be affected by economic status, social custom, and

psychological disturbances. In many persons overweight results from family customs of using concentrated high-calorie foods, of including rich party foods for entertaining in addition to usual mealtime eating, and of consuming excess amounts of carbohydrate foods because they are inexpensive.

Proudfit and Robinson (24) report an increasing awareness of the psychological aspects of obesity in recent years. Researchers have emphasized that eating is sometimes a solace and pleasure to the individual who is bored, feels lonely or unloved, has become discontented with his family or his social or financial standing, or who needs an excuse to avoid the realities of life.

Muscular activity is the largest single influence on energy requirements. Mayer (21) approaches this subject from the basis of natural selection. He hypothesizes natural selection, operating for hundreds of years, made men active and resourceful creatures, well prepared to be hunters, fishermen, or farmers. He theorizes the body's food regulating mechanism was adapted to this type of life and not to the modern age of mechanization and sedentary work. To avoid obesity under these modern conditions, a person would have to step up activity or endure mild or acute hunger throughout life. Since few would elect to follow the latter recommendation, the former one should be carefully considered. Mayer does not recommend strenuous exercise for the already obese untrained person but suggests a reorganization of the individual's life to include regular exercise adapted to his physical capacity.

Age, sex, glandular malfunction, and genetic differences may influence metabolism and, subsequently, body weight.

According to Armstrong, et al. (3), age is a factor in determining the basal activity level. As a result, daily food intake, chosen by the young individual no longer corresponds to his actual requirements, as he grows older and his metabolic rate tends to decrease.

Several diseases, due to their influence on metabolism, are accompanied by a gain in body weight (McLester and Darby 20). In some cases this is primarily due to a disturbance in water balance; under other conditions genuine accumulation of fat, which is abnormal in amount and distribution, occurs. The precise nature of the metabolic disturbance which leads to such accumulation of fat is unknown, but it is significant that all recognized disorders of this type are believed to be related to some derangement of the glands of internal secretion (McLester and Darby 20).

Mayer (21) supports the above theory, but Sebrell (25) is of the opinion that many people believe their obesity to be of endocrine origin. He indicates that although this factor cannot be disregarded in the etiology of obesity, cases in which endocrine disfunction is the sole basis for the condition are rare indeed.

Some researchers feel that heredity plays a part in obesity. Hereditary obesity is claimed to be the result of some anomaly of metabolism or other physiological errors which favor the accumulation of fat (McLester and Darby 20).

Sebrell (25) discredited the theory that overweight is inherited and believed that this is a fallacy which has not been proven. Mayer (21) takes a different stand on this issue, stating that it has been repeatedly shown that obesity "runs in families" with genetic as well as environmental factors involved. Mayer reports that studies in the United States have shown less than 10 per cent of the children whose parents have normal weight are obese; the proportion rises to 50 if one and 80 per cent if both parents are obese. Identical and fraternal twins have been studied and reports indicate food habits are not the main factors involved in the occurrence of obesity.

Follow-up Studies Conducted

Although most weight reduction programs which have been reported were conducted in six to nine month periods, some thought was given to the long-term results as early as 1939. Gray, et al. (14) conducted a study of obese patients who attended an endocrine clinic from June, 1933 to March, 1938. The permanence of the weight loss was observed. Forty-five patients were considered suitable for this analysis. During the total course of the study, weight loss averaged 25 pounds. In the follow-up period, however, an average gain of 1.2 pounds was observed.

Young (30) conducted a follow-up of the weight reduction of ten college women, 17-21 years of age, who were 17.2 to 28.2 per cent overweight. These women were studied for a three-week pre-reducing maintenance period. The subjects

were then studied 8-1/2 weeks on a 1400 calorie diet, in which 50 per cent of the calories were furnished by fat. Subjects lost an average of 17 pounds in 8-1/2 weeks. After six months, six of the eight subjects on whom follow-up information was available had maintained weight loss; one, recently married, had been only partially successful, the eighth, due to psychological factors, had reverted to her previous weight status.

As the researchers in the field become more aware of the value of the long-term study of weight reduction programs, follow-up studies are being conducted over longer periods of time. Kurlander (17) conducted a two-year follow-up of the Boston Pilot Study. In this study, groups of 15 to 20 persons met each week for counsel and guidance in weight reduction.

The desirable weight for each individual was determined at the beginning of the study according to Metropolitan Life Insurance Company weight standards. Because the loss of 20 pounds may bring one person to his desirable weight but represent only a beginning for another, achievement was measured in terms of the percentage of excess weight loss.

Kurlander (17), assuming the ultimate goal was loss of 100 per cent of excess weight and long-term maintenance of that weight loss, observed the percentage of success and reported as follows:

1. Of 95 persons who attended two or more sessions and whose records were followed for two years,

one showed a loss of 100 per cent excess weight after one year.

2. After two years, this subject had regained about one-third of the weight lost.

Since a large proportion of the group members were extremely overweight (several weighing nearly twice the desirable weight), Kurlander (17), after examining the second group of subjects who lost 50 to 100 per cent excess weight, reported:

1. Of 95 persons who attended two or more sessions and were followed for two years, eight showed a loss of 50 to 100 per cent excess weight after one year.
2. At the end of two years, four of the eight still showed a loss of 50 to 100 per cent excess weight.
3. Of 95 persons who attended two or more sessions, 43 showed a loss of 10-100 per cent of excess weight after one year.
4. After two years 29 of the 43 still showed a loss of 10-100 per cent of excess weight.

One phase of a study conducted by Burgess (8) evaluated the results of a weight reduction program in Virginia begun in 1953 by the Virginia Department of Public Health and Virginia Agricultural Extension Service.

The final data indicated women who were overweight by 50 per cent or less had a tendency to maintain weight loss after completion of a group program. On the other hand, nearly

half of the women who were more than 51 per cent overweight gained more than five pounds after completion of the class. Burgess stated physicians' records showed that the people who lost weight at a rapid rate while under treatment had a greater tendency to regain weight than those who lost weight less rapidly. The weight regained frequently exceeded that which was lost. Burgess reported the high percentage of women who maintained the new weight attained in this study might have been attributed to the fact that a group of women were completing the class at the time of initiation of the survey and sufficient time needed to determine long-term maintenance had not elapsed.

Burgess concluded that after the completion of group weight reduction classes, moderately overweight women were more apt to maintain the weight losses or to lose additional weight than the markedly overweight women.

EXPERIMENTAL PROCEDURE

A number of college women have served as subjects in weight reduction studies at Michigan State University in the past. The subjects entered the programs on a voluntary basis because they wanted to lose weight. All of their meals were planned and prepared by the investigators conducting the studies. The dates of participation in the studies, the amount of weight lost, and the addresses of participants were available. The questionnaire used in the present survey was mailed to 64 of the original 74 subjects whose current addresses were available. A copy of the questionnaire and the accompanying letter are included in the appendix.

The questionnaire was formulated to obtain information about the present weight status of the persons who participated in the Michigan State weight reduction programs and factors which were thought to have possible relevance in assessing the success or failure in weight reduction or maintenance of weight loss.

Each subject was asked to record birth date, height, present weight, lowest weight since the Michigan State study, highest weight since the study, a one-day dietary recall and general health (major illnesses and accidents) which may have greatly affected weight. These data were examined to determine similarities and differences in personal statistics of the successful and unsuccessful groups.

Success in this study was arbitrarily defined as a weight which did not exceed the recommendations of the National Research Council Publication 589 (22) by more than four pounds. For example, the publication indicates that 112 ± 11 pounds is the ideal weight for a woman 58 inches tall. A subject of this height was classified as successful if her weight did not exceed 127 pounds (112 pounds plus 11 pounds plus 4 pounds). This was done to allow for the error in the respondent's estimation of weight and the interpolation of the tables for persons between the height designations in the tables. When the success of each person had been calculated, these data were tabulated to obtain the percentage of:

1. The subjects successful at Michigan State and at the present time.
2. The subjects unsuccessful at Michigan State and unsuccessful at the present time.
3. The subjects successful at Michigan State and unsuccessful at the present time.
4. The subjects unsuccessful at Michigan State and successful at the present time.

The subjects were requested to record yearly incomes, types of work performed, and number of children. These data were obtained to examine possible relationships between success or failure in the maintenance of ideal weight and income, professional status (homemaker vs career woman), number of children and marital status.

Information concerning educational background was requested. The subjects were asked to indicate major area of

college program, non-degree or degree and degree level. This information was requested to determine possible relationships between the success or failure in the maintenance of ideal weight and the amount of education, and type of major (home economics students vs non-home economics students). The percentage of home economics students who used low calorie diets only, who dieted with or without supervision, and who used commercial low calorie foods was compared with the percentage of non-home economics students who did the same.

Various questions were asked concerning the eating habits of the subjects surveyed to determine possible trends in the successful vs unsuccessful groups. Check lists were provided for the persons to indicate how often meals were planned in advance (possible answers: never, sometimes, occasionally, usually, or always); how the decision was made to include or exclude certain foods in the diet (alternatives: what I like best, what fits into the money I can spend, things which do not take long to prepare, and foods I think will supply the necessary nutrients); and what foods were eaten more frequently than others (all food groups were included). The data concerning the decision to include or exclude certain foods in the diet were not used because of the ambiguity of the question. A 24-hour recall was requested to obtain information about the eating pattern of the group as a whole recognizing that a 24-hour recall is not sufficient to characterize individual intakes. The calorie, protein, calcium, and iron content of the 24-hour recall was calculated by using the food tables of Bowes and Church (6),

Taylor (27), and United States Department of Agriculture Bulletin 72 (28).

A chart was provided for the subjects to enumerate the types of prescribed or self-selected diets used since the Michigan State study. These data were examined to determine the percentage of successful vs unsuccessful subjects who used them and the percentage of previous home economics students who used them.

Some researchers theorize that heredity and environment play an important part in the occurrence of overweight in the individual. To obtain information on this point, the subjects were asked to list the family members (father, mother, brothers, sisters, husband, and children) who were overweight.

To obtain information concerning the self-perception of the overweight individual or of the participant with ideal weight about her weight status and reasons for success or failure, each subject was asked to elaborate on the factors which she felt influenced her success or failure in weight reduction or maintenance. These data were compiled and the frequency of listing certain factors by each group, successful or unsuccessful, was noted.

RESULTS AND DISCUSSION

Of the 64 questionnaires initially mailed to the subjects in the survey, 33 were returned completed without further correspondence. Two weeks after the initial mailing a follow-up letter and another copy of the questionnaire was mailed to subjects who had not responded. Ten more questionnaires were received after the second mailing bringing the total to 43. Seven questionnaires were returned due to incorrect addresses and 14 subjects did not respond. According to Gee (13) and Eigelberner (11), the return of 68 per cent can be considered good. Eigelberner suggested that a return of between 8 and 10 per cent is considered good for questionnaires sent to dealers, consumers, and similar groups. In the case of special questionnaires sent to scientists and technicians, a larger percentage of replies is often obtained. The questionnaire used in the survey reported here could be considered a special type because the participants were definitely interested in their weight problem and, in most cases, did not mind disclosing information about this problem.

The data were examined to determine whether or not the subjects obtained any lasting benefit from their participation in the Michigan State University weight reduction studies. The data were then studied to discover characteristics common to the successful group relative to eating

habits, activity, history of overweight family members, type of work, marital status, number of children, age, college major, and methods of weight reduction.

The first phase of data examination considered the overall success of the group. Of the subjects responding, 46.5 per cent succeeded in attaining ideal weight. A subject was considered successful if her weight fell within four pounds of the ideal weight given in the National Research Council publication 589 (22) for a specified height. Fifty-six per cent of the subjects successful and 35 per cent of those unsuccessful in weight reduction programs at Michigan State reported ideal weight at the present time. Therefore, one-half of the subjects who were able to find sufficient motivation for weight loss while in the Michigan State study were inclined to continue a successful weight control program. The incidence of failure was far greater among the persons who were unable to lose under the experimental conditions of the Michigan State University studies.

The percentage of the present success of the group surveyed as a whole and of persons successful at Michigan State is relatively high. Stunkard and McLaren-Hume (26) reported that two years after treatment of 100 obese patients only two had maintained their weight loss. McCann and Trulson (19) did a one- and two-year follow-up of 147 patients in the Harvard School of Public Health and found the types of treatment used were not effective for the large majority of those who had participated. Kurlander (17) reported in a two-year follow-up of the Boston Pilot Study

that of 95 persons in the original study only one showed a loss of 100 per cent excess weight after one year. After two years this participant had regained about one-third of the weight lost.

The second phase of data examination considered the similarities in personal statistics of the successful and unsuccessful groups surveyed. The average age of the subjects in the present survey was 27.5 years and the range was 22 to 35 years. The average height was 65.4 inches and the average weight was 159 pounds with a range of 120 to 239 pounds. The ideal weight for the group as a whole would be 135 ± 14 pounds (22). Therefore, the group as a whole was 10 per cent overweight. Averages of personal statistics for subjects in these groups may be found in Tables 1 and 2 and complete data in the appendix.

Forty-two per cent of the successful persons fell in an age range of 20 to 25 years, whereas only 26 per cent of the unsuccessful persons fell in the same age range (Table 2). A greater percentage of the unsuccessful subjects were in the 26 to 30 age range and in the 31 to 35 age range. The percentage success and failure within each age range may be seen in Figure 1.

Marital status also appeared to be a factor in the tendency to maintain a successful weight reduction program. Fifty-five per cent of the successful subjects were unmarried, whereas only 35 per cent of the unsuccessful subjects were single. Thus, the younger unmarried women showed a greater tendency to maintain a successful weight reduction

Table 1

The Relationship between Marital Status and Success or Failure in Weight Reduction

	Single		Married		Divorced	
	number	%	number	%	number	%
Successful	11	55	9	45	-	-
Unsuccessful	8	35	14	61	1	4

Table 2

The Relationship between Age and Success or Failure in Weight Reduction

	Age Range in Years					
	20-25		26-30		31-35	
	number	%	number	%	number	%
Successful	8	42	8	37	4	21
Unsuccessful	7	26	10	44	7	30

program than did the older, married women. Doubtless, the social pressures exerted by job demands and the desire to be attractive to members of the opposite sex are strong motivations in maintaining ideal weight. The relationship between marital status and the success or failure in weight reduction may be seen in Figure 2. The number of children was identical in both groups (Figure 3).

More than half (60%) of the total number of respondents had completed a Bachelor's degree. The percentage success among the subjects with a Bachelor's degree was lower than the percentage success among the subjects who had no degree

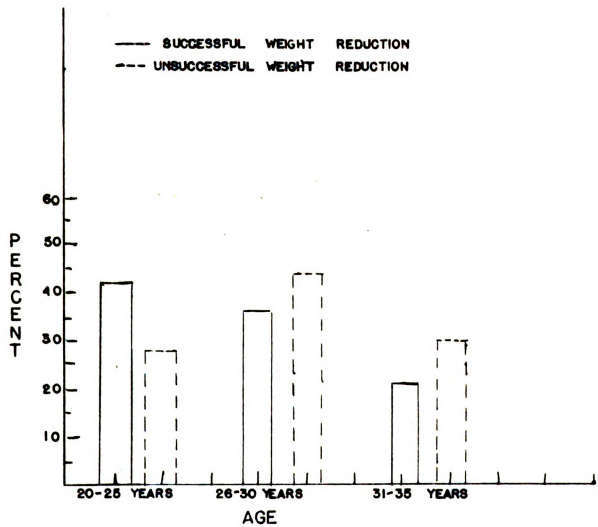

FIGURE I. RELATIONSHIPS BETWEEN AGE AND SUCCESS OR FAILURE OF WEIGHT REDUCTION PROGRAM

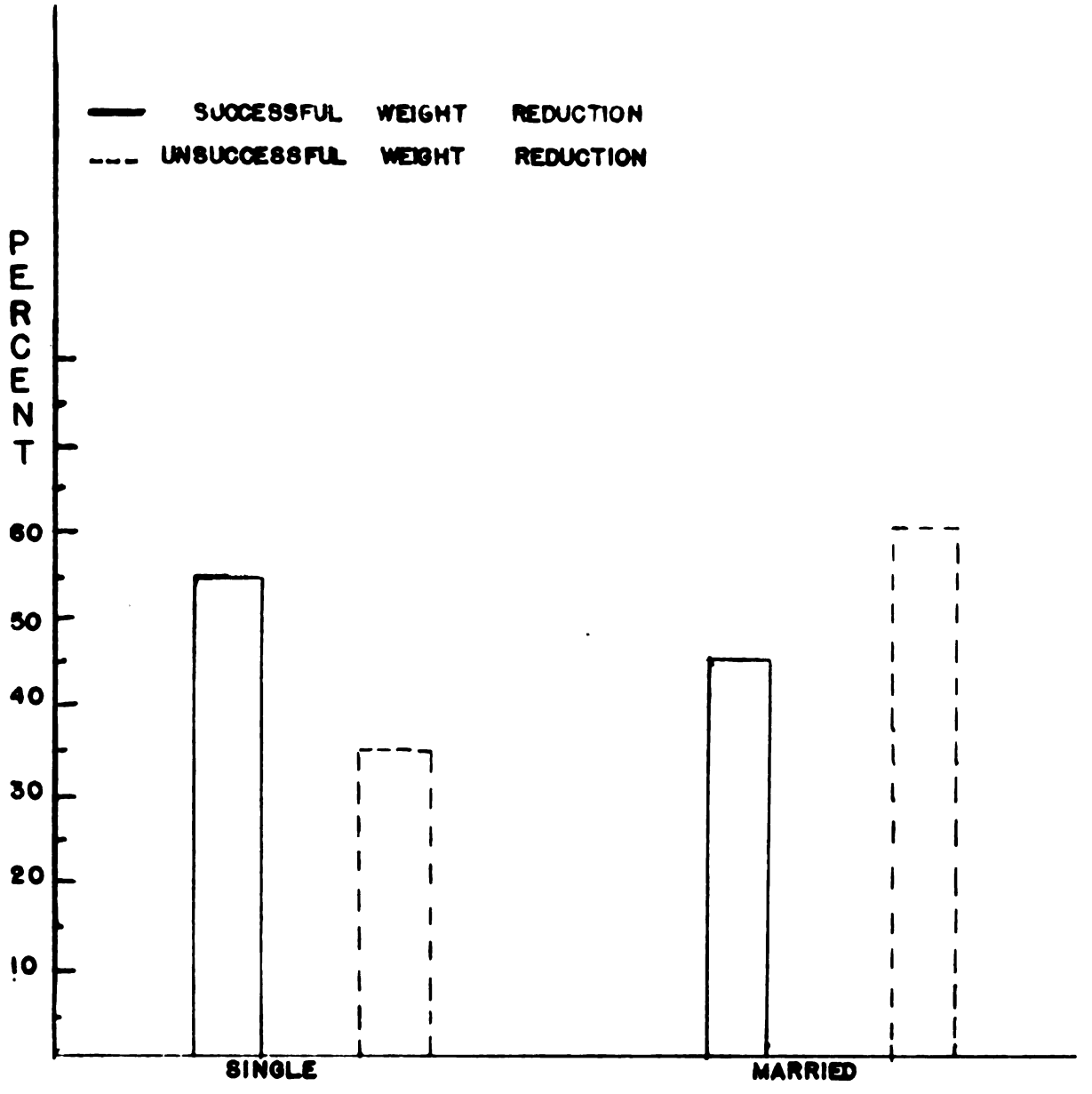

FIGURE 2. RELATIONSHIPS BETWEEN MARITAL STATUS AND SUCCESS OR FAILURE OF WEIGHT REDUCTION PROGRAM.

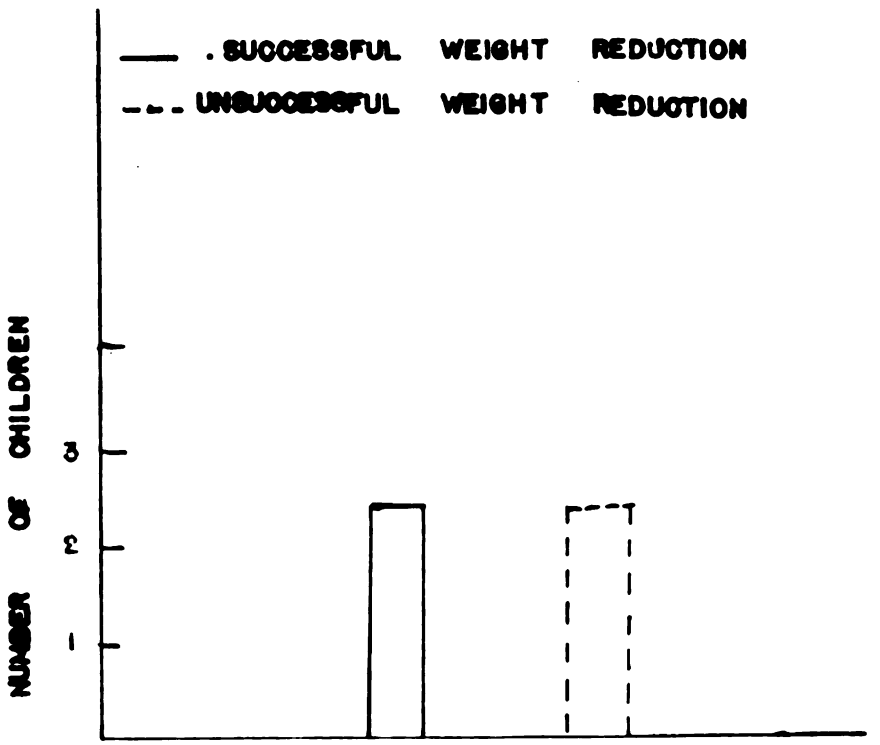

FIGURE 3. RELATIONSHIP BETWEEN NUMBER OF CHILDREN AND SUCCESS OR FAILURE OF A WEIGHT REDUCTION PROGRAM.

(44% vs 50%). However, the difference was small and, in terms of sample size, probably was not significant. Tabulated data on education may be found in Table 3 and Figure 4.

Table 3

The Relationship between Educational Background and Success or Failure in Weight Reduction

Degree	Successful number	%	Unsuccessful number	%
Non-degree	4	50	4	50
Bachelor's	12	44	15	56
Master's	4	57	3	43

Over one-third of the total number of respondents were in an income bracket higher than the national average of $7,020 per year. Tabulated data may be found in Table 4. Fifty per cent of the persons with incomes of $5,000-$8,000 were in their ideal weight range (Figure 5). When success was compared with failure in the group earning under $5,000, the results were 25 per cent vs 75 per cent; in the group earning over $8,000, it was 28 per cent vs 72 per cent. One reason for the low percentage of success in the group earning under $5,000 could be the lack of understanding of good planning practices. The subjects may tend to buy less expensive foods which are higher in carbohydrates and consume diets high in calories but not well balanced. The failure of the group earning over $8,000 could be due to less physical activity or consumption of rich foods.

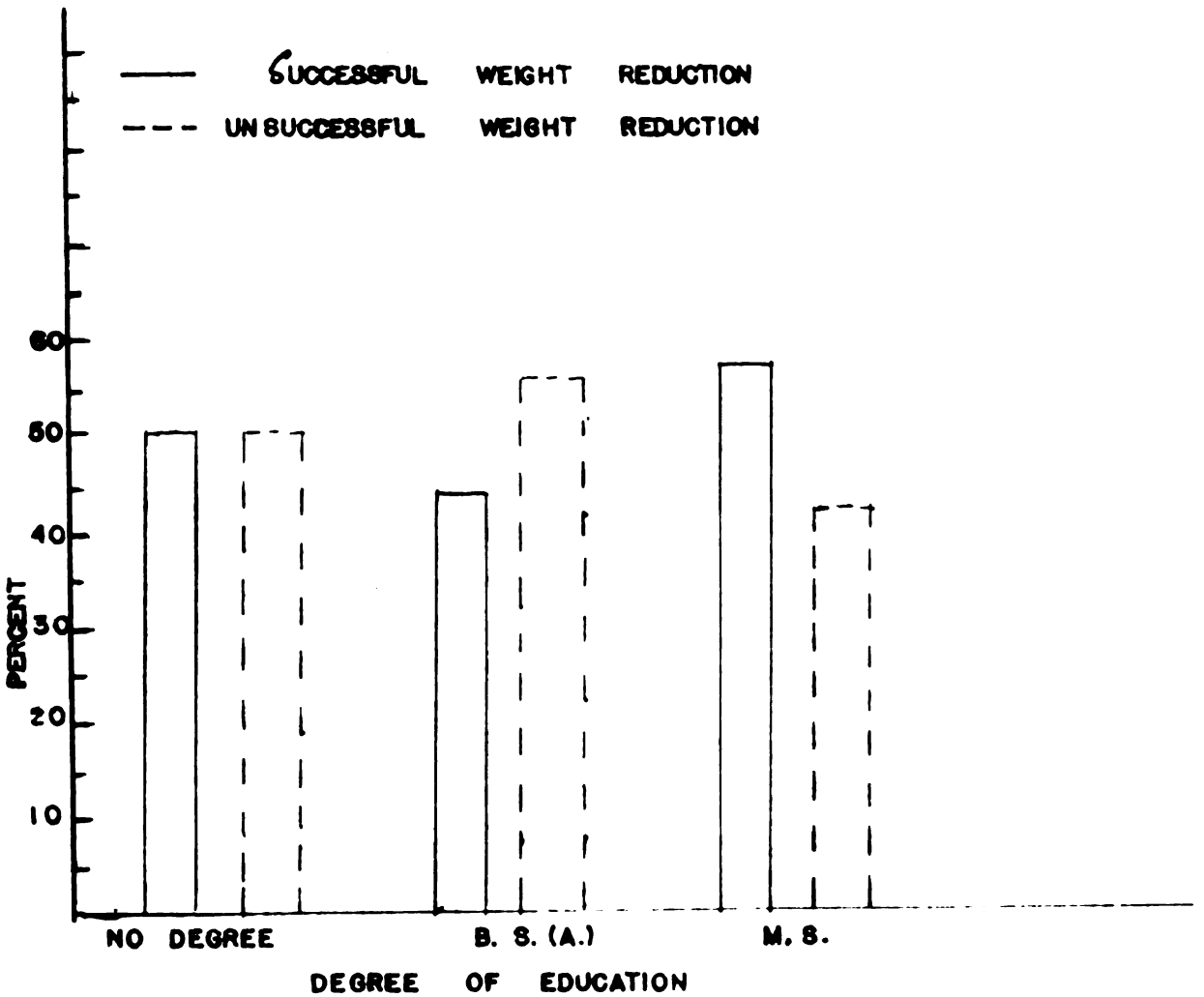

FIGURE 4. RELATIONSHIP BETWEEN DEGREE OF EDUCATION AND SUCCESS OR FAILURE OF WEIGHT REDUCTION PROGRAM.

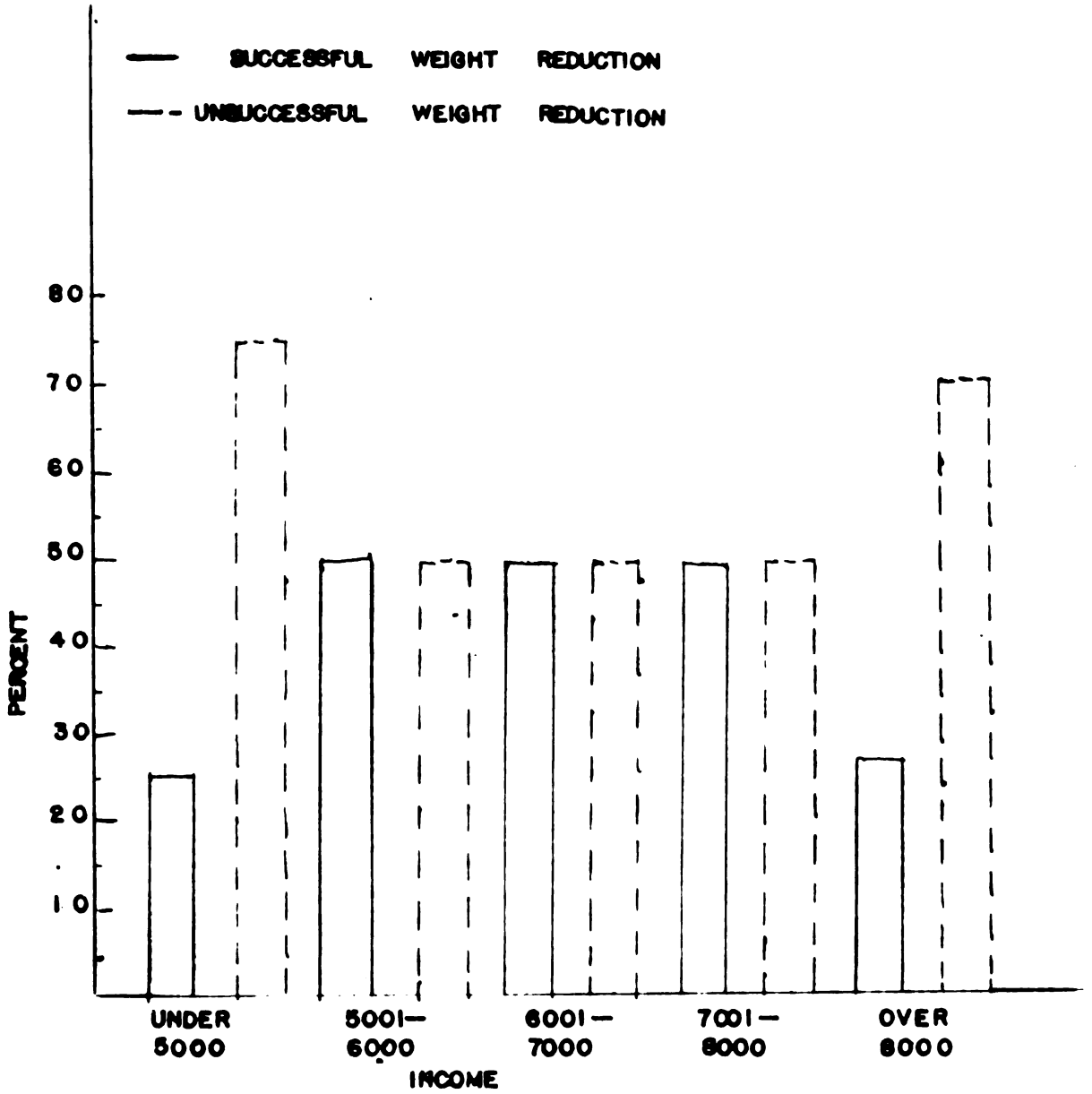

FIGURE 5. RELATIONSHIP BETWEEN INCOME AND SUCCESS OR FAILURE OF A WEIGHT REDUCTION PROGRAM.

Table 4

The Relationship between Income and Success or Failure in Weight Reduction

Income	Successful number	%	Unsuccessful number	%
Under $5000	2	25	6	75
$5001-6000	4	50	4	50
$6001-7000	2	50	2	50
$7001-8000	1	50	1	50
Over $8000	5	28	9	72

The third phase of the examination of data considered the similarities and differences in the activity patterns of the group who succeeded in attaining ideal weight and the group who failed. Several types of activity were listed (complete data in the appendix). Neither group could be considered highly active in those activities listed (Table 5). A larger percentage of the successful group bowled than did the unsuccessful group (60% vs 52%). Data on exercise of both groups indicated that the group which maintained ideal weight seemed to realize the importance of exercise in weight reduction more than did the overweight (65% vs 52%). Taking care of several children and doing housework could be considered to require reasonable physical activity. In light of this, subjects were asked to indicate whether or not they did their own housework and 75 per cent of the subjects answered yes. Another facet of activity considered was the type of work done outside the home. Subjects were

Table 5

Activity Pattern

Type	Participation			
	Successful		Unsuccessful	
	Number	%	Number	%
Bowling	12	60	12	52
Tennis	3	15	3	13
Swimming	13	65	11	47
Ice Skating	7	35	5	21
Skiing	4	20	2	8
Exercise	13	65	12	52
Walking	17	85	19	82
Gardening	1	5	3	13
Square Dancing	-	-	4	17
Golf	-	-	1	4
Softball	1	5	1	4
Speedball	1	5	-	-
Badminton	-	-	1	4
Volleyball	-	-	1	4
Farm Chores	-	-	1	4
Housework	15	75	14	60
Laundry	17	85	16	65
Outside Work				
Sedentary	1	5	1	4
Active	11	55	5	21

asked to indicate whether an active, moderately active, or sedentary job was held. Fifty-five per cent of the successful and 21 per cent of the unsuccessful subjects held moderately active jobs. On the whole, a higher percentage of the subjects who attained ideal weight participated in sports, household duties, and their jobs than did overweight subjects. Data were also examined to determine the frequency of participation by the subjects. Examination indicated the successful subjects participated more frequently in most of the activities than did the unsuccessful subjects. Percentages may be found in Table 6 and complete data in the appendix. The results obtained lend support to the theory that overweight is basically an imbalance between calorie intake and energy output (Pollack, et al. 23); although many other influencing factors exist. The fact that the subjects who possessed moderately active jobs were more successful may be more related to absence of readily available food than to increased activity.

To characterize the successful and unsuccessful subject in weight reduction, food habits must be considered. Researchers in the field have found that the eating pattern plays an important part in maintaining ideal weight; therefore, the fourth phase of this study was concerned with the eating patterns of the subjects surveyed.

In analyzing eating patterns, methods of control are important. One way of controlling eating habits is the planning of meals in advance. Eleven per cent of the successful subjects practiced this always, 65 per cent usually, and 24

Table 6

Activity Pattern

Subjects Who Participated in Activities Listed - Everyday, Twice per Week, Once per Week, or Often

	Successful		Unsuccessful	
	Number	%	Number	%
Bowling	3	15	3	13
Tennis	1	5	1	4
Swimming	5	25	1	4
Ice skating	1	5	--	--
Skiing	1	5	--	--
Exercise	7	35	7	30
Walking	17	85	15	65
Gardening	1	5	2	8
Square dancing	--	--	1	4
Golf	--	--	--	--
Softball	1	5	1	4
Speedball	1	5	--	--
Badminton	--	--	1	4
Volleyball	--	--	1	4
Farm chores	--	--	1	4
Housework	15	75	12	52
Laundry	9	45	12	52
Outside work	--	--	--	--
Sedentary	1	5	1	4
Active	11	55	5	21

per cent occasionally. The unsuccessful group used this method of control less frequently: only 5 per cent reported planning in advance always, 59 per cent usually, 27 per cent occasionally, and 9 per cent never. Responses from four subjects were not used because three lived in dormitories and one was in the Navy. From examination of data, the preplanning of meals appeared to have exerted some influence on success and failure in weight reduction by the subjects surveyed. Compiled data concerning the relationship of success or failure and the planning of meals may be found in Table 7.

Table 7

The Relationship between Success and Failure and the Planning of Meals

Frequency	Successful		Unsuccessful	
	Number	%	Number	%
Never	--	--	2	9
Occasionally	4	24	6	27
Usually	11	65	13	59
Always	2	11	1	5

Information collected relative to the general eating pattern of the subjects indicated approximately 5 to 10 per cent fewer successful subjects than unsuccessful subjects often ate foods such as canned fruits, potatoes, potato chips, fried foods, gravy, homemade breads, cake and ice cream. Five to 10 per cent more successful subjects often ate fresh yellow vegetables, poultry, fish, eggs, and cereals.

Tabulation of the data on all food groups which were eaten often may be found in Table 8 and complete data may be found in the appendix. Data examination infers that the successful group ate less often those foods high in fat and carbohydrate and more often foods low in these particular nutrients.

Table 9 presents the mean intake and the range of calories, protein, calcium, and iron consumed by the two groups. The National Research Council Allowances (22) for these nutrients, computed for women of ideal weight between 25 and 45 years of age, are also listed in the table. The calorie intake reported by both groups was lower than the recommended allowances; but this is to be expected, especially in a group of persons who are overweight and are trying to remedy the situation. In this study, the mean intake of the successful group was approximately 100 calories less than the mean intake of the overweight group, but this difference is negligible. The mean protein intake of the successful and overweight group was higher than the recommended amount; the mean calcium intake was a little low in both groups, and the mean iron intake was above the recommended amount. The data on individual intakes may be found in the appendix. The data collected on subjects' intakes may not give a true picture of individual intake because only a 24-hour recall was used and some subjects were not eating as usual due to the Lenten Season or some other special occasion. However, according to Young, et al. (31), the 24-hour recall should give a fair estimate of the group intake.

Table 8

General Eating Pattern: Foods Eaten Often

	Successful Subjects		Unsuccessful Subjects	
	Number	%	Number	%
Fruits				
Fresh	14	70	17	74
Canned	10	50	13	56
Frozen	5	25	6	26
Green Vegetables				
Fresh	11	55	13	56
Canned	8	40	9	39
Frozen	13	65	14	61
Other Vegetables				
Fresh	12	60	11	48
Canned	5	25	10	43
Frozen	8	40	11	48
Potatoes	7	35	11	48
Macaroni, noodles, spaghetti	3	15	4	17
Potato chips	--	--	1	4
Sandwiches	10	50	7	30
Meat	19	95	22	95
Poultry	17	85	17	73
Fish	9	45	9	39
Fried Foods	2	10	4	17
Gravy	2	10	3	13

Table 8 (continued)

	Successful Subjects		Unsuccessful Subjects	
	Number	%	Number	%
Eggs	7	85	18	78
Homemade breads	1	5	4	17
Cookies	9	45	7	30
Cake	1	5	2	8
Pie	2	10	--	--
Cereals	13	65	13	56
Ice cream	8	40	10	43

Table 9

The Mean and Range of Nutrient Intake

	Calories		Protein (gm)		Calcium (mg)		Iron (mg)	
	Mean	Range	Mean	Range	Mean	Range	Mean	Range
Successful	1482	867-2202	72	43-165	708	308-1988	17	6-62
Unsuccessful	1555	708-2230	78	41-149	746	377-1232	14	6-41
National Research Council Allowances	2300		58 gm		800 mg		12 mg	

One of the problems of nutritionists and other persons in the field is convincing the public of the practicability of using low calorie foods instead of purchasing "special low calorie foods." Data collected from subjects (Table 10) showed that 45 per cent of the successful subjects and 56 per cent of the unsuccessful subjects purchased some or all of the special foods listed. These results suggest that items sold as "special low calorie" foods may not possess the magic attributed to them by the advertisements and that reducing the intake of high calorie foods may be more rewarding than using the special foods to effect weight control.

Table 10

Low Calorie Foods Purchased

Low Calorie Foods	Successful		Unsuccessful	
	Number	%	Number	%
Salad dressing	9	45	13	56
Crackers	--	--	3	13
Breads	6	30	4	17
Canned fruits	1	5	2	5
Artificial sweetners	6	30	6	26

At the present time, numerous regimens for dieting are being promoted. The value of most of these dieting methods is very doubtful. To determine the degree of success attained by the use of some of these methods, subjects were asked to indicate the methods used in dieting since participation in the Michigan State studies.

The highest percentage of success (61%) was observed in the group that used low calorie diets only. Tabulated data showing the relationship of success and other methods of dieting may be found in Table 11. The results of this examination lead one to believe that the low calorie diet used consistently in most cases of overweight due to an energy imbalance will lead to a higher percentage of success on a long-term basis than the pills, liquid diets, and similar types of aids.

Table 11

Types of Weight Reduction Aids Used

Diet and Supplementary Aids	Successful Number	%	Unsuccessful Number	%
Low calorie	11	73	7	35
Liquid	1	6	1	5
Low calorie + pills	1	6	3	15
Liquid, pills + commercial diets	1	6	--	--
Pills	--	--	2	10
Liquid + low calorie	--	--	4	20
Liquid, pills + other medicine	--	--	2	10
All methods	1	6	1	5

To determine whether heredity played any role in the success or failure of these subjects to maintain their ideal weights, information on the existence of overweight among the subject's family members was examined. The data relative to overweight family members is presented in Table 12. Twenty-five per cent of the subjects of ideal weight had no

overweight family members but all of the subjects still overweight reported at least one overweight family member. It is not possible to draw conclusions from these limited data with relation to the effect of heredity on weight control. The small differences observed could indicate some environmental influences not identified in this study. Mayer (21) suggested that experiments with identical and fraternal twins have indicated that food habits are not always the sole cause of overweight and that heredity cannot be ignored. Some researchers, however, disagree with this theory (Sebrell 25).

Table 12

Subject's Overweight Family Members

Family Members	Successful Number	%	Unsuccessful Number	%
Father or mother	2	10	6	26
Father and mother	4	20	1	4
Father, mother, sisters and/or brothers	1	5	2	8
Mother, sisters and/or brothers	5	25	8	40
Father, sisters and/or brothers	1	5	--	--
Brother(s)	--	--	2	8
Sister(s)	--	--	2	8
Husband	3*		3*	
Children	1*		1*	
Yes**	1	5	1	4
No one	5	25	--	--
No answer	1	5	1	4

*In addition to others
**Members of family not identified

Some subjects in listing factors which influenced success or failure in weight reduction suggested that working away from home played an important part by limiting constant access to food. The fifth phase of data examination was conducted to determine any difference in the success of the homemaker and the career woman. Fifty-two per cent of the career women maintained ideal weight while only 45 per cent of the homemakers accomplished this goal (Table 13). The slightly greater success of the career woman may be related to being away from the temptation and easy availability of food. It may also be due to the fact that the person who must make a public appearance every day is more conscious about how she looks. Some employment situations may require that the employee be slim and attractive and keeping a job is sometimes sufficient motivation for weight control.

Table 13

The Success or Failure in Weight Reduction of the Homemaker vs Career Woman

Status	Homemaker Number	%	Career Woman Number	%
Successful	9	45	12	52
Unsuccessful	11	55	11	47

The sixth phase of this examination was conducted to determine whether more of the successful subjects surveyed were previously home economics or non-home economics students.

Overweight is of great concern to nutritionists and other workers in the field at the present time. If successful methods of weight reduction and ways of changing food habits are to be devised, it would be helpful to know how persons whose education provides reasonable knowledge of good food habits go about losing weight. The degree of success attained by home economics students as compared with non-home economics students was 56 per cent to 39 per cent in favor of the home economics students. It was also interesting to see what percentage of home economics students used some of the special dietary products on the markets. As shown in Table 14, 62 per cent of the home economics students who dieted used low calorie diets only, compared with 58 per cent non-home economics students. Twelve per cent of the home economics students, as compared with 25 per cent of the non-home economics students, used liquid diets. The home economics students used these only under the supervision of a physician. A higher percentage of the home economics students (37% vs 9%) used drugs, but only with doctor's supervision (Table 15). Supervision in dieting is important when drugs and products about which consumers know little are used. Even when low calorie diets are used, supervision is important because most persons are not familiar with food values and the nutrient intake desirable for adequate nutrition. The inference here is that home economics training may have exerted some favorable influence on the success of subjects but the difference is not as great as might be expected if persons used conscientiously the knowledge acquired.

Table 14

Comparison of the Use of Low Calorie Diets

Major	Low Calorie Diets Only	
	Number	%
Home Economics Students (8)	5	62
Non-Home Economics Students (24)	14	58

Table 15

Comparison of the Use of Dieting Aids and Types of Supervision

Major	Crash & Liquid				Drugs			
	Prescribed		Self-selected		Prescribed		Self-selected	
	Number	%	Number	%	Number	%	Number	%
Home Economics	1	12	--	--	3	37	--	--
Non-Home Economics	4	17	2	8.3	2	8.3	4	--

Although it has been established that food habits possibly play the major role in success or failure in weight control, it was of interest to find out what factors the subjects felt affected their ability to maintain the strict regimens necessary in weight reduction. A necessary step toward successful weight reduction is recognition of factors which influence success or failure. Table 16 shows the tabulation of factors listed most often by all subjects (complete data in the appendix). These have been divided into the two

main groups successful and unsuccessful discussed throughout this thesis. Seventy-five per cent of the subjects who had attained ideal weight compared with 65 per cent of the overweight subjects seemed to realize that will power is one of the most important factors influencing successful weight reduction. Emotional state was also recognized as playing a significant role. A high percentage (56%) of the unsuccessful persons indicated emotional status influenced success or failure. This may be explained by the fact that they were still trying to reduce and were more aware of the effect of emotions than the already successful subjects. The subjects of ideal weight (30%) placed the knowledge of food values and good nutrition high on the list of influencing factors. Even though not all the subjects surveyed were successful, most of them seemed to realize that one of the first steps toward success is the desire and determination to lose weight. After observation of the low percentage of success among persons using all types of methods of weight reduction, persons in the field have come to the conclusion that will power is the most important determinant.

Table 16

Factors Listed Most Often as Influencing Weight Reduction

Factors	Successful		Unsuccessful	
	Number	%	Number	%
Will power (desire and determination)	15	75	15	65
Emotional status	5	25	13	56
Motivation	4	20	4	17
Encouragement (family, friends, etc.)	2	10	4	17
Knowledge of food values and good nutrition	6	30	3	13
Environment	2	10	--	--

SUMMARY AND CONCLUSION

A follow-up study of subjects who participated in weight reduction studies at Michigan State University between 1950 and 1960 was conducted to determine the present weight status of these persons and possible factors influencing their success or failure in weight control.

The subjects were contacted through a mail questionnaire which contained questions about physical status, age, educational background, activity, history of overweight among family members, economic status, eating habits, and factors which the subjects felt influenced success or failure in weight reduction. Forty-three of the 65 questionnaires were completed.

All data were examined to determine trends within the group that attained ideal weight and the group that failed.

Upon examination of all the conditions which seemed to influence success or failure in weight reduction in the survey reported here, most of the successful subjects may be characterized as those who:

a. Are single and between the ages of 20 and 25.

b. Are in the income bracket between $5,000-$8,000.

c. Are moderately active.

d. Have none or very few overweight family members.

e. Have a career outside the home.

f. Have had some nutrition education.

g. Realize that the desire and determination to lose weight is one of the first steps to successful weight reduction.

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APPENDIX

MICHIGAN STATE UNIVERSITY East Lansing

College of Home Economics . Department of Foods and Nutrition

March 27, 1962

Dear

As you no doubt remember, you participated in the weight reduction studies carried out here at Michigan State University. Several studies have been completed and the time has come for us to take a look at our research program and evaluate the work done these past years. This evaluation is being done with the hope that we will be able to plan more meaningful programs in the future. The attached questionnaire has been designed to bring our files up to date with respect to your present physical status and to assist in the evaluation of the research program.

Would you therefore please complete the questionnaire and return it to us by April the 15th?

I hope you understand how much your help is needed in completing this project and how much your cooperation will be appreciated.

You may be certain the data in this study will be coded and that you will not be identified as an individual.

With kindest personal regards,

Sincerely,

Dena C. Cederquist, Chairman
Foods and Nutrition Department

Q U E S T I O N N A I R E

Code

1. Address _____.

2. College Major _____ Degree(s) B.S. _____

   M.S. _____ Ph.D. _____.

3. Date of Birth _____.

4. Present Ht. _____ Present Wt. _____

   Highest wt. (since participation in study _____ Approx. date __.

   Lowest wt. (since participation in study _____ Approx. date ___.

5. Marital status. Single _____ Married _____ Divorced _____.

6. Children:

Date(s) of Birth (s)	The infant was bottle fed	Breast fed

7. Present family income (if single-yours)

   _____ under 5000

   _____ 5001-6000

   _____ 6001-7000

   _____ 7001-8000

   _____ Over 8000

8. Work (outside the home since participation in study)

	Kind	Approx. Hrs. Worked/Week	Duration
a.			_____ 19__ to _____19__
b.			_____ 19__ to _____19__
c.			_____ 19__ to _____19__
d.			_____ 19__ to _____19__
e.			_____ 19__ to _____19__

9. Do you do all of your house work? Yes _____ No _____
   Laundry? Yes _____ No _____

10. Recreation

Kind	Frequency Since Study: Once per Week	Once per 2 Weeks	Twice per Week	Every day	Often	Occasionally
Bowling						
Tennis						
Swimming						
Ice Skating						
Skiing						
Sitting up exercises						
Walking						
Other						

11. a. Have you had a thorough physical examination since participation in the study? Yes ____ No ____

b. How often have you had a physical examination?

_____ Every six months.

_____ Annually.

_____ During pregnancy.

_____ Occasionally (no regular time).

c. Any recommendations for weight loss?

12. Physical status (since participation in study)

a.

Operations	Approx. date	Length of Confinement
1.		
2.		
3.		
4.		

b. Illnesses or accidents which caused you to be confined.

	Approx. date	Length of Confinement
1.		
2.		
3.		
4.		

c. Allergies which affect your eating habits.

1.

2.

3.

4.

13. Do other members of your family (father, mother, brothers, sisters, husband, children) have problems in maintenance of normal weight?

14. What factor(s) do you feel contribute to success or failure in losing weight?

15. Weight Reduction Diets Used Since Participating at M.S.U. (check type of supervision, period of time, type of diet and weight loss of each one).

Supervision		Period of time									
Under trained supervision (doctors, nutritionist, etc.	On Your Own	1 yr.	9 mo.	6 mo.	less	Natural foods low calorie	Aided by Com. Liquid Diets	Aided by Magazine "Crash Diets"	Aided by other Com. Diets	Weight loss	Approx. date

16. Do you plan menus for your family's meals in advance?
never ____ occasionally ____ usually ____ always ____

17. How do you decide what to serve (to eat) at meals?

a. What they (I) like best _____.

b. What fits into the money I can spend _____.

c. Things which don't take long to prepare _____.

d. Foods I think will supply necessary nutrients _____.

e. What I have on hand _____.

18. Foods I serve myself or my family (Please check one column after each food).

	Often	Occasionally	Seldom	Never
Fruit				
Fresh				
Canned				
Frozen				
Green Vegetables				
Fresh				
Canned				
Frozen				
Other Vegetables				
Fresh				
Canned				
Frozen				
Potatoes				
Macaroni, Spaghetti, Noodles				
Potato Chips				
Sandwiches				
Meat				
Poultry				
Fish				
Fried Foods				
Gravy				
Eggs				
Homemade Bread				
Cookies				
Cake				
Pie				
Cereals				
Ice Cream				

19. Do you buy any special foods for use in low calorie diets?

Salad dressing _____

Crackers _____

Breads _____

Canned fruit _____

Artificial sweetners _____

20. 24 Hour Recall Record. (Record the kinds and amount of all foods eaten by you in the previous 24 hours. Be sure to include beverages, soft drinks - beer, wine, mixed drinks, cream and sugar used in beverages).

Breakfast

Lunch

Dinner

Snacks

21. Comments -

Table 17

Personal Statistics

Successful Subjects (code)	Age	Height	Weight	Marital Status	Number of Children
176	--	5'3"	130	S	--
137	22	6'0"	160	S	--
175	31	5'9"	148	M	4
142	26	5'4"	145	S	--
145	22	5'8"	160	S	--
141	22	5'2"	124	S	--
135	29	5'2"	129	M	3
143	26	5'5-1/2"	141	M	--
147	23	5'6-1/4"	153	S	--
168	30	5'6"	145	M	--
165	25	5'8-1/4"	160	S	--
119	26	5'6"	138	M	5
115	29	5'1/2"	120	M	1
113	28	5'2-1/2"	125	M	4
151	35	5'5"	145	M	3
131	34	5'2"	124	M	2
183	34	5'9-1/2"	164	S	--
189	22	5'7"	142	S	--
191	24	5'6"	130	S	--
188	24	5'7-1/2"	157	S	--

Table 18

Personal Statistics

Unsuccessful Subjects (code)	Age	Height	Weight	Marital Status	Number of Children
139	23	5'7"	165	S	--
123	28	5'3-1/2"	155	M	1
116	30	5'6-3/4"	185	M	1
114	33	5'3"	239	M	4
122	26	5'2"	153	S	--
156	32	5'1"	141	S	--
162	30	5'4"	147	S	--
149	30	5'6"	170	M	5
164	31	5'4-1/2"	150	M	2
166	25	5'11"	182	S	--
158	31	5'4-1/2"	175	M	7
126	28	5'2-1/4"	167	M	2
148	24	5'4"	170	S	--
134	25	5'8-1/2"	200	D	1
159	31	5'5"	163	M	4
177	25	5'9"	190	M	--
169	29	5'6"	155	M	3
125	27	5'8"	236	M	1
170	31	5'1/2"	167	S	--
186	22	5'8-1/2"	174	S	--
184	31	5'6"	160	M	--
124	27	5'2-1/2"	166	M	2
185	30	5'6-1/4"	220	M	1

Table 19

General Eating Pattern (Successful subjects)

	Often	Occasionally	Seldom	Never
Fruits				
fresh	14	5	1	-
canned	10	7	3	-
frozen	5	9	3	1
Green vegetables				
fresh	11	6	3	-
canned	8	5	4	2
frozen	13	5	2	-
Other vegetables				
fresh	12	7	1	-
canned	5	10	2	2
frozen	8	6	2	1
Potatoes	7	5	7	1
Macaroni, noodles, spaghetti	3	8	7	3
Potato chips	-	5	13	1
Sandwiches	10	7	2	-
Meat	19	1	1	-
Poultry	17	1	2	-
Fish	9	8	3	-
Fried foods	2	8	9	1
Gravy	2	4	8	5
Eggs	17	2	1	-
Homemade bread	1	3	12	3
Cookies	9	5	6	-
Cake	1	12	7	-
Pie	2	13	7	-
Cereals	13	2	3	-
Ice Cream	8	7	4	1

Table 20

General Eating Patterns (Unsuccessful Subjects)

	Often	Occasionally	Seldom	Never
Fruits				
fresh	17	5	--	--
canned	13	7	1	--
frozen	6	9	4	2
Green Vegetables				
fresh	13	8	--	1
canned	9	7	3	1
frozen	14	6	2	--
Other Vegetables				
fresh	11	9	--	--
canned	10	8	2	--
frozen	11	9	--	1
Potatoes	11	4	6	--
Macaroni, noodles, spaghetti	4	9	8	--
Potato chips	1	7	13	1
Sandwiches	7	7	8	--
Meat	22			
Poultry	17	5	--	--
Fish	9	10	3	--
Fried foods	4	7	11	--
Gravy	3	4	10	4
Eggs	18	4	--	--
Homemade bread	4	5	6	6
Cookies	7	11	4	--
Cake	2	9	11	--
Pie	--	7	12	1
Cereals	13	3	4	2
Ice Cream	10	9	2	1

Table 21

Nutrient Intake (Successful Subjects)

Subjects	Calories	Protein (gm)	Calcium (mg)	Iron (mg)
137	982	47	305	19
175	2206	165	1988	37
142	1352	85	750	12
145	1921	82	430	20
141	1173	43	651	6
135	1054	62	187	29
143	2000	68	469	21
147	1795	77	815	10
168	1514	60	547	25
165	1328	52	1067	6
119	1582	59	857	62
115	1571	111	609	13
113	1371	52	580	8
151	1542	54	588	7
131	867	55	588	7
183	1284	67	758	8
189	2009	99	1163	14
191	1131	51	395	20

Table 22

Nutrient Intake (Unsuccessful Subjects)

Subjects	Calories	Protein (gm)	Calcium (mg)	Iron (mg)
139	1142	46	481	7
123	1190	149	500	28
116	2197	66	507	13
122	1749	65	506	41
156	1959	68	367	12
162	1266	75	578	33
149	1456	100	902	14
164	1691	59	903	14
166	1540	56	1029	6
158	2184	69	954	9
126	1721	104	914	12
148	1594	114	636	11
134	1646	53	452	9
159	1540	107	975	19
177	1422	64	1234	8
169	708	68	465	7
125	1101	74	960	10
170	2230	92	762	11
186	2287	101	1192	13
184	865	41	483	7
124	1159	64	877	9

Table 23

Activity Pattern (Number of Successful Subjects Participating)

Type	Frequency						
	Once/ wk.	Once/ two wks.	Twice/ wk.	Every- day	Often	Occas.	Total
Bowling	1	1	--	--	2	8	12
Tennis	--	--	--	--	1	2	3
Swimming	--	--	--	--	5	8	13
Ice Skating	--	1	--	1	--	5	7
Skiing	--	--	--	--	1	3	4
Exercise	--	1	--	5	2	5	13
Walking	1	--	--	11	5	--	17
Gardening	--	--	--	--	1	--	1
Square dancing	--	--	--	--	--	--	--
Golf	--	--	--	--	--	--	--
Softball	--	--	--	--	1	--	1
Speedball	--	--	--	--	1	--	1
Badminton	--	--	--	--	--	--	--
Volleyball	--	--	--	--	--	--	--
Farm chores	--	--	--	--	--	--	--
Housework	--	--	4	8	3	--	15
Laundry	4	8	4	1	--	--	17
Outside work							
Sedentary	--	--	--	1	--	--	1
Active	2	--	--	9	--	--	11

Table 24

Activity Pattern (Number of Unsuccessful Subjects Participating)

Type	Frequency						
	Once/ wk.	Once/ two wks.	Twice/ wk.	Every-day	Often	Occas.	Total
Bowling	3	--	--	--	--	9	12
Tennis	--	--	--	--	1	2	3
Swimming	--	--	--	1	--	10	11
Ice Skating	--	--	--	--	--	5	5
Skiing	--	--	--	--	--	2	2
Exercise	--	--	1	2	4	5	12
Walking	1	--	2	6	6	4	19
Gardening	1	--	--	1	1	--	3
Square dancing	1	2	--	--	--	1	4
Golf	--	--	--	--	--	1	1
Softball	--	--	--	--	1	--	1
Speedball	--	--	--	--	--	--	--
Badminton	---	--	--	--	1	--	1
Volleyball	--	--	--	--	1	--	1
Farm chores	1	--	--	--	--	--	1
Housework	1	2	3	8	--	--	14
Laundry	9	4	2	1	--	--	16
Outside work							
Sedentary	--	--	--	1	--	--	1
Active	--	--	--	5	--	--	5

Table 25

Factors Influencing Weight Reduction as Listed by Subjects

Factors	Successful Number	Successful %	Unsuccessful Number	Unsuccessful %
Will power (desire and determination)	15	75	15	65
Emotional status	5	25	13	56
Motivation	4	20	4	20
Encouragement (family, friends, etc.)	2	10	4	20
Knowledge of food values and good nutrition	6	30	3	13
Exercise	3	15	--	--
Environment	2	10	5	21
Admission of weight problem	1	5	3	13
Type of work (sedentary or active)	2	10	2	9
Boredom	2	10	1	4
Working away from home	2	10	--	--
Companionship (others dieting too)	2	10	1	4
Metabolic disturbance	--	--	2	9
Substitution (doing something to take mind off food)	2	10	1	4
Age	--	--	1	4
Long term dieting	2	10	2	9
Variety in food	3	15	--	--

ROOM USE ONLY