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## **Application of the Theory of Reasoned Action regarding the behavioral intention to consume five fruits and vegetables a day in a Women, Infants, Children population**

Katherine Michelle Anderson

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To the Graduate Council:

I am submitting herewith a thesis written by Katherine Michelle Anderson entitled "Application of the Theory of Reasoned Action regarding the behavioral intention to consume five fruits and vegetables a day in a Women, Infants, Children population." I have examined the final electronic copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Science, with a major in Health Promotion and Health Education.

Eugene C. Fitzhugh, Major Professor

We have read this thesis and recommend its acceptance:

Bill C. Wallace, Jack S. Ellison

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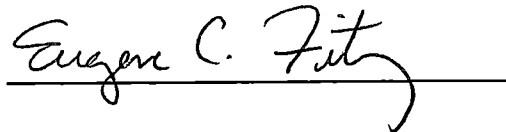
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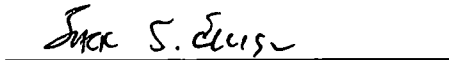
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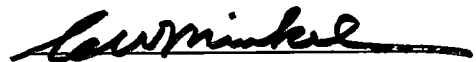


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and recommend its acceptance:



Accepted for the Council:



Associate Vice Chancellor and  
Dean of the Graduate School

**APPLICATION OF THE THEORY OF REASONED ACTION REGARDING  
THE BEHAVIORAL INTENTION TO CONSUME FIVE FRUITS AND  
VEGETABLES A DAY IN A WOMEN, INFANTS AND CHILDREN  
POPULATION**

A Thesis  
Presented for the  
Master of Science  
Degree  
The University of Tennessee, Knoxville

Katherine Michelle Anderson  
May 2000

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## ABSTRACT

The purpose of this study was to determine the intention to consume five servings per day of fruits and vegetables in a Women, Infants and Children (WIC) program. A second purpose was to determine the extent that attitude and subjective norm explain intention to consume fruits and vegetables.

A survey based on the Theory of Reasoned Action (TRA) was completed by female participants of the Women, Infants and Children (WIC) program ( $n = 723$ ) in two East Tennessee counties. At the time of the survey, participants had children that were between the ages of 2 and 5 years old. Participants completed the survey between March 1997 and May 1997 during regularly scheduled Women, Infants and Children (WIC) appointments.

This study concluded that overall female caregivers in an East Tennessee WIC population have a mean value of 5.7 out of a possible 7.0 for themselves and their families to consume five servings of fruits and vegetables a day. Also, this study found that a small but definite relationship exists between behavioral intention and attitude toward fruits and vegetables ( $r = +.33$ ) and behavioral intention and subjective norm with regards to fruits and vegetables ( $r = +.25$ ). Finally, this study found that attitude and subjective norm marginally explain (variance = .155) a person's intention for eating five fruits and vegetables a day.

It was concluded that the behavioral intentions of Women, Infants and Children (WIC) participants to eat five fruits and vegetables a day is strong. This study has provided insight into behavioral intentions of WIC participants to eat five fruits and

vegetables and is recommended as a foundation for future research into the Women, Infants and Children (WIC) program.

## CHAPTER 1

### INTRODUCTION

Fruit and vegetable consumption is associated with lowered risk of certain chronic illnesses (Steinmetz, 1993, 1996). Individuals who consume at least five fruits and/or vegetables a day have significantly lower incidence rates of breast, lung, oral cavity, colon, larynx, esophageal, bladder, uterine, pancreas and stomach cancers (United States Department of Health and Human Services [USDHHS], 1988). Research has shown that diets high in fat and low in fiber increase the risk for colon, breast and stomach cancer (Block, et al., 1992, Steinmetz, et al., 1991). Mortality from cancer accounts for approximately 564,800 deaths per year. Of those deaths, approximately 35% are related to diets that are high in fat and low in fiber (Havas, 1995). Cancer is one of the leading causes of death in the United States, and therefore, its prevention is one of the primary reasons for diets rich in fruits and vegetables.

Although there has been a 17% increase in consumption of fresh fruits and vegetables between 1970 and 1990, overall consumption of fruits and vegetables remains below the Recommended Daily Allowance (RDA) of five servings a day (USDA & Economic Research Service). Between 1994 and 1996, approximately 60% of the American population reported eating fewer than five servings of fruits and vegetables a day (USDHHS, 1998). In spite of availability of fruits and vegetables, the American diet continues to be high in fat and low in fiber (Laforge, 1994, Subar, 1995).

In 1991 a baseline survey conducted by the National Cancer Institute with funding provided by the Produce for Better Health Foundation, found that on average

Americans eat 3.4 servings of fruits and vegetables a day (National Cancer Institute [NCI], 1991). The random survey was conducted using telephone interviews with adults in the United States who were over the age of eighteen.

One of the nutrition goals of Healthy People 2000 is to have at least 75% of the population eating five servings of fruits and vegetables a day (USDHHS, 1990).

Towards this end, in 1991, the National Cancer Institute launched the Five-A-Day initiative to increase the consumption of fruits and vegetables in the United States (NCI, 1991). The goal of the Five-A-Day for Better Health Program is to increase American's consumption of fruits and vegetables to at least five servings per day.

The Five-A-Day program initially began in 1986 with a grant awarded to the California Department of Health by the National Cancer Institute (National Cancer Institute, 1994). The California program was later mass-produced and disseminated nationally. The Five-A-Day program uses the simple nutrition message to eat five fruits and vegetables a day for better health. One goal of the Five-A-Day campaign is to increase fruit and vegetable consumption in populations that report low consumption of fruits and vegetables. Among the groups reporting low consumption of fruits and vegetables are low-income populations, which include women, infants and children (Heimendinger, 1995, USDHHS, 1990) Individuals with low-income and low education levels have a higher incidence of cancer and heart disease, which is associated with poor consumption of fruits and vegetables.

The Women, Infants and Children (WIC) program initially began as a demonstration project in 1968 with the opening of a commissary clinic in Atlanta, Georgia (WIC Nutrition Risk Criteria, 1996). Two goals of the WIC program include

providing supplemental food and nutrition education to women who are at risk for nutritional deficiencies. Specifically, the WIC program provides supplemental foods and nutrition education to low-income women who are pregnant or lactating, infants and children up to five years of age. Since low-income populations' report eating fewer fruits and vegetables, it is important to find what motivating factors could improve consumption of fruits and vegetables in the WIC population. Women with low incomes have been found to consume fewer fruits and vegetables than any other group (Havas, 1995). Using survey information from NHANES, Patterson found that 30% of women in the lowest income bracket had not consumed any fruits in the previous four days. In comparison, only 12% of women in the high-income bracket had not consumed any fruits in the previous four days (Patterson, 1990).

The WIC program serves more than 7.1 million people each year and operates in all fifty states providing the ideal setting for studying consumption of fruits and vegetables in a low-income population. However, the WIC setting, although very widespread, is rarely used for research (Havas, 1997,1998). Several reasons exist for using the WIC setting for research (Havas, 1997). First, women are primary gatekeepers in the home when it comes to food purchases. Second, WIC clients are receiving nutrition education on regular schedule when they (the clients) come in to pick up their WIC vouchers. Third, women enrolled in WIC are often not eating a diet adequate in fruits and vegetables despite receiving nutrition education. Fourth, women who have small children are more likely to make diet related behavior changes in order to benefit their children (Havas, 1997).

## **Purpose**

There is, to the extent that it can be determined, no empirical evidence relative to the intention to or attitude regarding the consumption of five servings per day of fruits and vegetables by women enrolled in a Women, Infants and Children (WIC) program. The purpose of this study was to determine the intention to consume five servings per day of fruits and vegetables in a Women, Infants and Children (WIC) program. Related to this purpose this study examined the extent that attitude and subjective norm can explain this intention to consume fruits and vegetables. To accomplish this, secondary data analysis was conducted on data acquired from a survey of WIC participants in two counties within East Tennessee. The information collected from this research is beneficial in understanding how the attitudes and subjective norms are associated with the intention to eat five fruits and vegetables among WIC participants. Previous fruit and vegetable research within low-income populations has been limited to only fruit and vegetable consumption.

## **The Women, Infants and Children Program**

The relationship between proper nutrition and health became a federal focus in the late 1960's (WIC Nutrition Risk Criteria, 1996). The enactment of the Child Nutrition Act of 1966 brought the name change of school "feeding" programs to child "nutrition" programs. In response to the health problems of low-income pregnant women and children, the Commodity Supplemental Food Campaign began in 1969(WIC Nutrition Risk Criteria, 1996) This USDA program began providing commodities to low-income, nutritionally at risk pregnant women, children under six years old.

Around the same time as the Commodity Supplemental Food Campaign, physicians who worked in public health clinics also started noticing a variety of symptoms among low-income pregnant women and their infants (WIC Nutrition Risk Criteria, 1996). The problems these women and their infants were experiencing, though not diseases seemed to stem from lack of food in the home. The problems included anemia in both mother and infant, abnormal weight gain in women during pregnancy, and low birth-weight infants (WIC Nutrition Risk Criteria, 1996). Various groups, including the public health clinic physicians met in 1968 to discuss the lack of food in the home and possible solutions to this problem. Included in the groups who met were representatives from the U.S. Department of Health, Education and Welfare, the staff of Consumer and Marketing Services, the United States Department of Agriculture (USDA), and the Bureau of Women and Children. A suggestion was made to build food commissaries that would be a part of the health clinics. The commissaries would be stocked with infant formula and commodity foods prescribed by clinic staff. In 1968, the USDA opened the first demonstration of a commissary clinic in Atlanta, Georgia (WIC Nutrition Risk Criteria, 1996).

In 1972, the United States Congress expanded the original commissary clinic in Atlanta by Public Law 92-433 (WIC Nutrition Risk Criteria, 1996). Included within the 1972 law is the requirement that these programs be evaluated and the results of the evaluation be reported to Congress. State health departments received cash grants from the WIC program for operation of the programs. In the beginning, there were three possible ways for participants to receive their WIC benefits. Participants could pick up their food packages at the clinic, have their food delivered or receive coupons

(vouchers) redeemable at the local grocery store. In 1973, between August and December, 216 WIC programs throughout the United States received approval to start providing WIC benefits (WIC Nutrition Risk Criteria, 1996).

The purpose of the WIC program is “to provide supplemental nutritious food as an adjunct to good health care during such critical times of growth and development in order to prevent the occurrence of health problems” (Public Law 94-105). The main qualifying factor for WIC benefits is low income. Eligible person’s for WIC include the following: pregnant women, postpartum and breast-feeding women, infants and children up to five year of age. In addition to income, qualifying factors may also include special medical or nutritional needs. The WIC program now operates in all fifty states and provides three main services: nutrition education, supplemental food, and referrals to health care and social service providers (WIC Nutrition Risk Criteria, 1996).

One legislative requirement for the WIC program is that one-sixth of the WIC program funds are used for nutrition education and nutrition counseling (WIC Nutrition Risk Criteria, 1996). The nutrition education component of the WIC program serves to emphasize the relationship between proper nutrition and good health. Specifically, concerning women, the WIC program places importance on women who are pregnant, postpartum and breastfeeding. The WIC program serves children from birth to five years of age and takes into consideration ethnic and cultural food choices. The nutrition education component of the program assists individuals to make positive food changes in their dietary habits (WIC Nutrition Risk Criteria, 1996).



The supplemental food component of the WIC program provides specific foods rich in nutrients that are usually lacking in the diets of people who are eligible for WIC (WIC Nutrition Risk Criteria, 1996). The particular nutrients the foods provide are Vitamins A and C, iron, protein and calcium. The foods provided by the WIC program vary depending on the needs of the WIC participant. WIC recipients fit into one of seven possible categories. Three of the seven categories are specific to infants and children and three of the seven categories are specific to women. All three, women, infants and children share one category. For infants and children the categories are as follows: 1) birth to three months of age, 2) four months to twelve month old infants, and 3) children age one to five years of age. The three categories for women are 1)-breastfeeding mothers, 2) pregnant women, and 3) postpartum mothers who are not breastfeeding. All three, women, infants and children may also qualify for a package because of special dietary and nutritional needs.

A WIC voucher serves as money for supplemental foods. The WIC voucher or check also provides information on the specific sizes of products that a participant may purchase. Infants receive iron-fortified formula until they are one year of age. After the child reaches one year of age, milk replaces the formula on the voucher. Also included in the WIC package are cereals, fruit and vegetable juices, peanut butter, cheese, eggs, dried peas and beans (WIC Nutrition Risk Criteria, 1996).

The social service component of WIC serves to provide referrals to treatment and counseling for substance abuse. In addition, the social service component of WIC provides referrals to housing assistance, Aid to Families with Dependent Children (AFDC), food stamp programs and Medicaid. All WIC participants are eligible and

receive health care referrals. The health care referrals are helpful in the prevention and treatment of illness. The health care component of WIC provides services such as family planning, smoking cessation and immunizations (WIC Nutrition Risk Criteria, 1996).

The overall goal of WIC is to improve the health and well being of those people who participate in the WIC program. The health benefits for women who participate in WIC include prevention and curing of anemia, prevention of low-birth weight babies, an increase in gestational age and a decrease in pregnancy complications. Children and infants who receive WIC benefits also have overall better health. Normal growth and prevention of growth deficiencies help children who participate in WIC to have normal social, emotional and cognitive development (WIC Nutrition Risk Criteria, 1996).

### **The Theory of Reasoned Action**

Using the Theory of Reasoned Action as a theoretical foundation this secondary data analysis looked at subjective norms and attitudes towards fruits and vegetables as they relate to behavioral intention to eat five fruits and vegetables a day. Little research has been done on attitudes toward fruits and vegetables (Dittus, 1995). In June of 1995, subjects were recruited for a study that looked at beliefs associated with fruits and vegetables consumption (Anderson, 1998) Understanding attitudes toward fruits and vegetables, particularly among low-income populations, may help explain why intake remains low when availability of fruits and vegetables is high. The survey used the Theory of Planned Behavior to assess the perceived barriers to increasing fruit and vegetable consumption The questions used for belief and evaluation were

based upon a framework that came from the Theory of Planned Behavior (Ajzen, 1985). Included in the belief and evaluation section of the survey were questions about the participants' family and friend support with regards to consuming fruits and vegetables (Anderson, 1998). In a previous study by Anderson, over fifty percent of respondents felt they were consuming the right amount of fruits and vegetables. Among the reasons for low intake were, lack of willpower (attitude) and family influence (subjective norm) (Anderson, Lean, Foster, & Marshall, 1993)

Martin Fishbein initially introduced the Theory of Reasoned Action (TRA) in 1967 (Fishbein, 1967) and later expanded the TRA with Icek Ajzen (Ajzen and Fishbein, 1975). Ultimately, the TRA attempts to predict and understand behavior. The TRA has been utilized in health studies for a number of years.

According to the TRA, two independent components, a person's attitude towards a behavior and their subjective norm, predict behavioral intention with regards to a particular behavior (Ajzen and Fishbein). Behavioral intention is a person's intention to perform or not to perform a specific behavior. Figure 1-1, on the following page, provides a graphic depiction of the TRA. The first component, attitude toward the behavior is an evaluation of the positive or negative assessment of the behavior. If the person feels that the behavior will lead to a positive or negative outcome, the person will evaluate the consequences according to whether the assessment of the behavior was positive or negative. The second component, subjective norm, is a person's perception of how significant others will feel toward their performance of the behavior and their desire to please those significant others.

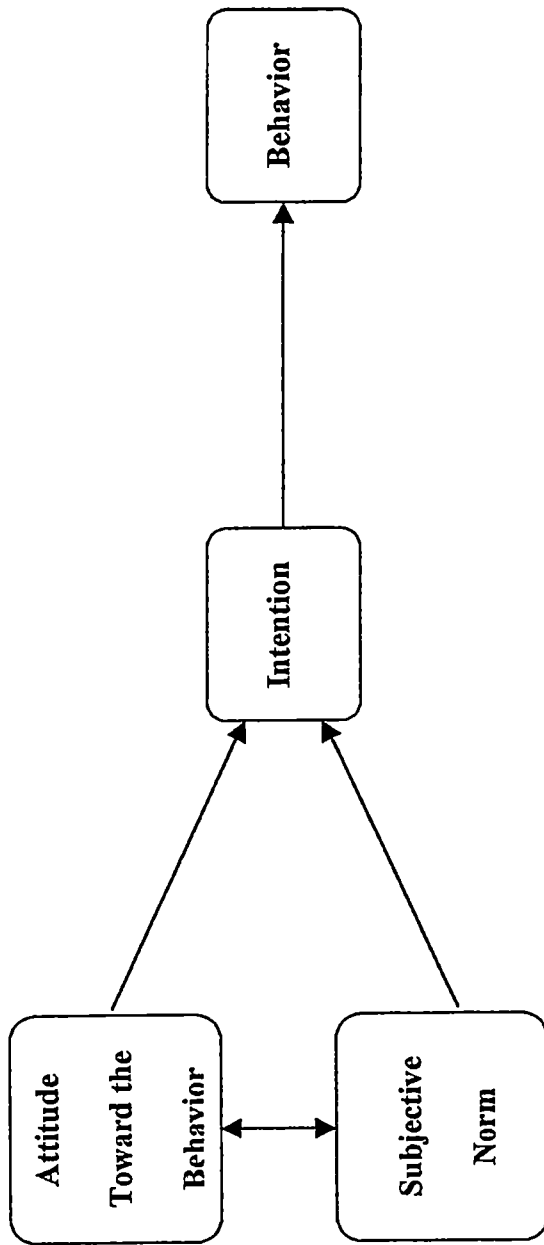


Figure 2-1

Theory of Reasoned Action Diagram (Fishbein and Ajzen, 1980)

The data used for this study was collected as part of a broader fruit and vegetable WIC study conducted between March 1997 and September 1998 (Zemel, 1999). WIC participants were asked to complete a food frequency questionnaire that asked participants how often they consumed a variety of foods. Within the food frequency questionnaire, participants were asked to write down the total number of servings of fruits and vegetables they had consumed within the past 24 hours. Participants were also asked the same information about the number of fruits and vegetables consumed by their children. The TRA component specific to that same study was developed using four focus groups of WIC clients. A total of 20 WIC clients participated in the focus groups that elicited information regarding subjective norms and attitudes with respect to behavioral intention to eat five servings of fruits and vegetables a day. The survey contained thirty questions related to subjective norms, attitudes and behavioral intentions with regards to fruits and vegetables (Zemel, 1999).

### **Research Questions**

Using the Theory of Reasoned Action (developed by Fishbein and Ajzen, 1967, 1975), four research questions were posed regarding the behavioral intentions, attitudes and subjective norms specific to fruits and vegetables of East Tennessee WIC participants.

1. To what extent do WIC participants intend to eat five fruits and vegetables per day?
2. To what degree is attitude towards fruits and vegetables associated with behavioral intention to eat five fruits and vegetables per day within a WIC population?

3. To what degree is subjective norm associated with behavioral intention to eat five fruits and vegetables per day within a WIC population?
4. To what extent does attitude toward fruits and vegetables and subjective norm together explain a person's behavioral intention to eat five fruits and vegetables a day?

### **Delimitations**

There were two delimitations in place during the course of this survey.

1. The study population was limited to female WIC participants residing in two East Tennessee counties who, at the time of the survey (March to May, 1997), had children between the ages of two and 5 years old.
2. The survey instrument utilized for this study was designed to determine the degree to which subjective norms and attitudes are associated with intentions to eat fruits and vegetables. This survey contained thirty questions and used a Likert scale to measure responses.

### **Limitations**

1. During the course of this survey, WIC participants with children between the ages of two and five (years of age) may not have kept their scheduled WIC appointment.
2. Demographic information on age, income and ethnicity was not gathered at the time of the initial survey.
3. Only the surveys of female caregivers were analyzed.

## **Definitions**

**Behavioral intentions:** The intention of an individual to engage or not to engage in a specified behavior (Ajzen and Fishbein, 1975). For the purposes of this study, the person's behavioral intention to eat fruits and vegetables will be measured using question number one from a TRA fruit and vegetable survey (see Appendix A).

**Attitude toward the behavior:** An individual's positive or negative evaluation of performing or not performing that particular behavior of interest (Ajzen, 1988). For the purposes of this study, a person's attitude toward consumption of fruits and vegetables will be measured using questions number three through twenty from a TRA fruit and vegetable survey (see Appendix A).

**Subjective Norm:** An individual's perception of social pressure to perform or not to perform the particular behavior of interest (Ajzen, 1988). For the purposes of this study, a person's subjective norm will be measured using questions number twenty-one through thirty from a TRA fruit and vegetable survey (see Appendix A).

**Theory of Reasoned Action:** A psycho-social theory developed by Martin Fishbein in 1967 and later expanded with Icek Ajzen in 1975 to explain and predict human behavior.

**Fruit:** for the purposes of this study, a fruit is defined as the edible produce or seed of a plant.

**Vegetable:** for the purposes of this study, a vegetable is defined as belonging to plants; especially a plant used as food

**Women, Infant and Children Program (WIC):** Government food subsidy program that provides specific food items to pregnant and/or lactating women, infants to one year of age, and children up to age five (WIC Nutrition Risk Criteria, 1996).

**Five-A-Day:** National campaign started in 1991 by The National Cancer Institute to increase consumption of fruits and vegetables by individuals to five servings per day.

**WIC population:** For the purposes of this study, WIC population were 723 female caregivers of children ages 2 – 5 years who were enrolled in the Women, Infants and Children (WIC) program.

### **Assumptions**

Several basic assumptions were considered throughout the process of collecting baseline data.

1. Participants understood the purpose and procedures of this survey.
2. Confidentiality of the survey was understood by the participants and maintained by the WIC staff.
3. Answers by the participants were honest and were given to the best of their ability.
4. As given, this is a valid TRA survey instrument to measure attitude, subjective norm and behavioral intention concerning eating fruits and vegetables.
5. The procedure for entering survey information was free of coding, editing processing and response errors.

### **Summary**

The relationship between proper nutrition and health became a federal focus in the late 1960's (WIC Nutrition Risk Criteria, 1996). The consumption of fruits and



vegetables is associated with lowered risk of certain chronic illnesses (Steinmetz, 1996). Approximately 35% of cancer deaths are related to diets that are high in fat and low in fiber (Havas, 1997).

Using the Theory of Reasoned Action as a theoretical foundation this secondary data analysis looked at subjective norms and attitudes towards fruits and vegetables as they relate to behavioral intention to eat five fruits and vegetables a day. According to the TRA, two independent components, a person's attitude towards a behavior and their subjective norm, predict behavioral intention with regards to a particular behavior (Ajzen and Fishbein, 1975). This research did not focus on actual consumption of fruits and vegetables, rather this research focuses on the behavioral intentions, attitudes toward, and subjective norms with regards to fruits and vegetables among WIC participants within two East Tennessee counties.

## **CHAPTER II**

### **REVIEW OF THE LITERATURE**

Using a WIC population, the purpose of this study was to expand the Theory of Reasoned Action as it applies to intentions to eat fruits and vegetables. Specifically, among female caregivers of children between the ages of 2 and 5 years old, this study attempted to determine the extent to which subjective norms and attitudes toward fruits and vegetables relate to behavioral intentions to eat fruits and vegetables. The following areas have been included in the review of the literature: the association of fruit and vegetable consumption and disease prevention, current consumption of fruits and vegetables nationally and in Tennessee. Also included in the review of the literature are overviews of the following: 1) the Five-A-Day campaign, 2) the Women, Infants and Children program and 3) the application of the Theory of Reasoned Action in dietary studies.

#### **Chronic Illness and Fruit and Vegetable Consumption:**

Fruit and vegetable consumption is associated with lowered risk of certain chronic illness (Steinmetz, 1993, 1996). Dietary intake of fruits and vegetables have been linked in the possible prevention of several types of cancer including breast, colon, bladder, cervix and thyroid cancers (Steinmetz, 1996). Some of the substances contained in fruits and vegetables are thought to have anti-carcinogenic properties (Steinmetz, 1991, Dragsted, 1993). Intake of fruits and vegetables in the United States is so low the decrease in cancer due to increased consumption of fruits and vegetables would be noticeable (Steinmetz, 1996).

As mentioned earlier, some of the contents of fruits and vegetables are thought to be anti-carcinogenic. Orange vegetables such as sweet potatoes, winter squash and carrots are excellent sources of beta-carotene (Phillips, 1993). Fruits that are rich in beta-carotene include cantaloupe, papaya and mango. Beta-carotene is an antioxidant and protects against free-radical damage. There is an association between cancer and the lack of cell to cell communication (Wolf, 1994). Beta-carotene is sometimes metabolized to vitamin A and vitamin A helps increase cell to cell communication.

Citrus fruits contain high amounts of vitamin C that can function as an antioxidant, and antioxidants are thought to be protective of cell membranes and DNA (National Research Council Committee on Diet and Health, 1989). Vitamin C in citrus fruit is also known for the ability to reduce nitrite, thereby lowering the formation of nitrosamines (National Research Council Committee on Diet and Health, 1989). D-limonene is found in the oils of citrus fruit and has been proven to increase the level of activity of the detoxification enzyme glutathione transferase (Wattenberg, 1987, Wattenberg, 1983). Finally, vitamin C deficiency may allow tumor growth (Cameron, 1979). Included in the category of citrus fruits are oranges, tangerines, mandarin oranges and lemons (Steinmetz, 1996).

Fruits and vegetables are excellent sources of dietary fiber. Dietary fiber is thought to be a protective agent against colon cancer (Jacobs, 1988, Potter, 1990 and Trock, 1990). Dietary fiber increases fecal bulk, which decreases the time between passage of waste to outside the body. The shorter period of contact between possible

carcinogens and the intestinal epithelium is thought to lower the risk of colon cancer (Steinmetz, 1996).

### **Consumption Levels of Fruits and Vegetables:**

The National Cancer Institute survey examines the consumption of fruits and vegetables in the general population of the United States. The findings of this survey show that most Americans do not eat the Recommended Daily Allowance (RDA) of five fruits and vegetables a day. Several reasons for not consuming fruits and vegetables were found by the National Cancer Institute's Five-A-Day baseline survey. The reasons for not eating five fruits and vegetables a day include: lack of knowledge regarding the RDA for fruits and vegetables, like or dislike of taste and failure to establish the habit of eating fruits and vegetables from childhood (Krebs-Smith, 1995). In 1991, the National Cancer Institute findings of a representative sample of 2,811 person's found the average intake of fruits and vegetables to be 3.4 servings a day (Subar, 1995). Again, this survey indicates that intakes of fruits and vegetables among adults in the United States are lower than the RDA of five fruits and vegetables a day.

Factors such as health status, health-related behaviors and psychosocial factors are all key components when looking at the intake of fruits and vegetables (Trudeau, 1998). Marital status and whether or not children are in the home influence the consumption of fruits and vegetables (Tennessee Department of Health, 1999, LaForge, 1994). Additional influences on fruit and vegetable consumption include the following: education, income, gender and smoking status (Subar, 1995). The 1991 NCI survey looked at gender, ethnicity, income, marital status, age, overall health

status, family encouragement and education as factors that affect consumption levels of fruits and vegetables.

Individuals who exercise report consuming approximately .44 more servings of fruits daily and .36 more servings of vegetables daily compared to those individuals who do not exercise (Trudeau, 1998) Sedentary lifestyle is also associated with lower education levels, which is associated with poor diet including a lower consumption of fruits and vegetables (Tennessee Department of Health, 1999). Seventy-two percent of those with only a high-school education report being sedentary, while only fifty-nine percent with some college report a sedentary lifestyle. For college graduates in Tennessee, fifty-seven percent report a sedentary lifestyle (Tennessee Department of Health, 1999).

In Tennessee, seventy-four percent of people report eating fewer than five fruits and vegetables a day (Tennessee Department of Health, 1999). Males and non-whites are at the greatest risk in Tennessee for eating fewer than five fruits and vegetables a day. Seventy-seven percent of men and eighty percent of the non-white population report eating fewer than five fruits and vegetables a day. Seventy-two percent of women and seventy-three percent of Caucasians in Tennessee report eating fewer than five fruits and vegetables a day (Tennessee Department of Health, 1997)

As mentioned earlier, marital status has an effect on consumption of fruits and vegetables. In Tennessee, seventy-eight percent of divorced individuals report consuming fewer than five fruits and vegetables per day. Eighty percent of individuals in Tennessee that have never been married report eating fewer than five fruits and vegetables a day. Eighty-three percent of separated Tennesseans reported

that they did not consume five fruits and vegetables a day. Seventy-two and seventy-three percent, respectively of married and widowed adults in Tennessee report eating fruits and vegetables less than five times per day (Tennessee Department of Health, 1997).

### **Low Income Populations and Consumption of Fruits and Vegetables:**

Income is a very important factor affecting food consumption in the United States. More than 40 million Americans were reported as poor in 1993, putting them at risk for not having financial resources sufficient enough to meet basic food needs (Hallberg, M. and Spitze, R. , 1994). Individuals with lower incomes and less education also tend to consume fewer fruits and vegetables (Patterson, 1998,1990). The NCI survey found that on average, daily fruit and vegetable intake for lower income populations is 3.1 and for higher income populations the daily intake is 3.7 servings per day (NCI, 1991)

Lower income populations also have the problem of access to healthy foods. Problems with access include availability of transportation, accessible grocery stores that carry a variety of foods and ability to carry large amounts of groceries on public forms of transportation (Caraher, 1998). In order to avoid radically changing their diets, families adopt a cheaper version of traditional eating habits (Walker, 1995).

### **The Five-A-Day Initiative**

The Five-A-Day initiative was instituted by the National Cancer Institute (NCI) in 1991 and is a partnership between NCI and the Produce for Better Health Foundation to increase the consumption of fruits and vegetables to five or more servings per day (NCI, 1991). Produce for Better Health represents the industry participants and

consist of supermarkets, commodity groups and other food service distributors (Havas1994).

The baseline survey for the National Cancer Institute found that only 41% of respondents felt that fruits and vegetables helped in the prevention of cancer. The survey also found that most respondents did not know the recommended daily allowance for fruits and vegetables (NCI, 1991). One study estimates that at the time of the baseline survey by the National Cancer Institutes only 8% of Americans thought that at least five servings of fruits and vegetables were needed daily for good health. Americans eating five or more serving of fruits and vegetables daily is in accordance with the nation's health promotion and disease prevention objectives (USDHHS, 1990). Diets high in fat and low in fiber are usually also low in fruit and vegetable consumption, both of which are related to high incidence of certain types of cancers (Havas, 1994). Studies show a relationship between consuming more fruits and vegetables and a lowered risk for certain types of cancer (Havas, 1994).

In May of 1993, the research component of Five-A-Day was started with the funding of nine NCI project grants (Havas, 1995). The funding of these projects allows researchers to look at fruits and vegetable consumption in diverse areas of the population. The grants were given to four schools, three work-site health programs, one religious organization and one to the WIC food assistance program. Each project included extensive collaboration between the public and private sectors. Included in the collaboration for these projects were government, academic and volunteer agencies. These projects symbolize a new model in public health for performing this form of research (Public Health Reports, 1995).

The four schools receiving grants were located in Alabama, Georgia, Louisiana, and Minnesota. The Georgia, Alabama and Minnesota programs focused on elementary aged children, while the Louisiana program focused on high school aged children. The work-site health programs were located in Arizona, Massachusetts, and Washington. In North Carolina, the religious organization program focused on African American adults. The final project was a community based program in Maryland, with interventions targeting women with low-incomes who were enrolled in the Women, Infants, and Children (WIC) program.

### **WIC Research**

Research about consumption of fruits and vegetables within the WIC population is limited. The primary limitation of WIC research regarding fruits and vegetables is the focus on the amount of fruits and vegetables consumed, rather than attitudes toward consumption. Several studies have been generated from the Maryland WIC 5-A-Day Promotion Project (Havas, 1998, 1997, Treiman, 1996). These studies measured attitudes, barriers, and behaviors related to consumption of fruits and vegetables in the WIC populations. The Maryland WIC Five-A-Day program focused on increasing the consumption of fruits and vegetables by WIC participants. Specifically, the program goal was to increase the amount of fruits and vegetables consumed by the intervention participants by one half serving per day. Because information is limited regarding the knowledge, attitude and dietary practices of the WIC population's consumption of fruits and vegetables, the researchers did focus group discussions (FGDs)(Havas, 1997). The focus group's original design was meant to help researchers better understand the shopping, eating and meal preparation



of the WIC population in Maryland. The focus group's findings revealed that most participants did not focus on their eating habits as much as they focused on their children's eating habits. Participants reported eating better while pregnant and then returning to poor dietary habits after delivering their child. In addition to the focus group discussions, intercept interviews were conducted to confirm the findings of the focus group discussions. The intercept interviews were also helpful in filling out the overall consumption patterns of fruits and vegetables in the WIC population.

The design of the intervention was a six-month pilot test in two intervention sites and one control site. One intervention site was (Harford County, Maryland) and the other an urban area (Baltimore City, Maryland). The control site location is in another area of Baltimore City. Participants were all women over the age of 18 and were either enrolled in WIC or had children enrolled in WIC. Participants received five dollars for completing a baseline survey and five dollars for completing a post-test or final survey (Havas, 1997).

The final evaluation survey administered to participants included questions regarding demographics, knowledge, attitudes, and social support and self-efficacy. Additional questions asked who had the responsibility for shopping and preparing food, the stage of dietary change, the consumption of fruits and vegetables and the perceived barriers to consuming fruits and vegetables. The assessment of fruit and vegetable intake over the previous month asked participants seven overall questions that are also included in the NCI national surveys. The seven questions are also included in all of the Five-A-Day research projects (Havas, 1997).

There are numerous useful lessons from the Maryland Five-A-Day Pilot Program (Havas, 1997). First, pilot testing and focus group discussions prior to implementing programs of this nature help to avoid potential problems that may occur in the WIC setting. The number of WIC participants served by a particular site and whether the area is urban is critical. When dealing with inner-city populations, it is more difficult to reach participants by both telephone and by mail. Because each clinic varies, it is important to talk with the staff in order to gain an understanding of the clients and help avoid any potential problems. Incentives to participate in programs are especially helpful in inner-city areas. The Maryland WIC project also kept the educational component simple after finding that too much content was overwhelming to participants. Motivation by clients to participate in a survey and an educational session is necessary in order for programs like this to succeed. The clients enjoy food demonstrations and opportunities for taste testing. Finally, feedback from both participants and WIC staff is also very important to the success of WIC programs to increase fruit and vegetable consumption (Havas, 1997).

An increase in the consumption of fruits and vegetables by both intervention groups was reported at the end of this pilot project. The Baltimore intervention site reported an increase of .2 servings and the Harford County site reported a .5 serving increase in consumption of fruits and vegetables.

### **Theory of Reasoned Action**

The Theory of Reasoned Action originates from Martin Fishbein and was later extended by Fishbein with the help of Icek Ajzen (Fishbein, 1967, Fishbein and Ajzen, 1975). The main goal of the TRA is to predict and comprehend human

behavior. The TRA has been applied as a way of explaining and predicting a variety of health related behaviors including family planning (Fishbein, Jaccard, et al., 1980) and condom use to prevent the spread of HIV/AIDS (Fisher and Fisher, 1992). In association to diet, the TRA has been used to predict milk consumption, (Brewer, 1999), dieting in adolescence, (Conner, 1996), eating at fast-food restaurants, (Saunders, 1990), and intake of fat and sugar (Saunders, 1990).

The TRA asserts that a person's attitude and subjective norm with regards to a particular behavior can predict behavioral intention (Fishbein and Ajzen, 1980).

Another way of explaining the TRA would be to say that two main factors (personal attitude and a subjective or social norm) predict or determine an individual's behavioral intention. An attitude according to Ajzen (1988) is a person's individual response to a specific behavior of interest and the positive or negative evaluation of that behavior. Subjective norm is a person's response to perceived social pressures to perform or not to perform a specific behavior. Behavioral intention is the probability that a person will carry out a particular behavior (Ajzen and Fishbein, 1980).

Detailed explanations for each component of the TRA (attitude, subjective norm and behavioral intention) are given within this chapter.

### **Behavioral Intentions**

According to the TRA, the direct factor determining a person's behavior is a person's intention to carry out or not carry out that particular behavior. Two components, subjective norm and attitude predict behavioral intention. Therefore, social influence (subjective norm) and personal evaluation (attitude) are the two determinants of a person's intention. At times, a subjective norm plays more of a role

in determining intention than attitude, and vice-versa. The weight of each component (subjective norm and attitude) varies depending on the individual. In general for most behaviors, the attitude component of TRA will outweigh the subjective norm component. The following formula represents the TRA (Ajzen, 1988, p. 117):

$$B \sim I = w_1A_b + w_2SN$$

### **Attitude Toward the Behavior**

Attitude toward a behavior, according to Ajzen and Fishbein, is a part of an individual's salient beliefs about the consequences of performing a particular behavior and the assessment of specific outcomes (Ajzen and Fishbein, 1980). Attitude according the TRA is a function of beliefs. If a person believes that a specific behavior will lead to a positive outcome, then that person is said to have a positive attitude with regards to that behavior. In other words, the individual's belief that by performing a particular behavior, a positive or negative outcome will occur. A variance in a person's attitudinal beliefs occurs with the possibility that a specific outcome will happen and is also influenced by whether that outcome will be positive or negative. Attitude according to Ajzen and Fishbein is a learned response toward a behavior (Ajzen, Fishbein, 1975). A person's beliefs that form a particular attitude about a behavior are known as *behavioral beliefs*. Outcome evaluations are beliefs that are valued by the consequences credited to a particular behavior. The following formula summarizes attitude toward the behavior (Ajzen, 1988, p.120).

$$A_b = \sum b_i e_i$$

$A_b$  equals the attitude toward the behavior.  $b_i$  is equal to the probability that the behavior will lead to the  $i$  or outcome, and  $e_i$  is equal to a person's positive or negative evaluation of that particular outcome. Figure 2-1 provides a graphic depiction of the TRA.

### **Subjective Norm**

Subjective norm is an act of the individual's belief that specific significant others think he/she should or should not practice a particular behavior and that individual's desire to adhere to the views of these significant others. Significant others will include mother, father, children, friends, spouse, in-laws as well as those people associated with the behavior in question. Subjective norm looks at the person's social environment as helping to determine behavioral intention. In other words, subjective norm is an individual's perceived social pressure to perform a behavior. If a person feels that those individuals important to them would want them to perform a specific behavior, then they are more likely to do so. The degree to which an individual wishes to please and comply with significant others determines the influence significant others have on the person performing the behavior in question. The beliefs that form subjective norm are known as normative beliefs. The following formula is representative of subjective norm (Ajzen, 1988, p. 121).

$$SN = \sum b_i m_i$$

In this formula, SN is equal to subjective norm,  $b_i$  is equated to normative belief regarding significant others and  $m_i$  is equal to the motivation to comply with that particular significant other.

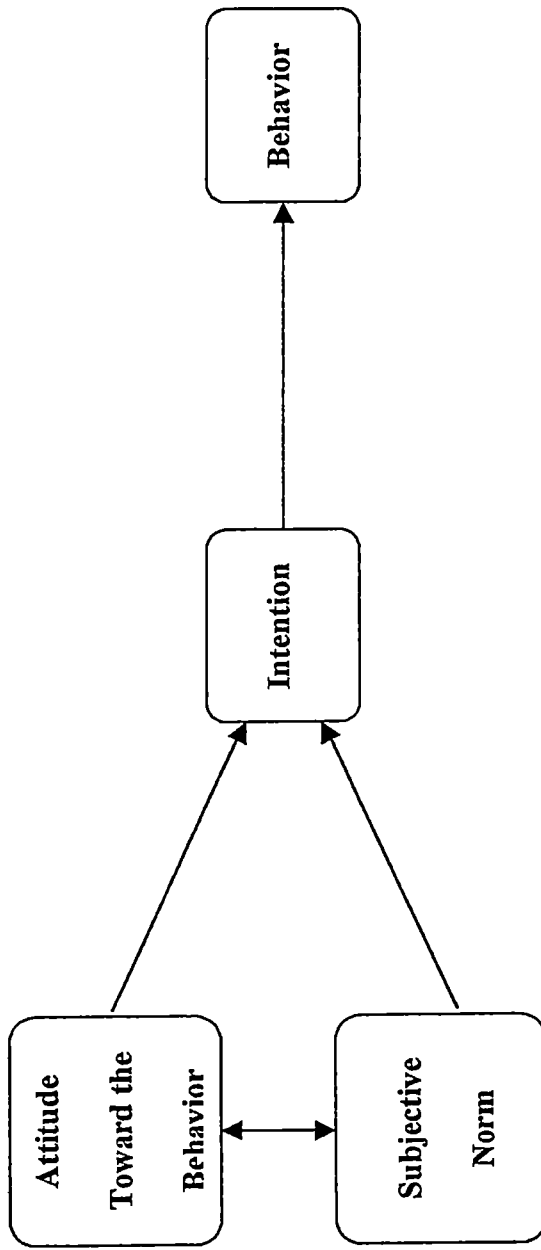


Figure 2-1

Theory of Reasoned Action Diagram (Fishbein and Ajzen, 1980)

### **Application of the Theory of Reasoned Action**

The Theory of Reasoned Action has been successful at predicting intentions regarding several health behaviors (Saunders, 1990). In relationship to diet, TRA has been used to predict eating at fast food restaurants, (Saunders 1990), milk consumption, (Brewer, 1999), intake of fat and sugar, (Saunders, 1990) and dieting in adolescence (Conner, 1996). "Intentions to diet, and restraint were significantly predicted by beliefs about the positive outcomes of dieting, conditions facilitating dieting, and pressure from the media to attain a slim body shape" (Conner, 1996).

### **TRA and Fat and Sugar Intake**

To predict dietary behaviors such as reducing the dietary consumption of fat and sugar, Saunders and Rahilly (1990) have used the TRA. The researchers created a questionnaire to measure the beliefs, values and social influences on intention with regards to reducing sugar and fat intake among college students. The results of this study were that both subjective norm and attitudes predicted a person's intention to reduce fat and sugar in their diets. The subjects of this study were health majors and non-health majors. A difference was noted in the reporting of the two majors. Health majors reported that attitude was more influential in regards to eating fat and sugar. Non-health majors reported that subjective norm played a more influential role over the consumption of fat and sugar (Saunders and Rahilly, 1990).

### **TRA Used to Predict Consumption of Milk**

Dietary application of the TRA has also been used in the prediction of milk consumption among women (Brewer, 1999). Data was collected from 100 women who completed milk attitude questionnaires that were constructed around the TRA. The study found that milk consumption was relatively low, with 23% of women reporting seldomly or never drinking milk. This study suggests that attitude toward drinking milk is most comparable with health and beliefs. In particular, familiarity beliefs were associated with the consumption of milk in the women who participated in this study (Brewer, 1999).

### **TRA Applications for Predicting Consumption of Fruits and Vegetables**

Most studies that research or question attitudes and intentions regarding fruits and vegetables do not apply the TRA model. Diet and nutrition research in which the TRA has been used has not specifically studied the consumption of fruits and vegetables. Currently, studies that specifically use the TRA to predict consumption of fruits and vegetables are limited (Dittus, 1995). Since the introduction of the "Five-A-Day" campaign by the National Cancer Institute, studies and research regarding the amount of fruits and vegetables consumed by Americans have increased significantly (Havas, 1994, 1995), although few use the TRA model.

Anderson, in 1998 reported on the impact on attitudes of a nutrition education intervention to increase fruits and vegetables (Anderson, 1998,). The Theory of Planned Behavior, an expansion of the TRA, was used to look at barriers to increasing consumption of fruits and vegetables. The Theory of Planned Behavior



postulates an additional factor as a determinant of intention (Ajzen, 1988). The additional determinant is perceived behavioral control, which is in addition to the determinants of subjective norm and attitude. The Theory of Planned Behavior does not directly take into account the amount of actual control a person has over a situation but rather, the theory considers the effect of perceived behavioral control. The stronger the individual's perceived behavioral control, the stronger the intention to perform the behavior in question (Ajzen, 1988).

In the study by Anderson, data collection from 104 adults assessed attitudinal variables in relationship to eating more fruits and vegetables (Anderson, 1998). One of the highest-ranking barriers to increasing fruits and vegetables found was family influence. In addition to family influence, cost and lack of will power ranked high among barriers to consuming fruits and vegetables. For the study, the assessment of behavioral belief used fourteen questions. The questions focused on increasing fruits and vegetables, and specifically related to heart disease, weight control, shopping for food, taste and cost of food, vitamin and mineral intake, cancer, nutrition, family and friend support and ease of preparing and cooking.

### **Summary**

Eating fruits and vegetables has been linked in the possible prevention of various types of cancer (Steinmetz, 1996). Because the intake levels of fruits and vegetables are so low in the United States, a decrease in cancer due to the increased consumption of fruits and vegetables would be noticeable (Steinmetz, 1996). The National Cancer Institute examined in their Five-A-Day baseline survey reasons for not eating five fruits and vegetables a day. The reasons for not eating five fruits and vegetables a

day include: lack of knowledge about the RDA for fruits and vegetables, and failure to establish eating fruits and vegetables from childhood (Krebs-Smith, 1995).

The Five-A-Day initiative began in 1991 and is a partnership between the Produce for Better Health Foundation and the National Cancer Institute (NCI) (NCI, 1991). In May of 1993, the Five-A-Day research component began with the funding of nine NCI project grants. One of the grants was for the Maryland Women, Infants and Children (WIC) program. Numerous studies have been generated from the Maryland WIC 5-A-Day Promotion Project (Havas, 1998, 1997, Treiman, 1996). Because of limited information regarding knowledge, attitude and practices of consumption of fruits and vegetables among the WIC population, it was necessary for the researchers to do focus group discussions. These studies are useful at establishing need for more studies that focus on more than increasing consumption levels of fruits and vegetables. Specifically, these studies are the beginning for research into not only the WIC participant knowledge, but also attitudes and social support for the WIC population concerning the consumption of fruits and vegetables.

One theory that tries to predict and comprehend human behavior is the Theory of Reasoned Action (Fishbein, 1967, Fishbein and Ajzen, 1975). The TRA asserts that a person's attitude and subjective norm with regards to a specific behavior can predict behavioral intention (Fishbein and Ajzen, 1980). The direct factor in determining behavior according to the Theory of Reasoned Action (TRA) is a person's intention to perform or not perform a particular behavior. Two components predict behavioral intention and they are attitude toward the behavior and subjective norm concerning the behavior. Attitude is part of an individual's salient belief about the consequences

of carrying out a specific behavior. Subjective norm looks at the person's social environment to determine behavioral intention (Fishbein and Ajzen, 1975).

The Theory of Reasoned Action has been successful at predicting intentions regarding several health behaviors (Saunders, 1990). The TRA has been used to predict various diet issues including the following: eating at fast food restaurants, (Saunders 1990), milk consumption, (Brewer, 1999), intake of fat and sugar, (Saunders, 1990) and dieting in adolescence (Conner, 1996). Research within the WIC population is generally limited to specific consumption levels of food and not the attitudes or social environment.

## **CHAPTER III**

### **METHODOLOGY**

The purpose of this study was to extend the Theory of Reasoned Action (TRA) within a WIC population as it applies to the intention to consume five fruits and vegetables. Specifically, this study determined the extent to which subjective norms and attitudes toward fruits and vegetables relate to behavioral intentions to eat five fruits and vegetables a day among female care-givers with children ages 2 to 5 years old who are WIC participants. Secondary data analysis was conducted on data acquired from a survey of WIC participants in two counties within East Tennessee. The information from this research should be beneficial to nutrition educators in understanding what the behavioral intentions are of WIC participants toward consuming fruits and vegetables. By knowing the behavioral intentions of WIC participants' nutrition educators may then be able tailor nutrition messages that help increase intentions by WIC participants to meet the dietary guidelines for fruits and vegetables.

#### **Subjects**

The subjects in this study were female caregivers, with children between the ages of 2 and 5, who were participating in the Women, Infants and Children (WIC) program in two East Tennessee counties. Seven hundred and twenty-three subjects completed a TRA survey between March and May, 1997 during regularly scheduled WIC appointments.

## **Survey Instrumentation**

The TRA fruits and vegetables survey was designed to extrapolate information on the intentions, attitudes, and subjective norm regarding the consumption of fruits and vegetables within a “Five-A-Day for Better Health Evaluation Project” funded by the Centers for Disease Control and Prevention (CDC) (Zemel, 1999). The purpose of this CDC funded project was to evaluate the effectiveness of a Five-A-Day intervention to increase consumption of fruits and vegetables within a Nutrition Education Center that provided a Five-A-Day intervention to increase consumption of fruits and vegetables. The nutrition education center provided the 5-A-Day intervention in a group setting as opposed to a traditional Five-A-Day WIC counseling session, which provided in a traditional one-on-one format.

The fruits and vegetables survey administered within this project was designed by the Co-Principle Investigator of the “5-A-Day for Better Health Project”, Dr. Eugene Fitzhugh, University of Tennessee, Department of Health and Safety Sciences (See Appendix A). The development of the survey took place through four focus groups and pilot testing conducted in a WIC clinic located in East Tennessee.

The TRA survey instrument utilized in the “5-A-Day for Better Health” project collected data during a pretest and posttest related to a participant’s intention to eat five fruits and vegetables a day, attitude and subjective norm with regards to eating five fruits and vegetables a day. Specifically, this survey instrument used questions based on Fishbein and Ajzen’s Theory of Reasoned Action (Fishbein and Ajzen, 1975). The instrument contained thirty questions utilizing a Likert scale (Dignan, 1975). The Theory of Reasoned Action assumes that behavioral intention is

influenced by two separate components, a person's perceived subjective norm and a person's attitude toward a behavior (Ajzen and Fishbein, 1980)

Survey question number one assessed a person's behavioral intentions to eat five fruits and vegetables a day (See Appendix A). The answer to survey question one was used to answer the first research question posed by this study. For the purpose of assessing the TRA in relationship to fruits and vegetables, questions from the survey will be measured in the following manner: questions number 3 through 20 assess a person's attitude toward fruits and vegetables. Questions number 21 through 30 assess a person's subjective norm regarding fruits and vegetables (See Appendix A).

The following is a breakdown of the measurement of each construct.

1. **Behavioral Intention**--- Question number one of the survey measures a person's intention to eat five fruits and vegetables a day. Response ranges are from extremely likely to occur to extremely unlikely to occur (see Appendix A).
2. **Attitude toward the behavior**—The measurement of this construct utilizes 18 questions. The 18 questions are paired to measure 9 distinct beliefs that participants may have toward fruits and vegetables. The questions are paired as follows: questions number 3 and 11, 4 and 12, 5 and 13, 6 and 14, 7 and 15, 8 and 17, and 9 and 18, and questions 10 and 19. For instance, question number 3 asks about the participant's belief about preventing cancer, and question number 11 asks the participant if they agree or disagree that fruits and vegetables prevent cancer. Questions 5 and 13 measured the participant's belief about improving.

eyesight and the role of fruits and vegetables. Responses to these questions were placed on a seven-point Likert scale. Participants were asked if they felt eating fruits and vegetables would help to provide adequate levels of fiber and vitamins, to maintain weight, to reduce the risk of cancer, to improve eyesight, to be difficult to get children to eat and to provide a healthy snack alternative. The seven responses for the attitude questions were as follows: extremely good to extremely bad, extremely healthy to extremely unhealthy, extremely beneficial to extremely harmful and extremely agree to extremely disagree (see Appendix A)

3. **Subjective Norm** was measured by 10 questions starting with question number 20. Questions 20 through 24 assessed if the participant wanted to please a particular significant other. In this section, participants were asked in the first five questions their perception of people who were important to them (the participants) would want them to eat five fruits and vegetables a day. This included the participants' mother, partner (significant other), mother-in-law, the participants' children and the WIC nutritionist. Questions 25 through 30 measured to what degree the participant wanted to please that particular significant other. For example, question 21 asked the participant "My spouse or boy/ girl friend thinks that my children and I should eat five fruits and vegetables a day" and question 26 asked the participant "Generally speaking, I want to do what my spouse or boy/ girl friend thinks I should do". Combined, these two questions assess the participant's perception of what the significant other thinks and if the participant wishes to please this particular significant other. The responses for subjective norm questions were as follows: extremely agree to

extremely disagree and does not apply. All questions in this survey have a possible response of neither (see Appendix A).

### **Data Collection**

Data collection took place between March and May 1997 during a regularly scheduled WIC appointment time. Two surveys were administered to participants, a food frequency questionnaire and the Theory of Reasoned Action fruit and vegetable survey. The Theory of Reasoned Action survey, which was utilized in this present study, took approximately eight minutes to complete. The Theory of Reasoned Action and the food frequency together took approximately twenty minutes to complete. A total of 723 participants from the two counties completed this survey. Approximately one-third of the participants completing the survey were from a control county of the original study and the other two-thirds of the participants were from an experimental county. Either a nutrition educator or a research assistant provided the explanation and administration of the Theory of Reasoned Action fruit and vegetable survey for the project. All eligible participants signed an informed consent form associated with the "Five-A-Day for Better Health Project" (See Appendix B).



## **Treatment of the Data**

### **Coding**

Survey responses were coded with numerical values from 1 to 7. The positive responses were coded with higher numerical values (numbers 5,6 and 7) and the negative responses were coded with a lower numerical values (numbers 1,2 and 3). Items that were left blank or did not apply to the participant were coded as missing. For example question number 21 asks the participant “My spouse or boy/girl friend thinks that my children and I should eat five fruits and vegetables a day”. If the participant was a single parent, the option of “does not apply” would be checked. The option of “does not apply” was also given as an option on questions 23, 24, 26, 28 and 29 (see Appendix A). In order to maintain confidentiality, a client identification number was assigned by the WIC clinic and used to identify participants in the survey.

### **TRA Scales**

This study utilized a series of scales to assess a subject and overall attitude and subjective norm, to eat 5 fruits and vegetables a day. Scales were created using a combination of questions from the TRA survey. It was not necessary to create a scale for behavioral intention in this study because behavioral intention was measured using only the first question from the TRA survey (See Appendix A). Therefore, the numerical value received for question one would represent the score for behavioral intention. Numerical values for each question ranged from one to seven. If, for example, a respondent answered that they extremely agreed with a statement on the survey, the point value for this response would be seven. If, for example, a person

responded that they extremely disagreed with the statement on the survey, the point value for this response would be one.

The scales utilized within this secondary data analysis utilized several steps (Litwin, 1995). First, the numerically coded values discussed earlier for attitude questions were multiplied with the corresponding attitude question to compute a score for that particular attitude. For example, in the survey, question 3 corresponded with question 11. If the point value for question 3 was seven and question 11 had a point value of seven then the total for this pair was forty-nine. Second, the score or sum from the first step was then divided by seven, which would give a score between 1 and 7. This process was completed for all nine pairs of attitude questions. After completing this process, all nine were added together for a possible total ranging from nine to sixty-three. This total was then divided by the total number of paired attitudes, nine. The final answer had a possible value between one and seven and represented the participant's total attitude (Litwin, 1995).

Similarly a scale was created in order to determine a participant's overall or total subjective norm (Litwin, 1995). Again, point values from one to seven were assigned for each subjective norm question. This score or point value was then multiplied with the corresponding subjective norm question. For example, question number 23 corresponded with question number 28. If the value for question number 23 equaled five and the point value for question 28 equaled seven then the total for this pair would be 35. This score would then be divided by seven. This process was completed for all five pairs of subjective norm questions. Totals from each pair were then added together to get a point value between five and thirty-five. This score was

then divided by five (the number of paired subjective norm questions) to get a score from one to seven. This final score between one and seven represented the participant's total subjective norm (Litwin, 1995).

### **Analysis**

The research questions in this study were analyzed using Pearson Product Moment Correlation coefficients and linear regression (Hatcher and Stepanski, 1994). Pearson Product Moment Correlation coefficients were utilized to assess the strength of a relationship among two variables. The first relationship and the second research question in this particular study is the strength of the relationship between behavioral intention to eat five fruits and vegetables a day and attitude toward eating five fruits and vegetables a day. The second relationship and the third research question is between behavioral intention to eat five fruits and vegetables a day and subjective norm with regards to eating five fruits and vegetables a day. The correlation between these two variables may be either a positive correlation or a negative correlation (Hatcher and Stepanski, 1994). A positive correlation means that as the value of one variable goes up so does the value of the other variable. For example, suppose that a researcher wishes to test the hypothesis that there is a positive correlation with a person's attitude toward eating fruits and vegetables and a person's behavioral intention to eat fruits and vegetables. In other words, a prediction is made that the more positive a person's attitude toward eating fruits and vegetables, the more positive that person's behavioral intention will be to eat fruits and vegetables. A negative correlation means that as one variable goes up (increases), the other variable goes down (decreases). For example, suppose that a researcher wishes to test the

hypothesis that as consumption of fruits and vegetables goes up, the incidence of cancer goes down. This would be a negative correlation.

In order to use Pearson correlation, the two variables must be either an interval scale or a ratio scale of measurement (Hatcher and Stepanski, 1994). An interval scale of measurement is the same throughout the full range of the scale, but does not contain a true zero-point. For instance, in an interval scale the distance between an attitude score of 2.4 and 3.4 is the same as the distance between a 3.4 and a 4.4. By saying that an interval scale does not have a true zero-point, this means that a score of zero does not necessarily mean that a person does not have an attitude. A ratio scale of measurement contains all the characteristics of an interval scale of measurement, but also has a true zero point. In this particular research study, the variables are behavioral intention, attitude and subjective norm

Linear regression estimates the dependence of one or more independent variables on the dependent variable (Hatcher and Stepanski, 1994). The use of linear regression is to estimate or predict the form of a relationship. Linear regression assumes that a straight line is appropriate for explaining the average relationship between two variables for a population. For this particular research study, the dependent variable is behavioral intention and the independent variables are attitude toward the behavior and subjective norm.

In order to depict linear regression, two variables, paired measurements, are plotted on graph paper. Placing a point on a graph represents each pair of findings. In this research study, the dependent variable in the first set is behavioral intention (plotted on the y-axis) and the independent variable is attitude (plotted on the x-axis)

In the second set, behavioral intention is again the dependent variable and subjective norm is the independent variable.

The first research question, which queried the extent that WIC participants intend to eat fruits and vegetables, was answered using the score from the first survey question (see appendix A). The creation of a scale was not required to determine behavioral intention because only one survey question was used to determine overall intention. The second research question looks specifically at the association of intention to eat fruits and vegetables and attitude toward fruits and vegetables (see Appendix A). Research question three looks at the relationship between behavioral intention to eat fruits and vegetables and subjective norm regarding fruits and vegetables (see Appendix A). Pearson Correlation's were calculated for research questions two and three.

Linear regression was used to answer the fourth research question which focused on how well subjective norm and attitude explain WIC participant's intention to eat fruits and vegetables. The dependent variable in research question 4 is behavioral intention and the independent variables are subjective norm and attitude toward the behavior. This research question was answered using all survey questions with the exception of survey question number two. All data from this study was analyzed using SAS version 6.12 (SAS Institute Inc. 1990)

### **Summary**

The data for this research is part of a "Five-A-Day for Better Health Project" conducted within the two East Tennessee counties (Zemel, 1999). Data for this research was collected from female caregivers, with children between the ages of 2

and 5, who were participants in the Women, Infants, and Children program (WIC), between March and May, 1997 in two East Tennessee counties. Using the Theory of Reasoned Action (TRA) fruit and vegetable survey from the “Five-A-Day for Better Health Project”, three behavioral constructs, behavioral intention, attitude toward a behavior and subjective norm were measured to answer four research questions. The research questions in this study were answered using the following statistical procedures: Pearson correlation coefficient, linear regression and mean.

## **CHAPTER IV**

### **FINDINGS**

The purpose of this study was to apply the Theory of Reasoned Action (TRA) as it pertains to the intention to consume five fruits and vegetables a day among WIC participants. To accomplish this, secondary data analysis was conducted on data acquired from a survey of Women Infants and Children participants in two East Tennessee counties. This chapter presents the findings of this study.

The participants in this study were female caregivers with children, (between the ages of two and five years old), who were participants in the Women, Infant and Children (WIC) program between March and May 1997. A total of 723 participants completed a TRA survey between March and May, 1997 during regularly scheduled WIC appointments.

#### **Results**

Four Theory of Reasoned Action (TRA) research questions were posed and answered by this study. The first research question was to determine to what extent WIC participants intended to eat five fruits and vegetables a day for the next six months. To answer this research question, an overall mean was calculated for intention to eat five fruits and vegetables. Numerical responses ranged from one to seven on a Likert scale, with one being extremely unlikely to occur and seven being extremely likely to occur. The overall mean for behavioral intention to consume five fruits and vegetables a day for the next six months was 5.65 with a standard deviation of 1.32, where the maximum value could have been 7.00.

Attitude was measured by 16 questions that measured eight beliefs on a scale of 1-7 with 7 being the more positive response. For the purpose of this study an overall scale was created by summing all eight attitude related beliefs. The overall mean for the attitude scale was 41.25 with a standard deviation of 7.34. The range for the attitude scale was 2.57 to 56.0. Table 1 shows the mean and standard deviation for each individual attitude belief. The highest score among individual attitude beliefs was that eating fruits and vegetables would provide adequate amounts of vitamins and minerals. The mean for this belief was 6.3 with a standard deviation of 1.0 (see Table 1). The mean for attitude that eating five fruits and vegetables will prevent cancer in a WIC population in two East Tennessee counties was 5.3 on a scale of 7.0 with a standard deviation of 1.7 (see Table 1). The mean for attitude that eating five fruits and vegetables a day help to will help maintain weight in a WIC population was 5.6 on a scale of 7.0 with a standard deviation of 1.4. It was found by this study that the mean attitude that eating five fruits and vegetables a day would improve eyesight was 5.5 on a 7.0 scale with a standard deviation of 1.4. The mean for the attitude that eating five fruits and vegetables a day would provide adequate amounts of fiber was 6.0 on a 7.0 scale with a standard deviation of 1.1. Women in this study had a 6.0 on a 7.0 scale and a standard deviation of 1.2, that eating five fruits and vegetables a day would provide them with a healthy snack alternative (see Table 1).

Women in this study had a mean attitude that eating five fruits and vegetables a day would make preparing meals easier of 3.2 with a standard deviation of 1.6 on a scale of 7.0. The women in this study had a mean attitude score of 3.5 (standard



Table 1: Mean and total scores of attitudes and subjective norm beliefs

| <b>Attitude Beliefs</b>  | <b>N</b>     | <b>Mean</b> | <b>(SD)</b>  |
|--|--------------|-------------|--------------|
| Fruits and vegetables will prevent cancer                                    | 700          | 5.3         | (1.7)        |
| Fruits and vegetables will help maintain weight                              | 712          | 5.6         | (1.4)        |
| Fruits and vegetables will improve eyesight                                  | 713          | 5.5         | (1.4)        |
| Fruits and vegetables will provide adequate amounts of vitamins and minerals | 713          | 6.3         | (1.0)        |
| Five fruits and vegetables a day will provide adequate levels of fiber       | 713          | 6.0         | (1.1)        |
| Five fruits and vegetables a day will make meal preparation easier           | 715          | 3.2         | (1.6)        |
| Five fruits and vegetables a day will provide a healthy snack alternative    | 715          | 6.0         | (1.2)        |
| Getting children to eat five fruits and vegetables a day will be challenging | 716          | 3.5         | (2.1)        |
| <b>Overall attitude belief</b>   |              | <b>41.3</b> | <b>(7.4)</b> |
| <br>   |              |             |              |
| <b>Subjective Norm Belief</b>  | <b>N</b>     | <b>Mean</b> | <b>(SD)</b>  |
| Significant other would want me to eat five fruits and vegetables a day      | 575          | 3.8         | (2.0)        |
| My children think we should eat five fruits and vegetables                   | 711          | 3.4         | (2.3)        |
| My mother thinks we should eat five fruits and vegetables                    | 584          | 4.1         | (1.9)        |
| My mother-in-law thinks we should eat five fruits and vegetables             | 496          | 3.5         | (2.0)        |
| My WIC nutritionist thinks we should eat five fruits and vegetables          | 709          | 5.9         | (1.3)        |
| <b>Overall subjective norm belief</b>  | <b>Total</b> | <b>18.0</b> | <b>(7.6)</b> |

deviation of 2.1) on a 7.0 scale that getting their children to eat five fruits and vegetables a day would be challenging (see Table 1).

Table 1 also shows the mean and standard deviation for each of the five individual subjective norm beliefs. The overall range for the subjective norm question responses was 2.0 to 35.0. The overall mean for scaled subjective norm question responses was 17.97 with a standard deviation of 7.56. The highest score for individual subjective norm beliefs was that the WIC nutritionist would want them to eat five fruits and vegetables a day. The mean for this belief was 5.9 with a standard deviation of 1.3. The lowest score for individual subjective norm belief was that the children would think they should eat five fruits and vegetables a day. The mean for this belief was 3.4 with a standard deviation of 2.3.

The findings of this study show that women in a WIC population in two East Tennessee counties have a mean score for subjective norm concerning their significant other of 3.8 and a standard deviation of 2.0 on a 7.0 scale. This study also found a mean of 3.5 on a 7.0 scale with a standard deviation of 2.0 for participants believing that their mother would want them to eat five fruits and vegetables a day (see Table 1).

Using the above attitude and subjective norm scales, research questions number two and three could be answered. Specific to the second research question, the relationship of attitude to behavioral intention, a moderate relationship was found as reflected by a Pearson Product Moment correlation of 0.33 ( $p = 0.0001$ ). The third research question, the relationship of subjective norm and behavioral intention, had a weak but significant relationship with a Pearson correlation of 0.25 ( $p = 0.0001$ ).

The final research question in this study was answered using linear regression. This examined the extent that attitude toward eating five fruits and vegetables and subjective norm together relate to a person's behavioral intention to eat five fruits and vegetables a day. Table 2 shows the results of the linear regression analysis of attitude toward behavior and subjective norm on behavioral intention. As noted by this table, the model was significant ( $p = 0.0001$ ). However, only 15.6 % of the variance associated with behavioral intention was explained by the two factors, leaving 84.4 % unexplained attitude and subjective norm.

### **Summary**

This chapter reported the results of four research questions that applied the Theory of Reasoned Action to intentions to eat five fruits and vegetables a day among WIC participants. An overall mean was calculated for the participant's in the survey to answer the first research question which was the intention of WIC participant's to eat five fruits and vegetables a day for the next six months. To answer research questions number 2 and 3, Pearson correlations were calculated. Finally, linear regression was used to determine the extent that attitude toward fruits and vegetables and subjective norm related to behavioral intention to eat fruits and vegetables.

Table 2. Results of regression analysis of attitude toward the behavior and subjective norm on behavioral intention.

| Source of variation | Degrees of Freedom | Sum of Squares | Mean Square | F Value | p*     | r <sup>2</sup> |
|---------------------|--------------------|----------------|-------------|---------|--------|----------------|
| Model               | 2                  | 191.97         | 95.99       | 64.99   | 0.0001 | .1555          |
| Error               | 706                | 1042.74        | 1.48        |         |        |                |
| Corrected Total     | 708                | 1234.72        |             |         |        |                |

\*Statistically significant at  $p \leq .05$

## CHAPTER V

### SUMMARY, CONCLUSIONS, AND DISCUSSION

The purpose of this study was to investigate the capacity of the Theory of Reasoned Action (TRA) to predict behavioral intentions of WIC participants to eat five fruits and vegetables per day. Presented within this chapter is (1) an overview of the objectives for this study, (2) a summary of the methods for this study, (3) the results and conclusions and (4) the recommendations for further research.

#### Methods

The subjects included in this study were female caregivers of children ages 2 to 5 years old who were participating in the Women, Infants, and Children (WIC) program between March and May of 1997 in two East Tennessee counties. The survey used in this study was part of a "Five-A-Day for Better Health Evaluation Project" funded by the Centers for Disease Control and Prevention (CDC) study (Zemel, 1999). The TRA fruit and vegetable survey instrument, located in Appendix A, solicited information on behavioral intentions, attitudes and subjective norms concerning the consumption of fruits and vegetables from Women, Infants, and Children (WIC) program participants. Data were collected from WIC participants during regularly scheduled WIC appointments and entered into SAS version 6.12 statistical software (SAS Institute Inc. 1990).

The theoretical constructs in this study were based on the Theory of Reasoned Action (TRA) (Fishbein and Ajzen, 1975). Constructs related to the Theory of Reasoned Action (TRA) included intention to eat five fruits and vegetables a day, attitude toward eating five fruits and vegetables a day, and subjective norm to eat five

fruits and vegetables a day. The constructs were measured using a series of scales to assess overall attitude toward eating five fruits and vegetables and subjective norm to eat five fruits and vegetables a day. It was not necessary to create a scale to measure behavioral intention because in this study behavioral intention to eat five fruits and vegetables a day was measured using only one question. A mean value was computed for all participants based on their responses to survey question number one. Pearson correlation coefficients were computed to determine the relationship between behavioral intention to eat five fruits and vegetables a day and attitude toward fruits and vegetables. Pearson correlation coefficients were computed to determine the relationship between subjective norm and behavioral intention. Linear regression was used to test the extent that attitude toward fruits and vegetables and subjective norm with regards to fruits and vegetables explain a person's behavioral intention to eat five fruits and vegetables per day.

### **Conclusions**

The following conclusions are offered based on the findings of this study.

1. Overall, female caregivers in an East Tennessee WIC population have a mean value of 5.7 out of a possible 7.0 for themselves and their families to consume five servings of fruits and vegetables a day
2. A definite but small relationship ( $r = +.33$ ) exists between behavioral intention and attitude toward eating five fruits and vegetables a day within this WIC population.
3. A definite but small relationship ( $r = +.25$ ) exists between behavioral intention and subjective norm concerning eating five fruits and vegetables a day.

4. Attitude and subjective norm together marginally explain (variance = .155) a person's intention for eating five fruits and vegetables a day.

### **Discussion and Implications**

This study attempted to provide an understanding of WIC participants behavioral intentions to eat five fruits and vegetables based on the Theory of Reasoned Action (TRA) (Ajzen and Fishbein, 1980). This was the first study to assess fruit and vegetable consumption using the Theory of Reasoned Action (TRA) within a Women, Infants, and Children (WIC) program setting. Prior to this study, research about fruit and vegetable consumption within the WIC population has been limited to primarily the amount of fruits and vegetables being consumed by the WIC population (Havas, 1997). Because of low income, participants in the Women, Infants and Children (WIC) program are considered a high risk group for not eating five fruits and vegetables a day (WIC Nutrition Risk Criteria, 1996). This research provided insight into the behavioral intentions of WIC participants to eat five fruits and vegetables a day.

The findings for this study revealed that participants of the Women, Infants, and Children (WIC) program have strong behavioral intentions to consume five fruits and vegetables a day for the next six months. This implies that nutrition educators in a Women, Infants, and Children program setting could expect a high level of compliance with behavioral consumption of five fruits and vegetables a day.

The attitude toward fruits and vegetables in this study were more strongly associated with behavioral intention than the subjective norm beliefs related to fruits and vegetables. By understanding attitudes, WIC nutritionists will be able to develop

nutrition education materials that are more applicable in the WIC setting. The findings in this study regarding subjective norm are similar to other studies that utilize the Theory of Reasoned Action (TRA). It is also noted by Ajzen and Fishbein that subjective norm generally has less bearing on behavioral intentions than that of attitude on behavioral intention (Fishbein and Ajzen, 1980). Applications of the Theory of Reasoned Action (TRA) and condom use also report lower association between subjective norm and behavioral intention (Fisher and Fisher, 1992). Brewer (1999) also found that subjective norm did not have a significant effect on behavior when using the Theory of Reasoned Action to determine intention of women to drink.

The level of variance for behavioral intention for this study is low in comparison to other Theory of Reasoned Action (TRA) based surveys which focus on diet. This study found that 15.6% of the variance for behavioral intention to eat five fruits and vegetables a day could be explained by attitude and subjective norm. Brewer (1999) found a variance between 45% and 67% in milk consumption by women depending on the milk product. Fat and sugar intake in a Theory of Reasoned Action (TRA) based study on college students demonstrated 41% of the variance could be explained (Saunders, 1990). Several possibilities exist for explaining the low variance calculated in this study. First, no other variables were introduced into the Theory of Reasoned Action (TRA) model. Demographic information was not taken from participants at the time of data collection for this survey. Also, the entire Theory of Reasoned Action (TRA) was not utilized. Second, using the Theory of Planned Behavior (TPB) would perhaps enhance the level of behavioral intentions explained (Ajzen, 1985). The Theory of Planned Behavior would incorporate the self-efficacy



of the Women, Infants, and Children program participants into the behavioral intention equation. It is also possible that this survey did not capture salient beliefs that are more reflective of attitude and subjective norm. Finally, fruits and vegetables may be too broad of a food group to capture. Perhaps in future studies fruits and vegetables could be placed in separate categories.

### **Recommendations for Further Study**

The following recommendations for further research specific to Women, Infants, and Children (WIC) populations are suggested:

1. In the future when conducting similar studies to this one, solicit demographic information from the participants. This will provide for complete information concerning the varying ethnic groups, age groups and size of families represented in the WIC program. Obtaining demographic information will also provide information specific to consumption of fruits and vegetables within ethnic groups, age groups, etc.
2. Conduct a study among WIC participants using the complete Theory of Reasoned Action (TRA). This would include asking questions about the performance of the actual behavior (eating five fruits and vegetables). This will provide for additional information beyond attitude and subjective norms concerning fruits and vegetables on how WIC participants behavioral intentions are determined for eating five fruits and vegetables a day.
3. Conduct a study among WIC participants using the Theory of Planned Behavior (TPB). This will allow for insight into the perceived barriers and

self-efficacy of WIC participants concerning the consumption of fruits and vegetables.

### **Summary**

This study investigated the capacity of the Theory of Reasoned Action (TRA) to predict behavioral intention of WIC participants to eat five fruits and vegetables a day. This chapter presented a summary of the methods used for this study, the results, conclusions and recommendations for further research. Data were collected from Women, Infants and Children (WIC) participants and entered into SAS statistical software (SAS Institute Inc. 1990). It was concluded that the behavioral intentions of Women, Infants, and Children (WIC) participants to eat five fruits and vegetables a day is strong. This study has provided insight into behavioral intentions of WIC participants to eat five fruits and vegetables a day. It is therefore recommended that this research be used as a foundation for future Women, Infants, and Children (WIC) program research.

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## **APPENDICES**

**Appendix A.**



1) I intend for myself, and my children, to eat at least five fruits and vegetables a day for the next six months?

LIKELY \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ UNLIKELY  
extremely quite slightly neither slightly quite extremely

---

2) My children and I eating five fruits and vegetables a day is... (please answer all three ratings below)

LIKELY \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ UNLIKELY  
extremely quite slightly neither slightly quite extremely

BENEFICIAL \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ HARMFUL  
extremely quite slightly neither slightly quite extremely

HEALTHY \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ UNHEALTHY  
extremely quite slightly neither slightly quite extremely

---

3) The prevention of cancer is...

GOOD \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ BAD  
extremely quite slightly neither slightly quite extremely

---

4) Maintaining a desirable weight is ...

GOOD \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ BAD  
extremely quite slightly neither slightly quite extremely

---

5) Improving eyesight is ...

GOOD \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ BAD  
extremely quite slightly neither slightly quite extremely

---

6) Getting an adequate level of vitamins and minerals is ...

GOOD \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ BAD  
extremely quite slightly neither slightly quite extremely

---

7) Getting good amounts of fiber is ...

GOOD \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ BAD  
extremely quite slightly neither slightly quite extremely

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8) Eating healthy snack alternatives is ...

GOOD \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ BAD  
extremely quite slightly neither slightly quite extremely

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9) Foods that take a long time to prepare are ...

GOOD \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ BAD  
extremely quite slightly neither slightly quite extremely

10) Children eating all of their food is ...

GOOD \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ BAD  
extremely quite slightly neither slightly quite extremely

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11) By eating five fruits or vegetables a day, my children and I will reduce our risk of getting cancer.

AGREE \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ DISAGREE  
extremely quite slightly neither slightly quite extremely

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12) By eating five fruits or vegetables a day, my children and I will be more likely to get to good weight levels

AGREE \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ DISAGREE.  
extremely quite slightly neither slightly quite extremely

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13) By eating five fruits or vegetables a day, my children and I will improve our eyesight.

AGREE \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ DISAGREE  
extremely quite slightly neither slightly quite extremely

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14) By eating five fruits or vegetables a day, my children and I will ensure that we get adequate levels of vitamins and minerals.

AGREE \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ DISAGREE  
extremely quite slightly neither slightly quite extremely

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15) By eating five fruits or vegetables a day, my children and I will help us get adequate levels of fiber.

AGREE \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ DISAGREE  
extremely quite slightly neither slightly quite extremely

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16) My children and I eating several fruits a day will make it easier for me to prepare meals.

AGREE \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ DISAGREE  
extremely quite slightly neither slightly quite extremely

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17) By eating five fruits or vegetables a day, my children and I will get a healthy snack alternative.

AGREE \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ DISAGREE  
extremely quite slightly neither slightly quite extremely

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18) My children and I eating several vegetables a day will take a longer time to prepare our meals.

AGREE \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ DISAGREE  
extremely quite slightly neither slightly quite extremely

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19) Getting my children to eat five fruits and vegetables a day will be a challenge

AGREE \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ DISAGREE  
extremely quite slightly neither slightly quite extremely



20) Most people who are important to me think that my children and myself should eat five fruits or vegetables a day?

AGREE \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ DISAGREE  
extremely quite slightly neither slightly quite extremely

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21) My spouse or boy/girl friend think that my children and I should eat five fruits and vegetables a day. (Note: If this question does not apply to you, please check this box  and go to the next question).

AGREE \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ DISAGREE  
extremely quite slightly neither slightly quite extremely

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22) My children think that we should eat five fruits and vegetables a day.

AGREE \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ DISAGREE  
extremely quite slightly neither slightly quite extremely

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23) My mother thinks that my children and I should eat five fruits and vegetables a day. (Note: If this question does not apply to you, please check this box  and go to the next question).

AGREE \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ DISAGREE  
extremely quite slightly neither slightly quite extremely

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24) My mother-in-law thinks that my children and I should eat five fruits and vegetables a day (Note: If this question does not apply to you, please check this box  and go to the next question).

AGREE \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ DISAGREE  
extremely quite slightly neither slightly quite extremely

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25) My WIC nutritionist thinks that my children and I should eat five fruits and vegetables a day.

AGREE \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ DISAGREE  
extremely quite slightly neither slightly quite extremely

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26) Generally speaking, I want to do what my spouse or boy/girl friend thinks I should do.

(Note: If this question does not apply to you, please check this box  and go to the next question).

AGREE \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ DISAGREE  
extremely quite slightly neither slightly quite extremely

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27) Generally speaking, I want to do what my children think I should do.

AGREE \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ DISAGREE  
extremely quite slightly neither slightly quite extremely

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28) Generally speaking, I want to do what my mother thinks I should do. (Note. If this question does not apply to you, please check this box  and go to the next question).

AGREE \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ DISAGREE  
extremely quite slightly neither slightly quite extremely

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29) Generally speaking, I want to do what my mother-in-law thinks I should do (Note If this question does not apply to you, please check this box  and go to the next question).

AGREE \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ DISAGREE  
extremely quite slightly neither slightly quite extremely

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30) Generally speaking, I want to do what my WIC nutritionist thinks I should do

AGREE \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ : \_\_\_\_\_ DISAGREE  
extremely quite slightly neither slightly quite extremely

Thank you!

**Appendix B.**

## INFORMED CONSENT

1. I have been informed of the nature of this research project, which is to assess new ways to provide nutrition education in the WIC program.
2. I understand that I will be asked to complete a survey of dietary habits and a survey about fruits and vegetables two times during the 1 year project as part of my nutrition education during my usually scheduled WIC appointment.
3. There are no foreseeable risks. My appointments will be scheduled as usual and I will not spend time I would normally spend in the WIC clinic.
4. The benefits to me include learning additional information about what I eat and gaining insight into why my family and I choose some of the foods we eat. At the end of the project, I can receive information about my personal nutrition habits. I will also have an opportunity to learn more about planning meals, shopping and cooking healthy foods for my family.
5. I understand that the information will be kept confidential and used for research purposes only. No names will be associated with the results.
6. I understand that I may choose not to participate or may withdraw from the project at any time without penalty. If I choose not to participate or do withdraw from the project, this will not affect my participation in the WIC programs or other programs offered at the Health Department.
7. Additional information about this project is available from Dr. Paula Zemel or Dr. Eugene Fitzhugh. They can both be reached at 974-5041.
8. I give my consent to participate in this project.

|             |      |
|-------------|------|
| participant | date |
| witness     | date |

## VITA

Katherine Michelle Anderson was born in Knoxville, Tennessee on November 8, 1971. She graduated from Anderson County High School in 1990. After graduation, she attended East Tennessee State University until 1994 when she transferred to the University of Tennessee. In May 1996, she completed an undergraduate degree in Community Health Education. In October 1996 she became a Certified Health Education Specialist.

From February, 1997 until September 1998 she worked as a research assistant for the Department of Health and Safety Science at the University of Tennessee. In January 1998, she enrolled in the graduate program of Health Education and Health Promotion at the University of Tennessee where she graduated in May, 2000. Currently she is employed as a health educator at the Knox County Health Department. She works as the tobacco control coordinator for the health department.