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THE EFFECT OF NUTRITION EDUCATION  
ON THE DIETARY INTAKE OF COLLEGE STUDENTS

BY

ELIZABETH ANN POND

A thesis submitted  
in partial fulfillment of the requirements for the  
degree Master of Science, Major in  
Home Economics, South Dakota State University

1985

THE EFFECT OF NUTRITION EDUCATION  
ON THE DIETARY INTAKE OF COLLEGE STUDENTS

This thesis is approved as a creditable and independent investigation by a candidate for the degree, Master of Science, and is acceptable for meeting the thesis requirements for this degree. Acceptance of this thesis does not imply the conclusions reached by the candidate are necessarily the conclusions of the major department.

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EAP

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## CHAPTER I

### Introduction

Nutrition is a topic of major interest in the United States. Americans are constantly reminded that what we eat may make a difference in how long and how well we live.

Since nutrition is a major interest and an important factor in health maintenance and disease prevention, one might logically conclude that such would be reflected in the nutritional status of the American people. On the contrary, evidence indicates that Americans are overweight and consume excess calories, sugar, fat, alcohol, and salt (Wenck, Baren, & Dewan, 1983). National nutritional assessments conducted over a period of years have shown specific nutrient inadequacies within the population. In the Ten State Nutrition Survey (1972) nutrient deficiencies were found for iron, vitamin A and riboflavin, and for some population groups, protein and vitamin C. In the Health and Nutrition Examination Survey (HANES) (Preliminary Findings..., 1974) conducted in 1971-72, iron, calcium, and vitamin A were found to be below recommended levels. In the most recent national study, the 1977-78 Nationwide Food Consumption Survey (Food and Nutrient Intakes..., 1980), inadequate intake was found for calcium and iron as well as magnesium and vitamin B<sub>6</sub>. In all of these studies, adolescents, particularly females, were one of the populations found to be at high nutritional risk. In a variety of studies done specifically with adolescents (Hampton, Huenemann, Shapiro, & Mitchell, 1967; Schorr, Sanjur, & Erickson, 1972; and



Wharton, 1963), calcium, iron, ascorbic acid, and vitamin A were low or deficient in adolescent diets.

According to Guthrie (1983), nutrition professionals are especially concerned about the food habits of adolescents. Dietary inadequacies are higher during adolescence than at any other stage of the life cycle. Deficiencies in this age range can have far reaching effects, especially for females. Female adolescent nutritive needs are surpassed only by those during pregnancy and lactation (Guthrie, 1983). The adolescent who becomes pregnant before growth is complete is of particular concern. If nutritive intake is inadequate before conception the adolescent and her unborn child are at high risk (Chenault, 1984; Guthrie, 1983; Stare & McWilliams, 1984; Wenck et al., 1983). Nutritive needs are high for the adolescent's own growth, so the demands of a growing fetus complicates the problem.

Another nutritionally related concern in adolescence is the increased incidence of eating disorders such as anorexia nervosa (self-imposed starvation) and bulimia (binge-purge syndrome), especially among adolescent girls. These illnesses involve obsessive fear of weight gain and can have serious health consequences, even death. The incidence of anorexia nervosa has increased significantly since 1950 when the condition was very rare (Whitney & Hamilton, 1984).

Education appears to have little impact on changing adolescents food habits. There has been nutrition education intervention at the adolescent age; however, it is well documented that knowledge of nutrition does not necessarily change food habits (Guthrie, 1983).

The effects of long term malnutrition on health is of little concern to the adolescent. Motivation appears to be the important factor for change in eating habits. According to Wenck et al. (1983), adolescents are usually not motivated to learn about nutrition except as it applies to them directly, (e.g., being overweight or being involved in athletics). Wenck et al. (1983) continue by stating that the highest time of motivation for learning about nutrition is not when one is young and living at home, but rather when faced with the actual problem of providing food for oneself or ones family.

Many studies have been done on nutritive intake and dietary practices of younger adolescents in junior and senior high schools. There is less information available on older adolescents, particularly concerning nutrition education. Is it possible that a group of older adolescents, college students, would be motivated to learn about nutrition and to apply this knowledge to their own eating habits more than the younger adolescents? Most college students are away from home for the first time and are completely responsible for their food choices. College students are usually more mature and may be less influenced by their peer group than younger adolescents.

Would a career interest in home economics, a professional field encompassing the subject area of nutrition, affect food choices and nutrient intake of college students? The relationship seems logical and some of Alexander's (1977) findings give support to this contention. Alexander (1977) found that college home economics students who had nutrition in their curriculum scored significantly higher than non-home economics students on a nutrition knowledge test.

Home economics students scored significantly higher on dietary adequacy than non-home economics females but lower than non-home economics males. Some of the aforementioned differences in younger and older adolescents and speculation about their effect on dietary behavior formed the basis for this research.

### Purpose of the Study

The purpose of the study was to determine the effects of nutrition education on the dietary intake of college students.

Specific questions to be answered were:

- 1) What is the dietary intake of college students?
- 2) Does nutrition education intervention have an effect on dietary intake of college students?
- 3) Does change in dietary intake relate to background characteristics of college students?

### Definition of Terms

The following definitions will be used:

Adolescence. The transition from childhood to adulthood or the period of life between puberty and maturity; usually considered as the teenage years from 13 to 19 or between 12 and 20.

Adolescent. An individual in the state of adolescence.

Dietary Intake. The food and beverage one consumes.

Dietary Score. A number ranging from 0 to 16 indicating dietary adequacy. The score is obtained by placing equal emphasis (4 points) on each of the four food groups. Two points are assigned for each of two servings in the milk and meat groups and one point for

each of four servings in the fruit and vegetable and in the bread and cereal groups.

Eating Habits. Practices or behaviors involving food consumption, such as kinds of food chosen or time of day food is eaten.

Food Category. A designation of foods or beverages other than the Basic Four Food Groups. The food categories in this study are vitamin C rich foods, vitamin A rich foods, diet soft drinks, regular soft drinks, alcohol, and other foods (fats and sweets).

Food Group. One or more of the food classes within the Basic Four. These classes are grouped according to the nutrients they contain in common. The Basic Four consists of the milk group, meat group, fruit and vegetable group, and bread and cereal group.

Food Record. A written list of all food and beverages consumed by an individual within a day, including quantity.

Health and Nutrition Examination Survey (HANES). A surveillance system designed to periodically measure the health and nutrition status of the United States population and monitor changes over time. The first study, HANES I, was conducted from 1971 to 1974 and sampled over 20,000 people representing all segments of the population. HANES II, conducted in 1977-1978, was a follow-up study focusing on clinical findings and biochemical analysis.

Nationwide Food Consumption Survey (NFCS). A survey conducted by the United States Department of Agriculture in 1977-1978 to determine amount and kind of food people were eating. Approximately 36,000 individuals from a stratified sample of households in the 48 conterminous states were included in the study.

Nutrition. The study of food, the nutrients therein, and the utilization of these nutrients in the body.

Nutrition Education. Instruction in the study of food consumption, the use of this food in the body, and the practices or behaviors involving food consumption.

RDA (Recommended Dietary Allowance). Amount of daily intake of essential nutrients considered to be adequate for maintenance of good nutrition of most healthy persons in the United States; recommended by the Food and Nutrition Board of the National Research Council (National Academy of Sciences).

Ten-State Nutrition Survey (TSNS). A survey conducted by the Department of Health, Education and Welfare in ten states during 1968-1970 to determine the magnitude and location of malnutrition and related health problems in the United States. The sample of low income people was drawn from census districts with the lowest average income and involved approximately 65,000 people.

## Chapter II

### Review of Literature

The adolescent period is difficult to define as it has no specific beginning or end. Adolescence is often viewed as being synonymous with the teenage years, 13 to 19 or between 12 and 20. Physical maturation and changes in nutrient requirements actually begin earlier and extend into the third decade of life. (Lucas, 1981) Full stature is commonly assumed to have been attained by 18 to 20 years of age, but there is evidence that growth in length can continue for another decade. Results of longitudinal growth studies by Garn and Wagner (Lucas, 1981) show that from 17 to 28 years of age, average height increments were 1.2 centimeters for females and 2.3 centimeters for males.

Adolescents often modify their food behavior in their search for independence and self identity. Societal pressure, particularly the peer group, has a great influence on adolescent food intake. The college student or older adolescent eating habits are of particular interest because students are usually away from home and have less direct parental guidance for the first time. They are completely independent as far as food choices are concerned.

The review of literature will focus on the nutritional status of adolescents, their eating patterns, the socio-psychological factors affecting eating habits, nutritionally related problems and nutrition education. Most of the studies reviewed have been published since 1970 except for a few included to give background information.

Calcium-----Black females ages 18 to 44 years  
showed calcium levels below the RDA.

Iron-----adolescents 12 to 17 years of age  
and females 18 to 44 years of age  
were below the RDA.

Vitamin A-----White females ages 18 to 44 years in  
the lower income group had vitamin A  
levels below the RDA.

In general, nutrient deficiencies were more prevalent among females of all ages than among males, regardless of economic status. (Celender, Shapero, & Sloan, 1978; Preliminary Findings ..., 1974).

The most recent nutritional status data is from the Nationwide Food Consumption Survey conducted by the United States Department of Agriculture in 1977-1978. (Food and Nutrient Intakes..., 1980) Findings were:

Calcium-----all groups were below RDA except:

- children under three years of age
- children six to eight years of age
- males 19 to 34 years of age
- females 12 years of age and over had  
    lowest intake of all groups.

Iron-----met or exceeded the RDA:

- infants
- most school age children
- men

significantly below the RDA:

- one to two year olds
- three to five year olds
- females 12 to 50 years of age
- females 19 to 22 years old and one to two year olds had lowest intake of all groups.

Magnesium——all groups over two years of age had intakes below the RDA.

females 19 to 22 years of age reported lowest intakes of all groups.

Pyridoxine——all groups over two years of age had intakes below the RDA.

females 15 years of age and over reported lowest intakes of all groups.

In the general population the nutrients most commonly deficient were calcium, iron, magnesium, and pyridoxine (vitamin B6). One-third of those surveyed had intakes of less than 70 percent of the RDA for their age and sex. The NFCS results confirmed the findings from the HANES study. Female adolescents were again among the groups found to be at most risk.

In the national surveys, no serious deficiencies of most nutrients was found for adolescents. However, low dietary intakes and marginal deficiencies were observed for some vitamins and minerals.



Adolescent groups most at risk for nutrient deficiencies were those of low socioeconomic status, those in certain ethnic groups, and females. (Food and Nutrient Intakes..., 1980; Preliminary Findings ..., 1974; Ten-State Nutrition Survey, 1972)

Studies of the nutritional status of college students show somewhat similar results as the nationwide surveys. In a study of 195 college women, there were high intakes of protein, vitamin A, and ascorbic acid and low iron intakes (Jakobovits, Halstead, Kelley, Roe, and Young, 1977). Ostrum and Labuza (1977) studied 375 college students and found an abundance of protein, calcium, phosphorus, and vitamin C. Vitamin A was marginally deficient, and iron was low for females. Suboptimal iron intake in college women was confirmed by Driskell, Keith, and Tangrey (1979) and Khan and Lipke (1982). Khan and Lipke found vitamin A below the RDA for some males. In summary, iron intake is consistently low in the diets of college women and vitamin A is marginally low for some males and females.

Nutrient deficiencies are high during the adolescence period. Suboptimal nutrient intakes at this stage can have long term effects. Females are especially at risk because of the increased demands on the body during pregnancy.

A conclusion from government studies that have been conducted over the years is that adolescent males are better nourished than adolescent females. (Food and Nutrient Intakes..., 1980; Preliminary Findings ..., 1974; Ten-State Nutrition Survey, 1972).

Studies of college students also show intake among men to be

significantly higher than among women for calories, protein, thiamin, riboflavin, and niacin (Driskell et al., 1990; Khan and Lipke, 1982).

An important factor in the difference of the two groups is the greater calorie allowance for males. Higher calorie allowance provides an opportunity for more food intake, thus resulting in a greater chance of higher nutrient intake for males (Stare & McWilliams, 1984).

### Eating Patterns of Adolescents

Food Preferences. Food preference studies conducted among the younger and older adolescent populations in the United States appear to show similar food likes and dislikes. In a 1972 study of 118 students in grades seven through twelve, the most popular food items reported were soft drinks, milk, steak, hamburgers, pizza, chicken, french fries, ice cream, spaghetti, and orange juice. The least liked foods reported in the study were liver and vegetables. (Schorr, Sanjur, Erickson, 1972).

Many studies have been made over the years to determine college student food preferences (Latzke, 1934; Schuck, 1961; Young & LaFortune, 1957). It appears from these studies that meat, bread, and fruit are the best liked items while vegetables and organ meats are least liked. In a study conducted by the United States Department of Agriculture (Einstein & Hornstein, 1970) 50,000 college students, representing one percent of the college enrollment in the United States during the 1966-1967 school year, reported some of the best liked foods were ice cream, soft rolls, beef steak, hot biscuits, milk, orange juice, roast turkey, roast beef, apple pie, and fried chicken.

The best liked food list contained many desserts but no vegetables except french fried potatoes and tossed green salad. On the least liked foods list were a large number of vegetable items and no desserts. Salads and vegetables were preferred more by college women than college men.

Results of other college student food preference studies showed similar results with milk, orange juice, steak, rolls, chicken, hamburger, bread, and pie being highly preferred (Stasch, Johnson, & Spangler, 1970) and liver and vegetables being disliked (Jakobovits et al., 1977).

Meal Skipping. During middle and late adolescence, meal skipping and eating at irregular times are especially common. The number of meals adolescents miss increases from early to late adolescence (Story, 1984). Breakfast and lunch are the most often missed. According to the 1977-78 Nationwide Food Consumption Survey (Food and Nutrition Intakes..., 1980), breakfast is frequently neglected and is omitted more by adolescents and young adults than by any other age group in the population. In the NFCS 19 percent of adolescent females, 12 to 18 years, and 11 percent of adolescent males of the same age were found to miss breakfast. In the 19-22 year old group the number reporting no breakfast increased to 29 percent compared to 25 percent reporting no breakfast in the 23-34 year age group and 15 percent in the 35-50 year age group.

Khan and Lipke (1982) found that breakfast was the meal most often skipped by college men and women, with approximately one-fourth

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skipping it. Four percent omitted the evening meal and 12 percent skipped lunch. Jakobovits et al. (1977) found that college women skipped the noon meal most and the evening meal least.

Time pressure and daily commitments affect adolescent eating habits. Many adolescents and young adults are "too busy" to worry about food and proper diet (Story, 1984). Regular meals are missed as school, jobs, athletics and social activities take priority over regular meals. If there is no "catch up" on food later on in the day, energy and nutrient intake may be inadequate. Lucas (1981) reports that adolescents who have food on a regular basis tend to have better nutrient intakes than those who skip meals and have irregular meal patterns. According to Hampton et al. (1967), adolescents eating less than three times a day have poorer diets than those eating more frequently. Schorr et al. (1972) found that as the food pattern becomes more complex (more foods) adolescent intake of calcium, iron, vitamin A, and ascorbic acid increased, resulting in significant improvement in the quality of the diet.

Snacking. Snacking is a prevalent eating behavior within the United States. According to the NFCS (Food and Nutrient Intakes..., 1980), two-thirds of the adolescents and young adults surveyed snacked during a one day period. Within the 15-18 and 19-22 year old age groups about 10 to 20 percent of nutrients and energy were obtained from snacks. Driskell et al. (1979), found approximately two-thirds of the 150 college students in their study reporting snacking once or twice a day. According to the NFCS (Food and Nutrient Intakes...,

1980) almost half of the snacking occurred in the evening with less in the afternoon and the smallest proportion in the morning. The results of a study of 195 college students (Jakobovits et al., 1977) confirmed the NFCS findings with the amount of snacking being greatest in the evening. The NFCS results indicated that snacks containing sugar were among the most frequently consumed items with soft drinks being at the top of the list. Carbonated beverages were also found to be the most popular snack item in Khan and Lipke's (1982) study of 250 college students. Other popular snacks reported in the NFCS (Food and Nutrient Intakes..., 1980) were bakery products, milk, bread, milk deserts, salty snacks, candy, meats, and fruits. Vegetables were seldom mentioned as a choice. Similar snack items were reported in studies of college students. Popular snacks that appeared repeatedly in several college student studies were fruits, bakery items, and candy (Driskell et al., 1979; Jakobovits et al., 1977; Khan & Lipke, 1982; Nelson & King, 1982). According to Nelson and King's (1982) study, many college students prefer nutritious snacks but other items such as chips, candy, and soft drinks are more readily available.

The idea that snacks are unhealthy is based on the premise that between meal snacks spoil the appetite for regular meals and that snacks are foods high in calories and low in nutrients. Whether snacking interferes with nutrient intake depends on the quality and quantity of the snack foods consumed. Results of some studies show that between-meal snacking contributes significantly to the total daily nutrient intake (Hampton et al., 1967; Wharton, 1963). Depending on

food choice, snacking can provide an adequate balance of nutrients (Story, 1984). Results from TSNS (1972) showed that snacks consumed by adolescents were not just empty calories but have a significant contribution to the total daily intake of energy, protein, riboflavin, and ascorbic acid.

Snacks contributed up to 35 percent of the RDA for some nutrients in Khan and Lipke's (1982) study of college students. Had it not been for snacks, energy level would have been below desired level for all subjects. Snacks enabled an adequate intake level of iron and calcium for women, and of vitamin A and thiamin for men.

Fast Foods. In the early 1970's there were approximately 30,000 fast food outlets in the United States; today there are almost five times as many ("Fast-Food Chains," 1979). The rapid growth of the fast food restaurant has undoubtedly had a great impact on adolescent diets. Fast foods, either for meals or snacks, are especially popular among adolescents and young adults (Marino & King, 1980). They are often preferred by this age group because they are affordable, convenient, quick, and filling. In other words fast foods fit the adolescent's life style (Story, 1984).

In the NFCS (Food and Nutrient Intakes..., 1980) over 50 percent of the 15 to 22 year olds obtained and ate some food or beverage away from home compared to 44 percent of all individuals surveyed. In both the 15 to 18 and 19 to 25 year age groups between 20 and 25 percent of daily nutrients were obtained from foods eaten

away from home. The amount was slightly higher for females than males.

With the ever increasing popularity of fast foods in the American diet, their nutritional impact has become a concern. Shannon and Parks (1980) state that the nutritional impact of fast foods depends on (1) the frequency and extent to which consumers use fast foods, (2) the nutritional value of fast foods, and (3) the selection consumers make from fast foods.

Fast food meals appear to be high in calories, fat, and sodium. Nutrients that are often low in fast foods are vitamin C if french fries or fruit juice are not included, and calcium, riboflavin, and vitamin A if milk or a shake are not included. (Fast-Food Chains," 1979)

An occasional fast food visit will have little impact on the nutritive intake of the week; however, if fast food is the mainstay of the diet, there is cause for concern. If the adolescent chooses servings from salad bars, which are increasing in popularity, the nutrient contributions of a fast food meal will most likely be improved (Story, 1984). Marino and King (1980) suggest that in addition to supplementing fast food meals with fresh fruits and vegetables, nutritional balance and meal quality can be improved by limitation of deep-fat fried foods, and selection of low-fat milk instead of sodas or milkshakes. Fast foods are acceptable nutritionally when wise choices are made and when these foods are consumed as part of a well-balanced diet (Story, 1984).

### Socio-psychological Factors Affecting Adolescent Nutrition

The adolescent period is critical in development because it involves not only physiological but also social and psychological change. Changes do not occur simultaneously but at varying rates. The adolescent may be at different chronological, physical, psychological and social ages at the same time. As adolescents encounter these changes their living patterns, including food intake and nutritional status, are affected (Lucas, 1981).

The socio-psychological factors that significantly affect the dietary habits of the adolescent are establishing independence from parents, acquiring acceptance by peers, and developing a satisfying personal image (Stare and McWilliams, 1984). Hochbaum (1977) states that food behavior is part of an intricate habit system embedded in psychological makeup, social and physical environments, and the total life-style of the individual. These factors affecting dietary habits of the adolescent may result in irregular and skipped meals, eating away from home, increased snacking and adoption of fad diets.

The psychological development of the adolescent has been described by Daniel (1975) as having an early, middle, and late stage. The early adolescent is characterized as being unstable, restless, and unsure of self. Much time is spent thinking at this stage which may appear as lack of interest or daydreaming. The early adolescent has a great need to prove that he/she is normal. The peer group begins to have more influence than parents. The middle adolescent is very intense and is inconsistent in behavior. At this stage they feel more secure with peers of the same sex. The middle adolescent often exper-



iences the struggle with adult authority. The adolescent in the late stage is more stable than younger adolescents. There is more consistent behavior and greater self acceptance. The older adolescent has learned to focus thoughts more toward others than toward self and shows an interest in career and adult life. Dating partners are the important influence rather than the parents or peers. (Lucas, 1981).

These psychological changes within the adolescent certainly could have an effect on their food choices. The young adolescent highly influenced by the peer group undoubtedly will make food choices to be accepted rather than for personal preference. As adolescents mature approval from peers becomes less important. Perhaps at this stage food choices are based on personal preference.

The major psychological task during adolescence is the establishment of an identity and an adult personality. The development of the identity and self image is not only psychological but is related to social and physical growth as well (Alford and Bogle, 1982). Physical changes, such as growth and sexual maturation, which result in changes in appearance and body shape have significant impact on the adolescents' self esteem, body image, and personality (Lucas, 1981).

Because of physical changes adolescents are often anxious and dissatisfied with their body image. One study of high school students revealed that of the tenth and twelfth grade students studied 70 percent of the females wanted to lose weight but only 10 percent were actually obese. Of the males in the study, 58 percent wanted to gain weight and only 25 percent were below average in weight (Huenemann, Shapiro, Hampton, & Mitchell, 1966). Students were generally dis-

satisfied with their body size and shape. Boys desired to gain weight while girls wanted to lose weight; boys preferred exercise for changing weight and girls were more favorable to dieting.

Conforming to society can become so important that adolescents may compromise their own well-being, including adequate food and nutrient intake, in an attempt to reach the ideal (Lucas, 1981). Sociologically, the adolescent's task is to reject authority and assume independence. Influence of the family diminishes as adolescents become more independent. Parental roles change from instructing to advising (Lucas, Rees, & Mahan, 1985).

The need for independence of the adolescent leads to modification of dietary patterns (Lucas, 1981). Food habits up to this point have been influenced by the family (Alford & Bogle, 1982). Adolescents now may choose to express their independence by rejecting parental eating habits. These independent food choices may be made on the basis of sociability, enjoyment, and status, rather than on nutrient content (Lucas, 1981). The adolescent, in pursuit of independence, becomes involved in many activities, resulting in schedules with little time for regular meals which can adversely affect nutritive intake (Lucas, 1981; Stare & McWilliams, 1984; Wenck, et al., 1983). The adolescent increasingly chooses foods that can be prepared or obtained independently such as snack foods and fast foods (Alford & Bogle, 1982). These independent food choices thus result in adolescents determining their own food intake (Lucas, 1981).

The peer group plays an increasingly larger role in the life of the adolescent during the early adolescent years, as dependent

relationships with parents begin to loosen. As orientation and identification shifts from parents to peers, the peer group may have more influence on behavior than parents (Story, 1984). Peer acceptance is a high priority as the adolescent moves away from home and parental authority (Alford & Bogle, 1982). The peer group becomes a source of self esteem and behavior standards; it defines what is socially acceptable in learning, dress, entertainment, language and food (Lucas, Rees, & Mahan, 1985).

The adolescent spends more time with the peer group and less time at home, thereby reducing family supervision of food choices (Alford & Bogle, 1982). Considering the large amounts of time they spend together, peers have considerable influence over food choices of adolescents (Story, 1984). Adolescents may choose foods or adopt eating practices to be part of a group rather than because of their own preferences (Stare & McWilliams, 1984; Wench et al., 1984). This desire to be accepted in the peer group may be manifested in such dietary practices as weight reduction, vegetarianism, alcohol consumption and muscle building (Lucas, 1981).

The peer group clearly plays a role of fundamental importance in shaping and modifying adolescent behavior, beliefs, attitudes, and values (Story, 1984). Adolescents want approval, thus peer pressure can be an important determinant in food selection. Food selected and eaten usually needs to meet the approval of the peer group (Story, 1984; Lucas et al., 1985). Lucas et al. (1985) contends that the peer group usually has a negative influence on eating habits of adolescents and that those who eat alone or with peers most of the time seem to

have the poorest diets.

In the older adolescent the opposite sex has more influence on behavior than the peer group or parents. Dating replaces the previous group activities of earlier years (Daniel, 1975).

### Nutritionally Related Problems of Adolescents

Pregnancy. The increasing incidence of adolescent pregnancy has become a significant health problem. In 1975 about one out of the five babies were born to mothers under 19 years of age (Worthington-Roberts, 1981). Between 1950 and 1980, the proportion of babies born to American mothers less than 19 years old rose from 12 to 20 percent of the total number of births (Statistical Abstracts, 1980). An estimated six percent of all deaths among 18 to 19 year old females results from complications during pregnancy (Guthrie, 1983). Compared with adult women, adolescents are considered to be at greater risk of health problems during pregnancy and at greater risk for poor pregnancy outcome ("Nutritional Concerns During Adolescence," 1981). Adolescent mothers are considered to be high risk because of the high incidence of toxemia, premature labor, and lower birth weight of infants (Marino & King, 1980).

Preeclampsia (toxemia) occurs in one out of every five girls under the age of 15 and frequent pregnancies can result in irreversible kidney and heart disease (Worthington-Roberts, 1981). About ten percent of all infants born to mothers 15 to 19 years of age are low birth weight (Marino & King, 1980).

Energy and nutrient needs are increased considerably during

pregnancy (Recommended Dietary Allowances, 1980). Because of increased nutritional needs for the growth of the fetus as well as the continuing growth of her own body, the pregnant adolescent can have nutritional requirements exceeding those of adult women and can be considered a nutritional risk (Marino & King, 1980; Worthington-Roberts, 1981). Nutrient requirements of the pregnant adolescent are four times higher than for nonpregnant females of the same age. Deficiency problems for the pregnant adolescent include energy and calcium, iron, vitamin A, vitamin C, and folacin (Chenault, 1984). If the adolescent is malnourished before pregnancy and/or during pregnancy, the incidence of low birth weight infants and infant mortality increases ("Maternal Weight Gain and the Outcome of Pregnancy," 1979).

Meal skipping, limiting food choices, and dieting to restrict calorie intake are typical eating behaviors of the adolescent which can adversely affect nutritional status. These eating habits may affect level of nutrient stores which, with the nutrient demands of growth and pregnancy, may effect pregnancy outcome (Lucas et al., 1985).

Obesity and Eating Disorders. Another health concern in the adolescent population is the prevalence of overweight and obesity. Many adolescents, especially girls, are either overweight, believe they are overweight, or are fearful of becoming overweight. Adolescents who go on severe energy restrictive diets because of real or perceived overweight may be endangering their health due to inadequate nutrient levels. Nutrient demands are high for adolescent growth and

accumulation of nutrient reserves should be taking place. The problem of weight reduction diets is even greater when carried out intermittently, with a fluctuating weight loss, weight gain pattern (Guthrie, 1983).

Overweight or obesity can be detrimental to the social and psychological well-being of the adolescent. Obese adolescents often experience a negative body-image, depression, low self esteem, and social isolation (Hammar, Campbell, Campbell, Moores, Sareen, Gareis, & Lucas, 1972) The feelings of rejection, isolation, depression, boredom and inactivity can cause an increase in food consumption and consequently perpetuation of the obese state (Meyer & Neumann, 1977).

An eating disorder at the opposite end of the spectrum from overweight and obesity is anorexia nervosa, a self imposed starvation. This disorder is characterized by severe weight loss and an exaggerated fear of weight gain that endangers the health and even life of the dieter (Garfinkel & Garner, 1979). According to Bruch (1978) anorexics have a distorted body image with an obsessive fear of gaining weight. Anorexia nervosa is diagnosed ten times more frequently in adolescent girls than in boys, begins during puberty, and is usually found in middle class, ambitious, conforming adolescents.

Bulimia is a disorder related to anorexia nervosa and is characterized by binge eating and purging. Both anorexia nervosa and bulimia appear to be related to society's emphasis on the extremely slim body type as being ideal (Whitney & Hamilton, 1984).

Alcohol. Increased alcohol consumption by adolescents is a

public health concern. In Harford's (1976) report of a national study, approximately 39 percent of the adolescent population were moderate drinkers and 28 percent were problem drinkers. Morrissey (1978) reports that more than 90 percent of high school students have had at least some experience with alcohol by 18 years of age. Alcohol use among girls is almost as high as it is among boys. In a survey of high school seniors from 1975 through 1979 (Bachman, Johnston, & O'Malley, 1979) 52 percent of the males and 31 percent of the females reported having taken five or more drinks in a row at least once during the two weeks preceding the survey; 26 percent of the males and 12 percent of the females did so three or more times. About 6 percent reported daily or near daily use of alcohol during the previous 30 days. Drinking among college students has been rising steadily since the 1930's. College students drink more often and become intoxicated more often than high school students (Alcohol and Health, 1978).

Driskell, Keith and Tangrey (1979) found that of the 150 college students in their study, three-fourths consumed alcohol during the three days of record collection. According to Kraft (1976), reporting on a Department of Health, Education and Welfare study, 90 percent of United States college students use alcohol and heavy drinking is common, with a third or more of all students getting drunk more than once a month. It is reported in Alcohol Health and Research World that one-third of all young people will use alcohol on a regular basis while 5 to 10 percent will have serious complications from drinking, and 1 in 12 will become an adult problem drinker or alcoholic ("Young People and Alcohol," 1975)

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Young people tend to drink less frequently than adults, but they consume larger amounts at a time, as in weekend binge drinking. Adolescents may also drink smaller quantities than the adult male alcohol abuser; however, the use of other drugs along with the alcohol is more common in the adolescent, thus the possibility of harmful effects from the alcohol is increased (Morrissey, 1978).

Alcohol abuse can seriously alter the nutritional status of the adolescent. Because of their increased nutritional needs for growth and development, adolescents are especially susceptible to nutritional deficiencies associated with alcohol abuse (Marino & King, 1980). The degree of nutritional risk for adolescents using alcohol will depend on the frequency and amount of their alcohol intake (Lucas, 1981). Alcohol, which has almost no nutritional value, can contribute a significant amount of energy while displacing food that provides nutrients for growth, resulting in risk of nutrient deficiencies (Becker, 1978). Alcohol has a toxic effect on the gastrointestinal tract, resulting in decreased appetite, impaired absorption and digestion, and altered metabolism. Long-term alcohol abuse may lead to organ damage with serious health consequences (Marino & King, 1980). There has been little research on the effects of alcohol on the nutritional status of the adolescent or the physiological effects of alcohol on the growth process (Story, 1984). The effect of alcohol on metabolism of the adult is well documented, but whether this knowledge applies to the adolescent population is not known ("Nutritional Concerns During Adolescence," 1981).

## Nutrition Education

Nutrition education programs are aimed at positive change in nutrition knowledge, attitudes, and behavior. Effective nutrition education is assumed to result in increased knowledge, positive attitudes toward nutrition, and desirable food habits. A review of the literature on the effect of nutrition education on changing food habits shows mixed results.

A significant number of studies have been conducted to determine the effects of nutrition education on the food behavior of elementary students. Many of these studies have indicated that nutrition education does not significantly influence eating behaviors. However, a nutrition education program for preschool children conducted by Harrill, Smith, and Gangiver (1972) resulted in increased vegetable consumption, and a study of fourth graders conducted by Smith and James (1980) revealed an increase in milk consumption.

Many studies have been conducted with high school students, most of which have dealt with nutrient intake, food preferences and food habits. Fewer studies relate to the effect of nutrition education on food habits and nutrient intake. In a study of high school seniors in 1958 (Kunkel & Hall, 1958) food practices improved after nutrition education, but the difference was not statistically significant. Spitke (1976) found that nutrition knowledge improved significantly after a two week nutrition education program, but food preferences did not show statistically significant change. Similar results in Byrd-Bredbenner, O'Connell, Shannon and Eddy's (1984) study of high school students showed nutrition knowledge improved significantly with no significant change in dietary behavior. The dietary

effect of adolescents teaching nutrition concepts to others was investigated by Hauck-Fenner (1980). Results confirmed previous high school studies as there was no significant change in eating habits after teaching nutrition to others.

College age people have been the focus of many research studies over the years. Nutrition knowledge, attitudes and practices, including food preferences, and nutritive intake have been investigated. Few of these studies have looked at the effect of nutrition education on the practices, food habits or nutritive intake of college students. In a study investigating the relationship between previous home economics courses and present nutritional knowledge, attitudes, and practices of older adolescents (high school graduates), Schwartz (1975) found significant correlations between nutritional knowledge and attitudes and between nutritional attitudes and practices. There was no significant relationship between nutritional knowledge and practices. Alexander (1977) conducted an investigation of the relationship between nutrition knowledge and eating habits of college students. No significant relationship was found between dietary adequacy and nutrition knowledge. These studies indicate that knowing the facts about nutrition does not automatically lead to change in food behavior patterns.

Few studies have been conducted to investigate differences in food intake between students with a professional interest in nutrition (i.e. home economics students) and students not professionally involved in nutrition. Alexander's study (1977) did make this comparison. Subjects for the study were 717 members (predominately female) of a

home economics honor society, 530 non-home economics males, and 682 non-home economics females. Results showed the home economics students scored significantly higher on a nutrition knowledge quiz than did non-home economics females and non-home economics males. Dietary adequacy scores, however, revealed that non-home economics males scored significantly higher than either home economics students or non-home economics females on a 24-hour food recall. Home economics students did score significantly higher than non-home economics females on dietary adequacy scores.

## CHAPTER III

### Methods

The purpose of this study was to determine the effects of nutrition education on the dietary intake of college students. The methods used to carry out the study are described in this chapter.

#### Sample

The subjects for the study were 119 college students taking a required beginning level nutrition class in the College of Home Economics, Department of Nutrition and Food Science, at South Dakota State University, Brookings, South Dakota. The class, entitled "Nutrition and the Family," is part of a core of courses required of all home economics majors. Students are encouraged to take the course during their first year of college. The convenience sample consisted of all students enrolled in the class over a two semester period of the 1982-1983 school year. There were two sections of the course in each semester. Fifty-two were enrolled in the class in the fall semester and 67 in the second semester. A total of 119 students participated in the study and 110 usable sets of data were acquired.

#### Design

The study was a single group pretest-posttest experimental design involving three steps. The first step, the pretest, was the collection of 3-day food records from all class members within the third and fourth weeks of the semester in the fall and spring semesters of the 1982-1983 school year. The food record assignment was

part of the course requirements designed to help students become aware of their food and beverage consumption. Students were requested to record all food and beverages consumed (except coffee, tea, and water) for three days in a one week period. They were to choose days representative of their typical eating patterns. Specific names, description, and amounts of food and beverages were to be recorded.

The second step was the instruction in nutrition. The same course objectives were used both semesters. The course met for two 50 minute periods per week. Major concepts studied were:

- function and sources of the nutrients
- diet planning
- energy needs
- weight control
- nutrition during pregnancy and lactation, infancy, childhood and adolescence, adulthood, and the later years.
- nutrition and athletics
- food facts and fallacies

Step three, the posttest, consisted of the completion of a 3-day food record at the end of the semester. Students were again instructed to record all food and beverages consumed for three days.

Approximately ten weeks elapsed between pretest and posttest administration. The 3-day food record was assigned as a normal part of the course. Students were told that the dietary data they were recording was to be used for a dietary analysis part of the assignment and the actual food record would not be evaluated. They were reminded

to not change their food intake because of the assignment, but to record just what was normal for them.

### Instrumentation

The measures used to collect data for this study consisted of 1) a 3-day food record and 2) a questionnaire. The 16 item questionnaire was used for gathering demographic data and background information on the subjects. Items in the questionnaire related to family background, major and college, nutrition study, food habits and health (see appendix A).

The 3-day food record was a three page form for recording food and beverage intake (see appendix A). The record provided for the date, name and amount of food and beverage, and time of day food or beverage was consumed. The purpose of the food record was to get each person's dietary intake for three days at the beginning of the semester and three days at the end of the semester.

There are several different dietary survey methods to obtain food intake data, each with its own advantages and disadvantages (Guthrie, 1983). Methods for obtaining individual food intakes are 24-hour recall, dietary history, weighed food records, and food intake records. The method chosen depends on the purpose of the study, the funds and personnel available to carry out the study, the target population, and the literacy level of subjects in the study.

In the 24-hour recall method the subject is interviewed and asked to describe kinds and amounts of food consumed in the previous

24 hours. This retrospective food intake account taken at an unannounced time reduces opportunity for subject to modify food behavior; there is also a relatively short recall period, which increases accuracy. The disadvantages of the 24-hour recall are that it is costly in time to conduct, requires good memory, and does not provide information on variations in diet from day to day. Thus, it may not represent usual intake.

A dietary history gathers qualitative rather than quantitative information on past dietary habits, such as number and type of meals normally eaten, frequency and extent food groups are used, and food likes and dislikes. This method describes long term and usual food practices but it is costly in time and money.

The weighed food record is the most accurate when a precise individual dietary analysis is required. All food is accurately weighed. The subject must keep accurate records or an investigator must be present to help, which may lead to modification of eating behavior. Limitations of the weighed food record are its high cost and its use only with highly motivated or paid subjects.

Food intake records can be 1-day, 3-day, 7-day or longer and are reported by the subject in writing, by tape recording, or by telephone. Written food records are an inexpensive and effective method for evaluating diets of large groups of literate subjects. Authorities disagree on the number of days and which days should be included. As number of days increases cooperation of subjects decreases, which results in incomplete or inaccurate information.

Guthrie (1983) states:



In a country such as the United States, with a varied food supply and a tradition for consuming a varied diet, a 1-day food record is considerably less representative of usual dietary patterns than in a country where the diet seldom varies. It is recognized that for many persons dietary patterns on weekends differ from those on weekdays. Yet experience has shown that persons asked to keep a 7-day food record lose interest in the task as the period progresses and keep increasingly less satisfactory records or stop entirely (p. 405).

The 3-day written food record was chosen as the dietary survey method for this study. The investigator felt it more representative of actual food intake than a 1-day food record and more likely to be completed by the students than a longer food record.

No method of assessing dietary intake is completely accurate. There are always the problems of incomplete or inaccurate record keeping, modification of food intake, and misjudgement of serving size. Investigator interpretation of the written record is also a source of contamination. Grivetti (1985) states that all methodologies for measuring food intake have flaws; all exhibit potential for error. Human subjects may alter their intake to please the researcher or to intentionally provide false information. In a validity study comparing six dietary intake methodologies, Grivetti (1985) found the mean accuracy ranged from 69 percent to 87 percent depending on the method used.

### Scoring

The 3-day food records were coded for analysis using a dietary score system. The dietary score system is a simple method of evaluating dietary adequacy using the Basic Four food guide (Four Food Groups) that does not require the extensive computations involved in using food composition tables. The dietary score system was designed for use in the Expanded Food and Nutrition Education Program (EFNEP) and has been used extensively by EFNEP (Bowering, Morrison, Lowenberg, & Tirado, 1977). A modification of this dietary score, which is based on the Basic Four food guide, is a simple scoring system for evaluation of dietary adequacy. The scoring system used in this study places equal emphasis (4 points) on each of the major food groups in the Basic Four. Thus if an individual consumed the recommended daily servings in each food group the total score would equal 16 points. The following scoring system was used.

Food Group	Points Per Serving	Possible Score
Milk and Milk Products (up to a maximum of 2)	2	4
Meat and Meat Alternative (up to a maximum of 2)	2	4
Fruit and Vegetables (up to a maximum of 4)	1	4

Bread and Cereals (up to a maximum of 4)	1	4
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Total Dietary Score 16

The 16 point system has been used in evaluating the effectiveness of nutrition intervention programs and its validity for assessing nutrient adequacy has been tested by Guthrie and Scheer (1981). Guthrie and Scheer evaluated 212 dietary intakes comparing actual nutrient intakes to RDA. Results were similar to a dietary assessment using a dietary score based on food groups. The simple dietary score was thus shown to be a reasonable substitute for the more complete and time consuming dietary analysis in diet evaluation.

The 3-day food records were changed from household measures to serving sizes of the Four Food Group standard. This data was used to calculate the dietary score. If a student consumed 4 ounces of meat in a day, which would be equivalent to two servings, the dietary score for the meat group would equal four (2 points for each serving).

In addition to the Four Food Groups used for dietary analysis other food categories were recorded from the student 3-day records. These categories included vitamin A and vitamin C rich foods, alcohol, soft drinks (diet and regular), and "other" foods or those high in sugar or fat. Foods and beverages appearing on the 3-day food records that fit into these categories were coded by counting daily servings in each category. For example, if one half cup of carrots and one orange were recorded on the food record, not only would these foods count 1 point each in the dietary (Basic Four) scoring system, but 1 serving for carrots would be recorded in the vitamin A category and

the serving of orange in the vitamin C category.

### Data Analysis

The food records and the questionnaire were coded by the researcher for analysis. Information on food records was changed from household measure to serving sizes using the Four Food Group standard. Servings were totaled in each food group and food category. Food group (meat, milk, bread and cereal, fruit and vegetables) data was used to calculate dietary score which is an indicator of dietary adequacy. Statistical analysis was done at the computer center at South Dakota State University.

### Limitations of the Study

The population, limited to students enrolled in the Home Economics core program at South Dakota State University, may not be totally representative of all college students in general because of the high percentage of females in the sample. Also, students at South Dakota State University are predominantly of Northern European extraction which could effect their food choices. However, college students nationwide do share similar lifestyle characteristics which have an effect on their eating habits. Media exposure to food and beverage advertizing and consumption of fast foods in the young adult population appear to be widespread throughout the nation. Therefore, this researcher contends that students at South Dakota State University are not remarkably different from other college students in the nation. Any generalizations from this study however, should be limited to female college students in the traditional age range in the

United States.

The Basic Four Food Guide which was used as a basis for the dietary score system used in this study does have limitations. Foods in the Basic Four are categorized according to their nutrient content but the vitamin and mineral content of food consumed is not measured, which may be limiting when determining dietary adequacy.

The method used for data collection is not completely accurate. The days chosen by students may not give a complete picture of their intake as weekdays and weekends may have very different food patterns. There may be incomplete or inaccurate record keeping by the subjects, students may modify their food intake when asked to write a record, and they may not judge amount of food consumed accurately. Another source of contamination is the researcher's interpretation of the food record and chance of error when coding.

## CHAPTER IV

### Results and Discussion

The major purpose of the study was to determine the effects of nutrition education on the dietary intake of college students. This chapter explains the results of the study. A background and description of the subjects is provided. Findings and their statistical significance are presented.

Data was obtained through the use of a 3-day food record and a demographic and background information questionnaire. From the 119 students in the sample, members of a nutrition class at South Dakota State University, 110 completed the pretest and posttest 3-day food record and the questionnaire. All inferences and conclusions are based on the responses of this group.

#### Background and Description of the Subjects

Table 1 provides a summary of demographic and background information obtained from the students in the study. All students in the classes included in the study were female except two and 89 percent were between the ages of 18 and 20 years. The sex ratio reflects the small percentage of males enrolled in home economics.

Most of the subjects had a rural background, with 52 percent indicating the place of residence during growing up years as farm or ranch compared to 46 percent growing up in a town or city. The rural population of South Dakota, southwest Minnesota, and northwest Iowa is reflected in this statistic. A majority of the students (97 percent) lived with both parents before their 18th birthday and 85 percent

Table 1

Summary of Information on Background and Eating Habits of College Students

Characteristics	Number <sup>a</sup> (n=110)	Percent <sup>b</sup>
<b>Sex</b>		
Female	108	98.2
Male	2	1.8
<b>Age</b>		
Less than 18	0	0.0
18-21 years	98	89.0
21 years	12	11.0
<b>Place of residence while growing up</b>		
On a farm or ranch	57	51.8
In a town or city	50	45.5
<b>Person/s lived with before 18th birthday</b>		
Both parents	107	97.3
Mother	3	2.7
Father	0	0.0
Other	0	0.0

(Table Continues)

Table 1

Summary of Information on Background and Eating Habits of College Students

Characteristics	Number <sup>a</sup> (n=110)	Percent <sup>b</sup>
<b>Children in family of origin</b>		
One	1	0.9
Two	15	13.6
Three	23	20.9
Four or more	71	64.5
<b>Year in College</b>		
Freshmen	59	53.6
Sophomore	38	34.5
Junior	12	10.9
Senior	1	0.9
<b>College</b>		
Home Economics	104	94.5
Other	5	4.5
<b>Major</b>		
Child Development & Family Relations	30	28.3
Education/Extension/Journalism	27	25.5
Nutrition and Food Science	14	13.2

(Table Continues)



Table 1

Summary of Information on Background and Eating Habits of College Students

Characteristics	Number <sup>a</sup> (n=110)	Percent <sup>b</sup>
Textiles and Clothing/Interior Design	33	31.1
Double Major	2	1.9
Nutrition courses taken		
Food and Man, NFS 111	16	14.5
Food Principles, NFS 141	6	5.5
Survey of Human Nutrition, NFS 221	0	0.0
Meal Management, NFS 251	0	0.0
Human Nutrition, NFS 321	0	0.0
Other	3	2.7
Junior and senior high school courses where nutrition was studied		
Home Economics		
Not taken	8	7.3
Taken less than 1 year	22	20.0
Taken 1 year	26	23.6
Taken more than 1 year	54	49.1

(Table Continues)

Table 1

Summary of Information on Background and Eating Habits of College Students

Characteristics	Number <sup>a</sup> (n=110)	Percent <sup>b</sup>
Health/physical education		
Not taken	38	34.5
Taken less than 1 year	21	19.1
Taken 1 year	23	20.9
Taken more than 1 year	28	25.5
General Science/biology/chemistry		
Not taken	36	32.7
Taken less than 1 year	14	12.7
Taken 1 year	24	21.8
Taken more than 1 year	36	32.7
Other courses where nutrition was studied		
Not taken	107	97.3
Taken less than 1 year	1	0.9
Taken 1 year	2	1.8
Taken more than 1 year	0	0.0

(Table Continues)

Table 1

Summary of Information on Background and Eating Habits of College Students

Characteristics	Number <sup>a</sup> (n=110)	Percent <sup>b</sup>
Other places nutrition was studied		
Elementary school	49	44.5
4-H	57	51.8
Scouts	10	9.1
FHA/HERO (Future Homemakers of America/Home Economics Related Occupations)	43	39.1
Other	7	6.4
Where most of meals are eaten		
Home	31	28.2
Restaurant	2	1.8
University food service	86	78.2
Other	9	8.2
Meal companion/s most of time		
None	14	12.7
Female friend/s	65	59.1
Male friend/s	7	6.4

(Table Continues)

Table 1

Summary of Information on Background and Eating Habits of College Students

Characteristics	Number <sup>a</sup> (n=110)	Percent <sup>b</sup>
Both male and female friends	26	23.6
Family or relatives	8	7.3
Perceived weight		
Within 10 pounds of recommended weight	70	63.6
Overweight more than 10 pounds	37	33.6
Underweight more than 10 pounds	3	2.7
Health		
Excellent	44	40.4
Good	57	52.3
Fair	8	7.3
Poor	0	0.0

<sup>a</sup> Totals do not always equal 110 because of nonresponse or unusable data.

<sup>b</sup> The percentage equals 100 percent of 110 respondents. If n is less than 110, total percents will not equal 100 percent.

lived in families with three or more children. This high percentage of stable families with more children than the national average may be related to traditional values in rural communities.

As expected, most of the students (54 percent) were freshmen in college and 35 percent were sophomores. The subjects were enrolled in a freshman level home economics core course. Approximately one-third of the students (31 percent) were in Textiles/Clothing and Interior Design, 28 percent in Child Development and Family Relations, 26 percent in Education/Extension/Journalism and 13 percent in Nutrition and Food Science. The remaining 2 percent had a double major.

Few college nutrition courses in addition to the core class had been taken by the students, probably due to the high percentage of freshmen and sophomores. Fifteen percent of the subjects had taken "Food and Man," a course covering the socio-cultural aspects of food and nutrition. Food Principles, an introductory food science course, had been taken by 6 percent of the subjects and 3 percent of the students had taken some other nutrition class either at South Dakota State University or another institution.

Ninety three percent had studied nutrition in home economics in junior and senior high school with nearly half of the students reporting studying nutrition in home economics for more than 1 year. Six percent had studied nutrition in health and/or physical education and 67 percent had nutrition in science, biology or chemistry. A small number of students (3 percent) listed other courses where nutrition was studied. These statistics indicate that nutrition is being included in a variety of courses in the secondary schools.

According to the survey results, 45 percent of the students had studied nutrition in elementary school. Surveys of elementary teachers also indicate nutrition is being taught in the elementary schools in South Dakota (Davis, 1979; Pearson, 1979). Over half of the students (52 percent) had nutrition in 4-H and 39 percent in Future Homemakers of American/Home Economics Related Occupations (FHA/HERO). These percentages reflect the high enrollment in 4-H and Consumer Homemaking programs in South Dakota. A smaller number, 9 percent, had nutrition in Scouts. Six percent of the students learned about nutrition from other places, including work, television, books, and public lectures.

Twenty-eight percent of the respondents ate most of their meals at home compared to 78 percent who ate at the university food service. This difference may be due to the college room and board requirements for freshmen and sophomore students. Few ate most of their meals in fast food establishments or restaurants (2 percent). Again university housing requirements might be a contributing factor to this finding. Eight percent reported eating most of their meals in another place, including at work, relative's home, and boyfriend's home.

Fifty-nine percent of the students ate with female friend/s and 24 percent ate with both male and female friends. Thirteen percent ate alone most of the time, 7 percent with relatives, and 6 percent with male friends. The university housing and food service requirement for freshmen and sophomores is probably a contributing factor to almost 60 percent eating with female friends.

The section on how students pay for their food was omitted from the analysis. Initial attempts to analyze showed that there was misinterpretation of the questions, resulting in invalid responses.

Of the 110 respondents, almost two-thirds (64 percent), perceived themselves as being within 10 pounds of their recommended weight. Thirty four percent saw themselves as being overweight and only 3 percent viewed themselves as being underweight. The number of students who saw themselves as overweight may represent the national preoccupation with thinness. They may be attempting to conform to the cultural norm. Studies indicate that adolescents are dissatisfied with their body dimensions. Huenemann et al. (1966) found that 70 percent of the females studied wanted to lose weight but only about 10 percent were actually obese.

When asked to evaluate state of health as excellent, good, fair, or poor, 40 percent rated themselves in the excellent category and 52 percent in the good category. No student rated him/her self as having poor health. Most of the subjects viewed their health status as being positive as 93 percent saw themselves as having good health or better. This is perhaps a typical response for this population. Most young adults of college age are healthy and feel good most of the time.

#### Consumption in Food Groups and Food Categories

Data on food consumption in various food groups and food categories was secured through the 3-day food record. Subjects were asked to write down everything they ate or drank for 3 days at the beginning

and end of the semester. Dietary record information was translated into servings per day for each food group and each food category. The food groups are the same as the Four Food Groups: milk, meat, bread and cereal, fruit and vegetables. Food categories were vitamin C rich foods, vitamin A rich foods, diet soft drinks, regular soft drinks, alcohol, and "other" foods (foods high in sugar and fat).

The average number of servings was calculated for each of the individual food groups and food categories (Table 2). Both pretest and posttest data were used to determine the averages. The dietary score percentages were also calculated and are presented in Table 3.

The dietary score system is a simple method of evaluating dietary adequacy using the Basic Four. Four points are given to each of the major food groups in the Basic Four. Two points are given for each serving in the milk group and the meat group and 1 point for each serving in the bread and cereal and fruit and vegetables groups. For this study the Basic Four is referred to as the foods groups. Food categories are the additional food classes recorded from students 3-day diaries. An example of scoring follows.

Lunch:

Scoring:

	Food Groups (used for dietary score)
peanut butter sandwich	Milk..... 1 serving = 2 pts.
2 slices bread	Meat..... 1/2 serving = 1 pt.
2 t. peanut butter	Bread & cereal.... 2 servings = 2 pts.
1 orange	Fruit & vegetables 1 serving = 1 pt.
8 oz. glass milk	Food Categories
brownie	Vitamin C..... 1 serving
	Vitamin A.....
	Diet soft drinks..

(Continued on p. 54)



Table 2

Average Daily Servings of Various Food Groups and Food Categories  
Consumed Over 6 Day Period

Group or Category	Servings <sup>a</sup>	% of students
<b>Food Groups</b>		
Milk group	0	15.5
	1	27.7
	* 2-3	47.7
	4 or more	8.9
Meat group	0	11.5
	1	30.9
	* 2 or more	57.6
Bread and cereal group	0	5.0
	1	6.2
	2	17.4
	3	17.6
	* 4 or more	52.8
Fruit and vegetables group	0	9.4
	1	17.9
	2	20.2
	3	18.2
	* 4	34.3

Table 2

Average Daily Servings of Various Food Groups and Food Categories  
Consumed Over 6 Day Period

Group or Category	Servings <sup>a</sup>	% of students
<b>Food Categories</b>		
Vitamin C foods	0	57.0
	1 or more	43.0
Vitamin A foods	0	85.5
	1 or more	14.5
Diet soft drinks	0	68.5
	1	19.5
	2 or more	11.8
Regular soft drinks	0	76.5
	1	17.1
	2 or more	6.4
Alcohol	0	89.8
	1-3	6.8
	4-6	2.0
	7-9	1.4

(Table Continues)

Table 2

Average Daily Servings of Various Food Groups and Food Categories  
Consumed Over 6 Day Period

Group or Category	Servings <sup>a</sup>	% of students
"Other" group	0	10.8
	1-3	55.0
	4-6	26.7
	7-9	7.6

Note. \* = recommended number of servings per day.

<sup>a</sup> Number of servings obtained by totaling average servings per day of the pretest and posttest and dividing by 6 to get overall average consumption for the 6 day period.

Table 3

Average Daily Dietary Score for Four Food Groups Over a 6 Day Period

Dietary Score	Percent of Students
0-9	24.5
10	12.0
11	8.9
12	14.4
13	13.9
14	13.2
15	5.5
16	7.6

<sup>a</sup> Obtained by giving 4 points to each of the Four Food Groups as follows:

Milk.....2 points for each of 2 servings = 4

Meat.....2 points for each of 2 servings = 4

Bread and cereal.....1 point for each of 4 servings = 4

Fruit and vegetables..1 point for each of 4 servings = 4

Total Possible Points =16

(Continued from p. 49)

Regular soft drinks	
Alcohol.....	
Other.....	1 serving

Over half of the students consumed the recommended servings or more in the milk, meat, and bread and cereal groups (See Table 2).

The fruit and vegetables group had a much lower percentage of students receiving the recommended servings per day (34 percent).

In the vitamin C category, 57 percent of the students consumed no servings while 86 percent consumed no foods in the vitamin A category. The findings concur with other nutrient intake studies. In the Ten-State Nutrition Survey (1972) and the Health and Nutrition Examination Survey (Preliminary Findings ..., 1974), vitamin A was found to be one of the nutrients below recommended levels. Results of studies done specifically with adolescents reveal both vitamin A and vitamin C as low or deficient in adolescent diets (Hampton et al., 1967, Schorr et al., 1972, Wharton, 1963). Other studies conducted with college students show mixed results. Jakobovits et al. (1972) found adequate intakes of vitamin A and vitamin C in college women; Ostrum and Labuza (1977) found adequate vitamin C but marginal vitamin A; and, Khan and Lipke (1982) found low vitamin A for some college males.

The soft drink categories showed 69 percent reporting no intake of diet soft drinks and 77 percent reporting no consumption of regular soft drinks. This is a high percentage of nonconsumers compared to other surveys. The Nationwide Food Consumption Survey (Food and Nutrient Intakes..., 1980) results indicate soft drinks as the most frequently consumed snack item. Khan and Lipke's study (1982) of

250 college students also revealed carbonated beverages to be the most popular snack item. This difference may be due to unreported snacking during the 3 day period.

A high percentage of the students (90 percent) reported no alcohol consumption in this study. These findings are contradicted by other studies on alcohol consumption in this population. Harford (1976) reports results from a national study that shows approximately 39 percent of the adolescent population to be moderate drinkers and 28 percent problem drinkers. From a government study, Kraft (1976) estimated that 90 percent of United States college students use alcohol and that heavy drinking is common, with a third or more of all students getting drunk more than once a month. The difference between South Dakota State University students and students in other studies may appear because of the days students in this study chose for their food records. Weekend days may differ from week days in food and beverage intake. Unreported weekend alcohol consumption may help explain this difference. Morrissey (1978) reported young adults concentrated their drinking episodes on weekends as in binge drinking.

The "other foods" category results showed 55 percent consuming one to three servings and 27 percent consuming four to six servings in contrast to 11 percent eating no foods from this group and 8 percent consuming seven to nine servings. According to these figures, the majority of college students in this study consumed foods high in fats and sweets in moderation.

Dietary score results showed 8 percent of the students had a score of 16, 47 percent had scores from 12 to 15, 21 percent had a

score of 10 or 11, and one fourth (25 percent) had dietary scores ranging from 0 to 9. Guthrie and Scheer (1981) tested the validity of the dietary score for assessing nutrient adequacy. They reported with a dietary adequacy score of 16 the average intake exceeded 90 percent of the RDA for all nutrients except iron and vitamin B<sub>6</sub>. For scores from 12 to 15, zinc was also low. As the score dropped to 10 and 11, magnesium, vitamin A, thiamin, and folacin levels decreased considerably. With a score of 9 or less only 5 nutrients out of the 12 examined were present in appreciable amounts. These nutrients were protein, ascorbic acid, riboflavin, vitamin B<sub>12</sub>, and calcium.

If these results are applied to the subjects in this study, 8 percent of the students had dietary intakes exceeding 90 percent of the RDA for all nutrients except iron and vitamin B<sub>6</sub> and nearly half of the students (47 percent) had intakes exceeding 90 percent of the RDA for all nutrients except for iron, vitamin B<sub>6</sub> and zinc. Twenty one percent, in addition to iron, vitamin B<sub>6</sub> and zinc, had suboptimal levels of magnesium, vitamin A, thiamin, and folacin. For one fourth of the students intake was inadequate for all nutrients except protein, ascorbic acid, riboflavin, vitamin B<sub>12</sub> and calcium.

### Statistical Analysis

Mean food group scores, food category scores, and mean dietary scores were determined for the pretest and posttest. The pretest and posttest means were compared for statistical significance using the paired t-test. This method was used since the same subjects took both the pretest and the posttest. Product-moment correlations were used

to analyze the degree of relationship between dietary score and food groups, and dietary score and food categories. Analysis of variance for food groups and food category scores in relation to subjects demographic and background characteristics was computed. Mean scores that showed significant F values ( $p < .01$ ) were further analyzed to determine which group means differed significantly from one another. A post hoc t test, Waller Duncan, was used for this comparison.

### Problems With Change Scores

The measurement of change from pretest to posttest called change score or gain score has some limitations. Some are subject to a ceiling effect, or a limited score range. This is true of the dietary score which has a maximum possible points of 16. A student scoring 14 points on the pretest dietary score can only improve by 2 points on the posttest. In contrast, a student with a score of 6 on the pretest can make a potential gain of 10 points. Thus, the ceiling effect places a restriction on the distribution of gain scores.

With the gain score there is also the problem of distortion because of regression toward the mean. The regression effect means those students who earned a high score on the pretest would tend to earn a lower score on the posttest while students with a low pretest score would tend toward a higher score on the posttest.

### Hypothesis Testing

The difference between pretest and posttest dietary score and dietary intake in specific food groups and food categories was tested for significance. Relationship between dietary score and food groups



and dietary score and food categories was analyzed. The relationship between the change in dietary intake score and background characteristics and change in food groups and food categories and background characteristics was tested for significance.

Hypothesis One. There is no significant difference in dietary intake (dietary score) before and after nutrition education.

Table 4 shows the summary of data after testing hypothesis one. Mean scores of 11.70 for the pretest and 10.99 for the posttest were recorded. This difference was significant at the .01 level so the hypothesis was rejected. This negative change in dietary score from pretest to posttest may be due to certain factors such as less money and time available for food purchasing and consumption at the end of the semester than at the beginning. Also, dietary practices may simply have deteriorated over the semester.

Hypothesis Two. There is no significant difference before and after nutrition education in dietary intake in specific food groups and food categories.

The mean posttest scores were higher than mean pretest scores in the meat food group, and in the following food categories: diet soft drinks, regular soft drinks, alcohol, and "other" foods (see Table 4). The alcohol category showed a significant increase ( $p < .05$ ) at the posttest level. The increase in alcohol consumption may have been influenced by factors such as additional stress during the semester resulting in higher alcohol consumption and more social activities involving use of alcohol as freshmen students develop more friendships throughout the semester.

Table 4

Paired t-test Analysis Summary for Food Groups, Food Categories, and Dietary Score

	Pretest, Posttest and Change Results					
	Pretest		Posttest		Change	
	Mean	Standard error of mean	Mean	Standard error of mean	Mean	Standard error of mean
<u>Food group</u>						
Milk	2.109	0.104	1.573	0.088	-0.536**	0.098
Meat	1.709	0.068	1.739	0.074	0.030	0.081
Bread & cereal	3.767	0.138	3.718	0.133	-0.049	0.162
Fruit & vegetables	3.106	0.174	2.800	0.148	-0.306	0.166
<u>Food category</u>						
Vitamin C foods	0.824	0.089	0.803	0.072	-0.021	0.102
Vitamin A foods	0.209	0.047	0.164	0.027	-0.046	0.050
Diet soft drinks	0.470	0.071	0.539	0.089	0.070	0.065
Regular soft drinks	0.297	0.045	0.321	0.048	0.024	0.050
Alcohol	0.182	0.061	0.485	0.110	0.303*	0.117
Other foods	2.903	0.152	2.997	0.154	0.094	0.180
<u>Dietary Score</u>	11.697	0.224	10.994	0.228	-0.703**	0.245

Note. N = 110

\* p < .05. \*\* p < .01.

The mean posttest scores were lower than pretest scores for the milk, bread and cereal, and fruit and vegetables groups. The mean posttest scores were lower than the pretest scores for the vitamin C and vitamin A food categories. The change within the milk group was significant ( $p < .01$ ). It appears that as milk consumption decreased, alcohol consumption increased. Based on the above findings, the hypothesis was rejected. There was a significant difference in the milk group and alcohol category from pretest to posttest.

Hypothesis Three. There is no significant relationship between dietary intake and intake of specific food groups and food categories.

The hypothesis was tested with the Pearson product-moment correlation. The results of the correlation of the variables for the pretest and posttest are presented in Table 5. Highly significant positive correlations were observed at the .001 level of significance for the four food group categories (milk, meat, bread and cereal, and fruit and vegetables) and the vitamin C food category. With these high positive correlations we can predict a high dietary score if any of the food groups or vitamin C have a high score. With this information a direct relationship can be concluded between the dietary intake score or vitamin C category and the four food groups. The Four Food Groups (Basic Four) are the basis of selecting an adequate diet. If any of the food groups has a score meeting the recommended servings per day it is only logical it would have a positive effect on the dietary intake score.

Other positive correlations significant at the .05 level were

Table 5

Correlations Between Dietary Score and Score in Specified Food Groups and Food Categories

Group or Category	Pretest	Posttest
<b>Milk</b>		
r value	0.3916**	0.6215**
probability	0.0001	0.0001
<b>Meat</b>		
r value	0.5220**	0.6596**
probability	0.0001	0.0001
<b>Bread and cereal</b>		
r value	0.5580**	0.5795**
probability	0.0001	0.0001
<b>Fruit and vegetables</b>		
r value	0.5842**	0.4188**
probability	0.0001	0.0001
<b>Vitamin C foods</b>		
r value	0.3972**	0.3385**
probability	0.0001	0.0003
<b>Vitamin A foods</b>		
r value	0.1797	0.2101*
probability	0.0603	0.0276

(Table Continues)

Table 5

Correlations Between Dietary Score and Score in Specified Food Groups and Food Categories

Group or Category	Pretest	Posttest
<b>Diet soft drinks</b>		
r value	-0.3494**	-0.1242
probability	0.0002	0.1960
<b>Regular soft drinks</b>		
r value	0.0653	0.1188
probability	0.4980	0.2163
<b>Alcohol</b>		
r value	-0.0268	-0.2250*
probability	0.7815	0.0181
<b>Other foods</b>		
r value	0.1346	0.1897*
probability	0.1610	0.0471

\*  $p < .05$ . \*\*  $p < .001$ .

observed between dietary intake and the vitamin A category in the posttest and dietary intake and the "other" category in the posttest. Negative correlations were shown between the dietary score and diet soft drinks in the pretest and dietary score and alcohol in the posttest ( $< .05$ ). The relationship between the diet soft drink category and dietary intake score was significant at the .001 level.

Hypothesis three is rejected. There are highly significant correlations between dietary intake and the four food groups and vitamin C foods in both the pretest and posttest.

Hypothesis Four. There is no significant relationship between the change in dietary intake (dietary score) and the selected background characteristics of:

- (a) Age
  - (b) Place of residence while growing up
  - (c) Children in family of origin
  - (d) Year in college
  - (e) Major
  - (f) Nutrition in junior and senior high school
    - 1. Home economics
    - 2. Health/physical education
    - 3. General science/biology/chemistry
  - (g) Nutrition in other places
    - 1. Elementary school
    - 2. 4-H
    - 3. Future Homemakers of America/Home Economics
- Related Occupations

- (h) Where most of meals are eaten
  - 1. Home
  - 2. University food service
- (i) Meal companions most of time
  - 1. None
  - 2. Female friend(s)
  - 3. Both male and female friends
- (j) Perceived weight
- (k) Health

The results of the analysis of variance between the independent variables and mean dietary change score are presented in Appendix B (see Table B-1). No significant difference was found in dietary score and any of the independent variables. Thus the null hypothesis was not rejected.

Hypothesis Five. There is no significant relationship between change in intake of food groups and food categories and the selected background characteristics of:

- (a) Age
- (b) Place of residence while growing up
- (c) Children in family of origin
- (d) Year in college
- (e) Major
- (f) Nutrition in junior and senior high school
  - 1. Home economics
  - 2. Health/physical education
  - 3. General science/biology/chemistry

## (g) Nutrition in other places

1. Elementary school
  2. 4-H
  3. Future Homemakers of America/Home Economics
- Related Occupations

## (h) Where most of meals are eaten

1. Home
2. University food service

## (i) Meal companions most of time

1. None
2. Female friend(s)
3. Both male and female friends

## (j) Perceived weight

## (k) Health

In Tables B-2 through B-11 in the appendix, the results of the analysis of variance between the independent variables related to background characteristics and the mean scores of the food groups and food categories are presented. Mean scores with significant F values were further analyzed to determine which means differed significantly from one another (see Table 6).

The only significant relationship found between the food groups and background characteristics was in the milk group when analyzed with year in college. As Table 6 indicates, however, when subjected to further testing to determine where the difference was, the mean difference in milk consumption between years in college was so minimal it did not appear in the post hoc test. There was no



Table 6

Analysis of Variance Data on Background Variables with Significant  
Difference Between Mean Change Scores at the .05 Level

Analysis of Variance Data on Background Variables with Significant  
Difference Between Mean Change Scores at the .05 Level

Independent Variables	N <sup>a</sup>	Mean <sup>b</sup>	Error Mean Square	F Value	Prob.
			<u>Milk Group</u>		
Year in College			0.980	3.74	0.013
Freshmen	59	-0.299A			
Sophomore	38	-0.658A			
Junior	12	-1.306A			
Senior	1	-0.667A			
			<u>Vitamin A Category</u>		
Year in college			0.268	2.70	0.048
Freshmen	59	0.017A			
Sophomore	38	-0.018A			
Junior	12	-0.444A			
Senior	1	0.000A			

(Table Continues)

Table 6

Analysis of Variance Data on Background Variables with Significant  
Difference Between Mean Change Scores at the .05 Level

Independent Variables	N <sup>a</sup>	Mean <sup>b</sup>	Error Mean Square	F Value	Prob.
			Alcohol Group		
Major			1.452	2.79	0.030
Child Development and Family Relations	30	0.378B			
Education/Extension/ Journalism	27	0.111B			
Nutrition and Food Science	14	0.119B			
Textiles, Clothing and Interior Design	33	0.343B			
Double Major	2	3.000A			
			Other Category		
Length of time course including nutrition education was taken:					
Health/physical education			3.318	3.87	0.011
Not Taken	38	0.518BA			
Taken less than 1 year	21	-0.397BC			
Taken 1 year	23	0.768A			
Taken more than 1 year	28	-0.667C			

(Table Continues)

Table 6

Analysis of Variance Data on Background Variables with Significant Difference Between Mean Change Scores at the .05 Level

Independent Variables	N <sup>a</sup>	Mean <sup>b</sup>	Error Mean Square	F Value	Prob.
<u>Vitamin A Category</u>					
Eat most meals at home:			0.273	3.99	0.048
No	79	0.017			
Yes	31	-0.204			
<u>Alcohol Category</u>					
Perceived weight			1.435	3.39	0.037
Within 10 pounds of recommended weight	70	0.191B			
Overweight more than 10 pounds	37	0.378B			
Underweight more than 10 pounds	3	2.000A			

<sup>a</sup> N in each category will not always equal 110 due to nonresponse or unusable data.

<sup>b</sup> Mean values followed by the same letter are not significantly different.

significant relationship between any of the background characteristics and changes in consumption in the meat group, bread and cereal group, fruit and vegetable group, or vitamin C category (see Appendix, Tables B-3, B-4, B-5, and B-6). Vitamin A was significantly related to year in college and to where meals were eaten. Mean scores of 0.017 for students not eating at home and -0.204 for those eating at home showed a greater negative change in vitamin A consumption for students eating at home. These findings may reflect lack of food preparation time available at end of semester for students living in apartments. Difference in vitamin A consumption and years in college was so minimal it did not appear when subjected to post hoc analysis.

There were no significant relationships between diet or regular soft drink consumption and background characteristics (Appendix, Tables B-8 and B-9). Mean alcohol scores (Appendix, Table B-10) were significantly related to single or double major and perceived weight. Students with double majors had the most increase in their alcohol consumption throughout the semester. Mean alcohol scores did not differ significantly between students who saw themselves as normal weight and those who perceived themselves as being overweight. Underweight and overweight subjects and underweight and normal weight subjects showed significant difference in alcohol consumption. The underweight students had a significantly higher increase in alcohol consumption at the end of the semester than the normal or overweight subjects.

The only significant difference in the "other" food category and background characteristics was with a course including nutrition

education (health/physical education) (Appendix, Table B-11). Mean change scores of 0.518 for those not having a health or physical education class including nutrition and -0.667 for those having such a class for more than 1 year indicated a greater change in the "other" foods intake (decrease) for students having a health or physical education class including nutrition for more than 1 year. Mean scores for those having taken a class less than 1 year of -0.397 and having taken it one year of 0.768 showed a greater change in "other" food consumption (increase) for students having a health or physical education class including nutrition for 1 year. A significant change in the mean intake of "other" foods also appeared between students taking a health or physical education class including nutrition for 1 year (0.768) and those taking such a class for more than 1 year (-0.667). These sporadic results do not appear to have any practical significance.

## CHAPTER V

### Summary and Implications

The purpose of the study was to determine the effects of nutrition education on the dietary intake of college students. The subjects were 119 college students taking a required beginning level nutrition class during the 1982-1983 school year in the College of Home Economics, Department of Nutrition and Food Science, at South Dakota State University. There were 110 usable sets of data used in the study. A usable set of data was a background questionnaire and a pretest and posttest 3-day food record.

Overall, nutrition education seemed to have little effect on the eating habits or dietary intake of college students involved in the study. Descriptive data indicated over half of the students consumed the recommended servings or more in the milk group, meat group, and bread and cereal group; however, only about one-third of the students were eating the recommended servings per day from the fruit and vegetables group. The low fruit and vegetable score appeared again in the vitamin C and vitamin A food categories as 57 percent and 86 percent, of the subjects, respectively, were consuming no foods rich in these nutrients. A high percentage reported no soft drink and alcohol consumption which contradicts results of most other studies conducted with this population.

Comparison of pretest and posttest mean dietary scores showed a statistically significant negative change. The dietary score is a scoring system for measuring dietary adequacy. The results indicate

that students diets actually deteriorated during the semester. Other factors may have been effecting their food intake such as less time and money available for nutritious meals. Mean pretest and posttest scores showed significant change for the milk group and alcohol category. Milk consumption decreased during the semester while alcohol consumption increased.

A correlation of mean dietary intake scores and mean food group and food category intake scores showed a highly significant positive relationship between dietary score (dietary adequacy) and the four food groups (milk, meat, bread and cereal, and fruit and vegetables) and the vitamin C food category. A high negative correlation was observed between the dietary score and diet soft drinks in the pretest. As diet soft drink consumption increased, total dietary adequacy decreased.

Results of the study showed a relationship between change in dietary score (dietary adequacy) and some of the background characteristics. Significant relationships were observed between: vitamin A intake and eating meals at home, alcohol consumption and college major, alcohol consumption and perceived weight, and intake of "other" foods and nutrition studied in health and physical education.

Students eating at home showed more of a decrease in vitamin A consumption during the semester than students eating other places. Students with double majors showed a significant increase in alcohol consumption. Students who perceived themselves as underweight had a significantly higher increase in alcohol consumption at the end of the semester than students who perceived themselves as normal weight or

overweight. Decreased consumption in the "other" foods was shown for students taking health or physical education when nutrition was included for more than one year and less than one year.

Results from this study indicate that changes in eating behavior (higher dietary score) did not result after nutrition education. Alexander's (1977) findings from her study of eating habits of college students are in agreement with the results of this study.

Nutrition knowledge alone does not appear to bring about behavioral changes. Present nutrition education methods are not effective in promoting changes in eating behaviors. Research is needed for exploring alternatives and developing new teaching strategies and techniques to assist educators in helping students learn not only the concepts of nutrition but also how to apply this nutrition knowledge to their eating behavior. We must investigate the factors that influence eating behavior if nutrition education is to affect dietary change. Perhaps a socio-cultural approach would help us understand the attitudes, beliefs and prejudices people have about food, and why they have them.

The case study may give us insight into the complex factors which may influence eating behaviors; a study of a few subjects in depth in a real life setting may increase our understanding of why people eat what they do. When we know the "whys" of eating behavior, programs could then be devised to motivate people to change their dietary habits and improve their nutritional status.



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FOOTNOTES AND REFERENCES

Name \_\_\_\_\_

Circle the letter of the item most to the right that most accurately describes you. Please answer each question.

- A. My age is:
  - 1. under 18
  - 2. 18-24
- B. My gender is:
  - 1. Male
  - 2. Female
- C. My marital status:
  - 1. Single
  - 2. Married

- D. Do you have (or will at the end of) any 18th birthday?
  - 1. None
  - 2. 1-2
  - 3. 3-4
  - 4. 5 or more (please specify) \_\_\_\_\_

APPENDIX A

Instruments

- E. The number of children in my family of origin is:
  - 1. 0
  - 2. 1
  - 3. 2
  - 4. 3 or more

- F. My year in college is:
  - 1. Freshman
  - 2. Sophomore
  - 3. Junior
  - 4. Senior

- G. I am a student at:
  - 1. College of New Brunswick
  - 2. Other (please specify) \_\_\_\_\_

- H. If you are a student at New Brunswick College, what major area of study?
  - 1. Child Development and Family Studies
  - 2. Education/Elementary/Secondary
  - 3. Health and Food Sciences
  - 4. Health and Clothing/Interior Design
  - 5. Other major (please specify) \_\_\_\_\_

## FOOD HABITS QUESTIONNAIRE

Name \_\_\_\_\_

Circle the letter or letters next to the responses that most appropriately describe you. Please answer each question.

- A. My sex is:
1. female
  2. male
- B. My age is:
1. less than 18
  2. 18 to 20
  3. 21 or over
- C. I grew up:
1. on a farm or ranch
  2. in a town or city
- D. For the years (or most of the years) up to my 18th birthday I lived with:
1. both my parents
  2. my mother
  3. my father
  4. other (please specify) \_\_\_\_\_
- E. The number of children in my family of origin is:
1. one
  2. two
  3. three
  4. four or more
- F. My year in college is:
1. freshmen
  2. sophomore
  3. junior
  4. senior
- G. I am a student in:
1. College of Home Economics
  2. other (please specify) \_\_\_\_\_
- H. If you are a student in Home Economics indicate your major area of study:
1. Child Development and Family Relations
  2. Education/Extension/Journalism
  3. Nutrition and Food Science
  4. Textiles and Clothing/Interior Design
  5. double major (please explain) \_\_\_\_\_

## I. Nutrition courses I have taken are:

1. Food and Man, NFS 111
2. Food Principles, NFS 141
3. Survey of Human Nutrition, NFS 221
4. Meal Management, NFS 251
5. Human Nutrition, NFS 321
6. other (please specify) \_\_\_\_\_

## J. During junior high school and senior high school, I have studied nutrition in the following courses: (Please check length of time for each course you circle.)

	LESS than <u>1 year</u>	<u>1 year</u>	MORE than <u>1 year</u>
1. Home Economics	_____	_____	_____
2. Health/Physical Education	_____	_____	_____
3. General Science/Biology/ Chemistry	_____	_____	_____
4. other (please specify) _____	_____	_____	_____

## K. Other places I have studied nutrition are:

1. Elementary School
2. 4-H
3. Scouts
4. Future Homemakers of America/HERO
5. other (please specify) \_\_\_\_\_

## L. Where do you eat your meals most of the time?

1. at home
2. fast food places and restaurants
3. university food service
4. other (please specify) \_\_\_\_\_

## M. Most of the time I eat:

1. by myself
2. with female friend(s)
3. with male friend(s)
4. with both male and female friends
5. with family or other relatives

## N. How do you pay for your food?

1. with money I earn
2. with money my parents and others give me
3. other (please specify) \_\_\_\_\_

## O. At present I:

1. weigh within 10 pounds of my recommended weight
2. am overweight more than 10 pounds over my recommended weight
3. am underweight more than 10 pounds less than my recommended weight



P. My health can best be described as:

- 1. excellent
- 2. good
- 3. fair
- 4. poor

Write down everything you ate and drank in one day. Give the specific name and amount of foods, for example, wheat 3 slices for breakfast, 1 slice butter and 1 tablespoon mayonnaise, etc. List

MEALS:

Day \_\_\_\_\_

MORNING:

Day \_\_\_\_\_

MIDD

Day \_\_\_\_\_

AFTERNOON

Day \_\_\_\_\_

EVENING

Day \_\_\_\_\_

NIGHT

Day \_\_\_\_\_

NAME \_\_\_\_\_

DATE \_\_\_\_\_

## DIETARY INTAKE

Write down everything you ate and drank in one day. Give the specific names and amounts of foods, for example, write: 2 slices rye bread with 2 slices bologna and 1 tablespoon mayonnaise, NOT JUST sandwich.

FOOD ITEM

AMOUNT

MORNING

Time \_\_\_\_\_

MIDMORNING

Time \_\_\_\_\_

NOON

Time \_\_\_\_\_

AFTERNOON

Time \_\_\_\_\_

EVENING

Time \_\_\_\_\_

NIGHT

Time \_\_\_\_\_

Table 6-4

Analysis of Variance Summary for Independent Variables Related to  
Health Status and the Dietary Score of Dietary Score

Independent Variable	DF	Mean Square	F Value	Prob.
Age	1	6.527	0.47	0.496
Place of residence (urban/rural)	2	6.383	1.27	0.284
Children in family (0-4, 5-10, 11-15)	3	6.360	0.67	0.596
Year of marriage	2	6.338	0.96	0.426
Religion	4	6.275	0.33	0.857
Gender and marital status (single, married, widowed, divorced)	3	6.275	0.33	0.857
Education (high school, college, postgraduate)	3	6.275	0.33	0.857
Occupation (unemployed, manual, non-manual)	3	6.275	0.33	0.857
Other chronic conditions (yes/no)	1	6.275	0.33	0.857
History of alcohol consumption	1	6.275	0.33	0.857
History of cigarette smoking	1	6.275	0.33	0.857
History of hypertension	1	6.275	0.33	0.857
History of diabetes mellitus	1	6.275	0.33	0.857
History of heart disease	1	6.275	0.33	0.857
History of stroke	1	6.275	0.33	0.857
History of cancer	1	6.275	0.33	0.857
History of kidney disease	1	6.275	0.33	0.857
History of liver disease	1	6.275	0.33	0.857
History of lung disease	1	6.275	0.33	0.857
History of rheumatoid arthritis	1	6.275	0.33	0.857
History of osteoarthritis	1	6.275	0.33	0.857
History of depression	1	6.275	0.33	0.857
History of anxiety disorder	1	6.275	0.33	0.857
History of bipolar disorder	1	6.275	0.33	0.857
History of schizophrenia	1	6.275	0.33	0.857
History of personality disorder	1	6.275	0.33	0.857
History of eating disorder	1	6.275	0.33	0.857
History of substance use disorder	1	6.275	0.33	0.857
History of self-harm	1	6.275	0.33	0.857
History of suicidal thoughts	1	6.275	0.33	0.857
History of suicide	1	6.275	0.33	0.857
History of mental health treatment	1	6.275	0.33	0.857
History of hospitalization	1	6.275	0.33	0.857
History of long-term care	1	6.275	0.33	0.857
History of disability	1	6.275	0.33	0.857
History of chronic pain	1	6.275	0.33	0.857
History of chronic fatigue	1	6.275	0.33	0.857
History of chronic stress	1	6.275	0.33	0.857
History of chronic anxiety	1	6.275	0.33	0.857
History of chronic depression	1	6.275	0.33	0.857
History of chronic mental health issues	1	6.275	0.33	0.857
History of chronic physical health issues	1	6.275	0.33	0.857
History of chronic overall health issues	1	6.275	0.33	0.857

APPENDIX B

Analysis of Variance Data for

Dietary Score, Food Groups, and Food Categories

According to Background Characteristics

TABLE CONTINUED

Table B-1

Analysis of Variance Summary for Independent Variables Related to  
Background and the Dependent Variable Dietary Score

Independent Variable	DF	Error Square Mean	F Value	Prob.
Age	1	6.659	0.47	0.496
Place of residence while growing up	2	6.593	1.27	0.284
Children in family of origin	3	6.800	0.07	0.968
Year in college	3	6.638	0.94	0.428
Major	4	6.993	0.22	0.927
Junior and senior high school courses where nutrition was studied:				
Home economics	3	6.793	0.11	0.950
Health/physical education	3	6.563	1.35	0.261
General science/biology/ chemistry	3	6.770	0.23	0.874
Other places nutrition was studied:				
Elementary school	1	6.688	0.00	0.974
4-H	1	6.686	0.04	0.849
Future Homemakers of America/Home Economics Related Occupations	1	6.688	0.00	0.974
Where most of meals are eaten:				
Home	1	6.555	2.19	0.142
University food service	1	6.685	0.05	0.827

(Table Continues)

Table B-1

Analysis of Variance Summary for Independent Variables Related to Background and the Dependent Variable Dietary Score

Independent Variable	DF	Error Square Mean	F Value	Prob.
<b>Meal companions most of time:</b>				
None	1	6.529	2.63	0.108
Female friend(s)	1	6.635	0.87	0.354
Both male and female friends	1	6.679	0.15	0.704
Perceived weight	2	6.748	0.02	0.981
Health	2	2.495	0.37	0.689

Table B-2

Analysis of Variance Summary for Independent Variables Related to  
Background and the Dependent Variable Milk

Independent Variable	DF	Error Square Mean	F Value	Prob.
Age	1	1.040	2.46	0.120
Place of residence while growing up	2	1.069	0.27	0.766
Children in family of origin	3	1.052	1.06	0.370
Major	4	1.084	0.04	0.997
Junior and senior high school courses where nutrition was studied:				
Home economics	3	1.060	0.80	0.502
Health/physical education	3	1.058	0.86	0.468
General science/biology/ chemistry	3	1.021	2.19	0.092
Other places nutrition was studied:				
Elementary school	1	1.060	0.37	0.542
4-H	1	1.048	1.66	0.201
Future Homemakers of America/Home Economics Related Occupations	1	1.059	0.50	0.480
Where most of meals are eaten:				
Home	1	1.062	0.24	0.627
University food service	1	1.049	1.51	0.221

(Table Continues)

Table B-2

Analysis of Variance Summary for Independent Variables Related to  
Background and the Dependent Variable Milk

Independent Variable	DF	Error Square Mean	F Value	Prob.
Meal companions most of time:				
None	1	1.044	2.09	0.152
Female friend(s)	1	1.044	2.04	0.156
Both male and female friends	1	1.062	0.20	0.656
Perceived weight	2	1.065	0.42	0.656
Health	2	1.068	0.81	0.447

(Table Continued)

Table B-3

Analysis of Variance Summary for Independent Variables Related to  
Background and the Dependent Variable Meat

Independent Variable	DF	Error Square Mean	F Value	Prob.
Age	1	0.725	0.35	0.558
Place of residence while growing up	2	0.726	0.59	0.554
Children in family of origin	3	0.722	0.93	0.432
Year in college	3	0.738	0.15	0.929
Major	4	0.743	0.76	0.553
Junior and senior high school courses where nutrition was studied:				
Home economics	3	0.740	0.06	0.977
Health/physical education	3	0.711	1.51	0.215
General science/biology/ chemistry	3	0.723	0.90	0.447
Other places nutrition was studied:				
Elementary school	1	0.726	0.23	0.629
4-H	1	0.726	0.29	0.593
Future Homemakers of America/Home Economics Related Occupations	1	0.727	0.03	0.873
Where most of meals are eaten:				
Home	1	0.724	0.54	0.466
University food service	1	0.726	0.19	0.664

(Table Continues)



Table B-3

Analysis of Variance Summary for Independent Variables Related to  
Background and the Dependent Variable Meat

Independent Variable	DF	Error Square Mean	F Value	Prob.
Meal companions most of time:				
None	1	0.719	1.34	0.250
Female friend(s)	1	0.727	0.02	0.885
Both male and female friends	1	0.727	0.10	0.750
Perceived weight	2	0.721	0.97	0.382
Health	2	0.716	1.75	0.180

Table B-4

Analysis of Variance Summary for Independent Variables Related to  
Background and the Dependent Variable Bread and Cereal

Independent Variable	DF	Error Square Mean	F Value	Prob.
Age	1	2.897	0.68	0.412
Place of residence while growing up	2	2.890	0.98	0.379
Children in family of origin	3	2.914	0.68	0.568
Year in college	3	2.905	0.80	0.500
Major	4	2.731	1.23	0.304
Junior and senior high school courses where nutrition was studied:				
Home economics	3	2.880	1.11	0.348
Health/physical education	3	2.876	1.16	0.330
General science/biology/ chemistry	3	2.963	0.08	0.963
Other places nutrition was studied:				
Elementary school	1	2.903	0.45	0.504
4-H	1	2.912	0.13	0.718
Future Homemakers of America/Home Economics Related Occupations	1	2.893	0.83	0.365
Where most of meals are eaten:				
Home	1	2.863	1.95	0.165
University food service	1	2.902	0.49	0.485

(Table Continues)

Table B-4

Analysis of Variance Summary for Independent Variables Related to  
Background and the Dependent Variable Bread and Cereal

Independent Variable	DF	Error Square Mean	F Value	Prob.
Meal companions most of time:				
None	1	2.915	0.01	0.913
Female friend(s)	1	2.915	0.00	0.984
Both male and female friends	1	2.909	0.24	0.624
Perceived weight	2	2.914	0.52	0.597
Health	2	2.896	1.35	0.263
Junior and senior high school				
Course above nutrition				
None	1	3.000	0.00	0.997
Junior high school	1	3.004	0.37	0.543
Senior high school	1	3.008	0.52	0.472
Grade point average				
None	1	3.054	0.37	0.543
High	1	3.044	0.35	0.552
Number of siblings				
None	1	2.700	0.19	0.660
Number of male siblings				
None	1	2.310	1.41	0.230
Number of female siblings	1	2.304	0.30	0.580

Table B-5

Analysis of Variance Summary for Independent Variables Related to  
Background and the Dependent Variable Fruit and Vegetables

Independent Variable	DF	Error Square Mean	F Value	Prob.
Age	1	3.046	0.34	0.560
Place of residence while growing up	2	3.073	0.20	0.823
Children in family of origin	3	3.091	0.25	0.860
Year in college	3	3.083	0.35	0.789
Major	4	3.032	0.84	0.502
Junior and senior high school courses where nutrition was studied:				
Home economics	3	3.060	0.62	0.607
Health/physical education	3	3.064	0.57	0.643
General science/biology/ chemistry	3	3.068	0.52	0.672
Other places nutrition was studied:				
Elementary school	1	3.054	0.07	0.799
4-H	1	3.046	0.35	0.553
Future Homemakers of America/Home Economics Related Occupations	1	3.051	0.18	0.668
Where most of meals are eaten:				
Home	1	3.016	1.44	0.232
University food service	1	3.056	0.00	0.966

(Table Continues)

Table B-5

Analysis of Variance Summary for Independent Variables Related to  
Background and the Dependent Variable Fruit and Vegetables

Independent Variable	DF	Error Square Mean	F Value	Prob.
Meal companions most of time:				
None	1	3.050	0.20	0.657
Female friend(s)	1	3.054	0.07	0.787
Both male and female friends	1	3.046	0.35	0.553
Perceived weight	2	3.075	0.17	0.847
Health	2	3.059	0.78	0.462

Table B-6

Analysis of Variance Summary for Independent Variables Related to  
Background and the Dependent Variable Vitamin C

Independent Variable	DF	Error Square Mean	F Value	Prob.
Age	1	1.148	0.25	0.619
Place of residence while growing up	2	1.130	1.50	0.228
Children in family of origin	3	1.160	0.37	0.778
Year in college	3	1.170	0.06	0.973
Major	4	1.169	0.65	0.628
Junior and senior high school courses where nutrition was studied:				
Home economics	3	1.149	0.71	0.551
Health/physical education	3	1.170	0.08	0.967
General science/biology/ chemistry	3	1.091	2.63	0.053
Other places nutrition was studied:				
Elementary school	1	1.149	0.18	0.672
4-H	1	1.133	1.67	0.199
Future Homemakers of America/Home Economics Related Occupations	1	1.144	0.60	0.440
Where most of meals are eaten:				
Home	1	1.150	0.04	0.842
University food service	1	1.150	0.03	0.860

(Table Continues)

Table B-6

Analysis of Variance Summary for Independent Variables Related to  
Background and the Dependent Variable Vitamin C

Independent Variable	DF	Error Square Mean	F Value	Prob.
<b>Meal companions most of time:</b>				
None	1	1.148	0.27	0.601
Female friend(s)	1	1.150	0.09	0.770
Both male and female friends	1	1.142	0.78	0.378
Perceived weight	2	1.159	0.11	0.900
Health	2	1.145	1.07	0.348
<b>was studied:</b>				
Head circumference	2	0.202	0.75	0.488
Height	1	0.204	0.28	0.607
Sexual activity/abstinence consistency	2	0.279	1.26	0.308
Number of cigarettes smoked per day	1	0.283	0.23	0.628
Age	1	0.277	1.28	0.262
Number of hours of exercise/week	1	0.280	1.27	0.263
Number of meals per week eaten	1	0.272	1.20	0.276
Alcohol consumption	1	0.280	1.26	0.263

(Table Continued)

Table B-7

Analysis of Variance Summary for Independent Variables Related to  
Background and the Dependent Variable Vitamin A

Independent Variable	DF	Error Square Mean	F Value	Prob.
Age	1	0.274	3.32	0.071
Place of residence while growing up	2	0.281	0.91	0.405
Children in family of origin	3	0.283	0.63	0.601
Major	4	0.290	0.32	0.865
Junior and senior high school courses where nutrition was studied:				
Home economics	3	0.282	0.75	0.531
Health/physical education	3	0.284	0.58	0.632
General science/biology/ chemistry	3	0.279	1.16	0.328
Other places nutrition was studied:				
Elementary school	1	0.283	0.03	0.874
4-H	1	0.277	2.38	0.125
Future Homemakers of America/Home Economics Related Occupations	1	0.280	1.27	0.263
Where most of meals are eaten:				
Home	1	0.273	3.99	0.048
University food service	1	0.280	1.26	0.263

(Table Continues)



Table B-7

Analysis of Variance Summary for Independent Variables Related to  
Background and the Dependent Variable Vitamin A

Independent Variable	DF	Error Square Mean	F Value	Prob.
Meal companions most of time:				
None	1	0.282	0.27	0.603
Female friend(s)	1	0.281	0.70	0.405
Both male and female friends	1	0.282	0.24	0.628
Perceived weight	2	0.277	1.67	0.194
Health	2	0.286	0.13	0.883

Table B-8

Analysis of Variance Summary for Independent Variables Related to  
Background and the Dependent Diet Soft Drinks

Independent Variable	DF	Error Square Mean	F Value	Prob.
Age	1	0.461	0.95	0.332
Place of residence while growing up	2	0.447	2.73	0.070
Children in family of origin	3	0.463	0.86	0.467
Year in college		0.463	0.85	0.473
Major	4	0.490	0.37	0.832
Junior and senior high school courses where nutrition was studied:				
Home economics	3	0.468	0.48	0.704
Health/physical education	3	0.462	0.94	0.427
General science/biology/ chemistry	3	0.452	1.74	0.161
Other places nutrition was studied:				
Elementary school	1	0.464	0.20	0.656
4-H	1	0.461	1.08	0.301
Future Homemakers of America/Home Economics Related Occupations	1	0.463	0.59	0.446
Where most of meals are eaten:				
Home	1	0.465	0.07	0.795
University food service	1	0.465	0.01	0.912

(Table Continues)

Table B-8

Analysis of Variance Summary for Independent Variables Related to  
Background and the Dependent Variable Diet Soft Drinks

Independent Variable	DF	Error Square Mean	F Value	Prob.
Meal companions most of time:	1	0.281	0.00	0.981
None	1	0.453	2.93	0.090
Female friend(s)	1	0.459	1.44	0.232
Both male and female friends	1	0.465	0.03	0.864
Perceived weight	2	0.468	0.20	0.823
Health	2	0.456	2.00	0.140
Age	4	0.283	0.27	0.902
Health/physical condition	3	0.280	0.23	0.900
General academic/college standing	3	0.283	0.51	0.615
College grades (GPA) and standing	3	0.280	0.03	0.979
Elementary school	1	0.280	0.34	0.561
Grade	1	0.280	0.34	0.561
Number of hours of exercise per week	1	0.280	1.20	0.275
Where most of meals are eaten	1	0.281	0.23	0.628
Do you eat fast service	1	0.281	0.11	0.740

(Table Continued)

Table B-9

Analysis of Variance Summary for Independent Variables Related to  
Background and the Dependent Variable Regular Soft Drinks

Independent Variable	DF	Error Square Mean	F Value	Prob.
Age	1	0.281	0.00	0.981
Place of residence while growing up	2	0.273	2.08	0.130
Children in family of origin	3	0.272	1.96	0.122
Year in college	3	0.286	0.06	0.977
Major	4	0.277	1.20	0.317
Junior and senior high school courses where nutrition was studied:				
Home economics	3	0.285	0.22	0.882
Health/physical education	3	0.280	0.83	0.482
General science/biology/ chemistry	3	0.282	0.61	0.613
Other places nutrition was studied:				
Elementary school	1	0.280	0.63	0.429
4-H	1	0.280	0.34	0.561
Future Homemakers of America/Home Economics Related Occupations	1	0.278	1.20	0.276
Where most of meals are eaten:				
Home	1	0.281	0.13	0.715
University food service	1	0.281	0.11	0.744

(Table Continues)



Table B-10

Analysis of Variance Summary for Independent Variables Related to  
Background and the Dependent Variable Alcohol

Independent Variable	DF	Error Square Mean	F Value	Prob.
Age	1	1.498	0.98	0.323
Place of residence while growing up	2	1.489	1.29	0.278
Children in family of origin	3	1.528	0.28	0.838
Year in college	3	1.525	0.33	0.803
Junior and senior high school courses where nutrition was studied:				
Home economics	3	1.525	0.35	0.789
Health/physical education	3	1.496	1.04	0.378
General science/biology/ chemistry	3	1.448	2.25	0.086
Other places nutrition was studied:				
Elementary school	1	1.509	0.15	0.695
4-H	1	1.503	0.59	0.444
Future Homemakers of America/Home Economics Related Occupations	1	1.507	0.35	0.557
Where most of meals are eaten:				
Home	1	1.499	0.87	0.353
University food service	1	1.494	1.26	0.264

(Table Continues)

Table B-10

Analysis of Variance Summary for Independent Variables Related to  
Background and the Dependent Variable Alcohol

Independent Variable	DF	Error Square Mean	F Value	Prob.
Meal companions most of time:	1	3.596	0.52	0.474
None	1	1.498	0.98	0.324
Female friend(s)	1	1.474	2.71	0.103
Both male and female friends	1	1.491	1.45	0.232
Health	2	1.489	1.79	0.171
Junior and senior high school courses where nutrition was studied:				
Home economics	2	3.660	0.21	0.887
General science/biology/ chemistry	3	3.493	1.91	0.131
Other places nutrition was studied:				
Elementary school	1	3.605	0.26	0.610
4-8	1	3.612	0.05	0.817
Future Homemakers of America/Home Economics Related Occupations	1	3.601	0.39	0.535
Where most of meals are eaten:				
Home	1	3.604	0.28	0.597
University food service	1	3.613	0.02	0.879

(Table Continues)

Table B-11

Analysis of Variance Summary for Independent Variables Related to  
Background and the Dependent Variable Other Foods

Independent Variable	DF	Error Square Mean	F Value	Prob.
Age	1	3.596	0.52	0.474
Place of residence while growing up	2	3.638	0.13	0.877
Children in family of origin	3	3.617	0.63	0.599
Year in college	3	3.580	1.00	0.395
Major	4	3.586	0.13	0.972
Junior and senior high school courses where nutrition was studied:				
Home economics	3	3.660	0.21	0.887
General science/biology/ chemistry	3	3.493	1.91	0.131
Other places nutrition was studied:				
Elementary school	1	3.605	0.26	0.610
4-H	1	3.612	0.05	0.817
Future Homemakers of America/Home Economics Related Occupations	1	3.601	0.39	0.535
Where most of meals are eaten:				
Home	1	3.604	0.28	0.597
University food service	1	3.613	0.02	0.879

(Table Continues)



Table B-11

Analysis of Variance Summary for Independent Variables Related to Background and the Dependent Variable Other Foods

Independent Variable	DF	Error Square Mean	F Value	Prob.
Meal companions most of time:				
None	1	3.612	0.04	0.843
Female friend(s)	1	3.611	0.08	0.778
Both male and female friends	1	3.611	0.07	0.793
Perceived weight	2	3.595	0.77	0.464
Health	2	3.630	0.40	0.669

THE EFFECT OF NUTRITION EDUCATION  
ON DIETARY INTAKE OF COLLEGE STUDENTS

Abstract

ELIZABETH A. POND

The purpose of the study was to determine the effects of nutrition education on the dietary intake of college students. The subjects were 119 college students taking a required beginning level nutrition class during the 1982-1983 school year in the College of Home Economics, Department of Nutrition and Food Science, at South Dakota State University. Data was obtained through the use of a demographic and background questionnaire and a 3-day food record which was collected at the beginning and end of the semester to determine dietary change.

Findings indicated that nutrition education had little effect on the dietary intake of college students involved in the study. Descriptive data revealed that over half of the students consumed recommended servings per day in the milk group, meat group, and bread and cereal group, but only one-third of the students were eating recommended servings of fruit and vegetables. Milk consumption decreased during the semester while alcohol consumption increased. Results showed a positive correlation between dietary score (dietary adequacy) and the Four Food Groups.

Results indicate the need for research to investigate the factors that influence eating behavior. Programs could then be developed to motivate people to change their dietary habits.