INFLUENCE OF MENARCHEAL AGE AND OTHER VARIABLES ON WEIGHT CONTROL PRACTICES OF ADOLESCENT FEMALES IN OKLAHOMA

BY

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PREFACE

This study examines several factors which affected the weight control practices in a racially mixed population of 132 adolescent females in Oklahoma. The major purpose of this study was to determine whether a relationship between menarcheal age and weight control practices existed; how other factors such as fatness and chronological age affected weight control practices was also studied.

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CHAPTER I

INTRODUCTION

It is generally accepted that due to the great physical changes which occur during pubescence and adolescence, individuals experience a heightened awareness of their physique (Stewart and Koch, 1983). It is also common that this increased awareness of physical appearance is associated with a dissatisfaction with one's physique (Bruch, 1973). It has been suggested that one reason for this is that adolescents, as a group, are particularly sensitive to the socio-cultural norms concerning body size (Kelly et al., 1982; Bruch, 1973). Variations in body size, even within the medically viewed normal range, are often perceived to be abnormal by the adolescent; this is particularly true for the adolescent female (Dwyer et al., 1969; Faust, 1983).

That the adolescent female makes the associations among diet, body composition, and appearance is apparent from the widespread documentation of weight control efforts practiced by this group. Although research has been conducted regarding the frequency, extent, and methods of weight control practiced by adolescent girls, little is known about when she initiates such practices and what

triggers them.

It is possible that physical maturation, rather than some of the socio-demographic and psychological variables which have been identified as factors that influence adult weight control practices (Dwyer and Mayer, 1970; Dwyer et al., 1970), is more relevant to when the adolescent female begins to modify her weight and how she attempts to do so.

As part of the normal physical development occurring during puberty, the adolescent female experiences an increase in absolute and relative fatness (Frisch, 1976). This increase in fatness is associated with the attainment of menarche (Tanner, 1955; Frisch, 1974). It is conceivable that this change in body composition is a phenomenon to which the adolescent female must psychologically and/or physically adapt. Perhaps deliberate weight control is one form in which this adaptation manifests itself.

Given the socio-cultural norms held by U.S. adolescent girls concerning weight, and the physical changes resulting in an increased level of fatness after menarche, it is probable that weight control practices are in some manner related to the length of time prior to or after menarche.

Purpose and Objectives of the Study

The purpose of this study of 132 adolescents in north-central Oklahoma was to determine whether a significant relationship existed between time prior to or past menarche (referred to as "menarcheal age") and the weight control

practices of females who were between 11.5 and 16.5 years of age. Another purpose of this study was to describe any relationship between these two variables.

Because maturation events are closely associated with chronological age, the effect of age on the weight control practices of adolescent females was also examined to determine whether the relationship between menarcheal age and weight control practices existed independent of chronological age. In addition, the data were analyzed to determine whether a significant relationship existed between degree of fatness (estimated by both triceps skinfold measurements and weight-for-height), menarcheal age, and weight control practices.

Selected socio-demographic and psychological variables were tested to determine whether these variables significantly influenced the weight control practices of adolescent females. The specific variables to be tested for effects on the weight control practices of adolescent girls were: race, place of residence, per capita income, mother's level of education, family type, self-esteem, and nutrition misconceptions in the area of energy metabolism. In addition, the relationships between the weight control practices of adolescent girls and their energy intake and physical activity were examined.

Assumptions

The researcher assumed:

1. The sample size was sufficient to obtain valid data.
2. All subjects' responses were made truthfully and voluntarily.
3. The methods applied to test the hypotheses were sensitive and accurate.

Definitions

The following definitions were used in this study.

1. Adolescent female: a female who was between the ages of 11.5 and 16.5 years as of March 1, 1981.
2. Menarcheal age: age in months prior to or past menarche.
3. Weight control practice: an individual's conscious manipulation of either diet, exercise, or life style aimed at weight control.

CHAPTER II

REVIEW OF LITERATURE

Adolescent females are considered to be a group nutritionally at risk. Numerous studies have documented the prevalence of dietary deficiencies among this population. The specific nutrients commonly identified as low in the diets of adolescent girls have been: vitamins A and C, calcium, and iron (U.S. National Center for Health Statistics, 1977; Haider and Wheeler, 1980; Schorr et al., 1972). These dietary deficiencies have been associated with low or deficient biochemical indices of nutrient status in the adolescent female population (Lee, 1978; Preliminary Findings of the First Health and Nutrition Examination Survey, 1974). The poor nutritional status of adolescent females is often attributed to their erratic eating patterns, poor dietary habits, and weight control efforts (Schorr, 1972).

Body Image and Acceptance of Physique

The adolescent female has been described as frequently preoccupied and dissatisfied with her physique and physical appearance (Bruch, 1973). Numerous researchers have attempted to quantitatively and qualitatively describe this

phenomenon so ubiquitous in our culture (Dwyer et al., 1969; Huenemann et al., 1968; Kelly et al., 1982; Macdonald et al., 1983; Storz and Greene, 1983).

Scanlon (U.S. National Center for Health Statistics, 1973), who analyzed data collected in the 1966 - 1970 National Health Survey on the self-reported health behaviors and attitudes of youths 12 - 17 years of age, reported that 48.4 percent of the girls surveyed (3,223) would like to be thinner than they actually were. This attitude increased with age. Dissatisfaction with other body dimensions such as height did not follow the same pattern: 67.7 percent of the girls were satisfied with their heights, 12.8 percent would prefer to be less tall, and 19.5 percent would prefer to be taller.

Dwyer et al. (1969) reported an even larger prevalence of dissatisfaction with weight. Of 446 female adolescents surveyed, 80 percent reported desired or ideal weights which were lower than their actual weights. The adolescent females' concern with their weights was also expressed when 57 percent of the respondents reported weighing themselves at least once a week. Storz and Greene (1983) studied a predominantly white group of 203 adolescent females in an urban area. Of these adolescents studied, 169 (83 percent) desired to lose weight; 104 of these girls had actual weights-for-heights within the "normal" range, defined as 20 percent above or below the average weight for sex and age on the National Center for Health Statistics growth charts.

Hampton et al. (1967) examined the effect of race on the body image of adolescents. The following results are based on interviews with 156 white, 63 black and 30 oriental adolescent girls in grades 9 through 12. Black girls were less likely than white girls to think themselves to be fat, and they became concerned with fatness at a later age than did white girls. More black girls were concerned about being underweight than girls in the other two racial groups. White girls tended to perceive themselves as being fatter than they actually were, and black girls had more realistic body images, which had a higher agreement with their actual body size.

Silhouette drawings of varying body types ranging from the extreme ectomorph to the extreme endomorph are often employed to elicit information concerning individuals' perceptions of their body size and to identify their ideal or desired physiques. This technique has been used by several researchers (Dwyer et al., 1969; Storz and Greene, 1983; and Macdonald et al., 1983) in attempts to measure the adolescent female's ability to accurately perceive her body size and to identify which physique she sees as most desirable. All three studies agreed as to the ideal body image of the adolescent female. Dwyer et al. (1969) reported that 58 percent of 446 girls chose the mesomorphic ectomorph, and 40 percent chose the extreme ectomorph, as the most feminine or ideal body type. It is interesting to note that when 145 male adolescents were asked to

identify the most feminine physique, using the same silhouette drawings, 77 percent chose the mesomorphic ectomorph, and only 8 percent chose the extreme ectomorph as the most feminine body type. Data from Macdonald et al. (1983) concur with the findings of Dwyer et al. (1969). Of their sample of 100 adolescent females, 78 percent chose the ectomorphic physique as their ideal, while 9 percent chose the extreme ectomorph as the ideal feminine physique. Storz and Greene (1983) reported similar results; 57 percent of the girls selected a 10 percent underweight physique as their ideal. These studies indicate that adolescent females strongly identify with an ectomorphic body type as the ideal feminine physique.

Weight Control Practices

The widespread weight control practices of adolescent females have been documented by several researchers (Dwyer et al., 1969; Kelly et al., 1982, and Storz and Greene, 1983). The majority of these studies focus primarily on diet-related behavior as the mode of weight control.

Of the 446 female adolescents studied by Dwyer et al. (1969), 61.4 percent reported attempting weight loss through diet modification at some time in their lives, and 5 percent reported attempting weight gain through diet modification. On the day they were surveyed, 37 percent of the girls reported they were following a weight reduction diet. Huenemann et al. (1974) found that by the 9th grade 65 percent

of the female adolescents studied reported practicing some form of weight control. Similar high frequencies of weight control practices were reported in other studies (Storz and Greene, 1983; Kelly et al., 1982; and Macdonald et al., 1983).

Storz and Greene (1983) questioned 203 adolescent girls on the frequency of trials of various weight control methods. Of the ten methods mentioned, exercise programs were the most frequently tried method (106 responses), followed by low-energy crash diets (frequency of 59), and a balanced diet with restricted energy (frequency 58). Other methods deemed as desirable forms of weight control on the part of the authors, such as supervised diet programs, received response frequencies of 16 to 17. However, faddish methods of weight loss, such as those involving use of appetite suppressants or fasting, had response frequencies of 24 and 27, respectively. Eighteen girls reported trying liquid protein diets, and 17 chose one-food diets as the method of weight control.

Adolescent girls frequently mentioned meal skipping as a form of weight control (Spindler and Acker, 1963; Dwyer et al., 1967; and Kaufmann et al., 1975). Indeed, the high frequency of meal skipping among teenage girls noted by other researchers (Lee, 1978; Edwards et al., 1964; and Baird, 1979) may actually be reflecting weight control efforts. Teenage girls also mentioned limiting specific food items, snacks in general and snacks consumed

in private as a frequently employed method of weight control (Kaufmann et al., 1975; and Dwyer et al., 1967). More drastic weight control methods practiced by adolescent females were documented by Kelly et al. (1982); of the 1298 adolescent females surveyed, 2.8 percent induced vomiting and 2.7 percent used laxatives after overeating as methods of weight control.

Factors Associated with the Weight Control Practices of Adolescent Females

Numerous factors, such as age, race, income, nutrition knowledge, body composition, self-esteem, and several socio-demographic variables, have been associated with the dietary habits and weight control practices of adolescent girls.

The average age at which some adolescent girls reported they initiated dieting or weight control efforts was 14 to 15 years of age (Dwyer et al., 1967; Huenemann et al., 1966). However, more recent studies (Kelly et al., 1982; Storz and Greene, 1983) reported that dieting practices were well established by this age. This indicates that weight control efforts may actually be initiated at a younger age than 14 years.

The effect of race on the weight control practices of adolescent females has been examined by Hampton et al. (1967). Although two-thirds of a sample of 249 girls reported they were trying to do something about their weight, the mode of weight control differed between racial groups.

White girls were four times as likely as black girls to mention exercise as a method of weight control; however, a change in diet was the method most frequently mentioned by all girls. Other studies which attempted to elucidate racial differences have focused on nutritional status or dietary intake rather than on weight control efforts (Haider and Wheeler, 1980; Lee, 1978). Both studies concluded that blacks had overall, poor dietary intakes of most nutrients. The preliminary findings of the First Health and Nutrition Examination Survey (1974) confirmed these findings.

Income and socio-status have also been associated with nutrient intake; girls of higher socio-status had more nearly adequate diets (Hinton et al., 1963; Haider and Wheeler, 1980). Family environment and characteristics such as family solidarity and organization, parental relationships, and parent-child stimulation affected food preferences and dietary habits of children (Hertzler, 1983). Probably, such factors also influence the dietary practices or behaviors of the adolescent female. Cross et al. (1975), who examined the effect of family life-cycle stage on the concerns regarding food selections, found that concern in planning low calorie meals increased as the age of household heads increased. Schorr et al. (1972) found a positive relationship among characteristics such as mother's level of education and parents' occupations and the diversity of teenagers' diets. Whether or not these factors are also associated with weight control practices has not been

studied in the adolescent female population. Although the distribution of the prevalence of obesity in rural and urban adult female populations has been studied by Kohrs et al. (1979), the weight control efforts of adolescent females have not been studied on the basis of place of residence.

Schwartz (1975) studied 313 female high school graduates who had or had not participated in a nutrition education class during high school. Although no significant relationship was found between dietary selections and participation in a nutrition education class, nutrition knowledge, practices, and attitudes were correlated. However, an individual's level of knowledge concerning nutrition does not always coincide with appropriateness of eating behavior. Data presented by Storz and Greene (1983) showed that while adolescent females could correctly identify desirable and undesirable methods of weight reduction in relation to health, 41.5 percent of the actual weight control attempts of the same girls fell into the "undesirable" or the "unhealthy" category. Kaufmann et al. (1975) who studied adolescents' opinions and knowledge about the causes and prevention of obesity, found that obese adolescents were more knowledgeable about the caloric content and nutritive value of foods than their non-obese peers. Obese subjects also exhibited a higher frequency of weight control attempts. Dwyer et al. (1967) found that dieters had significantly higher mean scores on tests of nutrition knowledge relevant to weight control than did non-dieters. Obese

girls also scored higher on questions relevant to nutrition knowledge concerning weight control than did their non-obese peers.

Body Composition and Weight Control

The literature concerning the association between body composition and weight control is conflicting. Storz and Greene (1983) classified dieters into two groups, those desiring to lose more than 10 percent of their body weight and those desiring to lose less than that amount. No difference in body composition was reported between the two groups; in fact, the majority of girls in both groups had normal weights-for-heights. When Macdonald et al. (1983) classified adolescent females according to the quality of their diets, they found, however, that girls with poorer diets were heavier, had increased fatfold thicknesses at six body sites, and reported a greater frequency of weight reduction dieting than did the girls with good diets. Dwyer et al. (1967) also claim that dieters tended to be larger in all body measurements than non-dieters, and that the dieting practices of obese girls were different from those of the non-obese. Obese girls initiated dieting at an earlier age than their non-obese peers, and reported diets which lasted for longer time periods.

Although the relationships among weight control, diet and physical activity had been studied, specific findings concerning these relationships are limited; a possible

reason is the difficulty in quantifying physical activity. Huenemann et al. (1974) encountered this difficulty when attempting to relate physical activity to body composition, diet, and weight control efforts of adolescents; amount of physical activity had little relation to either dietary practices or to body composition.

Physical and Psychological Maturation

During puberty the adolescent experiences a growth spurt, which for girls generally begins between 10.5 and 13 years of age (Tanner, 1955). Characteristic of the female adolescent growth spurt is the attainment of menarche within one year after peak height velocity (Tanner, 1955; Frisch, 1983). In the United States the average age at which menarche is attained is between 12.3 and 12.8 years (U.S. National Center for Health Statistics, 1973; Bullough 1981). Menarche is also associated with the attainment of a critical body composition or relative level of fatness ranging from 22 to 24 percent of body weight (Frisch, 1976). Research by Frisch (1983) has shown that girls continued to increase in total and relative fatness after menarche until approximately 18 years of age, the majority of the fat gain being attained prior to 16 years of age. The drastic physical and physiological changes normally occurring during puberty are also accompanied by psychological growth and behavioral changes (Tanner, 1955; Krogmann, 1972). All the above-mentioned factors and reactions of the adolescent to

them are crucial in the individual's psychological development (Stewart and Koch, 1983). This is confirmed with research by Simmons et al. (1973), who studied 1,917 girls and boys in grades three through twelve and concluded that adolescents typically passed through a period in which the self-image was disturbed; typically between eleven and thirteen years of age.

Bruch (1973) has commented that "the preoccupation of the whole Western culture with slenderness" places an extra burden on the adolescent female in her acceptance of her changing physique and body composition. In fact, Slade and Russell (1973) and Bruch (1973) described anorexia nervosa as a disorder partially attributable to the individual's inability to cope with or accept her changing physique and body composition. Bruch (1973) also described the "thin-fat" person as a person of normal weight who exhibited anorexia-like behavior. Such a person was excessively preoccupied with weight and with food, but did not manifest the extreme emaciation characteristic of the anorexia nervosa patient. Kelly et al. (1982) suggest that negative attitudes toward physique and body weight are common in adolescent female populations.

Tobin-Richards et al. (1983), who studied feelings of physical attractiveness (body image), satisfaction with weight, perceived weight, and timing of pubertal development in urban 6th, 7th and 8th grade girls, found that girls who perceived themselves as overweight had lower

body-image scores than girls who perceived themselves as normal or underweight. These researchers also found a significant linear relationship between perceived weight and satisfaction with weight. Girls who perceived themselves as underweight were the most satisfied with their weight. Similarly, a higher body-image score was related to an increased satisfaction with weight. A girl's perception of her pubertal change (timing), as either early or late in relation to her peers, was significantly related to body-image, girls who perceived their timing to be average or average-late had the highest body image. Such observations indicate that the preoccupation with weight, and the initiation of weight control practices appear to be related to the physiological and psychological changes occurring during adolescence. Peterson (1983) has found that postmenarcheal girls were more apt to describe themselves as overweight and were more dissatisfied with their weight than their premenarcheal peers; however, because actual weights-for-heights were not obtained, it was not possible to determine the relationship between perceived and actual weight. Nevertheless, as Chandra (1981) also concluded, more information is needed concerning the physiological and psychological factors governing food intake during adolescence.

Summary

It is evident from this review of literature that large numbers of adolescent females are concerned and dissatisfied with their weight. As a result, many are actively engaged in weight control practices in attempts to modify their weights and physiques. The types of weight control practiced by this population are varied, yet some form of dietary manipulation is usually involved. Numerous factors are associated with the weight control practices of the adolescent female and the time at which she initiates such practices. Physical maturation, with its interrelationships to behaviors related to weight control, are factors which merit further examination.

CHAPTER III

METHODS AND PROCEDURES

Introduction

Data for this study were obtained from data generated by the United States Department of Agriculture-funded project S-150, Nutritional Health of Adolescent Females. The primary purpose of the S-150 project was to study the influence and interrelationships of numerous physiological, biochemical, psychological, and sociodemographic variables and their effects on the health and nutritional status of adolescent females located in the southern region of the United States. This project was a collaborative effort of researchers located in eight states which included Oklahoma. All methods, procedures, and questionnaires were specified by the project leaders, the Regional Technical Committee, and were closely adhered to by researchers in each of the states. In this study, a subsample of the S-150 data will be analyzed to identify and describe several factors relating to the weight control practices of adolescent females in Oklahoma.

Population and Sample

The adolescent females who participated in this study were obtained on a voluntary basis from selected areas in northcentral Oklahoma. Criteria for selection and recruitment of subjects included arbitrarily specified ages (between 11.5 and 16.5 years) and race (black and white), with places of residence selected to approximate the population distribution in the state. Because so few blacks are in this population, an oversampling of black adolescent females was necessary in the attempt to obtain similar numbers of blacks and whites. The initial contacts and recruitment of subjects were conducted through teachers and administrators of public schools or through other local organizations. Parents of all potential participants received letters explaing the purpose of the study and the subjects' responsibilities when they consented to participate. Written consent was obtained from all subjects and their mothers. The adolescent females desiring to participate were then screened for diabetes or other metabolic disorders; girls with any such illness were considered ineligible for the study. Out of the 150 subjects who participated in the Oklahoma S-150 project, 18 were excluded from this analysis because they failed to provide complete data.

Data Collection

All subjects participated in two data collection sessions, scheduled at least two weeks apart between

February and May of 1981. All girls and their mothers were interviewed, usually in their homes, by an interviewer trained in the area of nutrition and dietetics. In addition, each girl came on a pre-scheduled morning, usually on Saturday, to a centrally located center at either the Oklahoma State University campus, a Tulsa medical center or a public school, to participate in various types of examinations related to the assessment of nutritional status and eating practices.

During the home interview, the girl was asked to recall and describe all foods and beverages and the quantities thereof consumed on the preceding day (the 24-hour recall method). All responses were recorded on form D1 b which appears in Appendix A. To assist the girls in estimating the amounts of foods and beverages consumed, visual aids of two dimensional drawings and models of unlabeled, commonly used portion sizes were used; the visual aids were similar to those described by Moore et al. (1967). In addition, each girl was interviewed regarding her dietary habits and food consumption patterns. The questionnaire (Appendix B) employed to obtain this information specifically inquired about the weight control practices of the adolescent girl. All interviews were conducted in as private an environment as possible, and an attempt was made to establish friendly rapport, so that the subject felt at ease to respond fully to the dietary questions and to the 24-hour recall. During the home visit, the

girl's mother was also interviewed regarding the income, employment and composition of the household in which the girl lived. A copy of the questionnaire used appears in Appendix C.

During the data collection session at a central location, the girls provided a variety of kinds of information; those pertinent to this study were: the physical examination (Appendix D), a psychological test (Appendix E), a nutrition misinformation test (Appendix F), a physical activity questionnaire (Appendix G), and the measurement of selected body dimensions (Appendix H). The registered nurse or physician who conducted the physical examination also interviewed the girls regarding their menstrual cycles and the ages at which menarche was attained. Many of the girls who had not yet attained menarche by spring of 1981 participated in a follow-up study in the spring of 1983, in which menarche data were collected. From this information it was possible to determine most of the girls' menarcheal ages during the spring of 1981; premenarcheal girls who did not participate in the follow-up study were not included in this analysis.

Standing height without shoes was measured to the nearest quarter inch using a physician's scale with a sliding horizontal bar attachment specifically designed to measure height. Girls were weighed in street clothing and without shoes or accessories to the nearest quarter pound on a calibrated physician's scale. The clothing worn was recorded on

a checklist and, during the data coding process, typical weights for all articles of clothing were deducted from each individual's weight. Triceps skinfold measurements were taken on the right arm using a Lange skinfold caliper. Measurements were taken with a precision of 0.1 millimeter. The procedures used to measure triceps skinfold, as well as height and weight, were similar to those described by Jelliffe (1966).

All participants were asked to describe the frequency, duration, and intensity of 20 physical activities they might have engaged in. Their responses were recorded as the number of times per year, month or week, whether activity was engaged in seasonally or year round, and the amount of time per session, in minutes, spent in each activity, which was described as either light, moderate, or heavy on the basis of their perceptions of intensity.

Responses to the physical activity test were scored in two ways. One way represented the actual amount of time per week each girl reported to spend in physical activity which she perceived as light, moderate, or vigorous (VEX). The other physical activity score (TSCORE) was a calculated value which was an estimate of each individual's total energy expenditure in physical activity. In calculating this score, each activity was weighted as a level of intensity characteristic of the activity as well as by the level of intensity each individual reported engaging in the activity; these values, as well as the amount of time

per week spent in each activity were multiplied together and summed; the final value represented the TSCORE (Reiff et al., 1967). For this study only the VEX and TSCORE values were used in the analysis.

Each girl was also required to complete a nutrition misconception questionnaire, adapted from Wodarski (1976), which included a set of ten items regarding weight control, and a psychological test designed by Rosenberg (1965), which estimated self-esteem. Each girl was instructed to complete these written tests on her own and without consultation with her peers.

The self-esteem and nutrition misconceptions were scored according to the procedures specified by each test and subsequent statistical analysis was conducted using these scores. Each girl was asked to agree strongly, agree, disagree or disagree strongly with each statement on a 10 item Guttman scale; responses were scored to yield a 7 point scale in which 0 represented high self-esteem and 6 represented low self-esteem (Rosenberg, 1965). There were three possible responses to each question on the nutrition misconception test: true, false or don't know. Each test was scored as aggregate numbers of correct, incorrect and don't know responses on the whole test as well as number of correct, incorrect and don't know responses to each of the seven areas of nutrition misconceptions tested (Wodarski, 1976). For this study, only responses to the questions relating to the area of energy metabolism were analyzed.

Data Analysis

The 132 participants were grouped into three "maturity" groups based upon how many months prior to or past menarche each girl was at the time of the physical examination. The menarcheal age group intervals were arbitrarily determined and are delineated in Table I. Of the 132 girls, 100 had attained menarche by the examination date, between February and May 1981, and 32 had not yet done so. Menarche data collected in May 1983 permitted classification of most girls according to their menarcheal age in the spring of 1981. Of the 32 premenarcheal girls in 1981, 5 had not yet attained menarche when they were interviewed in 1983. These girls were arbitrarily assigned the value -30 months menarcheal age; the majority of statistical analyses were conducted using the three maturity groups (3-level maturity grouping) described in Table I; however, for several analyses different intervals of menarcheal ages were used. The menarcheal age intervals of each of these 4 maturity groups are also listed in Table I; whenever this maturity grouping procedure was used, it was identified as 4-level maturity grouping.

Nine questions describing the frequency and form of weight control practiced by adolescent females were selected from the Dietary Habits Questionnaire (Form D1 in Appendix B). For statistical analysis, the responses were condensed into two response levels for each question; the specific questions and the corresponding responses are listed in

Table II. The variable, energy intake, represents the mean energy provided by foods in both 24-hour recalls (Appendix A).

TABLE I

MENARCHEAL AGE CATEGORIES OF MATURITY GROUPS

Maturity Grouping	Time from Menarche
	months
Three Groups	
1	$\geq$ -30 & $\leq$ 0
2	> 0 & $\leq$ 24
3	> 24
Four Groups	
1	$\geq$ -30 & $\leq$ -8
2	> -8 & $\leq$ 8
3	> 8 & $\leq$ 26
4	> 26

TABLE II

RESPONSES TO WEIGHT CONTROL QUESTIONS

Item Number	Question	Categorized Responses 1	2
Q 44	Have you ever been on a weight-reduction diet?	yes	no
Q 45x	Who recommended the weight-reduction diet?	authority figure	self, peers
Q 46	Have you been on a diet for weight-reduction within the last year?	yes	no
Q 48x	How long does the diet usually last?	$\leq$ 6 mo.	> 6 mo.
Q 49	Have you ever been on a diet to gain weight?	yes	no
Q 51x	Who recommended the weight-gain diet?	authority figure	self, peers
Q 52x	Presently, I am trying to _____ weight.	gain or lose	neither
Q 53x	I think my present weight is _____.	about right or too light	too heavy

Prior to hypotheses testing, the distribution of socio-demographic variables among maturity groups was tested for homogeneity using the chi-square statistic (Steele and Torrie, 1980). The socio-demographic variables tested were: race, place of residence, mother's level of education, family type and per capita income. To determine whether or not each socio-demographic variable had an independent effect on the responses to each of the weight control questions, regression analysis using the general linear model (GLM from Statistical Analysis System, Helwig and Council, 1979) for analysis of variance and chi-square analysis were conducted. The categories for each socio-demographic variable examined are listed in Table III.

Because it was of interest to determine whether the weight control practices of adolescent females were related to fatness (as estimated by skinfold thickness and by weight-for-height), self-esteem, nutrition misconceptions, exercise or physical activity, and energy intake, effect of each of these variables on responses to weight control questions was tested using chi-square and/or discriminant analysis. Weight-for-height was determined by expressing the weight of each girl as a percentage of the median (50th percentile) weight for girls of the same height in the HANES 1 data published by the National Center for Health Statistics (N.C.H.S.) (1973). The anthropometric values for each girl were grouped into either high, medium, and low categories for each variable; the intervals for each

TABLE III

RESPONSES TO SOCIO-DEMOGRAPHIC QUESTIONS AND CATEGORIES OF ANTHROPOMETRIC MEASUREMENTS

Variable	Responses		
	1	2	3
Race	white	black	
Place of Residence: Population	major urban ($\geq$ 100,000)	minor urban ($\geq$ 2500 & <100,000)	rural (<2500)
Family Type: Number of Parents in Household	one	two	
Mother's Education Level: Completed High School	yes	no	
Per Capita Income (dollars/year)	<3500	$\geq$ 3500 & $\leq$ 6000	> 6000
Weight for Height (% of NCHS median for age)	< 90	$\geq$ 90 & $\leq$ 110	> 110
Triceps Skinfold (mm)	<12.5	$\geq$ 12.5 & < 21.5	$\geq$ 21.5

group were arbitrarily set and are delineated in Table III.

Descriptive statistics such as the mean, range, and frequency distribution of each variable were calculated for the population of girls studied and for each maturity group.

To test the hypothesis that the weight control practices of adolescent females are associated with menarcheal age, chi-square analysis of number of girls in maturity groups and responses given to each weight control practice question was conducted. Discriminant analysis (Morrison, 1967) was employed to determine whether chronological age, menarcheal age, or both influenced the weight control practices of adolescent girls.

For all statistical analyses, the accepted level of significance was arbitrarily set at α=0.05; occasionally, tests with probability levels greater than this were discussed, but they are not considered to give adequate certainty to be considered significant.

CHAPTER IV

RESULTS AND DISCUSSION

The major objective of this study was to determine whether physical maturation, estimated primarily by menarcheal age and secondarily by change in fatness, affects whether and when adolescent females initiate weight control. Other researchers (Dwyer et al., 1969; Hampton et al., 1966; Hinton et al., 1963; Kelly et al., 1982; Macdonald et al., 1983) have studied the weight control practices of adolescent females as a function of age and have found a significant relationship: older girls (over 14 years of age) were more likely than younger ones to be dissatisfied with their weights and also to diet to lose weight. In this study, the author attempted to clarify why chronological age has this effect on weight control practices of adolescent females. Do many girls automatically begin weight reduction diets when they become 14 years old, or are these weight control efforts triggered by the physical changes which occur as part of the normal female development? To study whether or not this was true, girls were classified according to their physical maturity using menarcheal age, time prior to or past menarche, as the indicator of maturity; and another maturity variable, fatness, was also examined for its effect on girls'

weight control practices. An attempt was also made to describe how selected socio-demographic, psychological, and behavioral variables influenced girls' weight control practices.

In evaluating the usefulness of this study one should recall that the data analyzed were not collected with the specific intent of examining the relationships among various factors and their effect on adolescent females' weight control practices; rather, they were a subset of the data generated in the more expansive research endeavor, The Nutritional Health of Adolescent Females. This has limited both the data analysis and the interpretation of the study results. Often, the specific information necessary to clarify a particular point relative to the objectives of the study was not available. This was particularly evident when an attempt was made to distinguish between the effect of menarcheal age and chronological age on weight control practices. However, in light of the objectives of this study, much more emphasis was placed on examining the effect of menarcheal age on these practices. Analyzing the data in this manner may have introduced some bias, but it was consistent with the objectives.

The Sample

Information regarding subjects' race, age, time prior to or past menarche (menarcheal age), and age at menarche was collected on a sample of 132 girls. Means for the

group as a whole, as well as for each of the 3-level maturity groups are included in Table IV.

The mean age at menarche for this sample was 12.7 ± 1.1 years, which was in line with the national average, which is 12.8 years (U.S. Center for Health Statistics, 1973). The average age (14.0 ± 1.4 years) and the range of ages (11.5 to 16.5 years) of subjects in this sample were younger than those of most other studies which have examined the weight control practices of adolescent females; these studies (Storz and Greene, 1983; Macdonald et al., 1983; Dwyer et al., 1969; Hampton et al., 1966) examined the weight control-related behaviors and attitudes of adolescent females ranging between 14 and 18 years of age.

The girls in this study were not evenly distributed between races; 25 percent were black and 75 percent were white. This unbalanced distribution reflects the low percentage of blacks in the state; even the over sampling of the black population in Oklahoma did not result in an even racial distribution. Only two premenarcheal black girls participated in this study; for this reason, no comparisons by race were made among maturity groups.

Weight Perception and Weight-for-Height

Of the 132 adolescent girls studied, 55 percent perceived their weights to be too heavy. However, 80 percent of the girls had actual weights-for-heights which were equal to or less than 110 percent of the median weight-for-height

TABLE IV

DISTRIBUTION OF SUBJECT'S RACE, CHRONOLOGICAL AGE, MENARCHEAL AGE, AND AGE AT MENARCHE BY 3-LEVEL MATURITY GROUPS FOR THE SAMPLE POPULATION

Maturity Group	Race			Chronological Age Mean ± SD	Menarcheal Age Mean ± SD	Age at Menarche Mean ± SD
	Both	Black	White			
				yrs.	yrs.	yrs.
1	32	2	30	12.4 ± .75	-1.3 ± 0.8	*
2	53	16	37	13.8 ± 1.1	1.1 ± 0.5	12.8 ± 0.9
3	47	14	33	15.2 ± 1.0	3.1 ± 0.75	12.0 ± 1.1
Total	132	32	100	14.0 ± 1.4	1.3 ± 1.8	12.7 ± 1.1 #

* could not be calculated for this group because five girls had not yet attained menarche

\# calculated for 127 girls (see * above)

on the N.C.H.S. growth charts. How girls perceived their weight was consistent with results obtained in a national survey (U.S. National Center for Health Statistics, 1975) where 48 percent of the girls between 12 and 17 years old reported wanting to be thinner than they perceived themselves to be, but were inconsistent with results obtained by Dwyer et al. (1969) and Storz and Greene (1983), who report that 80 to 83 percent, respectively, of the girls studied, desired to weigh less than they actually did. One possible reason why the girls in this study were more satisfied with their weights was that they were younger and less mature physically than were the girls studied by either of the other research groups.

However, results regarding the relationship between girls' perceptions of their weights and their actual weights were consistent with other studies (Hampton et al., 1967; Storz and Greene, 1983; Dwyer et al., 1969). In all cases, more girls perceived themselves as too heavy or overweight than would be classified as overweight, if the classification for overweight was either 110 or 120 percent above the desirable weights-for-heights.

Dietary Weight Control Practices

Of the girls studied, 44 percent reported having dieted to lose weight at some time in their lives and 48 percent reported that they were presently trying to change their weight; of these, less than 1 percent were attempting

to gain weight. Other studies reported higher frequencies of weight reduction dieting; for example, Dwyer et al. (1969) reported that 61.4 percent of the 446 girls studied had dieted to lose weight. As already mentioned, this study is based on a sample of younger and less mature girls than those of other studies; possibly this can account for many of the differences among study results.

Less than 1 percent of the girls studied had ever dieted in an attempt to gain weight; this is comparable to the 2 percent reported by Kelly et al. (1982). Because such a small number of girls had ever dieted to gain weight, further examination of the questions regarding weight gain dieting (Q44, Q50 and Q51x) were omitted from this analysis. However, one can conclude that being underweight is not a great concern for the majority of adolescent girls studied.

A more extensive discussion regarding the length and timing of weight control efforts, who recommended girls' weight reduction diets, as well as how weight control practices differed according to girls' physical maturity or age is included in the next section.

The Effect of Physical Maturation on Weight Control Practices

Menarcheal Age

A major objective of this study was to determine whether a significant relationship existed between menarcheal age and the weight control practices of adolescent

females. Discriminant analysis, where menarcheal age functioned as the independent variable and selected questions regarding weight control functioned as dependent variables, indicated that menarcheal age had some bearing on the weight control practices of adolescent females, as well as on the degree of fatness and how they perceived it; these results are included in Table V. As menarcheal age increased there was a concomitant and significant increase in "yes" responses to the question "Have you ever dieted to lose weight?" (Q44). The same relationship was observed between menarcheal age and how girls perceived their weights (Q53x); girls were more likely to perceive themselves to be too heavy as their menarcheal age increased. However, menarcheal age was not related to whether girls were presently trying to change their weights (Q52x).

Results from chi-square analysis concurred with results obtained from discriminant analysis. The proportions of girls who thought their weights were too light and/or about right or too heavy (Q53x) varied significantly among the different 3-level maturity groups (Tables VI and VII); 34 percent of the premenarcheal girls thought their weights were too heavy, and 70 percent of the girls more than 24 months past menarche thought their weights were too heavy Table VII). The distribution of girls who had ever dieted to lose weight (Q44) differed among maturity groups (Table VI). Only 25 percent of the premenarcheal girls (maturity group 1) had ever dieted to lose weight (Q44) while 48 to

TABLE V

PROBABILITY ASSOCIATED WITH SLOPES OF RESPONSES AS A FUNCTION OF CHRONOLOGICAL OR MENARCHEAL AGE ON TRICEPS SKINFOLD, WEIGHT-FOR-HEIGHT, AND WEIGHT CONTROL PRACTICES OF ADOLESCENT GIRLS (N = 132)

	Paraphrased Question	Single Variable Model		Two Variable Model	
		Chronological	Menarcheal	Chronological	Menarcheal
Q 44	Have you ever dieted to lose weight? (1=yes, 2=no)	2 0.003	2 0.014	2 0.093	 0.758
Q 52x	Are you presently trying to change your weight? (1=yes, 2=no)	0.295	0.404	0.528	0.960
Q 53x	Presently, I think my weight is _____. (1=too light or about right, 2=too heavy)	0.166	1 0.011	0.385	1 0.022
	Triceps Skinfold	1 0.028	1 <0.001	0.581	1 0.010
	Weight-for Height	0.739	1 0.025	1 0.001	2 <0.001

1 = positive slope
2 = negative slope

TABLE VI

RESULTS OF CHI-SQUARE ANALYSIS OF MATURITY GROUPS, AGE, ANTHROPOMETRIC VARIABLES AND QUESTIONS RELATED TO WEIGHT CONTROL (N = 132)

	Paraphrased Question	3-Level Maturity Group Menarche Age in Mo. (≤0, >0 & ≤24, >24)		4-Level Maturity Group Menarcheal Age in Mo. (≤ -8, > -8 & ≤ 8, > 9 & ≤ 26, >26)		Age in Yrs. (12, 14, 16)		Height-for-Weight % of NCHS Median (< 90, ≥ 90 & ≤ 110, <110)		Triceps Skinfold (< 12.5, ≥12.5 & ≤ 21.5, >21.5)	
		X^2	p	X^2	p	X^2	p	X^2	p	X^2	p
Q 44	Ever dieted to lose wt.? (yes, no)	6.29	0.043 *	10.51	0.013 *	9.30	0.010 *	9.52	0.009 *	24.427	<0.001 *
Q 45x	Who recommended wt. loss? (authority figure, self)	3.79	0.151	6.39	0.094	7.71	0.021	2.90	0.234	1.702	0.427
Q 46	Tried to lose wt. this year? (yes, no)	2.85	0.241	1.04	0.121	1.70	0.428	0.93	0.630	2.153	0.341
Q 48x	Length of wt. loss diet? (≤ 6 months, > 6 months)	2.30	0.320	2.30	0.317	2.80	0.247	3.67	0.160	2.173	0.337
Q 52x	Presently trying to change weight? (yes, no)	2.04	0.360	4.64	0.201	0.95	0.621	4.89	0.087	4.414	0.110
Q 53x	Presently, I think my weight is _____. (too light or about right, too heavy)	9.46	0.009 *	6.28	0.099	1.68	0.431	41.59	<0.001 *	27.525	<0.001 *

* = significant at $\alpha = 0.05$

TABLE VII

PERCENTAGES OF "YES" RESPONSES TO SELECTED WEIGHT CONTROL PRACTICE QUESTIONS BY MATURITY GROUPS (N = 132)

		3-Level Maturity Group (≤ 0, > 0 & ≤ 24, > 24)			4-Level Maturity Group (≤ -8, > -8 & ≤ 8, > 8 & ≤ 26, >26)			
	Paraphrased Question	1	2	3	1	2	3	4
Q 44	Ever dieted to lose wt.?	25	48	52	24	24	54	52
Q 45x	Who recommended wt. loss diet? (authority figure)	50(8)	16(25)	29(24)	60(5)	40(5)	12(25)	32(22)
Q 46	Was wt. loss diet within last year?	100(8)	80(25)	92(24)	100(5)	100(5)	76(25)	95(22)
Q 48x	Length of diet? (over 6 months)	63(8)	40(25)	32(24)	60(5)	40(5)	40(25)	35(22)
Q 52x	Presently trying to change weight?	38	52	52	29	57	48	55
Q 53x	Do you think your wt. is too heavy?	34	56	70	38	57	50	69

( ) represents total number of girls who responded to this question

52 percent of the girls in the 3-level maturity groups 2 and 3, respectively, had dieted in an attempt to lose weight (Table VII).

Another objective of this study was to pinpoint a particular menarcheal age period when girls initiated weight control practices or when weight control practices changed. To do this, girls were grouped into various menarcheal age categories and frequency distributions were tabulated. The critical age range during which girls initiated dieting to lose weight appeared to be 6 and 8 months past menarche. When girls were grouped into 13-month intervals of menarcheal age (Figure 1), 20 to 24 percent of the girls under or equal to 6 months past menarche had dieted to lose weight, while 46 to 63 percent of the girls older than this menarcheal age had done so. Furthermore, 73 percent of the girls younger than 19 months premenarche thought that their weights were about right or too light, while a minimum of only 26 percent of the girls in the interval 19 to 32 months after menarche thought their weights were about right or too light (Figure 2). However, after 32 months past menarche girls seemed to get slightly more satisfied than they were at 19 - 32 months past menarche, that their weights were not too heavy.

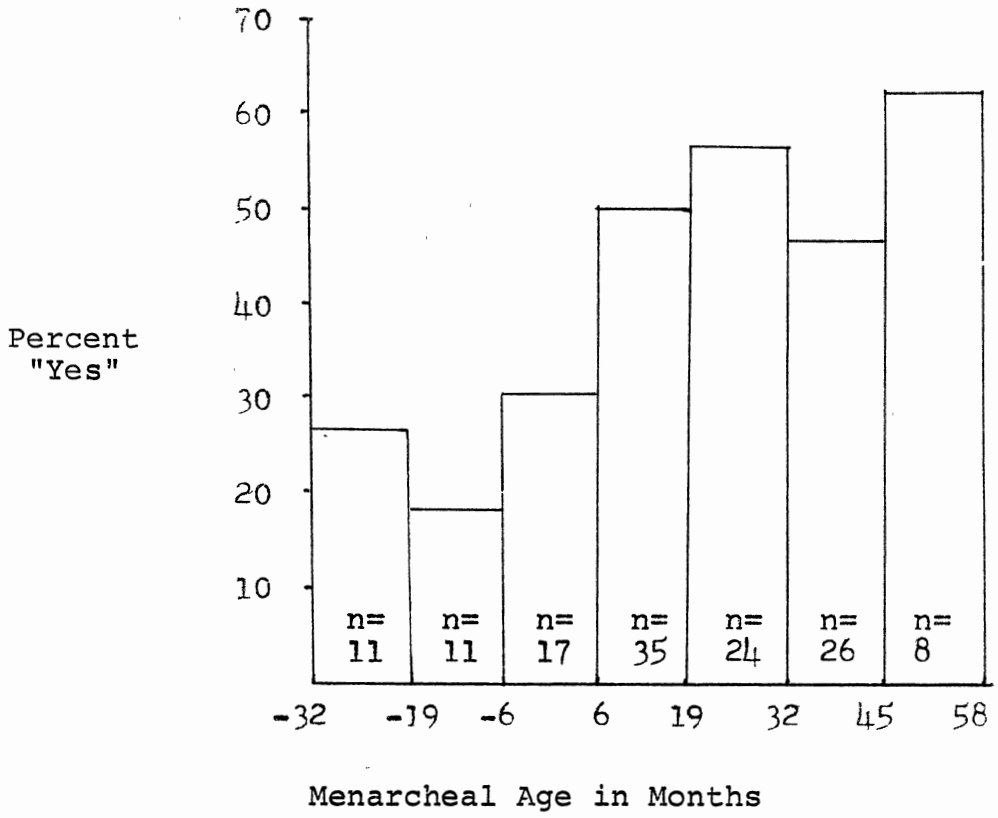

Figure 1. Percentage of "yes" responses to the question "Have you ever dieted to lose weight?", by categories of menarcheal age.

It is evident that relationships exist among menarcheal age, whether girls have ever dieted to lose weight, and how they perceived their weight. The less mature girls were the more likely they were to perceive their weight as too light or about right and the less likely they were ever to have dieted (Figure 1).

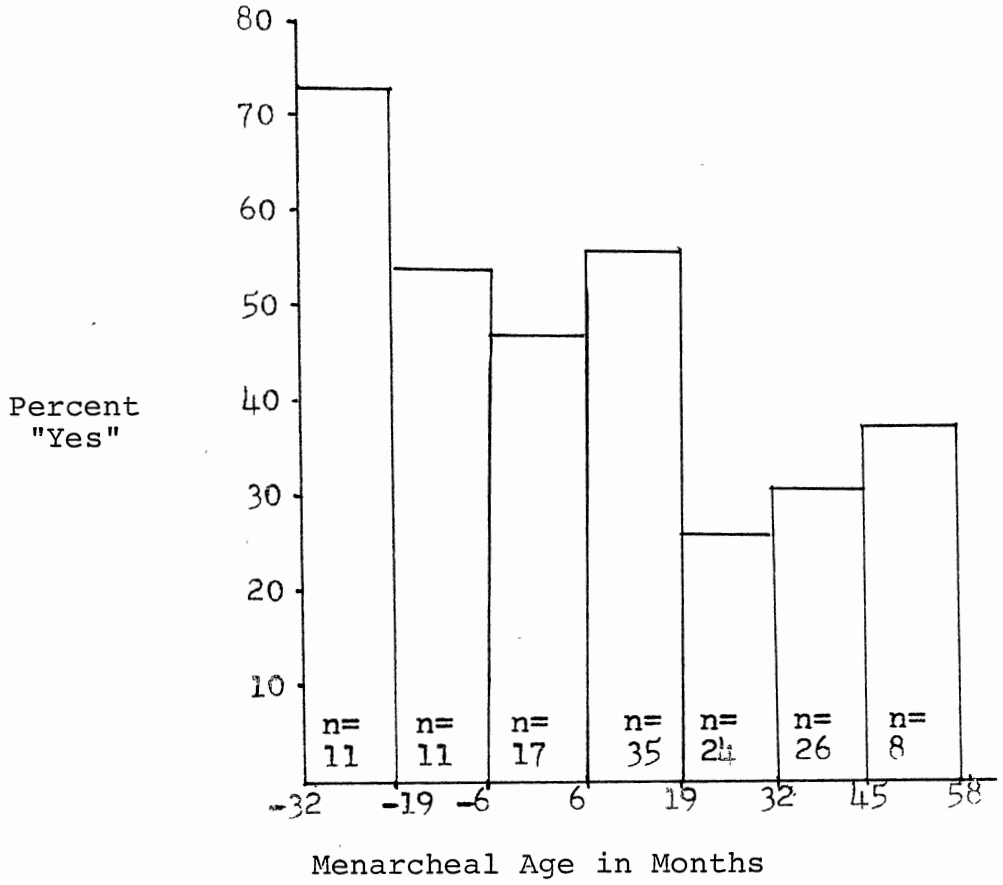

Figure 2. Percentage of "yes" responses to the question "Do you think your weight is too light or about right?", by categories of menarcheal age.

Girls' perceptions of their weights and their attempts to diet to lose weight did not always coincide. While 69 to 74 percent of the girls between 19 and 45 months past menarche felt that their weights were too heavy (Figure 2), only 46 to 57 percent of the girls in the same age intervals had ever dieted to lose weight (Figure 1). After 45 months

past menarche, 63 percent of the girls thought their weights were too heavy and were also dieting to lose weight. It is not known whether girls tried other methods of weight loss prior to dieting.

Although chi-square analysis did not disclose significant differences in the proportions of girls following weight control practices among the different maturity groups (Table VI), frequency distributions show several trends. For example, 50 percent of the eight girls who had not yet attained menarche responded that an authority figure (physician or parent) had recommended their weight loss diet (Table VII, 3-level maturity group), while only 12 to 18 percent of the girls past menarche report initiating weight loss at the advice of an authority figure. A similar trend was also observed when girls are grouped into 4-level maturity groups. Length of weight control efforts also tended to differ with menarcheal age, with 63 percent of the premenarcheal girls who reported having ever been on a weight reduction diet stating that their diets usually last more than 6 months; only 40 percent of the girls who were past menarche reported weight reduction diets which last that long (Table VII and Table VIII).

These results indicate that maturity, estimated by menarcheal age, was related to the weight control practices of the adolescent females studied. Both the incidences of weight reduction dieting and girls' perceptions of their weights as being too heavy increased as girls became more

TABLE VIII

PERCENTAGE OF "YES" RESPONSES WHERE SIGNIFICANT CHI SQUARE WAS FOUND (N = 132)

	Paraphrased Question	Age[1] (12, 14, 16) 1	2	3	Triceps Skinfold, mm (<12.5, ≥12.5 & ≤21.5, >21.5) 1	2	3	Wt.-for-Ht.,% NCHS (<90, ≥90 & ≤110, >110) 1	2	3	Place of Residence (≥100000, <100000 & ≥2500, <2500) 1	2	3	Family Type (1 parent, 2 parent) 1	2
Q 44	Ever dieted to lose weight?	26	45	63	14	36	76	26	42	68				40	64
Q 45x	Who recommended weight loss diet? (authority figure)	60 (10)	15 (27)	25 (20)											
Q 46	Was weight loss diet within last year?				66(3)	85(26)	92(28)				85(20)	100(22)	73(15)		
Q 52x	Presently trying to change weight?				28	50	56				52	34	63		
Q 53X	Do you think your weight is too heavy?				24	47	89	11	56	100					

( ) represents the total number of girls who responded to this question

mature. Although some girls initiated weight control practices prior to attaining menarche, the period which appears most common for initiating such behavior was 6 to 8 months past menarche.

With the exception of Hinton et al. (1963), other researchers have not studied the relationships among physical maturation and the weight control practices. For this reason it is difficult to compare the results of this study with those of other studies. Hinton et al. (1963) focused on examining differences in eating behaviors among early and late maturing girls and concluded that menarche and chronological age at menarche were related to eating practices; girls who attained menarche at a much younger or much older age than their peers expressed the greatest concern about their weights and had the poorest eating habits. Due to the major differences in design it is difficult to make comparisons between the studies; however, both studies do indicate that eating behaviors were in some manner related to maturity. Perhaps the link between these two variables is the change in body composition which occurs as girls become mature.

Fatness

Another objective of this study was to determine whether a change in fatness was related to the weight control practice of adolescent females. Prior to determining this relationship, change in fatness as girls matured was

first examined; both triceps skinfold measurements and weights-for-heights were used to estimate girls' fatness.

When regression analysis was used, an increase in menarcheal age was significantly related to an increase in both triceps skinfold measurements and weights-for-heights (Table V). The distribution of subjects only among high, medium and low triceps skinfold (not weight-for-height) categories varied significantly among maturity groups (Table IX).

The percentage distribution of subjects among categories of triceps skinfold measurements and weights-for-heights according to maturity groups are shown in Figures 3 and 4. Triceps skinfold measurements increased as girls became more mature (Table IX). In the 3-level maturity group 1 (Figure 3) 15 percent of the girls had a triceps skinfold (SKFD) greater than 21.5 mm while in maturity group 3, 47 percent of the girls had SKFD measurements above 21.5 mm. Within each maturity group, 53 to 70 percent of the girls were within 90 to 110 percent of the median weight-for-height (Figure 4).

Thus, girls became fatter as they became more mature, this is evident from the increase in weights-for-heights and the more dramatic increase in triceps skinfold measurements. That an increase in fatness was part of a normal maturation process, rather than anomaly of this group of girls, can be deduced from the lack of significant change among weight-for-height categories according to menarcheal

TABLE IX

RESULTS OF CHI-SQUARE ANALYSIS FOR DISTRIBUTION AMONG SOCIODEMOGRAPHIC OR ANTHROPOMETRIC CATEGORIES VS. 3-LEVEL MATURITY GROUPS (N = 132)

Variable	df	X^2	p
Race	2	7.45	0.024 *
Residence	4	2.98	0.561
Family Type	2	1.20	0.549
Mother's Level of Education	2	2.58	0.275
Per Capita Income	4	0.27	0.992
Age (3 Groups)	4	68.90	0.001 *
Weight-for-Height	4	7.71	0.103
Triceps Skinfold	4	13.28	0.010 *

* = significant at $\alpha = 0.05$

groups. Furthermore, these data were consistent with those of Frisch (1974), who documented that fatness was not only associated with the attainment of menarche, but also with other normal events of physical maturation in females. Frisch (1976) reported that a body fat content of 22 to 24 percent was critical for the initiation of menstrual cycles, and that after menarche girls normally had a 5 to 7 percent further increase in relative fatness.

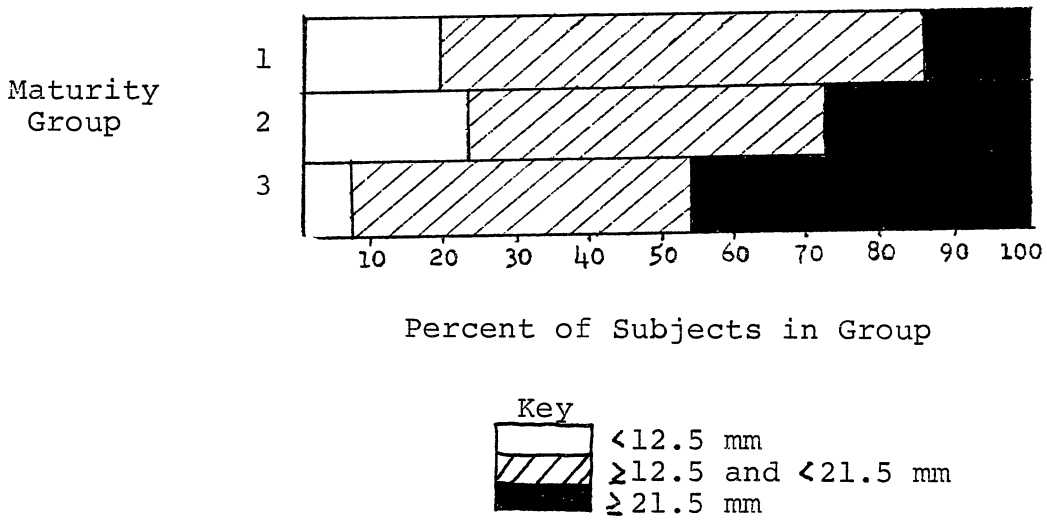

Figure 3. Distribution of subjects in various triceps skinfold categories by maturity groups, (N=132).

Whether this increase in fatness was also related to girls' weight control practices was also examined. Categories of fatness, estimated by both weight-for-height and triceps skinfold measurements, was significantly associated with whether girls had ever dieted to lose weight (Q44) and how they perceived their weights (Q53x); these findings were confirmed by both chi-square (Table VI) and discriminant analysis (Table V).

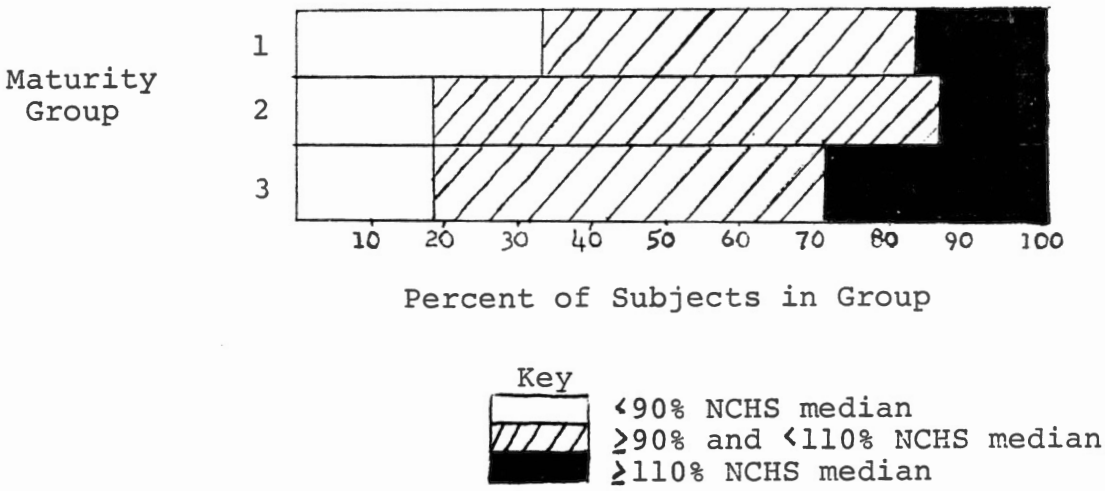

Figure 4. Distribution of subjects in various weight-for-height categories by maturity groups, (N=132).

In light of these results, the author concludes that initiation of weight control has a physiological basis. In general, as girls became more mature, they became fatter. Therefore, it may be in response to this physical change that many adolescent girls initiate weight control practices, probably in an attempt to counteract this physiologically normal increase in fatness.

Chronological Age

As expected, girls' chronological ages differed significantly among maturity groups (Table IX) and significantly affected how they responded to several questions regarding weight control (Tables V and VI). Older girls were more likely to have dieted to lose weight than were younger girls and more frequently mentioned themselves as the person who recommended their weight loss diets (Table VIII). These results are consistent with the findings of other studies regarding the weight control practices of adolescent females, (Dwyer et al., 1969; Dwyer et al., 1967; Hampton et al., 1966; Macdonald et al., 1983; Storz and Greene 1983). Thus, it is probable that the effect of age on weight control behavior may to a large degree be dependent upon physical maturation.

An attempt was made to determine whether a significant relationship, independent of chronological age, existed between menarcheal age and the weight control practices of adolescent girls. To do this, discriminant analysis using

a general linear model with both measures of age as independent variables, and selected weight control questions as the dependent variables, was conducted; results appear in Table V. In general, when both age variables appeared in the same model, the effect of either variable in a single and independent model was greatly diminished. Neither chronological age nor menarcheal age significantly affected how girls responded to the question "Have you ever dieted to lose weight?" when analyzed together in the same model, but each had a significant effect when analyzed in a single model. However, menarcheal age remained significantly related to fatness and how girls perceived their weight, independent of chronological age. That weights-for-heights were significantly related to girls' weight control practices in the 2 variable model but not in the 1 variable model, is curious; however, in the single variable model less than one percent of the variability in weights-for-heights was explained by age. Although the data indicate that maturity, estimated by menarcheal age, may have had an effect upon the weight control practices of adolescent girls which is independent of chronological age, a more in-depth analysis of this possibility was not possible with this set of data. More specific questioning about weight control practices, along with other measurements of maturity, are needed to determine more satisfactorily whether maturity affects weight control practices of adolescent girls independent of chronological age.

The Effect of Other Variables on Weight Control Practices

Socio-demographic Variables

Effects of the variables race, place of residence, mother's education, and per capita income on girls' weight control practices were also studied.

The distribution of subjects by race varied significantly among maturity groups (Table IX); however, the variable race had no significant effect on how girls responded to any of the weight control questions (Table X). These results were inconsistent with results presented by Hampton et al. (1966); these researchers found that white girls were more likely to engage in weight reduction activities and were also more likely to perceive themselves as overweight than were black girls. It is possible that the discordant findings can be attributed to sociological changes which occurred during the 20 year difference between when both studies were conducted. It is also recognized that this study may not detect racial differences due to the small number of blacks included.

The distribution of subjects among 3-level maturity groups did not vary significantly by categories of mother's level of education or by categories of per capita income (Table IX). These variables also had no significant effect upon how girls responded to weight control questions (Table X) or to fatness categories (Table XII and Table XIII).

TABLE X

RESULTS OF CHI-SQUARE ANALYSIS FOR RESPONSES TO QUESTIONS ABOUT WEIGHT CONTROL PRACTICES VS. SOCIODEMOGRAPHIC VARIABLES (N =132)

	Paraphrased Question	Race (white, black)		Mother's Level of Education (< 12 yrs., ≥ 12 yrs.)		Family Type (2 parent, 1 parent)		Residence (major urban, minor urban, or rural)		Per Capita Income (<$3500, ≥$3500 & ≤$6000, >$6000)	
		X^2	p	X^2	p	X^2	p	X^2	p	X^2	p
Q 44	Ever dieted to lose wt.? (yes, no)	0.06	0.806	0.59	0.444	4.21	0.040 *	1.81	0.404	0.17	0.920
Q 45x	Who recommended wt. loss? (authority figure, self)	0.09	0.763	0.60	0.440	0.05	0.825	2.22	0.330	0.98	0.613
Q 46	Tried to lose wt. this year? (yes, no)	0.15	0.698	1.97	0.161	1.44	0.230	6.10	0.047 *	0.18	0.912
Q 48x	Length of wt. loss diet? (< 6 months, > 6 months)	0.02	0.894	0.44	0.509	0.14	0.705	0.15	0.928	2.33	0.311
Q 52x	Presently trying to change wt. (yes, no)	2.68	0.100	0.17	0.682	0.61	0.437	6.41	0.041 *	4.75	0.093
Q 53x	Presently I think my wt. is _____. (too light or about right, too heavy)	0.01	0.944	0.50	0.480	0.73	0.393	3.22	0.200	1.88	0.391

* = significant at α =0.05 level

TABLE XI

PROBABILITIES BASED ON ANALYSIS
OF WEIGHT-CONTROL PRACTICES
AND OTHER VARIABLES
(N = 132)

	Paraphrased Question	Triceps Skinfold (mm)	Wt.-for-Ht. (%NCHS)	Self-Esteem Score	Total Exercise Score	Vigorous Exercise Score	Energy Intake (Kcals)
Q 44	Have you ever dieted to lose weight? (1=yes, 2=no)	2 0.001	2 0.001	0.147	0.395	0.655	2 0.004
Q 52x	Are you presently trying to change your weight? (1=yes, 2=no)	0.125	2 0.010	0.390	0.082	0.870	0.078
Q 53x	At present, I think my weight is _____. (1=too light or about right, 2=too heavy)	1 0.001	1 0.001	0.112	0.920	0.377	1 0.001

Continued

Question	Correct Concept	Misconception	Don't Know
Q 44	0.540	0.203	0.394
Q 52x	0.381	0.263	0.620
Q 53x	0.565	0.638	0.956

1 = positive slope
2 = negative slope

TABLE XII

CHI-SQUARE ANALYSIS AMONG SOCIO-DEMOGRAPHIC AND ANTHROPOMETRIC CATEGORIES (N=132)

Variables	Categories: Per Capita Income (< 3500, ≥ 3500 & ≤ 6000, >6000)		Family Type (1 parent, 2 parent)		Mother's Level of Education (< 12 years, ≥ 12 years)		Residence (major urban, minor urban, rural)	
	X^2	p	X^2	p	X^2	p	X^2	p
Triceps Skinfold Categories	6.31	0.177	3.95	0.139	2.39	0.312	16.62	0.002 *
Weight-for Height Categories	3.94	0.414	0.19	0.908	0.19	0.901	1.35	0.854
Family Type Categories	0.762	0.683						

* $\alpha = 0.05$

This was inconsistent with findings of several others (Bruch, 1973; Kohrs et al., 1979; and Huenemann et al. 1967) who related a higher incidence of obesity to both lower maternal education and family income, and a higher incidence of weight reduction dieting to a high socioeconomic status. However, Macdonald et al. (1983) found that neither mother's level of education or per capita income had any bearing on how adolescent females perceived their weights or attempted to modify them. Therefore, although these variables may indeed affect girls' weight control practices, the relationship was most likely not strong enough to be consistently detected.

Place of residence significantly affected how girls responded to the question "Are you presently trying to change your weight?" (Q52x), more of the rural girls answering "yes" than girls living in major or minor urban areas. Place of residence also significantly affected how girls responded to the question "Have you tried to lose weight this year?" (Q46) (Table X), more girls living in minor urban areas responded affirmatively to this question than did girls living in other areas (Table VIII). Place of residence affected girls' fatness when estimated by triceps skinfold measurements (Table XII), more girls living in major urban areas had triceps skinfold measurements which were classified as low (31 percent) than did girls living in minor urban or rural areas (2 and 9 percent respectively). However, because the distribution of girls' places of

residence did not vary among maturity groups (Table IX), it is unlikely that these results affected the relationships among maturity and girls' weight control practices.

Although the distribution of one-parent and two-parent families did not vary significantly among maturity groups (Table IX), family type did affect how a girl responded to the question "Have you ever been on a diet to lose weight?" (Q44). Girls in two-parent households were more likely to respond "yes" to this question than were girls in one-parent households (Table VIII); however, neither per capita income categories nor girls' fatness varied among family types (Table XII). While there is no evident explanation for this observation, it is consistent with findings concerning the family characteristics of girls who suffer from anorexia nervosa; this disorder was more frequent in families (two-parent is inferred) who were socially and economically "successful" and placed emphasis on the achievement of these values. In the case of the anorexic girl, the "over achieving" behavior became distorted into an abnormal preoccupation with attaining an ideal weight (Bruch, 1973).

Physical Exercise

In an attempt to relate exercise to girls' weight control practices several assumptions were made. It was assumed that if girls used physical exercise as a form of weight control, an increase in either total amount of energy

expended in physical activity (TSCORE) or amount of time spent in vigorous activity (VEX) would have followed. However, no significant relationship between selected questions regarding weight control and either estimate of physical activity was found (Table XI). The total amount of physical activity, however, may have been related ($p=0.087$) to whether girls responded affirmatively to the question, "Are you presently trying to change your weight?" (Q52x). It is possible that clearer relationships between physical exercise variables and weight control practices actually existed for this sample of girls than could be detected due to the inherent difficulties in quantifying physical exercise.

Unfortunately, girls were not directly questioned regarding how their physical activities related to their weight control practices; therefore, only inferences regarding the relationship could be made. Other researchers (Huenemann et al., 1974) have also failed to relate these variables. However, most girls in this study reported weight control efforts (dieting) which lasted less than 6 months. If amount of physical activity was actually related to weight control practices, one would expect amounts of activity to fluctuate in a magnitude similar to that of weight reduction dieting; perhaps the instruments used to quantify physical activity in both this study and that of Huenemann were insensitive to temporary fluctuation in activity which would be more characteristic of weight control.

Self-esteem

Some relationship between self-esteem and whether a girl had ever dieted to lose weight or how she perceived her weight was expected. However, discriminant analysis revealed no significant relationship (Table XI).

Data presented by Simmons et al. (1973) suggest that a high self-esteem (estimated by the same test employed in this study) was associated with adolescents' positive ratings of their physical appearance, and Tobin-Richards et al. (1983) found a high correlation between feeling of physical attractiveness and how girls perceived their weights. These data suggest that a relationship exists between self-esteem and how individuals perceive their weight. Lack of such relationship in this study may be attributed to a failure to question the girls more extensively about how they perceived their physique.

Nutrition Misinformation

Regression analysis was used to determine whether weight control practices were related to scores on a nutrition misinformation test in the area of energy metabolism. Neither the numbers of correct (correct concept), incorrect (misconception) or "don't know" responses were related to girls' weight control practices (Table XI). Other studies (Kaufmann et al., 1975; Schwartz, 1975) had indicated that nutrition knowledge or misconceptions in the area of energy metabolism increased as girls' weight reduction practices

increased. Schwartz (1975) reported that nutrition knowledge correlated with food-related attitudes and practices. Kaufmann et al. (1975) reported that obese adolescents who also dieted had more correct opinions and knowledge related to energy metabolism than did their non-obese peers. Because Kaufmann et al. (1975) studied nutrition knowledge and dieting as a function of obesity, no direct comparison between studies can be made, however, his findings do indicate that a relationship exists between these variables. Two possible explanations as to why no significant relationship was observed for this sample are that the instrument used to measure nutrition misconceptions may have been inadequate or that the lack of change in nutrition misconceptions was a peculiarity of this sample of girls.

Energy Intake

The energy intake and the relation of energy intake to weight control practices was also studied. Mean energy intakes for the population as well as for each 3-level maturity group are included in Table XIII. Energy intake decreased as girls became more mature. It is possible that this decrease in energy intake reflected the dietary weight reduction practices of the more mature girls as well as the decreased food intake necessary to maintain girls as growth slows.

Energy intake was also significantly related to how girls perceived their weights. Girls who thought their

TABLE XIII

MEAN ENERGY INTAKE OF MATURITY GROUPS
(N =132)

Maturity Group		Energy Intake Mean ± SD
	(months)	(Kcals)
1	($\geq$ -30 & $\leq$ 0)	2178 ± 801
2	(> 0 & $\leq$ 24)	1761 ± 449
3	(> 24)	1694 ± 603

weights were too heavy were more likely to report higher energy intakes than girls who thought their weights were too light or about right (Table XI). These findings are logical; a high energy intake would be consistent with a fatter physique and the girls of this sample who actually had fatter physiques accurately perceived their weights as too heavy (Table VIII). Whether or not a girl had ever dieted (Q44) was also significantly related to energy intake (Table XI); in this case, however, girls who had dieted reported lower energy intakes than those who had not. Although one would expect that a conscious attempt to lose weight would be associated with a lower energy intake, it was expected that a more significant relationship would have existed between current weight control efforts (Q52x) and energy intake; however, this was not the case.

General Discussion

As other researchers have documented, the weight control practices of adolescent girls were related to their chronological ages. However, the study indicated that chronological age per se may not be the primary factor which affects girls' weight control practices, but that these behaviors also were related, indirectly, to physical maturity. As the girls in this study became more mature (as their menarcheal age increased) their amount of body fat increased. And as girls became fatter, they also became more likely to perceive themselves as too heavy and

initiated weight control (Table VIII), even though the majority of girls would not have been classified as overweight.

About 60 percent of the girls who were over 2 years past menarche reported having dieted to lose weight at some time in their lives. The menarcheal age during which a dramatic increase in weight reduction dieting occurred was observed for girls who were 6 to 8 months past menarche. Because dietary weight control practices are often associated with nutritionally inadequate diets (Edwards et al., 1964; Schorr et al., 1972; Kelly et al., 1982) which may compromise the individuals' present, as well as future, health, the widespread weight control practices of adolescent girls is a concern. Therefore, why and when girls initiate such practices is also important.

This study indicates that girls responded to the normal physiological increase in fatness by initiating weight control practices. Although it is unlikely that nutrition education would alter which body type adolescent girls see as the ideal given the western cultural values regarding slimness and beauty, it is possible that it may have a positive influence on girls' dietary choices when they do attempt to control their weight. It is probable that the time in which girls would be most receptive to nutrition education would be when they begin to express dissatisfaction, by perceiving themselves as too heavy, and concern about their weight. For the girls in this study this time

occurred within the first year after menarche. Perhaps nutrition education in the area of energy metabolism and weight control would most appropriately be initiated with girls of this maturity status.

CHAPTER V

SUMMARY

The purpose of this study was to identify and describe how physical maturity affected the weight control practices of 132 adolescent females in Oklahoma. Two indicators of maturation, menarcheal age and change in fatness, were used to study this relation. Because maturation events are closely associated with chronological age, the effect of chronological age on girls' weight control practices was also examined. Numerous other variables (race, place of residence, family type, mother's level of education, per capita income, nutrition misconceptions, physical activity, energy intake, and self-esteem which have been associated by others with either weight control practices or dietary habits were also studied.

Subjects were Oklahoma residents between the ages of eleven and sixteen years, studied in the spring of 1981. All subjects provided a variety of information which was collected in two data collection sessions. Statistical tests were employed to evaluate the significance of the relationships found. Girls' maturity significantly affected how they responded to selected questions regarding weight control.

Girls of older menarcheal age were more likely to have engaged in weight reduction diets and to describe themselves as being too heavy than were girls of a younger menarcheal age. This was due in part to the fact that more mature girls were also fatter. The menarcheal age at which girls initiated weight reduction diets appeared to be between 6 and 8 months past menarche, and somewhere between 19 and 32 months past menarche, more girls began to perceive their weights as "too heavy". Girls' fatness, estimated by triceps skinfold measurements, increased with menarcheal age. Large triceps skinfold measurements were also related to perception of weight as "too heavy". However, weight-for-height categories, another measure of fatness, was not related to menarcheal age. Chronological age was similarly and significantly related to whether girls had ever dieted to lose weight.

When both menarcheal age and chronological age were analyzed concomitantly for their effect on weight control practices, only the relationship between how girls perceived their weight and menarcheal age was significant.

Although specific socio-demographic variables such as place of residence, family type, and per capita income affected how girls responded to three of the questions regarding weight control practices, the distribution of these variables did not differ among maturity groups. Although the distribution of races varied among maturity groups, race was not related to responses to any of the questions

regarding weight control practices. Neither self-esteem, nutrition misconceptions in the area of energy metabolism, nor physical activity was related to responses to any of the questions regarding weight control practices. Energy intake was significantly related to selected weight control practices. Girls who thought their weights were too heavy were more likely to have higher energy intakes and girls who reported having dieted tended to have lower energy intakes than those who had not.

Thus, the author concludes that differences in weight control practices observed among the different maturity groups are attributable to differences in maturity, for which chronological age is a good predictor.

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APPENDIX A

DIETARY RECALL FORM D 1b

Form D b

Subject no.__ __ __ Subject name _____

RECORD SHEET FOR DIETARY RECALL. "Tell me, beginning with the time you got up yesterday morning, everything you ate or drank until you went to bed last night."
(Bracket foods eaten together. Note carefully times of first & last meals or snacks.)

FOOD AND DESCRIPTION	AMOUNT	FREQUENCY	TIME OF DAY	PLACE

WHAT SUPPLEMENTS, IF ANY, DID YOU TAKE YESTERDAY? HOW MANY? WHAT TIME?
(Get brand name. Ask if multivitamins contain iron.)

SUPPLEMENT	AMOUNT/TABLET	NO. TABLETS	TIME OF DAY

GO TO NO. 39, page 9.

APPENDIX B

DIETARY HABITS AND FOOD CONSUMPTION QUESTIONNAIRE

S-150 REGIONAL PROJECT PAGE 9

FORM D1, CONT.

SUBJECT NO. ____ ___ STATE _____ STATION _____

39. WHEN YOU EAT SNACKS DO YOU EAT OR DRINK THEM: (ANSWER EACH ITEM BY RECORDING OFTEN = 3 NEVER = 1 SOMETIMES = 2 IN BLANKS 31-35)

A. BECAUSE YOU ARE HUNGRY? ___ 31

B. TO BE SOCIAL OR AS PART OF A SOCIAL ACTIVITY? ___ 32

C. JUST TO HAVE SOMETHING TO DO? ___ 33

D. BECAUSE YOU SEE SOMETHING THAT LOOKS GOOD? ___ 34

E. TO GAIN WEIGHT? ___ 35

F. ANY OTHER REASON VOLUNTEERED _____
(DO NOT CODE.)

40. ARE YOU PRESENTLY ON A VEGETARIAN DIET? YES = 1 NO = 2 ___ 36

41. AS A VEGETARIAN DO YOU EAT: YES = 1 NO = 2

A. EGGS? ____ ___ 37

B. MILK? ____ ___ 38

C. CHEESE? ____ ___ 39

D. FISH? ____ ___ 40

42. ARE YOU A VEGETARIAN FOR (CIRCLE ONE) ___ 41

1. RELIGIOUS REASONS
2. HUMANITARIAN REASONS
3. DISLIKE
4. ECONOMIC REASONS
5. HEALTH REASONS
6. LIFESTYLE

43. HOW LONG HAVE YOU BEEN A VEGETARIAN? _____ ___ 42 ___ 43 ___ 44
(SPECIFY TIME IN MONTHS.)

44. HAVE YOU EVER BEEN ON A WEIGHT REDUCTION DIET: ___ 45
YES = 1 NO = 2

IF ANSWER IS 'NO', SKIP TO # 49.

45. IF YES, WAS IT RECOMMENDED OR DECIDED ON PRIMARILY BY (SELECT ONE). ___ 46

1. PHYSICIAN
2. MOTHER
3. FATHER
4. SELF
5. GIRLFRIEND(S)
6. BOYFRIEND(S)
7. MEDIA

46. HAVE YOU BEEN ON A WEIGHT REDUCTION DIET WITHIN THE PAST YEAR? ___ 47
YES = 1 NO = 2

S-150 REGIONAL PROJECT PAGE 10

FORM D1, CONT.

SUBJECT NO. _____ STATE _____ STATION _____

47. HOW MANY TIMES EACH YEAR DO YOU GO ON A WEIGHT REDUCTION DIET? ___ ___ ___ 46 49 50

48. HOW LONG DOES THE DIET USUALLY LAST (SELECT ONE). ___ 51

1. LESS THAN ONE MONTH
2. ONE TO THREE MONTHS
3. FOUR TO SIX MONTHS
4. MORE THAN SIX MONTHS

49. HAVE YOU EVER BEEN ON A DIET TO TRY TO GAIN WEIGHT? ___ 52
1 = YES 2 = NO

IF ANSWER TO 'NO', SKIP TO #52.

50. HAVE YOU TRIED TO GAIN WEIGHT WITHIN THE PAST YEAR? ___ 53
1 = YES 2 = NO

51. IF YES, WAS IT RECOMMENDED OR DECIDED ON PRIMARILY BY (SELECT ONE). ___ 54

1. PHYSICIAN
2. MOTHER
3. FATHER
4. SELF
5. GIRLFRIEND(S)
6. BOYFRIEND(S)
7. MEDIA

52. ARE YOU PRESENTLY TRYING TO _____ WEIGHT? ___ 55
GAIN = 1 LOSE = 2 NEITHER = 3

53. DO YOU THINK YOUR WEIGHT IS NOW (CIRCLE ONE): ___ 56
TOO HEAVY = 3 TOO LIGHT = 1 ABOUT RIGHT = 2

54. DO YOU ADD SALT TO YOUR FOOD AT THE TABLE (CIRCLE ONE): ___ 57
ALMOST ALWAYS AND BEFORE TASTING = 4 SOMETIMES = 3
ALMOST ALWAYS BUT ONLY AFTER TASTING = 2 ALMOST NEVER = 1

55. DO YOU LIKE VERY SALTY FOODS SUCH AS SALTED NUTS, POTATO CHIPS? ___ 58
YES = 1 NO = 2

56. WHO PREPARES BREAKFAST IF YOUR FAMILY USUALLY (AT LEAST 4 TIMES EACH WEEK) HAS A PREPARED MEAL? (SELECT ONE.) ___ 59

0. MEAL IS NOT PREPARED AT LEAST 4 TIMES EACH WEEK
1. MOTHER
2. FATHER
3. GRANDMOTHER, AUNT, OR OTHER FEMALE RELATIVE
4. YOURSELF
5. OTHER CHILDREN IN THE FAMILY
6. MOTHER PREPARES FOR THE FAMILY AND THE FATHER PREPARES HIS OWN
7. EACH PERSON PREPARES HIS/HER OWN
8. VARIES FROM DAY TO DAY
9. OTHER; SPECIFY _____

S-150 REGIONAL PROJECT PAGE 11

FORM D1, CONT.

SUBJECT NO. ___ ___ STATE _____ STATION _____

57. IF BREAKFAST IS PREPARED AT LEAST 4 TIMES EACH WEEK, DOES YOUR FAMILY USUALLY EAT BREAKFAST: ___ 60

0. BREAKFAST IS NOT PREPARED AT LEAST 4 TIMES EACH WEEK
1. SEPARATELY
2. ALL TOGETHER
3. CHILDREN TOGETHER AND ADULTS TOGETHER (BUT NOT WITH CHILDREN)
4. VARIES FROM DAY TO DAY
5. SEPARATELY MONDAY TO FRIDAY AND ALL TOGETHER ON SATURDAY AND SUNDAY
6. OTHER; SPECIFY _____

58. IS AN EVENING MEAL REGULARLY PREPARED AT LEAST 4 TIMES A WEEK IN YOUR HOME? 1 = YES 2 = NO ___ 61

59. IF SO, WHO MOST FREQUENTLY PREPARES THE MEAL (SELECT ONE.) ___ 62

0. MEAL IS NOT PREPARED AT LEAST 4 TIMES EACH WEEK
1. MOTHER
2. FATHER
3. GRANDMOTHER, AUNT, OR OTHER FEMALE RELATIVE
4. YOURSELF
5. OTHER CHILDREN IN THE FAMILY
6. MOTHER PREPARES FOR THE FAMILY AND THE FATHER PREPARES HIS OWN
7. EACH PERSON PREPARED HIS/HER OWN
8. VARIES FROM DAY TO DAY
9. OTHER; SPECIFY _____

60. HOW MANY DAYS EACH WEEK DO YOU USUALLY EAT YOUR EVENING MEAL WITH MOST OF YOUR FAMILY? 0 1 2 3 4 5 6 7 ___ 63

61. HOW MANY DAYS EACH WEEK DO YOU USUALLY EAT YOUR EVENING MEAL AWAY FROM HOME? 0 1 2 3 4 5 6 7 ___ 64

62. WHEN YOU DO NOT EAT THE EVENING MEAL AT HOME, WHERE DO YOU EAT MOST FREQUENTLY? ___ 65

1. ALWAYS EAT AT HOME
2. FAST FOOD RESTAURANT OR GROCERY
3. OTHER RESTAURANT (NOT FAST FOOD TYPE)
4. VENDING MACHINE
5. A FRIEND'S OR RELATIVE'S HOME
6. OTHER, SPECIFY _____

63. IF YOUR FAMILY HAS AN EVENING MEAL PROVIDED AT LEAST 4 TIMES A WEEK DOES IT USUALLY EAT: (SELECT ONE.) ___ 66

0. EVENING MEAL IS NOT PREPARED AT LEAST 4 TIMES EACH WEEK
1. SEPARATELY
2. ALL TOGETHER
3. CHILDREN TOGETHER AND ADULTS TOGETHER (BUT NOT WITH CHILDREN)
4. VARIES FROM DAY TO DAY
5. SEPARATELY MONDAY TO FRIDAY AND ALL TOGETHER ON SATURDAY AND SUNDAY
6. OTHER; SPECIFY _____

S-150 REGIONAL PROJECT PAGE 12

FORM D1, CONT.

SUBJECT NO. _____ STATE _____ STATION _____

64. WHO DOES MOST OF THE GROCERY SHOPPING IN YOUR FAMILY? (SELECT ONE.) ___ 67

1. MALE HEAD OF FAMILY
2. FEMALE HEAD OF FAMILY
3. MALE AND FEMALE HEADS TOGETHER
4. WHOLE FAMILY
5. THE RESPONDENT
6. ONE OF THE CHILDREN OTHER THAN THE RESPONDENT
7. OTHER, SPECIFY _____

65. WHO MAKES THE MAJORITY OF DECISIONS ABOUT THE GROCERIES TO BUY? (SELECT ONE). ___ 68

1. MALE HEAD OF FAMILY
2. FEMALE HEAD OF FAMILY
3. MALE AND FEMALE HEADS TOGETHER
4. WHOLE FAMILY
5. CHILDREN
6. OTHER, SPECIFY _____

66. HOW OFTEN DO YOU HELP TO MAKE DECISIONS ABOUT WHAT GROCERIES YOUR FAMILY BUYS? ___ 69

1. NEVER
2. SOMETIMES
3. ALWAYS

D 1 ___ 3
77 78 79 80

****

THE FOLLOWING INFORMATION NEEDS TO BE ANSWERED BY THE INTERVIEWER.

A) SUBJECT'S AGE CATEGORY (CIRCLE ONE) 12 14 16 YEARS

B) YESTERDAY WAS (CIRCLE ONE) SU M TU W TH F SA

C) IS THIS RECALL BEING TAKEN ON THE DAY BLOOD IS DRAWN? (PLEASE CIRCLE)
YES = 1 NO = 2

THIS RECALL USED FORM D1.

APPENDIX C

SOCIODEMOGRAPHIC QUESTIONNAIRE

S-150 REGIONAL PROJECT — SUBJECT ___ (1-3)

FORM S 1 — STATE ___ (4)

SUBJECT _____ — STATION ___ (5)

DATE _____ — YEAR 1 OR 3 ___ (6)

SOCIO-DEMOGRAPHIC BACKGROUND INFORMATION

RESPONDENT'S RELATION TO SUBJECT_____

1. SUBJECT'S RACE
   1=WHITE 2=BLACK ___ (7)

2. LOCATION OF SUBJECT'S RESIDENCE
   1=MAJOR URBAN- GREATER THAN OR EQUAL TO 100,000
   2=MINOR URBAN- GREATER THAN OR EQUAL TO 2500 AND LESS THAN 100,000
   3=RURAL,NON-FARM- LESS THAN 2500 AND NON-FARMING
   4=RURAL,FARM- LESS THAN 2500 AND FARMING

9. WHO LIVES IN THE HOUSEHOLD WITH SUBJECT?
   (CHECK THE APPROPRIATE CATEGORY AND RECORD THE ACTUAL NUMBER)

___ FATHER	___ GRANDMOTHER(S)
___ MOTHER	___ GRANDFATHER(S)
___ BROTHER(S)	___ MALE COUSIN(S)
___ SISTER(S)	___ FEMALE COUSIN(S)
___ UNCLE(S)	___ NIECE(S)
___ AUNT(S)	___ NEPHEW(S)
___ CHILDREN OF SUBJECT	___ MOTHER-IN-LAW
___ HUSBAND OF SUBJECT	___ FATHER-IN-LAW
___ NON-RELATED MALES	___ GUARDIAN(S)
___ NON-RELATED FEMALES	___ NONE

***NOTE: CODE THE APPROPRIATE FAMILY TYPE TO THE RIGHT ___ (27)

14E. HOW MANY YEARS OF SCHOOLING HAVE YOU (THE MOTHER) COMPLETED?
   (CHECK THE HIGHEST LEVEL OF EDUCATION COMPLETED)

1= 0 TO 5	5=TECHNICAL OR VOCATIONAL SCHOOL
2= 6 TO 8	6=SOME COLLEGE
3= 9 TO 11	7=COMPLETED COLLEGE
4=COMPLETED HIGH SCHOOL	8=GRADUATE SCHOOL

___ (42)

17. GIVEN THE ABOVE INFORMATION IN QUESTION 16 WHAT IS THE SUBJECTS TOTAL GROSS FAMILY INCOME?
   (RECORD ACTUAL AMOUNT)
   ___ ___ ___ ___ ___ ___ (54-59)

18. HOW MANY PEOPLE DOES THIS INCOME SUPPORT?
   (RECORD ACTUAL NUMBER) ___ ___ (60-61)

APPENDIX D

MEDICAL HISTORY

(FIRST PAGE)

S-150 REGIONAL PROJECT — SUBJECT ___ (1-3)

FORM A2 — STATE ___ (4)

SUBJECT NO. _____ — STATION ___ (5)

DATE _____ — YEAR 1 OR 3 ___ (6)

MEDICAL HISTORY
(TO BE ASKED OF SUBJECT)

WE WOULD LIKE TO ASK YOU THE FOLLOWING QUESTIONS BECAUSE THE MENSTRUAL CYCLE AND CERTAIN DRUGS CAN AFFECT THE OUTCOME OF SOME OF THE ANALYSES WE ARE DOING. YOUR REPLIES WILL BE KEPT VERY CONFIDENTIAL.

NOTE: ASK QUESTION 1 AND 2 ONLY IF ANSWER WAS 'NO' TO QUES. 1 IN YEAR 1.

1. HAVE YOUR STARTED YOUR MENSTRUAL PERIODS? 1 = YES 2 = NO ___ (7)
   IF YES, ANSWER QUESTIONS 2-5B. (IF NO, SKIP.)

2. HOW OLD WERE YOUR WHEN YOUR MENSTRUAL PERIODS STARTED?
   AGE IN YEARS AND MONTHS _____
   (INTERVIEWER CALCULATE AND RECORD IN MONTHS.) ___ (8-10)

3. ARE YOUR MENSTRUAL PERIODS REGULAR? 1 = YES 2 = NO ___ (11)
   IF YES, WHAT IS THE LENGTH OF TIME BETWEEN THE FIRST DAY OF ONE PERIOD AND THE FIRST DAY OF THE NEXT ONE? _____
   _____ NUMBER OF DAYS.
   (INTERVIEWER CALCULATE AND RECORD. IF IRREGULAR, LEAVE BLANK.) ___ (12-13)

4. DATE WHEN LAST PERIOD STARTED _____/_____/_____
   DAY MONTH YEAR
   _____ DAY IN CYCLE.
   (INTERVIEWER CALCULATE AND RECORD. BEGIN WITH DATE LAST PERIOD STARTED AND END WITH INTERVIEW DATE.) ___ (14-15)

5. DO YOU TAKE MEDICATION FOR ANY OF THE FOLLOWING?
   IF YES TO A, B, OR C, PLEASE SPECIFY THE NAME OF THE MEDICATION.

   1 = YES 2 = NO

   A. PAIN RELATED TO MENSTRUATION SPECIFY _____ ___ (16)

   B. TO CONTROL REGULARITY OR FLOW OF MENSTRUATION
   SPECIFY _____ ___ (17)

   C. TO CONTROL ACNE SPECIFY _____ ___ (18)

6. HAVE YOU TAKEN BIRTH CONTROL PILLS? 1 = YES 2 = NO ___ (19)
   IF YES, ANSWER PARTS A-C.

   A. ARE YOU TAKING BIRTH CONTROL PILLS NOW? 1 = YES 2 = NO ___ (20)

   B. IF YOU ARE NOT TAKING THEM NOW, HOW LONG SINCE YOU STOPPED TAKING THEM?
   _____ NUMBER OF MONTHS (RECORD) ___ (21-22)

   C. IF YOU HAVE TAKEN THE PILL, WHAT IS THE TOTAL LENGTH OF TIME YOU TOOK IT?
   _____ NUMBER OF MONTHS (RECORD) ___ (23-24)

APPENDIX E

PSYCHOLOGICAL TEST

(SECTION ON SELF ESTEEM)

S-150 Regional Project Form S2-child is respondent

Subject_____

State_____ Station_____ Year 1 or 3_____

This is a study of some of your opinions. There is no right answer for any statement. The best answer is what you feel is true of yourself. Check (✓) one box after each question.

	A Strongly Agree	B Agree	C Disagree	D Strongly Disagree
1. On the whole, I am satisfied with myself.				
2. At times I think I am no good at all.				
3. I feel that I have a number of good qualities.				
4. I am able to do things as well as most people. . . .				
5. I feel I do not have much to be proud of				
6. I certainly feel useless at times				
7. I feel I am a person of worth, at least on an equal plane with others. .				
8. I wish I could have more respect for myself				
9. All in all, I am inclined to feel that I am a failure.				
10. I take a positive attitude toward myself.				

APPENDIX F

NUTRITION MISINFORMATION TEST

(QUESTIONS ON ENERGY METABOLISM)

NUTRITION INFORMATION QUESTIONNAIRE

Mark each statement "T" for true, "F" for false, or "?" if you don't understand the question or don't know the answer.

_____1. Margarine contains fewer calories than butter.

_____4. Yogurt contains practically no calories.

_____5. Polyunsaturated fats are lower in calories than saturated fats.

_____17. High protein foods such as meat and fish contain practically no calories.

_____28. The calorie requirement of the body is greatly increased by mental work.

_____29. Melba toast contains no calories.

_____40. Alcohol contains no calories because it is not a food.

_____60. Grapefruit can assist in burning up fat.

_____69. A calorie is a fatty substance found in food which causes weight gain.

_____70. Obesity is usually hereditary in adults.

APPENDIX G

PHYSICAL ACTIVITY QUESTIONNAIRE

(LIST OF ACTIVITIES AND FIRST PAGE)

LIST OF ACTIVITIES

Baseball
Basketball
Bicycling
Dancing
Racquetball
Ice Skating
Mountain Climbing or Hiking
Running
Tennis
Volleyball
Bowling
Calisthenics
Farming or Gardening
Golfing
Swimming
Soccer
Walking
Water Skiing
Roller Skating
Snow Skiing

S-150 REGIONAL PROJECT — SUBJECT ___ (1-3)

FORM A7 — STATE ___ (4)

SUBJECT NO. _____ — STATION ___ (5)

DATE _____ — YEAR 1 OR 3 ___ (6)

EXERCISE/ACTIVITY LEVELS

THE FOLLOWING SET OF INFORMATION NEEDS TO BE ASKED FOR EACH ACTIVITY WHICH THE SUBJECT HAS PARTICIPATED IN DURING THE LAST YEAR.

FREQUENCY (YEARLY BASIS)

1. ONCE OR TWICE/YEAR
2. MONTHLY
3. WEEKLY

SEASONALLY

1. YES - LESS THAN OR EQUAL TO 6 MONTHS
2. NO - MORE THAN 6 MONTHS

OF DAYS/WEEK

ANSWER ONLY IF YEARLY BASIS IS WEEKLY, BY PUTTING THE APPROPRIATE NUMBER OF DAYS.

DURATION/DAY

_____ MINUTES

INTENSITY SCALE

1. LIGHT (NOT TIRING, OR NO SWEATING)
2. MODERATE (SOMEWHAT TIRING, OR SWEATING)
3. VIGOROUS (TIRING TO EXHAUSTING, OR PROFUSE SWEATING)

****

1. BASEBALL OR SOFTBALL	-	FREQUENCY (YEARLY BASIS)	7
		SEASONALLY	8
		# OF DAYS/WEEK	9
		MINUTES	10 11 12
		INTENSITY	13
2. BASKETBALL	-	FREQUENCY (YEARLY BASIS)	14
		SEASONALLY	15
		# OF DAYS/WEEK	16
		MINUTES	17 18 19
		INTENSITY	20
3. BICYCLING	-	FREQUENCY (YEARLY BASIS)	21
		SEASONALLY	22
		# OF DAYS/WEEK	23
		MINUTES	24 25 26
		INTENSITY	27

APPENDIX H

ANTHROPOMETRIC MEASUREMENTS

S-150 REGIONAL PROJECT — SUBJECT ___ ___ ___ (1 2 3)

FORM AS-A — STATE ___ (4)

SUBJECT NO. _____ — STATION ___ (5)

DATE _____ — YEAR 1 OR 3 ___ (6)

ANTHROPOMETRIC MEASUREMENTS

MEASUREMENTS TAKEN BY: 1 NUTRITIONIST 2 ANTHROPOLOGIST 3 NURSE
4 STUDENT 5 OTHER (SPECIFY) _____ ___ (7)

NOTE: ASK SUBJECT TO REMOVE SHOES AND ALL HEAVY OUTER GARMENTS.

1. BIRTHDATE _____/_____/_____. CALCULATE AGE TO THE NEAREST MONTH. RECORD. ___ ___ ___ (8 9 10)
   MONTH DAY YEAR

2. WEIGHT _____LBS / 2.2 = _____ KG ___ ___ ___ . ___ (11 12 13 . 14)
   RECORD WEIGHT IN KILOGRAMS

3. CLOTHING ESTIMATE _____ G ___ ___ ___ . (15 16 17 . 18)
   (NOTE CLOTHING LIST IN #7)

4. HEIGHT _____ CM ___ ___ ___ . ___ (19 20 21 . 22)

5. TRICEPS CIRCUMFERENCE _____ CM ___ ___ . ___ (23 24 . 25)

6. TRICEPS SKINFOLD _____ MM ___ ___ . ___ (26 27 . 28)

7. CHECK THE CLOTHING ITEMS WORN WHEN SUBJECT WAS WEIGHED IN ORDER TO OBTAIN CLOTHING ESTIMATE. CALCULATE AND RECORD IN #3.

CLOTHING LIST:

BRA: NATURAL (25 G) PADDED (40 G)

PANTIES: NYLON (18 G) COTTON (20 G)

SLIP: FULL (110 G) HALF (80 G)

SOCKS: FOOTLESS (30 G) SHORT SOCKS (35 G) KNEE SOCKS (50 G)

SHEER HOSE: KNEE LENGTH (25 G) PANTY HOSE (60 G)

SLACKS: POLYESTER (250 G) COTTON (300 G) JEANS (440 G)

SKIRT: LIGHT (250 G) MEDIUM (300 G) HEAVY (420 G)

BLOUSE: LIGHT (100 G) MEDIUM (150 G) HEAVY (280 G)

SWEATER: LIGHT (320 G) MEDIUM (390 G) HEAVY (440 G)

BELT: LIGHT (60 G) MEDIUM (100 G) HEAVY (140 G)

OTHER: LIST AND WEIGH SIMILAR ITEMS

_____

_____

APPENDIX I

INDIVIDUAL DATA

OBS	SUBJECT	AGE	MENS	MNRK	W4	W5	W6	W8	W9	W50	W51	W52	W53	VEX	MEX	LEX	MED	FMTP	SELF_EST	WTHT	SKFD	E	CRCT_C	DKNK_C	NISC_C	PLAN C
1	1	146	2	176	2	.	.	.	2	.	.	3	2	0.0	5.5	24.4	4	1	.	85	15.5	2028	1	0	3	2200
2	2	169	1	144	1	2	1	2	2	.	.	2	3	0.0	26.6	0.0	0	1	1	89	20.2	2178	.	.	.	6500
3	3	168	2	174	2	.	.	.	2	.	.	2	3	8.5	4.6	5.5	6	4	.	109	30.8	2281	1	5	4	1000
4	4	187	1	146	1	4	1	1	2	.	.	3	3	0.0	1.0	6.2	4	1	1	94	20.0	2605	.	.	.	9300
5	5	162	1	132	1	4	1	1	2	.	.	3	3	0.0	12.1	2.5	8	1	2	113	33.5	1170	.	.	.	8500
6	6	189	1	151	1	4	1	1	2	.	.	2	1	0.1	32.0	15.3	4	4	.	89	13.5	1622	4	1	5	4000
7	8	193	1	164	1	4	1	1	2	.	.	2	3	0.0	2.5	6.8	6	1	0	101	30.5	1078	.	.	.	4167
8	10	163	1	132	1	1	1	2	2	.	.	2	3	8.1	6.7	16.2	6	1	3	125	34.0	1195	2	7	1	20000
9	11	189	1	152	1	2	1	3	2	.	.	2	3	0.0	4.1	17.1	5	1	.	107	40.4	1109	4	2	4	10000
10	12	193	1	139	1	4	1	1	2	.	.	3	3	0.0	0.0	1.3	4	4	2	104	30.0	1271	2	7	1	2500
11	13	172	1	133	1	4	1	1	2	.	.	3	3	0.0	1.4	3.6	6	1	2	109	27.2	1572	5	5	0	6400
12	14	165	1	155	2	.	.	.	2	.	.	1	2	0.2	13.4	2.5	7	1	2	80	15.4	2368	3	4	3	10000
13	15	164	1	155	2	.	.	.	2	.	.	3	2	1.0	5.0	0.3	4	1	.	105	16.8	2124	7	1	2	10000
14	16	162	1	142	1	4	1	2	2	.	.	3	3	0.0	4.8	0.6	5	1	0	107	23.8	1132	3	2	5	10354
15	17	175	1	150	2	.	.	.	2	.	.	3	3	0.0	49.3	4.1	5	4	0	94	20.8	2188	.	.	.	1500
16	18	162	1	144	1	4	2	1	2	.	.	3	2	0.8	1.5	1.2	5	1	5	91	17.2	1005	3	6	1	8000
17	19	149	2	154	2	.	.	.	2	.	.	3	3	3.5	4.8	10.0	6	1	1	93	15.0	1628	1	5	4	3500
18	20	165	2	195	1	4	1	2	2	.	.	2	3	2.0	15.0	3.4	6	4	1	115	20.5	2915	3	1	6	3240
19	21	193	1	167	1	4	1	1	2	.	.	2	3	0.0	0.3	2.2	6	1	2	96	26.0	1291	.	.	.	4167
20	22	193	1	160	2	.	.	.	2	.	.	3	2	0.1	5.3	0.1	4	1	1	88	21.0	2035	3	5	2	7200
21	23	179	1	150	.	.	.	.	.	.	.	.	.	.	.	.	5	1	1	100	27.2	949	.	.	.	5200
22	24	174	1	168	1	4	1	1	2	.	.	2	3	0.0	1.4	10.5	3	1	2	97	19.5	1198	.	.	.	5750
23	25	173	1	150	1	4	1	1	2	.	.	3	2	0.0	3.6	0.1	6	1	0	97	20.2	1085	6	0	4	5040
24	26	198	1	149	2	.	.	.	2	.	.	3	2	5.0	9.4	3.8	6	6	.	80	18.2	2488	8	1	1	6000
25	27	173	1	132	1	4	1	2	2	.	.	3	3	0.2	15.8	0.9	4	4	2	127	40.2	818	5	2	3	8000
26	28	195	1	155	1	1	1	1	2	.	.	3	3	0.1	0.0	0.0	5	1	.	115	36.0	2512	8	0	2	3950
27	29	164	1	144	2	.	.	.	2	.	.	3	3	0.0	6.5	2.8	4	1	4	101	22.2	1138	4	4	2	8667
28	30	173	1	165	2	.	.	.	2	.	.	3	3	0.0	3.3	6.7	4	4	2	100	20.0	1483	.	.	.	1167
29	32	188	1	164	1	4	1	2	2	.	.	3	2	18.0	5.9	7.4	8	1	1	87	13.5	2067	4	6	0	11250
30	34	188	1	182	2	.	.	.	1	1	4	3	3	7.5	3.4	6.1	7	1	1	90	5.0	2458	4	3	3	8571
31	35	172	1	151	1	4	2	1	2	.	.	3	3	1.0	5.7	11.2	4	4	2	102	18.0	1673	2	0	8	8032
32	37	189	1	165	1	4	1	1	2	.	.	2	3	0.6	8.1	10.1	5	1	.	105	20.8	1976	.	.	.	2857
33	38	146	2	150	2	.	.	.	2	.	.	2	2	0.0	18.2	14.2	3	1	3	99	19.0	2373	7	0	3	1349
34	39	168	1	154	1	4	1	1	1	1	1	2	3	26.5	16.8	19.0	3	1	.	96	22.0	2538	3	2	5	1349
35	40	140	2	170	1	2	1	2	2	.	.	2	3	0.0	2.8	26.4	6	1	.	116	20.0	1382	4	3	3	5100
36	41	147	1	138	1	1	2	1	2	.	.	3	3	0.0	5.3	15.3	1	4	1	130	34.7	1472	3	5	2	4334
37	42	169	1	142	1	4	1	2	2	.	.	2	3	0.0	29.7	0.1	4	1	4	151	42.2	1657	5	0	5	4667
38	43	140	2	150	2	.	.	.	2	.	.	3	1	0.0	5.9	3.5	0	1	.	91	14.7	2479	0	7	3	8000
39	45	188	1	143	1	4	1	4	2	.	.	2	3	4.0	25.2	11.5	4	1	2	96	18.0	1723	3	2	5	7000
40	46	171	1	161	1	4	1	1	2	.	.	2	3	10.1	9.5	4.8	7	1	2	93	25.7	1643	3	4	3	8000
41	47	191	1	156	2	.	.	.	2	.	.	3	2	3.3	11.1	1.2	7	1	0	97	26.7	1735	3	3	4	8000
42	48	190	1	144	1	4	1	2	2	.	.	2	3	6.4	40.8	2.4	6	1	.	98	30.0	1418	4	0	6	5917
43	49	196	1	162	1	4	1	1	2	.	.	2	3	2.8	28.9	25.1	6	1	.	84	15.0	822	6	2	2	5000
44	50	174	1	134	2	.	.	.	2	.	.	2	3	1.2	5.8	10.1	4	1	1	130	22.5	948	4	5	1	5000
45	51	150	2	162	2	.	.	.	2	.	.	3	2	1.9	7.4	21.0	4	1	0	92	14.2	2052	3	5	2	9007
46	52	148	2	152	2	.	.	.	1	.	.	2	2	2.0	14.0	17.1	4	1	2	97	13.2	4478	.	.	.	6667
47	53	190	1	149	2	.	.	.	2	.	.	3	3	4.0	0.6	3.0	5	1	1	101	21.0	1551	5	2	3	8250
48	54	186	1	177	1	4	1	1	2	.	.	3	2	2.6	7.5	1.1	5	1	2	79	12.2	1081	6	2	2	5000
49	55	150	2	162	1	2	1	1	2	.	.	3	3	10.8	3.7	0.0	7	4	3	116	30.2	1690	0	5	5	8000

OBS	SUBJECT	AGE	MENS	MNRK	Q44	Q45	Q46	Q48	Q49	Q50	Q51	Q52	Q53	VEX	MEX	LEX	MED	FMTP	SELF_EST	WTFHT	SKFD	E	CRCT_C	DKNW_C	MISC_C	PCINC
99	118	153	1	138	1	2	2	2	2	.	.	2	3	0.0	13.4	0.5	6	2	1	100	22.8	1315	3	2	5	5400
100	119	144	2	146	2	.	.	.	2	.	.	3	2	0.2	4.7	0.6	6	1	1	88	17.5	1879	3	5	2	5100
101	120	193	1	160	2	.	.	.	2	.	.	2	2	17.5	1.0	0.0	4	1	1	83	22.0	2074	4	3	3	1478
102	121	190	1	166	2	.	.	.	1	2	.	3	2	3.9	5.2	10.0	3	1	3	96	10.0	1640	4	3	3	1500
103	142	196	1	150	1	2	1	.	2	.	.	2	3	0.0	8.3	0.8	4	1	.	110	22.0	1702	2	3	5	5000
104	143	162	1	152	.	.	.	.	.	.	.	.	.	2.7	6.8	12.6	4	1	2	134	25.0	1288	5	0	5	13000
105	144	180	1	155	1	4	2	1	2	.	.	3	2	0.0	33.5	49.5	2	4	.	103	9.2	2219	4	1	5	4572
106	145	158	1	132	2	.	.	.	2	.	.	3	3	1.9	26.3	0.3	6	1	2	119	22.2	2167	1	3	6	3840
107	146	166	1	108	2	.	.	.	2	.	.	3	2	9.1	1.4	0.0	4	2	2	101	14.3	2020	5	3	2	6800
108	147	169	2	166	2	.	.	.	2	.	.	2	3	16.1	3.0	0.0	6	1	3	109	19.0	1418	4	0	6	5714
109	148	175	1	146	2	.	.	.	2	.	.	2	3	0.0	1.2	3.6	4	1	2	96	15.2	1072	4	1	5	1606
110	149	167	1	133	1	4	1	1	2	.	.	2	3	0.0	10.1	5.1	6	1	1	112	21.1	2099	6	0	4	6250
111	150	169	1	154	2	.	.	.	2	.	.	3	2	0.0	10.2	0.1	6	1	1	102	21.0	2063	3	1	2	13500
112	151	170	1	142	2	.	.	.	2	.	.	3	3	0.0	1.9	2.1	6	1	1	121	29.5	1745	3	2	1	5750
113	152	172	1	138	2	.	.	.	2	.	.	2	3	0.0	7.1	16.9	6	1	.	120	22.4	748	1	6	3	7000
114	153	177	1	150	2	.	.	.	1	1	2	1	1	1.9	5.3	1.0	7	4	1	87	14.0	2625	3	4	3	5730
115	154	173	1	160	2	.	.	.	2	.	.	3	2	0.0	0.0	2.5	4	1	0	108	21.2	1214	3	4	3	5833
116	155	189	1	156	1	4	1	1	2	.	.	2	3	6.0	3.3	1.4	4	4	1	100	11.3	2482	4	4	2	800
117	156	173	1	138	2	.	.	.	2	.	.	2	2	0.0	1.5	1.9	4	1	.	90	20.1	1905	3	5	2	4505
118	157	175	1	154	1	2	1	2	2	.	.	2	3	0.0	9.2	0.0	6	4	5	106	21.1	1331	3	4	3	9220
119	158	171	1	149	2	.	.	.	2	.	.	2	3	0.0	1.7	0.4	4	1	3	96	18.5	1852	4	2	4	2443
120	159	192	1	140	1	4	1	1	2	.	.	3	3	1.8	6.6	0.1	5	1	.	101	22.0	1755	5	4	1	.
121	101	143	2	173	2	.	.	.	2	.	.	3	2	5.2	5.5	0.6	5	1	0	84	17.5	1118	1	7	2	7875
122	162	191	1	151	2	.	.	.	2	.	.	3	2	7.8	17.6	21.0	8	4	.	95	15.2	1556	5	3	2	6250
123	163	146	1	132	1	7	1	2	2	.	.	2	3	9.9	8.9	2.7	3	4	0	107	23.2	1807	1	3	3	6900
124	166	156	1	152	2	.	.	.	2	.	.	2	3	6.4	29.0	5.4	6	1	4	103	16.2	2575	4	4	2	8000
125	167	186	1	149	2	.	.	.	1	1	4	1	1	7.0	19.2	10.5	7	1	.	88	12.2	2007	2	3	5	5000
126	168	149	1	138	2	.	.	.	2	.	.	2	3	0.0	2.0	0.1	6	1	.	119	19.1	2099	1	7	2	3327
127	169	172	1	155	2	.	.	.	2	.	.	3	3	3.8	16.1	0.0	6	1	0	93	17.5	2349	7	1	2	8100
128	170	168	1	157	2	.	.	.	1	1	4	3	2	0.0	8.5	6.0	6	3	.	81	12.2	1638	0	10	0	4333
129	171	194	1	158	2	.	.	.	2	.	.	2	3	3.8	6.0	14.7	6	1	.	106	16.0	1844	3	3	4	5400
130	172	178	1	138	2	.	.	.	2	.	.	3	3	1.2	14.3	2.0	7	1	1	134	20.2	1481	4	3	3	7500
131	173	190	1	145	2	.	.	.	2	.	.	2	3	1.4	9.4	21.5	4	1	1	97	14.3	1330	5	3	2	5000
132	174	191	1	173	1	4	1	1	2	.	.	3	2	0.1	1.8	14.4	8	1	0	84	15.3	1205	4	5	1	4000

VITA 2

Sylvia Maria Geiger

Candidate for the Degree of

Master of Science

Thesis: INFLUENCE OF MENARCHEAL AGE AND OTHER VARIABLES ON WEIGHT CONTROL PRACTICES OF ADOLESCENT FEMALES IN OKLAHOMA

Major Field: Food, Nutrition and Institution Administration

Biographical:

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