# INFLUENCES OF LIFESTYLE PATTERNS ON DIET

By

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ON DIET

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# CHAPTER I

#### INTRODUCTION

Knowledge, attitudes, beliefs and behaviors interrelate and play a major role in influencing nutrition and lifestyle choices. The leading causes of death related to diet and lifestyle choices are coronary heart disease, some types of cancer, stroke, and diabetes (DHHS, 1991; Rosenberg, Ventura, Maurer, et al., 1996). Researchers have found that dietary factors such as diets high in saturated fat, excess weight, hypertension, smoking, and a decrease in physical activity are associated with these causes of death (Frazao, 1995). Unhealthy diets and lack of physical activity account for at least 300,000 deaths each year and increase one's risk for an array of chronic diseases (DHHS, 1997).

Health behaviors may be interrelated (Patterson, Haines, Popkin, 1994B). Individuals with good health practices or poor health practices probably would act in the same way towards other health behaviors. For example, if a person consumes a healthy diet they probably exercise. Some health educators believe in the unidimensionality of health choices. This belief reflects a cognitive or rational approach to health choices. These educators believe if consumers change one component of their lifestyle that would lead to other positive changes. For example, if they improve their eating habits, it may lead to other lifestyle changes such as an increase in physical activity.

Biological factors that may play a role in smoking, alcohol, and physical activity may also play a role in influencing other health behaviors. Some

examples of these biological factors are that smoking can counteract the depressant effects of alcohol, and heavy smoking may discourage physical activity due to decreased lung function (Patterson et al., 1994B).

Diet quality, cigarette smoking, alcohol consumption, and physical activity are personal health practices that significantly impact health status. These behaviors are targeted nationally by Healthy People 2000 and locally by many health promotion/disease prevention programs (Patterson et al., 1994B).

People should be aware of the relationship between health and diet.

Knowledge, attitudes, beliefs and behaviors related to diet, nutrition and other health issues can influence the eagerness and ability of individuals to practice dietary recommendations and follow healthier lifestyles (FASEB, 1995). Other underlying factors that may influence health behavior choices include demographics such as age, gender, and socioeconomic status (Patterson et al., 1994). By examining the relationship between knowledge, attitudes, beliefs and behaviors of individuals with known socioeconomic and demographic characteristics, and the nutritional and health status of these individuals, a multidimensional profile of the population and various subgroups can be used to design relevant health promotion strategies (FASEB, 1995).

In this study, we measured the relationship of lifestyle patterns to diet quality, nutrition-related knowledge, attitudes, beliefs and behaviors using the 1994 Continuing Survey of Food Intake by Individuals (CSFII) and the Diet and Health Knowledge Survey (DHKS). An examination of these factors will show the association of diet and health choices.

#### CHAPTERIL

# Specific Research Questions;

What is the relationship between lifestyle patterns (smoking, alcohol consumption, and physical activity) and diet quality?

What is the relationship between lifestyle patterns and knowledge about food?

What is the relationship between lifestyle patterns and attitudes towards food/nutrition?

What is the relationship between lifestyle patterns and beliefs about diet and health?

What is the relationship between lifestyle patterns and food preparation behaviors?

The 1994 CSFII and DHKS data will be studied. These studies were conducted by the United States Department of Agriculture (USDA). The objectives of these surveys were to measure the amounts and kinds of foods Americans eat and measure knowledge and attitudes regarding diet and health (USDA, 1997). The CSFII/DHKS were specifically designed to link attitudes and knowledge about healthy eating with food preferences and nutrient intakes (USDA, 1997).

#### CHAPTER II 2 drinks per week, and smoked 1 connecte a

# BACKGROUND AND REVIEW OF THE LITERATURE

# Lifestyle Patterns

The following section will show how lifestyle patterns (physical activity, smoking, and alcohol consumption) relate to diet quality, knowledge, attitudes, beliefs and behaviors.

Patterson et al. (1994B) studied health lifestyle patterns using cluster analysis to create subgroups with similar behavior patterns. The sample (n=5,484) consisted of US adults (21 years and older) that completed 3 days of food intakes in the Nationwide Food Consumption Survey of 1987-1988. The subjects were put into subgroups based on similar health behavior patterns including diet quality, alcohol consumption, cigarette smoking, and physical activity. The subgroups were characterized by age, gender, race, income and education because these factors influence health practices.

The seven cluster groups identified by cluster analysis were health promoting, good diet, fitness, passive, drinking, smoking, and hedonic. The health promoting lifestyle group had a very good diet, were very active, had 3 drinks per week, and smoked 1 cigarette per day. The good diet lifestyle group had a good diet but were least active of the lifestyles, had 1 drink per week and also smoked 1 cigarette per day. The fitness lifestyle group had a poor diet but

were the most active, consumed 2 drinks per week, and smoked 1 cigarette a day. The passive lifestyle cluster had the worst diet quality, very low physical activity, 4 drinks per week and smoked 1 cigarette per day. The drinking cluster had fair diet, moderate activity levels, drank 21 drinks per week and smoked 6 cigarettes a day. The smoking lifestyle had a poor diet, were very sedentary, drank 2 drinks per week and smoked the most cigarettes per day. The hedonic group had a fair diet, moderate activity, drank the most per week and smoked 19 cigarettes per day.

The authors tested the ability of the clusters to describe BMI and supplement use. The results regarding BMI and vitamin/mineral supplement use indicated that subjects with lower BMIs consumed more supplements than subjects with higher BMIs. The good diet, fitness, passive, drinker and smoking groups had higher BMIs than the health promoting group. The good diet, drinker, passive, smoker and hedonic groups consumed fewer supplements than the health promoting groups.

Davis et al. (1994) studied the relationship between health behavior risk factors (smoking, drinking, physical activity and body weight) and mortality by age and gender. The subjects were 6,109 adults ages 45-74 years who were followed during the 1982-1984 NHANES I Follow-up Study. They found for men ages 45-54 and 65-74 years, smoking and less nonrecreational physical activity were predictors of dying sooner than those who didn't smoke and were more active. Also for older men, drinking and low BMI were associated with shorter survival time. For women, smoking and higher BMI were associated with less

survival time for the 45-54 year old age group. For older women less nonrecreational physical activity and low BMI were associated with shorter survival time.

## Demographics

The Patterson et al. (1994B) study showed those subjects in the good diet cluster were older and those in the fitness and hedonic lifestyles were younger. Hedonic and drinking lifestyles had the highest percentage of males, and females made up the majority of the good diet lifestyle. More blacks than the sample average were in the good diet and passive lifestyles. People with the highest income were in the health promoting and drinking lifestyles. Low income and low education were both associated with passive and smoking lifestyles. The subgroups with the highest levels of education were the health promotion and fitness lifestyle groups.

Murphy et al. (1992) studied 5,884 adults who participated in the 19871988 Nationwide Food Consumption Survey to determine the demographic and
economic factors associated with diet quality using a 1-day dietary recall and a
2-day dietary record. They found just a few differences in regards to race,
income, education and age. The mean number of low-intake nutrients (less than
67% of the RDA) was low in the oldest men and high in the youngest women.
Twenty-two percent of the subjects reported diets with no low-intake nutrients.
The mean percent of energy from fat was similar in all age and sex categories.
Women were more likely than men to consume diets less than or equal to 30%

of energy from fat. The youngest men who lived in households with incomes below poverty levels had 2.2 more low-intake nutrients than the average diet. In the older age groups (25-50 years, 51+ years), black men and women had a higher number of low-intake nutrients than whites. Years of education was a significant negative predictor of the number of low-intake nutrients for the two older age groups.

Huddy et al. (1996) studied 2,772 university faculty and staff to determine differences in health risks and perceptions between males and females and between the university population and the general population. Both males and females of the university population smoked less; consumed less alcohol; ate more grains, fruits and vegetables; ate a lower fat/cholesterol diet; and had lower blood pressure than males and females of the general population.

Kant et al. (1991) studied the dietary diversity of 11,658 black and white adults aged 19 to 74 years. Twenty-four hour dietary recalls were obtained from the respondents during the second 1976-1980 National Health and Nutrition Examination Survey (NHANES). A Food Group Score and a Serving Score were calculated to assess food consumption. A Food Group Score counts the number of food groups consumed daily and the Serving Score compares the subjects intake to the desired number of servings from each food group. A third of all the subjects reported eating foods from all food groups in the minimum recommended amount. Blacks scored lower on both scores than whites. As age increased among black men, the Mean Serving Score decreased. Older white women had higher Serving scores than the younger women. For all the sex-race

groups, the Food Group and Serving scores increased with increasing incomes and levels of education. Most men and blacks consumed no fruit on the survey day and consumption decreased with age. Blacks were less likely to consume dairy products than whites. Subjects that had higher levels of education and income ate more servings from the dairy, fruit and vegetable groups than those with lower education and income.

Smith et al. (1995) studied the socioeconomic status (SES) and personal characteristics of 249 male and female volunteers (age 18 years and older) to determine predictors of dietary change. These changes included change in usual food intake, dietary changes, and dietary stages of change. A food - frequency questionnaire was completed by the subjects. Almost half of the subjects held high occupational positions. There were no differences in SES between those that made two or more dietary changes and those who made fewer changes. There was no association between gender and dietary change.

Gates and McDonald (1997) used the 1989-1991 CSFII/DHKS to study 3,133 African-American and white women's nutrient intakes using one 24-hour dietary recall and 2-day food records. The African-American women were less educated and younger than the white women. More African-Americans were at or below the poverty level. They had higher BMI than white women. White women had higher intakes of energy and saturated fat than African-American women. For both groups of women, less than one-third met recommendations for consuming less than 30% of energy from fat and less than 10% energy from saturated fat. African-American women consumed higher cholesterol intakes

than white women. White women were more likely to meet guidelines for any cholesterol (less than 300 mg per day), potassium, calcium, and magnesium than African-American women. African-American women were more likely to indicate their diets should be lower in total fat, saturated fat, cholesterol, and salt or sodium than white women. White women were more aware of the relationship between health problems and consumption of fat and cholesterol than African-American women. White women were more likely to agree that diet can cause health problems than African-American women. African-American women were more likely than white women to agree that there are too many recommendations about healthy diets.

Patterson and Block (1988) studied 11,658 black and white adults (aged 19-74) from the second National Health and Nutrition Examination Survey 1978-1980. The authors used a 24-hour dietary recall to examine the diet in relation to the cancer dietary guidelines. Blacks had a higher consumption of cruciferous vegetables than whites, and consumption increased with age for both groups. Young white males had the lowest consumption of fruits or vegetables rich in vitamins A and C, and consumption was higher in blacks in all age groups than whites. Vitamins A and C consumption increased with age in both genders and races. Whites consumed more high fiber cereals and whole grain breads than blacks. The young subjects in both race and gender groups consumed at least one serving of red meat per day. Blacks consumed more fish and poultry than whites. Whites consumed more red meat than blacks. Almost half of all males consumed at least one serving of breakfast or lunchmeat per day. Subjects with

higher incomes consumed more garden and cruciferous vegetables, all fruits, and fruits and vegetables high in vitamin A and C than lower income subjects. Subjects with lower incomes ate less high fiber cereals and whole grain breads than those with higher incomes. Higher income whites consumed more of these products than higher income blacks. Individuals from both races with higher incomes consumed more red meat than subjects from lower incomes.

## Influences of Lifestyle Patterns on Diet

## Smoking

Studies have shown that heavy smokers have a lower health conscience score when compared to light smokers (Smith, Johnson, Wang, 1997). Smith et al. (1997) used the 1989-1990 CSFII-DHKS information to examine the association between smoking and health attitude awareness and knowledge of low-income parents. They found that heavy smoking was associated with negative attitudes toward the importance of food and nutrients needed for a healthy diet. Knowledge about health consequences of smoking were significantly higher in whites than in blacks. Age and education were positively related to knowledge scores. Heavy smokers engaged in risky health behaviors including poor diet and sedentary physical activity. Heavy smokers in low-income households consumed more energy, saturated fat, and sodium and less

importance of including certain foods and nutrients for a healthy diet.

Cade and Margetts (1991) found men who smoked had higher energy intakes and ate more fat and carbohydrates than non-smokers. In women the percent of energy from protein, fat and carbohydrate was similar between smokers and non-smokers. They also found that smokers consumed more sugar and alcoholic beverages than non-smokers. Smokers had lower intakes of total fiber and vitamin C. Current smokers had lower body mass indices (BMI) than non-smokers.

Larkin et al. (1990) evaluated 1-day food records from 1,338 women, aged 19 to 50 who participated in the 1985 CSFII. Smokers consumed significantly fewer fruits and vegetables and had significantly higher intakes of eggs, sugars, soft drinks, coffee and alcoholic beverages than non-smokers. Dietary fiber, protein, vitamin C and thiamin intake was also lower in smokers. Cholesterol intakes were significantly higher in smokers.

McPhillips et al. (1994) obtained a 24-hour dietary recall from 1,640 randomly selected men and women ages 18 to 64. They found that smokers consumed more energy, fat, alcohol and caffeine than non-smokers. Women smokers consumed fewer fruits and vegetables and had lower intakes of vitamin C than non-smokers. Smokers had lower BMIs than non-smokers. Both men and women smokers consumed more cholesterol and caffeine and less dietary fiber.

Morabia and Wynder (1990) studied 7,860 men and women using a food frequency questionnaire. They found that smoking was positively related to meat consumption. Both males and females who smoked consumed fewer fruits and vegetables and more alcohol and coffee than nonsmokers.

In the study conducted by Subar et al. (1990) 11,260 adults ages 19-74 years completed a 24-hour dietary recall. They found smokers consumed more alcohol and coffee, and exercised less than non-smokers. The smokers also consumed fewer fruits and vegetables, high fiber grains, low fat milk and vitamin and mineral supplements than non-smokers. The subjects who smoked also had lower vitamin C, folate, fiber and vitamin A intakes than non-smokers.

Margetts and Jackson (1993) divided 1,842 subjects into groups according to smoking status (non-smokers, light or heavy smokers). Subjects recorded all foods and drinks consumed for seven days. Heavy smokers ate more sugar and meat and less high fiber cereals and fruits than non-smokers. Smokers had lower intakes of protein, carbohydrates, fiber and ascorbic acid. The smokers were also more likely to drink alcohol than non-smokers.

Hebert and Kabat (1990) administered food frequency questionnaires to 1,426 males and females. They found smokers had decreased intakes of total fruit, vitamin A, and fiber compared to non-smokers.

Perkins et al. (1993) studied 541 women using a 24-hour dietary recall and found a reduced intake of fiber and vitamins by smokers compared to non-smokers. Smokers consumed less carbohydrate as a percentage of total caloric intake than non-smokers. There were no significant differences in fat,

cholesterol and vitamin and mineral intakes between smokers and non-smokers.

Fiber intake was lower in smokers than non-smokers. Alcohol intake was significantly higher in smokers than non-smokers. Smokers also had less physical activity than non-smokers.

Fisher and Gordon (1985) studied alcohol use and smoking in relation to the diet of 4,374 men and women ages 20 to 59 years. Smokers consumed more fat than non-smokers.

Veenstra et al. (1993) studied the interrelationship of alcohol consumption, energy and food intake, and smoking habits of 1,145 men and 1,171 women (aged 22-49 years). They found smokers consumed less protein than non-smokers.

Knowledge, Attitudes, Beliefs and Behaviors of Smokers

Castro et al. (1989) found that smokers had lower (more negative) attitude scale scores, lower health consciousness scores and higher unhealthy behavior scores than non-smokers. However, smokers did not differ from non-smokers in knowledge about stress, diet and smoking. They found that smokers had a lower commitment to enact healthy behavior changes and maintained a lower level of motivation for making healthy behavioral changes.

Chapman et al. (1993) studied 745 current smokers and exsmokers 16 years and older. They found that smokers were more likely than non-smokers to be at risk for various diseases (heart disease, poor circulation, bronchitis, lung

cancer, and stroke). Smokers also maintained more self-exempting (cognitive dissonance) beliefs about smoking, health and physical activity. For example, a majority of the smokers believed that they would have to smoke a lot more to put themselves at serious health risk.

Klesges et al. (1988) studied 611 males and females and found that predictors of knowledge about the health consequence of smoking included: education, race, smoking status and income. Smokers reported less knowledge about the health consequences of smoking and were more concerned with the health consequences of cholesterol. Weight control was the greatest health concern of smokers who had never attempted smoking cessation. Blacks reported less health knowledge than whites. Smokers who had never attempted smoking cessation were much less likely to believe that stopping was an important health behavior leading to overall quality of life than non-smokers. Further, they endorsed weight control/loss as most important to improving overall quality of life.

#### Alcohol

Veenstra et al. (1993) studied the interrelationship of alcohol consumption, energy and food intake, and smoking habits of 1,145 men and 1,171 women (aged 22-49 years). Using 48-hour dietary records, they found a strong relationship between alcohol consumption and energy intake. The calories from alcohol were not compensated for by lower intakes of other nutrients. Alcohol consumption was higher on the weekend days than on

weekdays. Nutrient intake did not differ between drinkers and non-drinkers on midweek days. However, on the weekend days, there was a higher total fat and saturated fat intake in male drinkers than female drinkers. Cholesterol intake was higher in women drinkers than women non-drinkers. No differences in carbohydrate intake were observed between drinkers and non-drinkers. Drinkers consumed more protein than non-drinkers. There was a positive relationship between alcohol consumption and smoking.

Colditz et al. (1991) studied alcohol intake in relation to diet of 89,538 women and 48,493 men. They found women with higher alcohol consumption had higher total energy intake than abstainers. For the men who drank there was a stronger relationship between increased alcohol intake and higher energy intake. Carbohydrate intake was lower in men and women who drank than non-drinkers. Total fat intake was higher in male drinkers and slightly higher in women who drank. Cholesterol and protein intakes were slightly higher in men and women who drank. There was a strong relationship between the amount of alcohol consumed and the number of cigarettes smoked by women. For male smokers, alcohol intake was only slightly positively related to the number of cigarettes smoked.

Gruchow et al. (1985) studied the alcohol consumption, nutrient intake and body weight of 10,428 US adults (ages 18-74) using data from the first National Health and Nutrition Examination Survey. Twenty-four hour recall interviews were used to obtain information on nutrient and calorie intakes.

Drinkers had higher intakes of total calories than non-drinkers. Drinkers had

lower BMIs and were less obese than non-drinkers. There was a lower carbohydrate intake among drinkers than non-drinkers. Drinkers consumed more saturated fat, fatty acids, niacin, riboflavin, vitamin C, iron, phosphorus and potassium than non-drinkers. Women drinkers had higher intakes of fat and protein than non-drinkers. Male drinkers had higher protein intakes than male non-drinkers.

Thomson et al. (1988) examined the relationship between alcohol consumption and dietary intake using 7-day dietary records for 164 men aged 45 to 54 years. Non-drinkers had a higher total energy intake than drinkers. Non-drinkers had higher intakes of fat, carbohydrate, saturated fatty acids, and monounsaturated fatty acids than drinkers.

Fisher and Gordon (1985) studied alcohol use in relation to the diet of 4,374 men and women ages 20 to 59 years. Subjects completed a 7-day alcohol history and a 24-hour dietary recall. Drinkers consumed more total energy per day than non-drinkers. Drinkers had slightly less food energy from carbohydrate than non-drinkers.

# Physical Activity

Armstrong et al. (1990) studied 930 male and female recreational exercisers to investigate dietary changes such as overall food choices and changes in consumption over the past five years. Questionnaires were compared to recommendations from the *Dietary Guidelines for Americans*.

Respondents reported changes in food choice over the last five years including increased use of fresh vegetables, fruits and whole grain products. Red meat, eggs, dairy products and canned vegetable consumption decreased. Women reported changing food consumption to a greater extent than men. Reasons respondents changed food choices included "to improve health", "to lose weight", "to feel better" and "to prevent health problems". They found most exercised for "health benefits", other reasons included "keeps body in shape", "to feel better" and "relieves stress". Most exercised at least three days per week. Men and women did not differ in exercise frequency.

Georgiou et al. (1996) studied the attitudes about food, dietary changes and food choices of 319 subjects, 18-24 years old who were classified as exercisers and non-exercisers. Exercisers considered it more important to eat nutritious foods than non-exercisers. They ate more nutrient dense, low-fat foods and met the Food Guide Pyramid recommendations for the grains and fruit groups more often than the non-exercisers. Female exercisers perceived foods high in calcium to be high in fat and not healthy, and decreased their consumption of high fat foods more than female non-exercisers. Female exercisers reported higher ability to use nutrition labels in food selection than did female non-exercisers. Male exercisers more frequently ate breakfast and were more likely to be within their desirable weight range than male non-exercisers. Male and female exercisers considered it more important to eat nutritious foods than non-exercisers. Both male and female exercisers ate more whole grains, vegetables, fruits, non-fried poultry, fish and beans than non-exercisers.

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Diet quality scores are used by researchers to help them summarize the adequacy of the diet including nutrient adequacy, servings of food groups, and overconsumption of foods that may put subjects at risk for disease. The following studies demonstrate different ways to score diets using the Diet Quality Index and the Healthy Eating Index.

Patterson et al. (1994A) used a diet quality index that relates to dietrelated, chronic diseases in the United States. A diet quality index was
calculated from a 24-hour dietary recall and 2-day food records of 5,484 adults
from the 1987-1988 Nationwide Food Consumption Survey. The respondents
who met a *Diet and Health* goal were given zero as a score, those with a fair diet
were given one point, and those with a poor diet were given two points. The total
score was on a scale from zero (excellent diet) to 16 (poor diet). Lower index
scores were associated with higher intakes of important measures of diet quality
(e.g. vitamin C).

Kennedy et al. (1995) developed an index of overall diet quality called the Healthy Eating Index (HEI). There are 10 components to the HEI that are based on the food groups (grains, vegetables, fruits, milk and meat) and dietary guidelines (total fat, saturated fat, cholesterol, sodium and variety) The number of servings in each group is based on the food groups and serving sizes used in the Food Guide Pyramid (USDA, 1992). Subjects were assigned the maximum score if they consumed the recommended number of servings from each food

group in a day. The Dietary Guideline components were based on the percentage of calories from fat, and milligrams of cholesterol and sodium consumed in a day. Subjects received a perfect score of 10 if they consumed less than 300 mg of cholesterol and less than 2400 mg sodium in a day. A variety score was measured by the total number of different foods the subjects consumed that substantially contributed to one or more of the five food groups. The author used the HEI to evaluate intakes of subjects who participated in the 1989 and 1990 CSFII. The mean HEI was 63.9; few subjects received very high or very low HEI scores. The components with the poorest scores were fruit, grains, vegetables, saturated fat, and total fat. For cholesterol, about 11% of the sample scored 10 which means they consumed less than 300 mg of cholesterol for the day, however, 69% ate more than 450 mg of cholesterol. For a majority of the nutrients, subjects with high HEI scores were less likely to consume less than 75% of the RDA.

The Framingham Nutrition Study characterized the dietary patterns of adult men and women using food frequency questionnaires of 1,831 men and 1,828 women between the ages of 20 and 70 years (Millen et al. 1996). Results indicated men had high intakes of total fat, saturated fat, and monounsaturated fat and low carbohydrate intake. Women's intakes of total fat, saturated fat and monounsaturated fat intakes were also high. Women's cholesterol intakes met recommendations but sodium intake was high. Women did not meet the number of servings of breads and grains, vegetable and meats recommended by the Food Guide Pyramid. Women consumed about the recommended number of

## Knowledge About Food

Knowledge is defined as use of the mind, intellectual ability, rational learning (e.g. recalling, remembering and recognizing) (Chamberlain, 1992).

The following studies discuss the relationship between knowledge and nutrition.

Patterson et al. (1996) studied 607 residents of Washington State three years after collecting data as part of the Washington State Cancer Risk Behavior Survey. The survey measured changes in knowledge of dietary recommendations, knowledge of fat and fiber composition of foods, and perceived norms to see if they would be positively related to healthful dietary changes. They found that knowledge of food consumption was not significantly related to dietary changes. There was a significant interaction between fiber intake and knowledge of food consumption. Respondents with low fiber intakes who had greater knowledge of food consumption at baseline, increased fiber intake over the 3-year period.

Cremer and Kessler (1992) used data from the 1987 National Health
Interview Survey to assess how much Americans knew about fat and fiber
content of foods. The subjects were put into knowledge groups (high, medium
and low) by their knowledge of fat and fiber in specific foods. They found that
knowledge of individual foods' fat and fiber content did not vary among
demographic groups. Foods that were low in fat were correctly recognized by

more than 70% of the respondents. More respondents had high knowledge about fat than high knowledge of fiber.

Guthrie and Fulton (1995) used data from female adult meal planners in the 1990-1991 CSFII/DHKS to examine the relationship of knowledge of recommended servings of the five major food groups to reported food group consumption. Three-day food intakes were obtained from 2,960 respondents. These were compared to the number of servings recommended in the Food Guide Pyramid. For the milk group, 12 percent reported consuming 2 to 3 servings above the recommendations by the Food Guide Pyramid. Most meal planners consumed the minimum number of servings from the five major food groups recommended by the Food Guide Pyramid. Knowledge of food group serving recommendations varied by food group. Most subjects provided correct responses for fruits and vegetables. A little more than half provided correct responses for the meat and beans group. Knowledge of the correct number of servings of vegetables was associated with higher consumption of vegetables and was positively associated with age, income and education. Knowledge of recommended servings from the fruit group was not associated with the decision to increase fruit consumption. Being older, taller, having a higher household income and a college education was associated with the decision to consume fruit. Consumption of servings from the meat and beans group was positively associated with knowledge of serving recommendations. Higher intakes of meat and beans were associated with respondents who were older, white, not on a diet, higher household income, and higher body mass. Knowledge of the correct number of milk group servings and milk group consumption were positively associated with being white, having a college education and being taller.

Brug et al. (1994) classified 1,507 men and women according to awareness of dietary fat intake. Subjects were assigned to the realistic classification when their subjective dietary fat intake was in the same category as their objectively assessed fat intake (e.g. subjects who thought they ate too much fat and whose self-reported fat intake was high). Almost half (49%) of women and 41% of men were realistic about their intake. Optimistic subjects underestimated dietary fat intake compared to objectively assessed fat intake (46% men, 36% women). Pessimistic subjects' subjective intake was higher than objectively assessed intake. Few men (12%) and women (14%) were pessimistic about their fat intake.

Knowledge and Attitudes Toward Food/Nutrition

Morton and Guthrie (1997) used data from the 1994 CSFII/DHKS to compare the nutrition knowledge of low- and high- income respondents. They found that low-income households were less aware of diet-disease relationships, less likely to use the nutrition panel on the food label when purchasing foods, and significantly less likely to practice low-fat and low cholesterol eating practices. The low-income respondents were less likely to have heard of health problems caused by low intakes of fiber and calcium, high cholesterol intakes, and being overweight than their higher income counterparts. There was little

difference between low- and high-income groups in knowledge of the correct number of servings from the grain group recommended by the Food Guide Pyramid. The low-income respondents were less likely than the higher income group to know the correct number of servings for the vegetable group. The low-income respondents were less likely to report the correct number of servings from the milk group than those of higher income. Both low- and high-income groups knew the correct number of recommended servings from the meat and fruit groups. About half of the respondents correctly answered the number of servings to consume from the milk group.

Reid et al. (1996) studied 1,953 adults to track changes over time in Canadians' attitudes, understanding and reported actions related to nutrition issues. They found that the number of people claiming nutrition was important in the foods they chose had increased between 1989 and 1995. In 1995, more people were concerned about fat and chemicals in foods and more were planning to reduce fat and increase fiber intake. Forty-three percent reported having very good or excellent food habits. The use of food labels, lower fat/cholesterol products and high fiber foods had grown in the last 5 years.

Colavito et al. (1996) studied 478 households to find out the relationship between household meal planners' fat and fiber intakes and their diet-health attitudes and nutrition knowledge. The meal planners who were more concerned with practical food concerns (e.g. price, parishability, ease of preparation) consumed more fat. Meal planners who thought their health status was poorer consumed less fat at home and in the total diet. Meal planners who had higher

knowledge scores consumed significantly less fat from home foods. The children of these meal planners also ate significantly less fat at home. Meal planners more concerned with taste and utility consumed significantly less fiber at home and in their total diet than those not concerned about taste and utility. Participants with higher knowledge scores consumed significantly more fiber at home and in their total diet.

Shepherd and Stockley (1987) examined the relationship of nutrition knowledge, attitudes and fat consumption of 210 participants. The participants were classified according to social class which was based on occupation. There was no significant correlation between any of the attitude measures and behavior intentions (attitudes toward nutrition, general food practices or specific nutrient intake). Male subjects had more favorable attitudes than females. The higher and lower managerial social classes attitudes were more negative compared to the other social class groups.

Kristal et al. (1990A) examined the influence of nutrition knowledge, attitudes and perceived norms on 97 women's selection of low-fat diets and dietary fat intakes. 4-day dietary records were collected along with a questionnaire on food frequency and diet habits. Higher fat intakes were associated with households with children and respondents with higher body mass index. Factors strongly associated with low-fat diets were perceived norms and knowledge of fat in foods. The strongest associations were between low-fat food availability and knowledge of fat in foods, and low-fat food availability and positive attitudes about diet.

Pierce et al. (1984) examined knowledge about heart disease and nutrition, and attitudes and beliefs toward dietary change in 881 men and women. They found that diet was seen as a useful preventive medicine technique for preventing heart disease but the perceived problem was the need to give up their favorite foods. They found that a majority of the respondents were aware of the associations between coronary heart disease, obesity, high blood pressure, smoking and dietary cholesterol. They were also aware that cholesterol is in dairy products, eggs and beef, but were unaware that it is not found in margarine, peanut butter and chocolate.

# Attitudes About Food/Nutrition

Attitude is defined as a learned predisposition to respond in a specific way, negative or positive, toward people, ideas or situations (Haber & Runyon, 1974). The following studies discuss the relationship of attitudes on food and nutrition.

Stafleu et al. (1994) studied 419 subjects' attitudes towards high-fat foods and their low-fat alternatives. They found more positive attitudes towards low-fat alternatives than towards high-fat foods. Neither attitude scores nor percentage of energy from fat in the diet were different for education level, occupation level, body mass index or household size. Women's attitude scores were more negative than men's. Subjects following a dietary treatment had lower attitude scores than those subjects not following a dietary treatment. The percentage of

energy from fat was lower in subjects following a special diet than subjects not following a special diet. Fat intake was different for the age groups; the older group (35-55 years old) had a lower fat intake than the subjects aged 18-35.

Medaugh-Abernethy and Fanelli-Kuczmarski (1994) studied 36 participants' 4-day food records to examine the association between food intake and attitudes. Individual rating scores showed few participants ate foods they disliked because they felt it was "good" or "healthy" for them. Most respondents said they ate food because they provide roughage, were simple and fast to prepare, and because they "like eating" the food.

Barker et al. (1995) examined the relationship between attitudes and consumption of certain foods in 592 subjects. Attitude scores for fat and fiber were calculated. A higher score indicated that fat was perceived as health threatening and fiber as health promoting. Women had greater attitude scores than men. Fat attitude scores were not related to age or BMI. Married men had a higher fat attitude score than men who were single. Single women had greater fat attitude score than the other groups. Fiber attitude scores were positively related to age in men and women. Women non-smokers tended to have higher fiber attitude scores than women smokers.

Treiman et al. (1996) studied the attitudes and behaviors related to fruit and vegetable consumption of 207 low-income women. They found that many reported positive perceptions of fruits and vegetables. The women identified barriers to increasing consumption of fruits and vegetables as lack of availability,

the amount of time and effort needed to prepare fruits and vegetables, and preferences for other foods.

#### Beliefs About Diet and Health

Belief is defined as perceptions of factual matters, of what is true or false or the cognitive aspect of attitudes (Crider, Goethals, Kavanaugh, Solomon, 1989; Parraga, 1990). The following studies discuss beliefs about diet and health.

Brug et al. (1995) studied psychosocial correlates of fruit and vegetable consumption in 367 adults. People who consumed higher amounts of boiled vegetables had more positive beliefs about general healthfulness, taste and pesticide content than those who consumed fewer vegetables. Those who consumed salads had more positive beliefs about taste, health consequences, and vitamin content of vegetables. Subjects who consumed the most fruit had more positive beliefs about the taste and health consequences of fruit.

Kristal et al. (1995) used the baseline results from the Working Well Study to examine 37,291 subjects' beliefs as predictors of current diet. They found that participants agreed more with the items related to diet and general health (belief in diet-disease connection) than with specific impact of a low-fat diet (benefits of healthy diet). Subjects who believed in a diet-disease connection had current diets that were lower in energy from fat and higher in fiber, vegetable, and fruit intakes than subjects who did not believe in a diet-disease connection.

Devine and Sandstrom (1996) conducted a study with 594 women to study the association of social roles, nutrition beliefs and fat avoidance practices. There was an association between nutrition beliefs and particular roles such as caretaking; there was a stronger perceived responsibility for nutrition care of others from the caretakers. Those women who perceived barriers to healthful eating, were not employed, and perceived little social support for healthful eating and had lower fat avoidance practices than the other women.

Medeiros et al. (1993) surveyed 1,560 respondents to study their dietary practices and nutrition beliefs. The subjects were compared by age groups. They found that all age groups agreed that food and nutrition lessens the severity of health problems, eating less fat will reduce risk of heart attack, vitamin C prevents colds, and eating more fiber reduces risk of cancer. This showed that the sample generally had correct beliefs about nutrition.

Pierce et al. (1984) examined knowledge about heart disease and attitudes towards nutrition of 881 men and women. They found that a majority of the respondents agreed that eating the right kinds of foods would reduce the chances of getting heart disease. The respondents described diet as a useful preventive technique but they perceived drawback of giving up their favorite foods. Most denied their current diet increased their risk for developing heart disease.

Crawford and Baghurst (1990) surveyed 916 adults to determine behaviors and beliefs of a community. They found two-thirds associated fat with heart disease and 45% of the respondents linked sodium to hypertension. There

was confusion about whether fiber and simple carbohydrate could cause diseases. The reasons most attempted to change food intake or dietary habits were for weight control, general or long-term health, concerns about cholesterol, heart disease and blood pressure.

Lloyd et al. (1995) studied the perceived and actual barriers to reducing dietary fat in 45 experimental subjects who were given instructions on reducing their fat intake. A potential problem for the group was a belief that the food would not taste as pleasant if was reduced in fat. The five changes believed to be unpleasant tasting included: reducing intake of cakes and cookies; changing to reduced-fat products, milks and spreads; and reducing intake of red meat. Ease of shopping was also seen as a barrier for purchasing the items above. The subjects believed purchasing reduced-fat items and more fruits and vegetables would be more expensive than following their usual diet.

Norman (1985) conducted two studies on the interrelationships among health behaviors in a student population. The first study included 286 students and the second study had 126 students who completed a health behavior questionnaire including questions on hours of sleep, stress, smoking, exercise, alcohol and diet. A high score indicated a more healthful lifestyle (balanced diet, little or no smoking etc.). Perceived health benefits and hedonic rating behaviors were also reported. Hedonic behaviors were rated by the extent to which the behavior was considered to be hedonically pleasant or distasteful. The hedonic behaviors were significantly correlated with not consuming a balanced diet because they perceived this as distasteful or unpleasant. The health benefits

were correlated with consuming a balanced diet for those that considered the behavior to be pleasant.

#### Beliefs and Attitudes Towards Diet and Health

Huddy et al. (1996) studied 2,772 university faculty and staff to determine their health risks and perceptions. The subjects filled out a Health Risk Appraisal which included questions on health, diet and belief/attitudinal issues. Males listed heart disease and cancer as their major concern for chronic disease, while four times as many females ranked cancer as their major concern before heart disease. Half of the respondents described their health as good, a third rated their health as excellent and one in ten rated their health as poor.

Lloyd et al. (1993) studied the attitudes and beliefs toward a low fat diet of 390 male and female subjects who ate high fat diets. Subjects were more positive about making dietary changes by reducing cakes and cookies, increasing bread and potatoes, changing to reduced fat milks, reducing fried foods, increasing fruit and vegetables, and changing to reduced fat products. Subjects did not wish to reduce red meat consumption. Females had significantly more favorable attitudes toward making more changes than did males. However, females were less favorable about changing to reduced fat milks and were more likely to plan to reduce fried food and red meat. Subjects had positive beliefs regarding the health and convenience (shopping, cooking and preparation) of following a low fat diet, however they had negative beliefs

about the impact of a low fat diet on the taste, hunger, and protein intake. A majority of the respondents believed that their health is affected by what they eat.

#### Behaviors

Behavior is defined as any activity that can be observed, recorded and measured (Crider et al., 1989). The following studies discuss the relationship between behaviors and dietary patterns.

Kristal et al. (1990B) studied the dietary behavior patterns of 99 women ages 45 to 59. The participants completed a dietary behavior questionnaire and completed two 4-day food records. Those with higher fat intakes were more likely to live in households with children and have higher BMI. The results showed that exclusion, replacement, substitution and modification of fat may be useful for guidelines to low-fat dietary patterns. There was a significant correlation between fat intake, using fat as seasoning and replacing high fat foods with alternatives. It showed that if subjects continue to consume high fat foods or use fat as a seasoning, they would increase their percentage of fat intake.

Smith-Schneider et al. (1992) created 7-day menus using dietary fat reduction strategies that provided two thirds of the 1989 Recommended Daily Allowances for all micronutrients. The menus included higher-fat items that were replaced by lean or lower-fat items. They also added high carbohydrate, low-fat foods to the menus. They found that changing the menu helped decrease the fat

in daily intakes for participants. For men, replacing higher-fat meat exchanges with lean meats helped achieve <30% energy from fat. Other strategies to achieve <30% were substitutions of eggs and cheeses, and reducing cholesterol to <300 mg. For women, fat substitutions in dressing, sauces and spreads helped achieve modify fat in the diets to <30% and lower cholesterol to <300 mg.

Crawford and Baghurst (1990) surveyed 916 adults to determine behaviors and beliefs of a community. Half of the subjects claimed to have reduced fat and sodium intakes, 40% reduced sugar and cholesterol, 25% reduced energy intake, and 40% increased fiber consumption.

Lloyd et al. (1995) studied the perceived and actual barriers to reducing dietary fat in 45 experimental subjects who were given instructions on reducing their fat intake. They found the most frequent reported changes to lower fat intake were reducing intake of cakes and cookies, red meat, cheese and snacks. There was an increase in fruit and vegetable intake, and in the use of reduced-fat spreads. The most preferred change was the increase in fruits and vegetables and the least favorite change was reducing cakes, cookies, snacks, and cheese.

Popkin et al. (1989) studied 6,474 women ages 19 to 50 years to examine trends in their diet from the data collected in National Food Consumption Survey Intake by individuals 1977-1978 and CSFII 1985. They found that women decreased the amount of food consumed in most food groups and the variety of foods chosen, but the consumption of lower-fat foods increased. Increasing numbers of women consumed lower-fat milks, higher-fiber breads, and low-fat

poultry. However, the percentage consuming high-fat cheeses, desserts and mixed grain dishes also increased.

These studies have found that smokers and drinkers have poorer nutrient consumption than non-smokers and non-drinkers. They also found exercisers consumed healthier diets than non-exercisers. However, little is known about the influence of these factors on knowledge, attitudes, beliefs, and behaviors about nutrition. Therefore, the purposes of our study were to determine: 1) the relationship between lifestyle patterns (smoking, alcohol consumption, and physical activity) and diet quality; 2) the relationship between lifestyle patterns and knowledge about food; 3) the relationship between lifestyle patterns and attitudes towards food/nutrition; 4) the relationship between lifestyle patterns and beliefs about diet and health; and 5) the relationship between lifestyle patterns and food preparation behaviors.

#### CHAPTER III

#### METHODOLOGY

The objective of this study was to determine the relationship between lifestyle patterns (smoking, alcohol consumption, and physical activity) and diet quality, knowledge, attitudes, beliefs and behaviors. This study analyzed data from the 1994 Continuing Survey of Food Intakes by Individuals (CSFII) and the Diet and Health Knowledge Survey (DHKS).

A nationally representative sample of households in the United States defined by sex, age (10 age groups) and income level (low-income and all-income) was used for the CSFII/DHKS. The United States was divided into 1,404 primary sampling units (PSU) (metropolitan areas or counties with at least 15,000 people); 62 PSU's were selected for this study. Each unit was then subdivided into 36 area segments (housing blocks) and twelve segments were sampled in 1994. Addresses of all units in the selected segments were listed and each household was screened to identify the appropriate numbers of sample persons and sex/age/income groups. A screening questionnaire specifying characteristics of the persons to be included in the sample was administered to the households. 5,589 subjects provided at least one 24-hour dietary recall from the CSFII survey and of these 1,879 subjects participated in the 1994 DHKS survey (USDA, 1997).

The data for the CSFII/DHKS was collected by Westat, Incorporated for the United States Department of Agriculture (USDA) (USDA, 1995). A letter and a brochure describing the survey was mailed to each respondent 1 week before being contacted by the interviewer. Screening interviews were conducted with people 18 years and older and preferably with the meal planner/preparer. The information collected included the number of people in the house, and each person's race, ethnicity (Hispanic or nonHispanic), date of birth, age, sex and relationship to others in the home. The household questionnaire consisted of questions regarding education level, employment status of household members 15 years and older, income, involvement in food assistance programs, food expenditures and other food related practices. The 1994 -1996 CSFII/DHKS was the first national survey to use Spanish-language questions. There were ten billingual (English and Spanish) interviewers.

# CSFII Data Collection Procedures

Interviewers collected 2 non-consecutive 24-hour dietary recalls during inperson interviews within a two-week period. Respondents were asked to recall
everything consumed (food or beverage) during the previous day. The
interviewer used a Food Instruction Booklet (FIB) to get a complete description of
every food and amounts eaten. The measuring guides used were household
measuring cups. Other questions asked on Day 1 included: salt intake, special
diets, vegetarianism, vitamin/mineral or fish oil/fiber supplements, cholesterol

checks, self reported height and weight, self assessed health status, physician diagnosed medical conditions, exercise, cigarette smoking status and consumption of alcohol. On Day 2, respondents provided another 24-hour dietary recall and indicated consumption (ever or never) of 28 foods during the past 12 months. Questions that were asked on both days included the hours of television or videos watched, how much water the respondent drank and if the previous intake was usual or unusual and why (USDA, 1995). The data files are set up so that diet intake can be matched with demographic characteristics, and DHKS responses for each individual.

## **Nutrient Data Base**

Survey Net was the food coding software used for the CSFII 1994. It contained food descriptions and food measures with their corresponding gram weights. This was used to match descriptions of foods eaten by sample subjects to foods in the food coding database. The food coding database contained 7,300 food codes with a description of each food and if applicable, the preparation method. In preparation for the 1994 CSFII, the coding database used for the CSFII 1989 -1991 was expanded to capture important food processing and nutritional information that was to be collected during the food intake interviews. Expanded food groups included vegetables, margarine, spreads and butters, fast food sandwiches and home-prepared soups. Ethnic

foods and new foods reported during the survey were added to all food groups (USDA, 1995)

Survey Nutrient Data Base was used to calculate the nutrient intakes in this survey. The weight of each food was used to calculate the nutrient value of every food eaten from the USDA Nutrient Data Base. The nutrient database includes values for food energy and 28 nutrients and food components (USDA, 1995). Most of the nutrient values in the database are supported by laboratory analysis. Nutrient values that were not available from laboratory analyses were imputed from data from other forms of the food or similar foods. The two nutrient data values that are based on limited data are beta-carotene (a form of vitamin A) and for vitamin E (as alpha-tocopherol equivalents) (USDA, 1995).

# **DHKS Data Collection Procedures**

The DHKS data was collected about 2 - 3 weeks after Day 2 intakes from the CSFII were taken. Respondents were selected randomly by a computerized process from CSFII sample persons 20 years and older who had provided Day 1 intakes. A reminder card was sent 3 - 5 days before the appointment. Eighty-four percent of the surveys were conducted by telephone, sixteen percent were in-person. The same interviewer who administered the CSFII usually administered the DHKS survey. Interviewers who conducted the survey from home used a hard copy of the questionnaire without computer assistance.

The content of the questions in the DHKS included: knowledge and attitudes about the Dietary Guidelines for Americans (USDA, 1995) food labeling, dietary behaviors, fat intake, self-perception of adequacy of nutrients and other dietary components, awareness of diet-health relationship, perceived importance of following dietary guidelines, behaviors related to fat intake and food safety, knowledge about food sources of fats and cholesterol, and perception of weight status (see Appendix A).

The incentives given to each household were a set of measuring cups and spoons, an insulated nylon sack, and a travel type beverage mug. The average length of questionnaire administration for the CSFII survey was 8 minutes for screening, 20 minutes for household questions, 33 minutes for Day 1 intake and 30 minutes for Day 2 intake. The average time for the DHKS survey was 31 minutes (USDA, 1995).

# Data Processing Procedures

Cluster analysis was used to place subjects into subgroups based on smoking, alcohol consumption, and physical activity (Patterson et al, 1994B). Smoking was measured by the number of cigarettes smoked per day. Alcohol intake was determined by the number of subjects who reported consuming at least one drink in the past twelve months. Physical activity was measured by how often the subjects exercised vigorously enough to work up a sweat. Only

subjects with two days of food intake information (CSFII) and the DHKS were included in this analysis (n=1,425).

Subjects in lifestyle subgroups were compared on diet quality, knowledge, attitudes, beliefs and behaviors. Diet quality was based on the Healthy Eating Index (HEI). "The Healthy Eating Index is a single, summary measure of diet quality that can be used to monitor changes in consumption patterns as well as serve as a useful tool for nutrition education and health promotion" (Kennedy et al., p. 1104, 1995). There are 10 components to the HEI that are based on the food groups (grains, vegetables, fruits, milk and meat) and dietary guidelines (total fat, saturated fat, cholesterol, sodium and variety). Subjects were assigned the maximum food group score if they consumed the recommended number of servings from each food group in a day. The number of servings in each group is based on the food groups and serving sizes used in the Food Guide Pyramid (USDA, 1992). The Dietary Guideline components were based on the percentage of calories from fat and saturated fat, and milligrams of cholesterol and sodium consumed in a day. Subjects received a perfect score of 10 if they consumed less than 30% of energy from fat, less than 10% of energy from saturated fat, less than 300 mg of cholesterol and less than 2400 mg sodium in a day. A variety score was measured by the reported consumption of foods from different food subgroups. Subjects who consumed at least 10 different kinds of food items received the maximum score (Kennedy et al., 1995).

The DHKS questions were distributed to 7 nutrition professionals.

Definitions for knowledge, attitudes, beliefs and behaviors were provided to the selected group. The definitions were as follows:

<u>Knowledge</u> - Use of the mind, intellectual ability, rational learning (e.g. recalling, remembering and recognizing) (Chamberlain, 1992).

Attitudes - A learned predisposition to respond in a specific way, negative or positive, toward people, ideas or situations (Haber & Runyon, 1974).

<u>Beliefs</u>- Perceptions of factual matters, of what is true or false or the cognitive aspect of attitudes (Crider, Goethals, Kavanaugh, Solomon, 1989; Parraga, 1990).

<u>Behaviors</u> - Any activity that can be observed, recorded and measured (Crider et al., 1989)

Based on the definitions given, these professionals were asked to select the questions that were pertinent to the study and decide if questions were knowledge, attitudes, beliefs or behaviors (see Appendix B).

The selected questions were used to calculate scores. The following are examples of types of questions used to obtain a score from the four categories:

1. Knowledge of nutrition - The knowledge score was based on the correct answers to the questions that required knowledge of nutrition. The scores were calculated from the number of questions the respondent answered correctly out of the total number possible. The USDA's Agricultural Handbook Number 8 (1976-1992) was used to determine correct answers. For questions answered correctly subjects received a score of one and if it was incorrect they received a zero. An example of a knowledge question is

"Based on your knowledge which has more saturated fat: liver or butter?" (USDA, 1995).

For question 3 a-e, (see Appendix A) subjects' actual intake was compared to the Recommended Daily Allowances (FNB, 1989); if it was at least 67% intake was considered to be about right, if it was less than 67% intake was considered to be too low. For question 3 f-j, (see Appendix A) subjects' actual intake was compared to the Dietary Guidelines (Kennedy et al., 1995). If subjects consumed more than 2400 mg sodium, 300 mg cholesterol, 30% fat, and 10% saturated fat, their intake was considered too high. If subjects consumed less than 25 g of fiber, their fiber intake was considered too low. This intake was compared to perceived intake. If perceived and actual intake matched, subjects received a score of one, if they did not match, subjects received a score of zero.

Factor analysis was used to determine subscores of knowledge scores. This method groups together questions that subjects responded to similarly. The analysis yielded 19 factors with items loading at or above an Eigen value of .40 (see Table 1). Eigen values above .40 are considered to be significant, with 1.00 being the strongest correlation possible. The goal of factor analysis is data reduction. Because of the large number of factors, subscores for knowledge questions are not reported. Reliability of the knowledge statements was 0.74 using coefficient alpha, or internal consistency reliability.

2. Attitudes towards food/nutrition - Attitude scores were based on a 4 point Likert scale (1 = not at all important, 4 = very important, or 1 = strongly disagree, 4 = strongly agree). An example of an attitude towards food/nutrition is "On a scale from '1' to '4' where '1' is 'not at all important' and '4' is 'very important,' how important is it to you personally to {maintain a healthy weight}?" (USDA, 1995). The scale for negative attitude statements was reversed (4=1). Responses were totaled to derive a score.

Factor analysis yielded three factors with items loading at or above an Eigen value of .40 (see Table 2). These three factors explained 46.2% of the variation in attitudes. Reliability of the attitude statements was 0.82 using coefficient alpha.

3. Beliefs about diet and health – The belief questions were given a subscore based on a 4 point Likert scale (1= strongly disagree, 4 = strongly agree). An example of a belief about diet and health question is "Choosing a healthy diet is just a matter of knowing what foods are good and what foods are bad."
A diet belief score was calculated by totaling the answers, the higher the score, the stronger the belief about diet and health.

Another belief score was based on a rating of overall health. Subjects were asked "In general would you say your health is excellent, very good, good, fair or poor?" (USDA, 1995). The ratings consisted of 1=excellent, 2=very good, 3=good, 4=fair, 5=poor, 8=don't know.

Factor analysis yielded four factors with items loading at or above an Eigen value of .40 (see Table 3). These four factors explained 62.2% of the

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4. Food preparation behaviors - Scores were calculated based on the number and frequency of healthy behaviors reported. An example of a food preparation behavior is "When you eat meat and there is visible fat, do you trim the fat always, sometimes, rarely, or never?" (USDA, 1995) The score was based on a scale from '1' to '4' where 4 = always, 3 = sometimes, 2 = rarely, and 1 = never. Responses were totaled to derive a score.

variation in beliefs. Reliability of the belief statements was 0.39 using

coefficient alpha.

Factor analysis yielded eight factors with items loading at or above an Eigen value of .40 (see Table 4). These eight factors explained 56.7% of the variation in behaviors. Reliability of the behavior statements was 0.85 using coefficient alpha.

## Statistical Analysis

Cluster analysis was used to place subjects in the subgroups (smoking, alcohol consumption, and physical activity). The subgroups were compared on knowledge, attitudes, belief and behavior scores. The subgroups were characterized by: gender, origin and race using chi square (X²) and education, age, and income using one way analysis of variance (ANOVA).

ANOVA was used to determine the differences among the lifestyle subgroups in knowledge, attitudes, beliefs and behavior scores. Differences or relationships between variables were considered statistically significant at the p

<0.01 level using the Scheffe multiple range test. USDA recommends that the survey data be weighted to compensate for the sampling method and to accurately represent the United States population. However, the recommended weighing software was unavailable, therefore, the data was limited to one person per household and a conservative p value of p <0.01 was used. The statistical software package used was the Statistical Package for the Social Sciences (SPSS) (SPSS, 1993).</p>

## Specific hypotheses were:

Hypothesis One: Subjects who have hedonistic lifestyle patterns (smoke, drink, and do not exercise) will have lower HEI scores than subjects with healthy lifestyle patterns (do not smoke or drink and exercise regularly). Subjects in the Moderate group will have moderate HEI scores.

<u>Hypothesis Two:</u> Subjects in the Healthy group will have higher nutrition knowledge scores than subjects in the Hedonistic group and the Moderate group will have moderate knowledge scores.

Hypothesis Three: Subjects in the Healthy group will have more positive attitudes toward nutrition than subjects in the Hedonistic group, and the Moderate group will have moderate attitudes.

<u>Hypothesis Four:</u> Subjects in the Healthy group will have more positive beliefs about nutrition than subjects in the Hedonistic group, and the Moderate group will have moderate belief scores.

Hypothesis Five: Subjects in the Healthy group will report healthier eating behaviors than the Hedonistic group, and the Moderate group will report moderate eating behaviors.

Table 1. Factor matrix for knowledge statements.

Factors	Eigen Values <sup>a</sup>
Factor 1: Fat and cholesterol knowledge Eating too much fat. Arteriosclerosis associated with eating too much	.78
cholesterol.	.75
Eating too much cholesterol.	.50
Arteriosclerosis/atherosclerosis.	.45
Factor 2: Calcium knowledge	
Not eating enough calcium.	.84
Bone problems /Rickets	.81
Factor 3: Fat and saturated fat contents in dairy products	
Skim or whole milk.	.71
Egg white or egg yolk.	.58
Butter or margarine.	.51
Yogurt or sour cream.	.47
Factor 4: Fiber knowledge	
Colon problems.	.82
Not eating enough fiber.	.79
Factor 5: Comparison of self-rating to actual intake	
Fat	.81
Saturated fat	.81
Cholesterol	.45
Factor 6: Disease and weight	
Arteriosclerosis/Atherosclerosis.	.81
Being overweight.	.78
Factor 7: Fat contents of meats	
Loin pork chops or pork spare ribs.	.62
Regular hamburger or ground round.	.57
Hot dogs or ham.	.51
Porterhouse steak or round steak.	.48

Table 1. continued.

Factors	Eigen Values <sup>a</sup>
Factor 8: Recommended servings of food groups	***************************************
Fruit group.	.64
Milk, yogurt, cheese group.	.59
Vegetable group.	.58
Meat, fish, dry beans and egg group.	.56
Factor 9: Salt/sodium knowledge	
Hypertension.	.71
High blood pressure.	.66
Eating too much salt or sodium.	.48
Factor 10: Self-perception vs. actual intake	
Cholesterol.	.79
Salt or sodium.	74
Factor 11: Saturated fat knowledge If a product is labeled as containing only vegetable oil is it low, high or either low or high	
in saturated fat.	.77
If a food has no cholesterol it is also low, high or eit low or high in saturated fat.	.63
Factor 12: Self-perception of nutrients compared to actual	intake
Protein	.74
Iron	.63
Factor 13: Sugar	
Cavities/caries, tooth problems.	.76
Eating too much sugar.	.50
Factor 14: Diseases associated with not eating enough fib	er
Arteriosclerosis.	.75
Cancer.	.59

Table 1. continued.

Factors	Eigen Values <sup>a</sup>
Factor 15: Vegetable oil knowledge	
High blood pressure is associated with not eating enough fat.  Is cholesterol found in vegetable and vegetable oils,	.70
animal products like meat and dairy or all foods containing fat or oil?  Which fat is most likely to be a liquid rather than a	.45
solid- saturated fat, polyunsaturated fat, or equally likely to be liquids?	.44
Factor 16: Recommended grain servings Bread, cereal, rice and pasta group.	.72
Factor 17: Self-perception of intake vs. actual intake	
Vitamin C Calcium	.65 .63
Factor 18: Fat knowledge	rica
Product labeled "light"- does it mean it is lower in calo fat or both?  Which has more saturated fat - liver or T-bone steak?	.77
Factor 19: Self-perception of energy intake vs. actual intake Calories	.73

<sup>a</sup>Eigen values above .40 are considered to be significant, with 1.00 being the strongest.

Table 2. Factor matrix for attitude statements.

Factors	Eigen Values <sup>a</sup>
Factor 1: Importance of following dietary guidelines	***************************************
Choose diet low in fat.	.81
Choose diet low in saturated fat.	.78
Choose diet low in cholesterol.	.77
Choose diet with fruits and vegetables.	.63
Use sugars in moderation.	.62
Choose diet with adequate fiber.	.62
Use salt and sodium in moderation.	.59
Maintain a healthy weight.	.58
Factor 2: Responses to buying food	
How well food keeps.	.70
Price.	.61
Ease of preparation.	.57
Food safety.	.52
Nutrition.	.44
Taste.	.40
Factor 3: Importance of food groups	
Eating at least two servings of dairy products	
daily.	.75
Choose plenty of breads and cereals.	.69
Eat a variety of foods.	.54

<sup>&</sup>lt;sup>a</sup>Eigen values above .40 are considered to be significant, with 1.00 being the strongest correlation possible.

Table 3. Factor matrix for belief statements.

Factors	Eigen Values <sup>a</sup>
Factor 1: Nutrition beliefs	
Eating a variety of foods daily.	.71
Knowing what foods are good/bad.	.68
What eating now is healthy.	.59
Factor 2: Health beliefs	
There are too many recommendations.	.76
Starchy foods make people fat.	.72
Some people are born fat and some thin.	.52
Factor 3: Disease beliefs	
What you eat can make a big difference in your	
chances of getting a disease.	.87
Factor 4: Health status	
Is your health excellent, very good, good, fair, poor	
or don't know.	.97
or don't know.	.01

<sup>&</sup>lt;sup>a</sup>Eigen values above .40 are considered to be significant, with 1.00 being the strongest correlation possible.

Table 4. Factor matrix for behavior statements.

Factors	Eigen Values <sup>a</sup>
Factor 1: Food label behaviors	
List of ingredients.	.80
Use the nutrition panel.	.79
Serving size information.	.78
Use phrases like "low-fat".	.76
Use health claims.	.76
Factor 2: Fat substitution behaviors	
Eat low-fat cheeses.	.76
Drink skim milk.	.69
Use low-calorie salad dressing.	.67
Eat ice milk or frozen yogurt.	.62
Eat lower-fat luncheon meats.	.55
Factor 3: Added fat behavior	
	.79
Add butter to vegetables. Add butter to potatoes.	.74
Amount of butter spread on muffins.	58
Add cheese or cream sauces to vegetables.	.48
Factor 4: Food & fat consumption	
Trim visible fat off meat.	.65
Remove the skins from chicken.	.62
Wash fruits and vegetables before eating.	.53
Eat smaller portions of meat.	.50
Factor 5: Consumption of animal products	
Eat beef, pork, or lamb.	.67
Eat eggs.	.51
Eat fried chicken.	.45
Factor 6: Fiber consumption	
Eat the peel on fresh fruits.	.86
Eat the peel on fresh rults.  Eat the peel on fresh vegetables.	.85

Table 4. continued.

Factors	Eigen Values <sup>a</sup>	
Factor 7: Consumption of snacks		
Eat cakes and cookies weekly.	.81	
Eat chips weekly.	.67	
Factor 8: Food choices		
Eat fruit for dessert.	.70	
Eat fish and poultry instead of meat.	.62	
Eat outer leaves of leafy vegetables.	.44	

<sup>&</sup>lt;sup>a</sup>Eigen values above .40 are considered to be significant, with 1.00 being the strongest correlation possible.

#### CHAPTER IV

#### RESULTS

# **Demographics**

Of the 1879 respondents who participated in the1994 CSFII/DHKS, 1,425 completed two 24-hour dietary recalls and the complete DHKS survey. The demographic characteristics of the sample population are presented in Table 5. The majority of the respondents were female, white, Non-Hispanic, and most had attended at least twelve years of school. The average income was twice the poverty level (see Table 6). The average age of the respondents was 49.2 ± 17.1. Table 7 shows lifestyle characteristics of the respondents. The average respondent smoked about 5 cigarettes per day and exercised vigorously enough to work up a sweat about 2 - 4 times per week. Approximately two-thirds of the people had consumed alcoholic beverages in the past 12 months.

The 1425 respondents were divided into three cluster groups based on the number of cigarettes smoked per day, consumption of alcoholic beverages in the last 12 months, and how often they exercised vigorously to work up a sweat (see Table 8). All three groups differed in the number of cigarettes smoked. The Healthy group smoked the fewest cigarettes (less than 1 cigarette per day), the Moderate group smoked about 1 pack per day and the Hedonistic group smoked about 2 packs per day. The Hedonistic group exercised significantly less than

the Moderate and Healthy groups. The subjects in the Moderate and Hedonistic groups were more likely to consume alcoholic beverages in the last twelve months than the Healthy group.

The number of respondents in each group was 197 in Moderate, 1191 in Healthy, and 37 in the Hedonistic group. Table 9 depicts the differences among the cluster groups demographic characteristics. Respondents in Healthy group were more likely to be female, but Moderate and Hedonistic respondents were more likely to be male. Groups did not differ in race or ethnic origin.

Table 10 shows the other demographic characteristics of the respondents.

The Healthy group had older respondents than the Moderate group. Income as a percent of poverty threshold was higher in the Healthy group than the Moderate group. The Healthy group completed significantly more education than the other groups.

# **Diet Quality**

The mean nutrient consumption of the respondents is in Table 11. Table 12 shows the mean nutrient consumption of the cluster group respondents. The Hedonistic and Moderate groups had significantly higher energy intake than the Healthy group. The Healthy group had significantly lower cholesterol, total fat, saturated fat, and sodium intake than the other groups. The Healthy group had significantly higher fiber and vitamin C intakes than the Moderate group. The Healthy group consumed less alcohol during the two days of reported intake than the Hedonistic group.

Table 13 compares Healthy Eating Index scores to respondents perceptions of their nutrient intakes. Most respondents thought their diets were too high in fat, but about right in saturated fat, cholesterol and sodium. When comparing HEI scores to perceived intake, subjects who thought their diet was about right in saturated fat had higher HEI saturated fat scores than subjects who thought their diet was too high in saturated fat.

When comparing the food group component of the HEI, the Healthy group consumed significantly more servings from the fruit group than the other groups (see Table 14). Subjects in all three groups consumed much less than the recommended number of servings of fruit and milk.

The dietary guideline components of the HEI are presented in Table 15.

The Healthy group had significantly higher total fat, saturated fat, and cholesterol scores than the other two groups. The Healthy group had significantly higher sodium scores than the Hedonistic and higher variety scores than the Moderate group.

Table 16 shows that the Healthy group had significantly higher overall scores for the food group and dietary guideline components of the HEI than the other two groups. The Healthy group also had significantly higher total HEI scores than the other groups.

# Knowledge

Shown in Table 17 are the responses to knowledge statements relating to the recommended number of servings from different food groups and the percentage of respondents who answered correctly. Respondents said the average number of servings recommended for each food group was about two. Most knew that one should consume 2 - 3 servings from the fruit group. A little more than half of the respondents correctly answered the number of servings to consume from the milk group and the meat group. Less than half correctly answered the number of servings to consume from the vegetable group and only 5% knew the correct number of servings to consume from the grain group.

Table 18 depicts what respondents thought about the nutrients in their diet. Most respondents thought their diet was about right in all nutrients except total fat. Many respondents thought their diet was too high in fat. However, when their perceptions were compared to actual intake, only about 20% categorized their diet correctly for fiber, and 30% correctly categorized their diet for calories, iron, and vitamin C. About 40% correctly categorized their diet for calcium, fat, and salt or sodium, and almost 50% of the respondents correctly categorized their diet for cholesterol, saturated fat, and protein.

Responses to knowledge statements about the relationship between nutrients, general health problems and specific diseases are shown in Table 19. Most of the respondents heard of health problems caused by being overweight, eating too much salt/sodium, cholesterol, fat, and sugar. Most also knew that

respondents did not know that diabetes and high blood pressure were caused by being overweight. Many knew that high blood pressure (hypertension) was related to eating too much salt or sodium. Many respondents knew that arteriosclerosis was associated with being overweight and eating too much cholesterol and fat. Few respondents knew that cavities/caries were associated with eating too much sugar. Most respondents knew osteoporosis was associated with not eating enough calcium, but only 1% knew that hypertension was also associated with calcium consumption. Many did not know that arteriosclerosis, cancer and colon problems were associated with not consuming enough fiber.

Responses to knowledge questions relating to sources of saturated fat are shown in Table 20. Most of the respondents knew that whole milk, egg yolk, butter, and t-bone steak were higher in saturated fat. Many of the respondents knew that sour cream, peanuts, regular hamburger, pork spare ribs, hot dogs, and porterhouse steak were high in fat (see Table 21).

Table 22 shows the responses to knowledge questions about fat and cholesterol. Many knew if a food has no cholesterol or if it contains vegetable oil, it could be either higher or lower in saturated fat. Most did not know that cholesterol was found only in animal products. About a third of the respondents knew if a food is labeled "light" it could be lower in either calories or fat. Many of the respondents did not know polyunsaturated fats were more likely to be a liquid rather than a solid, only 24% got it correct.

Table 23 shows respondents in the Healthy group had significantly higher total knowledge scores than the Moderate group.

### Attitudes

Responses to questions relating to the importance of following dietary guidelines are shown in Table 24. Many of the respondents felt it was very important to maintain a healthy weight; eat a diet high in fruits and vegetables; choose a diet low in cholesterol, saturated fat and fat; use sugars in moderation; eat an adequate amount of fiber; and use salt /sodium in moderation. Shown in Table 25 are the responses to the importance of food groups. Many respondents felt it was very important to eat a variety of foods. Most of the respondents felt it was important to choose a diet with plenty of grains and eat at least two servings of dairy products daily.

Most of the respondents felt it was very important to consider taste, food safety, nutrition, and food storage when buying food (see Table 26). Many respondents also felt price and ease of preparation were important or very important.

There was no significant difference between the cluster groups in attitude about buying food (see Table 27). However, all three cluster groups had significantly different total attitudes, attitudes toward dietary guidelines and food groups. The Healthy group had the highest attitude scores, the Hedonistic group had the lowest scores and the Moderate group had scores in the middle.

### Beliefs

Most agreed or strongly agreed that eating a variety of foods offers the vitamins and minerals needed for the day, that a healthy diet is just based on knowing what foods are good and bad, and that they currently eat a healthy diet (see Table 28). Table 29 shows most respondents disagreed that starchy foods make people fat. Respondents were slightly more likely to agree or strongly agree that some people are born to be fat and some thin and there are too many recommendations to know what to believe. Most respondents strongly agreed with the statement "What you eat can make a big difference in your chance of getting a disease" (see Table 30).

Responses to the question about health status are shown in Table 31.

Most respondents thought their health was excellent or very good.

Table 32 shows respondents in the Healthy group had significantly higher belief scores about health consequences, diet and disease, and total belief scores than the Moderate group. There was no significant difference among the groups for beliefs about their overall health.

# <u>Behaviors</u>

Responses to questions about food label behaviors are shown in Table

33. Most respondents sometimes or often/always used the nutrition panel, list of ingredients, and descriptive phrases like "low-fat". Some never used the serving size information or health claims.

Behavior responses about fat substitution are shown in Table 34. Most respondents sometimes or always ate: lower-fat luncheon meats, low calorie salad dressing, and ice milk or frozen yogurt. Some never used skim milk or low-fat cheeses.

Table 35 shows the responses to behavior statements about added fat.

Most respondents usually or always added butter or margarine but rarely or
never added cheese or cream sauce to cooked vegetables. Most respondents
spread a light to moderate amount of butter/margarine on breads and muffins.

Most always added fat to baked or boiled potatoes.

Most respondents always washed fruits and vegetables before eating them, trimmed the visible fat off meat, removed chicken skin before eating and ate medium portions of meat (see Table 36).

Table 37 shows most respondents consumed eggs and red meat less than twice a week and usually ate fried chicken. Most respondents ate chips less than once a week and bakery products three times a week or less (see Table 38).

Responses relating to behavior statements about fiber consumption are shown in Table 39. Most respondents usually or always ate fresh fruits and vegetables with the peels.

Table 40 shows that respondents usually substituted fish or poultry for meat and ate fruit for dessert. Most respondents ate the outer leaves of leafy vegetables.

The Healthy group had significantly higher behavior scores for food label, fat substitution, added fat, consumption of animal products and total behavior score than the Hedonistic and Moderate groups (see Table 41). The Healthy group had significantly higher consumption of snacks and food choices than the Moderate group. All three groups were significantly different for food and fat consumption scores.

Table 5. Demographic characteristics of the respondents.

Gender Male Female  Race White Black Asian/Pacific Islander American Indian/Alaskan Native Other  Origin Hispanic origin Non-Hispanic origin Seducation Level Never attended school or kindergarten only Year of school last attended: Elementary: First grade Second grade Third grade Fourth grade Fifth grade Sixth grade Seventh grade Seventh grade High School: Ninth grade	696 729 1158 176 27 10 54 115 1310	49 51 81 12 2 1 4 8 92
Male Female  Race  White Black Asian/Pacific Islander American Indian/Alaskan Native Other  Origin  Hispanic origin Non-Hispanic origin Non-Hispanic origin  Education Level Never attended school or kindergarten only Year of school last attended: Elementary: First grade Second grade Third grade Fourth grade Fifth grade Sixth grade Seventh grade Eighth grade High School:	729 1158 176 27 10 54 115 1310	51 81 12 2 1 4
Race White Black Asian/Pacific Islander American Indian/Alaskan Native Other  Origin Hispanic origin Non-Hispanic origin Non-Hispanic origin Education Level Never attended school or kindergarten only Year of school last attended: Elementary: First grade Second grade Third grade Fourth grade Fifth grade Sixth grade Seventh grade Eighth grade High School:	729 1158 176 27 10 54 115 1310	51 81 12 2 1 4
White Black Asian/Pacific Islander American Indian/Alaskan Native Other  Origin Hispanic origin Non-Hispanic origin  Education Level Never attended school or kindergarten only Year of school last attended: Elementary: First grade Second grade Third grade Fourth grade Fifth grade Sixth grade Seventh grade Eighth grade High School:	176 27 10 54 115 1310	12 2 1 4 8 92
Black Asian/Pacific Islander American Indian/Alaskan Native Other  Origin Hispanic origin Non-Hispanic origin  Education Level Never attended school or kindergarten only Year of school last attended: Elementary: First grade Second grade Third grade Fourth grade Fifth grade Sixth grade Seventh grade Eighth grade High School:	176 27 10 54 115 1310	12 2 1 4 8 92
Asian/Pacific Islander American Indian/Alaskan Native Other  Origin Hispanic origin Non-Hispanic origin  Education Level Never attended school or kindergarten only Year of school last attended: Elementary: First grade Second grade Third grade Fourth grade Fifth grade Sixth grade Seventh grade Eighth grade High School:	27 10 54 115 1310	2 1 4 8 92
American Indian/Alaskan Native Other  Origin Hispanic origin Non-Hispanic origin  Education Level Never attended school or kindergarten only Year of school last attended: Elementary: First grade Second grade Third grade Fourth grade Fifth grade Sixth grade Seventh grade Eighth grade High School:	10 54 115 1310	1 4 8 92
Origin Hispanic origin Non-Hispanic origin  Education Level Never attended school or kindergarten only Year of school last attended: Elementary: First grade Second grade Third grade Fourth grade Fifth grade Sixth grade Seventh grade Eighth grade High School:	54 115 1310	4 8 92
Origin Hispanic origin Non-Hispanic origin  Education Level Never attended school or kindergarten only Year of school last attended: Elementary: First grade Second grade Third grade Fourth grade Fifth grade Sixth grade Seventh grade Eighth grade High School:	115 1310	8 92
Hispanic origin Non-Hispanic origin  Education Level Never attended school or kindergarten only Year of school last attended: Elementary: First grade Second grade Third grade Fourth grade Fifth grade Sixth grade Seventh grade Eighth grade High School:	1310	92
Non-Hispanic origin  Education Level  Never attended school or kindergarten only Year of school last attended: Elementary: First grade Second grade Third grade Fourth grade Fifth grade Sixth grade Seventh grade Eighth grade High School:	1310	92
Education Level  Never attended school or kindergarten only Year of school last attended: Elementary: First grade Second grade Third grade Fourth grade Fifth grade Sixth grade Seventh grade Eighth grade High School:		
Never attended school or kindergarten only Year of school last attended: Elementary: First grade Second grade Third grade Fourth grade Fifth grade Sixth grade Seventh grade Eighth grade High School:	3	0
kindergarten only Year of school last attended: Elementary: First grade Second grade Third grade Fourth grade Fifth grade Sixth grade Seventh grade Eighth grade High School:	3	0
Year of school last attended: Elementary: First grade Second grade Third grade Fourth grade Fifth grade Sixth grade Seventh grade Eighth grade High School:	3	0
Elementary: First grade Second grade Third grade Fourth grade Fifth grade Sixth grade Seventh grade Eighth grade High School:		
First grade Second grade Third grade Fourth grade Fifth grade Sixth grade Seventh grade Eighth grade High School:		
Second grade Third grade Fourth grade Fifth grade Sixth grade Seventh grade Eighth grade High School:	0-20	
Third grade Fourth grade Fifth grade Sixth grade Seventh grade Eighth grade High School:	2	0
Fourth grade Fifth grade Sixth grade Seventh grade Eighth grade High School:	12	1
Fifth grade Sixth grade Seventh grade Eighth grade High School:	9	1
Sixth grade Seventh grade Eighth grade High School:	8	1
Seventh grade Eighth grade High School:	8	1
Eighth grade High School:	20	1
High School:	18	1
	62	4
Minuri grade	40	3
	61	
Tenth grade	67	4 5
Eleventh grade	511	36
Twelfth grade	311	30
College: First year	98	7
Second year	127	9
Third year	121	4
Fourth year	61	7
Five years or more	61 142	10

Table 6. Characteristics of the respondents.

Characteristics	N	Mean <u>+</u> SD	
Income (percent of poverty threshold)	1425	210.7 <u>+</u> 95.2	
Age (years)	1425	49.2 <u>+</u> 17.1	
Education (years)	1425	12.5 <u>+</u> 3.1	

Table 7. Lifestyle characteristics that were used to cluster the respondents into three groups.

Characteristics			
	N	Mean <u>+</u> SD	
Number of cigarettes smoked per day.	1425	4.7 <u>+</u> 10.1	
Frequency of exercising vigorously.x	1425	3.9 <u>+</u> 2.0	
Consumption of alcoholic	N	%	
drinks in the past twelve months.	895	62.8	

<sup>\*</sup>Exercise was rated on a 6 point scale (1=daily, 6=rarely or never).

Table 8. Differences among cluster groups in lifestyle habits of respondents.

Characteristics	Mode N= 1	erate 97	Healt		Hedo N= 3	nistic 7	Р
	Mear	<u>+</u> SD	Mean	± SD	Mear	± SD	
Number of cigarettes smoked per day.	21.8	<u>+</u> 6.0ª	0.6 <u>+</u>	2.2 <sup>b</sup>	43.0	<u>+</u> 6.6°	<.0001
Frequency of exercising vigorously.1	3.8	<u>+</u> 2.1ª	3.9 <u>+</u>	1.9ª	5.1 <u>+</u>	1.6 <sup>b</sup>	.001
Frequency of exercising vigorously.  Daily 5-6 times per week 2-4 times per week Once a week 1-3 times per month Rarely or never	N 50 11 31 14 13 78	% 25.4 5.6 15.7 7.1 6.6 39.6	N 229 70 278 94 69 451	% 19.2 5.9 23.3 7.9 5.8 37.9	N 2 1 5 2 1 26	% 5.4 2.7 13.5 5.4 2.7 70.3	.007
Consumption of alcoholic drinks in the past twelve months.	150	76.1	717	60.2	28	75.7	.0001

<sup>&</sup>lt;sup>a,b</sup> Means in a row with different superscripts are significantly different (p<.05). <sup>1</sup>Exercise was rated on a 6 point scale (1=daily, 6=rarely or never).

Table 9. Differences among cluster groups in demographic characteristics.

Characteristics	Mode N	erate %	Healt N	thy %	Hed N	onistic %	Р
Gender							
Male	115	58.4	557	46.8	24	64.9	.001
Female	82	41.6	634	53.2	13	35.1	
Race							
White	163	82.7	961	80.7	34	91.9	.38
Black	24	12.2	151	12.7	1	2.7	
Other	10	5.1	79	6.6	2	5.4	
Origin							
Hispanic origin	12	6.1	103	8.6	0	0	.09
Non-Hispanic	185	94.0	1088	91.4	37	100.0	
Income (percent of poverty threshold)							
0-75	32	16.2	122	10.2	8	21.6	.001
76-130	40	20.3	171	14.4	10	27.0	
131-300	60	30.5	392	32.9	7	18.9	
over 300	65	33.0	506	42.5	12	32.4	

Table 10. Demographic characteristics of the cluster groups.

Characteristics	Moderate N= 197	Healthy N= 1191	Hedonistic N= 37	Р	
Age (years)	44.7 <u>+</u> 3.4 <sup>a</sup>	50.1 <u>+</u> 17.6 <sup>b</sup>	47.6 <u>+</u> 12.6 <sup>ab</sup>	.0002	
Income (percent of poverty threshold)	187.9 <u>+</u> 98.9°	215.4 <u>+</u> 93.6 <sup>t</sup>	° 180.8 <u>+</u> 106.0 <sup>ab</sup>	.0001	
Education (years)	11.7 <u>+</u> 2.6 <sup>b</sup>	12.7 <u>+</u> 3.1 <sup>a</sup>	11.4 <u>+</u> 2.8 <sup>b</sup>	<.0001	

<sup>&</sup>lt;sup>a,b</sup>Means in a row with different superscripts are significantly different (p<.05).

Table 11. Mean nutrient consumption of respondents.

Nutrient consumption	N	Mean <u>+</u> SD	
Energy (kilocalories)	1425	1928.9 <u>+</u> 832.1	
Energy (% of RDA)	1425	81.7 <u>+</u> 30.4	
Protein (grams)	1425	76.5 <u>+</u> 35.5	
Cholesterol (milligrams)	1425	273.1 <u>+</u> 186.2	
Total fat (grams)	1425	73.3 ± 37.7	
Saturated fat (grams)	1425	24.4 <u>+</u> 13.7	
Fiber (grams)	1425	15.7 <u>+</u> 8.5	
Sodium (milligrams)	1425	3278.1 <u>+</u> 608.4	
Vitamin C (% of RDA)	1425	155.7 <u>+</u> 126.8	
Iron (% of RDA)	1425	134.7 ± 83.6	
Calcium (% of RDA)	1425	86.8 <u>+</u> 50.7	
Alcohol (grams)	1425	6.2 <u>+</u> 20.9	

Table 12. Differences among cluster group respondents in mean nutrient consumption.

Nutrients	Moderate N= 197	Healthy N= 1191	Hedonistic N= 37	Р
	Mean <u>+</u> SD	Mean <u>+</u> SD	Mean <u>+</u> SD	
Energy (kcal)	2087 <u>+</u> 949 <sup>b</sup>	1892 <u>+</u> 796 <sup>a</sup>	2260 <u>+</u> 1113 <sup>b</sup>	.0005
Energy (% of RDA)	84.8 <u>+</u> 34.0	80.9 <u>+</u> 29.3	92.0 <u>+</u> 42.1	.03
Protein (grams)	81.8 <u>+</u> 41.0	75.3 <u>+</u> 34.0	85.8 <u>+</u> 45.0	.02
Cholesterol (milligrams)	313 <u>+</u> 201 <sup>b</sup>	263 <u>+</u> 180ª	379 <u>+</u> 238 <sup>b</sup>	<.0001
Total fat (grams)	83.4 <u>+</u> 42.5 <sup>b</sup>	71.2 <u>+</u> 36.1 <sup>a</sup>	89.8 <u>+</u> 49.7 <sup>b</sup>	<.0001
Saturated fat (grams)	28.7 <u>+</u> 16.2 <sup>b</sup>	23.5 <u>+</u> 12.9 <sup>a</sup>	30.8 <u>+</u> 17.5 <sup>b</sup>	<.0001
Fiber (grams)	13.8 <u>+</u> 8.1 <sup>b</sup>	16.0 <u>+</u> 8.5 <sup>a</sup>	13.7 <u>+</u> 7.4 <sup>ab</sup>	.0009
Vitamin C (% of RDA)	121 <u>+</u> 112 <sup>b</sup>	163 <u>+</u> 129ª	113 <u>+</u> 92 <sup>ab</sup>	<.0001
Iron (% of RDA)	125 <u>+</u> 72	136 <u>+</u> 84	153 <u>+</u> 108	.11
Calcium (% of RDA)	90.8 <u>+</u> 62.8	86.1 <u>+</u> 48.7	86.8 <u>+</u> 41.2	.49
Sodium (milligrams)	3575 <u>+</u> 2023 <sup>b</sup>	3206 <u>+</u> 1507 <sup>a</sup>	4000 <u>+</u> 1947 <sup>b</sup>	.0002
Alcohol (grams)	8.7 <u>+</u> 26.1 <sup>ab</sup>	5.5 <u>+</u> 18.9 <sup>a</sup>	15.6 <u>+</u> 39.8 <sup>b</sup>	.0027

<sup>&</sup>lt;sup>a,b</sup> Means in a row with different superscripts are significantly different (p <.05).

Table 13. Comparison of HEI scores to respondents perceptions of their nutrient intakes.

	Parameter and the second secon		
Nutrients	N	Total Fat HEI score <sup>1</sup>	Р
Perceived fat intake			
Too low Too high About right Don't know	113 670 608 34	6.77 ± 3.36 6.21 ± 3.24 6.72 ± 3.23 6.12 ± 3.84	.03
	N	Saturated fat HEI score	P
Perceived saturated fat intake			
Too low Too high About right Don't know	113 486 692 134	6.78 ± 3.64 <sup>ab</sup> 5.82 ± 3.71 <sup>a</sup> 6.59 ± 3.63 <sup>b</sup> 6.45 ± 3.82 <sup>ab</sup>	.002
	N	Cholesterol HEI score	Р
Perceived cholesterol intake			
Too low Too high About right Don't know	91 427 821 86	7.46 ± 3.89 7.54 ± 3.86 7.92 ± 3.63 6.83 ± 4.15	.04
	N	Sodium HEI score	Р
Perceived sodium intake Too low Too high About right Don't know	153 376 873 23	6.52 <u>+</u> 3.58 5.90 <u>+</u> 3.66 6.51 <u>+</u> 3.58 6.04 <u>+</u> 3.80	>.05

<sup>&</sup>lt;sup>a,b</sup>Means in a column with different superscripts are significantly different

(p <.05).

<sup>1</sup>HEI score based on scale (10=intake meets dietary guideline to 0=intake exceeds dietary guideline by at least 50%).

Table 14. Differences among cluster groups in Healthy Eating Index food group scores.

Food Groups	Moderate N=197	Healthy N=1191	Hedonistic P N=37
Fruit group	3.6 ± 3.6 <sup>b,1</sup>	5.7 <u>+</u> 3.8 <sup>a</sup>	2.9 <u>+</u> 3.4 <sup>b</sup> <.0001
Grain group	7.9 <u>+</u> 2.3	8.1 <u>+</u> 2.2	8.2 <u>+</u> 2.4 .37
Meat group	9.4 <u>+</u> 1.9	9.2 <u>+</u> 2.0	9.5 <u>+</u> 1.4 .43
Milk group	5.3 <u>+</u> 3.3	5.3 <u>+</u> 3.1	4.9 <u>+</u> 3.2 .70
Vegetable group	8.0 <u>+</u> 2.7	8.1 <u>+</u> 2.5	7.7 <u>+</u> 2.7 .43

<sup>&</sup>lt;sup>a,b</sup>Means in a row with different superscripts are significantly different (p <.05).

<sup>&</sup>lt;sup>1</sup>Score based on 10 point scale (10=consumed the recommended number of servings to 0=did not consume any servings).

Table 15. Differences among clusters in Healthy Eating Index dietary guideline scores.

Dietary Guidelines	Moderate N=197	Healthy N=1191	Hedonistic N=37	Р
Total fat score	5.6 ± 3.3 <sup>b,1</sup>	6.7 <u>+</u> 3.2 <sup>a</sup>	4.9 <u>+</u> 3.6 <sup>b</sup>	<.0001
Saturated fat score	5.2 ± 3.7 <sup>b,1</sup>	6.6 <u>+</u> 3.6 <sup>a</sup>	4.9 <u>+</u> 4.0 <sup>b</sup>	<.0001
Cholesterol score	6.7 ± 4.3 <sup>b,1</sup>	7.9 <u>+</u> 3.6 <sup>a</sup>	5.8 <u>+</u> 4.4 <sup>b</sup>	<.0001
Sodium score	5.9 <u>+</u> 3.9 <sup>ab,1</sup>	6.5 ± 3.5 <sup>a</sup>	4.6 ± 3.9 <sup>b</sup>	.0017
Variety score	7.2 <u>+</u> 2.0 <sup>b,2</sup>	7.8 <u>+</u> 1.9 <sup>a</sup>	7.5 <u>+</u> 2.0 <sup>ab</sup>	.0002

<sup>&</sup>lt;sup>a,b</sup>Means in a row with different superscripts were significantly different (p <.05). 
<sup>1</sup>Score based on a 10 point scale (10=met the dietary guidelines to 0=exceeded the dietary guidelines by at least 50%).

<sup>2</sup>Score based on a 10 point scale (10=consumed at least 10 different food items

to 0=did not consume any food items).

Table 16. Differences among clusters in Healthy Eating Index total scores.

HEI scores	Moderate N=197	Healthy N=1191	Hedonistic N=37	P
Food group score	30.6 <u>+</u> 10.1 <sup>b</sup>	35.5 <u>+</u> 9.6 <sup>a</sup>	27.7 <u>+</u> 9.9 <sup>b</sup>	<.0001
Dietary guidelines scores	34.1 ± 7.8 <sup>b</sup>	36.5 <u>+</u> 7.5 <sup>a</sup>	33.2 <u>+</u> 7.0 <sup>b</sup>	<.0001
HEI total score	64.7 <u>+</u> 11.6 <sup>b</sup>	72.0 <u>+</u> 12.0 <sup>a</sup>	61.0 ± 9.9 <sup>b</sup>	<.0001

<sup>&</sup>lt;sup>a,b</sup>Means in a row with different superscripts are significantly different (p <.05).

Table 17. Respondent knowledge about the number of servings recommended for different food groups.

Fruit group (2-3 servings)  N  Mean $\pm$ SD  Fruit group (2-3 servings)  Meat, poultry, fish, dry beans & eggs group (2-3 servings)  Milk, yogurt and cheese group (2-3 servings)  Vegetable group (3-5 servings)  1379  2.7 $\pm$ 0.0  Bread, cereal, rice and pasta group (6-11 servings)  1375  Mean $\pm$ SD  2.7 $\pm$ 0.0				
Meat, poultry, fish, dry beans & eggs group (2-3 servings) 1372 $2.0 \pm 0.0$ Milk, yogurt and cheese group (2-3 servings) 1368 $2.2 \pm 0.0$ Vegetable group (3-5 servings) 1379 $2.7 \pm 0.0$ Bread, cereal, rice and	Groups	N	Mean <u>+</u> SD	% correct
beans & eggs group (2-3 servings) 1372 $2.0 \pm 0.0$ Milk, yogurt and cheese group (2-3 servings) 1368 $2.2 \pm 0.0$ Vegetable group (3-5 servings) 1379 $2.7 \pm 0.0$ Bread, cereal, rice and	group (2-3 servings)	1370 <sup>x</sup>	2.7 <u>+</u> 0.0	71
group (2-3 servings) 1368 $2.2 \pm 0.0$ Vegetable group (3-5 servings) 1379 $2.7 \pm 0.0$ Bread, cereal, rice and	s & eggs	1372	2.0 <u>+</u> 0.0	56
Bread, cereal, rice and		1368	2.2 <u>+</u> 0.0	54
	able group (3-5 servings)	1379	2.7 <u>+</u> 0.0	46
Proces 2. 22 / 1. 22 /	\$ 150 miles	1375	2.6 <u>+</u> 0.0	5

<sup>\*</sup>N totals less than 1425 because some respondents chose don't know or did not answer these questions.

Table 18. Respondents responses to questions about the nutrients in their diet.

Knowledge Statements	N	%	%participants who correctly categorized their diet
Would you say your diet is too low, too high, or about right in:			
Cholesterol? Too low Too high About right Don't know	91 427 821 86	6 30 58 6	51 <sup>1</sup>
Saturated Fat? Too low Too high About right Don't know	113 486 692 134	8 34 49 9	49 <sup>1</sup>
Protein? Too low Too high About right Don't know	172 165 1044 44	12 12 73 3	48 <sup>2</sup>
Calcium? Too low Too high About right Don't know	474 60 822 69	33 4 58 5	44 <sup>2</sup>
Fat? Too low Too high About right Don't know	113 670 608 34	8 47 43 2	43 <sup>1</sup>

Table 18. continued.

Knowledge Statements	N	%	%participants who correctly categorized their diet
Would you say your diet is too low, too high, or about right in:			
Salt or Sodium? Too low Too high About right Don't know	153 376 873 23	11 26 61 2	39 <sup>1</sup>
Calories? Too low Too high About right Don't know	92 566 731 36	6 40 51 3	36 <sup>2</sup>
Iron? Too low Too high About right Don't know	398 26 904 97	28 2 63 7	34 <sup>2</sup>
Vitamin C? Too low Too high About right Don't know	371 38 969 47	26 3 68 3	30 <sup>2</sup>
Fiber? Too low Too high About right Don't know	441 45 880 59	31 3 62 4	23 <sup>3</sup>

Table 18. continued.

Knowledge Statements	N	%	%participants who correctly categorized their diet
Would you say your diet is too low, too high, or about right in:			
Sugar and sweets?			
Too low	136	10	
Too high	493	35	
About right	787	55	
Don't know	9	1	

<sup>&</sup>lt;sup>1</sup>Comparison with Dietary Guidelines. If subjects consumed less than: 2400 mg sodium, 300 mg cholesterol, 30% fat, and 10% saturated fat their actual intake was about right. If subjects consumed more than above recommendation, it was too high.

<sup>&</sup>lt;sup>2</sup>Comparison of perception of diet with actual intake. If actual intake was ≥ 67% of the RDA, nutrient intake was considered to be about right. If actual intake was <67% of the RDA, nutrient intake was too low.

<sup>&</sup>lt;sup>3</sup>Comparison of perception of diet with actual intake. If subjects consumed less than 25 g of fiber a day, it was considered too low. If consumed more than 25 g, it was considered about right.

Table 19. Responses to the questions relating to knowledge about the relationship between nutrients, specific diseases and health problems.

Knowledge Statements	Y	es	No	)
	N	%	N	%
Have you heard of any				
health problems caused by:				
Being overweight?	1324	93	101	7
Arteriosclerosis <sup>a</sup>	1059	74	366	26
Diabetes	208	15	1217	85
High blood pressu	ire 314	22	1111	78
Eating too much salt or				
sodium?	1270	89	155	11
High blood pressu	ire/			
Hypertension	776	54	649	46
Eating too much				
cholesterol?	1255	88	170	12
Heart attack/				
Atherosclerosis	1046	73	379	27
Eating too much fat?	1248	88	177	12
Arteriosclerosis/				
Atherosclerosis	936	66	489	34
Eating too much sugar?	1170	82	255	18
Cavities/Caries	186	13	1239	87
	10.5-5	(# <del>18</del>	(4	
Not eating enough	4404	0.4	204	40
calcium?	1161	81	264	19
Bone problems/	1044	70	204	27
Osteoporosis	1044	73	381	27
Hypertension	11	1	1414	99
Not eating enough				0278000
fiber?	940	66	485	34
Arteriosclerosis	44	3	1381	97
Cancer	204	14	1221	86
Colon problems	697	49	728	51

<sup>&</sup>lt;sup>a</sup>Includes diseases and health problems that were identified in the <u>Third Report on Nutrition Monitoring in the US</u> (1995) as being related to the specific nutrients.

Table 20. Respondent knowledge about sources of saturated fat.

Knowledge Statements	N	%	% correct
Based on your knowledge, which has more saturated fat:			
Skim milk	39	3	93 <sup>2</sup>
Whole milk <sup>1</sup>	13 <b>29</b>	93	
The same	7	0	
Don't know	50	4	
Egg white	132	9	81
Egg yolk <sup>1</sup>	1154	81	
The same	14	1	
Don't know	125	9	
Butter <sup>1</sup>	1047	73	73
Margarine	197	14	
The same	105	7	
Don't know	76	5	
Liver	363	25	63
T-bone steak <sup>1</sup>	891	63	
The same	13	1	
Don't know	158	11	

<sup>&</sup>lt;sup>1</sup>Correct response.
<sup>2</sup>The percentage of respondents that answered correctly.

Table 21. Respondent knowledge about sources of fat.

Knowledge Statements	N	%	% correct	
Based on your knowledge, which has more fat:				
Yogurt Sour cream <sup>1</sup> The same Don't know	111 1199 21 94	8 84 1 7	84 <sup>2</sup>	
Peanuts <sup>1</sup> Popcorn The same Don't know	1190 152 23 60	84 11 2 4	84	
Regular hamburger <sup>1</sup> Ground round The same Don't know	1161 153 40 71	81 11 3 5	81	
Loin pork chops Pork spare ribs <sup>1</sup> The same Don't know	293 960 50 122	21 67 4 9	67	
Hot dogs <sup>1</sup> Ham The same Don't know	868 429 55 73	61 30 4 5	61	
Porterhouse steak <sup>1</sup> Round steak The same Don't know	700 331 84 310	49 23 6 22	49	

<sup>&</sup>lt;sup>1</sup>Correct response.
<sup>2</sup>The percentage of respondents that answered correctly.

Table 22. Responses to the question relating to knowledge about fat and cholesterol.

Knowledge Statements	N	%	% correct
If a food has no cholesterol is it also:			
Low in saturated			
fat	352	25	
High in saturated	50	4	
fat It could be either	58	4	
high or low in			
saturated fat <sup>1</sup>	743	52	52 <sup>2</sup>
Don't know	272	19	
If a product is labeled as containing only vegetable oil is it:  Low in saturated			
fat	488	34	
High in saturated			
fat	76	5	
It could be either high or low in			
saturated fat <sup>1</sup>	668	47	47
Don't know	193	14	
Is cholesterol found in:			
Vegetables and vegetable oils Animal products	26	2	
like meat and dairy products <sup>1</sup> Al <b>l</b> foods containing	525	37	37
fat or oil	734	52	
Don't know	140	10	

Table 22. continued.

Knowledge Statements	N	%	% correct
If a food is labeled as			
"light" it is: Lower in calories	224	16	
Lower in fat	174	12	
Lower in calories			
and/or fat <sup>1</sup>	510	36	36 <sup>2</sup>
Something else	312	22	
Don't know	205	14	
Which kind of fat is more likely to be a liquid rather than a solid:			
Saturated fats Polyunsaturated	201	14	
fats <sup>1</sup>	349	24	24
Are they equally			
likely to be liquids	412	29	
Don't know	463	32	

<sup>&</sup>lt;sup>1</sup>Correct response.
<sup>2</sup>The percentage of respondents that answered correctly.

Table 23. Differences in knowledge scores among cluster groups.

Knowledge scores	Moderate N=197	Healthy N=1191	Hedonistic N=37	Р
Responses to the quest relating to knowledge about:	stions			
Total knowledge score.	24 8 + 5 9 <sup>a</sup>	26 3 + 5 7 <sup>b</sup>	24.5 ± 7.1 <sup>ab</sup>	.00

<sup>&</sup>lt;sup>a,b</sup>Means in a row with different superscripts are significantly different (p <.05).

Table 24. Responses to questions relating to importance of following dietary guidelines.

Attitude Statements		N	%	Mean <u>+</u> SD
How important is it to you	u to:			
Maintain a healthy weight.				
Not at all impt.	1 <sup>x</sup> 2 3	23 54 312	2 4 22	3.66 <u>+</u> 0.63
Very important	4	1036	73	
Choose a diet with plenty of fruits and vegetables.				
Not at all impt.	1 2 3	16 65 360	1 5 25	3.62 <u>+</u> 0.63
Very important	4	984	69	
Choose a diet low in cholesterol.				
Not at all impt.	1 2 3	52 125 404	4 9 28	3.43 <u>+</u> 0.80
Very important	4	844	59	
Choose a diet low in saturated fat.				
Not at all impt.	1 2 3	73 139 421	5 10 30	3.36 <u>+</u> 0.86
Very important	4	792	56	
Use sugars only in moderation.				
Not at all impt.	1 <sup>x</sup> 2 3	40 158 476	3 11 33	3.36 <u>+</u> 0.79
Very important	4	751	53	

Table 24. continued.

Attitude Statements		N	%	Mean <u>+</u> SD
How important is it to yo	u to:			
Choose a diet with adequate fiber.				
Not at all impt.	1 2 3	70 131 480	5 9 34	3.33 <u>+</u> 0.84
Very important	4	744	52	
Choose a diet low in fat.				
Not at all impt.	1 2 3	83 180 373	6 13 26	3.31 <u>+</u> 0.91
Very important	4	789	55	
Use salt or sodium only in moderation.				
Not at all impt.	1 2 3	83 180 373	6 13 26	3.31 <u>+</u> 0.90
Very important	4	789	55	

<sup>&</sup>lt;sup>x</sup>Respondents who replied they did not know were assigned a score of 1.

Table 25. Responses to questions relating to importance of food groups.

Attitude Statements		N	%	Mean <u>+</u> SD
How important is it to yo	u to:			
Eat a variety of foods.				
Not at all impt.	1 <sup>x</sup>	17	1	$3.55 \pm 0.66$
*	2	85	6	<del>2</del>
	3	419	29	
Very important	4	904	63	
Choose a diet with plenty of breads, cereals, rice and pasta.				
Not at all impt.	1	69	5	3.01 ± 0.86
and a service of the	1 2 3	312	22	
	3	581	41	
Very important	4	463	32	
Eat at least two servings of dairy products daily.			_	
Not at all impt.	1	95	7	3.00 <u>+</u> 0.92
	2	318	22	
17 5	3	511	36	
Very important	4	501	35	

<sup>&</sup>lt;sup>x</sup>Respondents who replied they did not know were assigned a score of 1.

Table 26. Responses to questions relating to buying food.

Attitude Statements		N	%	Mean <u>+</u> SD
When you buy food how important is:				
Taste?				
Not at all impt.	1 <sup>x</sup> 2	9 24	1 2	3.81 <u>+</u> 0.48
Very important	2 3 4	202 1190	14 84	
Food safety?	4	00	0	277 . 0.64
Not at all impt.	1	33 38	2 3	3.77 <u>+</u> 0.61
	2	152	11	
Very important	4	1202	84	
Nutrition?				
Not at all impt.	1	27	2	3.54 ± 0.68
•	2	68	5	
		436	31	
Very important	4	894	63	
How well the food keeps	?			
Not at all impt.	1	39	3	3.48 <u>+</u> 0.77
	2	124	9	
		381	27	
Very important	4	881	62	
Price?				
Not at all impt.	1	53	4	3.29 <u>+</u> 0.81
	2	158	11	
V Producti in the control of the control		541	38	
Very important	4	673	47	

Table 26. continued.

Attitude Statements		N	%	Mean <u>+</u> SD
When you buy food how important is:				
Ease of proporation?				
Ease of preparation?				
Not at all impt.	1 <sup>x</sup>	88	6	3.07 ± 0.90
일 사람들이 나타가 되었다. 그리고 있었습니다. 가장이 보고 있는데 하는데 있었다면 없다고 있다면 하는데 살 때문에 없다면	1 <sup>x</sup> 2	88 268	6 19	3.07 <u>+</u> 0.90
일 사람들이 나타가 되었다. 그리고 있었습니다. 가장이 보고 있는데 하는데 있었다면 없다고 있다면 하는데 살 때문에 없다면				3.07 <u>+</u> 0.90

<sup>\*</sup>Respondents who said they did not know were assigned a score of 1.

Table 27. Differences among cluster groups in attitude scores.

Attitude scores	Moderate	Healthy	Hedonistic	P
Responses to buying food.	20.9 <u>+</u> 2.5	21.0 <u>+</u> 2.4	20.2 <u>+</u> 3.7	.14
The importance of following dietary guidelines.	26.0 <u>+</u> 5.1 <sup>a</sup>	27.9 <u>+</u> 4.0 <sup>b</sup>	24.0 <u>+</u> 6.5°	<.0001
The importance of food groups.	9.3 <u>+</u> 1.9 <sup>a</sup>	9.6 <u>+</u> 1.8 <sup>b</sup>	8.9 <u>+</u> 1.6 <sup>c</sup>	.004
Total attitude score	56.2 <u>+</u> 7.5 <sup>a</sup>	58.5 ± 6.2 <sup>b</sup>	53.1 <u>+</u> 10.3°	<.0001

 $<sup>^{\</sup>text{a-c}}\text{Means}$  in a row with different superscripts are significantly different (p <.05).

Table 28. Respondent beliefs about a healthy diet.

Belief Statements		N	%	Mean <u>+</u> SD			
How much do you agree or disagree with the following:							
Choosing a healthy diet is just a matter of knowing what foods are good and what foods are bad.							
Strongly disagree	1 <sup>x</sup> 2 3	62 170 584	4 12 41	3.22 <u>+</u> 0.82			
Strongly agree	4	609	43				
Eating a variety of foods each day probably gives you all the vitamins and minerals you need. Strongly disagree	1 2 2.5 3	88 250 1 577	6 18 0 40	3.10 <u>+</u> 0.88			
Strongly agree	4	509	36				
The things I eat and drink now are healthy so there is no reason for me to make changes.  Strongly agree	1×	158	11	2.60 ± 0.90			
Strongly disagree	2 2.5 <sup>y</sup> 3 4	507 2 504 254	36 1 35 18	2.00 - 0.00			
onongly disagree	-	204	10				

<sup>&</sup>lt;sup>x</sup>Respondents responses to belief statements using a 4 point Likert scale were reversed (1=strongly agree to 4=strongly disagree).

<sup>y</sup>Respondents that answered don't know were assigned a 2.5.

Table 29. Respondent beliefs about health consequences.

Belief Statements		N	%	Mean <u>+</u> SD
How much do you agree or disagree with the following:				
Starchy foods, like bread, potatoes, and rice make people fat.				
Strongly agree	1 <sup>x</sup> 2 2.5 3	225 353 5	16 25 0	2.71 <u>+</u> 1.03
Strongly disagree	4	456 386	32 27	
Some people are born to be fat and some thin; there is not much you can do to change this. Strongly agree	1 <sup>×</sup> 2 2.5 3	232 425 1 418	16 30 0 29	2.62 <u>+</u> 1.03
Strongly disagree	4	349	24	
There are so many recommendations about healthy ways to eat, it's hard to know what to believe.				
Strongly agree	1 <sup>x</sup> 2 2.5 3	610 535 2 177	43 38 0 12	1.84 <u>+</u> 0.90
Strongly disagree	4	101	7	

<sup>&</sup>lt;sup>x</sup>Respondents responses to belief statements using a 4 point Likert scale were reversed (1=strongly agree to 4=strongly disagree).

<sup>y</sup>Respondents that answered don't know were assigned a 2.5.

Table 30 . Respondent beliefs about diet and disease.

Belief Statements		N	%	Mean <u>+</u> SD
How much do you agree or disagree with the following:				
What you eat can make a big difference in your chance of getting a disease, like heart disease or cancer.				
Strongly disagree	1	59	4	3.45 <u>+</u> 0.79
	2	88	6	
	2.5 <sup>y</sup>	7	0	
	3	425	30	
Strongly agree	4	846	59	

<sup>&</sup>lt;sup>y</sup>Respondents that answered don't know were assigned a 2.5.

Table 31. Respondent beliefs about their health status.

Belief Statements		- N	%	Mean <u>+</u> SD
In general, would you say your healt				
Excelle	nt 5	471×	33.1	3.85 ± 1.06
Very go	od 4	464	32.6	
Good	3	326	22.9	
Fair	2	126	8.8	
Poor	1	37	2.6	

<sup>\*</sup>Respondents responses to belief statements using a 5 point Likert scale were reversed (1=poor to 5=excellent).

Table 32. Differences among cluster groups in beliefs.

Belief Statements	Moderate N= 197	Healthy N= 1191	Hedonistic N= 37	Р
Beliefs about a healthy diet.	8.6 <u>+</u> 1.8 <sup>x</sup>	8.9 <u>+</u> 1.8	8.6 <u>+</u> 1.9	.053
Beliefs about health consequences.	6.8 <u>+</u> 1.9 <sup>a</sup>	7.3 <u>+</u> 2.1 <sup>b</sup>	6.5 <u>+</u> 1.9 <sup>ab</sup>	.001
Beliefs about diet and disease.	3.3 <u>+</u> 0.8 <sup>a</sup>	3.5 ± 0.8 <sup>b</sup>	3.5 ± 0.8 <sup>ab</sup>	.036
Beliefs about their health status.	3.9 <u>+</u> 1.0	3.8 <u>+</u> 1.1	3.9 <u>+</u> 1.1	.94
Total belief score.	20.9 <u>+</u> 2.6 <sup>a</sup>	21.9 ± 3.2 <sup>b</sup>	20.7 ± 2.6 <sup>ab</sup>	<.001

<sup>\*</sup>Responses to belief statements were added together to create a score.

a,b Means in a row with different superscripts are significantly different (p <.05).

Table 33. Respondent food label behaviors.

Behavior Statements		N	%	Mean <u>+</u> SD
When you buy foods, do you use:				
The nutrition panel that tells the amount of calories, protein, fat, and such in a serving of food? Never seen/don't know Never	0 <sup>y</sup> 1 <sup>x</sup> 3 2 4	36 301 460 173	3 21 32 12	2.70 <u>+</u> 1.19
Often/always	4	455	32	
The list of ingredients? Never seen/don't know Never  Often/always	0 1 2 3 4	30 287 211 476 421	2 20 15 33 30	2.68 <u>+</u> 1.16
The short phrases like "low-fat", "light" or "good source of fiber"? Never seen/don't know Never  Often/always	0 1 2 3 4	41 314 200 476 394	3 22 14 33 28	2.61 <u>+</u> 1.19
The information about the size of a serving?  Never seen/don't know Never  Often/always	0 1 2 3 4	36 428 270 401 290	3 30 19 28 20	2.34 <u>+</u> 1.17

Table 33. continued.

Behavior Statements		N	%	Mean <u>+</u> SD
A statement that describes how nutrients or foods and health problems are related? Never seen/don't know Never		116 414	8 29	2.16 <u>+</u> 1.24
140701	1 <sup>x</sup> 2	261	18	
	3	396	28	
Often/always	4	238	17	

<sup>\*</sup>Subjects responded to behavior statements using a 4 point Likert scale (1=never to 4=often/always).

yResponses of subjects who answered never seen or don't know were combined.

Table 34. Respondent fat substitution behaviors.

Behavior Statements		N	%	Mean <u>+</u> SD
When you eat foods, do you:				
Eat lower-fat luncheon meats instead of regular luncheon meats?				
Never	1 <sup>x</sup> 2 3	273 212 525	19 15 37	2.76 <u>+</u> 1.07
Always	4	415	29	
Use low-calorie instead of regular salad dressing?				
Never	1 2 3	388 153 472	27 11 33	2.64 <u>+</u> 1.16
Always	4	412	29	
Eat ice milk, frozen yogurt, or sherbet instead of ice cream?			is e	
Never	1 2 3	402 206 522	28 14 37	2.50 <u>+</u> 1.11
Always	4	295	21	
Use skim or 1% milk instead of 2% or whole milk?				
Never	1 2 3	543 179 220	38 13 15	2.45 <u>+</u> 1.30
Always	4	483	34	

Table 34. continued.

Behavior Statemen	its		N	%	Mean <u>+</u> SD	
Eat special, low-fat cheeses, when you eat cheese?						
Never		1 <sup>x</sup>	560	39	2.21 + 1.14	
	4	2	246	17	and the second s	
		3	380	27		
Always		4	239	17		

<sup>\*</sup>Responses to all fat substitution behavior statements using a 4 point Likert scale were reversed (1=never to 4=always).

Table 35. Respondent added fat behaviors.

Behavior Statements		N	%	Mean <u>+</u> SD
When you eat cooked vegetables, do you eat them with added cheese or another creamy sauce?  Always	1 <sup>x</sup> 2 3	32 467 476	2 33 33	2.94 <u>+</u> 0.85
Never	4	450	32	
Would you describe the amount of butter or marga you usually spread on breand muffins as:  Generous  Moderate  Light  None		162 483 627 153	11 34 44 11	2.54 <u>+</u> 0.83
When you eat cooked vegetables, do you eat them with added butter or margarine? Always	1 <sup>x</sup> 2 3 4	325 582 261 257	23 41 18 18	2.32 <u>+</u> 1.02
When you eat baked or be potatoes, how often do yo add butter, margarine, or sour cream?  Always		819 377	57 26	1.66 <u>+</u> 0.93
Never	4	118 111	8 8	

<sup>\*</sup> The scale for these behavior statements using a 4 point Likert scale were reversed (1=never to 4=always).

Table 36. Responses to questions relating to behavior statements about food and fat consumption.

Behavior Statements		N	%	Mean <u>+</u> SD
Do you wash your fresh frand vegetables before yo eat them?				
Never	1×	19	1	3 90 + 0 53
Never	2	24	2	3.80 ± 0.52
	2			
A.I.		180	13	
Always	4	1202	84	
When you eat meat and there is visible fat, do you trim the fat?				
Never	1	93	7	$3.53 \pm 0.84$
Nevel		47	7 3	3.33 ± 0.64
	2			
A.1		297	21	
Always	4	988	69	
When you eat meat, are your portions:				
Large	2	152	11	$3.24 \pm 0.63$
Medium	3	778	55	<u> </u>
Small	4	494	35	
Do not eat meat	8	1	0	
When you eat chicken,				
do you remove the skin?				92 (grav - 11 10/2)
Never	1	248	17	3.04 <u>+</u> 1.12
	2	114	8	
	3	398	28	
Always	4	665	47	

<sup>\*</sup>Respondents responses to all the behavior statements using a 4 point Likert scale were reversed.

Table 37. Responses to questions relating to behavior statements about consumption of animal products.

Behavior Statements		N	%	Mean <u>+</u> SD
Weekly consumption of				
eggs?	.X	400	44	2.02 - 2.02
5 or more	1 <sup>x</sup>	163	11	2.89 <u>+</u> 0.99
3-4	2	293	21	
1-2	3	514	36	
Less than once				
a week/never	4	455	32	
Weekly consumption of				
beef, pork, or lamb as				
your main meal?				
5-7 times	1	236	17	2.50 ± 0.93
3-4	2	441	31	2.30 - 0.33
	3			
1-2	3	548	38	
Less than once			52552	
a week/never	4	200	14	
When you eat chicken,				
do you eat it fried?				
Always	1	119	8	2.52 ± 0.85
, -	2	664	47	
	3			
Never				
Never	3 4	420 222	29 16	

<sup>\*</sup>Respondents responses to all the behavior statements using a 4 point Likert scale were reversed.

Table 38. Responses to questions relating to behavior statements about weekly consumption of snacks.

Behavior Statements	N	%	Mean <u>+</u> SD	
Weekly consumption of				
chips, such as potato or	*			
corn chips				
7 or more	1×	72	5	3.34 <u>+</u> 0.81
4-6	2	91	6	
1-3	3	549	39	
Less than once				
a week/never	4	713	50	
Weekly consumption of				
baked products like cake	es,			
cookies, or donuts				
7 or more	1×	106	7	$3.11 \pm 0.88$
4-6	2	167	12	_
1-3	3	624	44	
Less than once				
a week/never	4	528	37	

<sup>\*</sup>Respondents responses to all the behavior statements using a 4 point Likert scale were reversed.

Table 39. Respondent behavior statements about fiber consumption.

Behavior Statements		N	%	Mean <u>+</u> SD
Do you eat the peels that can be eaten when				
eating fresh fruits?				
Never	1 <sup>x</sup>	216	15	3.09 + 1.06
	2	95	7	
	3	463	32	
Always	4	651	46	
Do you eat the peels				
that can be eaten when				
eating fresh vegetables?	0			
Never	1	229	16	2.88 <u>+</u> 1.01
	2	139	10	
	3	630	44	
Always	4	427	30	

<sup>\*</sup>The scale for these behavior statements using a 4 point Likert scale was reversed (1=never to 4=always).

Table 40. Responses to questions relating to behavior statements about food choices.

Behavior Statements	N	%	Mean <u>+</u> SD	
Eat fish or poultry instead of meat?				
Never	1 <sup>x</sup>	68	5	$3.34 \pm 0.93$
	2	138	10	
	3	972	68	
Always	4	247	17	
Have fruit for dessert when	n			
you eat dessert?				
Never	1	114	8	2.87 ± 0.79
	2	207	15	
	3	857	60	
Always	4	247	17	
Do you eat the outer				
leaves of leafy vegetables				
like lettuce and cabbage?				
Yes	4	755	53	2.59 ± 1.50
No	1	670	47	

<sup>\*</sup>Respondents responses to all the behavior statements using a 4 point Likert scale were reversed (1=never to 4=always).

Table 41. Differences in behavior scores among cluster groups.

Behavior Statements	Moderate N=197	Healthy N=1191	Hedonistic N=37	Р
Behavior statements about:				
Food labels.	10.7 ± 5.2 <sup>a</sup>	12.9 ± 4.7 <sup>b</sup>	9.1 <u>+</u> 5.5 <sup>a</sup>	<.0001
Fat substitution.	10.4 ± 4.2°	13.0 ± 4.1 <sup>b</sup>	9.8 <u>+</u> 4.1 <sup>a</sup>	<.0001
Added fat.	8.5 ± 2.2 <sup>a</sup>	$9.7 \pm 2.5^{b}$	$7.8 \pm 2.4^{a}$	<.0001
Food & fat consumption.	12.8 <u>+</u> 2.4 <sup>a</sup>	13.8 <u>+</u> 1.9 <sup>b</sup>	11.7 <u>+</u> 2.8°	<.0001
Consumption of animal products.	6.8 <u>+</u> 1.9 <sup>a</sup>	8.1 <u>+</u> 1.9 <sup>b</sup>	6.5 <u>+</u> 2.1 <sup>a</sup>	<.0001
Consumption of snacks.	6.1 <u>+</u> 1.6 <sup>a</sup>	6.5 <u>+</u> 1.3 <sup>b</sup>	6.0 <u>+</u> 1.9 <sup>ab</sup>	<.0001
Fiber consumption.	5.8 <u>+</u> 1.9	6.0 <u>+</u> 1.8	5.7 <u>+</u> 1.9	.321
Food choices.	8.0 ± 2.2 <sup>a</sup>	8.5 ± 1.9 <sup>b</sup>	7.8 ± 2.1 <sup>ab</sup>	.001
Total behavior scores	69.1 <u>+</u> 13.8 <sup>a</sup>	78.5 <u>+</u> 11.9 <sup>b</sup>	64.4 <u>+</u> 13.1 <sup>a</sup>	<.0001

<sup>&</sup>lt;sup>a-c</sup>Means in a row with different superscripts are significantly different (p <.05).

#### CHAPTER V

#### DISCUSSION

The purpose of this study was to examine the relationship between lifestyle patterns (smoking, alcohol consumption, and physical activity,) and diet quality, knowledge, attitudes, beliefs and behaviors. Specifically, the study hypothesized that 1) subjects who have hedonistic lifestyle patterns (smoke and drink more and do not exercise) will have lower Healthy Eating Index (HEI) scores than subjects with healthy lifestyle patterns (do not smoke or drink and exercise regularly) and subjects in the Moderate group will have moderate HEI scores, 2) subjects in the Healthy group will have higher nutrition knowledge scores than subjects in the Hedonistic group and subjects in the Moderate group will have moderate knowledge scores, 3) subjects in the Healthy group will have more positive attitudes toward nutrition than subjects in the Hedonistic group, and the Moderate group will have moderate attitudes, 4) subjects in the Healthy group will have more positive beliefs about nutrition than subjects in the Hedonistic group, and the Moderate group will have moderate scores, and 5) subjects in the Healthy group will report healthier eating behaviors than the Hedonistic group, and the Moderate group will report moderate eating behaviors.

# **Demographics**

The results of the demographics showed that subjects in the Healthy group were more likely to be female, older and more educated than subjects in the Hedonistic and Moderate. There were also more subjects in the Healthy group with an income of greater than 300 percent of the poverty threshold.

Patterson et al. (1994B) also found subjects in their good diet cluster were more likely to be older and female than those in the other clusters. Low income and less educated subjects were both associated with passive and smoking lifestyles. The subjects of higher income were more likely to be in the health promoting and drinking lifestyles.

The results of the lifestyle patterns showed that subjects in the Healthy group smoked half a cigarette per day, sixty percent of the subjects had consumed alcoholic beverages in the past twelve months and exercised vigorously almost four times per week. Some researchers (Veenstra et al., 1993; Colditz et al., 1991; Margetts & Jackson, 1993; Perkins et al., 1993) have found a positive relationship between smoking and alcohol consumption and negative relationship with physical activity (Smith et al., 1997; Perkins et al., 1993).

Smokers lead more sedentary lifestyles than non-smokers (Smith et al., 1997; Castro et al., 1989). These studies support the findings of our study. Subjects in both the Hedonistic and Moderate group smoked significantly more cigarettes a day than the Healthy group. Of these subjects, seventy-five percent also consumed alcoholic beverages in the past twelve months which was higher than

the Healthy group. The Hedonistic group exercised significantly less times a week than the Healthy group.

# Hypothesis One

Study results showed that subjects who had Hedonistic and Moderate lifestyle patterns had lower food group, dietary guidelines and total HEI scores than subjects with Healthy lifestyle patterns. However, subjects in the Moderate group did not have higher total HEI scores than those in the Hedonistic group.

The cluster groups in this study differed in the number of cigarettes smoked; the Healthy group smoked half a cigarette per day, the Moderate group smoked twenty-one per day and the Hedonistic group smoked forty-three per day. Other studies have found that smokers consume more energy (McPhillips et al., 1994), fat (McPhillips et al., 1994; Fisher & Gordon, 1985; Smith et al., 1997), saturated fat (Smith et al., 1997), cholesterol (McPhillips et al., 1994; Larkin et al., 1990; Margetts & Jackson, 1993), sodium (Smith et al., 1997) and alcohol (McPhillips et al., 1994; Cade & Margetts, 1991; Subar et al., 1990; Perkins et al., 1993; Morabia & Wynder, 1990; Margetts & Jackson, 1993) than non-smokers. However, Perkins et al. (1993) found no significant differences in fat, cholesterol, vitamin or mineral intakes between smokers and non-smokers.

Other studies have found that smokers consume less protein (McPhillips et al., 1994; Larkin et al., 1990; Margetts & Jackson, 1993; Veenstra et al., 1993), fiber (McPhillips et al., 1994; Cade & Margetts, 1991; Subar et al., 1990; Perkins et al., 1993; Larkin et al., 1990; Margetts & Jackson, 1993; Herbert & Kabat,

1990) and vitamin C (Cade & Margetts, 1991; Subar et al., 1990; Larkin et al., 1990; Margetts & Jackson, 1993) than non-smokers.

Other studies have also found that smokers consume fewer fruits and vegetables (McPhillips et al., 1994; Larkin et al., 1990; Margetts & Jackson, 1993; Morabia & Wynder, 1990; Herbert & Kabat, 1990), grains (Subar et al., 1990) and lowfat milk (Subar et al., 1990) than non-smokers. Smokers consume more meat (Morabia & Wynder, 1990; Subar et al., 1990; Margetts & Jackson, 1993) than non-smokers.

The cluster groups in this study also differed in the number of alcoholic beverages consumed; subjects in the Hedonistic group were more likely to consume alcohol than the other two groups. Researchers have found differences between drinkers and non-drinkers in nutrient intake. Drinkers consumed more cholesterol (Veenstra et al., 1993; Colditz et al., 1991), fat (Veenstra et al., 1993; Colditz et al., 1991; Gruchow et al., 1985), saturated fat (Veenstra et al., 1993; Colditz et al., 1991), protein (Veenstra et al., 1993; Colditz et al., 1991; Gruchow et al., 1985; Fisher & Gordon, 1985) than non-drinkers. In contrast, Thomson et al. (1988) found that non-drinkers had a higher energy, fat, and saturated fat intake than those who drank. Others found drinkers consumed less carbohydrate (Colditz et al., 1991; Gruchow et al., 1985; Fisher & Gordon, 1985; Thomson et al., 1988) than non-drinkers.

The cluster groups in our study also differed in the frequency of exercising vigorously. The Hedonistic group exercised significantly less than the Healthy

and Moderate groups. Other researchers found that exercisers met the Food Guide recommendations for the grains and fruit groups more often than non-exercisers (Georgiou et al., 1996). Exercisers consumed more whole grains, fruits and vegetables (Georgiou et al., 1996; Armstrong et al., 1990) than non-exercisers. Armstrong et al. (1990) also found that exercisers reported decreasing their consumption of red meat, eggs, and dairy products.

These studies support the findings of our study. Like the other studies we found that subjects in the Healthy group who drank and smoked less and exercised more made better food choices than the Hedonistic and Moderate groups.

#### Hypothesis Two

The results showed that subjects in the Healthy group had higher nutrition knowledge scores than subjects in the Moderate group. However, the total knowledge scores of the Hedonistic group were not different from the other groups.

Other studies have found differences between smokers and non-smokers knowledge about nutrition. Klesges et al. (1988) found that smokers were more concerned about the health consequences of cholesterol and weight control than non-smokers. However, Castro et al. (1989) found no differences between smokers and non-smokers knowledge about stress, diet and smoking.

Subjects in the Healthy group in our study smoked less, were older, had higher levels of education and income than subjects in the Moderate group.

Knowledge about the health consequences of smoking was predicted by smoking status, education and income (Klesges et al., 1988). Smith et al. (1997) found that knowledge about specific nutrients in foods was higher in smokers as the level of income and education increased. This further supports findings of our studies, that subjects in the Healthy group who smoked and drank less and exercised more, had higher knowledge scores about nutrition than the Hedonistic and Moderate groups.

# Hypothesis Three

The results showed that subjects in the Healthy group had more positive attitudes towards nutrition than subjects in the Hedonistic and Moderate groups. However, the Hedonistic and Moderate groups were also significantly different from each other.

The following studies provide support for the finding that positive attitudes toward nutrition are associated with more physical activity and less smoking and drinking. Castro et al. (1989) found non-smokers had more positive attitudes about health than smokers. Smith et al. (1997) found that smoking was associated with negative attitudes towards the importance of food and nutrients needed for a healthy diet. Georgiou et al. (1996) found that young adults who exercised considered it more important to eat nutritious foods than non-exercisers. Armstrong et al. (1990) found some specific attitudes exercisers cited for changing food choices included "to improve health," "to lose weight," and "to prevent health problems".

These studies support our findings that subjects in the Healthy group who smoked and drank less and exercised more had more positive attitudes toward nutrition than the other groups.

# Hypothesis Four

Study results showed that subjects in the Healthy group had more positive beliefs about nutrition than subjects in the Moderate group. The Healthy group had significantly higher belief scores for health consequences, diet and disease, and total beliefs than subjects in the Moderate group.

Other studies found smokers to have more negative beliefs than nonsmokers. Castro et al. (1989) found smokers had a lower commitment to enact healthy behavior changes and maintained a lower level of motivation for making healthy behavioral changes than non-smokers. Smokers maintained more selfexempting beliefs about smoking, health and physical activity (Chapman et al., 1993).

These studies provide some support for our findings that the Healthy group who smoked less had more positive beliefs about nutrition.

# Hypothesis Five

Study results showed subjects in the Healthy group reported healthier eating behaviors (total behavior scores) than the Hedonistic and Moderate groups. The Healthy group had significantly higher behavior scores for food

labels, fat substitution, added fat, food and fat consumption, consumption of animal products and snacks, food choices and total behaviors.

Other studies found that exercisers reported healthier eating behaviors than non-exercisers. Exercisers reported changes in food choices and increased fruits and decreased consumption of eggs and dairy products (Armstrong et al., 1990). Georgiou et al. (1996) found that exercisers consumed more nutrient dense and low-fat foods, non-fried poultry and fish and beans than non-exercisers.

Researchers have found that smokers are more likely to report poor food choices by choosing foods high in cholesterol (Castro et al., 1989) than non-smokers.

These studies support the findings of our study. Subjects in the Healthy group who exercised more and smoked less reported healthier eating behaviors.

These healthier behavior patterns were confirmed by higher HEI scores.

# Limitations of the Study

There are a number of limitations to the study. First, a team of professionals chosen by the USDA designed the original survey. The survey was not pre-tested in the target population. Second, the data may not be reliable because it was self-reported. Third, groups were not evenly distributed, with more subjects in the Healthy group than the other groups. Fourth, nutritional professionals we selected chose the questions to consider in our analyses.

There may be a bias to the questions chosen because others may have fit them

into different categorizes (knowledge, attitudes, beliefs, and behaviors) than what they chose. To ensure reliability of the categorized questions, we could have had the nutrition professionals get together and interpret the questions at the same time. This would have ensured they were seeing and interpreting the questions the same way. Therefore, the questions would have been categorized based on a consensus of the views, which they reflected. This would have also increased the validity of the questions selected based on the consensus agreement of the nutrition professionals. Finally, there was no reported reliability data for the survey by the USDA. Future research needs to be done regarding the reliability of the survey because, the respondents may be answering the survey based on what they think is right as opposed to what they actually do.

As for the surveys, the low-income subjects were over-sampled. Most subjects were white and female. Subjects in this study were only chosen if they completed two 24-hour recalls and answered all the DHKS questions. Therefore, the views may not represent the entire United States and the sample may have been biased toward subjects who may be more aware of lifestyle patterns and diet.

#### CHAPTER VI

#### CONCLUSIONS

The results of this study support the unidimensionality of health choices, the idea that health behaviors may be interrelated (Patterson et al., 1994B). Individuals who led a healthier lifestyle (smoked and drank less, and exercised more) made better food choices.

For this study, subjects were grouped based on the lifestyle patterns.

Subjects in the Healthy group had higher diet quality, knowledge, attitudes, beliefs and behavior scores than subjects in the Hedonistic and Moderate groups. This implies that the Healthy group consumed a healthy diet which led to other positive changes such as, more knowledge, positive attitudes and beliefs, and healthier eating behaviors.

This study is useful to dietitians because they need to be aware that smoking, drinking and not exercising can strongly influence a person's diet and lifestyle habits. The dietitian should ask about lifestyle habits, knowledge, attitudes, beliefs, and behaviors in their initial assessment of the client. This will help in counseling them about the relationship of diet and these factors. By understanding that these factors influence diet, the dietitian can more effectively help educate the client about the effects of these negative lifestyle habits and turn them into positive and productive habits.

Studies that would have been useful to help support the hypothesis are studies that specifically examined how smoking, alcohol consumption, and physical activity influence knowledge, attitudes, beliefs and behaviors. The studies would have examined the general population, using a standardized questionnaire based on these factors, and a scoring method similar to the current study, would have helped to identify direct influences.

For future research it may be helpful to design a questionnaire or alter the current questionnaire to better categorize the questions into knowledge, attitudes, beliefs or behaviors. There were some questions that could have been grouped in either category.

Future research could use the CSFII and DHKS data to determine how demographic characteristics influence diet quality, knowledge, attitudes, beliefs and behaviors about diet. This would help nutrition educators understand how education, income, race, age and gender play a role in nutrition knowledge, attitudes, beliefs and behaviors.

The results of this study pose a challenge to nutrition educators to educate their clients about the influence of smoking, alcohol consumption and physical activity on diet.

# CHAPTER VI

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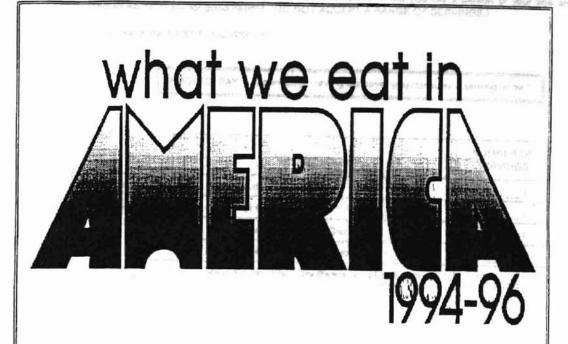
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# APPENDIX Aga from offerent book groups that a presion strauts on



WHAT WE EAT IN AMERICA: 1994-1996
CONTINUING SURVEY OF FOOD INTAKES BY INDIVIDUALS

Conducted for:

United States Department of Agriculture

Conducted by:

Westat 1650 Research Blvd. Rockville, MD 20850

TIME STARTED	AM
	 PM

Let's begin by talking about the number of servings from different food groups that a person should eat each day. How many servings from the (FOOD GROUP) would you say a person of your age and sex should eat each day for good health? (DO NOT ACCEPT A RANGE OF SERVINGS.)

What about the (NEXT FOOD GROUP)?

IF ASKED, SAY: "Count as a serving whatever you consider a serving to be."

START AT "X"

•	FOOD GROUP	NUMBER OF SERVINGS	KNOW
a.	Fruit Group?	1_1_1	98
ь.	Vegetable Group?	1_1_1	98
c.	Milk, Yogurt, and Cheese Group?	1_1_1	98
ď.	Bread, Cereal, Rice, and Pasta Group?	1_1_!	98
0.	Meat, Poultry, Fish, Dry Beans, and Eggs Group?	1 1 1	98

 Now I am going to read some statements about what people eat. Please tell me if you strongly agree, somewhat agree, somewhat disagree, or strongly disagree with the statement: (READ STATEMENT)

What about (NEXT STATEMENT)?

IF NEEDED, SAY: "Do you strongly agree, somewhat agree, somewhat disagree, or strongly disagree with the statement?"

Somewhat Strongly Somewhat Strongly STATEMENT Agree Agree Disagree Disagree START Choosing a healthy diet is just a matter of 3 AT "X" knowing what foods are good and what foods 2 1 are bad. Eating a variety of foods each day probably gives b. you all the vitamins and minerals you need. 3 2 1 Some people are born to be fat and some thin; there is not much you can do to change this. 4 3 2 1 Starchy foods, like bread, potatoes, and rice, make people fat. 4 3 2 1 There are so many recommendations about healthy ways to eat, it's hard to know what to believe. 4 3 2 What you eat can make a big difference in your chance of getting a disease, like heart disease or cancer. 3 2 1 The things I eat and drink now are healthy so 2 there is no reason for me to make changes. 3 1 Somewhat Somewhat Strongly Strongly STATEMENT Disagree Agree Agree Disagree

3. Next, let's talk about your own diet. Compared to what is hearthy, do you think your diet is too low, too high, or about right in (STATEMENT)?

What about (NEXT STATEMENT)?

IF NEEDED. SAY: "Would you say your diet is too low, too high, or about right in that?"

IF NEEDED. SAY: "The question is asking about nutrients from foods, not from vitamin pills."

FREEDO SAY 1, no my expenses servines improving no le-

START AT "X"

	STATEMENT	Too Low	Too High	About Right	DON'T KNOW
2	Calories?	1	2	3	8
b.	Calcium?	1,	2	3	8
a	Iron?	1,2	2	3	8
d.	Vitamın C?	1	2	3	8
0.	Protein?	1	2	3	8
1.	Far?	1	2	3	8
g.	Saturated fat?	1	2	3	8
h.	Cholesterol?	1 11	2	3	8
i,	Salt or sodium?	1	2	3	8
j.	Fiber?	1	2	3	8
k.	Sugar and sweets?	1	2	3	8
	STATEMENT	Too Low	Toa High	About Right	DON:T

 To you personally, is it very important, somewhat important, not too important, or not at all important to (STATEMENT)?

To you personally, how important is it to (NEXT STATEMENT)?

IF NEEDED, SAY: "Is that very important, somewhat important, not too

important, or not at all important to you cersonally?"

IF NEEDED, SAY: "The question is not asking about your actual eating habits,

it is asking about the importance of the statement to you

personally."

START AT 'X"

. STATEMENT	Very Important	Somewhat Important	Not Too Important	Not At All Important	DON'T KNOW
Use sait or sodium only in moderation?	4	3	2	1	8
b. Choose a diet low in saturated far?	4	3	2	1	8
c. Choose a diet with plenty of fruits and vegetables?		3	2	1	8
d. Use sugars only in moderation?	4	3	2	1	8
e. Choose a diet with adequate fiber?	4	3	2	1	8
f. Eat a variety of foods?	4	3	2	1	8
g. Maintain a healthy weight?	4	3	2	1	8
h. Choose a diet low in fat?	4	3	2	1	8
i. Choose a diet low in cholesterol?	4	3	2	1	8
j. Choose a diet with plenty of breads cereals, rice, and pasta?	4	3	2	1	8
k. Eat at least two servings of dairy products daily?	4	3	2	1	8
 STATEMENT	Very Important	Somewhat Important	Not Too Important	Not At All Important	DON'T

IRT	5. Have you heard about any health problems caused by (BEHAVIOR)?  (ASK QUESTIONS 5A - 5G AND 6 UNTIL COMPLETE, THEN GO TO QUESTION 7.)	6.		ACLE - Ar - Ba - Ba - C - C - C - C - C - C - C - C - C -	terioscithius one pri eathir ancer avities logged olitus/fonstip oronau iabele	elerosi oblem og proi (All typ /Carle d arter Colon ation ry disa	FIE A s/Alhe s/Reck blems bes) s ies proble	PPHC roscle	PRIA	ÍER	09 - 10 - 15 - 01 - 11 - 12 - 08 - 13 - 12 - 06 - 14 -	ELOV Eder Fatig Fat/ Hard Heat High High High High High High High High	ma gue Overw dening rt prot	reight of the dema, dehol depres desugn vity	arteri Heart estero	es arteck		15 - 03 - 14 - 16 - 10 - 07 - 17 - 00 - 00 -	Obesity/Overweight Ostsoporosia Renal disease Stroke Tiredness Tooth problems Water (fluid) retention HEALTH PROBLEMS NOT SPECIFIED
	BEHAVIOR		08		vertio						10 -		k of er						
	a. Eating too much fat?  YES	01	02	Ω3	04	05	06	07	08	09	10	11	12	13	14	15	16	17	00 (SPECIFY)
	b. Not eating enough fiber?  YES 1 (O6)  NO	01	02	03	04	06	06	07	08	00	10	11	12	13	14	15	16	17	00 (SPECIFY)
	c. Eating too much salt or sodium?  YES	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	00 (SPECIFY)
	d. Not eating enough calcium? YES 1 (O6) NO	01	02	03	04	05	06	07	0.6	09	10	11	12	13	14	15	16	17	00 (SPECIFY)
	e. Eating too much cholesterol? YES	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	OO (SPECIFY)
	1. Eating too much sugar?  YES	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	(SPECIFY)
	g. Being overweight?  YES 1 (O6)  NO 2 (O5a)	01	02	03	(14	05	06	07	08	09	10	11	12	13	14	15	16	17	00 (SPECIFY)

7	Do you consider	yourself	to	be

Overweight,	1
Underweight, or	2
About right?	3

 Based on your knowledge, which has more saturated fat: (READ EACH PAIR STARTING AT "X" AND THEN WAIT FOR AN ANSWER. DO NOT PROBE "DON'T KNOW" ANSWERS.)

> START AT'X'

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	PAIR	
a.	Liver, or	1
	T-bone steak?	2
	THE SAME	3
	DON'T KNOW	8
b.	Butter, or	1
	Margarine?	2
	THE SAME	3
	DON'T KNOW	8
c.	Egg white, or	1
	Egg yolk?	2
	THE SAME	3
	DON'T KNOW	8
d.	Skim milk, or	1
	Whole milk?	2
	THE SAME	3
	DON'T KNOW	а

9. Which has more fat: (READ EACH PAIR STARTING AT "X" AND THEN WAIT FOR AN ANSWER. DO NOT PROBE "DON'T KNOW" ANSWERS.)

The state of the s

War and the

START AT "X"

	PAIR	
2	Regular hamburger, or	
199	Ground round?	
	THE SAME	1
	DON'T KNOW	8
ь.	Lain park chops, or	70
	Pork spare ribs?	2
	THE SAME	:
	DON'T KNOW	
c.	Hot dogs, or	114
	Ham?	:
	THE SAME	:
	DON'T KNOW	8
d.	Peanuts, or	S
	Popcom?	2
	THE SAME	:
	DON'T KNOW	8
0.	Yogurt, or	7
	Sour cream?	2
	THE SAME	:
	DON'T KNOW	8
1.	Porterhouse steak, or	1
	Round steak?	2
	THE SAME	
	DON'T KNOW	8

### DO NOT PROBE DON'T KNOW ANSWERS FOR Q10-14.

10.	Which kind of fat is more likely to be a liquid	frather than a solid:	
		Saturated fats,	1
		Polyunsaturated fats, or	2
		Are they equally likely to be liquids?	
		DON'T KNOW	8
11.	If a food has no cholesterol is it also:	n to need	
		Low in saturated fat,	1
		High in saturated fat, or	2
	.50	Could it be either high or	
	(.*.)	low in saturated far?	3
		DON'T KNOW	8
12.	Is cholesterol found in:		
		Vegetables and vegetable oils,	1
		Animal products like meat and	
		dairy products, or	2
		All foods containing fat or oil?	3
		DON'T KNOW	8
13.	If a product is labeled as containing only ve	getable oil is it:	
		Low in saturated fat,	1
		High in saturated fat, or	2
		Could it be either high or low	
		in saturated fat?	3
		DON'T KNOW	8
14.		t mean that compared to a similar product not lat ories and/or fat, or does it mean something else?	
		LOWER IN CALORIES	1
		LOWER IN FAT	2
		LOWER IN CALORIES AND/OR FAT	3
		SOMETHING ELSE	4
		DON'T KNOW	8

15. Now think about huying fond. When you buy food, how important is (FACTOR) – very important, somewhat important, not too important, or not at all important?

What about (NEXT FACTOR)?

IF NEEDED, SAY: 'How important is (FACTOR) - very important, somewhat important, not too important, or not at all important?"

 START
AT 'X'

		FACTOR	Very Important	Somewhat Important	Not Too Important	Not At All Important	NOW.1
	*	How sale the food is to ear?	4	3	2	1	8
	<b>b</b> .	Nutrition?	4	3	2	1	8
	c.	Price?	4	3	2	1	8
-	d.	How well the food keeps?	4	3	2	1	8
	•	How easy the food is to grepare?	4	3	2	1	8
	1.	(aste)	4	3	2	1	8

16. Now think about food labels. When you buy foods, do you use (SECTION) often, sometimes, rarely, or never?

What about (NEXT SECTION)?

IF NEFDED, SAY: "Do you use (SECTION) often, sometimes, rately, or never?"

START AT'X'

1		SECTION	Offen (Aways)	Some-	Rately	Navar	NEVER SEEN	DON.1
	a	The list of ingredients?	1	2	3	4	5	8
	b.	The short phrases like "low-fat" or "light" or "good source of fiber"?	,	2	3	4	5	8
	c.	The nutrition panel that tells the amount of calories, protein, fat, and such in a serving of the food?	,	2	3	4	5	8
	d.	The information about the size of a serving?	1	2	3	A	5	8
	•	A statement that describes how nutrients or foods and health problems are related?	,	2	3	4	5	8

BOX 1

IS 'NEVER' (4) OR 'NEVER SEEN' (5) CIRCLED FOR ALL PARTS OF QUESTION 16?

YES ...... 1 (O24)

0 .....

17. When you look for numition information on the lood label, would you say you often, sometimes, rarely, or never look for information about (STATEMENT)?

What about (NEXT STATEMENT)?

IF NEEDED, SAY: "Would you say you often, sometimes, rarely, or never look for information about that?"

START AT 'X'

	STATEMENT	Often (Always)	Some- times	Rarely	Never
a.	Calones?	1	2	3	4
b.	Salt or sodium?	1	2	3	4
c.	Total fat?	1	2	3	4
d.	Saturated fat?	1	2	3	4
0.	Cholesterol?	1	2	3	4
f.	Vitamins or minerals?	1	2	3	4
g.	Fiber?	1	2	3	4
h.	Sugars?	1	2	3	4

18. Now think about the types of food products you buy using food labels. When you buy (FOOD PRODUCT), do you look for nutrition information on the food label often, sometimes, rarely, or never?

What about (NEXT FOOD PRODUCT)?

IF NEEDED, SAY: "And when you buy (FOOD PRODUCT), do you use the label often, sometimes, rarely, or never?"

START AT 'X'

FOOD PRODUCT	Often (Always)	Some- times	Rarely	Never	NEVER SEEN	DO NOT
Dessert items like cookies or cake mixes?	,	2	3	4	5	6
Snack items like chips, popcorn, or pretzels?	1	2	3	4	5	6
c. Frozen dinners or main dishes?	1	2	3	4	5	6
d. Breakfast cereals?	1	2	3	4	5	6
e. Cheese?	1	2	3	4	5	6
f. Fresh fruits or vegetables?	1	2	3	4	5	6
g. Salad dressings?	,	2	3	4	5	6
h. Table spreads like butter or margarine?	1	2	3	4	5	6
i. Raw meat, poultry, or fish?	1 .	2	3	4	5	6
j. Processed meat products like hot dogs and bologna?	1	2	3	4	5	6
FOOD PRODUCT	Often (Always)	Some- firmes	Rārely	Never	NEVER SEEN	DO NOT BUY

19. Now think about the types of nutrition information on food labels. Do you think (SECTION) is very easy to understand, somewhat easy, or not too easy to understand?

What about (NEXT SECTION)?

IF NEEDED, SAY: "Would you say that is very easy to understand, somewhat easy, or not too easy to understand?"

START AT 'X'

SECTION	Very Easy	Somewhat Easy	Not Too Easy	NEVER SEEN	DON'T KNOW
a. The list of ingredients?	1	2	3	4	8
b. A short phrase like "low-fat" or "light" or "good source of fiber"?	1	2	3	4	8
c. The number of calories in a serving?	1	2	3	4	8
d. The number of calories from fat in a serving?	1	2	3	4	8
The number of grams or milligrams of nutrients like fat and sodium in a serving?	1	2	3	4	8
f. The percent of the daily value for each nutrient?	1	2	3	4	в
g. A description like "lean" or "extra lean" on meats?	1	2	3	4	8
SECTION	Very Easy	Somewhat Easy	Not Too Easy	NEVER SEEN	DON'T

20. If a food label says a food is (DESCRIPTION), would you say you are very confident, somewhat confident, or not too confident that the description is a reliable basis for choosing foods?

What about (NEXT DESCRIPTION)?

IF NEEDED, SAY: "How confident are you that the description is reliable? Would you say very confident, somewhat confident, or not too confident?"

START AT 'X'

DESCRIPTION	Very Confident	Somewhat Confident	Not Too Confident	DON'T
Low-fat?	1	2	3	8
Low-cholesterol?	1	2	3	8
A good source of fiber?	1	2	3	8
Light?	1	2	3	8
Healthy?	1	2	3	8
Extra lean?	1	2	3	8
	Low-fat?  Low-cholesterol?  A good source of fiber?  Light?  Healthy?	DESCRIPTION Confident  Low-fat? 1  Low-cholesterol? 1  A good source of fiber? 1  Light? 1  Healthy? 1	DESCRIPTION         Confident         Confident           Low-fat?         1         2           Low-cholesteror?         1         2           A good source of fiber?         1         2           Light?         1         2           Healthy?         1         2	DESCRIPTION         Confident         Confident         Confident           Low-fat?         1         2         3           Low-cholesteror?         1         2         3           A good source of fiber?         1         2         3           Light?         1         2         3           Healthy?         1         2         3

As far as you know, does the government define and enforce the meaning of the phrase (PHRASE) on food 21. labels? (DO NOT PROBE 'DON'T KNOW' ANSWERS.)

What about the phrase (NEXT PHRASE)?

START AT "X"

	PHRASE	YES	NO	DON'T
	Low-cholesterol?	1	2	8
t	. Light?	1	2	8
	Extra lean?	1 1 1	15 2	8

Now think about the section of the food label that tells the amount of calories, protein, and fat in a serving of 22. the food. If it showed that one serving of the food contained (AMOUNT OF NUTRIENT), would you consider that to be a low amount or a high amount? (DO NOT PROBE "DON'T KNOW" ANSWERS.)

What about (NEXT AMOUNT OF NUTRIENT)?

IF NEEDED, SAY: "Would you consider that to be a low amount or a high amount for one serving

of food?"

START AT "X"

	AMOUNT OF NUTRIENT	Law	High	DON'T
2	100 milligrams of sodium?	1	2	8
b.	20 grams of far?	1	2	9
c.	15 milligrams of cholestero?	1	2	8
d.	5 grams of fiber?	1	2	8
0.	10 grams of saturated fat?	1	2	8

Now 6 am going to read some statements. Please tell me if you strongly agree, somewhat agree, somewhat disagree, or strongly disagree with the statement: (READ STATEMENT)

What about (NEXT STATEMENT)?

IF NEEDED, SAY: 'Do you strongly agree, somewhat agree, somewhat disagree, or strongly disagree with the statement?"

START AT "X"

STATEMENT .	Strongly Agree	Somewhat Agree	Somewhat Disagree	Strongly Disagree	NO OPINION
The nutrition information on food labels is useful to me.	4200	3	Ž	1	0
<ul> <li>b. I feel confident that I know how to use food labels to choose a healthy diet.</li> </ul>	4	3	2	1	0
c. The nutrition information on food labels is hard to interpret.	4	3	2	1	0
d. Reading food labels takes more time than I can spare.	4	3	2	1	0
I read food labels because good health is important to me.	4	3	2	1	0
I would like to learn more about how to use food labels to choose a nutritious diet.	4	3	2	1	o
g. Reading food labels makes it easier to choose foods.	4	3	2	1	0
h. Sometimes I try new foods because of the information on the food label.	4	3	2	1	0
When I use food labels, I make better food choices.	4	3	2	1	0
<li>j. Using food labels to choose loods is better than just relying on my own knowledge about what is in them.</li>	4	3	2	1	0
STATEMENT	Strongly Agree	Somewhat Agree	Somewhat Disagree	Strongly Disagree	NO OPINION

GO TO Q28

24. Now I am going to read some statements about food labels. Please tell me if you strongly agree, somewhat agree, somewhat disagree, or strongly disagree with the statement: (READ STATEMENT)

What about (NEXT STATEMENT)?

IF NEEDED, SAY: \*Do you strongly agree, somewhat agree, somewhat disagree, or strongly disagree with the statement?\*

START AT 'X"

	STATEMENT	Strongly Agree	Somewhat Agree	Somewhat Disagree	Strongly Disagree	NO OPINION
	I feel confident that I know how to use food labels to choose a healthy diet.	4	3	2	,	0
	The nutrition information on food labels is hard to interpret.	4	3	2	1	0
	<ul> <li>Reading food labels takes more time than I can spare.</li> </ul>	4	3	2	1	С
	<ul> <li>d. I would like to learn more about how to use food labels to choose a nutritious diet.</li> </ul>	4	3	2	1	0
3	<ul> <li>Using food labels to choose foods would be better than just relying on my own knowledge about what is in them.</li> </ul>	4	3	2	1	0
	STATEMENT	Strongly Agree	Somewhat Agree	Somewhat Disagree	Strangly Disagree	NO OPINION

25. As far as you know, does the government define and enforce the meaning of the phrase (PHRASE) on food labels? (DO NOT PROBE 'DON'T KNOW' ANSWERS.)

What about the phrase (NEXT PHRASE)?

START AT "X"

	PHRASE	YES	NO	DON'T KNOW
a.	Low-cholestero/7	1	2	8
b.	Light?	1	2	8
c.	Extra lean?	1	2	8

26. Now think about the foods you eat. Would you say you always, sometimes, rarely, or never (HABIT)?

What about (NEXT HABIT)?

IF NEEDED, SAY: "Do you always, sometimes, rarely, or never (HABIT)?"

NU LATING

	HABIT	Always (Almost Always)	Some- times	Rarety	Never	DOES NOT APPLY
a	Est lower-fat luncheon meats instead of regular luncheon meats? (IF NEEDED, SAY: "Examples of lower-fat luncheon meats are deli harn and turkey. Examples of regular luncheon meats are bologna and salami.")	1	2	3	4	0
b.	Use skirn or 1% milk instead of 2% or whole milk?	1	2	3	4	0
c.	Eat special, low-fat cheeses, when you eat cheese?	1	2	3	4	0
d.	Eat ice milk, frozen yogurt, or sherbet instead of ice cream?	i	2	3	4	0
€.	Use low-calorie instead of regular salad dressing?	1	2	3	4	0
I.	Have fruit for dessert when you eat dessert?	1	2	3	4	0
g	Fat fish or poultry <u>instead</u> of meat? (IF NEEDED, SAY: "Meat refers to beef, pork, or lamb."	,	2	3	4	0
	 HABIT	Always (Almost Always)	Some-	Rarely	Never	DOES NOT APPLY

27. When you eat baked or boiled potatoes, how often do you add butter, margarine, or sour cream? Would you say always, sometimes, rarely, or never?

ALWAYS (ALMOST ALWAYS)	1
SOMETIMES	2
RARELY	3
NEVER	4
DO NOT EAT BAKED OR BOILED	
POTATOES	0

	marganne added?	POCHS III AND PROPERTY OF	-	
		ALWAYS (ALMOST ALWAYS)	,	
		SOMETIMES	2	
		RARELY	3	
		NEVER	4	
		DO NOT EAT COOKED VEGETABLES	0	(Q30)
		*		
j	When you eat other cooked veget another creamy sauce added?	ables, do you always, sometimes, rarely, or never eat them	w	th chee
		ALWAYS (ALMOST ALWAYS)	,	
		SOMETIMES	2	
		RARELY	3	
		NEVER	4	
		SOMETIMES RAHELY NEVER DO NOT EAT CHICKEN	3 4 0	(032)
	When you eat chicken, do you alw	ays, sometimes, rarely, or never remove the skin?		
		ALWAYS (ALMOST ALWAYS)	1	
		SOMETIMES	2	
		RARELY	3	
		NEVER	4	
	Would you describe the amount of	butter or margarine you usually spread on breads and mu	ttir	s as:
	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	None,	: 2 3	

33. About how many times in a week do you eat (FOOD) - less than once a week, 1-3, 4-5, or 7 or more times?

IF ASKED, SAY: "A 'time' is any single eating occasion."

	FOOD	Less than once a week (Never)	1-3	4-8	7 or More
a.	Bakery products like cakes, cookies, or donuts?	1	2	3	4
b.	Chips, such as potato or corn chips?	1	2	3	4

34.	And at your main meal, about how many times in a week do you eat beef, pork, or amb, W	lould you say
	less than once a week, 1-2, 3-4, or 5-7 times?	

LESS THAN ONCE A WEEK, NEVER	1	
1-2 TIMES	2	
3-4 TIMES	3	
5-7 TIMES	4	
DO NOT EAT MEAT	0	(037)

35. When you eat meat, do you usually eat:

IF ASKED, SAY	*The question
	is asking about
	meats, like beef,
	pork, or lamb.*

Small,	1	
Medium, or	2	
Large portions?	3	
DO NOT EAT MEAT	0	(037)

36. When you eat meat and there is visible fat, do you trim the fat always, sometimes, rarely, or never?

ALWAYS (ALMOST ALWAYS)	1
SOMETIMES	2
RARELY	3
NEVER	4
NEVER EAT MEAT WITH VISIBLE FAT	0

37. How many eggs do you usually eat in a week - less than one, 1-2, 3-4, or 5 or more?

IF ASKED, SAY:	'The question is
	asking about
	plain eggs, not
	egg substitutes
	or eggs in mixed
	dishes or baked
	goods."

LESS THAN ONE/NONE	1
1-2	2
3-4	3
5 OR MORE	4

never?	ALWAYS (ALMOST ALWAYS)  SCMETIMES  RARELY  NEVER  DON'T KNOW  DO NOT EAT FRESH FRUITS/  VEGETABLES  Can be eaten, do you eat the peel always, some  ALWAYS (ALMOST ALWAYS)  SOMETIMES  RARELY  NEVER  DON'T KNOW  S that can be eaten, do you eat the peel always, so  ALWAYS (ALMOST ALWAYS)  SOMETIMES  STATE CAN BE EATEN, DO YOU EAT THE PEEL ALWAYS, SO  ALWAYS (ALMOST ALWAYS)  SOMETIMES	2 3 4 8 0 1 2 3 4 8 8 materials	es.:areny.
never?  O. When you eat fresh vegetables with peel or never?  1. Do you eat the cuter leaves of leafy veget	RARELY NEVER DON'T KNOW DO NOT EAT FRESH FRUITS/ VEGETABLES Can be eaten, do you eat the peel always, some  ALWAYS (ALMOST ALWAYS) SOMETIMES RARELY NEVER DON'T KNOW Sthat can be eaten, do you eat the peel always, so	3 4 8 0 0 time 1 2 3 4 8 8 8 8	es.:areny.
Do you eat the outer leaves of leafy veget	NEVER  DON'T KNOW  DO NOT EAT FRESH FRUITS/  VEGETABLES  Can be eaten, do you eat the peel always, some  ALWAYS (ALMOST ALWAYS)  SOMETIMES  RARELY  NEVER  DON'T KNOW  S that can be eaten, do you eat the peel always, so	4 8 0 0 1 2 3 4 8 8 mmst	es.:areny.
never?  When you eat fresh vegetables with peel or never?  Do you eat the curter leaves of leafy veget	DON'T KNOW  DO NOT EAT FRESH FRUITS/  VEGETABLES  Can be eaten, do you eat the peel always, some  ALWAYS (ALMOST ALWAYS)  SOMETIMES  RARELY  NEVER  DON'T KNOW  s that can be eaten, do you eat the peel always, so	8 0 0 ttime	es.:areny.
When you eat fresh vegetables with peel or never?  Do you eat the cuter leaves of leafy veget	DO NOT EAT FRESH FRUITS/ VEGETABLES  Can be eaten, do you eat the peel always, some  ALWAYS (ALMOST ALWAYS)  SOMETIMES  RARELY  NEVER  DON'T KNOW  S that can be eaten, do you eat the peel always, so	0 1 2 3 4 8 8 8 8 1	os, rarety.
When you eat fresh vegetables with peel or never?  Do you eat the cuter leaves of leafy veget	DO NOT EAT FRESH FRUITS/ VEGETABLES  Can be eaten, do you eat the peel always, some  ALWAYS (ALMOST ALWAYS)  SOMETIMES  RARELY  NEVER  DON'T KNOW  S that can be eaten, do you eat the peel always, so	0 1 2 3 4 8 8 8 8 1	os, ∶areiy
When you eat fresh vegetables with peel or never?  Do you eat the cuter leaves of leafy veget	ALWAYS (ALMOST ALWAYS)  STATE Can be eaten, do you eat the peel always, some always (ALMOST ALWAYS)  ALWAYS (ALMOST ALWAYS)  ALWAYS (ALMOST ALWAYS)	1 2 3 4 8 8 met	os, ∶areiy
When you eat fresh vegetables with peel or never?  Do you eat the cuter leaves of leafy veget	ALWAYS (ALMOST ALWAYS)	1 2 3 4 8	
Do you ext the cuter leaves of leafy veget	SOMETIMES RARELY RARELY ROUNTER ROUNTE	3 4 8	imes, ran
Do you extine cuter leaves of leafy veget	RARELY  NEVER  DON'T KNOW  sthat can be eaten, do you eat the peel always, so  ALWAYS (ALMOST ALWAYS)	3 4 8	imes rar
Do you eat the cuter leaves of leafy veget	RARELY  NEVER  DON'T KNOW  sthat can be eaten, do you eat the peel always, so  ALWAYS (ALMOST ALWAYS)	3 4 8	imes rar
Do you eat the cuter leaves of leafy veget	NEVER  DON'T KNOW  s that can be eaten, do you eat the peel always, so  ALWAYS (ALMOST ALWAYS)	4 8 mai	imes, rar
Do you eat the cuter leaves of leafy veget	s that can be eaten, do you eat the peel always, so	8 mai	imes, rai
Do you eat the cuter leaves of leafy veget	ALWAYS (ALMOST ALWAYS)	1	imes, rar
NEEDED, SAY: "What	RARELY NEVER DON'T KNOW	3	
. (2014) 120 (1914) 120 (1914) 120 (1914) 120 (1914) 1 H	ables like lettuce and cabbage?		
	YES	,	
o you do most of the	NO	2	
No. 1	DON'T KNOW	9	
ne?*	DO NOT EAT LEAFY VEGETABLES	0	
Are you the person most responsible for	planning or preparing the meals in your household?	?	
	YES	1	
	NO		
	DON'T KNOW	8	
THANK YOU	J FOR YOUR TIME AND COOPERATION		
			AM

# APPENDIX B LETTER SENT TO NUTRITIONAL PROFESSIONALS

March 6, 1997

Kirsten Horton 12 The Downs Tuscaloosa, AL 35401

#### Dear Kirsten:

We are conducting a study on the factors influencing food behaviors. We would appreciate your assistance in examining the Diet and Health Knowledge Survey (DHKS) questionnaire. We ask you to help us with two tasks:

First, read the research questions below. Next, read the questionnaire and indicate by circling the question number if the questions are pertinent to the research questions.

#### Research Questions:

What is the relationship between lifestyle patterns (smoking, alcohol consumption, physical activity, diet quality) & attitudes towards food/nutrition?

What is the relationship between lifestyle patterns & beliefs about diet and health?

What is the relationship between lifestyle patterns & behaviors about food preparation?

What is the relationship between lifestyle patterns & knowledge about food?

Second, indicate with the corresponding letter whether the questions you chose refer to attitudes=A, beliefs=L, behaviors=H or knowledge=K based on the given definitions.

#### **DEFINITIONS**

<u>Knowledge</u> - Use of the mind, intellectual ability, rational learning (e.g. recalling, remembering and recognizing).

(Chamberlain VM. Creative Home Economics Instruction. 3<sup>rd</sup> Edition 1992. MacMillan/McGraw-Hill. Peoria, IL pg. 18)

<u>Attitudes</u> - A learned predisposition to respond in a specific way, negative or positive, toward people, ideas or situations.

(Haber A, Runyon R. <u>Fundamentals of Psychology</u>. 1974. Addison-Wesley Publishing Co. Philippines. pg. 577.)

<u>Beliefs</u>- Perceptions of factual matters, of what is true or false or the cognitive aspect of attitudes.

(Crider AB, Goethals GR, Kavanaugh RD, Solomon PR. <u>Psychology</u>. 3rd Edition 1989. Scott, Foresman & Company. Glenview, IL. pg. 411. Parraga IM. Determinants of food consumption. *J Am Diet Assoc.* 1990;90(5):661-663).

Behaviors - Any activity that can be observed, recorded and measured.

(Crider AB, Goethals GR, Kavanaugh RD, Solomon PR. <u>Psychology</u> . 3<sup>rd</sup> Edition 1989. Scott,
Foresman & Company. Glenview IL. pg. 6)

Please return the questionnaire by March 20, 1997 in the envelope provided. Thank you for your time.

Sincerely,

Beth DeLucia Graduate Student Gail Gates, Ph.D., RD/LD Associate Professor

#### VITA

0

#### Beth Anne DeLucia

# Candidate for the Degree of

#### Master of Science

Thesis: INFLUENCES OF LIFESTYLE PATTERNS ON DIET

Major Field: Nutritional Sciences

Biographical:

Personal Data: Born in New Haven, Connecticut on July 12, 1972, the daughter of John DeLucia and Norine Santarpia.

Education: Graduated from Branford High School, Branford,
Connecticut in June 1990; received a Bachelor of Science
degree in General Dietetics from the University of New Haven,
West Haven, Connecticut in May 1996. Completed the
requirements for the Master of Science degree with a major in
Nutritional Sciences at Oklahoma State University in December
1997.

Experience: Employed by Oklahoma State University, Department of Nutritional Sciences as a graduate research assistant and designed the web page for the department, 1996 to 1997.

Professional Memberships: American Dietetic Association, Connecticut Dietetic Association and Oklahoma Dietetic Association.