

AN ASSESSMENT OF CURRICULA IN RELATION TO THE  
NUTRITION KNOWLEDGE AND LIFESTYLE SKILLS  
OF NINTH GRADE STUDENTS

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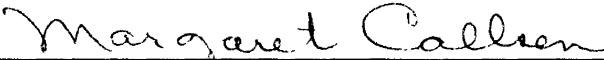
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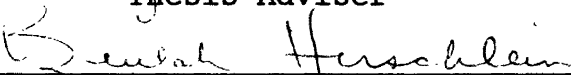
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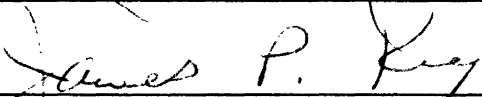
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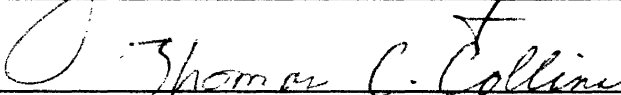
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## CHAPTER 1

### INTRODUCTION

A growing concern in today's society has been nutrition awareness and a healthy lifestyle in adults, and its relationship to major health risks. Researchers are realizing that this problem begins in childhood. Despite the nation's obsession with food and nutrition adolescents seem to move at the speed of light compared with those of generations past, and sometimes flitting from activity to activity, appointment to appointment, they leave the basics of good nutrition behind. The main concern is to establish lifetime eating habits that are rooted in positive choices (Cooper, 1991). If America's young people continue exemplifying poor eating habits we will see a major health crisis. Since major health risks such as coronary vascular disease, cancer and diabetes are known to be the most frequent causes of death in the United States it is important that assessments be done that will help researchers conduct intervention programs for the prevention of possible major health risks in adolescents.

Proper nutrition plays an important role in the physical, as well as mental development of individuals. Because physical and mental health are prerequisites for success in school, and because school is where children

spend a good portion of their waking hours, schools have an obligation to teach children how to make appropriate food choices. Nutrition not only must be taught, but proper nutritional practices must be reinforced (Baron 1990). The goal of such educational programs should be to make ordinary people more able to cope with health problems and to give people an opportunity to have greater control with regard to the health problems they encounter (Rody 1988). As educators, it is our responsibility to teach students accurate nutrition information hoping that their eating behavior will reflect their acquired nutritional knowledge (Freeman, 1986). In compliance with House Bill 1017, the Oklahoma State Department of Education is presently updating and revising the Comprehensive Health guidelines to further encourage the teaching of nutrition and healthy living information.

A nutrition education program designed to improve the knowledge and lifestyle skills of adolescents could be very instrumental in empowering adolescents to take an active role and responsibility in the management of their own behaviors. This study will address the issue of nutrition education and its relation to knowledge and behavior of adolescents, and will test the feasibility and efficacy of two nutrition educational curriculums as intervention programs. It will compare the efficacy of two educational intervention programs for the improvement in knowledge and lifestyle skills of adolescents as a means of decreasing the risk for the major health threats faced by the adolescent



population. According to the U.S. Commerce's Statistical Abstract of the United States, (1989) the major causes of death among adolescents are accidents, homicide and suicide. Cancer, diabetes and stroke follow as health disease related threats that have their roots early in life.

The two curricula to be compared include the Foods and Nutrition portion of the Foundations for Living I curriculum developed by the Oklahoma State Vocational and Technical Education Department and the Applied Biology/Chemistry curriculum developed by the Center for Occupational Research and Development, Waco, Texas. The curricula are similar in many respects in that they are complete with specific behavioral objectives for each unit, prepared overheads, videos, worksheets, and a variety of possible enrichment activities for the units. The Applied Biology/Chemistry curriculum was designed to supplement the various occupational areas, to include Home Economics, as well as science curriculums. This curriculum includes many scientific experiments for the students to perform. The Foundations for Living I curriculum was designed to help students and teachers learn more about present-day issues and their impact on society. Home economists have long maintained that home economics is an applied science that brings together knowledge from many different disciplines. Therefore, both curricula are of a scientific nature with the Foundations for Living curriculum having less experimentation and more use of traditional teaching tools, such as resource persons. The major purpose of both

curricula is to help individuals and families improve their lifestyles by developing habits, including eating, managing stress, and routine exercise, that affect the body today as well as in the future. A comparison of these curricula will allow the researcher to examine the differences of knowledge and lifestyle skills with regard to nutrition, and disease and wellness. This examination will allow the researcher to evaluate both curricula for possible implementation in an ongoing health/nutrition education program within the Ada School System and throughout the state of Oklahoma.

#### Purpose and Objectives

The purpose of this study is to compare the efficacy of two educational intervention programs for the improvement of knowledge and lifestyle skills associated with the risk for the major health threats in adolescents.

Specific objectives include:

1. To develop and implement a nutrition education program to be delivered to adolescents enrolled in 9th grade home economics classes.
2. To compare the feasibility and efficacy of an educational intervention program by examining differences in knowledge and lifestyle skills among adolescents exposed to nutrition education using the Applied Biology/Chemistry instructional materials versus those exposed to the State Vocational and Technical Foundations for Living I, Foods and Nutrition curriculum.

## Hypotheses

The following hypotheses were postulated for the study:

- H1: There will be no significant difference in nutrition related knowledge between adolescents enrolled in Home Economics classes and those in a control group.
- H2: There will be no significant difference in behavioral skills between adolescents enrolled in Home Economics classes and those in a control group.
- H3: There will be no significant difference between nutrition knowledge of adolescents exposed to nutrition education using the Applied Biology/Chemistry instructional materials versus those exposed to the State Vocational and Technical Education Foundations for Living I curriculum.
- H4: There will be no significant difference between behaviors of adolescents exposed to nutrition education using the Applied Biology/Chemistry instructional materials versus those exposed to the State Vocational and Technical Education Foundations for Living I curriculum.

## Assumptions

The following assumptions are recognized for this study:

1. The overall goal of nutrition education is to improve dietary behavior and healthy lifestyle skills.

2. The sample size is sufficient to obtain valid data.

#### Limitations

The following limitation was recognized for this study:

1. The sample was limited only to adolescents enrolled in the 9th grade Home Economics classes and one Physical Science class at Ada Junior High.
2. There may have been some unconscious duplication in the manner of presenting the information with the same teacher teaching both curricula.

#### Definitions

The following definitions and symbols specify the meaning of concepts as applied to this study:

1. Adolescents - 14-16 year old 9th graders.
2. Empowerment - People's capacities to control their own lives by defining, analyzing and acting upon their health and nutrition problems to their own satisfaction.
3. Efficacy - power to produce effects or accomplishments.
4. Behavior - the way in which a person conducts oneself.
5. Lifestyle - human activities; the way of life of an individual as shown by his manner, attitudes, possessions, etc.

6. Knowledge - the range of information, awareness or understanding that has been perceived or grasped by the mind through learning experiences.

## CHAPTER II

### REVIEW OF LITERATURE

#### Introduction

As a nation, citizens of the United States eat too much, sleep too little, take on too much stress, and avoid exercise when possible. Maintaining good health, or wellness, could be defined as efforts to combine physical, emotional, social, and educational components of life in a balance that results in feeling well. Adolescents need to learn about behavior, attitudes, and activities that will improve the quality of life. The stresses of modern life influence our health and often contribute to the leading causes of death in this country (Marshall, 1990). Even though, the three leading causes of death for adolescents according to the U.S. Department of Commerce's Statistical Abstract of the United States (1989) are accidents, homicides, and suicides, it is important to note that the major causes of death among all age groups are heart disease, cancer, and strokes. These diseases have their origin in the lifestyle choices established during the early years of life and result from poor habits practiced over many years. The lack of accurate nutrition knowledge among adolescents and the poor dietary practices of many

adolescents have been topics of concern for several decades.

Adolescents are identified as a group in critical need of accurate nutrition information, but they have been resistant to many nutrition education efforts (Skinner, 1984). The need continues to grow for assessing the impact of nutrition education among adolescents and its relationship to major health threats. The quality of curriculum and infusion of health related information throughout the educational process are important components to be considered by educators. This study will compare the efficacy of two educational intervention programs for the improvement in nutrition related knowledge and lifestyle skills of adolescents as a means of decreasing the risk for the major health threats faced by the adolescent population.

#### Nutrition Education

America's growing interest in nutrition and a healthy lifestyle is a laudable and long awaited development. Nutrition education, like all forms of education, is dependent on awareness, assessment of facts, and experimentation (Herbert, 1983). Although improved dietary practices and good health are the ultimate goals of nutrition education, increased knowledge of nutrition is considered a component that is preliminary to achievement of these goals. Other studies have indicated that the format of presenting nutrition education information is an important factor. It appears that in communicating other

types of health care related information, several formats of presentation should be assessed (Skinner, 1984). The biggest challenge to nutrition educators is creating a desire to learn about nutrition and implementing educational experiences that involve students in positive behavioral change.

Nutrition education plays a significant role in school health programs. Educational programs are especially important in junior high and high schools since American adolescents are exposed to various influences outside the school setting (e.g. television, advertising, peer pressure) that advocate less nutritious food choices. Effective programs aimed at influencing the nutrition attitudes and behavior of adolescent students need to be designed. In developing nutrition education programs, it is important to examine the communication process. The characteristics of the communicator have been found to be a major factor in this process. Feldman's (1984) study found that adolescents may be skeptical of outside experts and more responsive to familiar individuals and peers. Since peers have influence among students, the use of peer educators may be one approach to reaching students. By emphasizing their similarities with their students rather than their expertise school educators are likely to increase their effectiveness.

An excellent source for reaching adolescents is through consumer efforts such as the media, advertisements, and fast-food establishments. A search for innovative approaches to providing nutrient information to consumers is



needed. New approaches need to supplement, not replace, existing information sources. It has been shown that advertisements can be used to effectively communicate nutrition information, and it appears that advertisements could be used in an equally effective manner for providing information about a number of health related issues. The format of presenting information is an important factor. It appears that in communicating other types of health care related information, several formats of presentation should be assessed (Lancaster, 1986).

Education as a means of changing behavior is an underlying assumption held within the behaviorist approach to learning theory. As Watson (1925) stated in his pioneering works on behaviorism:

I think behaviorism does lay a foundation for saner living. It ought to be a science that prepares men and women for understanding the first principles of their own behavior. It ought to make men and women eager to rearrange their own lives, and especially eager to prepare themselves to bring up their own children in a healthy way. (p. 248)

Nutrition education is the sum total of the experience, knowledge, and skill possessed by the individual and family used to translate health concerns into the act of buying and consuming foods (Peterson, 1980). Since social learning plays a major role in dietary behavior, many studies have focused on the family experience as the first nutrition education for human beings. Mead (1964), as an anthropologist concerned with food uses beyond physiological demands, determined that the conventional atmosphere during

the principal family meal was instrumental in shaping the life attitude of children toward food.

A comparison study of Harvard Medical School Faculty (Olson, 1983) among 1000 families indicated that adolescents generally follow better health practices than do their parents. It was clear that improvement could be made on most of the health practices observed and that adolescents could be useful models for their parents in some of these areas. According to Glenn (1987) to be healthy, young people must:

- Perceive closeness and trust with parents and other significant adults by about the age of 12.
- Have strong moral positions by about the age of 12.
- Perceive themselves as significant contributors to church, youth organizations, family, community and other groups.
- Be confident of personal capabilities.
- Perceive themselves to have personal influence over events and circumstances.
- Develop skills in self-discipline, communication, responsibility and judgment. (p. 10)

Young people who are strong in the above areas are usually successful, low-risk, motivated people with high self-confidence and self-esteem. People who are very weak in two or more of the above areas have little self-esteem and self-confidence. They are open to peer influence and drawn to unhealthy circumstances in their environment.

In 1984, The University of Illinois implemented a study using computer tracking of daily nutrient intake in a traditional nutrition assignment. In this study students kept a three-day diet record which was analyzed on the computer for nutrient content. The computer recorded the students' daily nutrient intake and provided a three-day

average of all the nutrients. Using the information the students prepared a paper evaluating their dietary intake based on the U.S. Department of Agriculture's Dietary Guidelines and made specific suggestions for improvement. Students reactions to this computer activity included such comments as: "really liked it even though I didn't think I would," "it was easier than I expected," and "it was much faster and easier than doing the calculations and functions by hand." This type of nutrition education program allows the students a greater awareness of their own nutritional status and motivates them to improve their own diets (Payne, 1984).

Home Economics is deeply rooted in physical and life science. As an integral part of the educational system, home economics programs can bring to life the theories, principles, and skills students learn in their science classes as they apply to everyday living situations. As teachers practice identifying science concepts in home economics curricula, it will increase their ability to assist students in the application process (Moss, 1986).

To improve their eating habits, students must understand certain ideas about nutrition, choose and apply these ideas within their personal value systems, and develop the skills to accomplish these tasks. At the junior high level, curriculum guides tend to emphasize issues and controversies rather than nutrients, functions, food sources, and other basic nutrition information. Topics of interest to adolescents need to be presented in the hope of

gaining their attention and encouraging them to continue to explore nutrition.

### Food Selection

Poor eating habits during childhood can lead to a lifetime of health problems. The old adage "you are what you eat" is taken quite literally by today's consumers. Today the average consumer is much more concerned about heart disease, cancer, obesity and even cavities than his or her parents ever were, and eating for health, rather than for pleasure has become the main objective (Hatfield, 1986).

When elementary school children are asked about their health, they seem to understand that it is not just something that will stay positive but rather that good health is something they have to work at almost continually. Young people recognize that nutrition and physical fitness are important in maintaining their health. Most children do not define health in terms of illness. And as they grow through childhood and enter young adolescence they are likely to define health in more abstract and global terms (O'Connor-Francoeur, 1983). No longer a child, the young adolescent can recognize that other people have their own thoughts too. However, since they are preoccupied with themselves, they believe that these thoughts of others invariably focus on them. It is this belief that others are preoccupied with their appearance and behavior that constitutes the egocentrism of the adolescent (Elkind, 1967). This egocentrism interferes with the young

adolescent's ability to think abstractly and hypothetically. Therefore, they think they are magically protected from things that can happen to other people. Elkind feels that egocentrism diminishes at about age 15 or 16, when the young person comes to recognize the difference between his own preoccupation and the interests and concerns of others.

A growing number of pediatricians are treating children for high cholesterol, trying diet first and resorting to medication in more extreme cases. As people continue to become more aware of their food selections and what they do for their body, plans can be made for healthier food selections in school cafeterias and fast food establishments, as well as at home. Health activists and the USDA feel that despite a national obsession with food and nutrition, the average American child still eats a diet too high in fat and too low in important nutrients. The nutrition of adolescents is a concern of health professionals because of the unusual needs for nutrients during this developmental period. Furthermore, adolescents in particular skip meals, snack excessively, eat away from home, and adopt alternate dietary patterns to maintain or improve appearance. Studies have shown that these children are nutritionally-at-risk (Touliatas, 1984).

Smart shopping will lead to smarter eating habits. If the house is stocked with a large variety of easy healthful options, the child will snack at home at least occasionally and will be mixing healthy choices with not-so-healthy selections to end up with a relatively balanced diet. One

key to convincing children to eat healthier is not to convince them, but make sure the house's pantry is healthy and let the child choose what he wants to eat, within reason.

Parents should set the basic guidelines that the child's meals should include one item from each of the food groups in the food pyramid. Current thinking indicates that fat is the key nutrient adolescents should control in order to avoid being at risk for major health problems. A few years ago sugar and white bread were the villains. An unhealthy diet laden with junk food, high in fat, is certainly a contributor to high cholesterol levels. With fast foods replacing home-cooked meals, children have greater potential for high cholesterol. Modifying children's diets has been suggested as a way of establishing improved eating habits and focusing on prevention rather than treatment of chronic diseases (Shupe, 1987).

With its inception in 1946, the National School Lunch Program was designed to safeguard the health and well-being of the children by providing nutritious, reasonably priced lunches. In addition, the program contributes to better understanding of proper nutrition, improved food habits and their relationship to health. In 1977, the original act was amended by the National School Lunch Act and the Child Nutrition Amendment which promotes improved nutrient intake and food habits of children by coordinating lunchroom activities and nutrition education in the classroom. This effort may help provide the continuity and reinforcement

needed for nutrition education to effectively influence food behaviors of young children. Programs combining nutrition education with the school lunch program, as well as involving parents and the community, provide a broad-based approach to nutrition education that may have a greater impact on food behavior than nutrition education in the classroom alone (Shupe, 1987).

The Oklahoma State Department of Education established a Nutrition Education and Training Program to meet the purposes of this law. Program staff developed a statewide plan for achieving the goals of the legislation which was funded by the United States Department of Agriculture, Food, and Nutrition Service. Phase One of the plan included the development of a guide for use by school teams in integrating nutrition into the basic curriculum (Freeman, 1986). John M. Folks, as cited in Freeman, Oklahoma State Superintendent of Schools in 1986 said, "Learning to choose foods wisely should be considered a survival skill. As educators, it is our responsibility to teach students accurate nutrition information with hope that their eating behavior will reflect their acquired nutritional knowledge." (p. iii) At the present time the Oklahoma State Department of Education is developing a plan and setting parameters for Comprehensive Health classes in our public schools which will meet the guidelines established by House Bill 1017. Health and nutrition education courses are still electives in the Oklahoma schools and curriculum materials available are few.

## Exercise

The 1987 National Children and Youth Fitness Study reports that one-third of all youths, ages 10 to 18, don't engage in sufficient physical activity to give them any aerobic or endurance benefit (Cooper, 1991, p. 1). This situation is nothing short of tragic.

A good exercise program is as important to good health as diet. Exercise is not just for people who wish to lose weight, it has many benefits. Our children by nature gravitate toward healthy activities and habits. At the most fundamental levels, they genuinely want to have strong and sound bodies and minds. Yet in many cases the forces of unwise nutrition, sedentary living, and lack of knowledge among parents have combined to deprive many children of the very benefits they desire so deeply. Children with average athletic abilities increasingly begin to drop out of organized sports and games beginning at about age 9. A major cause is that they perceive that they can't keep up with their more physically skilled and gifted peers. By age 13, most boys and an even greater majority of girls, are no longer participating in organized athletics or any type of regular physical activity. This movement toward inactivity is unnecessary. Various studies show that many of these early dropouts are simply late bloomers. If parents and other adult authorities will just continue to work on fitness and athletic skills with these children, most will



eventually catch up with their peers in physical and cognitive development (Cooper, 1991).

Inactivity is a frequent finding in obese children and physical activity is a crucial factor in determining whether intervention will be successful, since exercise may offset the decline in basal metabolic rate which occurs with dietary control. Because obesity is associated with inactivity, and excessive dietary intake; assessment of body composition in relation to dietary intake and activity is essential prior to intervention.

#### Summary

American adolescents are getting the message about the need to eat right. Fast-food establishments, school lunch programs and parents are more aware and are learning to adapt their menus to meet the needs, as well as the wants of today's adolescents. It continues to be important, however, to teach adolescents to choose appropriate foods, especially by reducing their fat and cholesterol intake, and to supplement the diet with valuable nutrients.

It is important for adolescents to receive nutrition education and develop a positive approach to reducing their risk for major health threats. Contento, as cited in Baron, (1990) suggests nutrition education be based on concrete information and real-world experiences to help children distinguish which foods to eat and which to avoid.

Nutrition education must become more concerned with the affective behavior and knowledge base of the learner.

## CHAPTER III

### METHODOLOGY

#### Introduction

This study is an analysis of the data collected in a comparison of two educational intervention programs designed to teach nutrition related knowledge to fifty-four 9th grade adolescents enrolled in the Ada Junior High. These students participated in a pretest/posttest control group study during the spring semester of 1993. The two research questions that were examined were: (1) Is there a difference in knowledge and behavioral changes associated with adolescents enrolled in a nutrition education program and those who are not exposed to nutrition education, and (2) Is there a difference between nutrition knowledge and behaviors of adolescents exposed to two different curricula? This study will compare the efficacy of two educational intervention programs for improvement in knowledge and lifestyle skills associated with major health risks in adolescents.

#### Research Design

A pretest-posttest control group without random assignment to groups was used to conduct this study. The

course participants were selected according to the class in which they were enrolled. The Ada Junior High class schedule consisted of two 9th grade home economics classes. The first home economics class (Group A) was selected to receive the Applied Biology/Chemistry curriculum. The second class (Group B) received the Vocational and Technical Education curriculum. The process for selecting the science class (Control Group) included eliminating the honors science classes and choosing one of the science classes that met during the same period as one of the experimental groups. This allowed for fewer science students also being enrolled in one of the home economics classes. The first period science class was selected as the control group (Group C). Those students in the science class who were presently enrolled in Group A or Group B were not tested with the science class. In this particular study generic classes were used and no particular allowances were made for ability, gender, or age. Home Economics is an elective class in the Ada School System and science a required course for all ninth graders. A science class was chosen as the control group due to the scientific nature of the curricula being used.

#### Description of Participants

The sample for this study included fifty-four (N=54) 9th grade adolescents who were enrolled in the Ada Public School System. The intervention phase of the project

involved two ninth grade Home Economics classes for exposure to one of two educational curricula (Applied Biology/Chemistry versus State Vocational and Technical Education, Foundations for Living I), and one ninth grade Physical Science class as the control group. The Applied Biology/Chemistry curriculum consisted of 21 participants. The Vocational Technical Education curriculum consisted of 17 participants and the Control Group contained 16 participants.

#### Curriculum Development

Nutrition education programs were developed and implemented using two 9th grade home economics classes. The focus of the programs was major health risks as related to adolescent nutrition. The curriculum units were taught in 20 consecutive school days and the lesson plans that were developed appear in Appendix A. One of the units was developed from the Applied Biology/Chemistry curriculum, while the other was developed from the State Vocational and Technical Education Foods and Nutrition curriculum.

The Applied Biology/Chemistry unit was taught to Group A from a more medical or scientific approach. The instruction included the use of medical personnel as guest speakers, field trips to the local hospital and experimentation with the latest of technology, such as computers, video players and medical equipment. The use of medical terms was more prevalent in class lectures and discussions. Group A received this information.

Participants in Group B received their instruction from the State Vocational and Technical education curriculum (Foundations for Living I). This approach evolved from a more practical application, including worksheets, textbooks and more traditional teaching tools which included some medical and scientific terminology.

The major differences in the two educational curricula involved the use of modern technology versus lack of exposure to modern technology, first hand experiences versus lectures or reading, and videos versus worksheets and text book materials. The students in the Applied Biology/Chemistry class did not have a book, whereas those in the Foundations for Living I unit used the curriculum and each student had his/her own workbook. Students in both groups A and B were exposed to the Food Guide Pyramid. The teaching plans for both curricula are found in Appendix A.

#### Test Development

A pretest, posttest, and longterm retest were administered to all participants. The tests were devised from questions obtained from both curricula. The researcher developed the tests using test questions taken from the unit tests provided with each of the two curricula. The test consisted of 92 possible responses that included matching, identifying, short answer, and multiple choice. Only questions pertaining to the particular areas of nutrition education being taught in the course outlines were used. Copies of the tests may be found in Appendix B.

The instruments used to evaluate the knowledge and behavior were administered before and after twenty educational sessions, and six weeks following the posttest. This allowed for evaluation of immediate and longterm effects. The same test for both knowledge and behavior were administered to participants in all groups at all three testing times.

The behaviors test, "How Healthy Are You? A Guide to Understanding Your Health Status," (see Appendix B), was taken directly from the Applied Biology/Chemistry Disease and Wellness unit. For this particular test lower ratings indicated more positive evaluations.

Gain in test scores and improvement in actual practice determined the results of the assessment. Differences in scores between the pretest/posttest and posttest/retest were assessed using ANOVA to determine significance for curriculum effects on nutrition knowledge and behavior.

#### Implementation of the Curriculum and Testing

To meet the objectives of the study, instruction sessions for both groups were set up and administered by the Ada Junior High School Home Economics teacher. The pretest, posttest and longterm retest were administered by another teacher not known to the students.

To assure anonymity, a number was assigned to each test in the place of the name of the participant. The student was responsible for remembering his or her number for each of the testings. The knowledge test and behavior test were

enclosed in an envelope with an identification number written on the outside of the envelope, as well as, in the name blank on each test. The numbering for each of the participants in a particular group went as follows: Group A - A1, A2, A3, ...A21; Group B - B1, B2, B3, ...B17; Group C - C1, C2, C3, ...C16.

A nutrition education knowledge and behavior test was administered to the participants in the three groups (A, B, and C) three different times. The pretest was given just prior to teaching the curriculum. The nutrition education units were taught in 20 classroom periods. The posttest was administered on day 21, and the longterm retest was given six weeks after the posttest.

#### Data Analysis

This 3 x 3 within subjects repeated measures design was conducted using a pretest-posttest-retest with 54 participants. The computer program IBM Statpak was used to run the ANOVA test for all data collected. All subjects were given a pretest, posttest and longterm retest for both knowledge and behavior. Subjects were enrolled in one of two teaching methods and a control group. The efficacy of the educational program was assessed by comparing the differences in scores of knowledge and behavior before and after the course by analysis of variance. This analysis of variance design was the most efficient way of answering the research question by allowing the investigator to directly compare groups for differences in scores. The Scheffe' test



allowed the researcher to make further comparisons to search specific areas for significant effects.

The following assumptions for the analysis of variance were met:

1. Independence - subjects were independently selected and no one subject was contained in any another group.
2. Normality - while not selected randomly, by virtue of the selection process of subjects enrolled in those particular classes.
3. Homogeneity of Variance - there was no significance at the pretest for all three groups for the two dependent measures.
4. Interval Data - the researcher felt that selected questions for the tests tapped the knowledge base of the curricula in equal amounts. Kerlinger (1986) supports this when he states, "The best procedure would seem to be to treat ordinal measurements as though they were interval measurements, but to be constantly alert to the possibility of inequality of intervals" (p. 427).

The plan for this research was approved by the Institutional Review Board at Oklahoma State University.

## CHAPTER IV

### RESULTS AND DISCUSSION

#### Introduction

This study involved nutrition intervention efforts targeted at adolescents. Curriculum components included cooperative learning experiences, coping strategies, and exercises in decision-making skills based on characteristic choices involved in changing daily dietary and exercise routines. The study compared the efficacy of two educational intervention curricula involving adolescents in a series of decisions leading to adoption of measures designed to bring about change in lifestyle associated with the risk for major health threats. Students enrolled in the two ninth grade Foundations for Living I classes were exposed to a nutrition education unit developed from either the Applied Biology/Chemistry instructional materials versus a unit developed from the Oklahoma State Department of Vocational and Technical Education Foundations for Living I curriculum. A 9th grade physical science class was used as the control group and was not exposed to either curriculum.

### Sample

The initial sample in this study was comprised of 57 participants. There were twenty-two students in the Applied Biology/Chemistry curriculum (Group A), 18 in the Vocational and Technical Education Foundations for Living I curriculum (Group B), and 17 students enrolled in the 9th grade physical science class (Group C) which was the control group. One student in each group moved from the area before all testing was completed. Those scores were removed from the experiment, therefore reducing the sample to  $N = 54$  with Group A = 21, Group B = 17 and Group C = 16. All participants were 9th grade adolescents ranging in age from 14 to 16 years old. There were 23 males and 31 females participating in the study.

Both groups showed considerable interest in nutrition knowledge and expressed concern for behavioral changes concerning their health. They questioned the reason for the differences in activities used in the two classes. Therefore, there was an exchange of information outside the classroom among the various students involved. Those students from the science class who were currently enrolled in home economics were not included in the control group.

### Student Behavior Characteristics

Participants in all three groups were administered the behavior test which was derived from the Applied Biology/Chemistry curriculum. The questionnaire was

designed to help students evaluate their health habits and was used exactly as it appears in the Applied Biology/Chemistry Disease and Wellness curriculum (see "How Healthy are You," Appendix B). The total scores could range from 0 to 74. Scores between 0-15 indicate excellent health habits, 15-40 good health habits, but may need improvement, and scores above 40 show poor health habits. Points were given for all answers as follows: A = 0, B = 1, C = 2, and D = 3 (for certain questions D = 5). The scoring system is explained on the final page of the test instrument (see Appendix B).

The mean scores of all three groups on the pretest falls within the 15-40 range (good health habits, but needs improvement) and appears in Table 1. The mean for group A = 24.10, Group B = 24.29 and Group C = 18.50. The control group (C) revealed scores closer to the excellent range. Only three students in the total sample scored 40 or above, which indicated poor health habits. The analysis of variance did not reveal a significant difference among the groups for the pretest.

As indicated differences among groups for the posttest were very slight. However the scores of all groups were within the good health habits range. The reader should keep in mind that in this behavioral part of the study lower ratings indicate more positive evaluations.

Table 1

Comparison of Means for Behavior Test Scores

<u>Variable</u> <u>N=54</u>	<u>Group A</u> <u>n=21</u>	<u>Group B</u> <u>n=17</u>	<u>Group C</u> <u>n=16</u>
Pretest	24.10	24.29	18.50
Posttest	24.76	24.65	17.81
Retest	24.95	22.76	19.31

Group C's slight decrease in the mean indicated some improvement in behavior, whereas, Groups A and B showed a slight increase in the means, indicating regression. Only one student scored 40 or above on the posttest. A significant difference of  $p < .05$  was indicated among groups for the posttest results (see Table 5, Appendix C). However, the Scheffe' test did not show a significant difference between any two groups. A slight difference could be seen between Group A and Group C and Group B and Group C.

As indicated in Table 1 the longterm retest revealed that Group B showed the most improvement in health habits. The scores were Group A = 24.95, Group B = 22.76 and Group C = 19.31. Group A and Group C means increased indicating less desirable behaviors. In this test lower ratings indicate more positive evaluations. The F ratio showed no significant difference in longterm retest scores among the groups.

The overall results for the behaviors tested indicated that the differences among groups for pretest and longterm retest were not significant for the posttest at the .05 level (see table 5 in Appendix C).

An ANOVA was conducted to examine differences between pretest and posttest scores and between posttest and retest scores. Significant differences were not found for behavioral changes (see Appendix D for supporting tables).

The areas of behavior showing the greatest concern were daily food intake, (see Questions 3 and 4, Appendix E) sleep patterns, (see Question 9, Appendix E) and relaxation (see Question 10, Appendix E) across all three groups. The questions regarding alcohol and drug usage (see Questions 1 and 16, Appendix E) indicated that the behavior patterns of these adolescents does not include alcohol and drugs and only minimal cigarette smoking (see Question 15, Appendix E). An analysis of the behavior test questions are in Appendix E.

#### Nutrition Knowledge

Nutrition knowledge awareness was tested with a pretest/posttest design derived from the Applied Biology/Chemistry and the Foundations for Living I curricula. The test consisted of 92 possible responses that included matching, identifying, short answer, and multiple choice. All subject matter that was tested was covered with both groups through curricula and approaches as described

earlier. A copy of the test entitled "Healthy Habits for Living" may be found in Appendix B.

The mean scores for the pretest for knowledge showed means as follows: Group A = 51.29, Group B = 59.94, and Group C = 52.50 (see Table 2). Analysis of variance indicated there was no significant difference among the groups (see Table 7 in Appendix B).

Table 2

Comparison of Means for Knowledge Test Scores

<u>Variable</u> N=54	<u>Group A</u> n=21	<u>Group B</u> n=17	<u>Group C</u> n=16
Pretest	51.29	59.94	52.50
Posttest	61.62	68.41	51.31
Retest	45.43	55.65	45.63

The posttest means showed an increase with the largest increase being in Group A, an increase of over 10 points. The means for the groups were Group A = 61.62, Group B = 68.41, and Group C = 51.31. The F ratio of 7.33 for the posttest was significant at the .01 level (see Table 8 in Appendix C). The Scheffe' tests showed the largest effect to be between Group B and Group C which was significant at the .05 level. These results show that the

groups receiving the Applied Biology/Chemistry (Group A) and the Foundations for Living I (Group B) instruction had approximately the same increase in knowledge. Group A's mean score increased from the pretest to the posttest by 10.33 points and Group B's increase was 8.47 points. Group C (the control group) showed a decrease in mean score of 1.19.

Analysis of variance indicated that there was no significant difference in longterm retest scored among the groups (see Table 9). The retest means for the groups were Group A = 45.43, Group B = 55.65, and Group C = 45.63 (see Table 2).

Analysis of variance of differences between pretest and posttest scores and posttest and retest scores by groups was conducted (see tables in Appendix D). Significance was seen between the pretest and posttest differences,  $F_{(2,35)} = 9.65$ ,  $p < .01$  (see Table 10, Appendix D). The Scheffe' post hoc analysis showed significance between Group A (treatment) and Group C (control) and Group B (treatment) and Group C (control). Therefore, indicating that exposure to nutrition does influence knowledge scores when compared to subjects receiving no exposure to nutrition education (see Table 10, Appendix D). There was no significant difference between the posttest and retest scores for knowledge. Table 3 presents the differences in pretest and posttest scores by groups. Group A showed the greatest increase from knowledge pretest to knowledge posttest.

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Table 3

Analysis of Groups Pretest and Posttest Mean Scores


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<u>GROUP A</u>			<u>GROUP B</u>			<u>GROUP C</u>		
<u>Pretest/Posttest/Diff</u>			<u>Pretest/Posttest/Diff</u>			<u>Pretest/Posttest/Diff</u>		
50.71	61.61	+10.79	59.00	67.82	+8.82	51.94	51.19	-.75

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An examination of the responses to specific items on the knowledge test indicated that Group A had larger gains per item than either of the other groups (see Appendix F). While Group B experienced positive changes for more items than Group A, the amount of the change was less than for Group A.

On the knowledge assessment the questions showing the greater increases in correct responses were those relating to behaviors or lifestyle skills (see Appendix F). It is apparent to the researcher that more time needs to be spent teaching our young people dietary and nutrition information, as these were the areas that show the greatest concern to nutrition educators. One definition question that revealed a considerable increase was question 19 which referred to food normally eaten as "diet" (see appendix B). The researcher/instructor recalls addressing a misconception of the term "diet". At the beginning of the study the majority of the students regarded the word "diet" as a means

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of losing weight, only. The messages portrayed by the media, which provides so much influence on our youth, indicates that "diet" refers to losing weight.

The correct response rate to questions regarding fiber did not show an increase in spite of messages on the subject which appear regularly in the media. Question 3 showed a decrease in response rate (see Appendix B). The pyramid, in regard to fiber, could be confusing to the young adolescent since there are separate categories for fruits and vegetables and they are also forms of fiber. Despite the time spent in teaching nutrition to both Groups A and B, as well their being bombarded by the media and consumer products with information concerning "fiber" and "fat" they do not show a strong knowledge base of nutrition education. This shows that nutrient information needs to be infused and emphasized to students throughout their educational experience.

This study would not be complete without reporting the results of exercise when comparing the individual test questions. Questions 51, 52, and 53 (see Appendix B) regarding the stages of a good exercise program were answered correctly by almost all participants even in the pretesting. When comparing correct responses on the behavior test (see Appendix E) and the knowledge test (see Appendix F) the researcher found that the participants reflect strong exercise behavior practices and are knowledgeable in the area of exercise in regard to a healthy lifestyle. It can be inferred that the Ada School System

and community promote a strong athletic program of which most students take an active part. Even though, physical education, like nutrition education, is not a mandatory class within the school curriculum a majority of the students choose to take physical education classes.

#### Testing of the Hypotheses

The hypotheses were tested using analysis of variance for the 3 x 3 within subjects repeated measures design. The significance level accepted was  $p < .05$ . The intent of the study was to test the following null hypothesis:

##### Hypothesis One:

H1: There will be no significant difference in nutrition related knowledge between adolescents enrolled in Home Economics classes and those in a control group.

The analysis indicated a significant immediate retention of knowledge,  $F(2,51) = 7.33, p < .01$  at the posttest level (see Table 8). The Scheffe' post hoc analysis indicated a significant difference between Group B and Group C,  $F(2,51) = 7.25, p < .05$  (see Table 8). When differences in individual scores were analyzed significance was indicated when comparing pretest to posttest scores,  $F(2,51) = 9.65, p < .01$  (see Table 10). The Scheffe' post hoc analysis showed significance between Group A and Group C and between Group B and Group C (see Table 10). Therefore, this null hypothesis was rejected.

Hypothesis Two:

H2: There will be no significant difference in behavioral skills between adolescents enrolled in Home Economics classes and those in a control group.

The analysis indicated a significant difference among groups on the posttest  $F(2,51) = 3.50, p < .05$  (see Table 5). However, a further analysis of differences between pairs indicated no significance. There was no significance at the pretest (see Table 4) or the retest (see Table 6). Therefore, the researcher fails to reject the null for this comparison based on the Scheffe' differences analysis.

Hypothesis Three:

H3: There will be no significant difference between nutrition knowledge of adolescents exposed to nutrition education using the Applied Biology/Chemistry instructional materials versus those exposed to the State Vocational and Technical Education Foundations for Living I curriculum.

As predicted there was no significance found between the two curricula for nutrition knowledge. Therefore, the researcher fails to reject the null hypothesis.

Hypothesis Four:

H4: There will be no significant difference between behaviors of adolescents exposed to nutrition education using the Applied Biology/Chemistry

instructional materials versus those exposed to the State Vocational and Technical Education Foundations for Living I curriculum.

There was no significance between the two groups for change in behavior. The researcher fails to reject the null hypothesis.

## CHAPTER V

### SUMMARY, RECOMMENDATIONS, AND IMPLICATIONS

#### Introduction

This study examined nutrient knowledge and lifeskill behaviors of ninth graders in relation to curriculum used. Three groups of ninth grade students enrolled in Ada Junior High School were the subjects. One group was taught nutrition education using Applied Biology/Chemistry curriculum, a second group was taught nutrition education using Foundations for Living I, Foods and Nutrition curriculum, and a third group was exposed to no nutrition education during a four week period of instruction. In this chapter, conclusions, implications, and recommendations will be discussed.

#### Summary of the Study

This study was conducted to compare the efficacy of two educational intervention programs in obtaining improvement in knowledge and behavior skills of adolescents. The researcher's desire to increase the risk for the major health threats faced by the adolescent population motivated this study. The relationship between two different nutrition educational curriculums taught to 9th graders and

the differences between these two experimental groups and a control group were analyzed.

### Methods

A pretest-posttest control group repeated measures study was conducted using 54 ninth grade students enrolled in the Ada Junior High School. Two home economics classes were used as the experimental groups and a physical science class was used as the control group. One group received nutrition related information from the Applied Biology/Chemistry curriculum (Group A) and the other group (Group B) received instruction from the State Vocational and Technical Education foods and nutrition curriculum. The control group did not receive any nutrition education treatment. The research instrument was administered during the spring semester of 1993. All three groups were administered the same pretest before a four week unit of instruction, a posttest at the end of a four week unit of instruction, and a longterm retest six weeks after the instruction was completed.

Analyses were done on the mean averages of the test scores for knowledge and behavior, and differences among the groups were determined between the three groups for comparison of the pretest/posttest and posttest/retest results. A simple ANOVA was used for all statistical analysis. Post hoc analysis was conducted using the Scheffe' test.

## Findings

Knowledge gain for the three groups tested showed the greatest difference between the pretest and posttest (see Table 1). Significance for increase in knowledge was found for groups for the posttest (see Table 8, Appendix C). The greatest difference in knowledge gain was between Group B and Group C. There was a significant difference between pretest and posttest scores among groups (see Table 10, Appendix D). The Scheffe' post hoc analysis indicated that Group A was significantly different from Group C and Group B was significantly different from Group C. With both A and B having higher posttest scores than the control group, C.

There was also an overall significant difference in the behavior test scores of the three groups between the pretest and posttest (see Table 5). However, post hoc analysis did not indicate which of the groups varied from the other. When differences between the pretest and posttest and posttest and retest were assessed there was no significance for behavior. The mean scores for the control group, as indicated in Table 1, showed better behavior scores at all three testings.

## Conclusion

The influence of nutrition education in improving knowledge and lifestyle skills of adolescents as they approach adulthood is an important concern in our society. A good nutrition education program designed to improve



knowledge and behavior patterns in adolescents could be helpful in encouraging adolescents to take an active role in decision making and management of their own nutrition/healthy lifestyle behaviors. The educational approaches and development of curriculums are vitally important factors that researchers must continue to address. Studies of this nature provide educators a base for which to make choices regarding curriculum and its effectiveness to allow for a wider range of opportunities for reaching the needs of the adolescents student.

This particular study proved that exposure to nutrition education did make a difference in achievement of knowledge when compared to a group that received no nutrition education. Both experimental groups (Group A and Group B) improved on the knowledge test from pretest to posttest, but both regressed in their scores on the longterm retest. This study supports the inference that the biggest challenge to nutrition educators is creating a desire to learn about nutrition and creating continuing educational experiences that encourage adolescents to make healthy lifestyles a conscious choice. According to this study both curricula were associated with increases in nutrition knowledge. There was no significant difference between the two curricula.

The researcher concludes that the use of more first hand experiences, modern technology efforts and the more innovative teaching techniques used in the Applied Biology/Chemistry unit could account for the slight

difference regarding improvement in knowledge test scores between the pretest and posttest for Group A versus Group B. Even though, both of the experimental groups were taught using traditional teaching methods the activities used with Group A were more creative in nature allowing the student to see and explore first hand, as opposed to the use of worksheets and class lectures that only allowed Group B to hear and imagine. Just learning about nutrition and health is not enough. Students need positive experiences that encourage and allow the application of knowledge of nutrition education. The development and implementation of innovative curricula focused on nutrition education, such as the ones used, have proven successful in orienting and motivating adolescents to develop nutrition awareness and encourage them to practice effective nutritional habits.

Nutrition education is not something that can be learned in one setting. In this particular study there was no indication that behaviors were substantially changed. The researcher therefore concludes that the brevity of the instructional units and the discontinuity of nutrition education throughout the school curriculum could partially explain this undesirable outcome. It appears that for meaningful change to occur accurate information must be shared and the knowledge must be continually supplemented and reinforced.

## Implications

Results of this study indicated that nutrition knowledge and behavior practices can be affected by nutrition education classroom instruction. However, it is apparent in education that immediate recall shows the better scores when testing. Students enrolled in nutrition education courses prove to be more knowledgeable of the topic of health. Teachers must show students how to use the skills available, judge them on mastering application of skills, and lead the student in the selection and integration of appropriate information in decision making related to major health threats in our society. The researcher infers that nutrition education needs to be an ongoing educational process started in the elementary schools. A search for innovative approaches to providing nutrient information to consumers is needed. New approaches need to supplement, not replace, existing information sources. Therefore, the researcher implies that the Applied Biology/Chemistry curriculum would be a good choice to supplement the Foundations for Living I, Foods and Nutrition curriculum for ninth grade students.

Education alone can make a strong impact on the improvement of healthy living skills, but a joint effort involving parents, the media and eating establishments could even enhance the positive effects seen in our young people. Poor eating habits during childhood can lead to a lifetime of health problems. To improve their eating habits,

students must understand certain ideas about nutrition, choose and apply these ideas within their personal value system, and develop the skills to accomplish these tasks. The need continues to grow for assessing the impact of nutrition education on adolescents.

#### Recommendations

The results of this study indicated several recommendations for future studies:

1. A study encompassing a wider range of demographic correlations such as height, weight, age, gender, GPA, and medical and family history would be good to study the behavioral influence in regards to nutrition education.
  2. A comparison of a variety of nutrition education curricula would help to determine the most adequate program to meet the health needs of adolescents.
  3. The actual instruction should be for a longer period of time to determine the effectiveness of students attainment of knowledge.
  4. Studies should be conducted among younger age groups to assess the influence of an ongoing nutrition education program in regards to knowledge and behavior.
  5. A study to compare nutritional knowledge and behaviors of students who had previously taken home economics courses versus those who had not
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been exposed to home economics would assist in determining if home economics is meeting the needs of nutrition education.

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## APPENDIXES

**APPENDIX A**

**TEACHING UNITS**

## Nutrition Education Teaching Unit Designed for Adolescents

### Fight Fat for Fun and Fitness

#### Introduction

Major health threats in young children and adolescents is often accompanied by an unhealthy lifestyle, and if it continues into adulthood will be associated with higher than expected adult morbidity and mortality rates. Since major health risks, such as coronary vascular disease, cancer and strokes, are known to be the most frequent causes of death in the United States, an assessment of adolescents will be conducted. A nutrition education program designed to improve knowledge and lifestyle skills in adolescents could be a very useful device to motivate adolescents to take an active role and responsibility in the management of their own behaviors. This program will test the feasibility and efficacy of nutrition education intervention teaching units.

#### Objectives

1. To develop and implement a nutrition education program to be delivered to adolescents enrolled in home economics classes.
2. To compare the feasibility and efficacy of an educational intervention program by testing improvement in knowledge and lifestyle skills in adolescents exposed to nutrition education using the Applied Biology/Chemistry instructional materials versus those exposed to the State Vocational Technical foods and nutrition curriculum.

#### Purpose

The purpose of this study is to compare the efficacy of two educational intervention programs for the improvement of knowledge and lifestyle skills associated with the risk for the major health threats in adolescents.

#### Procedure Recommendations

Nutrition education information in relation to major health disease topics will be used in this program. The

instructional materials will be derived from the Applied Biology/Chemistry materials for Disease and Wellness and Nutrition developed by CORD. The alternate curriculum will be derived from the Oklahoma Vocational Technical Education Foundations for Living Curriculum. These nutrition educational teaching units will emphasize information regarding major health risks in adolescents.

The procedures for the intervention phase include:

- The intervention phase of the project will involve two ninth grade Home Economics classes for exposure to one of the educational courses and one control group (9th grade science class).
- The educational courses will be assessed by testing the adolescents for gains in knowledge, behavior and interest before and after eight sessions.
- All students will be given Pre and Post Nutrition Education Tests.
- The efficacy of the educational program will be assessed by comparing changes in scores of knowledge and interest before and after the course.
- Retesting will be performed 10 weeks following the initial testing.

#### Curriculum Outline/Applied Biology and Chemistry

### Objectives and Teaching Strategies

#### I. Assessment Phase Instrument

1. The students will be given a nutrition pre-test to measure their level of knowledge.
2. The students will be given a test to measure behavior referred to as "How Healthy are You?"

A. Objective: A college home economics instructor will assess the adolescents for their level of knowledge and degree of healthy lifestyle in regard to nutrition education.

B. Teaching Strategy:

1. The nutrition knowledge and behavior pre-tests will be administered to the students.

#### II. Session #1 - Introduction (1 day)

The introduction will consist of a "get acquainted session" which will be structured to promote interpersonal interaction.

A. Objective: The students will identify the link between a healthy lifestyle and its relation to disease and wellness.

B. Teaching Strategies:

1. Each of the students will be asked to orally state their name, age and special interests.

2. An overview of the program will be presented in a question and answer format to enhance incentives and motivate.
  3. The concept of taking over the control of their own lifestyle management will be explained and termed "Empowerment".
  4. Goals will be set and aspects of the teaching methodology will be outlined with emphasis on manipulating concepts, reflection and challenge.
- III. Session #2 - Major Health Threats (4 days)
- A. Objectives:
1. The students will explore the link between American lifestyles (nutrition, exercise, work and play) and major health threats.
  2. The students will compare and contrast the leading causes of death in the United States for all age groups versus that 15-24 year old adolescents.
  3. The students will describe and discuss five major health threats.
- B. Teaching Strategies:
1. Major health threats will be defined and warning signs discussed.
  2. Leading causes of death statistics will be viewed via handouts and overheads and compared through class discussion.
  3. Students will research and give an oral report on one of five major health threats.
- IV. Session #3 - How we become and stay healthy (3 days)
- A. Objective: The students will identify guidelines for understanding their health status, as preventive measures for major health threats.
- B. Teaching Strategies:
1. View and discuss the video, "Mobile Health Unit."
  2. Devise guidelines for good fitness and health, considering your needs for exercise, nutrition, sleep, etc.
  3. Identify preventive measures for major health threats, such as heart disease.
  4. Suggest changes that could be made in the daily routine that would improve health.
  5. Local pediatrician will weigh, measure height and perform skin caliper/body composition tests on students.
- V. Session #4 - You really are what you eat (3 days)
- A. Objectives:
1. The students will identify the basic nutrients required to maintain life - their sources and their roles in the body.

2. The students will learn to make food choices that fit their body's needs.
- B. Teaching Strategies:
1. Discuss the food guide pyramid and relate the chemical structure of each nutrient to its nutritional role.
  2. Evaluate the nutrient content of sample diets and judge whether a given diet would meet the RDA for nutrients.
  3. Determine the presence of selected nutrients in sample meals.
  4. View video "You Really are What You Eat".
  5. Develop brown bag lunches. Glue magazine cut outs of foods onto the brown bag.
  6. Determine the fat content of various through experimentation.

VI. Session #5 - Dietary assessment for weight control (2 days)

- A. Objective: The students will evaluate their diets to determine the balance of their caloric intake and average caloric usage, and predict the effect that such a diet might have on their body weight.
- B. Teaching Strategies:
1. The basis for calorie reduction and a low cholesterol and saturated fat diet will be outlined.
  2. Difficulties in selection of a low fat diet will be presented.
  3. Discuss how diet has a direct effect on a person's physical health and energy level.
  4. The students will keep a food diary for three days and analyze it with the computer program Food Processor II.

VII. Session #6 - Exercise and relaxation techniques (3 days)

- A. Objective: The students will review the role of exercise and relaxation in weight control and major health risks.
- B. Teaching Strategies:
1. General benefits of exercise on health will be enforced.
  2. Real life examples of opportunities to exercise for the average adolescent will be reviewed and choices whether to exercise or not will be presented in terms of an option (whether to use the stairway or not).
  3. Particular emphasis will be directed toward utilizing resources in the community and at home.
  4. Exercise will be introduced as a relaxation technique.
  5. The students will design their own exercise/fitness program.

6. A local psychologist will discuss relaxation techniques.
- VIII. Session #7 - Social influences on the diet (1 day)
- A. Objective: The students will review how cultural, religious and ethnic beliefs have a strong influence on an individual's food choices.
  - B. Teaching Strategies:
    1. Problems with socializing will be presented to the adolescents in terms of difficult choices which they are exposed to at various events.
    2. Participation in planning events, providing a sack lunch, assertiveness, and making choices will be presented as alternatives.
- IX. Session #8 - Relapse prevention training (1 day)
- A. Objective: The students will identify causes of relapse and outline ways to prevent relapse.
  - B. Teaching Strategies:
    1. Discuss fad diets, diet pills, extremely low calorie diets and eating disorders.
    2. Each student will do a written report on an eating disorder.
- X. Follow-up Assessment (2 days)

-The nutrition knowledge, and behavior post-tests will be given immediately following the conclusion of the eight sessions.

-A re-assessment of nutrition knowledge, and behavior will be performed 10 weeks following the initial assessment.

## Curriculum Outline/ Vocational Technical Education

## Foundations for Living I

## Objectives and Teaching Strategies

- I. Assessment Phase Instrument is the same as the Applied Biology/Chemistry curriculum outline.
- II. Session #1 - Introduction (1 day)  
The introduction session will be the same as the Applied Biology/Chemistry curriculum outline.
- III. Session #2 - Good Health Practices (2 days)
  - A. Objectives:
    1. The students will match terms associated with food habits, exercise, and good health to their correct definitions.
    2. Students will name factors that contribute to good health.
  - B. Teaching Strategies:
    1. Terms will be defined and good health practices discussed in the form of a class discussion.
- IV. Session #3 - Personal Food Habits (3 days)
  - A. Objectives:
    1. The students will name factors that influence personal food habits and list personal characteristics that affect food habits.
    2. The students will list guidelines for improving food habits.
  - B. Teaching Strategies:
    1. Students will evaluate their personal food habits by beginning to keep a record of the foods they eat - three day dietary assessment.
    2. Students will use calorie and nutrient value charts to analyze their daily food intake.
- V. Session #4 - Gaining and Losing Weight (3 days)
  - A. Objectives:
    1. Students will distinguish between procedures for gaining and losing weight.
    2. The students will name sources for determining calorie content of foods.
  - B. Teaching Strategies:
    1. A nutritionist or dietitian will be invited to speak to the class on preparing meal plans for weight reduction.
    2. Students will research the calorie content of the foods they eat including snack foods and fast-food products.



## VI. Session #5 - Weight Control (2 days)

## A. Objectives:

1. Students will determine their desirable weight.
2. Students will measure their calorie intake.

## B. Teaching Strategies:

1. Through the use of the height-weight table in the Foundations for Living curriculum the students will determine their desirable weight.
2. The students will do a dietary assessment by writing down all of the foods they eat for three days. They will compare their daily calorie intake with the daily calorie requirements specified in the Foundations for Living curriculum.

## VII. Session #6 - Exercise (3 days)

## A. Objectives:

1. The students will name the purposes of exercise.
2. The students will arrange in order the parts of a good exercise program.

## B. Teaching Strategies:

1. A fitness expert will be invited to speak to the class on how to exercise properly.
2. The students will discuss types of warm-up, aerobic, and cool-down exercises.
3. The students will actually go to the gym to exercise.

## VIII. Session #7 - Overweight versus Underweight (2 days)

## A. Objective: The students will define and list the effects of being overweight and underweight.

## B. Teaching Strategies:

1. The students will determine their body frame type and determine where in the desirable weight range they should be.
2. The students will make a plan to reach their desired weight.

## IX. Session #8 - Eating Disorders (2 days)

## A. Objective: The students will describe the types of eating disorders.

## B. Teaching Strategies:

1. The students will write a research report on eating disorders such as anorexia and bulimia to share with the class.

## X. Follow-up Assessment (2 days)

The same follow-up procedures will be used for both curricula.

**APPENDIX B**

**TESTS**

Name: \_\_\_\_\_

Score: \_\_\_\_\_

How Healthy Are You?  
A Guide to Understanding Your Health Status

Working by yourself, fill out a copy of the health questionnaire below. Put a check next to the blank that best describes your health behavior. There are no right or wrong answers. Be as honest as you can be. You do not have to share your answers with anyone.

1. How much alcohol do you drink?

- a. none
- b. 1-2 drinks a day
- c. 1-2 drinks a day and more on weekends
- d. more than 2 drinks on most days

2. How many cups of caffeinated beverage (tea, coffee, soft drinks) do you drink per day?

- a. none or less than 1 a day
- b. 1-2
- c. 3-6
- d. more than 6

3. How often do you eat a balanced breakfast?

- a. 6-7 days per week
- b. 4-5 days per week
- c. 2-3 days per week
- d. 0-1 days per week

4. Which description sounds like your daily eating pattern?

- a. three balanced meals a day and no snacking
- b. three balanced meals a day and light snacking
- c. 1-2 balanced meals a day and snack foods other times
- d. snack foods (chips, sodas, candy, cookies, etc.) when I feel hungry

5. How many servings per day of concentrated sugar do you eat (sodas, candy, cookies, etc.)?

- a. 0-1
- b. 2-3
- c. 4-5
- d. 6 or more

6. Considering how tall you are and your body build, how near are you to your ideal weight?
- a. within 10 pounds
  - b. within 20 pounds
  - c. within 30 pounds
  - d. more than 30 pounds from ideal weight
7. How many times a week do you exercise aerobically (brisk walking, jogging, swimming, aerobics class, biking, etc.)?
- a. 3-4 times
  - b. 2 times
  - c. 1 time
  - d. 0 times
8. How many times a week do you do other types of exercise (weight lifting, tennis, calisthenics)?
- a. 3-4 times
  - b. 2 times
  - c. 1 time
  - d. 0 times
9. How much sleep do you get per night on the average?
- a. more than 9 hours
  - b. 6-8 hours
  - c. 5-6 hours
  - d. 0-4 hours
10. How many times a week do you make an effort to manage stress by relaxing, exercising, or other stress-reduction techniques?
- a. 6-7
  - b. 4-5
  - c. 2-3
  - d. 0-1
11. Which statement most correctly describes your friendship patterns?
- a. have friendship where I can always share my feelings.
  - b. have friendship where I can sometimes share my feelings.
  - c. have a friend, but I can't share my feelings.
  - d. have no friends.

12. Is there an adult or adults in your life with whom you can share serious problems that you might be having?
- a. Yes, I can talk with my parents and other adults about problems.
  - b. I can sometimes talk with my parents and another adult.
  - c. I can't talk to my parents, but sometimes I can talk with another adult.
  - d. No, I have no adult with whom I can talk about problems.
13. How often do you use seat belts while driving or riding in a car?
- a. always
  - b. sometimes
  - c. rarely
  - d. never
14. How often do you ride with someone who is taking drugs or drinking?
- a. never
  - b. a few times a year
  - c. once a month
  - d. at least once a week
15. Which choice best describes your cigarette smoking?
- a. I don't smoke
  - b. less than one pack a day
  - c. 1-2 packs a day
  - d. 2 or more packs a day
16. Which choice best describes your use of drugs that are considered "recreational"?
- a. I don't use drugs.
  - b. I use drugs once a month.
  - c. I use drugs when I need them and I'm careful.
  - d. I use drugs whenever I feel like it.
17. How often do you go to the doctor for a check-up?
- a. yearly or every two years
  - b. every 3-5 years
  - c. only when something is wrong
  - d. never

18. How often do you see a dentist?

- a. every 6 months
- b. every year
- c. every 2-3 years
- d. only if something is wrong

19. Do you practice safe sex?

- a. Not relevant as I'm not sexually active.
- b. yes, consistently
- c. sometimes
- d. Never, it is too much of a hassle

20. How often do you have fun (fun that doesn't pose any risk to your health)?

- a. much of the time
- b. some of the time
- c. rarely
- d. never

**Scoring:**

- Give yourself 0 (zero) points for all (a) answers, 1 point for all (b) answers, 2 points for all (c) answers, and 3 points for all (d) answers.
- If you answer (d) for questions 1,11,13,14,15,16,and 19, give yourself 5 points for those answers.
- The total scores can range from 0 to 74. If you scored 0-15, your health habits are excellent! If you scored between 15-40, your health habits are good, but may need improvement. If you scored above 40, you have poor health habits. Watch out!

Name: \_\_\_\_\_

Score: \_\_\_\_\_

## Healthy Habits for Living

Multiple Choice. Write the correct letters in the blanks.

- \_\_\_\_\_ 1. Mom always said to eat your vegetables. But just how many veggies should you be eating?  
A. none - what did mom know?  
B. one serving a day  
C. two servings a day  
D. three or more servings a day
- \_\_\_\_\_ 2. It's 100 degrees in the shade, and dehydration seems just around the corner. Which beverage is the wisest way to ward it off?  
A. a caffeinated soft drink  
B. water  
C. beer  
D. iced tea
- \_\_\_\_\_ 3. Unless you've been touring Antarctica for the past two decades, you've probably heard that dietary fiber is good for you. Which of these is a good source?  
A. carrot sticks  
B. oatmeal  
C. fresh fruit  
D. dried beans  
E. all of the above
- \_\_\_\_\_ 4. It seems everyone's talking about fat lately (are they trying to tell you something?). The best way to control fat in your diet is to:  
A. drop all meat and dairy products  
B. use "balance, variety and moderation" as a guide  
C. go on a strict diet
- \_\_\_\_\_ 5. Take heart, folks - this one's easy. Which one of these affects your risk of heart disease?  
A. smoking  
B. diet  
C. high blood pressure  
D. heredity  
E. all of the above
- \_\_\_\_\_ 6. You're a card carrying couch potato, but lately you've been thinking about exercise. Which of these will do you some good?  
A. walking  
B. bike riding  
C. gardening  
D. all of the above

- \_\_\_\_\_ 7. It's 3 p.m. and your stomach sounds like a mighty angry cheetah. Which of these is your wisest lowfat snack choice?
- A. a chocolate chip cookie
  - B. a lowfat frozen yogurt cone
  - C. 15 potato chips
  - D. trail mix with peanuts and raisins
- \_\_\_\_\_ 8. If your knowledge of nutrition isn't too rusty, you'll know that getting enough iron is especially important for women. Which of the following is an iron-rich choice?
- A. lean roast beef
  - B. spinach
  - C. dried beans
  - D. enriched bread
  - E. all of the above
- \_\_\_\_\_ 9. While boning up on nutrition, you've learned that calcium is important. Which of the following is the best bet for getting the calcium you need?
- A. cheddar cheese
  - B. broccoli
  - C. eggs
  - D. lowfat milk
- \_\_\_\_\_ 10. Eating lots of starchy foods, like potatoes, rice, pasta and bread, make you fat.
- A. true
  - B. false



Match terms associated with food habits, exercise, and good health to their correct definitions. Write the correct letters in the blanks.

- |           |  |                     |
|-----------|--|---------------------|
| _____ 1.  | Science that studies the effect of food on the body  | A. anorexia         |
| _____ 2.  | Excessive body fat (15 to 20 percent above the recommended amount for height and weight)                     | B. posture          |
| _____ 3.  | Overall ability to resist illness and tiredness  | C. bulimia          |
| _____ 4.  | Position of the body   | D. eating disorders |
| _____ 5.  | Unit of measure that indicates the amount of energy released from food                                       | E. nutrition        |
| _____ 6.  | Weight significantly under the normal range ( 10 percent below the recommended amount for height and weight) | F. appetite         |
| _____ 7.  | Actions one usually does without thinking or that are very hard to break                                     | G. physical health  |
| _____ 8.  | Weight at which one looks, feels, and can be at his or her best  | H. fitness          |
| _____ 9.  | Food normally eaten  | I. obesity          |
| _____ 10. | Irregular food habits that usually make a person overweight or underweight                                   | J. exercise         |
| _____ 11. | Food that provides bulk to the diet  | K. habits           |
| _____ 12. | Desire for food  | L. overweight       |
| _____ 13. | Weight exceeding normal range (10 percent above the recommended amount for height and weight)                | M. calorie          |
|           |  | N. stamina          |
|           |  | O. health           |
|           |  | P. desired weight   |
|           |  | Q. mental health    |
|           |  | R. underweight      |
|           |  | S. fiber            |
|           |  | T. diet             |

Name five factors that contribute to good health.

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_

Name five factors that influence personal food habits.

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_

Select from the following list the effects of being overweight or underweight. Write an "X" in the blank before each correct answer.

- \_\_\_\_\_ 1. Increased risk of early death
- \_\_\_\_\_ 2. Increased risk of disease
- \_\_\_\_\_ 3. Unattractive appearance
- \_\_\_\_\_ 4. Longer life expectancy, if underweight
- \_\_\_\_\_ 5. Increase in stamina and vitality

Select from the following list characteristics affected by food habits. Write an "X" in the blank before each correct answer.

- \_\_\_\_\_ 1. Physical and mental performance
- \_\_\_\_\_ 2. Self-concept
- \_\_\_\_\_ 3. Energy and stamina
- \_\_\_\_\_ 4. Health and physical fitness
- \_\_\_\_\_ 5. Attribute
- \_\_\_\_\_ 6. Appearance
- \_\_\_\_\_ 7. Exercise
- \_\_\_\_\_ 8. Personality and emotions

Select from the following list guidelines for improving food habits. Write and "X" in the blank before each correct answer.

- \_\_\_\_\_ 1. Set good examples of what to eat
- \_\_\_\_\_ 2. Prepare a limited variety of foods
- \_\_\_\_\_ 3. Encourage family members to try new foods
- \_\_\_\_\_ 4. Base family meals on the nutritional requirements of the youngest family member
- \_\_\_\_\_ 5. Manage food habits and calorie intake
- \_\_\_\_\_ 6. Create a pleasant atmosphere for mealtimes
- \_\_\_\_\_ 7. Use mealtime as a time to solve family problems

Name two sources for determining calorie content of foods

- 1. \_\_\_\_\_
- 2. \_\_\_\_\_

Match procedures for determining overweight or underweight to their correct descriptions. Write the correct letters in the blanks.

- |          |   |                          |
|----------|---|--------------------------|
| _____ 1. | Test involving looking at yourself naked in a mirror to help estimate undesirable weight; if you look fat or thin you probably are                | A. squeeze test          |
| _____ 2. | Test where you squeeze the skin and tissue together on the back of the arm; if the layer of fold is more than 1 inch, there is excessive body fat | B. height-weight table   |
| _____ 3. | Chart the lists desirable weight ranges according to age, height, and sometimes, bone structure   | C. pinch test            |
|          |   | D. mirror test           |
|          |   | E. laboratory test       |
|          |   | F. stamina-fitness table |

Name three purposes of exercise.

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

Arrange in order parts of an exercise program. Write the correct numbers in the blanks.

\_\_\_\_\_ Cool-down period

\_\_\_\_\_ Warm-up period

\_\_\_\_\_ Aerobic period

Distinguish between procedures for gaining and losing weight. Write a "G" before procedures for gaining weight and an "L" before procedures for losing weight.

- \_\_\_\_\_ 1. Eat small portions of high-calorie food (snacks) more often in the day
- \_\_\_\_\_ 2. Eat slowly and chew food well
- \_\_\_\_\_ 3. Avoid situations that cause nervousness or irritation
- \_\_\_\_\_ 4. Eat preferably only at mealtime
- \_\_\_\_\_ 5. Substitute milk for water
- \_\_\_\_\_ 6. Eat calorie-rich foods
- \_\_\_\_\_ 7. Increase daily exercise
- \_\_\_\_\_ 8. Begin lunch and dinner with foods that contain fiber
- \_\_\_\_\_ 9. Decrease calorie intake
- \_\_\_\_\_ 10. Reduce calorie requirements by reducing your physical activity each day
- \_\_\_\_\_ 11. Eat only enough food at each meal to satisfy hunger

List four lifestyle factors that contribute to major health threats in America.

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_

List two examples of community groups you might join that would motivate you to maintain a regular exercise program.

1. \_\_\_\_\_
2. \_\_\_\_\_

List six guidelines for successfully developing an exercise habit.

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_
6. \_\_\_\_\_

List five components of a plan for a lifetime of good health.

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_

**APPENDIX C**  
**INSTITUTIONAL REVIEW BOARD APPROVAL**

OKLAHOMA STATE UNIVERSITY  
INSTITUTIONAL REVIEW BOARD  
FOR HUMAN SUBJECTS RESEARCH

Date: 07-02-93

IRB#: HES-93-036

Proposal Title: AN ASSESSMENT OF CURRICULA AS RELATED TO THE  
INTERVENTION OF NUTRITIONAL AWARENESS IN ADOLESCENTS

Principal Investigator(s): Kenneth E. Case, Camille Frye DeYoung

Reviewed and Processed as: Exempt

Approval Status Recommended by Reviewer(s): Approved

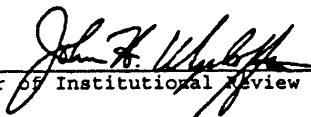
APPROVAL STATUS SUBJECT TO REVIEW BY FULL INSTITUTIONAL REVIEW  
BOARD AT NEXT MEETING. APPROVAL STATUS PERIOD VALID FOR ONE  
CALENDAR YEAR AFTER WHICH A CONTINUATION OR RENEWAL REQUEST IS  
REQUIRED TO BE SUBMITTED FOR BOARD APPROVAL. ANY MODIFICATIONS  
TO APPROVED PROJECT MUST ALSO BE SUBMITTED FOR APPROVAL.

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Comments, Modifications/Conditions for Approval or Reasons for  
Deferral or Disapproval are as follows:

Modifications received and approved.

Signature:

  
Chair of Institutional Review Board

Date: July 2, 1993



APPENDIX D

ANALYSIS OF VARIANCE FOR BEHAVIOR AND KNOWLEDGE  
PRETESTS AND POSTTESTS BY GROUPS

Table 4

ANALYSIS OF VARIANCE FOR BEHAVIOR PRETESTS BY GROUPS

STATISTIC		VALUE			
NO. OF SCORES IN GROUP A		21			
SUM OF SCORES IN GROUP A		506.00			
MEAN OF GROUP A		24.10			
SUM OF SQUARED SCORES IN GROUP A		13780.00			
NO. OF SCORES IN GROUP B		17			
SUM OF SCORES IN GROUP B		413.00			
MEAN OF GROUP B		24.29			
SUM OF SQUARED SCORES IN GROUP B		10981.00			
NO. OF SCORES IN GROUP C		16			
SUM OF SCORES IN GROUP C		296.00			
MEAN OF GROUP C		18.50			
SUM OF SQUARED SCORES IN GROUP C		6950.00			
-----					
SOURCE OF VARIATION RATIO	SUM OF SQUARES	df	MEAN SQUARE	F	
BETWEEN	364.16	(k - 1) 2	182.08	2.32	
WITHIN	4009.34	(N - K) 51	78.61		
TOTAL	4373.50	(N - 1) 53			
-----					
SCHEFFE' TESTS					
-----					
GROUP A VS GROUP B	0.00				
GROUP A VS GROUP C	1.81				
GROUP B VS GROUP C	1.76				

Table 5

ANALYSIS OF VARIANCE FOR BEHAVIOR POSTTESTS BY GROUPS

STATISTIC		VALUE			
NO. OF SCORES IN GROUP A		21			
SUM OF SCORES IN GROUP A		520.00			
MEAN OF GROUP A		24.76			
SUM OF SQUARED SCORES IN GROUP A		15334.00			
NO. OF SCORES IN GROUP B		17			
SUM OF SCORES IN GROUP B		419.00			
MEAN OF GROUP B		24.65			
SUM OF SQUARED SCORES IN GROUP B		11201.00			
NO. OF SCORES IN GROUP C		16			
SUM OF SCORES IN GROUP C		285.00			
MEAN OF GROUP C		17.81			
SUM OF SQUARED SCORES IN GROUP C		5653.00			
-----					
SOURCE OF VARIATION RATIO	SUM OF SQUARES	df	MEAN SQUARE	F	
BETWEEN	535.87	(K - 1) 2	267.94	3.50	
WITHIN	3908.13	(N - K) 51	76.63		
TOTAL	4444.00	(N - 1) 53		p<.05	
-----					
SCHEFFE' TESTS					
-----					
GROUP A VS GROUP B	0.00				
GROUP A VS GROUP C	2.86				
GROUP B VS GROUP C	2.51				

Table 6

ANALYSIS OF VARIANCE FOR BEHAVIOR RETESTS-LONGTERM BY GROUPS

STATISTIC	VALUE
NO. OF SCORES IN GROUP A	21
SUM OF SCORES IN GROUP A	524.00
MEAN OF GROUP A	24.95
SUM OF SQUARED SCORES IN GROUP A	15458.00
NO. OF SCORES IN GROUP B	17
SUM OF SCORES IN GROUP B	387.00
MEAN OF GROUP B	22.76
SUM OF SQUARED SCORES IN GROUP B	9343.00
NO. OF SCORES IN GROUP C	16
SUM OF SCORES IN GROUP C	309.00
MEAN OF GROUP C	19.31
SUM OF SQUARED SCORES IN GROUP C	6711.00

SOURCE OF VARIATION RATIO	SUM OF SQUARES	df	MEAN SQUARE	F
BETWEEN	289.59	(K - 1) 2	144.79	2.02
WITHIN	3659.45	(N - K) 51	71.75	
TOTAL	3949.04	(N - 1) 53		

SCHEFFE' TESTS

GROUP A VS GROUP B	0.31
GROUP A VS GROUP C	2.01
GROUP B VS GROUP C	0.68

Table 7

ANALYSIS OF VARIANCE FOR KNOWLEDGE PRETESTS BY GROUPS

STATISTIC		VALUE			
NO. OF SCORES IN GROUP A		21			
SUM OF SCORES IN GROUP A		1077.00			
MEAN OF GROUP A		51.29			
SUM OF SQUARED SCORES IN GROUP A		58379.00			
NO. OF SCORES IN GROUP B		17			
SUM OF SCORES IN GROUP B		1019.00			
MEAN OF GROUP B		59.94			
SUM OF SQUARED SCORES IN GROUP B		62639.00			
NO. OF SCORES IN GROUP C		16			
SUM OF SCORES IN GROUP C		840.00			
MEAN OF GROUP C		52.50			
SUM OF SQUARED SCORES IN GROUP C		45782.00			
-----					
SOURCE OF VARIATION RATIO	SUM OF SQUARES	df	MEAN SQUARE	F	
BETWEEN	783.37	(K - 1) 2	391.68	3.13	
WITHIN	6385.23	(N - K) 51	125.20		
TOTAL	7168.59	(N - 1) 53			
-----					
SCHEFFE' TESTS					
-----					
GROUP A VS GROUP B	2.81				
GROUP A VS GROUP C	0.05				
GROUP B VS GROUP C	1.82				

Table 8

ANALYSIS OF VARIANCE FOR KNOWLEDGE POSTTESTS BY GROUPS

STATISTIC		VALUE			
NO. OF SCORES IN GROUP A		21			
SUM OF SCORES IN GROUP A		1294.00			
MEAN OF GROUP A		61.62			
SUM OF SQUARED SCORES IN GROUP A		84194.00			
NO. OF SCORES IN GROUP B		17			
SUM OF SCORES IN GROUP B		1163.00			
MEAN OF GROUP B		68.41			
SUM OF SQUARED SCORES IN GROUP B		81415.00			
NO. OF SCORES IN GROUP C		16			
SUM OF SCORES IN GROUP C		821.00			
MEAN OF GROUP C		51.31			
SUM OF SQUARED SCORES IN GROUP C		44305.00			
-----					
SOURCE OF VARIATION RATIO	SUM OF SQUARES	df	MEAN SQUARE	F	
BETWEEN	2438.77	(K - 1) 2	1219.38	7.33	
WITHIN	8488.50	(N - K) 51	166.44		
TOTAL	10927.27	(N - 1) 53		p<.01	
-----					
SCHEFFE' TESTS					
-----					
GROUP A VS GROUP B		1.30			
GROUP A VS GROUP C		2.90			
GROUP B VS GROUP C		7.25		p<.05	

Table 9

ANALYSIS OF VARIANCE FOR KNOWLEDGE RETESTS-LONGTERM BY GROUPS

---

STATISTIC	VALUE
NO. OF SCORES IN GROUP A	21
SUM OF SCORES IN GROUP A	954.00
MEAN OF GROUP A	45.43
SUM OF SQUARED SCORES IN GROUP A	49706.00
NO. OF SCORES IN GROUP B	17
SUM OF SCORES IN GROUP B	946.00
MEAN OF GROUP B	55.65
SUM OF SQUARED SCORES IN GROUP B	56332.00
NO. OF SCORES IN GROUP C	16
SUM OF SCORES IN GROUP C	730.00
MEAN OF GROUP C	45.63
SUM OF SQUARED SCORES IN GROUP C	35368.00

---

SOURCE OF VARIATION RATIO	SUM OF SQUARES	df	MEAN SQUARE	F
BETWEEN	1196.48	(K - 1) 2	598.24	2.52
WITHIN	12118.78	(N - K) 51	237.62	
TOTAL	13315.26	(N - 1) 53		

---

SCHEFFE' TESTS

---

GROUP A VS GROUP B	2.06
GROUP A VS GROUP C	0.00
GROUP B VS GROUP C	1.74

---

APPENDIX E

ANALYSIS OF VARIANCE FOR DIFFERENCES  
IN PRETEST AND POSTTEST SCORES AND  
POSTTEST AND RETEST SCORES  
BY GROUPS



Table 10

ANALYSIS OF VARIANCE FOR DIFFERENCES BETWEEN KNOWLEDGE  
PRETEST AND POSTTEST SCORES BY GROUPS

STATISTIC		VALUE			
NO. OF SCORES IN GROUP A		21			
SUM OF SCORES IN GROUP A		1226.00			
MEAN OF GROUP A		58.38			
SUM OF SQUARED SCORES IN GROUP A		73144.00			
NO. OF SCORES IN GROUP B		17			
SUM OF SCORES IN GROUP B		963.00			
MEAN OF GROUP B		56.65			
SUM OF SQUARED SCORES IN GROUP B		55587.00			
NO. OF SCORES IN GROUP C		16			
SUM OF SCORES IN GROUP C		731.00			
MEAN OF GROUP C		45.69			
SUM OF SQUARED SCORES IN GROUP C		35091.00			
-----					
SOURCE OF VARIANCE RATIO	SUM OF SQUARES	df	MEAN SQUARE	F	
BETWEEN	1627.43	(K-1) 2	813.71	9.65	
WITHIN	4298.27	(N-K) 51	84.28		
TOTAL	5925.70	(N-1) 53			p<.01
-----					
SCHEFFE' TESTS					
-----					
GROUP A VS GROUP B		0.17			
GROUP A VS GROUP C		8.68			
GROUP B VS GROUP C		5.87			p<.05

Table 11

ANALYSIS OF VARIANCE FOR DIFFERENCES BETWEEN KNOWLEDGE  
POSTTEST AND RETEST SCORES BY GROUPS

STATISTIC	VALUE
NO. OF SCORES IN GROUP A	21
SUM OF SCORES IN GROUP A	660.00
MEAN OF GROUP A	31.43
SUM OF SQUARED SCORES IN GROUP A	25788.00
NO. OF SCORES IN GROUP B	17
SUM OF SCORES IN GROUP B	589.00
MEAN OF GROUP B	34.65
SUM OF SQUARED SCORES IN GROUP B	23133.00
NO. OF SCORES IN GROUP C	16
SUM OF SCORES IN GROUP C	645.00
MEAN OF GROUP C	40.31
SUM OF SQUARED SCORES IN GROUP C	28261.00

---

SOURCE OF VARIANCE	SUM OF SQUARES	df	MEAN SQUARE	F
BETWEEN	721.24	(K-1) 2	360.62	1.83
WITHIN	10030.46	(N-K) 51	196.68	
TOTAL	10751.70	(N-1) 53		

---

SCHEFFE' TESTS

---

GROUP A VS GROUP B	0.25
GROUP A VS GROUP C	1.82
GROUP B VS GROUP C	0.67

---

Table 12

ANALYSIS OF VARIANCE FOR DIFFERENCES BETWEEN BEHAVIOR  
PRETEST AND POSTTEST SCORES BY GROUPS

STATISTIC	VALUE				
NO. OF SCORES IN GROUP A	21				
SUM OF SCORES IN GROUP A	476.00				
MEAN OF GROUP A	22.67				
SUM OF SQUARED SCORES IN GROUP A	11846.00				
NO. OF SCORES IN GROUP B	17				
SUM OF SCORES IN GROUP B	380.00				
MEAN OF GROUP B	22.35				
SUM OF SQUARED SCORES IN GROUP B	9094.00				
NO. OF SCORES IN GROUP C	16				
SUM OF SCORES IN GROUP C	335.00				
MEAN OF GROUP C	20.94				
SUM OF SQUARED SCORES IN GROUP C	7679.00				
-----					
SOURCE OF VARIANCE RATIO	SUM OF SQUARES		df	MEAN SQUARE	F
BETWEEN	29.35	(K-1)	2	14.67	0.32
WITHIN	2321.49	(N-K)	51	45.52	
TOTAL	2350.83	(N-1)	53		
-----					
SCHEFFE' TESTS					
-----					
GROUP A VS GROUP B	0.01				
GROUP A VS GROUP C	0.30				
GROUP B VS GROUP C	0.18				

Table 13

ANALYSIS OF VARIANCE FOR DIFFERENCES BETWEEN BEHAVIOR  
POSTTEST AND RETEST SCORES BY GROUPS

STATISTIC					VALUE
NO. OF SCORES IN GROUP A					21
SUM OF SCORES IN GROUP A					466.00
MEAN OF GROUP A					22.19
SUM OF SQUARED SCORES IN GROUP A					11148.00
NO. OF SCORES IN GROUP B					17
SUM OF SCORES IN GROUP B					340.00
MEAN OF GROUP B					20.00
SUM OF SQUARED SCORES IN GROUP B					7136.00
NO. OF SCORES IN GROUP C					16
SUM OF SCORES IN GROUP C					376.00
MEAN OF GROUP C					23.50
SUM OF SQUARED SCORES IN GROUP C					9602.00

-----

SOURCE OF VARIANCE RATIO	SUM OF SQUARES	df	MEAN SQUARE	F
BETWEEN	104.10	(K-1) 2	52.05	1.39
WITHIN	1909.24	(N-K) 51	37.44	
TOTAL	2013.33	(N-1) 53		

-----

SCHEFFE' TESTS

-----

GROUP A VS GROUP B	0.60
GROUP A VS GROUP C	0.21
GROUP B VS GROUP C	1.35

-----

APPENDIX F

ANALYSIS OF GROUPS PRETEST AND POSTTEST RESPONSES  
TO INDIVIDUAL BEHAVIOR TEST QUESTIONS

Table 14

ANALYSIS OF GROUPS PRETEST AND POSTTEST RESPONSES TO  
INDIVIDUAL BEHAVIOR TEST QUESTIONS

Questions	GROUP A				GROUP B				GROUP C			
	A	B	C	D	A	B	C	D	A	B	C	D
1.												
Pretest	18	1	2	0	13	2	2	0	15	0	0	1
Posttest	19	1	1	0	12	0	5	0	13	2	1	0
2.												
Pretest	2	7	5	7	0	6	7	4	1	8	6	1
Posttest	1	10	4	6	4	5	5	3	1	8	7	0
3.												
Pretest	4	3	7	7	1	1	7	8	4	4	2	6
Posttest	3	2	8	8	1	1	2	13	2	3	7	4
4.												
Pretest	0	5	12	4	0	1	12	4	2	3	10	1
Posttest	0	4	16	1	0	1	12	4	1	3	11	1
5.												
Pretest	2	11	6	2	3	10	1	3	4	10	0	5
Posttest	5	9	4	3	2	9	2	4	1	11	3	1
6.												
Pretest	12	5	1	3	12	2	2	1	8	6	1	1
Posttest	13	4	4	0	12	3	1	1	12	1	1	2
7.												
Pretest	15	5	1	0	6	8	3	0	10	5	0	1
Posttest	15	3	3	0	6	4	7	0	10	3	3	0
8.												
Pretest	9	3	7	2	3	7	2	5	9	3	1	3
Posttest	8	4	6	3	2	4	6	5	9	2	1	4
9.												
Pretest	2	14	5	0	0	11	5	1	2	11	1	2
Posttest	2	9	10	0	0	11	6	0	0	15	0	1
10.												
Pretest	2	3	10	6	3	2	7	5	1	3	5	7
Posttest	2	1	8	10	2	3	7	5	2	2	4	8
11.												
Pretest	15	5	1	0	8	7	2	0	8	5	3	0
Posttest	9	10	1	1	8	4	5	0	9	5	2	0

(table cont.)

Table 14 (cont.)

Questions	GROUP A				GROUP B				GROUP C			
	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>D</u>
12.												
Pretest	6	7	5	3	6	6	3	2	7	4	2	3
Posttest	5	9	5	2	4	5	3	5	7	6	3	0
13.												
Pretest	1	7	7	6	2	8	3	4	7	5	1	3
Posttest	2	8	7	4	2	7	3	5	6	5	4	1
14.												
Pretest	15	1	2	3	9	4	3	1	12	4	0	0
Posttest	11	6	1	3	8	6	2	1	11	4	1	0
15.												
Pretest	14	6	1	0	11	5	1	0	15	1	0	0
Posttest	15	3	2	1	11	6	0	0	15	1	0	0
16.												
Pretest	21	0	0	0	16	0	0	1	15	0	0	1
Posttest	19	0	0	2	15	0	0	2	15	1	0	0
17.												
Pretest	6	1	13	1	6	1	9	1	8	0	7	1
Posttest	5	4	8	4	7	0	10	0	9	1	4	2
18.												
Pretest	5	4	3	9	9	0	1	8	6	5	2	3
Posttest	5	7	2	7	10	1	0	6	7	5	1	3
19.												
Pretest	10	6	4	1	11	3	2	1	10	3	1	2
Posttest	11	5	5	0	11	4	2	0	7	4	2	3
20.												
Pretest	14	6	0	1	10	5	2	0	9	3	2	2
Posttest	13	7	1	0	8	5	3	1	11	4	0	1

**APPENDIX G**

**ANALYSIS OF GROUP PRETEST AND POSTTEST RESPONSES  
TO INDIVIDUAL KNOWLEDGE TEST QUESTIONS**



Table 15

ANALYSIS OF GROUPS PRETEST AND POSTTEST  
RESPONSES TO INDIVIDUAL KNOWLEDGE TEST QUESTIONS

	<u>GROUP A</u>			<u>GROUP B</u>			<u>GROUP C</u>		
	CORRECT RESPONSES			CORRECT RESPONSES			CORRECT RESPONSES		
	<u>PRE</u>	<u>POST</u>	<u>DIFF</u>	<u>PRE</u>	<u>POST</u>	<u>DIFF</u>	<u>PRE</u>	<u>POST</u>	<u>DIFF</u>
1.	7	6	-1	9	9	0	4	8	+4
2.	16	20	+4	14	13	-1	15	14	-1
3.	14	12	-2	13	11	-2	6	7	+1
4.	19	18	-1	13	17	+4	13	14	+1
5.	12	17	+5	8	11	+3	11	9	-2
6.	16	18	+2	14	10	-4	12	11	-1
7.	12	8	-4	9	9	0	4	3	-1
8.	11	8	-3	7	5	-2	5	6	+1
9.	17	12	-5	9	11	+2	8	8	0
10.	14	15	+1	11	10	-1	5	8	+3
11.	3	3	0	1	6	+5	1	1	0
12.	3	9	+6	5	10	+5	5	8	+3
13.	3	7	+4	6	9	+3	5	2	-3
14.	10	14	+4	14	15	+1	13	10	-3
15.	7	5	-2	8	11	+3	6	6	0
16.	9	16	+7	14	15	+1	14	11	-3
17.	8	16	+8	11	16	+5	11	11	0
18.	10	15	+5	13	16	+3	10	10	0
19.	3	12	+9	6	13	+7	6	7	+1
20.	8	14	+6	9	15	+6	10	9	-1
21.	7	7	0	6	14	+8	10	8	-2
22.	8	15	+7	9	15	+6	8	9	+1
23.	5	10	+5	8	13	+5	8	10	+2
24.	71	79	+8	69	73	+4	48	42	-6
25.	24	36	+12	20	52	+32	5	5	0
26.	18	18	0	11	17	+6	13	15	+2
27.	17	19	+2	11	15	+4	11	13	+2
28.	18	16	-2	14	16	+2	14	13	-1
29.	15	19	+4	14	16	+2	13	12	-1
30.	14	15	+1	13	13	0	10	12	+2
31.	17	17	0	14	15	+1	11	14	+3
32.	16	12	-4	8	13	+5	10	14	+4
33.	17	19	+2	14	13	-1	13	16	+3
34.	19	17	-2	15	12	-3	11	12	+1

(table cont.)

Table 15 (cont.)

	<u>GROUP A</u>			<u>GROUP B</u>			<u>GROUP C</u>		
	<u>CORRECT</u>	<u>RESPONSES</u>		<u>CORRECT</u>	<u>RESPONSES</u>		<u>CORRECT</u>	<u>RESPONSES</u>	
	<u>PRE</u>	<u>POST</u>	<u>DIFF</u>	<u>PRE</u>	<u>POST</u>	<u>DIFF</u>	<u>PRE</u>	<u>POST</u>	<u>DIFF</u>
35.	13	11	-2	12	11	-1	16	11	-5
36.	19	16	-3	16	16	0	14	14	0
37.	8	12	+4	6	10	+4	9	6	-3
38.	16	15	-1	10	17	+7	10	11	+1
39.	19	17	-2	15	14	-1	14	16	+2
40.	5	9	+4	6	2	-4	8	5	-3
41.	14	18	+4	11	10	-1	12	12	0
42.	13	17	+4	14	15	+1	9	10	+1
43.	21	20	-1	16	16	0	13	13	0
44.	12	12	0	12	14	+2	7	8	+1
45.	18	18	0	15	17	+2	15	13	-2
46.	13	18	+5	18	25	+7	17	13	-4
47.	21	20	-1	15	16	+1	16	15	-1
48.	3	10	+7	7	9	+2	8	6	-2
49.	10	15	+5	13	14	+1	13	11	-2
50.	41	46	+5	36	45	+9	35	31	-4
51.	19	21	+2	17	16	-1	16	15	-1
52.	18	21	+3	16	17	+1	16	16	0
53.	18	21	+3	17	16	-1	16	15	-1
54.	16	16	0	12	15	+3	12	13	+1
55.	19	18	-1	15	15	0	12	11	-1
56.	6	5	-1	3	5	+2	6	4	-2
57.	16	20	+4	16	15	-1	14	14	0
58.	12	11	-1	6	10	+4	9	10	-1
59.	21	19	-2	14	15	+1	15	16	+1
60.	20	21	+1	16	15	-1	15	16	+1
61.	16	18	+2	14	16	+2	10	6	-4
62.	17	16	-1	16	12	-4	14	15	+1
63.	12	15	+3	13	13	0	13	10	-3
64.	16	18	+2	14	14	0	11	11	0
65.	32	70	+38	53	54	+1	35	35	0
66.	19	27	+8	25	32	+7	18	20	+2
67.	15	64	+49	37	39	+2	13	11	-2
68.	59	75	+16	57	54	-3	21	28	+7
SUM	1065	1294	+229	1003	1153	+150	831	819	-12
**	50.71	61.61	+10.90	59.00	67.82	+8.82	51.94	51.19	-.75
**	Avg# of correct responses based on Group size (A=21) (B=17) (C=16)								

VITA

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