Nutrition Education for Persons with Disabilities

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ACKNOWLEDGMENTS

The first to be acknowledged for this manuscript are my advisors Dr. Wayne Fuqua and Dr. James Kaye. Their individual expertise in research and Behavioral Health Psychology helped to further not only my career but scientific knowledge in this field. Others who should be recognized are the wonderful staff at the Young Adult Program where this study took place and the willing and eager participants. Without which this project would not have been possible.

Data for this study were analyzed using a method known as the Dennison and Dennison 2001 Composite Scoring System. Both Dennison and Dennison are experts in this growing field of health and nutrition and should be acknowledged for their great achievements that aided in the completion of this research study.

Jada A. Miller
This study provides descriptive information about the dietary knowledge and intake of community-based young adults who have been diagnosed with a number of disabilities. A nutrition education curriculum was implemented for the Experimental group (N=9) and at a later date for the Delayed Intervention group (N=9). Results indicated that the three-week nutrition education curriculum produced moderate improvement in participants’ nutritional knowledge and moderate improvement in nutritional value of foods chosen from a menu. However, the intervention proved to have a negligible effect on the nutritional value of foods consumed within this population of individuals.

Based on the results of this study the conclusion can be made that a nutrition education curriculum or merely education alone is insufficient in increasing the amount of nutritionally valuable foods consumed. It is unclear however, by this data, had there been more of an increase in knowledge levels of nutrition if there would have been a corresponding increase in nutritional values of foods consumed. Future research should attempt to conclude this question as well as focus on the various controlling variables of which food consumption is a function that are presented in this study.
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INTRODUCTION

The overall health of today's society has been an ever-increasing topic of concern. Life expectancy has increased dramatically over the past 100 years, largely a result of lowered infant mortality and the development of effective treatments (e.g., pharmaceuticals) and prevention measures (e.g., vaccination programs, improved water safety) aimed at infectious diseases. While some infectious diseases continue to elude treatment and prevention efforts, much of the attention has shifted to a new class of diseases, often called chronic or lifestyle diseases. These diseases, such as certain types of cardiovascular diseases, cancers, and diabetes, are characterized by a slow insidious onset and often persist over an extended period of time where those afflicted with these diseases survive for a protracted period of time after the diagnosis of the disease, albeit with a compromised quality of life. Many of these diseases have one or more identified behavioral risk factors, such as smoking, sedentary lifestyle and food consumption patterns, that gradually and over a protracted period of time elevate a person's risk of developing that disease. As a result of this development pattern, this class of diseases is often referred to as "lifestyle" diseases. Because lifestyle diseases now account for a large portion of morbidity and mortality, the focus of health promotion has now expanded to embrace efforts to promote healthy lifestyles, an endeavor that draws heavily on psychology, especially behavioral psychology (Cottrell, Girvan, & McKenzie, 2002).
The scope of the challenge presented by lifestyle diseases is immense. For example, a recent report estimated that between 20-27% of the general population was living with high blood pressure and high blood cholesterol that are both risk factors for cardiovascular disease, the leading cause of death in the United States (Pastor, Makuc, Reuben, & Xia, 2002). Furthermore, in 1999, an estimated 61% of American adults in the general population were overweight and 27% were classified as obese. The well-documented prevalence of weight and obesity problems in children and adolescents suggests that health problems associated with obesity (e.g., diabetes, cardiovascular disease) will continue to compromise the health of Americans for many years (Pastor et al.).

These daunting health challenges are a direct result of the way people live, especially the health-related behaviors that characterize a person’s daily living such as dietary consumption, physical activity, smoking, and alcohol consumption (Sutherland, Couch, & Iacono, 2002). These behaviors are commonly identified as lifestyle factors and are determinants of premature and preventable death in the general population. Poor diet and physical activity are lifestyle factors that are the second highest to tobacco use, contributing to 14% of premature deaths (Robbins, Powers, & Burgess, 2002).

Efforts to prevent lifestyle diseases via the promotion of healthy behavior patterns have emerged over recent decades. For example, *Healthy People 2010: Understanding and Improving Health*, is a government-sponsored statement of national health objectives that emphasizes prevention of lifestyle diseases and
promotion of healthy behavior patterns (see www.healthypeople.com). Unfortunately, efforts to achieve these worthy health objectives have been hampered by a lack of focus and funding. Even though more than $1 trillion is spent annually in the U.S. on treating disease, only 4% of the money spent towards treating disease annually goes toward prevention efforts. This observation led Robbins et al. (2002) to conclude, “America is great at heroic care, but very poor at low-cost preventive care” (p. 5).

While prevention efforts with the general population have not been uniformly effective, well focused or adequately supported, the health challenges facing Americans with developmental disabilities are even more daunting than those facing the general population. These individuals face an increased risk for conditions secondary to their disorder, which can lead to preventable diseases. For example, researchers have found that adults with Down’s syndrome tend to be at a particular risk of being overweight (Rubin, Rimmer, Chicoine, Braddock, & McGuire, 1998). And there is an unusually high prevalence of risk factors for cardiovascular diseases (e.g., hypertension, obesity) among those individuals with intellectual disability (Sutherland et al., 2002).

Recent statistics reveal that approximately 1.6% of school-age children and 1.5% of adults in the United States have a developmental disability (National Institute for Occupational Safety and Health [NIOSH], 2000). Therefore, using a 2000 population of 274 million people, 4.1 million adults and 4 million children in the United States are living with a developmental disability. Of these individuals living with developmental disabilities, 32% have high blood pressure, 24% have high blood
cholesterol, and 30% of these men and women are obese (Office of Disease Prevention and Health Promotion, 2000). Compared to the statistics of the general population discussed previously, these statistics reveal that the needs of those persons living with developmental disabilities are not much different from those of the general population. The level of health-promoting practices in people’s lives influences the high prevalence of health problems among adults with developmental disabilities (Sutherland et al., 2002). Risk factors such as poor diet are as evident in those with developmental disabilities as the general population. Equal efforts in the areas of health promotion and prevention efforts dealing with risky lifestyle factors in this population should be addressed. Thus, the health issues of concern for those with developmental disabilities are not different from that of the general population and there is an evident need for research in the areas of possible prevention and health promotion strategies, such as nutrition education, for this population.

A health education program is an important method of health promotion in the prevention of diseases because research suggests that “diseases such as obesity and coronary heart disease for which sedentary behavior is a likely risk factor are lifelong processes with origins during childhood; physical activity [as well as nutritional] habits are established early in life and may persist into adult years” (Sallis et al. 1992). It is also important to create such a school-based health education curriculum for the reason that 50% of the mortality rate among adults is attributable to modifiable health behavior patterns that have their onset in childhood (Utley et al. 2001). Thus, early intervention techniques aimed at teaching adolescents the importance of healthy
lifestyle behaviors, such as diet and nutrition, should be used, with schools being the most obvious and important site for health instruction.

Some authors (e.g., Anderson, 1993; Sutherland et al., 2002; Zajicek-Farber, 1998) have proposed the use of school-based health education programs as an adaptable intervention and an effective means increasing an individual's healthy lifestyle behaviors. Health education has been completely integrated into our scholastic framework for typically developing youngsters. Comprehensive guidelines developed by the Centers for Disease Control and Prevention (i.e., Guidelines for School and Community Programs to Promote Lifelong Physical Activity Among Young People [CDC, 1997] and Guidelines for School Programs to Promote Lifelong Healthy Eating [CDC, 1996]) provide objectives that regular health education curricula should incorporate. However, these guidelines do not address the needs of young persons with specific disabilities. While the advances in health education are admirable, modification of these health education programs and guidelines for persons with developmental disabilities remains an important consideration. Thus, given that statistically, the health of those individuals with developmental disabilities is not different from that of the mainstream population, but their functioning level is, there is a significant need to modify and implement health education programs for persons with impairment and developmental disabilities (Anderson, 1993).

While the needs of the population of persons with disabilities are not different from that of the general population, it is important to consider that due to their level of functioning, different health promoting interventions may be needed. Adapting such
an intervention for persons with disabilities would involve modifying the educational materials used. An example would be taking into account the population’s level of reading and altering the size of the font used. Utley and colleagues (2001) compared the effects of classwide peer tutoring of health education to that of traditional teaching methods in a population of children with developmental disabilities. Classwide peer tutoring utilizes pairs of students as tutors and tutees to teach material from flash cards. The results indicate that increases in posttest scores from this form of teaching were greater than in the traditional teacher led instructional procedures.

Level of functioning is also important when considering whether this population is capable of self-monitoring and self-management of health behaviors. Some interventions may need to take into consideration that such individuals could be living in environments where contingencies do not promote healthy lifestyles. Just as standard teaching techniques are not effective for everyone (thus the need for special education), there is a need to develop health promotion strategies that would be effective with this large population of individuals who face double risks, those imposed by their health behaviors and those imposed by disabilities that limit the efficacy of traditional health promotion interventions (e.g., informational pamphlets and programs). Efforts have been reported to improve the health status of individuals with developmental disabilities through behavioral interventions focusing on health related behaviors and are discussed next.
Literature Review

Recent studies on health education for individuals with developmental disabilities have concerned issues of health prevention in the areas of sexuality education (Caspar & Glidden, 2001; Garwood & McCabe, 2000), AIDS education (Scotti, Nangle, Masia, & Ellis, 1997), and smoking and substance abuse (Tracy & Hosken, 1997), as well as nutrition education (Utley et al., 2001). These studies demonstrate the use of modified education programs in order to increase participant knowledge and awareness of important health-risk behaviors. These studies report that modified educational and skills training programs resulted in an increase in both knowledge of AIDS, sexuality and health, and an increase in risk-reduction skills such as the cessation of smoking (Caspar & Glidden, 2001; Garwood et al., 2000; Scotti et al., 1997; Tracy & Hosken, 1997). Each of these studies reveals that individuals with developmental disabilities can benefit greatly by learning from a modified health education program. Their individual needs, as discussed above, should be considered in the adaptation of school-based health education, such as a nutrition enhancing program, which could provide this much needed training for those who have developmental disabilities.

Sutherland and colleagues (2000) suggest that research explore the health-related lifestyle behaviors of adults with disabilities and the effects of these behaviors on health. One such area is the issue of decision-making and the specification of choice. Sutherland et al. (2002) reviewed the literature containing lifestyle behaviors as determining factors of health problems. Their review reveals that nutrition is an
important determinant of health, and may be associated with where people live as well as choice behaviors. Researchers have hypothesized that individuals with disabilities living in restrictive environments tend to be healthier than those people who live in less restrictive settings (Sutherland et al., 2002), indicating that choice behaviors may be involved in the unhealthy lifestyles of individuals with developmental disabilities. Raynor, Epstein, and Leonard (2001) support this claim by identifying in their study food choice as associated with dietary variety. Dietary variety occurs when a meal or diet is composed of foods that differ on at least one sensory characteristic (e.g., color, flavor, shape). These authors found that when such dietary variety occurs in successive courses, humans generally consume more foods than in meals where the same food is offered in the same number of successive courses. Although no studies experimentally link this hypothesis with development or maintenance of obesity, these authors suggest that it is associated with increased consumption of sweets, snacks, condiments, entrees, and carbohydrates. This hypothesis can also explain why independent food choices in group homes where variety may be boundless is less healthy than in an institutional setting where food choice behaviors are more limited due to a restrictive diet.

Mercer and Ekvall (1992) compared diets of adults living in group homes to adults living in a care facility in a study assessing the nutritional concerns of individuals with intellectual disabilities. The results indicated that those individuals living in a group home consumed more calories and less nutritionally rich foods than adults living in the care facility. An analysis of the menus revealed that there was no difference in
the nutritional values of the menus across facilities indicating that the real issue of concern is the choices made by adults with disabilities when they are afforded the opportunity to choose, such as in the group home setting versus the large care facility which did not allow food choices (Sutherland et al., 2002). Rimmer, Braddock, and Marks (1995) also suggest that unhealthy lifestyle behaviors are associated with where people with disabilities live, and thus examined the cholesterol, body composition and health behaviors of individuals with mild to severe intellectual disability living in institutions, group homes or with family. Cholesterol levels were analyzed using blood analysis and body composition using skin folds. The results indicate that individuals living in institutions had less percent body fat and lower total cholesterol levels than individuals living in group homes or with family.

These results point toward the need for an environment that promotes healthy behavior (e.g., a group home that provides healthy meals and requires appropriate medical and dental care) and possibly restricts opportunities for unhealthy behaviors (e.g., group home prohibitions against drug use or weapon possession) or for the teaching of skills such as, in a nutrition education program, that would allow individuals with developmental disabilities to live a healthy life without being in a restrictive environment. Sutherland et al. (2002) states that the food “choices may be mediated by the chance to learn about the consequences of health risk behaviors, which is the essence of health promotion” (p. 437). Future interventions should thus focus on the lifestyle behavior of food choice in individuals with developmental disabilities allowing them to learn about the consequences of such behavior in
maintaining good health. With trends toward community-based placements and self-
determination, both trends that, without adequate health promotion programs, may
result in a decrement in health lifestyles.

Teaching individuals with developmental disabilities the importance of proper
nutrition and a healthy diet have important implications in the potential reduction in
weight as well as reducing the risk of preventable diseases through modifying food
choice behaviors. Robbins and colleagues (2002) suggest that having the knowledge
of the theories of obesity should motivate one to commit to a lifetime food
management plan in order to manage weight. Understanding the nutritional value of
certain foods is advantageous because one-third of cancers might be prevented by a
healthful diet (Robbins et al.). Thus, interventions focusing on increasing participants’
nutritional knowledge are necessary for the individual to decide to create food
management plans to maintain weight as well as for effective prevention and treatment
of illness (Beier & Ackeman, 2003). The fact that lifestyle change is motivated not by
knowledge alone but also by supportive social environments validates the use of
school-based nutrition education classes aimed at increasing knowledge and providing
a supportive social environment for those individuals at greatest risk, individuals with
developmental disabilities.

This study evaluated the effects of a school-based health education program on
healthy lifestyle behaviors such as nutritional knowledge, food choice and food
consumption in a population of young adults with disabilities. The program consisted
of educational lectures aimed at providing the students with the necessary knowledge
to begin leading healthy lives, as well as educational activities aimed at promoting the transfer and generalization of such knowledge into healthy lifestyle behaviors. As suggested in the literature, the school-based health education program focused on teaching young adults with developmental disabilities the importance of nutrition and healthy food choices in maintaining proper health, and assessed these behaviors using the suggested strategies of simulations and direct observation. The health education curriculum could ultimately be successfully used in future implementation at a variety of schools whose population consists of individuals with developmental disabilities. This study also indirectly assesses the ability of this population to accurately measure portion sizes and collect self-report data, as well as the use of a similar scoring method to that of Dennison and Dennison (2001) in this population of individuals. This study also attempts to establish whether educational treatment approaches are in fact capable of altering health behaviors of persons with disabilities.
METHOD

Participants and Setting

Approximately 18 participants were selected for the study by recruiting students who were enrolled in a personal hygiene course named Dress for Success. The participants were separated into Delayed Intervention and Experimental groups consisting of 9 participants each. Participants from the Experimental Group were those currently enrolled in the personal hygiene course and participants in the Delayed Intervention Group were those who were previously enrolled in the course who matched on nutrition pre test scores to the other group. The participants were both male and female young adults between the ages of 18 and 26 who have been diagnosed with mild disabilities ranging from Emotional Impairments, Autism, Prader Willi, and Down Syndrome, and who were currently enrolled in the Young Adult Program (YAP), a regional public school program that assists young adults in achieving their high school diploma. Exclusionary criteria included physical impairments that may inhibit their ability to make independent food selections.

The participants in the Experimental Group were selected from those volunteering students who were currently enrolled in the Dress for Success Class at YAP. The class was presented with a brief description of the project and a consent form. Of the 10 students enrolled in this class, 9 volunteered to participate in this experiment. The nutrition education curriculum was taught to all 10 students; however, only the scores of the consenting 9 were reported.
The participants in the Delayed Intervention Group were selected from students who had previously completed the Dress for Success Class, a version that did not contain any nutrition education information. Fifteen students were invited to participate in this experiment and those expressing interest (n=13) were given a nutrition knowledge pretest. Those with nutrition knowledge scores within the range of the nutrition knowledge scores for the Experimental Group were invited to participate. A total of nine students participated in the Delayed Intervention Group.

The study took place in a classroom of the YAP located in downtown Kalamazoo. The health education curriculum was taught in conjunction with two experienced YAP staff members and supervised by the school's principal. The location was selected based on the need for a health education program as specified by the YAP principal. The classroom was similar to other classrooms in that it included student desks, a chalkboard and educational materials.

Informed Consent Process

The researcher indicated to the students during class that she was interested in doing a project about the way people eat. A consent form for the Experimental Group (Appendix A) and a consent form for the Delayed Intervention Group (Appendix B) was handed out to each student, depending on to which group the student belonged. Before the Delayed Intervention Group was exposed to the intervention, participants in that group were given a second consent document similar to the consent document of the experimental Group specifying the intervention conditions. The consent form was read aloud to the students and any questions they had were answered. Those
students wishing to participate were asked to sign and date the form. All students were required to return the consent form when the researcher was finished with the consent process to eliminate the identities of those not willing to participate. The willing students in the Experimental Group then began the pre-measures including the pre-test, 2 menu simulations, daily food logs, and lunch observations. Those students in the Delayed Intervention Group who consented to being a part of the project were given a pre-test. The individual scores were then matched to that of the Experimental Group and those participants matching closely to the Experimental Group scores was also given the remaining pre-measures. Those students who did not match similarly to the Experimental Group pre scores was approached and commended for their knowledge regarding nutrition and debriefed with a list of nutrition counseling centers for them to pursue if interested in learning more about nutrition. It was also conveyed that the course would be available again during another semester for those students who might be interested in enrolling.

At the end of the study all participants were debriefed in a group setting which included answering any questions the participants had about their scores and providing them with a list of resources for local nutrition counseling. This allowed the young adult participants who may have more serious eating habits or disorders to seek necessary treatment. All participants upon completion of the intervention conditions in both groups received a treatment acceptability questionnaire (Appendix C).
Experimental Group

The Experimental Group was exposed to pre and post-tests, menu simulations, daily food logs and intervention conditions. The intervention was a nutrition education curriculum that was modified from a general education classroom by changing the reading level and font, adding guided notes and including more concept definitions. The curriculum consisted of classroom lectures and activities teaching the importance of nutrition for a healthy life. The data were analyzed across time and compared to that of the Delayed Intervention Group in order to evaluate the effects of the intervention.

Delayed Intervention Group

The Delayed Intervention participants were exposed to pre and post-testing conditions of the four dependent variable measures described in a later section and, upon completion of the intervention for the Experimental Group, Delayed Intervention participants were exposed to the same intervention conditions and follow-up conditions as the Experimental Group. These students attended their regular classes and daily schedules while the Experimental Group was in the health education program, after which the students were exposed to the same curriculum. The participants of the Delayed Intervention Group were not allowed to attend or enroll in any separate health education programs during the course of the study. It is noted, however, that not all sources of nutritional information can be controlled. Therefore, these participants did not receive any aspects of the health education program at the time Experimental participants were exposed and were tested using the same pre and
post-tests as well as simulated tests and lunch observations. Also the participants in the Delayed Intervention Group were asked to complete daily self-report food logs similar to all of which were present in all conditions of the Experimental Group.

Materials

Modified Nutrition Education Curriculum

A Modified Nutrition Education Curriculum (Appendix D) was developed by the researcher from various sources (e.g., American Institute for Cancer Research, 2002; Cottrell, Girvan, & McKenzie, 2002; Raynor, & Epstein, 2001) and was in accordance with the Michigan Department of Education guidelines for health education. Similar lecture materials were created and taught by another professional to typically developing 7th graders in a public Michigan school. These materials were modified for use by individuals with developmental disabilities by adapting reading level to 4th grade ability and font size, adding more visual aids and examples such as, pictures and graphics, as well as further defining concepts. Guided notes were also added to the curriculum that allowed students to fill in blanks of overhead lectures in order to aid students with note taking and attention strategies.

Composite Scoring System

The Food Guide Pyramid (FGP) Composite Scoring System was used to assess food consumption and was developed by Dennison et al. (2001). The Composite Scoring System was used to evaluate how well or how poorly individuals eat based on the Food Guide Pyramid. The Food Guide Pyramid was developed by the U.S.
Department of Agriculture in 1992 with support from the U.S. Department of Health and Human Services (Dennison et al.). It has been nationally accepted as a food guidance system and its purpose is to portray a graphic illustration of the dietary guidelines for Americans and to serve as a foundation for nutrition education programs. This scoring system was chosen due to the simplicity of the pyramid and ease with which it can be taught to individuals with developmental disabilities. Moreover, the food guide pyramid was recommended for use by The Centers for Disease Control and Prevention in 1995, which stated that the school-based nutrition education system should focus on the principles contained in the Food Guide Pyramid (Dennison et al.).

The Food Guide Pyramid Composite Score Chart (see Table 2) calculates a composite score based on an individual’s daily caloric consumption of food groups that comply with the Food Guide Pyramid and the corresponding recommended servings of healthy foods (see Table 1). Scores are calculated by (1) recording foods eaten (2) determining which food group or food groups the food belongs to (3) identifying the serving size and amount eaten of each food (4) tallying the number of servings eaten from each food group, and (5) assigning sub-scores to each food group. A caloric value of .5 for each serving of fruits or vegetables and a caloric value of 1 for each serving of breads, meat, milk, fats or sweets is assigned to each of the foods and multiplied by 100 to estimate calories consumed. Points are then totaled and, depending on the amount, are given a descriptor of: 1-25 pts Poor eating, 26-50 pts Fair eating, 51-74 pts Good eating, or 75-100 pts Great eating.
Scores from male participants were analyzed and assigned points using the 2200-calorie level food group point system. Because female participants typically had a lower body weight, all female scores were analyzed using the 1600-calorie level food group point system. This scoring system was used to score the data from self-report daily food logs and lunchroom observations.

Dependent Variables and Measures

The dependent variables of interest were "knowledge" or the ability to describe what is nutritionally appropriate, food choice behaviors, and food consumption. These variables were measured using four procedures: Nutrition Knowledge Tests, Menu simulations, Daily Self Report Food Logs, and Direct Observations.

Nutritional Knowledge Tests

Nutritional knowledge was assessed using pre and post tests to measure the extent to which the participant understands or has the ability to describe the concepts of nutrition. The Nutrition Knowledge Test consisted of 30 multiple-choice and true/false questions presented at a reading level that was appropriate for the participants' level of functioning (Appendix F). The test took approximately one half hour to complete, once before intervention and once after intervention with a one-month follow-up. Teachers read the questions and the answer options (when appropriate) to the students from the overheads and students were then instructed to mark the correct answer on their answer sheets (questions and answers were repeated as needed). The test was designed in accordance with the school's objective based curriculum and the participants' level of functioning. The test covered topics
discussed in the Modified Nutrition Education Curriculum. The test was given at pre, post and follow-up conditions for both groups.

Food Choice Behaviors

Food choice behaviors were assessed by allowing the participants to choose food items from two restaurant menus. The menu simulation test involved the presentation of two separate menus. One menu was from a local restaurant that had an even balance of healthy versus unhealthy foods (50%). The other menu was from a popular fast food restaurant that contained healthy foods but to a lesser extent than the first menu (38%). Each menu was presented to each participant and the participant was instructed to verbally indicate which items he/she would order from that particular menu. The instructions were systematically varied across assessments with some assessments (pre, post and first follow-up) including instructions to indicate which foods you would typically order at this restaurant and some assessment (second and third follow-ups) including instructions to select healthy food items. These simulation tests took place in the classroom and were conducted on an individual basis.

The behavior of the participant consisted of choosing three foods from the menu that was equivalent to one meal for example, choice one would be a house salad with choice two, grilled chicken and choice three, ranch dressing or choice one is a hamburger with choice 2, American cheese and choice three French fries. The researcher took on the role of a waitress asking the participant the necessary questions to complete the three choices during ordering, such as “what would you like for dinner?” “Would you like cheese on that burger?” Or “That comes with two sides,
salad or fries, which would you prefer?" (see Appendix E for a copy of the menus). This was dually beneficial in creating the simulation as similar to the natural environment as possible; real instead of copied menus were used, as well as prompting participants to make choices they might typically make at these restaurants. The menu chosen for the testing procedure was examined and approved prior to simulation by the nutrition expert for an equal balance of healthy, moderately healthy and unhealthy food choices to control for any bias. At that time, a nutrition expert determined which menu options were healthy (2), moderately healthy (1) or unhealthy (0). Each food choice behavior of the participant was scored on a three point scale, a rating of 2 being healthy, 1 being moderately healthy and 0 being unhealthy, based on the scoring system developed by the nutritionist. Average rating of the three choices was calculated for each participant and group averages were used for reporting purposes. No feedback was given to participants regarding their individual choice scores or group scores. However, scores were available for participants at the end of the study if so desired.

Consumption

Food consumption was measured with a Daily Self Report Food Log and via Direct Observation of foods selected and consumed at lunch.

Daily Self Report Food Log

Participants' food consumption was measured using a daily self-report data sheet (Appendix G). The daily food log data sheet was used to fill the first three columns of the data sheet that will be used during lunchtime direct observations when
both were combined for scoring purposes. This was designed so that the students were able to accurately fill out the necessary data sheets pertaining to meals that were not able to be directly observed by the researcher, so that those data could then be entered onto the direct observations data sheet to calculate the composite score.

Participants were asked to document food consumed for all meals, including lunch. Lunch data were compared to the direct observation data as an accuracy check for self-reporting. If a participant was absent on a data collection day they still reported all meals even if they were unable to be apart of direct observation. This allowed a composite food score to be calculated. If a participant was absent and fails to complete the daily food log, their data were removed from the group average.

Participants needing assistance in writing and spelling were allowed aid from staff, parents and researchers in completing food logs. Recall interviews were also performed for students needing assistance in documenting evening meals the day following those meals. During recall interviews the researcher or school staff would approach the student and inquire separately foods and drinks consumed for each meal prompting the participant to remember any snacks or meals.

Both Delayed Intervention and Experimental groups were required to record every day the type and amount of food consumed for a period of one school week before and one school week after intervention, as well as once a week during intervention and a one month follow-up. The participants were trained on how to record such data during one 20-minute food log training session. The training session introduced the food log with an explanation of how important it is to complete during
or immediately after any meal or snack to ensure accuracy without delayed recall. The training session provided an example of a meal and snack and questions and answers to ensure their understanding. They were also taught how to measure the amount of portion sizes and record them. A letter was sent home to the parents asking for their assistance in filling out participant food logs.

In order to increase the behavior of completing and returning the daily food logs, participants were awarded the chance to earn incentives in the form of a lottery. For each food log completed and turned into the researcher, the participant received a ticket whose duplicate was pooled and drawn from at the end of each condition.

Direct Observations

Although self reporting using food logs is an efficient way to obtain information on food consumption not directly observed, self-report methods of data collection may not be accurate measures of data (Spiegler & Guevremont, 2003). Trained observers used the Dennison et al. (2001) data collection sheet (Appendix G) to collect data on direct observation of food consumption at lunchtime. Participants were not aware that they were being observed and if research assistants were asked by participants as to what they were doing, the assistants stated they were there to observe cafeteria procedures.

Observers were trained WMU students or site supervisors, for those YAP students who ate lunch off campus at on the job training sites. Trained observers indicated the participant observed, the date and the observer, as well as second observer at the top of the data collection sheet. The observer recorded each food type
on the participants tray and, during the course of the lunch period, indicated whether
the selected food item was consumed and if so, how much.

Due to the obtrusive nature of observers measuring portion size with the use of
measuring devices a standard visual size was used to record amount. Observers as
well as students were trained to measure portion sizes by comparing amount of food
to different places on their hand. Multiple sources (e.g. American Institute for Cancer
Research, 2002; University of Kentucky, 2003; Weinraub, 1999) recommend
individuals who cannot accurately measure portion sizes, for example, while in
restaurants, use the clenched fist as an approximate measure of one serving size.

There is considerable variability of what constitutes a serving size between
sources, such as nutritional labels, restaurant portions and the Food Guide Pyramid.
Weinraub (1999) discusses that an average woman’s palm of the hand compares to the
size of a three-ounce portion; when closed, the fist represents about a cup; the thumb
tip, a teaspoon; and from the tip to the joint of the thumb, a tablespoon (see Appendix
H for a Serving Size Table comparison from the American Institute for Cancer
Research, 2002). It is not practical to weigh or measure everything before you put it in
your mouth and the hand is always with you (unlike other measuring devices) and is a
way to improve accurate estimation of serving sizes. Therefore, due to its unobtrusive
nature and because it is a source of measure which can be used by observers and
participants without the added intrusion of measuring devices, serving sizes were
determined by observers and participants using the different measures available from
the human hand.
Data obtained for food consumption relied on self report from participants. In order to assess the accuracy of this data a direct observation accuracy check was conducted during school lunches. Direct observers indicated the type and amount of food consumed for participants during school lunches and this was subsequently compared to the participants self report of lunch data by type and amount of food consumed. There was an 84% agreement between what participants were reporting to eat for lunch and what was directly observed across both categories of type and amount. This indicates that we can be 84% confident that what participants were reporting for other meals was accurate and it is only 16% possible participants did not report some foods.

**Composite Scoring Procedure**

Finally, Food consumption data collected via Daily Self Report Food Logs and Direct Observations was calculated based on the amount of servings the person consumes of foods as recommended by the federal government in the Food Guide Pyramid utilizing the composite scoring system developed by Dennison et al. (2001) described earlier. The composite score reflects the combination of the self-report and direct observation data, which combined, makes up one complete day of food choices. No feedback was given to participants regarding scores of food consumption during either of these two measures in order to control for reactivity. Scores were available for participants at the end of the study if so desired.
Interobserver Agreement

Interobserver agreement was calculated by having two trained observers simultaneously record the foods selected and consumed at lunch. Their recordings were then compared for agreements and disagreements on specific foods selected and for the amount of each food. Percentage agreement was calculated by dividing the number of agreements by the number of agreements plus disagreements. Interobserver agreement was recorded during approximately 60% of the lunchtime direct observations. Observer agreement was calculated by dividing the number of agreements on the components of food type and amount, by the number of agreements plus disagreements, and then multiplying by 100%. Observer agreement ranged from 75% to 100%, with a mean of 96% for all participants.

Scoring accuracy for participants testing materials, menu simulation ratings and food log scores were also assessed. A trained observer independently scored a random sample of 30% of all nutrition tests. Accuracy was calculated by dividing the number of agreements on the correct and incorrect answers to the test, by the number of agreements plus disagreements and then multiplying by 100%. Observer agreement ranged from 86% to 100%, with a mean of 95% for all participants.

Thirty percent of menu simulation rating scores were checked by an independent observer. Observer agreement was calculated by dividing the number of agreements on the 0, 1 and 2 ratings for menu items, by the number of agreements plus disagreements, and then multiplying by 100%. Observer agreement ranged from 86% to 100%, with a mean of 96% for all participants.
Interobserver agreement was also calculated to check the accuracy of the scores for the Daily Self Report Food Logs FGP Composite Scoring System. Thirty percent of all food logs were scored by a second independent observer using the same FGP Composite Scoring System utilized to assess the participants’ nutritious level of food consumption. Accuracy was calculated by dividing the number of agreements on servings from each food group, by the number of agreements plus disagreements and then by multiplying by 100%. Observer agreement ranged from 33% to 100%, with a mean of 82%.

Accuracy of participants’ self reported food consumption was also assessed by comparing food reported by participants consumed during lunch with that of direct observation of lunch time food consumption by the trained observers mentioned above. Self report accuracy was calculated using the formula for the two prior agreement checks and ranged from 16% to 100%, with a mean of 84%.

Experimental Design and Phases

A multiple baseline design across groups was utilized to evaluate the effects of the health education program on healthy eating and food choice behaviors across individuals and within groups.

Baseline

During baseline conditions both groups were exposed to nutrition tests, menu simulations, lunchtime observations and asked to complete and return daily food log records. The only programmed contingencies in effect during baseline were tickets that were provided contingent on completing and returning daily food log records.
These tickets were entered into a drawing for $10 gift certificates to a local Target or Best Buy store. Otherwise, participants were asked to continue eating as they normally would have.

**Intervention**

The primary independent variable was the health education curriculum focusing on nutritional information and how to create healthy diets. The goals of the curriculum are outlined in Appendix F. The curriculum was implemented in a classroom setting 3 times per week for a period of 3 weeks to participants in the Experimental Group and at a later time for participants in the Delayed intervention group. The curriculum consisted of lectures, guided notes and daily activities (see Appendix D for an example of each classroom material). The lectures lasted 20-30 min. using overhead transparencies. The participants used guided notes (copies of overhead transparencies) for them to fill in important concepts and aid in increasing participant attention. During the last part of class students were invited to apply their newly learned knowledge and skills to active learning classroom activities. The students in the Experimental Group were instructed to not discuss the information from the health education curriculum with other students not enrolled in the same class in order to ensure treatment integrity.

Although it was not explicitly programmed, some socially mediated contingencies for healthy eating were implemented by peers during the intervention phase. For example, peers were noted to bring bottled water to school in place of soda pop and to apply differential social praise contingent upon food selection and nutrition knowledge.
Because these socially mediated contingencies were not empirically documented or systematically applied by the peers, they are not reported in detail in this experiment.

**Treatment Integrity**

A YAP staff member present in the classroom used a checklist to evaluate treatment integrity each week. A list of topics was given to the available staff in the classroom and that staff member checked off only the topics and activities covered that week during class lectures (see Appendix J for an example checklist). The form also allowed for the staff member to assess treatment integrity by determining the extent to which the goals were met by observing participants’ performance on the daily activities.

Staff reported that all 3 of the requirements were met during baseline, meaning that no nutritional information or scores were provided to participants during baseline by the experimenter. During intervention, class activities and follow-up conditions staff reported a 100% treatment integrity score which denotes researcher compliance with all treatment and activity requirements.

**Treatment Acceptability**

Participants completed the Nutrition Education Class Evaluation (Appendix C) at the end of the study, in order to assess acceptability of the treatment from those experiencing the intervention. This provided social validation information from the consumers of the educational intervention. The survey addressed whether the participants enjoyed the class and would recommend it to a fellow student; how much they felt the class changed the way they eat, as well as the way they feel and think.
about what they eat; and whether or not the social support contingencies present in classroom settings, such as encouragement from teachers and classmates, affected participants’ food choice and consumption behaviors. Participants rated each question on a 5-point Likert scale with 1 being the answer “No, Not at all” to 5 being the answer “Yes, Very much.” Participant average ratings on the survey questions can be seen in Table 4.

**Follow-up**

After the Intervention Phase, classroom activities returned to baseline conditions. Participants completed all dependent variable measures again to assess the immediate effects of the intervention. One month later participants were exposed to all dependent measures again to assess the long term effects of the intervention. One month beyond that, participants completed a third Menu Simulation Assessment that differed from prior Menu Simulations by the inclusion of instructions from the experimenter to make healthy choices rather than just to chose an item they would prefer to consume. A final Menu Simulation Assessment was conducted at the end of the experiment in which participants were provided a brief review of the nutrition class content, instruction to choose healthy food choices from the menus, and specified social as well as tangible contingencies for healthy menu selections. Students were informed that to the extent to which they could accurately make healthy choices they would be given social recognition in the school newsletter as well as certificates of completion of the nutrition class.
RESULTS

Nutritional Knowledge

Experimental Group

Figure 1 presents group averages on each of the three administrations of the Nutrition Knowledge test. During baseline the group average percentage of correct answers on the test was 54% (range: 38%-76%). At post intervention conditions, the mean increased to 71% (range: 49%-95%). This increase was statistically significant, t(8) = -3.596, p<.05, two-tailed. At follow-up conditions the group average percentage of correct answers decreased to 59% (range: 32%-93%). The difference between pre conditions and follow-up conditions was not statistically significant, t(8) = -0.754, p<.05, two-tailed.

Delayed Intervention Group

In Figure 1, the percentage of correct answers on the nutritional knowledge test is depicted for the delayed intervention group. During baseline the group was exposed to the nutrition test on three separate occasions. These scores (62%, 63%, 64%) were combined and the average percentage of correct answers on the test was 63% (range: 38%-81%). At post intervention conditions, the mean percentage of correct answers increased to 84% (range: 65%-97%). This difference was statistically significant, t(8) = -4.363, p<.05, two-tailed. At follow-up conditions the group average percentage of correct answers decreased to 75% (range: 57%-97%). The
difference between average scores from pre to follow-up was statistically significant, 
$t(8) = -4.376, p<.05$, two-tailed.

Food Choice

Experimental Group

The data for choosing food from two separate menus are shown in Figure 2. Data are based on healthy ratings ranging from 0 (unhealthy), 1 (moderately healthy) to 2 (healthy). During baseline, when participants were asked to select three items of food they would typically eat at each restaurant, the mean rating score was 0.7 (range: 0-1.3) for the Wayside West (WW) restaurant menu and 0.3 (range: 0-1) for the McDonald (McD) restaurant menu. At post intervention conditions, the mean rating score for the WW restaurant menu increased slightly to a rating of 0.8 (range: 0-1.3) and was not significant, $t(8) = -1.660, p<.05$, two-tailed. The mean rating score increased to 0.6 (range: 0-1.3) for the McD menu with statistical significance, $t(8) = -0.528, p<.05$, two-tailed. Mean rating for one month follow-up of the WW restaurant menu increased to 0.9 (range: 0-1.7) while mean ratings for the McD restaurant menu increase again to 1.0 (range: 0-1.7). The difference from pre conditions to instruction conditions for the WW menu was not significant, $t(7) = -0.461, p<.05$, two-tailed and for the McD menu was significant, $t(7) = -2.312, p<.05$, two-tailed. The final menu simulation assessment was conducted after a nutrition
education review, instruction to choose healthy foods and social as well as tangible reinforcement contingent upon healthy selections. The mean ratings for the WW restaurant menu was 1.4 (range: 0.3-2) and when compared to pre conditions was statistically significant, $t(8) = -2.808$, $p<.05$, two-tailed. The mean ratings for the McD restaurant menu was 1.4 (range: 0.7-2) and when compared to pre conditions was statistically significant, $t(8) = -5.698$, $p<.05$, two-tailed.

Delayed Intervention Group

Menu simulation assessment data for the delayed intervention group are also shown in Figure 2. Delayed intervention group participants were assessed at three separate occasions during baseline, when participants were asked to select three items of food they would typically eat off each menu. The mean rating score of all three assessments (0.8, 0.5, 0.9) was 0.7 (range: 0-2) for the Wayside West (WW) restaurant menu and the mean rating score of all three assessments (0.1, 0.5, 0.3) was 0.3 (range: 0-2) for the McDonald (McD) restaurant menu. At post intervention conditions, the mean rating score for the WW restaurant menu increased to 1.1 (range: 0-2), difference between pre and post conditions was not statistically significant, $t(8) = -1.929$, $p<.05$, two-tailed. Mean rating score for McD menu also increased to 1.0 (range: 0-2) at post conditions and the difference between pre and post conditions was significant, $t(8) = -4.012$, $p<.05$, two-tailed. Mean rating for one month follow-up of the WW restaurant menu decreased to 0.7 (range: 0-1.7) and to 0.6 (range: 0-1.7) for the McD restaurant menu. A second follow-up was conducted one month later and differed from the first follow-up in that it instructed participants to choose healthy
foods. Mean ratings for the WW restaurant menu increased to 1.4 (range: 1-2) and when compared to pre conditions was statistically significant, \( t(8) = -3.150, p<.05 \), two-tailed, while mean ratings for the McD restaurant menu increased to 1.4 (range: 0-2) and when compared to pre conditions was significant, \( t(8) = -8.242, p<.05 \), two-tailed. Shortly after another follow-up was conducted, this included a nutrition education review, instruction to choose healthy foods and social as well as tangible reinforcement contingent upon healthy selections. The mean ratings for the WW restaurant menu was 1.7 (range: 1-2) and when compared to pre conditions the difference was significant, \( t(8) = -4.783, p<.05 \), two-tailed. The mean ratings for the McD restaurant menu was 1.6 (range: 1-2) and when compared to pre conditions the difference was significant, \( t(8) = -10.930, p<.05 \), two-tailed.

Food Consumption

Experimental Group

Food Consumption Composite scores, a measure of the nutritional value of total daily food consumption for each participant, are depicted in Figure 3, which shows the pre, intervention and follow-up results of the group average Food Guide Pyramid (FGP) composite scores. At baseline, group mean FGP composite score was 47 (range: 23-83), Fair eating, across all five days. These scores increased slightly during the intervention to a group mean of 52 (range: 29-76), Good eating, across all three assessment days. At the follow-up assessment point, intervention group mean FGP composite score remained at 52 Good eating (range: 17-84). The difference between pre and post conditions was not significant, \( t(8) = -1.899, p<.05 \), two-tailed.
Delayed Intervention Group

Figure 3 shows the pre, intervention and follow-up results of the group average Food Guide Pyramid (FGP) composite scores for the delayed intervention group. At baseline, group mean FGP composite score was 49 (range: 10-83), Fair eating, across all 19 days. Group mean FGP composite score during intervention conditions increased to a score of 50 (range: 15-73), but remained at a rating of Fair eating, across all three assessment days. After intervention group mean FGP composite score was 48 Fair eating (range: 13-73). Difference between pre and post conditions was not significant, t(8) = .531, p<.05, two-tailed.
DISCUSSION

The objective of this study was to assess whether a modified nutrition education program would affect a range of measures related to nutrition knowledge and food consumption in a population of young adults with disabilities. Results suggest that this educational program had modest effects on nutrition knowledge, producing increases in participants' ability to describe and correctly answer questions concerning nutritional facts and healthy food choices. The results also show that this educational program had negligible effects on the amount of healthy foods actually consumed by participants on a daily basis. Each dependent variable of interest is different in behavioral repertoire and corresponding maintaining variables from the other dependent variables.

The study documented a significant increase in the participants' ability to describe and correctly answer questions concerning nutritional facts or nutritional knowledge. However, these results did not maintain at high levels over a one-month period. It is possible that the 3 week educational program was neither long enough nor rigorous enough to increase scores higher than a 20% increase and maintain scores at a higher level across time within this population.

There are a number of possible explanations for the lack of durable changes in many of the targeted nutrition behaviors. The act of learning is a complex behavior and incorporates many variables of which it is a function. Skinner (1953) believed that even the term 'learning' is misleading and therefore, for purposes of this discussion,
should be well defined. Learning thus refers to the acquisition, maintenance, and change of an organism’s behavior as a result of lifetime events (Pierce & Epling, 1999) or an enduring change in behavior as a result of experience (Wolery, Bailey, & Sugai, 1988). Based on these definitions learning is a behavior that is a function of change in the organism’s environment or behavior from external variables that maintains over time. One such maintaining variable is that of repetition; repeated exposure to a topic of interest, just as one might practice a specific sport, will speed acquisition and maintenance of the topic. It can be expected then that time would play an important part in the act of repetition; the longer the intervention the more time for repeated exposure to the topic of interest and for reinforcement of the repertoire that is most directly altered by the learning experience. Due to the short duration of this educational curriculum, there may not have been enough repetition of the nutritional information for acquisition and maintenance of nutrition facts.

Learning also involves behavior changes that can contact and be maintained by naturalistic or programmed consequences. For example, a correct answer on a test or during class may result in a higher course grade, a powerful conditioned reinforcer when the learner has an appropriate conditioning history with regard to grades. Unfortunately, the intervention tested in this experiment did not incorporate any contingencies based on participant performance. Participants were not provided with feedback regarding their scores or social praise for correct answers on the test. It is possible that peers provided some differential social consequences based on the target behaviors but this was not directly assessed and based on casual observations, it
appears that such peer mediated contingencies were neither consistently applied or powerful.

Another factor that merits consideration is the absence of mastery requirements for the participants. More specifically, participants were not required to perform at 100% on any of the assessment measures in order to complete the intervention. Absent some level of mastery, over-learning was not able to occur, a condition that contributes to behavioral fluency and promotes maintenance of learned behavior over time and in the face of disruptive influences.

It is also possible that the nutrition education program did not meet the needs of this population because of its brevity. Individual’s with disabilities learn at a slower rate and warrant much repetition (hence the need for special education programs). Some scientists (Bahrick, 1979; Kimble, 1981) have attributed maintenance of knowledge to factors such as frequency, recency, duration and distribution of information as well as biological and cognitive constraints such as, preparedness, negative reinforcement, learned helplessness, memory capacity, encoding and modes of representation. Silver, Feldman, Pablo, Warren and Ruben (2003) hypothesized that impaired “working memory” is a core deficit underlying multiple neuropsychological dysfunctions in patients with schizophrenia and “since working memory capacity is also limited in normal subjects” individuals with disabilities are at a greater disadvantage of acquisition and maintenance of knowledge.

The brevity of the intervention may also have contributed to the moderate but disappointing increase in healthy selections during the menu simulations. This study
showed little improvements in the nutritional value of food choice behaviors when the educational curriculum alone was in effect. A significant increase was seen pre to post for the McD menu across both groups which indicates that the intervention did have an effect on selections made off from this menu and not the WW menu. This may be due to the focus of the intervention topics. An entire lesson was planned around choosing healthy foods at fast food restaurants. It may be that participants did not transfer this knowledge to the full service restaurant WW.

Participants displayed the ability to make moderately healthy choices during the Instruction follow-up in which participants were instructed to choose healthy foods. This condition displays whether or not the participants are able to identify healthy foods on the same test menus. Results suggest that participants in fact are able to identify healthy choices off from each menu with a minimal difference between menus. This indicates that the issue, then, is not a “can’t do” it is a “won’t do” problem. The nutrition education program was successful in altering the ability of participants to identify healthy foods; however, the curriculum was unsuccessful in altering the ability of the participants to transfer this knowledge into their food consumption repertoire as shown by the earlier phase which asked “what would you eat at this restaurant?”

Participants did display the ability (although not at as high a level as might be optimal) to make healthy choices during menu simulation during final follow-up conditions when given a review, instruction and contrived contingencies. The final follow-up included a 30 minute nutrition education review, instruction to choose healthy foods, with reinforcement contingent upon healthy selections. This final phase
proved to be most effective relative to the education alone and education with instruction phases. These results confirm earlier findings from Bahrick (1979) who identified recency of information as playing a major role in the acquisition and maintenance of knowledge in a population of regularly functioning individuals. The results also suggest that in order to get individuals with disabilities to make healthy food selections contrived contingencies must be in place. Thus, some combination of review, instructions and special contingencies may be needed to promote and maintain such behavior changes. These contingencies, however, are most probably absent when a person is actually at one of these restaurants and thus we would have no expectation that the behavior on the Menu Simulations would be a valid measure of what these participants actually did when they ate at McD or WW or similar restaurants.

Visually we can see that the McD menu had a lower rating score at different assessment points across both groups when compared to the WW menu rating scores. This difference in rating scores across menus may be attributed to the difference between the availability of healthy options on each menu. Food choice is affected by the factors availability, opportunity and prompts found in the external environment. Healthy food selections are more likely to be made when such choices are set up to be convenient (readily available). There are more opportunities to make such choices and there are prompts, such as signs or pictures, reminding us to make healthy choices and vice versa. Thus because 50% WW menu was rated as healthy and only 38% on the McD menu was rated healthy, the lower rating scores of participants’ choices on the McD menu can be directly due to the number of available healthy choices.
These results suggest that there are other intervening variables of which food choice is a function that compete with the factor of knowing which foods are good for us or rule-governed contingencies acquired during education alone. Some of these, as discussed earlier, are availability, opportunity, prompts and convenience of food. Other variables that affect food choice that lie in the natural environment are modeling and advertising. These factors affect food choice by displaying what is culturally accepted. The most obvious intervening variable is conditioning history, which refers to the development of taste aversion and preference. The conditioning history exposes individuals to a variety of foods of which they have had contact in the past which allows a person to state rules about the foods they like or dislike. The behavior of choosing food is often immediately followed by the presentation of food (a conditioned reinforcer from repeatedly pairing presentation with taste) and the taste of food, especially food we like, is highly reinforcing. This reinforcement history directly competes with the delayed and probable effects that are often a result of eating a healthy diet. Physiological changes such as a reduction in weight and a reduction in the risk of disease are the most common controlling variables in healthy food selection. However, because these controlling consequences are both delayed and probable, they are not strong enough to compete with the immediate presentation and highly reinforcing taste of food for unhealthy food choices (taste is often equated with foods high in sugar and fat).

These results suggest that simple presentation and acquisition of nutritional facts alone creates only a mild improvement in participants’ ability to make healthy
food choices. Furthermore, the conditioning history of food selection and the current contingencies for food choice also play a major role in unhealthy food choice behaviors, opportunities and prompts (e.g., advertising) in our natural environment also encourage healthy or unhealthy food choices. Finally, the natural gustatory consequences of consuming foods is a factor in promoting consumption of foods high in sugar, fats and salt, all commodities (or stimulus characteristics) that may have acquired powerful reinforcing capabilities over the evolutionary history of the human race. Clearly, a comprehensive program to alter a range of these complex contingencies that influence food selection will be needed to produce clinically significant alternations in dietary intake and to maintain those changes.

The results of this study also depict that a three-week nutrition education program is not significant in altering the foods actually consumed by this population of individuals. The results show negligible effects in the amount of healthy foods consumed post intervention for the experimental group but were not replicated across groups to the delayed intervention group. This observed difference between groups could be due to the concept of inter-subject variability. The participants were different in both groups and were matched only on knowledge scores and not on food consumption scores allowing for some discrepancy between groups regarding this variable. Therefore future study should apply random sampling techniques when assigning groups.

With these results we can conclude that simply learning about which foods are healthy and the importance of nutritiously valuable foods does not change the way
individuals within this population choose and consume food. The term "choice" here is not to be confused with the term "choice" analyzed in the menu simulation test. The behavior of food choice in the testing condition is different from the behavior of food choices made in vivo. This is one limitation to this study. The moderate increase in food choice during simulation conditions does not represent an increase in food choice in the natural environment. Instead, many other controlling variables are responsible for the foods that are chosen and consumed in vivo. These variables include those discussed above regarding food choice in simulation settings, cultural and external factors as well as biological factors. Along with modeling, availability, opportunity, prompts and conditioning history, biological factors of individual food sensitivities and innate food preferences such as sweet tastes and textures of food play an important role in determining which foods are actually chosen and consumed in vivo.

Rules play an important role when choosing which foods to consume during simulation and in vivo. In simulation the anticipated consequence is to answer correctly which is a conditioned reinforcer from previous pairing of social praise. In vivo, the anticipated consequence responsible for the rule governing food choice is the taste of food which is more reinforcing than simply answering a question correctly and much more reinforcing when compared to the delayed and probable effects of eating healthy.

It is important to note that participants in this study had variable control over food options which may have affected the results of this study. Some individuals were living in group homes where meals are pre-planned and yet others were living with
parents or guardians where choices were less restrictive. Previous research regarding living arrangements and diets of individuals with disabilities found that in general, those individuals living in group homes and natural family settings consumed more calories and less nutritiously rich foods than those living in large care facilities (Mercer & Ekvall, 1992). These environments prove to be less restrictive than the environment of large care facilities where meals and food are more restricted along with other risky health behaviors such as smoking. These authors also discovered that individuals living in group homes had paying jobs that allowed them more access to purchase foods outside of the group home. Therefore, although these participants were living in a group home where meals are pre-planned which may be a confounding variable to this study’s results, there is evidence that these participants still have independent access to foods such as vending machines at school and work as well as access to restaurants.

Although this study proved insignificant in altering the choice and consumption of food in-vivo, researchers and staff reported through direct observation a change in fluid intake for most individuals. Prior to the intervention participants consumed large amounts of regular pop. Towards the end of the study participants were consuming less regular pop and replacing it with healthier choices such as diet pop, fruit juice or water. A single dietary change such as a reduction in calories consumed in fluid form is a possible factor in the slight increase observed in food consumption scores for the experimental group.
Treatment acceptability was assessed at the end of each intervention for both groups by the consumer regarding acceptance of the intervention. These results can be seen in Table 4. Ratings included whether participants felt the intervention in fact changed their eating behavior. Participants from both groups rated the intervention highly, indicating the intervention had an effect on their food choice and consumption behavior in vivo, when in fact, the data obtained do not support this positive rating. This interesting finding supports Patterson’s (1982) earlier observation of parent ratings of intervention effects on child behavior showed a highly effective intervention, when in fact, the observed behavior had not changed.
In conclusion, this study, in particular the baseline data, document the relatively poor nutrition knowledge and eating habits of young adults with developmental disabilities. Clearly there is a pressing need for interventions to improve the nutritional status of such individuals and hopefully to avoid or delay some of the health problems associated with poor nutrition. Unfortunately, the nutrition education program tested in this study produced only a moderate change in nutritional knowledge and even more modest changes in food choice behaviors during simulation settings. The intervention proved negligible in altering the behavior of food consumption. This study contributes to the minimal literature available within this field by extending previous studies in the lifestyle behaviors of adults with disabilities. While many of the prior studies reported positive changes in measures of healthy behaviors for the participants (Caspar et al., 2001; Scotti et al., 1997; Tracy et al., 1997), little change was noted herein thus calling into question the reliability of experimental effects reported in previous studies. Previously successful studies utilizing similar intervention methods proved successful in decreasing risky behaviors and increasing knowledge in the areas of AIDS, sexuality and smoking education. Each of these studies utilized a psycho-educational approach in a population of disabled adults reporting an increase in knowledge and reported condom usage and a decrease in number of cigarettes smoked. It is possible that these behaviors, although complex, were more susceptible to changes brought about by an educational
intervention more so than dietary intake behaviors as found by the present study.

These studies also relied on self report methods to measure condom usage and cigarette smoking which may have been an efficient but unreliable method of data collection resulting in inaccurate positive findings. The present studied conducted accuracy checks of self report data and can be confident that the data obtained were highly accurate and thus did not allow for participant self report bias.

The study identifies the different variables involved with the selection and consumption of food and directs future research. This study also displays that psycho-educational approaches are adequate in altering participant knowledge and simulated food choices but that other supplementary variables such as contrived contingencies need to be in place in order to reach higher levels of healthy food selections.

One limitation to this study was the brevity of the intervention. The 3-week program was not long enough to establish and maintain mastery levels of nutrition knowledge, nor would it have been long enough to allow participants to come into contact with the delayed and cumulative naturalistic consequences of altering eating behaviors, namely weight loss, changes in body consumption, etc. Diet and exercise takes approximately 4-6 weeks in order to begin to see results, therefore had the intervention increased the amount of healthy foods consumed the length of the study might not have been long enough to maintain food consumption at healthier levels.

Future research should address these limitations by modifying the educational program to increase efficacy and improve mastery of knowledge content by including contingencies identified in this study as responsible for influencing food selection and
performance. Such contingencies might include bringing more general community interventions in education and media into the more immediate environment for individuals with disabilities. An example would be to create a support system of family, staff, and classmates that would work to support healthy choices and consumption through social praise and recognition. Future studies should also assess the effects of altering the opportunities in an individual’s environment to promote, prompt and make available the ability to consume healthier foods.

Future research should aim to identify a means to shift the control from contrived interventions to more naturalistic contingencies for food selection. Future interventions might be more beneficial to participants if they were conducted in a naturalistic setting such as, grocery stores and restaurants while healthy food choices made in these environments are socially reinforced. Other interventions that may prove effective would be to bring individuals into contact with the delayed benefits of eating a healthy diet in order for the natural contingencies of weight loss and risk reduction to have an effect. It may even be beneficial to consider an intervention that would recondition the participants’ preference in taste of foods in order to increase the amount of nutritiously valuable foods consumed and maintain these behavior changes over time. Clearly a comprehensive program set up to alter a range of the complex contingencies that influence food selection and consumption will be needed to produce clinically significant alterations in dietary intake and to maintain those changes over time.
### Table 1

Number of Recommended Servings per Food Group by Individual Calorie Levels.

<table>
<thead>
<tr>
<th>Food Groups</th>
<th>1600 Calorie Level (1200-1899 calories)</th>
<th>2200 Calorie Level (1900-2499 calories)</th>
<th>2800 Calorie Level (2500+ calories)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Children ages 2 to 6 years, women and older adults</td>
<td>Older Children, teen girls, active women, sedentary men</td>
<td>Teen boys, active men, very active women</td>
</tr>
<tr>
<td>Bread Group Svg</td>
<td>6</td>
<td>9</td>
<td>11</td>
</tr>
<tr>
<td>Vegetable Group Svg</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Fruit Group Svg</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Milk Group Svg</td>
<td>2 or 3</td>
<td>2 or 3</td>
<td>2 or 3</td>
</tr>
<tr>
<td>Meat Group Svg</td>
<td>2</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Total Fat servings</td>
<td>5 or less</td>
<td>7 or less</td>
<td>9 or less</td>
</tr>
<tr>
<td>Total Added Sugar</td>
<td>3 or less</td>
<td>4 or less</td>
<td>5 or less</td>
</tr>
</tbody>
</table>

### Table 2

Food Guide Pyramid Composite Score Chart at the 2200-Calorie Level.

<table>
<thead>
<tr>
<th>Bread Svf</th>
<th>Bread Pts</th>
<th>Fruit Svf</th>
<th>Fruit Pts</th>
<th>Veg Svf</th>
<th>Veg Pts</th>
<th>Meat Svf</th>
<th>Meat Pts</th>
<th>Milk Svf</th>
<th>Milk Pts</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>1</td>
<td>6</td>
<td>1</td>
<td>5</td>
<td>1</td>
<td>5</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>2-3</td>
<td>4</td>
<td>2</td>
<td>13</td>
<td>2</td>
<td>10</td>
<td>2</td>
<td>10</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>4-5</td>
<td>6</td>
<td>3</td>
<td>20</td>
<td>3</td>
<td>15</td>
<td>2-3</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6-7</td>
<td>8</td>
<td></td>
<td>4</td>
<td>20</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8-9</td>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fats Svf</th>
<th>Fats Pts</th>
<th>Sweets Svf</th>
<th>Sweets Pts</th>
<th>Total Cal</th>
<th>Total Cal Pts</th>
<th>Variety # of food groups</th>
<th>Variety Pts</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 or less</td>
<td>5</td>
<td>4 or less</td>
<td>5</td>
<td>1200-1899</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>8 or more</td>
<td>0</td>
<td>5 or more</td>
<td>0</td>
<td>1900-2499</td>
<td>10</td>
<td>2-3</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>&gt;2500</td>
<td>0</td>
<td>4</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5</td>
<td>10</td>
<td></td>
</tr>
</tbody>
</table>

Table 3
Food Guide Pyramid Composite Score Chart at the 1600-Calorie Level

<table>
<thead>
<tr>
<th>Bread Svgs</th>
<th>Bread Pts</th>
<th>Fruit Svgs</th>
<th>Fruit Pts</th>
<th>Veg Svgs</th>
<th>Veg Pts</th>
<th>Meat Svgs</th>
<th>Meat Pts</th>
<th>Milk Svgs</th>
<th>Milk Pts</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1-2</td>
<td>5</td>
<td>1</td>
<td>10</td>
<td>1</td>
<td>6</td>
<td>1</td>
<td>5</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>3-4</td>
<td>8</td>
<td>2</td>
<td>20</td>
<td>2</td>
<td>13</td>
<td>2</td>
<td>10</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>5-6</td>
<td>10</td>
<td>3</td>
<td>20</td>
<td>2</td>
<td>13</td>
<td>2</td>
<td>10</td>
<td>2</td>
<td>8</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fats Svgs</th>
<th>Fats Pts</th>
<th>Sweets Svgs</th>
<th>Sweets Pts</th>
<th>Total Cal</th>
<th>Total Cal Pts</th>
<th>Variety # of food groups</th>
<th>Variety Pts</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 or less</td>
<td>5</td>
<td>3 or less</td>
<td>5</td>
<td>1200-1899</td>
<td>10</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>6 or more</td>
<td>0</td>
<td>4 or more</td>
<td>0</td>
<td>1900-2499</td>
<td>0</td>
<td>2-3</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>&gt;2500</td>
<td>0</td>
<td>4</td>
<td>6</td>
</tr>
</tbody>
</table>

Table 4
Average Participant Rating of Nutrition Education Intervention.

<table>
<thead>
<tr>
<th>Survey Question</th>
<th>Average Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>This class changed the way I eat.</td>
<td>4.3</td>
</tr>
<tr>
<td>This class helped me to eat healthier.</td>
<td>4.5</td>
</tr>
<tr>
<td>This class changed the way I felt about what I eat.</td>
<td>3.8</td>
</tr>
<tr>
<td>This class changed the way I choose what to eat.</td>
<td>4.4</td>
</tr>
<tr>
<td>This class changed the way I think about what to eat.</td>
<td>4.5</td>
</tr>
<tr>
<td>My teachers encouraged me to eat better.</td>
<td>3.6</td>
</tr>
<tr>
<td>My friends/classmates encouraged me to eat better.</td>
<td>3.7</td>
</tr>
<tr>
<td>I encouraged my friends/classmates to eat better.</td>
<td>4</td>
</tr>
<tr>
<td>I liked this class.</td>
<td>4.6</td>
</tr>
<tr>
<td>I would recommend this class to other students.</td>
<td>4.5</td>
</tr>
</tbody>
</table>
Figure 1. Average percentage of correct answers on nutrition test for experimental and delayed intervention groups during pre, post and follow-up conditions.
Figure 2. Average group rating scores of menu choices for both experimental and delayed intervention groups during pre, post and follow-up conditions.
Figure 3. Average food guide pyramid composite scores for both experimental and delayed intervention groups during baseline, intervention and follow-up conditions.
Appendix A

Experimental Group Consent Document
My name is Jada. I am a student at Western Michigan University. I am doing a project about health and nutrition. You are invited to be a part of my project.

**Goal**
What I would like to do is see the way people.

**What will be done and how long?**
For 2, weeklong sessions and one session each week during the class we will watch what you chose to eat and what you eat during lunchtime. We will also watch what food you select off a menu 2 times. You will be in class two hours every other day for at least two months where you will hear and do activities about food choices. You will have to take a test, thirty minutes in long, before and after the study. You will complete and return a daily food log during the 2, weeklong sessions and once a week during the health education class.

**Benefits**
You will be entered to win a drawing each time you complete and return the daily food log. As a result of doing this study you might weigh less and have more energy. Also, by doing this study you may learn about how to choose and eat foods good for you to prevent you from getting sick in the future.

**Risks and Protections**
When you choose and eat your food at lunch you might feel uncomfortable being watched. However, other students will not know who is being watched and why. You might not like filling out the daily food log but the food log will be created as simple as possible. As in all research, things might happen that no one can predict. If anything bad happens to you or if an accident or injury occurs, the right emergency actions will be taken.

**Confidentiality**
All information about you in this study will remain private. No names will be used. By signing this form you will be letting me use your scores for
professional presentations and publications. Any information collected (for example during observations) will remain private.

**Voluntary Participation**

Your participation in this study is completely voluntary; you are free to participate or not or to stop the project at any time without penalty or grade change. At the end of the study, the researcher will answer any questions you have.

**Who to Call With Questions**

If you have any questions about this study you may call Jada Miller at 720-4491. Also, Dr. James Kaye, can be reached at 599-6320. You may also call the Human Subjects Review Board at 387-8293 if questions or problems come up during the study.

This consent document has been approved for use for one year by the Human Subjects Institutional Review Board (HSIRB) as indicated by the stamped date and signature of the board chair in the upper right corner. Do not participate in this study if the stamped date is older than one year.

*Your signature below indicates that you read (or it was read to you) the above information and agree to participate in the study.*

---

**Your Signature**

**Date**
Appendix B

Delayed Intervention Group Consent Document
My name is Jada. I am a student at Western Michigan University. I am doing a project. You are invited to be a part of my project.

Goal
What I would like to do is to see how people eat.

What will be done and how long?
For 2, weeklong sessions and one session each week we will watch what you eat at lunch. You will select food off a menu 2 times. You will have to take a test, thirty minutes long, before and after the study. You will complete and return a daily food log during the 2, weeklong sessions and once a week during. You will not be graded on any of these assignments or lose points for not participating.

Benefits
You will be entered to win a drawing each time you complete and return the daily food log.

Risks and Protections
When you choose and eat your food at lunch you might feel uncomfortable being watched. However, other students will not know who is being watched and why. You might not like filling out the daily food log but the food log will be created as simple as possible. As in all research, things might happen that no one can predict. If anything bad happens to you or if an accident or injury occurs, the right emergency actions will be taken.

Confidentiality
All information about you in this study will remain private. No names will be used. By signing this form you will be letting
Voluntary Participation

Your participation in this study is completely voluntary; you are free to participate or not or to stop the project at any time without penalty or grade change. At the end of the study, the researcher will answer any questions you have.

Who to Call With Questions

If you have any questions about this study you may call Jada Miller at 720-4491. In addition, Dr. James Kaye, can be reached at 599-6320. You may also call the Human Subjects Review Board at 387-8293 if questions or problems come up during the study.

This consent document has been approved for use for one year by the Human Subjects Institutional Review Board (HSIRB) as indicated by the stamped date and signature of the board chair in the upper right corner. Do not participate in this study if the stamped date is older than one year.

Your signature below indicates that you read (or it was read to you) the above information and agree to participate in the study.

__________________________  ______________________
Your Signature               Date
Appendix C

Nutrition Education Class Evaluation
## Nutrition Education Class Evaluation

**Instructions:** Please circle the number from 1 to 5 that best describes the following statements, with 1 being “not at all” and 5 “Very Much.” There are no points for right or wrong answers but please provide honest answers.

1. **This class changed the way I eat.**

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>YES</td>
</tr>
<tr>
<td>Not at all</td>
<td></td>
<td></td>
<td>Don’t Know</td>
<td></td>
<td>Very Much</td>
</tr>
</tbody>
</table>

2. **This class helped me to eat healthier.**

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>YES</td>
</tr>
<tr>
<td>Not at all</td>
<td></td>
<td></td>
<td>Don’t Know</td>
<td></td>
<td>Very Much</td>
</tr>
</tbody>
</table>

3. **This class changed the way I felt about what I eat.**

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>YES</td>
</tr>
<tr>
<td>Not at all</td>
<td></td>
<td></td>
<td>Don’t Know</td>
<td></td>
<td>Very Much</td>
</tr>
</tbody>
</table>

4. **This class changed the way I choose what to eat.**

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td>YES</td>
</tr>
<tr>
<td>Not at all</td>
<td></td>
<td></td>
<td>Don’t Know</td>
<td></td>
<td>Very Much</td>
</tr>
</tbody>
</table>
1. This class changed the way I think about what to eat.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO</td>
<td>1</td>
<td>Don't Know</td>
<td>YES</td>
<td>Very Much</td>
</tr>
</tbody>
</table>

2. My teachers encouraged me to eat better.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO</td>
<td>1</td>
<td>Don't Know</td>
<td>YES</td>
<td>Very Much</td>
</tr>
</tbody>
</table>

3. My friends/classmates encouraged me to eat better.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO</td>
<td>1</td>
<td>Don't Know</td>
<td>YES</td>
<td>Very Much</td>
</tr>
</tbody>
</table>

4. I encouraged my friends/classmates to eat better.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO</td>
<td>1</td>
<td>Don't Know</td>
<td>YES</td>
<td>Very Much</td>
</tr>
</tbody>
</table>

5. I liked this class.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO</td>
<td>1</td>
<td>Don't Know</td>
<td>YES</td>
<td>Very Much</td>
</tr>
</tbody>
</table>

6. I would recommend this class to other students.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO</td>
<td>1</td>
<td>Don't Know</td>
<td>YES</td>
<td>Very Much</td>
</tr>
</tbody>
</table>
Appendix D

Classroom Materials
Sample Lecture

Nutrients

- The substances in food that your body needs to function properly to grow, to repair itself and to supply you with energy.

Nutrition

- The process by which the body takes in and uses food.

Hunger vs. Appetite

- Natural drive that protects you from starvation.
- Your body tells you through hunger when it needs food.
- A desire, rather than a need, to eat.
- It is learned, rather than inborn (natural).
- Shaped by environmental factors and emotions.

Eating Influences

- Culture
- Family and Friends
- Advertising
- Time and Money
- Emotions

Why nutrition is important:

- Maintain Weight
- Increase Energy
- Repair and Protect
- Prevent Diseases
Guided Notes (Example)

Date: ____________________________
Name: ____________________________

______________ is the substances in food that your body needs to function properly to grow, to repair itself and to supply you with energy.

______________ is the process by which the body takes in and uses food.

| VS. |  
| --- | --- |
| • Natural drive that protects you from starvation. | • A desire, rather than a need, to eat. |
| • Your body tells you through hunger when it needs food. | • It is learned, rather than inborn |
| | • Shaped by environmental factors and emotions. |

Factors that influence eating:
• 
• Family and Friends
• Advertising
• Time and Money
• 
• Nutritional

Why Nutrition is so important:
• Maintain ____________
• ____________ Energy
• Repair and ____________
• Prevent ____________
Eating Influences Worksheet

Directions: Identify 5 examples of the factors that influence your eating and three food items that you frequently eat at each. Culture, Family and Friends, Advertising, Time and Money, Emotions are all influences.

Culture/Example _________________________
Food Items:
____________________________________
____________________________________

Family and Friends/Example _________________________
Food Items:
____________________________________

Advertising/Example _________________________
Food Items:
____________________________________

Time and Money/Example _________________________
Food Items:
____________________________________

Emotions/Example _________________________
Food Items:
____________________________________

Personal Profile:

1. What is the healthiest item from each example? _________________________
   _________________________
   _________________________

2. Are these good food choices, why or why not? _________________________

3. What is something that you could eat instead that is healthier? _________________________
Appendix E

Menu Simulation
Menu Simulation Data Sheet

Directions: Participant must choose three food items from a menu equivalent to one meal they would consume at this local restaurant. For Example; 1.) Salad with 2.) Chicken and 3.) Ranch dressing. Or 1.) Hamburger with 2.) Cheese and 3.) Fries.

Wayside West
Food Items Chosen:__________________________

1. ________________________________
   Score: Healthy (2)
   Moderately Healthy (1) or
   Unhealthy (0)
   Please circle one
   0 1 2

2. ________________________________
   0 1 2

3. ________________________________
   0 1 2

Total Score: _______ / 3 = Average rating ____

McDonalds

Food Items Chosen:__________________________

1. ________________________________
   Score: Healthy (2)
   Moderately Healthy (1) or
   Unhealthy (0)
   Please circle one
   0 1 2

2. ________________________________
   0 1 2

3. ________________________________
   0 1 2

Total Score: _______ / 3 = Average rating ____
Buffalo Wings
Meaty fried chicken wings covered with your choice of mild or hot sauce. Served with your choice of dressing and celery sticks - 5.25

Chicken Tenders
Strips of tender chicken breast lightly battered and fried to a golden brown. Served over a Thai salad with choice of barbecue, Hidden Valley® Original Ranch® or honey-mustard sauce - 6.25

Cajun Chicken Tenders
Tender chicken breast strips seasoned with zesty Cajun spices and perfectly broiled. Served over a Thai salad with choice of barbecue, honey-mustard or Hidden Valley® Original Ranch® dressing - 6.25

Buffalo Tenders
Chicken tenders served with our famous hot sauce, tempered with blue cheese dressing and celery sticks - 6.25

Wing Dings
Served with your choice of barbecue sauce or Hidden Valley® Original Ranch® dressing - 5.25

Soup of the Day
Made fresh daily. Ask your server about today’s steaming hot selections. Also serving French onion and chili Bowl - 2.25 Cup - 1.50

Cheese Sticks
Creamy mozzarella in our special golden coating, deep-fried to perfection. Served with marinara or Hidden Valley® Original Ranch® dressing - 5.25

Brew City Fries™
Premium potatoes dipped in a batter made with real draft beer - 3.25

Wayside Nachos
Crisp tortilla chips topped the way you like best. Choose seasoned ground beef or chicken, then add tomatoes and green onions, if you like. Served with salsa and sour cream - 6.25

Potato Skins
Stuffed with bacon, two cheeses, scallions and tomatoes. Served with sour cream - 5.50

Thai Chicken Skewers
Served over crisp lettuce with a light Thai dressing - 6.25

Seafood Crab Rangoon
Served with an orange marmalade sauce - 5.75

Onion Rings
A Wayside original! Hand-cut and beer-battered, then golden-fried. Served on a ring stick - 3.25

Fried Calamari
Lightly floured and fried golden crisp. Served with cocktail sauce - 6.25

Jalapeño Poppers
Zesty jalapeños stuffed with cool cream cheese, served with a hearty Southwestern sauce - 5.25

Brew City Fries™
Premium potatoes dipped in a batter made with real draft beer - 3.25

Cheese Fries
Our golden Brew City Fries® topped with melted mixed cheese - 3.25

Chips and Salsa
Crisp tortilla chips and plenty of salsa for dipping - 2.00

Hidden Valley® and Original Ranch® are registered trademarks of Hidden Valley Foods.
**Beef**

Add a house salad to your dinner for only 1.50.

**New York Strip**
12-oz. sirloin seasoned with Roquefort butter and broiled to your specifications. Served with seasonal vegetables and your choice of potato - 13.95.

**Mom's Famous Pot Roast**
Roast beef slow-cooked until tender. Served with garlic mashed potatoes, seasonal vegetables and fresh bread - 9.95.

**Rib Eye Steak**
12-oz. boneless rib eye steak seasoned with Roquefort butter and broiled to your liking. Served with seasonal vegetables and your choice of potato - 12.95.

---

**Chicken**

**Thai Chicken Pasta**
Thai marinated chicken breast served over cavatappi pasta mixed with a Thai peanut sauce. Served with a garlic stick - 8.95

**Chicken Broccoli Alfredo**
Pan-fried tender chicken served over a bed of fettuccine, tossed with creamy Alfredo sauce and the freshest broccoli. Served with a garlic stick - 9.25

---

**Catch**

**Grouper Fillet**
Tender fillet of grouper seasoned with thyme and lemon basil, then pan-sauteed with lemon and butter. Served with rice - 9.25

---

**Pasta**

**Chicken or Beef Wraps**
Fajita chicken or beef, grilled until tender. Served sizzling in a flour tortilla with grilled onions and green peppers, lettuce and our own special sauce. Served with Brew City Fries* - 6.75

**Wet Burrito**
Your choice of seasoned ground beef or chicken, topped with diced tomatoes and crisp lettuce. Served with salsa and sour cream - 6.95.

---

Where indicated, potato choices include garlic mashed potatoes, baked potato or French fries.
Grilled Marinated Chicken Sandwich
Fresh boneless chicken breast marinated in Italian dressing and served open-faced on a grilled bun with lettuce and tomato - 6.25

The Wayside Reuben
Truly a Wayside classic. Lean corned beef, tangy sauerkraut and three slices of cheese (Swiss, American and Mozzarella) stacked between three pieces of grilled marble rye bread. Finished off with Thousand Island dressing - 6.45

Club Sandwich
Thressed fresh bread with roasted turkey breast, bacon, lettuce, tomato, cheese and mayo - 5.75

BLT with “C”
An old favorite done better. Lightly toasted bread with sliced bacon, lettuce and tomato, plus cheese - 5.25

Grilled Cajun Chicken Sandwich
Zesty! Fresh boneless chicken breast seasoned with hot Cajun spices and grilled to perfection. Served open-faced on a grilled bun with lettuce and tomato - 6.25

French Dip
Tender roast beef sliced thin and piled high on a grilled Wayside bun. Served with au jus - 5.95

The Wayside Sub
Your choice of ham, turkey, roast beef or corned beef on a toasted homemade sub bun. Served with sub seasoning, lettuce, tomato, onion, mozzarella and potato chips - 4.95

Half-sub & chips - 3.25
Half-sub, chips & a cup of our soup of the day - 4.50
Add extra meat to your sub - 1.50

Wayside Steak Burger
Half-pound of lean ground beef charbroiled and presented on a grilled bun with lettuce and tomato. Served with Brew City fries. Try it with cheese or bacon - 5.50
Add cheese (American, Mozzarella or Swiss) - .50
Add bacon - 1.00

Fajita Salad
Beef or chicken grilled with fajita seasoning on a bed of crisp romaine with grilled green peppers, onions, mixed cheese and tomatoes. Served with corn chips and our house dressing made with ranch and salsa - 6.75

Chicken Caesar Salad
Grilled chicken breast topped crisp romaine lettuce tossed with croutons, red onion, Parmesan cheese and our classic Caesar dressing. Served with a warm garlic stick - 6.75

House Salad
Fresh mixed greens tossed with tomatoes, cucumbers, sweet red onions and seasoned croutons. Served with your choice of dressing - 2.25

Grilled Chicken Salad
Italian seasoned chicken breast fillet served over chilled romaine with tomatoes, cucumbers, red onions and croutons. Served with a garlic stick and your choice of dressing - 6.25

Try it with Cajun-style chicken, if you like

A Pizza Tradition
We've been hand-tossing pizza for over 35 years! . .
An original that can only be topped by you!

Choose your favorite toppings:
Pepperoni Ham Ground Beef Italian Sausage
tomato Onion Mushroom Green Olive
Pineapple Bacon Green Pepper Jalapenos

Medium 14" Pizza
Topped with cheese - 9.25
Additional toppings
Choose your favorites - .99 each

Large 16" Pizza
Topped with cheese - 11.75
Additional Toppings
Create your own original. Choose among the toppings listed above - .99 each
Sweets

Bistro Collection
Cheesecake of the Month
Smooth, creamy and delicious! Ask your server for our featured flavor sensation. - 3.50

Warm Chocolate Fudge Cake
Indulge yourself! Rich and moist, topped with chocolate fudge sauce. - 3.50

Miami Ice
A tempting combination of five different liquors, served in a 23-oz. glass

Rum Runner
Captain, banana, blackberry, pineapple, grenadine, and cranberry juice blended and topped with 151

Long Island Iced Tea
The classic mix of vodka, gin, rum, sour mix and Pepsi

Your Favorites
Margarita • Daiquiri • Piña Colada • Martini

Various flavors available. Ask your server for your favorite!

Icy Cold Beer

On tap! At Wayside, we proudly feature at least 16 beers on tap, served in a pint or 25-oz. frosty mug

By the bottle
A wide variety of your domestic and imports available

Taste of the Grape
We suggest you complement your meal with a glass of wine. Enjoy your choice.
Chardonnay
Cabernet Sauvignon
White Zinfandel
Pleasporter
Burgundy
Merlot

Beverages

Pepsi products sold here!
Pepsi, Diet Pepsi, Mountain Dew, Squirt
Sierra Mist, Tonic, Lemonade, Iced Tea and Club Soda

Hot Coffee
Fresh-brewed, regular or decaf

Milk
Got yours?

Chilled Juice
Orange, cranberry, pineapple or grapefruit juice

For your convenience, a gratuity of 15% will be added for parties of eight or more

We welcome MasterCard, Visa, Discover and American Express

Join us Monday thru Saturday, 11:00 a.m. to 2:00 a.m. and noon to 1:00 a.m. on Sunday

Happy Hour! Every Monday thru Friday, 11:00 a.m. thru 7:00 p.m.

Having a party? Have it here! We have the expertise and facilities to accommodate parties of up to 150 people

Wayside has been in operation for more than 40 years. We look forward to you visiting us during the next 40!

Wayside gift certificates are available. They make a convenient and tasteful gift!

www.waysidewest.com
Appendix F

Pre-Post Test
Nutrition

Pre-post Test

Answer the following questions:

1. Which of the following are food groups found on the food guide pyramid: (You may circle more than one)
   a. Pizza  c. Milk  e. Fruit  g. Vegetable
   b. Grains  d. Chocolate  f. Meat  h. Sweets

2. Carrots are an example of the _____________ food group:
   a. Pizza  b. Meat  c. Vegetable

3. Yogurt is an example of the _____________ food group:
   a. Chocolate  b. Sweets  c. Milk

4. Which meal is the worst one to skip?
   a. Breakfast  b. Lunch  c. Dinner

5. Which of the following would be a safe way to lose weight?
   a. Balanced Diet  b. Diet Pills  c. Skipping Breakfast

6. The majority of your diet should come from which food group?
   a. Breads  b. Fruit  c. Sweets

7. The food guide pyramid recommends 2-3 servings a day of which of the following?

8. An adult female needs ___________ calories per day and an adult male needs ___________ calories per day.
   a. 1,000 & 1,400  b. 1,600 & 2,200  c. 2,000 & 2,800

9. A serving size of bread is:
10. An example of a healthy snack is:
   a. Twinkie       b. String cheese       c. Candy Bar

11. Which has the highest amounts of sugar:
   a. Water         b. Diet pop            c. Pop

12. The body gets its best source of energy from.
   a. Protein       b. Water              c. Carbohydrates

13. BMI stands for,
   a. Be More Intelligent       b. Body Mass Index

14. A healthy way to lose weight is ______ pounds per week.
   a. 3-4         b. 5-6               c. 1-2

15. Which is the best source of nutritional information for a specific food?
   a. Commercials       b. a Food Label

16. The two types of Carbohydrates are:
   a. Simple and Complex  b. High and Low

17. Examples of fatty foods are
   a. Chocolate, mayonnaise b. Banana, Baked beans

18. Reaching for a snack because you are bored is a factor of
   a. Feelings         b. Family & Friends c. T.V

19. Skipping lunch because you are a little short on money is a factor of
   a. Culture          b. Family & Friends c. Time and Money
20. Grabbing a pop-tart as you are walking out the door for school is a factor of
   a. Time and Money    b. Culture    c. T.V.

21. Ordering a bag of popcorn at the movies is a factor of___________.
   a. Culture    b. Family & Friends    c. T.V.

22. Trying an unusual sandwich after seeing it on a commercial is a factor of

23. The food guide pyramid recommends you eat 6-11 servings a day of___________.
   a. Fruits    b. Breads    c. Meats

24. The food guide pyramid recommends you eat 2-4 servings of___________. a day.

25. The food guide pyramid recommends you eat 3-5 servings of___________. a day.
   a. Meats    b. Vegetables    c. Dairy

26. Balance, variety and portion size of food is good way to eat healthy.
   a. True    b. False

27. There is nothing on a fast food menu that is healthy.
   a. True    b. False

28. Being overweight can cause heart problems and other diseases.
   a. True    b. False

29. A healthy diet can reduce your risk of cancer, disease and being overweight.
   a. True    b. False

30. Protein is highest in breads and fruits.
   a. True    b. False
Appendix G

Data Collection
**Direct Observation Scoring Sheet**

**Participant:**

Record each food eaten on a separate line.

**Date:**

Record the amount of the food they ate.

**Observer:**

Record the number of servings for each amount in the first seven columns. Next, assign points in the "calories" column.

**IOA:**

**Food Item**

(please specify Main Course)

<table>
<thead>
<tr>
<th>Salad</th>
<th>- Croutons</th>
<th>- Cheese</th>
<th>- Dressing (specify)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>1/2 or all</td>
</tr>
</tbody>
</table>

| Vegetable | 1/2 | 1 |

<table>
<thead>
<tr>
<th>Fruit</th>
<th>1/2</th>
<th>1</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Cottage Cheese</th>
<th>1/2</th>
<th>1</th>
</tr>
</thead>
</table>

| Soup | 1/2 | 1 |

<table>
<thead>
<tr>
<th>Bread/Roll/Muffin</th>
<th>1/2</th>
<th>1</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Chips</th>
<th>1/2</th>
<th>1</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Dessert</th>
<th>1/2</th>
<th>1</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Milk</th>
<th>1/2</th>
<th>1</th>
</tr>
</thead>
</table>

**Total Servings:**

**Points Assigned:**

**Possible Points**

**Composite Score:**
# Daily Food Log

<table>
<thead>
<tr>
<th>Meal</th>
<th>Food Item</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breakfast</td>
<td>Cheerios</td>
<td>1 cup (one fist) or 2 cups</td>
</tr>
<tr>
<td>Lunch</td>
<td>Whole Milk</td>
<td></td>
</tr>
<tr>
<td>Dinner</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Snack</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MEAL</td>
<td>FOOD ITEM</td>
<td>HOW MUCH?</td>
</tr>
</tbody>
</table>
Appendix H

Serving Size Table
## Standard Serving Sizes

<table>
<thead>
<tr>
<th>Food</th>
<th>Serving</th>
<th>Looks Like</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chopped Vegetables</td>
<td>½ cup</td>
<td>½ baseball or rounded handful for average adult</td>
</tr>
<tr>
<td>Raw Leafy Vegetables (such as Lettuce)</td>
<td>1 cup</td>
<td>1 baseball or fist of an average adult</td>
</tr>
<tr>
<td>Fresh Fruit</td>
<td>1 medium piece</td>
<td>1 baseball</td>
</tr>
<tr>
<td></td>
<td>½ cup chopped</td>
<td>½ baseball or rounded handful for average adult</td>
</tr>
<tr>
<td>Dried Fruit</td>
<td>¼ cup</td>
<td>1 golf ball or scant handful for average adult</td>
</tr>
<tr>
<td>Pasta, Rice, Cooked Cereal</td>
<td>½ cup</td>
<td>½ baseball or rounded handful for average adult</td>
</tr>
<tr>
<td>Ready-to-Eat Cereal</td>
<td>1 oz., which varies from ½ cup to ¼ cup (check label)</td>
<td>Deck of Cards or the palm of an average adult</td>
</tr>
<tr>
<td>Meat, Poultry, Seafood</td>
<td>3 oz. (boneless cooked weight from 4 oz. raw)</td>
<td>Deck of Cards or the palm of an average adult</td>
</tr>
<tr>
<td>Dried Beans</td>
<td>½ cup cooked</td>
<td>½ baseball or rounded handful for average adult</td>
</tr>
<tr>
<td>Nuts</td>
<td>1/3 cup</td>
<td>Level handful for average adult</td>
</tr>
<tr>
<td>Cheese</td>
<td>1 ½ oz. (2 oz. if processed cheese)</td>
<td>1 oz. looks like 4 dice or human thumb</td>
</tr>
<tr>
<td></td>
<td>1 cup</td>
<td>Human fist or cupped hand</td>
</tr>
<tr>
<td></td>
<td>1 oz.</td>
<td>Human thumb</td>
</tr>
<tr>
<td></td>
<td>1 teaspoon</td>
<td>Tip of thumb</td>
</tr>
<tr>
<td>Snack Food</td>
<td>1 or 2 oz</td>
<td>1 average adult handful</td>
</tr>
<tr>
<td></td>
<td>3 oz</td>
<td>Palm of an average adult</td>
</tr>
</tbody>
</table>

*Source: U.S. Department of Agriculture*
Appendix I

Curriculum Objectives
Curriculum Objectives

Ultimate goal: To implement health education curricula, instruction and activities that help students with developmental disabilities develop the knowledge, attitudes, behavioral skills, and confidence needed to adopt and maintain nutritionally healthy lifestyles.

1.) Students will be able to accurately define nutrition and nutrients.
2.) Students will be able to identify the difference between hunger and appetite as well as describe the factors that influence dietary choices.
3.) Identify advantages of a healthy diet and implications for future disease.
4.) Students will be able to analyze food labels and identify healthy as well as unhealthy contents of foods.
5.) Students will be able to identify the major essential nutrients and indicate what purpose they serve in maintaining overall health.
6.) Differentiate between complex and simple carbohydrates
7.) Calculate the amount of calories individuals need throughout the day, depending on their weight and activity level.
8.) Students will use goal setting to create a plan to improve their eating and snacking habits.
9.) Identify saturated versus unsaturated fats.
10.) Identify recommended number of daily servings from the food groups in the Food Guide Pyramid, their importance and how to incorporate them into a well balanced diet.
11.) Learn how to keep a daily food log.
12.) Identify ways to eat nutritiously in a fast food restaurant and healthy menu choices.

1.) Define obesity and overweight and their implications on health.
2.) List conditions associated with obesity.
3.) Calculate Body Mass Index (BMI).
4.) Identify major components of effective weight management.
5.) Identify healthy weight loss strategies.
6.) Identify healthy fluid intake.
Appendix J

Treatment Integrity Checklist
### Treatment Integrity Checklist

<table>
<thead>
<tr>
<th>Baseline</th>
<th>Y</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.) No information was provided in regards to nutrition.</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>2.) No feedback was provided on correct food choices during baseline.</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>3.) Participants were not shown Composite FGP score.</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td><strong>Total %</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Curriculum Topics</th>
<th>Y</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.) Definition of nutrition and nutrients identify major essential nutrients and their implications.</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>2.) Differentiate between Hunger and Appetite.</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>3.) Identify Factors that influences our eating.</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>4.) Analyze food labels.</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>5.) Why do people gain weight? Importance of food management.</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>6.) Aspects of the food guide pyramid, recommendations and uses.</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>7.) How to calculate individual calorie needs depending on weight and activity level.</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>8.) How to determine a healthy weight, calculate Body Mass Index (BMI) and associated health risks based on BMI.</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>9.) Teach goal setting plans to improve eating and snacking habits.</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>10.) Definition of Obesity.</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>11.) Smart weight loss strategies.</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>12.) Healthy fast food and menu choices.</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>13.) Differentiate simple versus complex Carbohydrates.</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>14.) Teach goal setting to create a plan to improve their eating and snacking habits.</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>15.) Identify saturated versus unsaturated fats.</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>16.) Identify advantages of a healthy diet and implications for future disease.</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>17.) Learn how to keep a daily food log.</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>18.) Identify ways to eat nutritiously in a fast food restaurant and healthy menu choices.</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>19.) Define Obesity and implications on health.</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>20.) Effective weight management.</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>21.) Identify healthy fluid intake.</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td><strong>Total %</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Class Activities</th>
<th>Y</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.) The participants were able to complete class activities successfully.</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>2.) The participants were able to complete class activities easily.</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td><strong>Total %</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix K

HISRB Approval Letter
Date: October 21, 2003

To: R. Wayne Fuqua, Principal Investigator
   Jada Miller, Student Investigator for thesis

From: Mary Lagerwey, Ph.D., Chair

Re: HSIRB Project Number 03-09-08

This letter will serve as confirmation that your research project entitled “Health Education for Persons with Disabilities” has been approved under the full category of review by the Human Subjects Institutional Review Board. The conditions and duration of this approval are specified in the Policies of Western Michigan University. You may now begin to implement the research as described in the application.

Please note that you may only conduct this research exactly in the form it was approved. You must seek specific board approval for any changes in this project. You must also seek reapproval if the project extends beyond the termination date noted below. In addition if there are any unanticipated adverse reactions or unanticipated events associated with the conduct of this research, you should immediately suspend the project and contact the Chair of the HSIRB for consultation.

The Board wishes you success in the pursuit of your research goals.

Approval Termination: October 15, 2004
BIBLIOGRAPHY


