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Social Ecological Influences of WIC Programming Behavior Change of Former WIC Participants

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This is to certify that the doctoral dissertation by

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has been found to be complete and satisfactory in all respects,
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Walden University
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MPH, Walden University, 2007

MS, United States Sports Academy, 1992

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Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Public Health

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Abstract

The Special Supplemental Women, Infants, and Children (WIC) Program is one of many United States Department of Agriculture's (USDA) food subsidy programs that serves 8.6 million participants, deemed nutritionally at risk. WIC is designed to influence nutritional and health behaviors to a population least capable of functioning. The purpose of this study was to identify if participation in WIC's nutrition education activities and restricted use of food subsidy benefits had a post-factorial effect on their nutritional behaviors. This study provides data on Bronfenbrenner's social ecological influences and how it impacts on long-term behavioral change. A quantitative causal-comparative design utilizing a convenience sampling method compared responses to a survey on nutritional habits of women shoppers at a Walmart retailer in an urban southeastern metropolitan city. The study population included women aged 18-50 years with one or more child who had or were currently receiving WIC (n = 63) compared with controls (n = 32) who also met the aforementioned criteria, yet did not receive WIC. Analyses of a Wilcoxon signed rank test supported an association between participation in WIC and an influence on participants' food purchase habits, while evidence from a linear equation for repeated measures between groups did not support a common variable for what influenced purchases between cases and controls. This study provides insight for future study regarding WIC's effectiveness to promote long-term health for its participants. It may also lend to discussion by USDA officials to consider programmatic review and change of other food subsidy programs which conceivably could impact the diets of more than 49 million Americans.

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Dedication

I dedicate this work to my nieces and nephews; a hearty work ethic is a blueprint for success. Set the tempo, feel the rhythm and just do it!

To my girls (Ren, Theresa, TMAC, J-Bird, Ann, Jen, Wind, Viv, Pam, Tomeka, Kimmey, Lisa {R.I.P}) I love, love, love and appreciate your unwavering support. Now that I have time, meet me on the links or at our favorite watering hole I've got some catching-up to do! Seriously, thanks for getting me through the rough patches; I could not have done it without you all. To my male friends (Eric, Elbert, Will x 2, Luckie, Enoch, Randi, Carnell, Martin, Eddie, Forrest, Keith, and Tory), you live life with such passion! You all really know how to party. Thanks for all of the good times; can't wait until the next party! To my Morehouse and Spelman colleagues, you all are the best! Your sincerity and willingness to help, was phenomenal. In the future, just ask and I will answer; many, many thanks! To the 3 J's (Jackie, Joe, & Johnathan) thanks for your support and allowing me to be me. Oh, Jackie don't call me for every little thing, Johnathan let's talk more, and Joe, "thanks for always calling, to make sure I was alright (it meant so much to me)!

Most importantly I would like thank my mother, Jean for her expressions of love and commitment to help me through some of the most trying times during this journey; there is nothing in the world like a praying mother! *I love you mom….*

Finally, I dedicate this work to my dad, Pete. I did it, "Partner"; you were one of my greatest supporters…RIP.

Acknowledgments

I imagined writing Acknowledgments for this document would be rather simple, as I have worked over the last 7 years researching, writing, and presenting my work, and yet to no avail this is the 3rd draft of just this paragraph! For those who know me well, they know, I innately do things over, and over, and over again; perhaps that explains the 7 years…hum. Seven, the Sabbath; a sign of completion, a time to rest! In 7 years I finally will be able to put this to rest; I guess it was time. I am tired, I need to rest…

"Blessed is the man that walk not in the counsel of the ungodly, nor stands in the path of sinners, nor sits in the seat of the ungodly, but his delight is in the law of the Lord and in his law he meditates both day and night. He is like a tree planted by the river of the waters, that bears fruit in due season, his leaf shall never whither, whatsoever he touches shall prosper…" (Psalms 1, KJV). Every day for the past 7 months I wrote a line or two in my composition book(s) before I would begin the days' work until I had committed it to memory. And though at the time there was no rhyme or reason for selection of that chapter, I now realize "I am due to prosper at this time and this moment" (this feels right)!

I extend gratitude to Drs. Carla Riemersma (Chairperson) and Li for their guidance, leadership, and most importantly accepting my invitation to steer me along with this undertaking. You believed in my work before I had an opportunity to prove myself.

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Chapter 1: Introduction to the Study

Background of the Problem

The purpose of this study was to examine the impact participation in the United States Department of Agriculture (USDA)'s Women, Infants, and Children (WIC) program had on the nutritional behaviors of former participants. When food shopping, consumer behavior is often influenced by several factors: price-point index, marketing, budget, food availability, culture, nutritional value of food items, convenience, taste, hunger, family influence, habits, societal influence, and food insecurity concerns (Rani, 2014, p.53). Though these variables may provide an indication of what prompts or steers consumer behaviors regarding food choice purchases, a WIC participant is met with very few of these challenges, given program participants are required to purchase food items from USDA and Institute of Medicine (IOM) approved food packages (USDA, Food Nutrition Service, 2015, para. 1) and served as an indicator for what truly motivated purchase habits of WIC program participants for this study.

The mission of WIC is to impose a nutritiously dense diet for "pregnant, breastfeeding and nonbreastfeeding postpartum women, infants and children up to five years" (USDA, 2013b, para. 1). This mission is further evidenced in the USDA's most recently revised approved food packages; foods should have high fiber content and little saturated fat. USDA program officials assert, "WIC food packages and nutrition education are the chief means by which WIC affects the dietary quality and habits of participants" (USDA, Food and Nutrition Service [FNS], 2012, para. 1).

Yen (2010) examined the nutritional diets of children whose families received WIC versus Supplemental Nutrition Assistance Program, and found WIC "increase[d] the intake of three of the four important nutrients for WIC children" (p. 579). By contrast, children participating in SNAP received 2.71% less fiber intake as required by daily dietary reference intake (DRI).

The USDA regulates WIC participants' purchases and encourages attendance at nutrition education workshops, classes, and counseling sessions. These programs are designed to help ensure recipients cultivate quality nutritional habits while enrolled in WIC, yet very few if any studies have been conducted on the effectiveness of how these methods effect behaviors long term. This research study was conducted to address the gap in the literature by examining the impact these factors had on influencing nutritional behaviors after a participant was either ineligible to receive WIC benefits or voluntarily stopped participating. The accountability of former WIC participants to continue making healthy food choices when no longer regulated to by USDA program guidelines was of special interest.

A considerable body of research has been published on the positives and negatives surrounding WIC (e.g. food packages, infant mortality, funding, vendor management), however, very few, if any documented studies have been conducted on the participant post-WIC. While presenting at a conference sponsored by the Institute of Medicine conference titled "Planning a WIC Research Agenda," Sally E. Findley, of the Mailman School of Public Health, Columbia University, provided the following recommendations (2010):

> If WIC is successful at achieving the goals of behavioral change, balanced nutrition and weight gain, these changes may be lasting. WIC therefore need studies which document different time frames of impact: Immediate or co-terminus with WIC participation, short term (1-5 years post-WIC) and long-term (5-10 years post WIC).

The mission of WIC is to improve the quality of participants' diets by monitoring food purchases of the more than 9.17 million "low-income pregnant, breastfeeding, nonbreastfeeding postpartum women, infants and children up to five years of age who are at nutritional risk" (USDA, 2010, para. 1) it serves. It accomplishes its mission by utilizing WIC Works an online educational and training tool for staff and healthcare professionals, the Core Nutrition Messages resource, and other educational resources tailored for women and children audiences.

This study examined the impact participation in WIC had on influencing nutritional behaviors of current and former WIC recipients. It was designed to determine if a post-factorial effect exists as a result of the impact of social ecological influences, specifically, participation in nutrition education sessions, WIC nutritional counseling, and restricted purchase power impacted nutritional behaviors post-WIC. Results from this study indicate an association exists between food choices made post-WIC and participation in WIC. These findings may provide greater insight surrounding the effectiveness of WIC's educational programs, counseling, and food purchase restrictions.

Problem Statement

Obesity related deaths are preventable, yet five percent and 15.6% of Black men and White men respectively and 26.8% and 21.9% Black and White women deaths are attributed to overweight and obesity 1986-2006 (Masters, Reither, Powers, Yang, Burger, and Link, 2013, pg. 1899) related condition. In a study designed to identify mortality rates attributable to overweight and obesity, Masters, et al. concluded age, birth cohort and period of observation are indicators that essential when defining mortality and population rates (pg.1900). It is projected in the year 2030, 42% of all Americans will be clinically obese (see Table 1) with a body mass index (BMI) of 30 lbs. /in^2 or greater (O'Grady and Capretta, 2012, pg. 10).

Table 1

Body Mass Index

BMI	Weight Status
Below 18.5 lbs./in.^{2}	Underweight
18.5-24.9	Normal Weight
25.0-29.9	Overweight
30.0 and above	Obese

Note. Adapted from "How is BMI Interpreted for Adults", by Centers for Disease Control and Prevention, 2015, Retrieved from http://www.cdc.gov/healthyweight/assessing/bmi/adult_bmi/index.html. Copyright 2015 by the CDC.

In the National Health and Nutrition Examination Study 2009-2010, 35.7% (i.e. 78 million) of all American adults were identified as obese while 16.9% (i.e. 12.5 million) of children and adolescent ages 6-9 years were identified as overweight or obese (Ogden, et. al., 2012, p. 3). The prevalence of overweight and obesity in the United States has tripled since the 1970s, and its impact on the economy has been just as significant. The Centers for Disease Control and Prevention estimated the cost of obesity and related co-morbidities (e.g., heart disease, sleep apnea, type II diabetes) cost $147 billion annually to the American economy (CDC, 2012, para. 6), of which $66 billion was because of annual losses in productivity (Hammond & Levine, 2010, p. 295).

The significance of this issue is underscored in Healthy People (HP) 2020; science-based outline of objectives and health goals that if Americans take heed we might see an improvement in our health by the year 2020. Healthy People 2020, a federal initiative provides recommendations, information, and tools to assist Americans with making informed decisions regarding their health and ultimately their quality of life. Authorities consider nutrition, physical activity, and obesity as critical areas of concern, particularly since obesity has reached epidemic proportions and why it is identified as one of 10 leading health indicators targeted in this 2020 initiative. The following are a few objectives under the Nutrition and Weight Status category, adults should do to improve their health status; increase muscular strength by 10%; decrease the proportion of adults, children and adolescents ages 2-19 who are obese by 10% (“Institute of Medicine, 2011, p. 30); and increase vegetable consumption in diets of children 1.1-cup equivalents per 1,000 calories (Healthy People, 2013, para. PA-2).

The Health and Human Services (HHS) Healthy People 2020 program (Institute of Health of the National Health Academies, 2011) continues to provide a comprehensive health agenda platform all Americans should follow to improve their quality of life and to live long healthy years. A final assessment of objectives defined in Healthy People 2010 found a decline in coronary and stroke related deaths, yet, minimal to no change with decreasing health disparities and obesity prevalence, yet overall, a 71% success rate in achieving objectives according to HHS (Health and Human Services, 2011, para 1). According to U.S. Health and Human Services Assistant Secretary of Health Howard K. Kor, true change to address the short-fall will occur when there is "health in policies" (U.S. Department of Health and Human Services, 2011, para. 3).

The obesity epidemic is not limited to a select socioeconomic class, level of educational attainment, or race. The prevalence of obesity in children and adolescents has more than tripled over the past three decades. The Economic Research Service the research arm of the USDA, examined WIC participation and weight status from 1988-2006, and concluded "boys who received WIC benefits had similar BMI and [were] less likely to be at risk of overweight [than those who were] income eligible as nonparticipants" and "girls whose families received WIC had similar BMI [to] income eligible and higher income nonparticipants" (USDA, 2009, p. 2). Mexican American boys and girls had a significantly higher BMI and were at greater risk of being overweight than non-Hispanic White boys and girls; this difference was not statistically significant during 1999-2006 for either gender. Non-Hispanic Black girls were, however, at greater risk of being overweight than non-Hispanic White girls during 1999-2006.

Obesity is a national epidemic in the United States. This is due in part to a cultural shift that over the course of 30 years has created an obesogenic environment. An obesogenic environment is defined as "the sum of influences that the surroundings, opportunities, or conditions of life have on promoting obesity in individuals or populations (Lake & Townsend, 2006, p.264). Unhealthy nutritional habits have been compounded by a robust technology industry that encourages physical inactivity. The average time spent viewing television per day and using a smartphone by an18^{+} year old is 4.2 hours , and 1.33 hours respectively (Nielsen, 2014, para 6). One third of every American adult is obese, while 12.1% of children aged 2-5 years are overweight or obese (Ogden, 2012, p.1). As reported by The Pediatric Nutrition Surveillance System the prevalence of overweight and obese children enrolled in federally funded programs was 14.6% (n = 2,222,410) in 2008, (Centers for Disease Control and Prevention [CDC], 2009b, p. 769).

Nature of the Study

This was a quantitative study that utilized a causal-comparative design to determine the effect and impact participation in WIC had on nutritional behaviors, long-term. The study compared responses to a survey regarding food choices made by current and former WIC recipients with those made by the control group. Controls represented women who had not participated in WIC and never received benefits (e.g., the nutrition education, health education counseling, or food subsidy vouchers) [See Operational Definition of Non-WIC Participant]. Prospective study participants were invited to participate in the study at a Walmart retail location located in a major southeastern

metropolitan urban city. Surveys were collected over a two-week period April 11-13, 2015 and April 17-19, 2015. The research questions and hypotheses were designed to determine the effect social, cultural, environmental/setting, and personality factors had on behavioral change that influenced ones' attitudes and behaviors. The purpose of this study was designed to address a need to investigate potential WIC post-factorial effects on promoting positive behavioral change.

Research Questions and Hypotheses

The primary research questions were designed to address a need for literature on this topic and may contribute additional information about on-going debates and discussions surrounding modification of guidelines of other USDA food subsidy programs.

Research Question 1 (RQ1): Are current food choices made by former WIC participants the result of behaviors learned while participating in WIC-sponsored health education classes, nutrition counseling, and restrictions to use food benefits/vouchers only towards purchase of foods on WIC approved food lists?

$H_0$1a: There is no relationship between pre-WIC and post-WIC bread purchases for the study group.

H_a1a: There is a relationship between pre-WIC and post-WIC bread purchases for the study group.

Rationale 1:

This question is intended to examine USDA's assertion that the federal nutrition assistance programs, administered by the Food Nutrition Service, provides an

opportunity for program participants and eligible persons to maximize food resources and make food choices that support and promote good health using science-based, behavior-focused nutrition education and promotion strategies (USDA, FNS, Office of Research and Analysis, 2010, p. 14).

Research Question 2 (RQ2): Have food choices made by controls changed over the last two years?

$H_0$2a: There has been no change in what influence bread purchases for the control group over the last two years.

H_a2a: There has been a change in what influenced bread purchases for the control group over the last two years.

Rationale 2

A person's dietary habits my change for various reasons (e.g. health status, price point of food item, nutrition knowledge/education). The purpose is to identify which variable had the greatest impact on influencing food choice(s) made by controls.

Research Question 3 (RQ3): Does the primary variable that influenced food choices differ between study and control groups?

$H_0$3a: There is no relationship between bread purchases by the study group with bread purchases by the control group.

H_a3a: There is a relationship between post-WIC bread purchases by the study group and recent bread purchases by the control group.

Rationale 3

Identifying similarities and differences in food choices made by the study group compared with controls' allows for additional insight for what motivates purchases made by study participants. Additionally, this provides evidence of a causation effect as a result of participation in WIC and its program effectiveness particularly in shaping/influencing long-term behavior change of program participants

Purpose of the Study

This study examined food purchases of current and former WIC beneficiaries, with a specific focus on the purchase of wheat bread and buns. A 25 question survey instrument was used to measure frequency and influence of purchases made by current and former WIC participants as compared with the responses made by controls who never participated in WIC. The overall goal of this study was to determine if participating in WIC had an association on participants' long-term nutritional behaviors.

Theoretical Framework

The theoretical framework for this study was based upon Urie Bronfenbrenner's social ecological model (1994). The theory suggests one' behavior and attitudes are influenced by their social ecological environment (e.g. microsystem, exosystem, macrosystem) further sub-characterized by five additional levels. This model suggests human development and eventually one's behavioral patterns are understood and influenced best, when all aspects of the ecological environment in which one lives are acknowledged. Greater, five sub-levels of influence (intrapersonal, interpersonal,

community, organization, and policy), provide a comprehensive multilevel depiction of these influences and how behavioral change is affected. The SEM was use by Glanz, Rimer, and Viswanath (2008) to examine best practices in health care promotion and health care practice and they assert "experts have explicitly recommended that interventions on social and behavioral factors related to health should link multiple levels of influence, including the individual, interpersonal, institutional, community, and policy levels" (p. 10) for dramatic behavioral change to occur. The WIC program implements intrapersonal, interpersonal, and policy influences in an attempt to effect long- and short-term nutritional behavior changes of program participants and thus SEM was the choice for the theoretical framework. In the section of this study titled SEM, additional explanation of this framework is provided.

Operational Definitions

Because of the nature of this study, several specific definitions as set forth by the Center for Effective Government, USDA, and the Department of U.S. Health and Human Services are provided:

Automatic stabilizer: Economic policies and programs that are designed to offset fluctuations in a nation's economic activity without intervention by the government or policymakers (Center for Effective Government, 2011, para. 6).

Body Mass Index: A measure of body fat calculated using a person's weight and height. This study uses the BMI delineations from the Centers for Disease Control and Prevention (see Table 1).

Breastfeeding women: "Women up to one year postpartum who are breastfeeding their infants" (USDA, n.d., § 246.2, p. 353).

Children: "Persons who have had their first birthday but have not yet attained their fifth birthday" (USDA, n.d., § 246.2, p. 353).

Food Instrument: "A voucher, check, electronic benefits transfer card (EBT), coupon or other document which is used by a participant to obtain supplemental foods" (USDA, n.d., § 246.2, p. 355).

Nutrition Education: A state or local agency may provide services (e.g., medical referral, breastfeeding promotion) and encourage participation in activities (e.g., classes, counseling) to improve participant's knowledge of health and nutrition related information. A participant cannot be denied benefits if she declines to nutrition education services (USDA, n.d., § 246.10, p. 401).

Nutritional risk: Poor or declining health associated from a nutritional related condition (e.g., diet, drug/alcohol abuse, biochemical) or environment climate (e.g., homelessness, migrancy) which impair one's health (USDA, n.d., § 246.2, p. 357).

Obesogenic environment: "obesogenic environment" refers to "an environment that promotes gaining weight and one that is not conducive to weight loss" within the home or workplace (Powers, Spears, & Rebori, 2010, p. 10).

Overweight and Obesity :According to the CDC Divisions of Nutrition, "overweight" and "obesity" both are labels for ranges of weight that are greater than a weight that is considered healthy for a given height. Adults 20 years or older are categorized as overweight if their BMI is 25-30 lbs./in.^{2} and obese if their BMIs are > 30

lbs./in.^{2}. BMIs for children aged 2-19 years are specific to age and sex and are known as BMI-for-age. No exact measures are defined for this population of people.

Poverty: A state of being extremely poor. U.S. federal guidelines for poverty vary based upon family size, and determine financial eligibility for certain federal programs. The poverty threshold is a statistical measure used to estimate the number of people who are impoverished (U.S. Department of Health and Human Services, n.d.).

Special Supplemental Nutrition Program for Women, Infants, and Children (WIC): A federally funded health and nutrition program for women, infants, and children.

Supplemental Nutrition Assistance Program (SNAP): A U.S. federal government program "in which eligible households receive benefits that can be used to purchase food items from authorized retail stores and farmers' markets" (USDA, n.d., § 246.2, p. 358); formerly known as the Food Stamp Program.

WIC Nutrition Counseling: A service in which paraprofessionals and professionals provide information and assistance on educational subjects (e.g., breastfeeding, nutrition, drugs) to participants.

Breakfast cereal: Any cold or hot instant or ready to eat meal which meets Food and Drug Administration (FDA) nutrient guidelines [refer to the FDA for nutrition guidelines] (USDA, n.d., § 246.10, p. 398)

Whole wheat bread/Whole grain bread/other whole unprocessed grains: Bread and buns must contain 51% whole grain and low in saturated fats to be considered whole wheat, grain or other whole unprocessed grain products [refer to the FDA for nutrition guidelines] (USDA, n.d., § 246.10, p. 398).

Assumptions

Assumptions for this study:

1. WIC is effective at improving the nutritional value of diets of participants or beneficiaries (e.g., pregnant women, new mothers, infants and children [up to five years]), particularly if benefits are strictly used towards foods on the WIC Approved Food list (see Appendix B).
2. All WIC study participants experience equal at best, similar levels of benefit from counseling services rendered, health literature received and any other affect had as a result of participating in WIC and adhering to program guidelines
3. The WIC population within the southeastern metropolitan urban where surveys were collected was representative of the WIC population within the state of Georgia and the nation.
4. All Study group participants were enrolled in WIC and received benefits

Limitations

1. I was not granted direct access to Georgia Department of Public Health WIC database/records for the purposes of contacting former WIC participants.
2. Some study participants may not have met the study criteria of having been ineligible to receive WIC benefits (based upon program requirements) at time of data collection.
3. USDA program eligibility of WIC is gender specific for females. Men were excluded from this study

Delimitations

1. Participants will only be selected from the southeastern metropolitan urban city.
2. Study participants were only asked about wheat bread/buns purchases (i.e. a WIC approved food) regarding their purchase habits.

Significance of the Study

The purpose of this research study was to identify if participation in WIC had a causal effect on current and former recipients' nutritional behaviors. Study results found an association between purchases made by current and former WIC recipients and participation in WIC sponsored nutrition education and counseling sessions and restrictions to purchase foods only on the WIC approved food list. Implications for this research have the potential to be far-reaching. Study results established that former WIC participants continue to purchase wheat bread/buns even after participation in WIC and attribute their participation in WIC various programs that influenced this behavior. It would be safe to reason that these families' diets have been improved because of this. Additionally, one might conclude that since children in these families may eat wheat bread/buns, it is likely they are forming a behavior or attitude surrounding wheat bread that if it is a positive attitude, this may become a choice that is lasting and perhaps stem influence that is generational. Additionally, this research study may provide an opportunity to provide additional information regarding WIC program effectiveness.

Summary

The premier program of USDA's FNS, WIC, offers women, infants, and children a means of improving their health and thus their quality of life. WIC assists low-income families with invaluable resources by providing food subsidy, nutritional education, and medical and social service referrals; these services may be considered gateways to a healthier tomorrow.

The mission of WIC is to safeguard the health of those who need it most, yet, are the least capable due to their circumstances (e.g., socioeconomic status, educational attainment, health status) that prevent them from functioning at their best physiologically. Sound nutritional behaviors and practices are essential to good health and why the USDA is committed to and continues to strive towards providing a nutritional program that is second to none. Women, Infants, and Children is a "short-term intervention program designed to influence lifetime nutrition and health behaviors in a targeted, high-risk population" (National WIC Association, 2013, para. 1).

The USDA has designed the nutritional format of WIC to include health education materials and nutritional counseling that targets adults and adolescent audiences and promotes the program's central themes: increased consumption of fruits, vegetables, and water; increased physical activity; and concepts of moderation. The program achieves this goal using all forms of media (e.g., Internet, DVD, pamphlets). In a second, all-out effort to encourage healthy nutritional practices, program guidelines mandate that participants use food benefits only towards purchase of foods aligned with

the UDSA food pyramid guide that are science based nutritious foods according to the World Health Organization and USDA.

The aim of this study was to identify the effect if any, participation in WIC had on food choices; specifically the purchase of wheat bread/buns post-WIC. Interventions that encompass influences at individual, interpersonal (e.g., family, friends), and policy (i.e., organization) levels may be the best approach to influencing behavioral change and therefore have better success rates. Women, Infants, and Children is an intervention program for persons whose diets are not nutritiously dense and though behavior modification is not the focal point of the program's mission, the foundation of the program is closely aligned with Bronfenbrenner's (1994) social ecological model for behavioral change.

The motivation to conduct this study was to answer the following question: "Why does SNAP not restrict choices recipients can make when using their benefits as WIC does?" Americans live in a society where convenience, sedentary lifestyles (e.g., television/movie viewing, playing electronics [i.e., video games]), overconsumption of fast foods, and excessive portion sizes are commonplace; creating an obesogenic environment. Both WIC and SNAP programs were started in our country during a time when the prevalence obesity was not at epidemic levels as witnessed present day. This study was designed to examine if social ecological influences impacted behavioral choices of WIC participants and results did indicate an association exist between food choices made post-WIC and participation in WIC programs.

Chapter 2: Review of the Literature

Introduction

This chapter is a review of the literature surrounding health education interventions and the impact they have on long-term nutritional habits. It examines federally funded nutrition programs that utilized evidenced based approaches to promote eating a healthy diet as a way of life. This review focuses on Women Infant, and Children, one of more than 13 food nutrition programs funded by the federal government that requires recipients participate in nutrition education programs. This program provides health services for women and children who are at risk of disease and conditions (e.g., anemia, infant mortality, underweight, overweight/obesity) common in this population of people. Educating participants about the importance of incorporating physical activity and sound nutritional habits as a component of their daily habits can ultimately lead to a better quality of life (UDSA, FNS, 2006, para. 7). Nutrition education is a central component in the success of WIC participants improving their health outcome.

This review includes a discussion of landmark U.S. health policy decisions and initiatives, as well as the significance of policy as a cornerstone of public health in safeguarding the people it is designed to protect. Additionally, this section includes details of WIC's comprehensive nutrition programming including health education counseling, and guidelines of the policy which requires the WIC food voucher be used only towards purchase of foods found on the WIC approved food list. Results from this study of food choices made by former WIC beneficiaries' food choices indicate

participation in WIC program activities (i.e., counseling, nutrition/health literature) has an association on the food choice post-WIC. Review of and consideration by the USDA to impose additional restriction to purchase “approved” foods as done in the WIC program, of other Food Nutrition food subsidy programs particularly the Supplemental Nutrition Assistant Program (formerly the Food Stamp Program) this may help serve with improving the diets of recipients of this and other food subsidy programs.

Literature Search Strategy

An extensive search of the literature was conducted 2010 - 2015 to identify what studies had been conducted that examined the impact participation in WIC had on attitudes and behaviors (e.g. nutritional, physical activity) post-WIC. The following outlines the literature review strategy:

Item	Result
Name and Host of the Database:	**Walden University Library**
Time period searched:	**December 2007 - 2012**
Patient population:	**Former and current WIC participants**
Intervention:	**Recipient of USDA WIC benefits**
Outcomes:	**Behavioral changes (e.g. nutritional, physical activity)**
Databases searched:	**Academic Search Complete CINAHL Plus with Full Text Ebsco ebook Medline with Full Text ProQuest Nursing and Allied Health source Sage Premier Soc Index with Full Text**
Key Concepts:	**WIC, obesity, nutritional behaviors, physical activity behaviors, Post-WIC, former WIC participants, SNAP, purchase habits, restricting purchase power, food subsidy programs, USDA, overweight, prohibited foods**

The prevalence of obesity has reached epidemic proportions and the ability to abate this problem appears to be bleak. The United State is one of the most powerful industrialized nations in the world, with an annual gross national product of $14.11 trillion dollars, (World Bank, 2011), but ranks last amongst the "19 industrialized nations evaluated in terms of preventing early deaths from certain chronic diseases, (Arvantes, 2008, para. 4).

Life expectancy at birth in the United States circa 1900 was 47 years, yet today, average life expectancy is 77.9 years (Xu, Kochanek, Murphy, & Tejada-Vera, 2010, p.1). The National Health and Nutrition Examination Survey (Ogden & Carroll, 2010, para 2) reported the prevalence of overweight and obese adolescents aged 6-11 years in 2007-08 was 16.96%, compared with a rate of 4.25% in the years 1963-65. Obesity can be debilitating to the health of an individual and why health officials project obese adolescents will become obese adults, and therefore, less likely to reach their full life expectancy.

According to the Centers for Disease Control and Prevention (CDC), the 10 leading causes of death in the United States in the year 2000 were chronic disease (e.g. heart disease, cancer, cerebrovascular disease, chronic obstructive lung disease), and other co-morbidities associated with overweight or obese (Mokdad, Marks, Stroup, & Gerberding, 2004) conditions. The difference in the etiology between an infectious disease which was the leading cause of death in 1900 and chronic illness, the leading cause of death in the 21st century is communicability. Communicable or infectious diseases are transmitted by contact with another individual. Chronic diseases are not

contracted by this means. Taber's Medical Encyclopedia (Davis, 1985) defined infection as "the state or condition in which the body or a part of it is invaded by a pathogenic agent (microorganism or virus) that under favorable conditions, multiplies and produces effects that are injurious" (p. 840). Conversely, chronic disease is characterized by residual disability, permanence, nonreversible pathological alteration, and the need for special training of the patient for rehabilitation or a considerable period of supervision and observatory care (Turnock, 2004, p. 383).

The life expectancy of approximately 16% of obese children is dismal. In the words of former U.S. Surgeon General Richard Carmona, "because of the increasing rates of obesity, unhealthy eating habits and physical inactivity, we may see the first generation that will be less healthy and have a shorter life expectancy than their parents" (American Heart Association [AHA], 2010, para. 3). Thus, the projection of a 78-year life expectancy may be short lived for an unfortunate portion of a vulnerable population; U.S. children. America's obesity problem continues to be a growing concern for public health officials, the medical community, and policymakers, and why U.S. First Lady Michelle Obama has joined the ranks and taken a stand to adopt childhood obesity as one of her personal initiatives and started the Let's Move Campaign.

Let's Move Campaign

In February 2010, the Let's Move campaigned launched, with a goal of reversing childhood obesity in a single generation. This program, a national initiative, takes a comprehensive approach to addressing this issue, providing four foundational pillars that aggressively target the chronic disease. The approach is to target the family first;

encouraging parents to become involved with their child's nutritional needs and promote exercise; provide greater accessibility to more nutritious foods; emphasizes improving the quality of school lunches; and supports physical activity (Let's Move, 2010, para. 2). Greater, to underscore the importance combating this problem, President Barack Obama has, for the first time in the nation's history, formed The Task Force on Childhood Obesity, a task force dedicated to study childhood obesity.

The Task Force on Childhood Obesity formed in 2010 is comprised of senior cabinet members (e.g. secretaries of: Interior, Agriculture, Education, Health and Human Services, Director of Office Management and Budget) of the federal government; its purpose is two-fold. The initial step is to conduct a full-scale review of all policies and programs associated with nutrition and physical activity and the secondly and perhaps most importantly, to implement a national model that offers the most effective strategies to address this massive problem (*the* White House, 2010, para.4). This model will be developed using an evidence-based multifaceted approach to mitigate obesity in America. A multifaceted approach has proven to be beneficial as noted by Stokols (as cited in Fleury & Lee, 2006) who recommends a shift toward more comprehensive interventions in order to promote healthy behaviors regarding physical activity among African American women he studied. The SEM, emphasizes the importance of a cohesive interdependence of individual, relationship, community, organizational constructs and policy (Fleury & Lee, 2006, p. 130) and in particular defines the impact policy has on influencing behavior. In a review of literature, Fleury and Lee (2006) found social norms, social support, socioeconomic status, motivation, and community resources to impact

behavior modification significantly amongst African American women, particularly regarding their participation in physical activity. A multidimensional approach, as defined by the SEM framework, may provide the research community with a greater understanding of variables that influence behavior modification; the "ecological analysis can sometimes lead to a diffuse and difficult test of explanations of health and illness" (p. 137).

Federally Funded Nutrition Programs

The following section provides the results of a literature review of studies conducted to examine the effectiveness of interventions designed to increase healthy behaviors of women enrolled in federally funded nutrition programs. The importance of highlighting this literature review conducted by Vidourek and King (1998) is to gain additional insight regarding approaches that may or may not have been found to be effective with improving nutritional behaviors of this target population. Vidourek et al. sought to identify approaches that had a significant impact on increasing and or improving healthy eating behaviors of low-income women. Researchers identified 15 studies that met their study inclusion criteria. Ten of these had common themes and were quite distinct in its methodology; however, three themes that emphasized how best to improve nutritional behaviors of this population is discussed for purposes of this study. The study criteria for inclusion, along with a brief overview of the missions of the federally funded programs, followed by study results of the three major themes found to be of significant for improving health behaviors are discussed.

The Expanded Food and Nutrition Education Program (EFNEP) is a nutrition program funded by the USDA under the National Institute of Food and Agriculture. The program targets audiences with limited resources that often prevent participants from making the best choice for their individual and or family's nutritional health. The EFNEP serves approximately 500,000 families in need of which 80 percent live at or below poverty.

The second program highlighted in the review is the Special Supplemental Women, Infants, and Children (WIC). As explained, WIC is a federally funded health and nutrition program for women, infants, and children who are deemed to be nutritionally at risk. The program provides nutrition education, medical referral services, and food subsidy for program participants who are at or below poverty. The WIC program serves approximately 9,000,000, people.

The Eat Well Live Well Nutrition Education program is a community-based program funded through the USDA via state Departments of Health and Human Services. The mission of the program is to provide nutrition education to low income families who live in rural and urban areas. No data found on participants served.

Study Inclusion Criteria

Publication dates were January 1, 2001 and January 1, 2007. Study population included low-income females; nutrition and improvement of dietary behaviors; publication in English; intervention within the United States only. Of the 15 studies examined by researchers 10 common themes were; "1) WIC and EFNEP-based

interventions, 2) collaborative approaches, 3) theoretical framework, 4) learner-centered, 5) skills-based programs, 6) use of produce coupons or vouchers, 7) computer-based programs, 8) culturally-based interventions, 9) peer teaching, and 10) recommendations to include social support or physical activity. The following are key words: nutrition, low income, Women, Infants, and Children (WIC), Stages of Change"(Vidourek & King, 2008, p. 57).

Themes

Of the 10 themes identified by Vidourek & King, the following were discussed for this research study: learner-centered and individualized approaches; use of skill-based approaches to enhance knowledge and self-efficacy; social support and increased physical activity complemented with dietary changes.

Theme 1: Learner-centered and Individualized Approaches to Education

Learner-centered education is an approach of teaching a skill, discipline, or behavior to a student or individual. This concept began to evolve in the mid-1990s and continues to gain momentum in the educational community as studies conducted on this approach have shown it to be highly effective and successful. The ideology; students must become engaged in the learning process as active learners, unlike a traditional context of learning, where the teacher has the knowledge or information that is shared with the student via lecture, assigned reading(s), discussion, or another format. In a review of literature on pedagogical approaches, Wright (2011) indicates students

tend to be more receptive to the centered learned approach than a traditional approach or style of learning resulting in an improved performance (p. 95). Vidourek and King (2008) reported that in a study conducted by Carson, Scholl, and Kassab, researchers found when the learner-centered intervention was implemented in the Emergency Food Education Program (EFNEP), results indicate improved effectiveness with teaching nutrition education and healthy behaviors to low income families than interventions that were group focused. Carson et al. concluded participants in learner-centered or more individualized intervention programs were more likely to increase their consumption of meals daily in addition to consuming a greater intake of dairy, fruit, iron, B6, and fiber (p. 61).

Carson et al. (as cited in Vidourek & King, 2008) recommended the learner-centered approach be taught to more instructors so that it can be instituted throughout the EFNEP and other programs that use the group approach.

Theme 2: Use of Skill-based Approaches to Enhance Knowledge and Self-efficacy

The principles of skill-based approaches require the participant practice the skill taught. In two of the interventions involving WIC recipients, study participants had a significant propensity to implement or practice the skill taught in everyday life, if the intervention concentrated on the use of a skill (Vidourek & King, 2008, p. 66). In a study conducted by Boyd and Windsor (as cited in Vidourek & King, 2008), pregnant women were taught health knowledge, methods of identifying social support, and how to make healthy and develop healthy eating behaviors. Boyd and Wilson concluded, significant

improvements were made in participants' behaviors and knowledge. In an intervention that required WIC study participants read a "how to" recipe book and practice skills found in a recipe booklet results indicate 70% of the study participants were more apt to choose quality fresh produce after the intervention than before; 68% increased knowledge regarding proper ways to store vegetables and fruit; and 74% had a better sense of confidence about adding fruits and vegetables in meals (Vidourek & King, 2008, p. 62). Additionally, Birmingham, Shultz, and Edelfsen (as cited in King, 2008) maintained that family members of study participants were open to try recipes with fruits and vegetables and reported incorporating fruits and vegetables into meals. Finally, a recommendation made by Cason, Scholl, and Kassab, researchers who examined the effects of *Social Support and Increased Physical Activity Along with Dietary Changes* suggested an emphasis be placed on relationships and communication (e.g., telephone calls, individual meetings) between clients and facilitators to promote long-term behavioral change (Vidourek & King, 2008).

Health Policy

Health policy has long been proven as a proven approach to ensure improvement for the good of public welfare. In the past, policy mandates (e.g., ban smoking in public facilities, immunizations, seat belt use) designed to reverse or diminish adverse unfit work environments, social inequalities, and improve health have been significant to changing the protecting wellbeing of our nation. The following provides statistics of major public health policies that have helped to revolutionize the significance of epidemiological policy interventions:

- "National Highway Traffic Safety Administration estimates safety belts have saved 147,246 lives in the period 1975-2001" (Glassbrenner, n.d., p. 1).
- Overall mean decrease in acute myocardial infarction of 17%, after ban on public smoking was imposed (Schroeder, 2009, p. 1257).
- After the speed limit was reduced to 55 mph in 1974, there was a 17% decrease in fatalities (Physics.org, 2009, para. 3).

While these interventions have proven to provide positive change in the lives of the people they are designed to protect, there have been, however, policy interventions supported with legislative powers that were less effective with improving the population is was intend for. An example of this was the Prevention of Youth Access Act of 2006, which states the following:

> Youth under the age of 18 years must not purchase, attempt to purchase, possess, or attempt to possess a tobacco product, or present or offer proof of age that is false or fraudulent for the purpose of purchasing or possessing a tobacco product. A minor who violates this provision may be subject to penalties including a civil fine up to $25, to include all applicable court costs, assessments, and surcharges. (South Carolina Department of Health and Environmental Control, n.d., para.1)Not always is policy successful at achieving its intended outcome. In a study conducted by Fichtenberg and Glantz (2002), which examined the effectiveness of laws restricting the purchase of tobacco products by minors, researchers investigated the correlation between "merchant compliance with youth access laws and prevalence (30 day and regular) of youth smoking" and

found “there was no detectable relationship between the level of merchant compliance and 30-day (r = .116; n = 38 communities) or regular (r = .017) smoking prevalence” (p. 1088).

History of WIC

By an act of the United States Congress in 1972, WIC was formed under the Child Nutrition Act of 1966. WIC provides supplemental foods, health care referrals, and nutrition education subsidy to low income pregnant, breast-feeding, nonbreastfeeding women, post-partum, infants, and children five years or younger who were considered to be at nutritional risk (i.e., inadequate diet) and predisposed to medical risk (e.g., anemia, underweight, pregnancy complications, poor pregnancy outcomes). In the year of 2009, there were approximately 9,122,000 people receiving WIC (USDA, FNS, 2010, para. 4).

The program is not an entitlement program, which provides services to all eligible applicants, but rather a grant-appropriated program providing designated funding for annual operating costs. Upon depletion of the grant, no additional appropriations are made until the next budget year. According to the USDA’s Office of Analysis, Nutrition, and Evaluation, WIC’s operating budget for fiscal year 2005 was $5 billion, of which $3.6 billion was spent on food subsidy (USDA, 2007, p. 1). Currently, there are 90 WIC offices in the 50 United States and its legal territories.

Nutrition education is provided by local and private agencies to educate program participants on how to make healthy food selections while considering cultural preferences and other special household situations; “the intent is to help participants continue healthful dietary practices after leaving the Program” (Federal Register, 2003, p.

2). Participants receive food allocations in the form of checks or other food instruments (e.g., vouchers, electronic benefits transfer cards, coupons, or documents for the purchase of food) to purchase foods found on the WIC Approved Foods list or food packages.

The food package is a detailed food list of WIC-eligible foods (see Appendix B). Beneficiaries use this food package or list as a guide while grocery shopping. The food package includes foods rich in iron, calcium, vitamin A and C, infant formula, and has, since December 2007, incorporated more whole grains, fruits, vegetables, and cultural foods to ensure program participants receive a wholesome, nutrient-dense diet. The following is an example of a food package (see Table 2).

Table 2

Sample of WIC Food Package

Approved foods:

- 100% fruit and/or vegetable juice.
- Hot or cold cereal, requiring not more than 21.2 grams of sucrose and other sugars per 100 grams of dry cereal (i.e., not more than 6 grams of sucrose and other sugars per 1 ounce of dry cereal).
- Milk: whole, low fat, or nonfat.
- Cheese, eggs.
- Peanut butter.

Foods not approved:

- Fruit drinks.
- Fruit-flavored beverages.
- Sodas.
- Other beverages that are not 100% juice.
- Cheese foods or spreads.
- Peanut butter with added jelly, marshmallow, or other mixtures.

Adapted from "WIC Food Packages – Regulatory Requirements for WIC-Eligible Foods", by USDA Food Nutrition Service, 2015, Retrieved from http://www.fns.usda.gov/wic/wic-food-packages-regulatory-requirements-wic-eligible-

foods#INFANT FOOD FRUITS and VEGETABLES. Copyright 2015 by the USDA Food Nutrition Service.

In December 2007, the federal government made an interim ruling to revise the food offerings. The new approved food list includes a variety of foods that accommodate cultural preferences and affords state agencies the latitude to prescribe food packages that promotes long-term breastfeeding. The improvements made to the WIC food package received mixed reviews. The details can be found in Appendix H (see Appendix H).

In addition to its food subsidy, WIC provides counseling to promote breastfeeding as well as substance use prevention education resources. WIC administrators understand the importance of educating participants about the harmful effects caused by drug use and why active participation in substance prevention education classes is strongly encouraged. Additionally, breastfeeding promotion education is strongly encouraged. If a women breastfeeds, she will receive an additional allocation in her food package, breast pumps; and other supplies. Also, they are allowed to participate in the program longer than the standard length of period.

History of the Supplemental Nutrition Assistance Program

The mission of the USDA food stamp program, established in 1964, is to provide food subsidy benefits for low-income families, thus increasing their purchasing power for healthier food selections. The food stamp program had a name change to the Supplemental Nutrition Assistance Program (SNAP) in 2008 under the Obama administration. In April 1964, legislation (i.e., The Food Stamp Act of 1964) under President Johnson was passed; securing permanency of the program that would be controlled by congress. The following highlights measures created under this legislation:

- "the requirement that recipients purchase their food stamps, paying an amount commensurate with their normal expenditures for food and receiving an amount of food stamps representing an opportunity more nearly to obtain a low-cost nutritionally adequate diet" (USDA, 2013a, para. 3).
- "the eligibility for purchase with food stamps of all items intended for human consumption except alcoholic beverages and imported foods (the House version would have prohibited the purchase of soft drinks, luxury foods, and luxury frozen foods)" (USDA, 2013a, para. 3).
- "appropriations for the first year limited to $75 million; for the second year, to $100 million; and, for the third year, to $200 million" (USDA, 2013a, para. 3).

Major reform of the Food Stamp Act of 1964 occurred in 1977; the Food Stamp Act of 1977 set the stage for existing program guidelines. Highlights of this legislation include:

- "established statutory income eligibility guidelines at the poverty line" (USDA, 2013a, para. 5).
- "EPR eliminate the purchase requirement because of the barrier to participation the purchase requirement represented" (USDA, 2013a, para. 5).

Finally, in 2004 the Electronic Benefits Transfer (EBT) card emerged, replacing the paper food stamp voucher or coupons. Monetary allotments are loaded onto the EBT card monthly and similar to bankcards. When a participant swipes their card at the check-out counter, they are authorizing the transfer of government benefits to a retailer for

purchase of products (USDA, 2013a, para. 8). Additionally, by utilizing an electronic tracking system, the EBT card enables effective management of program operations and moreover, believed to be a useful approach to reduce fraud. Unfortunately, fraud is rampant throughout the program among participants and store merchants. In a report to determine the extent of trafficking of food benefits, the Food Nutrition Service, Office of Policy Support (2013) conducted a study to identify abuse of SNAP benefits by studying the rate at which benefits are trafficked and the number of stores involved. Key findings from the report indicate 1.3% of benefits are trafficked, a value totaling $858 million dollars. Results also found 10.5% of authorized retailers were involved in abuse. These figures reflect a surge in participation of recipients and merchants over time (USDA, 2013b, p. 1).

To date the Food Nutrition Service (FNS), a division of USDA which administers its nutrition programs, reports that SNAP provides benefits to an "estimated 11.7 million households or 26.7 million people, with operating and program costs totaling $31.1 billion" (USDA, 2013a, para. 1). Of the 25.7 million serviced, half are children and of this number, 66% are school aged. To identify if children were prone to become obese from participating in the food stamp program, research generated by the Economic Research Service, (2008) suggested this notion is baseless (p. 1), however, in 2010, the USDA decided it would steer nutrition education to target obesity prevention as they appreciate the prevalence of obese children and adults in the population it serves. The Healthy, Hunger-Free Kids Act of 2010 (Public Law 111-296), section 241, requires SNAP nutrition education (SNAP-Ed) to focus on three behavioral outcomes delivered in

individual and group settings. These are as follows: make half your plate fruits and vegetables; increase physical activity; and maintain an appropriate calorie balance. Although USDA understands the importance of impacting behavioral change among its constituents, participation in SNAP-Ed sessions remains optional for program participants.

Comparative Analysis of WIC and SNAP Programs

A comparison of WIC and SNAP programs is included to provide the reader with an overview of differences and similarities of these signature USDA Food Nutrition Service food subsidy programs. Table 3 shows a comparative analysis of the WIC and SNAP programs.

Table 3

Comparative Analysis of WIC and SNAP Programs

Variable	WIC	SNAP
Target Population	Pregnant, post-partum women, infants, children with low income; nutritional risk	Americans in "need"
Operating Budget	$1.8 billion	$7.8 billion
Grant/Entitlement	Grant/authorized amount annually	Entitlement/ automatic stabilizer meet eligibility = accepted
Population Served	8,907,840	47,000,000
Food Subsidy Guidelines	Purchase WIC Approved Foods only	Cannot purchase "nonfood", hot/foods that can be eaten in the store
Education	Breastfeeding, drug prevention, nutrition education; required for	Targets three central nutrition goals; participation

	re-certification	optional
Other	Referrals to medical, social services	

Need for the Research

According to CDC, an estimated 34% of American adults are overweight, which suggest they are one to 34 pounds over their desired weight for height, while 32% of adults are categorized as obese, weighing 35 pounds or more over their desired weight (Hearne, Segal, Unruh, Earls, & Smolarcik, 2004, p. 3). Data from National Health and Nutrition Examination Surveys (1976-1980 and 2003-2006) indicate the prevalence of obesity has increased; for children aged 2-5 years, prevalence increased from 5.0% to 12.4%; for those aged 6-11 years, prevalence increased from 6.5% to 17.0%; and for those aged 12-19 years, prevalence increased from 5.0% to 17.6% (CDC, 2013, p. 1). Obesity is credited with contributing to numerous co-morbidities (see Table 4), often leading to mortality. This is reflected in treatment of these diseases, which costs an estimated $92.6 billion annually (Finkelstein, Fiebelkorn, & Wang, 2003, p. 225).

Table 4

Obesity-related Co-morbidities

Obesity-related Co-morbidities
• Hypertension • Dyslipidemia (for example, high total cholesterol or high levels of triglycerides) • Type II diabetes • Coronary heart disease • Stroke • Gallbladder disease • Osteoarthritis • Sleep apnea and respiratory problems • Some cancers (endometrial, breast, and colon)

It is reported that 45 persons per hour die due to an obesity-related illness in the United States. Obesity is not impervious to socioeconomic, educational, cultural, religious, gender, or age variables. Statistics from the Surgeon General's Report, *Call to Action to Prevent and Decrease Overweight and Obesity* (United States Department of Health and Human Services, 2001), indicate the following:

- For all racial and ethnic groups, women whose income is < 130% of the poverty threshold are 50% (estimated) more likely to become obese than persons of higher socioeconomic status.
- The prevalence of obesity increases until age 60 years and then begins to decline.
- More Mexican American men are overweight and obese than non-Hispanic White and Black men.

- There is a greater prevalence of overweight non-Hispanic White adolescents from lower income families than those from higher-income families, while Mexican American boys tend to have a higher chance of being overweight than non-Hispanic White or Black boys.

Sadly, obesity is not restricted solely to America's adult population. One of the largest groups suffering from obesity today is America's youth. Statistics confirms childhood obesity is steadily on the rise, affecting one-third of American children, or approximately 12,600,000 adolescents and youth. Overweight and obesity in children is diagnosed by an assessment of BMI or their weight in relation to height for age and sex. Should the BMI fall at the 85th percentile point on CDC Growth Charts, the child is considered overweight and if at the 95th percentile then classified as obese (see Figure 1; CDC, 2009a, para. 5). Table 4 provides body mass index information for adults.

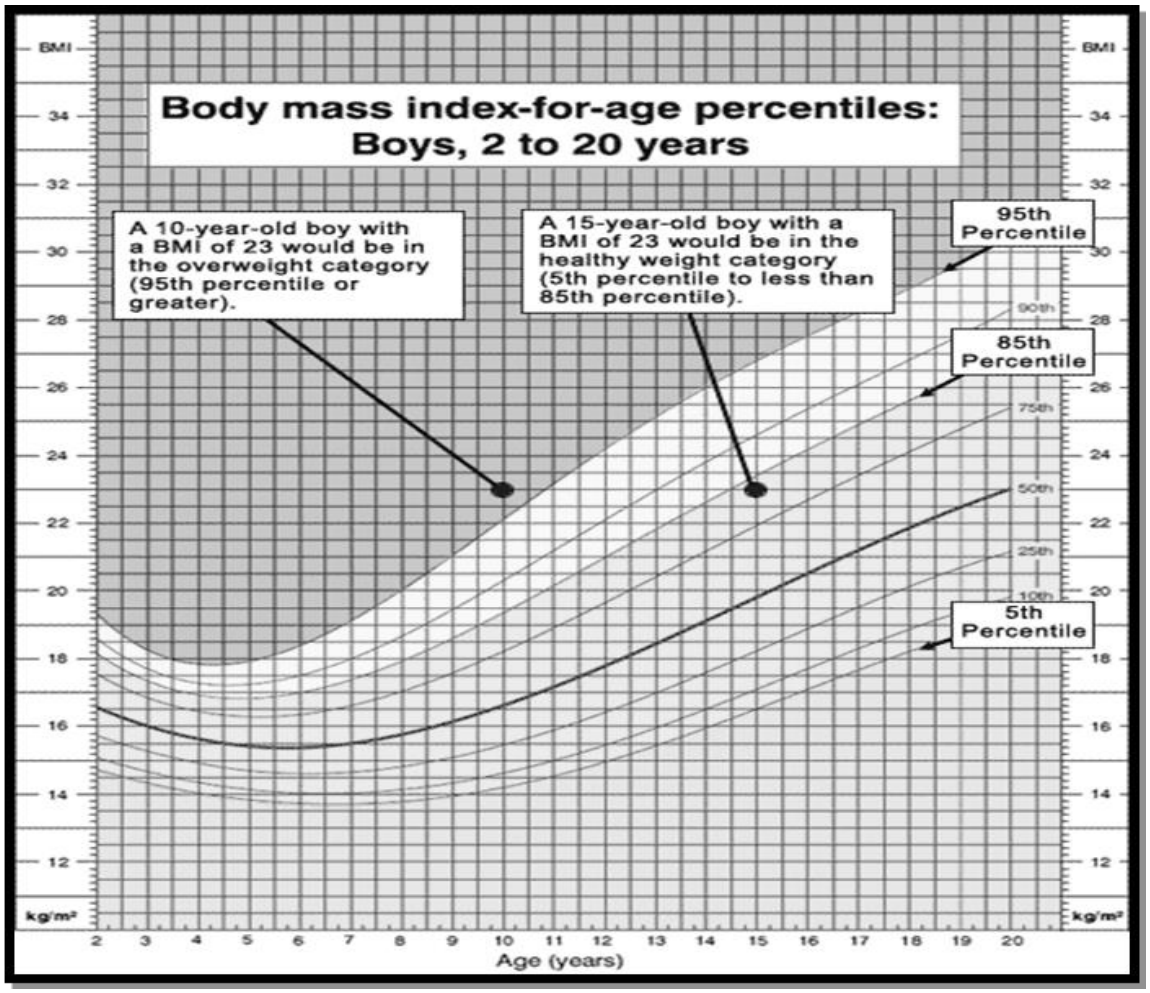

Figure 1. CDC growth charts showing the interpretation of BMI for 10- and 15-year-old boys. Adapted from "2 to 20 years: Boys Body mass index-for-age percentiles", CDC, 2009, http://www.cdc.gov/growthcharts/data/set1clinical/cj41l023.pdf. Copyright 2009 by the Centers for Disease Control and Prevention.

These trends also are reflected in the federally funded WIC program, a food-subsidy program designed to ameliorate the health and well-being of its program participants. Additionally, nutrition education is provided by local and private agencies to educate program participants about how to make healthy food selections while considering cultural preferences and other special household situations; "the intent is to

help participants continue healthful dietary practices after leaving the Program" (Federal Register, 2003, p. 2).

Edmunds et al. (2006) examined obesity trends of children enrolled in a New York district WIC program between 1989 and 2003. They found "the prevalence of overweight increased from 12.1% to 16.1%, and the prevalence of 'at risk of overweight' subjects increased from 13.3% to 16.1%" (p. 114). Edmunds et al. suggested the adoption of Eat Well Play Hard by New York's WIC program which encourages engagement in physical activity and increased consumption of fruits, vegetables, and low-fat milk; foods representative of WIC food packages. By doing so, this would aid in decreasing the number of overweight children in this population of people (p. 115). Furthermore, they recommended "WIC nutrition professionals to examine theories and practices of behavioral change for adoption into WIC clinics to address the rising prevalence of overweight" (p. 116).

Edmunds et al. (2006) are not alone in their recommendation to use policy to aid in mitigating this crisis. It is important to note that nearly 70 years have passed and a marked change has occurred in the nutritional needs and habits of Americans. However, federally funded nutrition programs once intended to provide food subsidies to service malnourished and deficient populations no longer represent the norm; programmatic changes are warranted to provide services for populations of children who are overweight or obese (Kennedy, 1999, p. 331). In an effort to examine the effect participation in WIC has had on nutritional behaviors of its former recipients and the effects of social

ecological influences (e.g., individual, interpersonal, policy), the infrastructure of WIC program was the emphasis of this social epidemiological study.

Social epidemiology is a branch of epidemiology intended to investigate the impact social influences have on health behavior. The historical origins of this area of study is a blend of medical, social, and psychiatric sciences designed systematically [to] examine variations in the incidence of particular diseases among people diversely located among the social structure and [to] attempt to explore the ways in which their position in the social structure tended to make them more vulnerable or less, to a particular disease (Berkman & Kawachi, 2000). Social variables are social phenomena such as socioeconomic status, work conditions, personal relationships, and education, which undoubtedly affect an individual's life and behaviors, directly influencing health.

The Social Ecological Model

The Social Ecological Model (SEM) described by Bronfenbrenner (1994) suggests that one's development and eventually one's behavioral patterns are understood best when all aspects of the ecological environment in which one operates are acknowledged. Each fraction of the ecological system (microsystem, mesosystem, exosystem, and macrosystem), is thought to play a critical or central role in the developing organism, yet when acting independently of each other, influences in the ecological system may not be highly effective. When functioning in cohesion, the ecological systems provide an optimum for impacting behavior. Accordingly, it is necessary to acknowledge each component for its significance and contribution.

In Bronfenbrenner's (1994) model, the microsystem, also named the interpersonal influence, is believed to have the greatest influence on the individual. Those closest to the individual, namely family, friends, co-workers, peers, and the neighborhood, often set the tone of the individual's foundational principles (e.g., morals, ethos), and disciplinary actions. Those from whom life-skills are learned have an immense amount of influence on the individual's behaviors. The exosystem is the component of an organism's environment that is considered to have an indirect influence on human development and behavior. The value of the exosystem resides in acknowledging the influences of workplace, social networks, religious ties, and other facets of this component and their effects on the organism. Finally, the macrosystem is centered on influences created beyond the individual's immediate environment and includes societal stimuli such as customs, cultures, and laws. The macrosystem provides the platform or stage upon which an organism lives its life. Figures 2 and Table 5 illustrate Bronfenbrenner's Ecological System and its components of influence, respectively.

Figure 2

Bronfenbrenner's Ecological Theory.

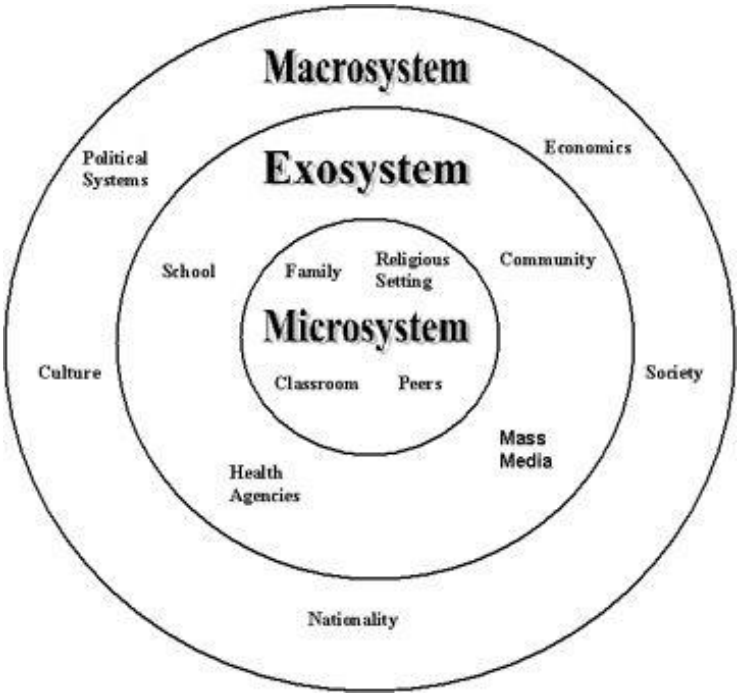

Figure 2. Lists three primary levels of social ecological influences and its sub-systems. Adapted from "Growth and Development Theory: Urie Bronfenbrenner (1917-2005)," by Schoolworkhelper. Retrieved from http://schoolworkhelper.net/growth-and-development-theory-urie-bronfenbrenner-1917-2005/.*Copyright 2010-2015 by SchoolWorkhelper.*

Social Ecological Influences

Table 5

Overview of Bromfenbrenner's SEM Levels of Influence:

	Intrapersonal factors—Characteristics of the individual such as knowledge, attitudes, behavior, self-concept, skills, and developmental history. Includes gender, religious identity, racial/ethnic identity, sexual orientation, economic status, financial resources, values, goals, expectations, age, genetics, resiliency, coping skills, time management skills, health literacy and accessing health care skills, stigma of accessing counseling services.
	Interpersonal processes and primary groups—Formal and informal social networks and social support systems, including family, work group, and friendship networks. Includes roommates, supervisors, resident advisors, rituals, customs, traditions, economic forces, diversity, athletics, recreation, intramural sports, clubs, Greek life.
	Institutional factors—Social institutions with organizational characteristics and formal (and informal) rules and regulations for operations. Includes campus climate (tolerance/intolerance), class schedules, financial policies, competitiveness, lighting, unclean environments, distance to classes and buildings, noise, availability of study and common lounge spaces, air quality, safety.
	Community—Relationships among organizations, institutions, and informational networks within defined boundaries. Includes location in the community, built environment, neighborhood associations, community leaders, on/off-campus housing, businesses (e.g., bars, fast food restaurants, farmers' markets), commuting, parking, transportation, walk ability, parks.
	Public policy—Local, state, national, and global laws and policies. Includes polices that allocate resources to establish and maintain a coalition that serves a mediating structure connecting individuals and the larger social environment to create a healthy campus. Other policies include those that restrict behavior such as tobacco use in public spaces and alcohol sales and consumption and those that provide behavioral incentives, both positive and negative, such as increased taxes on cigarettes and alcohol. Additional policies relate to violence, social injustice, green policies, foreign affairs, the economy, global warming.

Behavioral Changes and WIC

Bell and Gleason (2007) conducted a feasibility study using data from grocery store point-of-purchase receipts to assess behavioral changes of WIC study participants. Study participants volunteered to participate in the WIC-sponsored special nutrition education intervention sessions at WIC agencies in the Washington State area. Baseline measures were taken of their preferences for milk and cheese prior to the intervention. Several grocery stores agreed to install scanning equipment that would detect and track study participants' purchase transactions using their WIC check identification number linked to the Universal Purchase Code (UPC) barcode database. A UPC was assigned to every food item on the grocery store shelf, allowing for accurate tracking of every food item purchased. Study participants participated in one-on-one nutrition education sessions at local WIC agencies for six to eight months, where they received a nutrition education message encouraging the consumption of low-fat milk and cheese as alternatives to higher-fat products. All study participants received a minimum of two educational messages. Post-intervention measures were taken of milk and cheese purchases. Researchers concluded a nutrition intervention designed to encourage the purchase of 1% milk or skimmed milk and low-fat cheese by WIC participants (n = 296) utilizing point-of-purchase receipts to track purchase did not have a significant influence on purchase patterns. Researchers did conclude, however, that using point-of-purchase data is a feasible way of assessing behavioral changes in WIC participants.

Many studies have been conducted to determine how behavioral habits and decision making are impacted by social influences (e.g. SES, education, church, family),

which have resulted in the formulation of several theories. The trans-theoretical model and SEM are widely used in the science of social epidemiology; as countless scientific investigations have modeled study designs based upon these theoretical perspectives: "The most effective intervention strategies are likely to incorporate both the individual whose health behavior is in question and the larger community and governmental forces that influence the life of that individual" (Emmons, 2000, p. 249).

Significant policies instituted by federal and state governments over the past century have had a considerable impact on improving population health and advancing our understanding of the importance of public policy and its effect on positively influencing health outcomes. One example of public health policy that has had a noteworthy effect on population health is the motor vehicular safety laws. The National Traffic and Motor Vehicle Safety Act of 1966 was enacted as a result of the federal government regulating safety standards (Turnock, 2004) which required mandatory use of a seat belt and thus resulted in a decline in "vehicular rated fatality rates between 13-46 percent" (p. 165). The USDA has an opportunity to invoke change in the diets of the more than 4.6 million recipients of SNAP benefits by imposing greater restrictions of purchase of healthier or a more nutritiously dense food, yet it stands by the fact the evidence does not support imposing additional restrictions which could potentially make a difference in the prevalence of overweight and obese SNAP program participants.

In January 2006, the USDA imposed policy requiring the quantity of trans fat in a serving size of all food products be included on packaging (AHA, n.d., p. 1). The American Heart Association (AHA) rallied food manufacturers to be more transparent

regarding the harmful effect consumption of industrially produced trans-fat has on the heart and it continues to advocate for limiting the amount of unhealthy fats (e.g., cholesterol, trans fat, saturated fat) in restaurant food, snack foods, and school lunches. The AHA recommends trans-fat should make up less than 1% of the total caloric intake (p. 1). The benefits of this policy change are yet to be determined, however, any act that assist in abating this problem is welcomed. Finally, in the spirit of promoting social epidemiology, McKinley argued that "social system contributions, including governmental policies, organizational priorities, and behaviors and practices of health care professionals represent intervention strategies that have considerable potential for yielding lasting health benefits" (Berkman & Kawachi, 2000, p. 249).

Research conducted by Bowman, Gortmaker, Ebbeling, Pereira and Ludwid (2004) indicate there has been an 8% increase in the consumption of energy dense fast food by children during a period of 1970-1990. In a study that examined the affect diets high in fast foods had on dietary quality and its link to obesity risk, researchers found study participants (n=6212) who consumed fast food or high-energy diets (e.g. fats, carbohydrates, sugars, calories) had poorer dietary quality than study participants who did not consume a diet of fast food. Bowman et al. concluded that dietary quality is adversely affected by a diet of fast food can lead to a risk for obesity. Learned behaviors or attitudes that encourage the practice of healthy behaviors consistently (e.g., eating a nutritious diet, engaging in physical activity, refraining from smoking) are examples of lifestyle practices that will assist in reversing childhood obesity and its associated co-morbidities. It is to be expected one may, on occasion, make unhealthy food choices and

skip engaging in some form of physical activity daily, however, emphasizing the importance of practicing sound nutritional and wellness habits to a child during his or her formative years are essential to positive change whether the child has a problem with obesity or not (Lobstein, Baur, Uauy, 2004).

Upon leaving the WIC program, participants may enroll in SNAP or discontinue participation in federally subsidized food programs, at which time they have greater control regarding decisions about their food choices (e.g., nutritiously dense, healthy/nutritious, high in caloric content); no longer are they required to select food(s) from the Approved WIC List. Hence, as a SNAP recipient they are less encumbered by USDA restrictive guidelines and therefore, more empowered. WIC program guidelines define the type and quantity of foods program participants are allowed to purchase with benefits. Comparatively speaking, WIC program guidelines are far more restrictive than SNAP, which imposes modest restrictions on food purchases and naturally, if one opts not to or ineligible to participate in federally funded food subsidy programs, naturally they have an unrestricted purchase power, allowing the purchase of any types and quantity they desire. As reported by the World Health Organization in the Global Strategy on Diet, Physical Activity, and Health, children whose parents exhibit positive attitudes about their health are influenced by these behaviors (WHO, 2003). The purpose of this study was to examine food selections of former and current WIC participants who may currently enrolled and receiving both WIC and SNAP or another USDA food subsidy program benefits; receiving benefits from one of 15 USDA food subsidy

programs other than WIC; not receiving and form of government food subsidies benefits to investigate the following regarding current and former WIC participants:

1) Determine what influences food shopping behaviors
2) Determine if the variable that influence purchase of wheat bread/buns/rolls is the same for both study and control groups

Summary

Approximately 3.4 million Americans die annually as a result of an obesity-related illness, (World Health Organization, 2014) and one of many reasons why innovative scientifically based approaches are needed if we are seeking to reverse the obesity epidemic our nation faces. Data from National Health and Nutrition Examination Surveys (1976-1980 and 2003-2006) indicate the prevalence of obesity has increased in children considerably; the increase is threefold in some age categories (CDC, 2010). Comprehensive approaches to abate this epidemic are paramount. President Barack Obama is reviewing all nutritional and physical activity programs to create a comprehensive national model in an effort to attack this problem with full force. A multilevel approach (individual, interpersonal, community, organizational, public policy) is one of the most effective approaches when seeking to affect preventative measures. The purpose of this study was to investigate if there was a causal link between participation in WIC and food choice selections post-WIC. This research study provided a better understanding of WIC's program effectiveness and contributed to the literature surrounding to impose additional purchase restrictions of other USDA Food Nutrition Service programs.

Chapter 3: Research Method

Introduction

The purpose of this study was to determine if participation in the Women, Infants, and Children (WIC) had a causal effect on influencing the nutritional habits of its recipients. When food shopping, U.S. consumer behavior is often influenced by several factors, including but not limited to price-point index, marketing, brands, budget, food availability, the nutritional value, convenience of preparation, taste, hunger, family influence, and food insecurity concerns. WIC participants are faced have fewer of these challenges because program participants are required to purchase food items from USDA and FDA approved food packages (USDA, 2012, para. 1). This study examined how the three main components of the WIC program; nutrition education; counseling, and program policy have affected former WIC recipients' long-term behaviors and decisions regarding food purchases.

This federally funded program promotes and encourages sound nutritional habits by imposing purchase of nutritiously dense foods for purchase by program recipients. This is evident in the USDA's most recently approved food packages, which are based upon nutrition science; foods have greater fiber content and modest amounts of saturated fat (USDA, 2014, p. 12274). Consuming foods that are nutritiously dense is ideal for achieving immediate short-term goals when a participant is actively enrolled in WIC, and why these influences were examined to identify if there was residual effect on molding former participants' behaviors post-WIC. There is a lack of data regarding an association or causation between WIC participation and its impact.

Evidence from this study indicates nutrition education, staff counseling, and mandating recipients streamline food choice purchases to those found only on the WIC Approved Food List had an association on long-term behaviors of former WIC participants. Studies such as this and other studies are necessary to better understand how USDA food subsidy programs affect short and long- term nutritional habits of current and former recipients. This study can potentially impact more than 47 million recipients of food subsidy programs. This study's three primary research questions are based on obesity being the second leading cause of preventable death in America and associated with 385,000 mortalities annually.

The theoretical framework of this quantitative study is based on the social ecological theory. It assessed if independent variables nutrition education, staff-participant counseling, and restricted purchase power, had impact on long-term behaviors of former WIC participants. Women, Infants and Children's program education has been hailed as being "effective with providing the WIC participant with nutrition education but studies yielded inconclusive findings when examining the relationship between increased knowledge and the actual food purchasing behaviors of WIC participants" (Bell & Gleason, 2007, p. 7). Educational programming (e.g., literature, counseling, classes) offered by WIC has provided recipients with an understanding and knowledge about nutrition and health, yet, their ability to associate this to a behavior change is questionable. To best understand how to create long-term behavior change, additional studies and effective strategies must be employed. According to Bronfenbrenner's Social Ecological Model (SEM) of change, an individual's knowledge, behavior, attitudes and

character are associated with their intrapersonal influences [e.g., educational attainment, gender, health literacy, economic status], therefore arming an individual these attributes is necessary.

The social ecological theory formulated by Bronfenbrenner (1994) suggests a greater likelihood of behavioral change occurs when social ecological influences (e.g., intrapersonal, interpersonal, organizational, community, or public policy) are the foundational principles of a program or treatment, (p. 39). The ultimate goal of WIC is to increase the ability of pregnant and post-partum women, and children to consume a nutritious diet. To support the mission of WIC and encourage long-term practice of healthy behaviors, the USDA has established a multidimensional approach to address these objectives. This approach is framed by and closely parallels components of the social ecological model's individual, organizational, and policy levels of influence. For the purposes of this research study, individual, organizational, and policy level domains within the WIC infrastructure specifically pertaining to (a) nutrition education, (b) policy, and (c) stakeholder (i.e., personnel) involvement were examined.

When WIC participants participate in health education classes or receive literature that promotes and encourages steps to make wise food choices, these are examples of intrapersonal influence, (i.e., counseling conducted by WIC staff), while requiring purchase of foods from a pre-approved food list is an example of policy level of influence. Both of these are examples of constructs defined in Bronfenbrenner's (1994) social ecological theory. These, in addition to the two other influences, are essential when behavioral change is an expected outcome. Covariates, associated with this study include

length of time enrolled in WIC. The time spent in nutrition education and counseling sessions, and the quality of these educational tools may or may not influence the dependent variable; purchase of wheat bread/buns a food item on the WIC Approved Food Lists the dependent variable tested for this study.

A quantitative approach was used in this research study to allow for precision and clarity of its purpose and to enhance the research ability of the problem. The study used a causal-comparative experimental design that compared food purchases made by former WIC participants with food purchases made by study participants who had never received WIC in efforts. This comparison was made to document any statistical relationship between participation in WIC and nutritional behaviors post-WIC.

Research Design

This study used an explanatory causal-comparative experimental design to guide the data collection process. This design was ideal for this study because it provides information regarding relationships that may exist between independent and dependent variables, particularly if the event has already occurred (Brewer & Kuhn, 2010, p. 1). The signature attribute of a causal-comparative design is that it attempts to identify differences that may be present between two groups to determine cause and effect after a treatment has occurred. I was is not afforded the opportunity to manipulate the dynamics of the treatment; thus, a predetermined approach or methodology specific to exposure, be it quantitative and/or qualitative, is nonexistent, which challenged and threatened the veracity of the study's reliability, internal validity, and thus causal conclusion(s). Contrary to a randomized experiment, where the collective body of study participants'

(e.g., control and study participants') characteristic profiles are comparable at baseline, allowing for equality and uniformity in the assignment to control or treatment groupings, whereas a causal-comparative design is nonrandomized; therefore, randomization is compromised and caution with making inferences of study results to the general population is advised. Oftentimes, study results of causal research give rise to experimental studies that may be conducted in the future.

The purpose of this study was to compare food selections made by former WIC recipients with those of controls (i.e. never participated in the WIC program) to determine if participation in WIC had influenced or had any effect on nutritional behaviors long-term or post-WIC. The causal-independent variable was WIC participation and therefore indicated that the individual was a WIC recipient and thus a benefactor of WIC benefits including nutrition education, breastfeeding promotion, food subsidy vouchers, and medical referral services. This causality was a logical conclusion because it is required that individuals meet WIC program eligibility criteria as set forth and defined by the USDA in order to participate in and therefore benefit from WIC program offerings. Program eligibility is contingent upon meeting categorical, residential, income, and nutritional risk criteria.

The independent variable, denoted by x and termed the grouping variable in a causal-comparative design; as the treatment or cause has already occurred. Those who participated in the WIC program were assigned to the study group and those who did not receive WIC were assigned to the control group. The dependent variable y = purchase of select food items (i.e., wheat bread/buns) listed on the WIC Approved Food List or a food

item(s) of the nutritional equivalent. Participation in WIC is qualified as ex-post-facto meaning it occurred and was established prior to onset of this research study.

I collected data to determine whether participation in the WIC program affected nutritional behaviors specific to food choices made by former WIC participants, post-WIC. The operational definition of participation in WIC was as follows: Women between the ages of 18 and 50 years of age who met the WIC eligibility requirements as defined by the USDA and were enrolled in the WIC program.

WIC Eligibility Requirements

The following requirements are adapted from the U.S. Government Publishing Office (2015):

Categorical

> Women must be pregnant (during pregnancy and up to 6 weeks after the birth of an infant or the end of the pregnancy), postpartum (up to six months after the birth of the infant or the end of the pregnancy), or breastfeeding [up to the infant's first birthday] (Government Publishing Office, 2015, para. §246.2).

Residential

> Applicants must live in the State in which they apply. Applicants served in areas where WIC is administered by an Indian Tribal Organization (ITO) must meet residency requirements established by the ITO. At State agency option, applicants may be required to live in a local service area and apply

at a WIC clinic that serves that area. Applicants are not required to live in the State or local service area for a certain amount of time in order to meet the WIC residency requirement (Government Publishing Office, 2015, para. §246.2).

Income

To be eligible for WIC, applicants must have income at or below an income level or standard set by the State agency or be determined automatically income-eligible based on participation in certain programs.

- Income Standard:

The State agency's income standard must be between 100 percent of the Federal poverty guidelines (issued each year by the Department of Health and Human Services), but cannot be more than 185 percent of the Federal poverty income guidelines.

- Automatic Income Eligibility*:*

Certain applicants can be determined income-eligible for WIC based on their participation in certain programs. These include:

Eligible to receive SNAP benefits, Medicaid, or Temporary Assistance for Needy Families (TANF, formerly known as AFDC, Aid to Families with Dependent Children), in which certain family members are eligible to receive Medicaid or TANF, or at State agency option, individuals that are eligible to participate in certain other State-

administered programs (Government Publishing Office, 2015, para. §246.2).

Nutrition Risk

1) Applicants must be seen by a health professional such as a physician, nurse, or nutritionist who must determine whether the individual is at nutrition risk. In many cases, this is done in the WIC clinic at no cost to the applicant. However, this information can be obtained from another health professional such as the applicant's physician. "Nutrition risk" means that an individual has medical-based or dietary-based conditions. Examples of medical-based conditions include anemia (low blood iron levels), underweight, or history of poor pregnancy outcome. A dietary-based condition includes, for example, a poor diet. At a minimum, the applicant's height and weight must be measured and blood work taken to check for anemia. An applicant must have at least one of the medical or dietary conditions on the State's list of WIC nutrition risk criteria (Government Publishing Office, 2015, para. §246.2).

2) Must have been enrolled in WIC a minimum of three months to one year. Must have completed a minimum of two WIC recertification cycles, which is equivalent to one (1) of enrollment and participation in two staff nutrition education counseling sessions.

3) The primary grocery shopper in the household must be the person who shops for groceries ¾ of the time groceries are purchased for the household in a monthly buying cycle.

Operational Definition of Non-WIC Participant

The following are the criteria for the control group:

1) Must be female between the ages of 18 and 50 years with 1+ child.
2) Income must fall at or below 185% of the U.S. Poverty Income Guidelines (see Table 6):

Table 6

WIC Income Eligibility Guidelines for the 48 Contiguous States, District of Columbia, Guam, and Other U.S. Territories (July 1, 2014 to June 30, 2015)

Persons in Family or Household Size	Annual	Monthly	Twice-Monthly	Bi-Weekly	Weekly
1	$21,590	$1,800	$900	$831	$416
2	29,101	2,426	1,213	1,120	560
3	36,612	3,051	1,526	1,409	705
4	44,123	3,677	1,839	1,698	849
5	51,634	4,303	2,152	1,986	993
6	59,145	4,929	2,465	2,275	1,138
7	66,656	5,555	2,778	2,564	1,282
8	74,167	6,181	3,091	2,853	1,427
For each additional member, add	+$7,511	+626	+313	+289	+145

Note. Adapted from WIC Eligibility Guidelines, by U.S. Department of Health and Human Services, 2015, Retrieved from http://www.fns.usda.gov/wic/wic-income-eligibility-guidelines. Copyright 2015 by USDA.

3) The primary grocery shopper in the household must be the person who shops for groceries ¾ of the times groceries are purchased for the household in a monthly buying cycle
4) Participant has never enrolled in WIC and therefore has not received WIC benefits as an adult; however, a participant may have received WIC as an infant and/or child. This may be considered a confounder.

Study participants are not randomly selected in a causal comparative design, therefore, regression analyses are conducted to minimize this threat or weakness.

Setting and Population

The setting for this study was southeastern metropolitan suburban city Fulton County. According to the Business Chronicle for this city, it is the ninth-largest population in the country with an estimated population of 5,490,000 people. The state of Georgia reports 303,875 families participated in WIC for fiscal year 2013 (USDA, 2013b), a 6.6% decrease in families served since February 2013. Greater details of state population demographics can be found in Appendix F.

Sampling Method

The sampling method selected for this study is nonprobability convenience sampling. This was the primary method of choice of sampling techniques due to an inability to obtain access to the WIC participant files of former participants. I contacted the USDA and spoke with the Director of Special Nutrition Research Analysis in the Division of Office and Policy Support USDA, FNS. I requested access to data files, specifically, contact information of former participants and was told "petitioning to be granted permission to WIC participant records is not only a lengthy process but the IRB would more than likely be denied." Convenience sampling is the more practical sampling approach with respect to this barrier, yet in an effort to identify and recruit former WIC participants as effectively as possible, potential study participants were recruited accordingly:

3) Zip codes where the median income ranges from $11,000-$45,000. The rationale for recruiting in zip codes with a median income of $11,000-$45,000 is that this income reflects the characteristic average median income of WIC

participants (i.e., $10,808). Recruiting in these areas increases the likelihood of recruiting former WIC participants. Potential study participants were recruited at the Historic West Village Wal-Mart; the zip code is 30314 (see Appendix I for physical address). Table 7 shows zip codes that were considered for recruitment areas.

Table 7

Zip Codes Considered for Recruitment of Study Participants

Zip Code	Median Income
30337	$28,627
30318	$28,589
30354	$28,155
30314	$19,438
30313	$13,084
30032	$35,084
30312	$20,094
30080	$45,514
30134	$46,580

Table 7. Adapted from Basic Zip Code Search, by ZipWho, 2013, Retrieved from http://zipwho.com/. Copyright 2014 by ZipWho.

Convenience sampling is a nonprobability sampling technique and therefore does not have a defined method or approach for isolating a true sample size. The actual size of the sample is determined by the investigator's insight and judgment of an appropriate sample size (Laerd, 2012).

While convenience sampling is not deemed a robust sampling technique because of nonrandomization, it remains the best choice because of ease of accessibility to the

study population (inability to access WIC participant files), in addition to being inexpensive to conduct (Laerd, 2012). Basic data may be collected when convenience sampling is conducted. Additionally, this research method may enhance the ability to identify relationships that may exist because an event occurs. Given these possibilities, in the interest of understanding the effectiveness of WIC nutrition education programs and the impact they have on former recipients, this method was ideal because if may offer additional knowledge regarding best practices which may lead to discussion centered on programmatic review of WIC and other USDA food subsidy programs by key stakeholders.

Sample Size Justification

The study used descriptive statistics, Wilcoxon signed rank tests, and chi square tests of independence. A power analysis was conducted when the analyses used to address the research questions were inferential, but not for descriptive statistics; there was no minimum sample size required to conduct descriptive statistics. Typically for nonparametric analyses an additional 15% of the parametric alternative is required for the calculated sample size (Lehmann, 2006). The parametric alternative to the Wilcoxon signed rank test is the dependent sample *t* test. Power analysis was conducted on a two-tailed dependent sample *t* test with G*Power 3.1.7 using a level of significance of .05, a power of 0.80, and a medium effect size ($d = 0.50$). Based on the aforementioned parameters, the minimum required sample size for the Wilcoxon signed rank test is 39 participants. Power analysis for a chi square test of independence was conducted with G*Power 3.1.7 to determine a sufficient sample size using an alpha of 0.05, power of

0.80, a medium effect size ($w = 0.3$) and 25 degrees of freedom. Based on the aforementioned parameters, the minimum required sample size for the chi square test of independence is 254 participants, however, only 95 participants participated in this study;

Instrumentation and Materials

The instrument used in this study was a 25-question survey requiring the respondent to answer questions about weight and its relationship to health and the type, frequency, and influence of food choices made over a period of time. Although the purpose of this study was to explore the influence of WIC on food choices, a few survey questions were designed to determine the respondents' basic knowledge about excessive weight status (e.g. overweight, obesity) , and its association to co-morbidities (e.g., diabetes, hypertension, cancer). It is my opinion that it is necessary to identify, at minimal, if respondents associate weight with health; no additional data regarding this topic will be collected. The remainder of survey questions were dedicated to identifying a respondent's food preference for wheat bread/buns and if that preference has changed over time, and if so what variable influenced this change.

I designed a behavioral frequency rating scale specifically to examine the frequency of purchase of select foods (i.e., 100% whole wheat bread/buns), temporal measures, and variables that influenced these choices. A Likert-type scale is the basis of the frequency component of this instrument.

The Likert-type instrument was used in this study. A 25-question survey queried respondents regarding their purchase habits pre-, during, and post-WIC. The survey was designed to evaluate the study and control groups' likelihood of purchasing 100% whole

wheat bread/buns; a food approved by USDA as an approved food (see Tables 8 and 9). Responses will be measured using a six-point Likert-type frequency scale designed for this research study.

Table 8

Behavioral Frequency Scale for Study Group

Food Item	**Pre-WIC**	**During WIC**	**Post-WIC**
Bread	If you needed bread on six separate grocery store visits before you received WIC, how often would your purchase **100% whole wheat bread, rolls, or buns** during these visits? ☐ 100% of the time/Always 6 ☐ 90% of the time/Usually 5 ☐ 80% of the time/Often 4 ☐ 70% of the time/Sometimes 3 ☐ 60% of the time/Seldom 2 ☐ 0% of the time/Never 1 Was your selection based on: ☐ Taste ☐ Nutritional benefits ☐ Cultural influence ☐ Price ☐ other	If you needed bread on six separate grocery store visits when you were enrolled in WIC, how often would your purchase **100% whole wheat bread rolls, or buns** during these grocery visits? ☐ 100% of the time/Always 6 ☐ 90% of the time/Usually 5 ☐ 80% of the time/Often 4 ☐ 70% of the time/Sometimes 3 ☐ 60% of the time/Seldom 2 ☐ 0% of the time/Never 1 Was your selection based on: ☐ Taste ☐ Nutritional benefits ☐ Cultural influence ☐ Price ☐ other	If you needed bread when you no longer received WIC, how often would your purchase **100% whole wheat bread, rolls, or buns** during these visits? ☐ 100% of the time/Always 6 ☐ 90% of the time/Usually 5 ☐ 80% of the time/Often 4 ☐ 70% of the time/Sometimes 3 ☐ 60% of the time/Seldom 2 ☐ 0% of the time/Never 1 Was your selection based on: ☐ Taste ☐ Nutritional benefits ☐ Cultural influence ☐ Price ☐ other

Table 9

Behavioral Frequency Scale for Control Group

Food Item	**Purchases made during the past 2 years**	**Purchases made during the past year**	**Purchases made during the past 6 months**
Bread	If you needed bread during six separate grocery store visits five years ago, how often would you have purchased **100% whole wheat bread, rolls, or buns** during these visits? ☐ 100% of the time/Always 6 ☐ 90% of the time/Usually 5 ☐ 80% of the time/Often 4 ☐ 70% of the time/Sometimes 3 ☐ 60% of the time/Seldom 2 ☐ 0% of the time/Never 1 Was your selection based on: ☐ Taste ☐ Nutritional benefits ☐ Cultural influence ☐ Price ☐ other	If you needed bread during six separate grocery store visits three years ago, how often would you have purchased **100% whole wheat bread, rolls, or buns** during these visits? ☐ 100% of the time/Always 6 ☐ 90% of the time/Usually 5 ☐ 80% of the time/Often 4 ☐ 70% of the time/Sometimes 3 ☐ 60% of the time/Seldom 2 ☐ 0% of the time/Never 1 Was your selection based on: ☐ Taste ☐ Nutritional benefits ☐ Cultural influence ☐ Price ☐ other	If you needed bread during six separate grocery store visits during the last year, how often would you have purchased **100% whole wheat bread, rolls, or buns** during these visits? ☐ 100% of the time/Always 6 ☐ 90% of the time/Usually 5 ☐ 80% of the time/Often 4 ☐ 70% of the time/Sometimes 3 ☐ 60% of the time/Seldom 2 ☐ 0% of the time/Never 1 Was your selection based on: ☐ Taste ☐ Nutritional benefits ☐ Cultural influence ☐ Price ☐ other

A Likert item is the statement framed for the respondent to answer for example, "how often did you purchase 100% total wheat bread/bun," while the Likert scale is the total sum of the numerical values associated with each Likert item, it is not to be confused with the scale itself or the range of values (1-6) associated with the scale. A good Likert-type scale has a neutral, often positioned between opposing sides making it equivalent; the numerical value in this example of the two suggests the respondent does not have a dislike of or an affinity for a food item; rather, the respondent may or may not

purchase a food item. Additionally, I made certain all questions were centered on a common theme (e.g., frequency of purchases) to ensure reliability; "all of the items would be categorically similar so the summed score becomes a reliable measurement of the particular behavior or psychological trait you are measuring" (Vanek, 2012, para. 2).

Reliability and Validity of Likert Scale

Numerous schools of thoughts exist regarding the reliability and validity of Likert-type scales; "reliability is independent of the number of scale points" (Chang, 1994, p. 205) or "reliability is maximized using 7-pt, 5-pt, and 3-pt scales" (p. 205). A general rule about reliability suggests that the greater the number of test items, the more accurate the test; yet too many test items may compromise the test reliability. Additionally, it is important to note that if a respondent relies on guessing, this too threatens reliability. Other factors that may compromise test reliability include trick questions, timed tests, and distractions (e.g., pencil lead breaking) (Anonymous, n.d., p. 3). In a study that examined the reliability and validity of 4-point and 6-point Likert-type scales, it was concluded that "both the reliability and the heterotrait monomethod correlations were substantially reduced for the 6-point scale. Within the multitrait-multimethomatrix framework, the 4-point scale had greater reliability than the 6-point scale" (Chang, 1994, p. 212). "The number of scale points in a Likert-scale affects internal consistency reliability and HTMM validity but not HTHM validity" (Chang, 1994, p. 212).

The study group was asked to answer questions about purchases made before enrolling in WIC (i.e., pre-WIC), while enrolled in WIC (i.e., during-WIC), and when

they were no longer enrolled in WIC (i.e., post-WIC). The control group will be asked to answer questions regarding purchases they made two years ago, one year ago and six months ago. If respondents cannot accurately remember their food preferences as far back as two years ago, this may result in guessing and create a climate of recall bias threatening the internal validity of this study.

Recall bias is a form of informational bias and is defined as "intentional or unintentional differential recall (and thus reporting) of information about the exposure or outcome of an association by subjects in one group compared to the other" (Hassan, 2013, para. 3). "Research tells us that 20% of critical details of a recognized event are irretrievable after one year from its occurrence and 50% are irretrievable after 5 years" (para. 4). Of the various methods recommended to reduce recall bias, suggestions recommended are:

- "Use standardized, closed-ended questionnaires to promote consistency and specificity" (Dugan, 2013, p. 1).
- "Ask subjects about their knowledge of the study hypothesis (at end of interview), and analyze data accordingly" (Dugan, 2013, p. 1).

Because of this criteria of closed ended questions were used for this study to reduce recall bias. It is important to note the following: "little to nothing can be done once information bias has occurred and information bias cannot be "controlled for" in the analysis" (Dugan, 2013, p. 1).

Measures

The dependent variable or the variable of interest for this study was purchase of whole wheat bread/buns. I examined how frequent and what influenced the purchase of wheat bread/buns by study participants when grocery shopping. Although food choices may be influenced by several variables (e.g., price, cost, taste), the aim was to concentrate on identifying if former WIC participants are influenced by habits adopted as a result of participating in nutrition education workshops, health nutrition literature received, and purchasing of food items from the WIC approved food list.

An antecedent variable is defined as a variation of the dependent variable used to describe the correlation between two other variables that may have a relationship. The following is an example of an antecedent variable; warm weather typically has a direct relationship with ice cream sales and the incidence of crime. In this example the antecedent variable is summer; both sales of ice cream and incidence of crime increase in the summer time. In another example, given the antecedent variable is pregnancy, the following may apply. Prior to enrolling in WIC, pregnant women make healthier nutritional choices out of concern for the health of their unborn child as well as her own health. Sometimes, pregnancy may create its own health complications (e.g., gestational diabetes, high blood pressure), again requiring the mother to eat a select diet consisting of healthy foods, abstaining from alcohol consumption, and smoking which, may negate the primary objective of WIC, to encourage women to eat a nutritious diet; therefore, this may serve as an antecedent variable may be problematic.

The independent variable is the variable the researcher may control or manipulate; its designation is signified by the letter x. The independent variable for this study was participation in WIC and by default requires participation in WIC-sponsored nutrition education workshops and purchase of foods found on WIC Approved Food Lists. As noted, the independent variable is one that can be manipulated by the researcher; however, in some instances the independent variable is fixed and therefore cannot be manipulated, as in this study. For example, a person's health belief is a variable that may not be manipulated, as this belief may have been learned as a child and/or cultivated from experiences that may have developed over the years. Therefore, the ideas and attitudes regarding one's personal health are ingrained and often times un-manipulative. Another variable that cannot be manipulated is one's medical/personal health history; specifically, if a study participant or family member has a documented food allergy. A food allergy to milk or a religious belief banning the consumption of select foods are examples of intrinsic or intervening independent variables that cannot be manipulated. Participation in WIC was not manipulated for this study. Time enrolled in WIC ranged from one year to as long as 5 years, additionally, the health nutrition literature received and counseling experience one study participant received may have been vastly different from another's experience and cannot be manipulated. Further discussion regarding time enrolled in WIC is discussed in Chapter 4.

Quantitative variables include income, price of food, years of education, years enrolled in WIC, age. Qualitative variables include gender, race, cultural influences, health belief, and medical history.

Relationship of variables: The length of time a WIC participant was enrolled in the program it can be conceived the greater a social ecological influence/effect on one's behaviors and thus food choices.

Assertion: The length of time a person is enrolled in WIC may reflect its influence on a recipient's nutritional habits. The longer recipients receive WIC the greater the tendency for them to adopt behaviors learned from educational (e.g. nutrition, health) literature, counseling received and requirements to purchase healthy food (i.e., WIC Approved Foods).

Relationship of variables: Health status and food choices.

Assertion: The more health conscious WIC participants are prior to enrolling in WIC, the greater their inclination to make healthy food purchases, and, therefore, less likely to be significantly impacted to by education (e.g. nutrition, health) counseling received and requirements to purchase foods on the WIC Approved Food List.

Analysis Justification

Descriptive Statistics

Descriptive statistics are the appropriate form of analysis when the goal of the research is to present the participants' responses to survey items in order to address the research questions. Descriptive statistics include frequencies and percentages for categorical data, including dichotomous variables (e.g., difference of what influenced bread purchase pre- and post-WIC) and ordinal variables (e.g., purchase frequency of wheat bread/buns). Frequency is the number of participants that fit into a certain

category. Percentages were calculated to assess the proportion of the sample that corresponds with the given frequency.

Wilcoxon Signed Rank Test

The Wilcoxon signed rank test is the appropriate form of analysis when the goal of the research is to determine if a change exists between one group of participants' responses when measured on the same scale at two different time points or when participants are matched on some characteristic. The test converts the responses to ranks and compares the differences between the two time periods (Pallant, 2010). The Wilcoxon signed rank test uses nonparametric analysis and given the nonparametric nature of this statistical analysis, there are fewer assumptions to assess. The assumption is that data is obtained from random samples of populations (Brace, Kemp & Sneglar, 2006).

Chi Square Test of Independence

The chi square test of independence uses nonparametric analysis and is the appropriate test to determine if there is a significant relationship between two categorical variables, such as group and purchase frequency. The calculated chi-square coefficient (χ^2) and the critical value coefficient was compared to determine the significance of the results. Using an alpha of .05 and given the degrees of freedom, if the calculated value is larger than the critical value it indicates a significant relationship. The degrees of freedom for a chi-square test were calculated using the following equation: (r - 1) x (c - l), where c equals the number of columns and r equals the number of rows (Howell, 2010).

Analysis of Variance for Repeated Measures

An analysis of variance (ANOVA) is designed to identify the difference(s) between two means of a sample for measures taken over three or more time points and also may be used to identify the difference(s) of means that exist when a sample is exposed to three or more conditions. The repeated measures ANOVA uses an F-statistic, a value used to determine the statistical significance of a model. An F-statistic is a ratio of the variance between group means to project the variance within the group means. The ANOVA for repeated measures between two groups was used to analyze if a difference of significance exist between study and control groups.

Data Analysis Plan

Data was collected and entered into SPSS 21.0 for Windows for analysis. Descriptive statistics was compiled to describe the characteristics of the sample. The characteristics of the sample came from the demographic portion of the survey and examined by groups (e.g. study vs. control). Frequencies and percentages are calculated from categorical data, primary area of employment, and weight description. Means and standard deviations were calculated from continuous data, including age, current income, and years of receiving WIC benefits.

Research Questions and Hypotheses

RQ1 Are current food choices made by former WIC participants the result of behaviors learned while participating in WIC-sponsored health education classes, nutrition counseling, and restrictions to use food benefits/vouchers only towards purchase of foods on WIC approved food lists?

RQ2 Has the variable which influenced food choice made by the control group changed over the past two years?

RQ3 Does the primary variable, which influences food choice, differ between study and control groups?

Research Question One

Are current food choices made by former WIC participants the result of behaviors learned while participating in WIC-sponsored health education classes, nutrition counseling, and restrictions to use food benefits/vouchers only towards purchase of foods on WIC approved food lists?

$H_0$1a: There is no relationship between pre-WIC and post-WIC bread purchases for the study group.

H_a1a: There is a relationship between pre-WIC and post-WIC bread purchases for the study group.

To address research question one, two sets of analyses were conducted. The first sets of analyses conducted were frequencies and percentages for wheat bread/bun purchases using the *Behavioral Frequency Rating Scale*. Frequency periods examined by time were pre-WIC, during WIC, and post-WIC. The survey questions pertaining to bread will ask: *If you needed bread on six separate grocery store visits before WIC/when enrolled in WIC/when you no longer received WIC, how often would you purchase 100% whole wheat bread, rolls, or buns during these visits*. For pre-WIC, during WIC, and post-WIC, the response options will range from 1 = 0% of the time or never to 6 = 100% of the time or always; these were treated as ordinal variables.

The second set of analyses conducted was the Wilcoxon signed rank tests used to determine if a statistically significant change exists between pre-WIC and post-WIC purchase frequencies of bread. To address hypothesis 1a, a Wilcoxon signed rank test was conducted between pre-WIC bread purchase frequency and post-WIC bread purchase frequency. Statistical significance will be determined with a level of significance of .05.

Research Question Two

Has what influenced choice made by controls changed over the past two years?

$H_0$2a: There has been no change what influenced bread purchases for the control group over the last two years.

H_a2a: There has been a change in what influenced bread purchases for the control group over the last two years

To address research question two, two sets of analyses were conducted. The first sets of analyses conducted examined frequencies and percentages of wheat bread/bun using the *Behavioral Frequency Rating Scale*: bread was examined by time periods (two years ago, one year ago, and six months ago). The survey questions pertaining to bread asked: *If you needed bread on six separate grocery store visits two years ago, one year ago, and six months ago, how often would you purchase 100% whole wheat bread, rolls, or buns during these visits*. For two years ago, one year ago, and six months ago, the response options range from 1 = 0% of the time or never to 6 = 100% of the time or always; they were treated as ordinal variables.

The second set of analyses conducted was an ANOVA test to determine if a significant change exists between the influence variable to purchase bread over the time

periods. To address hypothesis 2a, an ANOVA for repeated measures was conducted between bread-purchase frequency two years ago, one years ago, and six months ago. Statistical significance was determined with a level of significance of .05.

Research Question Three

Does the primary variable, which influences food choice, differ between study and control groups?

$H_0$3a: There is no difference between the primary variable that influences food choice for the study and control groups.

H_a3a: There is a difference between the primary variable that influences food choice for the study and control groups.

To address research question three, an ANOVA for repeated measures between two groups was conducted to determine if a significant relationship exists between what influenced bread choice for the study group compared with the control group. Post-WIC purchase influence for bread was treated as an ordinal and dichotomous variable where response were nutritional value and some other variable (e.g. culture, price, taste, WIC). For hypothesis 3a, an ANOVA for repeated measures between groups was conducted to determine if a statistically significant relationship exists between the variable that influenced post-WIC bread choice by the study group and compared with the influence variable for controls at six months. Statistical significance was determined with a level of significance of .05.

Ethical Protection of Participants

This research study was conducted to examine the impact the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) had on influencing food choice behaviors post-WIC (i.e., former-WIC recipients). The following provides details of how study participant's privacy and confidentiality were protected:

I invited prospective participants who were female, 18 years or older, with one or more children to participate in this study. The study group included women who met USDA program guidelines for WIC in addition to having received WIC benefits (x= study group). Conversely, the control group (y = control group) included women 18 years or older, yet had never received WIC benefits. Males were not invited to participate in this study, as USDA WIC program eligibility requirements for do not include males.

A letter was distributed to shoppers at the Historic West Village Wal-Mart retailer located in a southeaster metropolitan urban city. Invitees were not coerced to participate, but offered a $5 Walmart gift card as a thank you, for taking part in the study and for any other research related inconveniences incurred. The willingness to participate by submitting their survey served as an act of implied consent. Age verification was not required. Additionally, the initial question of the survey required the study participant to consent she is of legal age (i.e., 18 years or older) to participate before access is granted to start of survey:

> "By answering yes to this statement you agree to the following: 1) I am 18 years or older; 2) I will not impersonate any person or entity; 3) I am not participating

> in this study against my will; 4) I have one or more children; the prospective participant is automatically directed to the "disqualification page" which reads "Minors under age 18 are disqualified from participating in the "Social Ecological Influences of WIC Programming Survey on Behavior Change of Former WIC Participants". Thank you.

It is important to note, if participants were disqualified at this stage of the survey because she did not meet study criteria she still was entitled to receive gift card. If the participant partially completed the survey and withdraws before completing entirely, she was still entitled to receive gift card. This was explained in the general information question and answer period/session prior to procession of survey. Additional details about the nature of the study (e.g. purpose, sample copy of study questions, risks, data security) and an opportunity to ask questions were always an option.

The Federal Policy for Protection of Human Subjects defines minimal to no risk to a human study participant as "the probability and magnitude of harm or discomfort anticipated in the proposed research are not greater, in and of themselves, than those ordinarily encountered in daily life or during the performance of routine physical or psychological examinations or tests [Federal Policy §___.102 (i)]" (Department of Health and Human Services, 1993, para. 1). Participants were only asked to answer questions regarding food choices made over various time periods. The following is an example of a survey question:

> "If you needed rice on 6 separate grocery store visits when you were no longer enrolled in WIC how often would you purchase "wheat bread/buns" during these grocery store visits"?

a. 100% of the time / Always (6 out of the 6 times)
b. 90% of the time / Usually (5 out of the 6 times)
c. 80% of the time / Often (4 out the 6 times)
d. 70% of the time / Sometimes (3 out of the 6 times)
e. 60% of the time / Seldom (2 out of the 6 times)
f. Less than 0% of the time (1 out of the 6 times)

Additionally, the survey required the respondent to provide demographic information (e.g. age range, income range, educational status). For a complete list of survey questions see Copy of Survey Questions (see Appendix E).

Protecting the confidentiality of human study participants is the utmost importance. The survey was conducted through Survey Monkey an online survey website. To ensure confidentiality, the survey did not contain any information that allowed me to identify a study participant. Survey Monkey is a self-serve survey tool utilized by millions of users and is committed to secure data of its users. The following is a brief synopsis of how data is secured.

Survey Monkey retains data responses as long as the account holder has an active account, yet once the account is cancelled access and usage is restricted. I will delete responses two years after completion and confirmation of doctoral studies.

Summary

The study was designed to examine former WIC program participants to determine if participation in WIC programs (e.g. nutrition counseling, health education literature, restrictions to use food subsidy benefits only towards purchase of WIC Approved Foods) influenced food choices post-WIC. The purpose of WIC is to improve the health of low income families particularly women, infants, and children who are nutritionally at risk and not a behavior modification intervention program, WIC has

garnered a reputation for improving the health of those served by providing health education courses and literature, counseling, and food subsidy benefits to its recipients. The research questions for this study were based on the problem statement. The theoretical framework of this quantitative study is based on the Bromfenbrenner's social ecological theory. This study used an explanatory causal-comparative experimental design to guide the data collection process. This design was selected because it "seeks to find relationships between independent and dependent variables after an action or event has already occurred" (Brewer & Kuhn, 2010, p. 1). The sampling method selected for this study was a nonprobability convenience sampling as this was primarily because of an inability to obtain access to the WIC participant files of former participants.

The instrument used was a 25-question survey requiring the respondent to answer questions about weight status (e.g. overweight, obese) its relationship to health, and the frequency, and influence of food choices made over a period of time. Females between the ages of 18 and 50 years of age who met the WIC eligibility requirements as defined by the USDA and enrolled in the WIC program = (x_1) served as the study group while females between the ages of 18 and 50 years of age who never received WIC served as controls.

Chapter 4: Results

Introduction

The aim of this study was to identify the impact participation in the Supplemental Nutrition Program for Women, Infants, and Children (WIC) had on nutrition behaviors of current and former recipients. This chapter presents the statistical analyses conducted to address this study's research questions. It also includes a discussion of the study participants' demographic and descriptive statistics, as well as discussion of Wilcoxon, ANOVA, and general linear regression statistical tests performed and an interpretation of findings. This chapter concludes with a summary of results.

I invited potential study participants to complete a questionnaire regarding their food choice behaviors. I specifically formulated the questionnaire to assess the frequency of purchase of wheat bread/buns and what influenced this choice. Collections of the surveys were conducted April 11-13, 2015 and during final visits to the retailer April 17-19, 2015. The dataset includes 95 (N = 95 observations) participants of whom n = 63 (66.31%) represented WIC cases (i.e., current or former recipients of the USDA WIC food subsidy program) and n = 32 (33.68%) controls (i.e., people who never received USDA WIC food subsidy benefits).

Participant Demographics and Descriptive Statistics

Data was collected from N = 95 participants (see Table 10), all of whom were women ranging in age from 18-42 years. The number of years of education of the sample included one person (3.13%) who completed grammar school, 41 (44.44%) whose highest level of education was high school, 17 (20.63%) who completed vocational

school, and 31 (43.76%) who held masters, professional, or doctoral degrees. A majority (58.9%) of the sample worked in a full-time capacity. Variances of income ranged significantly, with 55 (57.9%) reporting annual earnings of ≤ $30,000 and 18 (8.9%) reporting an income of ≥ $60,000. Eighty-two (86.3%) participants indicated English as their primary language and 71 (74.7%) reported having 1-3 children. The participants worked in all areas of the workforce (See Figure 3) and some received benefits from other USDA food subsidy programs (See Figure 4).

Table 10

Demographic of Study Sample by WIC Status

Variables	All	Ever participated in WIC?		Ever participated in WIC?	
		no	yes	no	yes
	n	*n*	*n*	%	%
What is your age?					
18-25	9	3	6	9.38	9.52
26-33	27	4	3	12.50	36.51
34-41	22	8	14	25.00	22.22
42 and over	37	17	20	53.13	31.75
What is your current household income?					
Under $10,000	22	7	15	21.88	23.81
10,000-19,900	18	1	17	3.13	26.98
20,000-29,000	15	5	10	15.63	15.87
30,000-39,000	9	1	8	3.13	12.70
40,000-49,000	4	1	3	3.13	4.76
50,000-59,000	9	6	3	18.75	4.76
60,000-69,000	3	0	3	0.00	4.76
70,000-79,000	5	5	0	15.63	0.00
80,000 and over	10	6	4	18.75	6.35
What is your primary language?					
English	82	29	53	90.63	84.13

Variables	All	Ever participated in WIC?		Ever participated in WIC?	
		no	yes	no	yes
	n	*n*	*n*	%	%
Spanish	7	1	6	3.13	9.52
Other	6	2	4	6.25	6.35
What is your highest level of education completed?					
Some high school	5	0	5	0.00	7.94
High School	41	13	28	40.63	44.44
Vocational school	17	4	13	12.50	20.63
Bachelor's degree	18	7	11	21.88	17.46
Master's degree	7	4	3	12.50	4.76
Professional degree	5	2	3	6.25	4.76
Doctoral degree	1	1	0	3.13	0.00
Grammar school	1	1	0	3.13	0.00
Which describes your current employment status?					
Disabled unable to work	6	3	3	9.38	4.76
Unemployed	9	3	6	9.38	9.52
Student	13	7	6	21.88	9.52
Retired	3	0	3	0.00	4.76
Homemaker	8	0	8	0.00	12.70
Full time employed	56	19	37	59.38	58.73

Variables	All	Ever participated in WIC?		Ever participated in WIC?	
		no	yes	no	yes
	n	*n*	*n*	%	%
How many children do you have?					
Missing = no response	2	0	2	0.00	3.17
1-3 children	71	29	42	90.63	66.67
3-5 children	16	3	13	9.38	20.63
more than 6 children	6	0	6	0.00	9.52
How many children under 6 years of age live in your household?					
Missing = no response	9	4	5	12.50	7.94
none	39	14	25	43.75	39.68
1-3 children	41	14	27	43.75	42.86
3-5 children	6	0	6	0.00	9.52

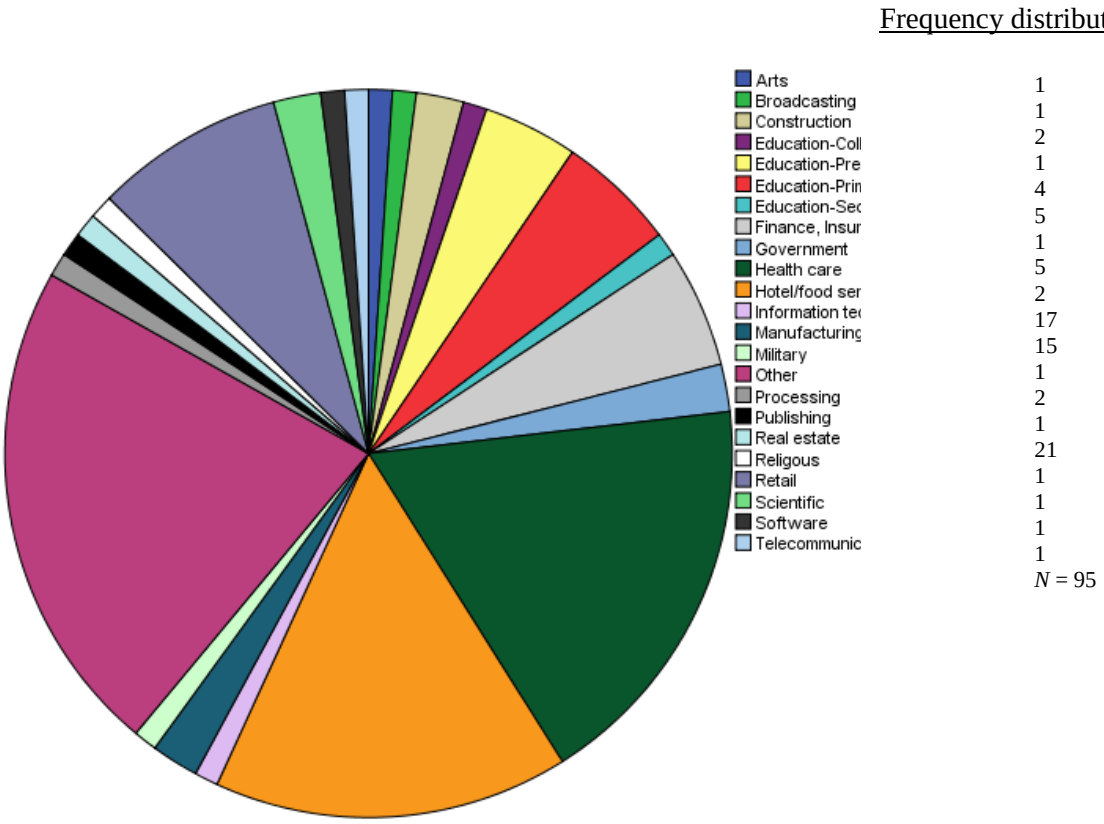

Figure 3. *Note*: Study Participants' primary areas of employment.

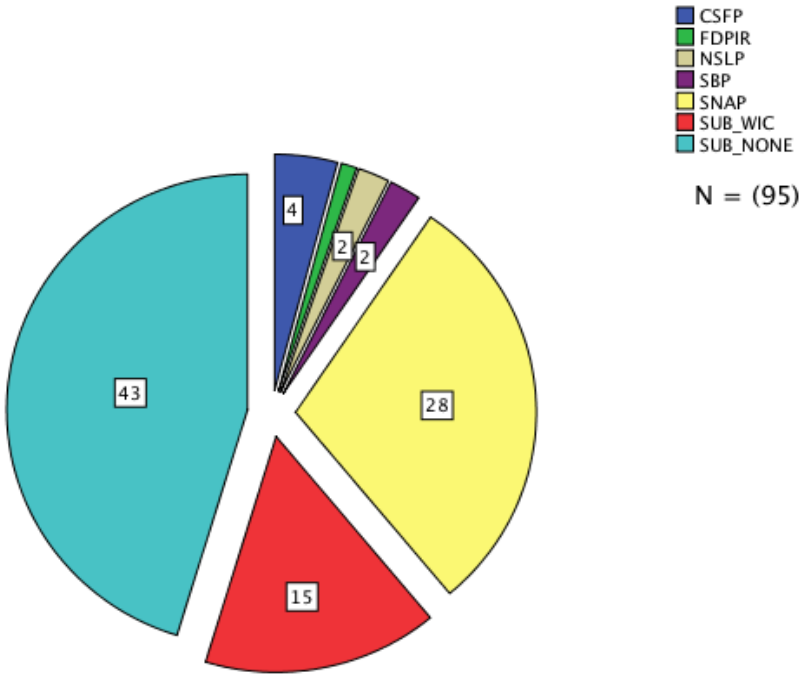

Figure 4.Note: Study participants enrolled in USDA food subsidy programs at the time of the study.

CSFP	=	Commodity Supplemental Food Program;
FDPIR	=	Food Distribution Program on Indian Reservations;
NSLP	=	National School Lunch Program;
SBP	=	School Breakfast Program;
SNAP	=	Supplemental Nutrition Assistance Program;
SUB WIC	=	WIC only;
SUB NONE	=	None of these

The dataset of the variables was collapsed to provide summary statistics of the original study sample to facilitate interpretation of data. A bivariate table was constructed via WIC status that compares cases with controls against the following variables: understanding of health in relation to weight status; age; income; education; employment

status; primary language; number of children; number of children age 6 years or younger living at home. A Pearson Chi-Square test was conducted on the categorical data to determine the probability of independence of the study sample in efforts to identify if it was representative of a distribution that was expected. Note, Fisher's exact test was appropriate to use when conducting 2 x 2 contingency tables specifically when the sample size is small (i.e., <5) or when a researcher has defined marginal sums (Sheskin, p.506, 2003).

Table 11

Bivariate Table of Variables (Collapsed) by WIC Status; N = 95

Variable	*n*	Ever received WIC? No *n* (%)	Yes *n* (%)	χ^2 P-value
Being overweight may contribute to health problems?				0.73†
No	5	2 (6.5)	3 (4.7)	
Yes	89	29 (93.5)	60 (95.2)	
Obesity may contribute to health problems?				0.41†
No	6	3 (9.4)	3 (4.9)	
Yes	87	29 (90.6)	58 (95.1)	
Age				0.08
18-25	9	3 (9.4)	6 (9.5)	
26-33	27	4 (12.5)	23 (36.5)	
42 and over	37	17 (53.1)	20 (31.8)	
Income				0.01
Less than $30,000	55	13 (40.6)	42 (66.7)	
$30,000 - $59, 000	22	8 (25.0)	14 (22.2)	
$60,000 or more	18	11 (34.4)	7 (11.1)	
Education				0.30
High school or less	47	14 (43.8)	33 (52.4)	
Vocational school	17	4 (12.5)	13 (20.6)	
Bachelor's	18	7 (21.9)	11 (17.5)	
Master's/professional/doctoral	13	7 (21.9)	6 (9.5)	
Employment Status				0.23†
Full time employed	56	19 (59.4)	37 (58.7)	
Other	17	3 (9.4)	14 (22.2)	
Primary Language				0.58†
English	82	29 (90.6)	53 (84.1)	
Spanish	7	1 (3.1)	6 (9.5)	
Other	6	2 (6.3)	4 (6.4)	
Children				0.02
1-3 children	71	29 (90.6)	42 (68.9)	
4 or more children	22	3 (9.4)	19 (31.2)	
Children under 6 years				0.26†
None	39	14 (50.0)	25 (43.1)	
1-3 children	41	14 (50.0)	27 (46.6)	
4 or more children	6	0 (0.0)	6 (10.3)	

† Fisher's exact p-value

As shown in Table 11, the variables of age, income, and children across WIC status have $p = 0.08$, .01, and 0.02, respectively, signifying marginal significance to significant between the two groups. Results of the test indicate women who participated or received WIC were slightly younger than those who never participated or received WIC. A p = 0.08 or a marginal significance of difference for age exists between the two groups. Twenty-three (36.5%) cases reported age between 26-33 years while 17 (53.1%) controls reported age as 42 years and older. According to the USDA's report titled "WIC Participant and Program Characteristics 2012 Final Report" 865.9% (N=2,300,065) of women receiving WIC in April 2012 were between the ages of 18 and 34 years (USDA, pg. 20, 2013); the sample for this study was representative of the national WIC population for the age variable. It is important to note, WIC eligibility guidelines defined by the Georgia Department of Public Health (the state in which this study was conducted), indicate there is no age requirement to receive WIC benefits, only that the women is pregnant and meet all program eligibility (e.g. income, residence) requirements.

A p = 0.01 for income is indicated between the two groups. Women who participated in WIC reported a lower annual income than women who never participated in WIC. Forty-two cases (66.7%) reported incomes ≤ $30,000 representative of a little less than half the cases, while 11 (34.4%) controls reported an income of ≥ $60,000 annually. USDA report 66% of WIC recipients nationally reported annual incomes at or below Federal poverty levels; $15,000 was the median annual income for April 2012 (USDA, 37, 2013). This difference between cases and controls in this study groups may

be attributed to the variance in age. Cases who represent the 18-33 year cluster (i.e. 46.03%) of the study population may not have reached their true earning potential versus more than half of the study population (i.e. 53.1%) representative of the 34-42 or older who may have reached a point where they have maximized their earning potential or and earning well beyond federal poverty guidelines.

Cases *n*=63 reported having more children than controls *n*=32; 42 (68.9%) and 19 (31.2%) respectively. This difference may be attributed to several factors (e.g. family planning, educational pursuits, advanced and professional degrees) however, this study was not designed to test these variables.

The results of the dataset indicate there are no extreme differences between the cases and control groups with the exception of age, income and children variables.

Cases WIC History

The following section includes analyses using frequency tables to illustrate study cases' (n=63) WIC history (e.g. how many years received WIC, first year of WIC, last year of WIC). The purpose for questioning cases regarding their WIC participation was to identify if they were former or a current recipient at the time the study was conducted and to establish how many years or their length of stay in the program. Cross-tabulation analyses were conducted against these variables (e.g. wicyears, first year /WIC, last year), to determine if there were any relationships within the data that might not be apparent. Note extreme caution was exercised with making inferences surrounding results. The following were questions asked about WIC history:

- How many years did you receive WIC benefits? (See Table 12)

- What year did you initially receive WIC benefits? (See Table 13)
- What year did you last receive WIC benefits? (See Table 14)

Table 12

Answers to the Question "What Year Did You Initially Receive WIC Benefits?"

wicyr1	Frequency	Percent	Cumulative Frequency	Cumulative Percent
prior to 2000	23	37.10	23	37.10
2000-2005	12	19.35	35	56.45
2005-2010	13	20.97	48	77.42
2010-2014	14	22.58	62	100.00

*Frequency missing = 1

Table 13

Answers to the Question "What Year Did You Stop Receiving WIC Benefits?"

wicyr2	Frequency	Percent	Cumulative Frequency	Cumulative Percent
prior to 2000	21	33.33	21	33.33
2000-2005	13	20.63	34	53.97
2005-2010	9	14.29	43	68.25
2010 to present	20	31.75	63	100.00

Table 14

Answers to the Question "How Many Years Did You Receive WIC Benefits?

wicyears	Frequency	Percent	Cumulative Frequency	Cumulative Percent
1-6 months	7	11.29	7	11.29
6-12 months	10	16.13	17	27.42
1-3 years	20	32.26	37	59.68
3-5 years	25	40.32	62	100.00

Results

Twenty-three (37.10%) cases received WIC benefits prior to the year of 2000, 21 (33.33%) received WIC in the year of 2000, and the average length of participation in the program was 3-5 years representative of 25 (40.32%) responses.

Table 15 below is a cross tabulation table displaying the variables wicyears, (representative of the number of months to years a case may have participated in WIC) crossed by the frequency; the likelihood a participant would purchase of wheat bread or buns when shopping on six separate grocery store visits. A $p = .078$ of a Chi-square test examined if a relationship exists between years participated in WIC and the frequency of purchase of wheat bread/buns. Results indicate there was no evidence of a correlation between the two variables.

Table 15
Cross Tabulation Analyses of wicyears*WIC_WheatB2

			WIC_WHEATB2						Total
			0	1	2	3	4	5	
wicyrs	0	Count	2	0	0	2	1	1	6
		Expected Count	1.5	.5	.2	.9	.8	2.2	6.0
		% within wicyears	33.3%	0.0%	0.0%	33.3%	16.7%	16.7%	100.0%
		% within WIC_WHEATB2	13.3%	0.0%	0.0%	22.2%	12.5%	4.5%	9.8%
		% of Total	3.3%	0.0%	0.0%	3.3%	1.6%	1.6%	9.8%
	1	Count	3	0	0	1	1	5	10
		Expected Count	2.5	.8	.3	1.5	1.3	3.6	10.0
		% within wicyears	30.0%	0.0%	0.0%	10.0%	10.0%	50.0%	100.0%
		% within WIC_WHEATB2	20.0%	0.0%	0.0%	11.1%	12.5%	22.7%	16.4%
		% of Total	4.9%	0.0%	0.0%	1.6%	1.6%	8.2%	16.4%
	2	Count	3	3	1	3	3	7	20
		Expected Count	4.9	1.6	.7	3.0	2.6	7.2	20.0
		% within wicyears	15.0%	15.0%	5.0%	15.0%	15.0%	35.0%	100.0%
		% within WIC_WHEATB2	20.0%	60.0%	50.0%	33.3%	37.5%	31.8%	32.8%
		% of Total	4.9%	4.9%	1.6%	4.9%	4.9%	11.5%	32.8%
	3	Count	7	2	1	3	3	9	25
		Expected Count	6.1	2.0	.8	3.7	3.3	9.0	25.0
		% within wicyears	28.0%	8.0%	4.0%	12.0%	12.0%	36.0%	100.0%
		% within WIC_WHEATB2	46.7%	40.0%	50.0%	33.3%	37.5%	40.9%	41.0%
		% of Total	11.5%	3.3%	1.6%	4.9%	4.9%	14.8%	41.0%
Total		Count	15	5	2	9	8	22	61
		Expected Count	15.0	5.0	2.0	9.0	8.0	22.0	61.0
		% within wicyears	24.6%	8.2%	3.3%	14.8%	13.1%	36.1%	100.0%
		% within WIC_WHEATB2	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
		% of Total	24.6%	8.2%	3.3%	14.8%	13.1%	36.1%	100.0%

Table 16 (see below), is a crosstabulation of variables wicyears, (i.e., representative of the number of months to years a study case may have participated in WIC) crossed by the influence variable (e.g., price, taste, participation in WIC, culture) for purchase of wheat bread/buns when shopping on six separate grocery store visits. Chi-square results $p = .908$ indicating there is no evidence of an association for length of time participated in WIC and influence on choice of wheat bread/buns.

Table 16

Cross Tabulation wicyears*WIC_Choice_B2

wicyears * WIC_CHOICEB2 Crosstabulation

			WIC_CHOICEB2						Total
			0	1	2	3	4	5	
wicyears	0	Count	0	5	1	0	0	0	6
		Expected Count	.1	3.0	.4	1.1	1.2	.2	6.0
	1	Count	0	6	0	2	2	0	10
		Expected Count	.2	5.1	.7	1.8	2.0	.3	10.0
	2	Count	0	9	1	4	5	1	20
		Expected Count	.3	10.2	1.3	3.6	3.9	.7	20.0
	3	Count	1	11	2	5	5	1	25
		Expected Count	.4	12.7	1.6	4.5	4.9	.8	25.0
Total		Count	1	31	4	11	12	2	61
		Expected Count	1.0	31.0	4.0	11.0	12.0	2.0	61.0

Frequency Distribution for Controls

The following section includes analyses of controls (n = 32) for frequency of purchase of bread and what influenced purchase of wheat bread/buns. The tables below provide frequency percentages of purchase of wheat bread made by controls at two years, one year, and six months ago. The purpose of these analyses is to identify if purchase habits were consistent over time.

ANOVA for Repeated Measures

A repeated measures ANOVA was conducted for the analysis of this section. An ANOVA is designed to identify the difference(s) between two means of a sample for measures taken over three or more time points; it also may be used to identify the difference(s) of means that exist when a sample is exposed to three or more conditions. For purposes of this research, the ANOVA was used to identify the differences between the means of the controls groups' purchases over a three time points (e.g. two years, 1 one, 6 months) and discussed. The repeated measure design allows (Explorable, 2009)

- Variances exist among sample members is pronounced yet may be minimized (para. 5)
- The sample is not divided (conditions, treatments) allowing for robust analysis (para. 5)
- Convenience and practical when recruiting because all subjects are measured under all conditions (para. 5)

The repeated *measures* ANOVA uses an F-statistic, a value used to determine the statistical significance of a model. An F-statistic is a ratio of the variance between group mean to the variance within the group mean.

In this research study I wanted to determine if there was a difference in the frequency and the influence of choice of purchase of wheat bread/buns over three separate time for cases (*n*=63) and controls (*n*=32).

Frequency Measurement:

The variables and corresponding questions asked are as follows:

- Time = independent variable
- Cases = Before, During, After = levels of time
- Controls = 2 years ago, 1 year ago, 6 months ago
- Variable of interest = Frequency

"If you needed bread on six separate grocery store visits, how often would you purchase wheat bread/buns/rolls"?

Analyses of ANOVA for repeated measures indicate "there is no significant effect of time before, during and after WIC on frequency of wheat bread/buns purchased, Wilks' Lambda = .937, F (2, 60) = 2, p = .144."

Analyses of ANOVA for repeated measures indicate "there is no significant effect of time two years ago, one year ago, or six months ago for controls frequency of wheat bread/buns purchased, Wilks' Lambda = .986, F (2, 24) = .172, p = .843".

Influence Measurement:

The variables and corresponding questions asked are as follows:

- Time = independent variable
- Cases =Before, During, After = levels of time
- Controls = 2 years ago, 1 year ago, 6 months ago
- Variable of interest = Influence

  "If you needed bread on six separate grocery store visits, what influenced your choice to purchase wheat bread/buns/rolls"?

Analyses of ANOVA for repeated measures indicate "there is no significant effect of time before, during, and after WIC on influence of choice to purchase wheat bread/buns, Wilks' Lambda = .986, F (2, 60) = .414, p. = .663".

Analyses of ANOVA for repeated measures indicate "there is no significant effect of time two years ago, one year ago, or six months ago for controls for what influenced purchase of wheat bread/buns purchased, Wilks' Lambda = .992, F (2, 24) = .093, p. = .911".

_t_ Test

The *t* test was conducted for analyses in this section. The *t* test is designed to measure if the difference that may exist between two groups is reflective of what may occur in the real population. It is important to understand the difference, rather the variance if found to be significant, is dependent upon the group size, averages, and standard deviations of the sample groups (Trochim, 2006, para. 2). The *t* test is a ratio of the difference between the group's means by the variability that exist between the group (See Figure 5 for *t*-test formula).

t test formula:

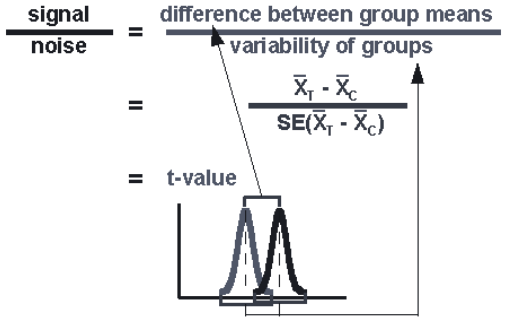

Figure 5. Adapted from The T-Test, by Web Center for Social Research Methods, 2006, Retrieved from http://www.socialresearchmethods.net/kb/stat_t.php. Copyright 2006 by The Web Center for Social Research Methods.

Cases and controls were compared for in this section to provide additional information on how the two groups differ with respect to both variables (frequency, influence) examined for the research study.

Frequency Variable Analyses

- Group: cases (*n*=63) compared with controls (*n*=63)
- Variable of interest = frequency
- Time period = Before WIC Compared with 2 years ago

Results from the Levene's test, F (94) = 1.41, p = .238, indicate the equal variances between the two groups are not assumed to be approximately equal. Thus, the equal variances not assumed independent t test results were not significant for frequency of how often cases purchased wheat bread/buns before enrolling in WIC compared with frequency of purchase two years ago. Cases (1 =.564, *SD* = .499, *n* = 62) and controls (0 = .6250, *SD* = .491, *n* = 32). The confidence intervals for the difference between the

means were - 300 to .275, t (94) = .562, p = .576, d = -.154, indicating there is no significant difference between the scores (See Tables 17 and18).

Independent *t*-Test Analyses:

Table 17

t Test

Group Statistics					
	WIC	*n*	*M*	*SD*	*SEM*
Pre_Freq2	.00	32	.6250	.49187	.08695
	1.00	62	.5645	.49987	.06348

Table 18

Independent Samples Test

Independent Samples Test										
		Levene's Test for Equality of Variances		*t* test for Equality of Means						
		F	Sig.	*t*	*df*	*p*	*M* Difference	*SE* Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Pre_Freq2	Equal variances assumed	1.412	.238	.559	92	.578	.06048	.10822	-.15445	.27542
	Equal variances not assumed			.562	63.664	.576	.06048	.10766	-.15461	.27558

Influence Variable Analyses:

- Group: cases (*n*=63) compared with controls (*n*=63)
- Variable of interest = influence/ middle
- Time period = Before WIC compared with 2 years ago

Results from the Levene's test, F (89) = 4.078, p = .047, indicate the equal variances between the two groups are not assumed to be approximately equal. Thus, the equal variances not assumed independent t test results were not significant, t (89) =, p = .325, d = -.115, indicating there is no significant difference between cases and controls for what influenced purchases; results for cases (1 = .516, *SD* = - .503, *n* = 62) and controls (0 = .629, *SD* = .492, *n* = 27). The confidence interval for the difference between the means was -.230 and .342; see Tables 19 and Table 20.

Table 19

Group Statistics

Group Statistics					
	WIC	N	Mean	Std. Deviation	Std. Error Mean
Mid_Influence	.00	27	.6296	.49210	.09471
	1.00	62	.5161	.50382	.06399

Table 20

Independent Samples

Independent Samples Test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	p	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Mid_Infln.	Equal variances assumed	4.078	.047	.984	87	.328	.11350	.11537	-.11581	.34281
	Equal variances not assumed			.993	50.655	.325	.11350	.11429	-.11599	.34299

Threat to Validity

To address the potential of confounders threatening the validity of study results, an assessment of the criteria (See questions see below) was done to report any potential confounding effects. The confounding criteria (McNamee, 2003):

1. must be a proxy measure of a cause, in unexposed people (p.228)
2. must be correlated (positively or negatively) with exposure in the study population (p.228)
3. must not be an intermediate step in the causal pathway between exposure and disease (p.228)
4. must not be an effect of the exposure (p. 228)

Criteria 1: must be a proxy measure of a cause, in unexposed people

Controls were asked the following questions:

Do you have a pre-existing medical condition (yes/no); are you required by your physician to be on a special diet (yes/no); how would you classify your weight (don't know, underweight, normal, overweight, obese, morbidly obese)?

The possibility of frequency and influence variables contributing to a causation to purchase wheat bread/buns may threaten validity of research, as results indicate a portion of controls answered yes to pre-existing medical condition (31.75%), 15.87% to special diet, 44.44% to overweight and 1.59% being obese.

Criteria 2: Must be correlated (positively or negatively) with exposure in the study population

A Pearson correlation (PC) was conducted on the following variables; pre-

existing medical condition (yes/no), are you required by your physician to be on a special diet (yes/no); how would you classify your weight (don't know, underweight, normal, overweight, obese, morbidly obese) crossed by frequency of bread purchase during WIC for cases.

The following results for pre-existing medical conditions (PC = -.045, p = .726); special diet (PC = -.018 p = .889); weight status (PC = -.121 p = .347) and though the criteria indicates there may be a positive or negative correlation, the corresponding p-values are not equal or close to in 0.05 value, therefore no association of these variables threaten validity.

3. Must not be an intermediate step in the causal pathway between exposure and disease

These confounders do not violate this criterion.

4. Must not be an effect of the exposure

These confounders do not violate this criterion

Weight status specifically over-weight and obese, a pre-existing medical condition, and eating a special diet may all be considered confounders. Additionally, there is a strong possibility there are variables that were not controlled for. Based upon this assessment of the criteria however, there were no statistical analyses that indicate tests for confounder threats were needed. Confounders should not have a tremendous impact on jeopardizing the validity of this research study.

Research Questions and Hypotheses

Research Question 1

Are current wheat bread/bun choices made by former WIC participants the result of behaviors learned while participating in WIC sponsored health classes, nutrition counseling, and restrictions to use food benefits/vouchers only towards the purchase of food on WIC Approved Food lists?

Wilcoxon is the appropriate test of measure, when comparing two scores of a related group. Scores may occur at different intervals (e.g. first quarter, second quarter) or due to varying the conditions/treatment (e.g. summer, winter) yet, the group that is evaluated is related. Additionally, a Z statistic is used to report the Wilcoxon score. A Z statistic is a standard random distribution representing X values; X is a random variable selected from a normal distribution. X is located at 0 on the on the X –axis and Z indicates the number of standard deviations X is away from the mean. The assumptions for Wilcoxon are as follows (Lund, 2013, para. 5):

- Dependent variable must be measured on a ordinal or continuous level (para. 5)
- The independent variable should consist of two categorical or related groups (para. 5)
- The distribution of the difference between the related groups should be symmetrical (para. 5)

Wilcoxon statistical tests were used for the analyses to answer research question one.

Measurements:

- Time = Before WIC & After WIC
- Variable of interest = Influence

Wilcoxon Analysis:

Table 21

Descriptive Statistics NEWWIC0 and NEWWIC2

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
NEWWIC0	62	.00	.000	0	0
NEWWIC2	62	.06	.248	0	1

Table 22
Ranks

Ranks

		N	Mean Rank	Sum of Ranks
NEWWIC2 - NEWWIC0	Negative Ranks	0[a]	.00	.00
	Positive Ranks	4[b]	2.50	10.00
	Ties	58[c]		
	Total	62		

a. NEWWIC2 < NEWWIC0
b. NEWWIC2 > NEWWIC0
c. NEWWIC2 = NEWWIC0

Table 23

Test Statistics

Test Statistics[a]	
	NEWWIC2 - NEWWIC0
Z	-2.000[b]
p	.046

a. Wilcoxon Signed Ranks Test
b. Based on negative ranks.

In this analysis, 62 cases received WIC sponsored health classes, nutrition counseling, and were restricted to use food benefits/vouchers only towards the purchase of food on WIC Approved Food while participating in the WIC program. A questionnaire was administered to identify what influenced purchase (e.g. price, culture, taste, nutritional value) of wheat bread/buns prior to prior enrolling in WIC compared with what influenced purchased (e.g. price, culture, taste, nutritional value, participation in WIC sponsored programs) [e.g. nutrition counseling classes, participating in a counseling session where the nutrition/health topic was discussed, or restricted purchase of WIC Approved Foods]) post-WIC. Time periods evaluated were pre-WIC (i.e. NEWWIC0) versus post-WIC participating (i.e. NEWWIC 2). The results for Descriptive Statistic are in Table 21, Ranks in Table 22, and Test Statistics in Table 23. The Ranks results indicate zero cases had an influence to purchase wheat bread/buns prior to participating in WIC, there was no change for the influence variable pre-WIC versus post-WIC in 58 of the cases, however, four cases reported WIC participation influenced purchases. The Ranks Table indicates an increase of influence post WIC (average rank 0.00 vs. 2.50).

Wilcoxon signed rank (Z = -2.00, p = .046) provides evidence of an association between participation in WIC and what influenced purchase post-WIC..

Research Question 1 Hypotheses

$H_0$1a: There is no relationship between what influenced bread purchases after participating in WIC compared with what influenced bread purchase before WIC.

H_a1a There is a relationship between what influenced bread purchases after participating in WIC compared with what influenced bread purchase before WIC.

SPSS analysis software was utilized for dataset analyses to determine if participation in WIC sponsored nutrition workshops/counseling, health education literature received, and restrictions requiring use of food subsidy benefits towards purchase of foods found on WIC Approved Food List had an association on influencing purchase of wheat bread/buns after WIC. The Wilcoxon signed-rank test (Z = -2.00, p = 0.046) supports accepting the alternative hypothesis (H_a1a).

Research Question 2

Has the variable for what influence food choice for controls changed over the past two years?

The rationale for querying controls regarding wheat bread/bun purchases over a period of two years was to identify if what influenced their choice remained consistent over time. Examination of controls' responses is essential as it will allow for elimination and isolation of variables and moreover enhances discussion and interpretation of results.

Measurements:

- Controls = Two years ago, One year ago, six months ago
- Variable of interest = Influence

Table 24

Descriptive Statistics Choice_2Yr, Choice_1Yr, Choice_6mons

Descriptive Statistics

	Mean	Std. Deviation	N
Choice_2Yr	.6538	.48516	26
Choice_1Yr	.6538	.48516	26
Choice_6mos	.6154	.49614	26

Table 25

Multivariate Tests

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power[c]
Influnc	Pillai's Trace	.038	1.000[b]	1.000	25.000	.327	.038	1.000	.161
	Wilks' Lambda	.962	1.000[b]	1.000	25.000	.327	.038	1.000	.161
	Hotelling's Trace	.040	1.000[b]	1.000	25.000	.327	.038	1.000	.161
	Roy's Largest Root	.040	1.000[b]	1.000	25.000	.327	.038	1.000	.161

a. Design: Intercept Within Subjects Design: Influnc
b. Exact statistic
c. Computed using alpha = .05

Analyses of ANOVA for repeated measures indicate “there is no significant effect of time two years ago, one year ago, or six months ago for what influenced purchase of

wheat bread/buns by controls; Wilks' Lambda = .962, F (1, 25) = 1.00, p. = .327". See Tables 24 and 25 for descriptive statistics and Table 25 for multivariate results.

Research Question 2 Hypotheses

$H_0$2a: There has been no change what influenced bread purchases for the control group over the last two years.

H_a2a: There has been a change in what influenced bread purchases for the control group over the last two years

Results:

SPSS analysis software was utilized for dataset analyses to determine what influenced controls' choice (e.g. cultural, nutrition, taste, price, other) to purchase wheat bread compared over a period of two years. It is evident from the analyses of repeated measures ANOVA, p = .327, there was no difference for what influenced purchase, therefore, the null hypothesis ($H_0$2a) was accepted.

Research Question 3

Does the primary variable, for what influenced food choice, differ between study and control groups?

The aim of research question three was to identify if the variable that influenced choice of wheat bread/buns is identical or differs between cases and controls. A general linear model for repeated measures also known as a repeated measures ANOVA was conducted for this purpose. A general linear model is a form of a regression model. The purpose of regression testing in statistics is to measure if a relationship exists between the dependent and independent variables. The test allows for greater understanding of what independent variable (s) has the greatest impact on influencing the outcome variable

therefore affording interpretation or forecasting the probability of a distribution. Caution is advised about using a regression analysis when making inferences to the general population; as this may result in false indicators and effects. The probability distribution of a regression analysis concentrates on the independent variable = X; it may be varied, manipulated, and controlled. The regression line produces the regression function:

$$Y = b_0 + b_1 + X$$

b_0 = a constant amount

b_1= slope of the line

X = independent variable

Y = dependent variable

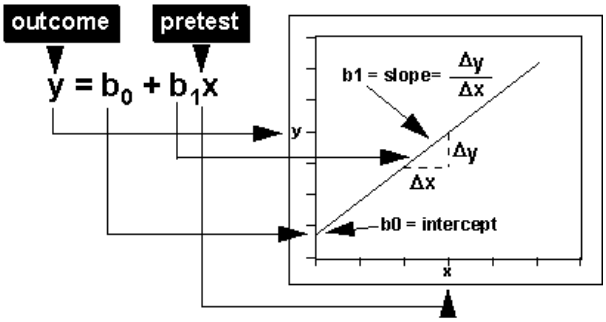

Figure 6. Adapted from General Linear Model, by Web Center for Social Research Methods, 2006, Retrieved from http://www.socialresearchmethods.net/kb/genlin.php. Copyright 2006 by Web Center for Social Research Methods.

A linear regression analysis evaluates the independent or variable of interest in relation to its effect on the dependent variable (See Figure 6). To evaluate if a difference exist between cases (*n*=63) and controls (*n*=32) for the influence variable, a repeated measures between two groups ANOVA was conducted. The following are assumptions for repeated measures between two groups ANOVA (Web Center for Social Research Methods, 2006):

- Sphericity: The variances between pairings of all groups should be similar. Mauchly's W should be very close to = 1; If only measuring two levels/cells no significance test is warranted (para.8)

- Parametricity:
  - Interval level variables
  - Normal distribution
  - Equality of variances

The following is the equation for the repeated measures between two groups ANOVA:

$$F = \frac{MStime}{MSerror} \qquad \text{or} \qquad F = \frac{MSconditions}{MSerror}$$

MS time = time course experiments or conditions:

$$SS_{time} = SS_b = \sum_{i=1}^{k} n_i(\bar{x}_i - \bar{x})^2$$

MS error = SSw (within subject variation) - $SS_{subjects}$ (each subject)

$$SS_w = \sum_{1}(x_{i1} - \bar{x}_1)^2 + \sum_{2}(x_{i2} - \bar{x}_2)^2 + \cdots + \sum_{k}(x_{ik} - \bar{x}_k)^2$$

$$SS_{subjects} = k \cdot \sum(\bar{x}_i - \bar{x})^2$$

General Linear Regression for Repeated Measures between two groups:

Measurements:

- Cases compared to Controls
- Time periods = Pre-WIC versus 2 years ago
  &
  Post-WIC versus 6 months ago
- Variable of interest = influence

Note: This analysis stopped because there was an unequal number of cases (*n* =63) to compare with controls (*n* =32), therefore, no Sphericity is required or is assumed. Results are acknowledged of the Sphericity Assumed Test of Within-Subjects Effects in Table 25 below. The Descriptive Statistics are shown in Table 26 and Test Within Subjects Effects in Table 27.

Table 26
Descriptive Statistics

Descriptive Statistics

	WIC	Mean	Std. Deviation	N
Pre_Influence	.00	.6538	.48516	26
	1.00	.5000	.50408	62
	Total	.5455	.50078	88
Final_Influence	.00	.6154	.49614	26
	1.00	.5161	.50382	62
	Total	.5455	.50078	88

Table 27

Tests of Within-Subjects Effects

Tests of Within-Subjects Effects					
Measure: MEASURE_1					
Source		Type III Sum of Squares	df	Mean Square	F
Influence	Sphericity Assumed	.005	1	.005	.099
	Greenhouse-Geisser	.005	1.000	.005	.099
	Huynh-Feldt	.005	1.000	.005	.099
	Lower-bound	.005	1.000	.005	.099
Influence * WIC	Sphericity Assumed	.027	1	.027	.591
	Greenhouse-Geisser	.027	1.000	.027	.591
	Huynh-Feldt	.027	1.000	.027	.591
	3Lower-bound	.027	1.000	.027	.591
Error(Influence)	Sphericity Assumed	3.973	86	.046	
	Greenhouse-Geisser	3.973	86.000	.046	
	Huynh-Feldt	3.973	86.000	.046	
	Lower-bound	3.973	86.000	.046	

Results:

Evidence from the general mixed model repeated measures between groups analysis indicate the variable that influenced purchased of wheat bread/buns is not significantly different between cases and controls at the pre and post time intervals ” F (1,86) =.99, p = .754, η^2 = .001”.

Research Question 3 Hypotheses

$H_0$3a: There is no difference between the primary variable that influences food choice for the study and control groups.

H_a3a: There is a difference between the primary variable that influences food choice for the study and control groups.

It is evident from the general linear repeated model for two groups analysis generated there is no a significant difference in what influenced choice of wheat bread/buns between cases and controls (p = .754). The null hypothesis ($H_0 3_a$) was accepted.

Summary

Results and analyses used to test each research question and hypotheses were presented in this chapter. Results from the analyses indicate there is an association between what influenced wheat bread/bun choices made by current and former WIC and participation in WIC sponsored health classes, nutrition counseling, and restrictions to use food benefits/vouchers only towards the purchase of food on WIC Approved Food lists; (Z = -2.00, p = 0.046). The alternative hypothesis ($H_a 1_a$) is *tentatively* accepted. Although results indicate an association between WIC participation and an influence for

purchase of wheat bread/buns, extreme caution is taken when making any inferences of this conclusion to the general WIC population, due to the nature of the causal-comparative research design used for this research study. Because the causal-comparative design is a nonrandomized design causal inferences should not be made when there fails to be a randomization process (SAS as cited in Yu, n.d., para. 10). In research question two evidence did not indicate there was a change in the variable that influenced purchase of wheat bread/buns compared at three different time periods (e.g. 2 years ago, 1 year ago, and 6 months ago), therefore the null hypothesis was accepted. Research question three asked if there was a difference between cases (n =63) compared with controls (n = 32) for the influence variable during the pre-WIC compared with 2 years ago and the post-WIC compared with 6 months ago time periods. Results indicated there is no difference in the influence variable for cases compared with controls for these time periods, therefore the null hypothesis was accepted. The influence variable was the same for both cases and controls.

A summary and interpretation of findings, limitations and recommendations for further study, and implications for positive social change will be presented in Chapter 5.

Chapter 5: Discussion, Conclusions, and Recommendations

Introduction

The purpose of this study was to identify the effect participation in USDA's Special Supplemental Nutrition Program for Women, Infants, and Children Program (WIC) had on former participants' nutritional behaviors, post-WIC. This study queried current and former recipients regarding their choice of a wheat bread/buns over different time periods (e.g., pre-WIC, during WIC, post-WIC) to identify how frequent they would select this item and what influenced their choice (e.g. taste, nutritional value, price, cultural influence, participation in WIC) for this food item. Their responses (n=63) were compared with responses of controls (n =32).

The mission of WIC is to improve the diets of low income expectant mothers, postpartum, breastfeeding women, infants, and children whose health may be comprised secondary to a nutrient deficient diet. In its efforts to improve birth outcomes (e.g. high birth weight, increase full term deliveries, decrease infant mortality) of expectant mothers, and diets of all other program participants, WIC offers a comprehensive program including but not limited to nutrition/health education, medical service referrals, substance abuse prevention and food subsidy benefits. In Fiscal Year 2014, WIC provided benefits to 8.3 million people, of which 4.32 million were children, 1.95 million were infants and 1.97 million were women (USDA Food Nutrition Service, 2015, para. 3). Women, Infants, and Children program is funded by federal grants which are disbursed to the 48Contiguous States, District of Columbia, Guam, and other U.S. Territories. In fiscal year 2010 WIC cost 6.4 billion dollars to operate.

The WIC program is intended to serve those who are nutritionally at risk, and is designed to assist its participants with practicing healthy dietary practices beyond WIC (Federal Register, 2003, p. 2) by emphasizing nutrition education, counseling, and restricting use of food subsidy benefits as a means of achieving this goal. According to Sally Findley the impact participation in WIC's has on behavioral change of nutritional habits, particularly long-term, has yet to be studied and thus the impetus for this study; Findley's presentation (as cited in Institute of Medicine, 2010).

Summary and Interpretation of Findings

The dataset included $N = 95$ participants, of whom $n = 63$ (66.31%) represented cases (i.e., current or former recipients of the USDA WIC food subsidy program) and $n = 32$ (33.68%) controls (i.e., never received USDA WIC food subsidy). Research Question 1 was aimed to identify if wheat bread/bun choices made by former WIC participants the result of behaviors learned while participating in WIC sponsored health classes, nutrition counseling, and restrictions to purchase foods on WIC Approved Food lists. It was hypothesized a causal effect from participation in WIC and the frequency in which one purchased wheat bread/buns. The Wilcoxon signed-rank test ($z = -2.00$, $p = 0.46$) supports there is an association between participation in WIC and an influence on the purchased of wheat bread/buns. The alternative hypothesis (H_a1_a) was tentatively accepted because the nature of a causal comparative design suggests using caution with making inferences of study results to the population. The Social Ecological Model (SEM) as theorized by Bronfenbrenner in 1994 asserts, an individual's behavior is affect by the microsystem, ecosystem, and its macrosystem. These levels of the biological community

are sub-categorized by five levels of influences. These levels of influence and a few of its unique qualifiers are provided here:

1. Intrapersonal influence (e.g., knowledge, education, behavior)
2. Interpersonal influence (e.g., family, friends, informal/formal networks)
3. Institutional influence (e.g., social institutions/organizations)
4. Community influence (e.g., relationships among organizations, businesses
5. Public policy (e.g., local, state, national laws/policies)

The WIC program offers a comprehensive program for its participants that include nutrition education which may translate to the intrapersonal level of influence as the purpose of nutrition education. According to the USDA, nutrition education is designed to "encourage participation in activities (e.g., classes, counseling) to improve participant's knowledge of health and nutrition related information" (USDA, n.d., § 246.10, p. 401). This act may be considered an interpersonal level of influence because the purpose is to educate and increase a recipients' knowledge on a health or nutrition topic.

Interpersonal influence is the level of influence that recognizes networks be they formal or informal that with family, friends, social support systems, and other groups. The interpersonal influence may translate to the health education counseling a WIC staffer provides to a recipient during the re-certification period. The USDA defines WIC Nutrition Counseling as "a service in which paraprofessionals and professionals provide information and assistance on educational subjects" (USDA, n.d., § 246.10, p. 398).

Finally, USDA Food Nutrition guidelines for the WIC program state a recipient may use monthly allocations to purchase "specific foods each month that are designed to supplement their diets with specific nutrients that benefit WIC's target population" (USDA, Food Nutrition Service, 2015, para. 5). This is an example of Bromfenbrenner's institutional influence as it is characterized as an organization's rules and regulations imposed for operations.

It was hypothesized there was not a causal effect participation in WIC sponsored programs (e.g., health literature, counseling session, restricted use of benefits) had on influencing the purchase of wheat bread/buns post-WIC. Evidence from the Wilcoxon Signed Rank test ($p = .046$) conducted to identify if there was a causal effect supports there was an "association" between participation in WIC and influence on purchase of wheat bread/buns. Cautioned is taken when stating purchase of wheat bread/buns purchase by former recipient's post-WIC is directly related to participation in WIC programs and restriction on food purchases because a causal comparative study designed used for this study. This design does not use a randomization method for the population selection process and therefore making causal inferences is cautioned.

Research question 2 examined purchase of wheat bread/buns made by the control group to identify what variable affected choice over the two years. The rationale for querying controls regarding wheat bread/bun purchases over a period of two years was to identify if their choices changed over time periods or if their choice persisted and at best may be considered a behavior or habit. It is important to note, this study was not designed to control for confounding variables such as behavioral habit(s) that might have

influenced choice. An examination of controls' responses to this question was important as it allowed for a better understanding about what motivates purchases. It also allowed for an elimination and isolation of variables, and enhanced the discussion and interpretation of results. It was hypothesized there was no difference existed between what influenced (e.g., taste, nutritional value, price, cultural influence) purchase of wheat bread/buns over time periods (e.g., 2 years ago, 1 year ago, 6 months ago). It was evident, from the analyses of the repeated measures ANOVA, Wilks' Lambda = .962, F (1, 25) = 1.00, p = .327 that there was no difference for what influenced purchase of wheat bread/buns over a two year period, therefore, the null hypothesis ($H_0$2a) was accepted.

Research question 3 compared the primary variable of influence for the cases with the controls. It was determined from a linear equation for repeated measures for two groups (p = .754) that there was no evidence to support a relationship between the primary variable that influenced choice of wheat bread/buns for cases compared with controls. The null hypothesis was accepted (H_a3_a) and the alternative was (H_a3_a) rejected.

Implications for Social Change

Obesity is attributed as being one of the leading causes of preventable death in the United States, resulting in one in 10 deaths or approximately 385,000 mortalities annually (Mokdad, 2004, p. 1240). It is projected that by the year 2030, 42% of all Americans will be clinically obese; indicative of a body mass index (BMI) 30 lbs./in.^{2} or greater. The WIC Program achieves its mission of improving birth outcomes and diets of its recipients by offering a comprehensive program (e.g., nutrition education, medical referrals, food subsidy benefits). Given this, WIC nutrition education has two goals; to assist

participants whose nutrition is compromised with achieving positive nutrition outcomes and secondly, to promote eating a well-balanced nutritious diet and to engage in physical activity (USDA, 2015, p. 4). Results from this study indicate there is an association between participation in WIC and purchase habits of study participants and why this study has implications for positive social change. From the literature review search done, I was unable to identify any study conducted on former participants of USDA food subsidy programs and why I believe this study lends to the literature and discussion regarding the short and long-term impact federal food subsidy programs have program participants. The purpose of this study was to gain additional insight regarding health attitudes and behaviors beyond WIC.

This research study was designed investigate the impact WIC nutrition education and program restrictions had on health behaviors of former WIC recipients. In fiscal year 2013, program costs were $6.5 billion dollars, of which $4.5 billion (70%) was allocated for food benefits (USDA, 2013, p. 1). The 2011 Census Report indicated that 49.2% of Americans received benefits from one or more government programs. This study has the potential to affect approximately 109,631,000 Americans who participate in one of 13 federally funded food subsidy programs. Additional studies must be conducted to determine the impact participation in respective USDA Food Nutrition program has on behaviors of its participants to better understand strengths and weakness of the program before taking steps to make changes in program guidelines.

Consider the following, preschoolers have a better ability to modify behaviors than school-aged children, and why it is importance to initiate healthy behaviors early on

(USDA, 2005, p. 12). If USDA were to consider using the WIC program as a model for other food subsidy programs by imposing guidelines for example, that would require benefits are used towards purchase of foods deemed nutritionally dense. It is plausible to begin impacting nutritional behaviors of children at an early age and thus begin to offset poor nutritional habits during a child's formative years. Figure 7 compares the consumption percentages of 10 Major Supermarket Aisle Food Groups of a child whose family receives WIC by child whose family receives the Supplemental Nutrition Assistance Program (SNAP). It is important to note, SNAP program guidelines do not require purchase of food items pre-approved by the USDA and the Institute of Medicine as nutritiously dense or healthy.

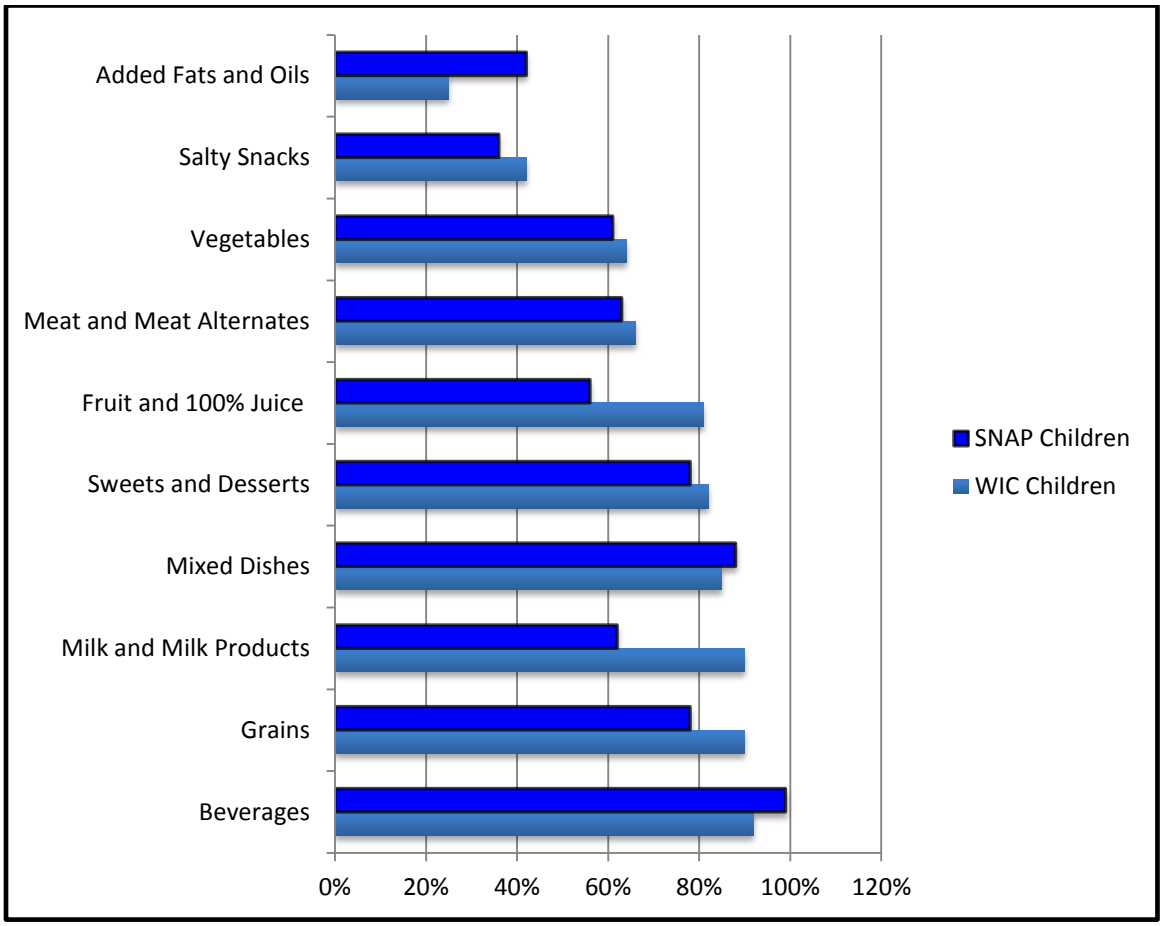

Figure 7. Percent of children consuming any discrete foods from 10 major supermarket aisle food groups. Adapted from Diet of American Young Children by WIC Participation Status & Diet Quality of Americans by SNAP Participation Status, 2015, Retrieved from http://www.fns.usda.gov/sites/default/files/ops/NHANES-WIC05-08.pdf. Copyright 2015 by USDA.

Comparatively, the child whose family receives SNAP consumes greater amounts of added fats, oils, and beverages and the WIC child consumes greater amounts of sweets and desserts and salty snacks; foods that may not the healthiest. The WIC child consumers greater amounts of fruit, fruit juices, milk/milk products, and grains; foods that tend to be healthier. Approximately 50 years ago, the House version of the Food Stamp Act of 1964 would have prohibited the purchase of select foods (e.g., soft drinks,

luxury foods, and frozen foods) with benefits (USDA, 2014, para. 6). Consider the following; the prevalence of obesity was not at epidemic levels then as it is today, and may explain legislators' refusal to allow purchase of luxury foods and sugary beverages with benefits in 1964. The USDA needs to take action and make bold moves and reconsider implementing additional restrictions to purchase of healthier foods with SNAP benefits as done with WIC. By doing so, this would impact more than 46 million families and a significant impact for social change. It is reasonable to believe, additional restrictions on purchases could potentially positively impact the diets of SNAP and other recipients of USDA Food Nutrition Service food subsidy programs.

Now more than ever, greater emphasis should be placed on implementing policy that is evidence based and geared toward health promotion and preservation to enhance the quality of life. Change in federally funded food subsidy programs guidelines would bring about tremendous positive social change for its recipients. This study was designed to examine the WIC culture in efforts to demonstrate that positive nutritional behaviors cultivated from participating in WIC are long-lasting.

It is critical and necessary that policy makers, the health and medical communities, and stakeholders dedicated to advocating for the health of all Americans must remain focused, committed, and act to create change for the greater good. There are numerous examples of significant health legislation policies (e.g., including seat belt laws, tobacco control policy) that have been mandated which proved to prevent casualties and save lives. In June of 2015, the U.S. Food and Drug Administration made a decision that require food manufacturers to reframe from the use of partially hydrogenated oils in

food products found to increase risk of heart diseases. Additionally, campaigns such as First Lady of the United States, Michelle Obama's Let's Move Campaign, the National School Lunch Program and legislation passed at state and federal levels may contribute to reversing the obesity epidemic.

Limitations and Recommendations for Further Study

While conducting this study I appealed to the USDA and requested contact information of former WIC recipients. This information was necessary because the purpose of this research was to investigate former WIC recipients and this information was needed to invite them to participate in this study. The request was denied secondary to confidentiality concerns and the Institutional Review Board (USDA would have required) would have been extremely extensive and time consuming and would have prolonged initiation of this study. To adjust for this barrier I used the convenience sampling procedure, preventing a randomization process however, and had to rely on potential study participants' honesty about participating in WIC, in part to receive the "thank you" gift offered for participating in the study.

Secondly, the study criteria limited participation to females only, as WIC eligibility guidelines are defined by USDA and is gender specific to females. Males were excluded from participating in this study. Males play an essential role in managing the household and may be in many instances the primary person who does the grocery shopping for a family that receives WIC, therefore, males should be considered for participation in like studies.

The need for further research on all federally funded food subsidy programs populations is warranted. The Economic Research Service the arm of the USDA Food and Nutrition Service (FNS) conducts research and provides information used in decision and policy making issues concerning all matters of the USDA (e.g. food, agriculture, natural resources). When speaking with the Director of Special Nutrition Research Analysis in the Division Office of Policy Support USDA FNS, he requested a final copy of the study manuscript; he stated in his 18 year tenure with the USDA, it has never studied *former* recipients of a food subsidy program. A longitudinal study examining health and wellness habits of former WIC and SNAP beneficiaries encourages an opportunity for comprehensive evaluation of nutrition education programming, policy revision, and a reevaluation of missions and goals; these are merely a few areas importance. As noted earlier by Sally Findlay, Columbia Mailman School of Public Health, if WIC claims to achieve goals of behavioral change; WIC need studies to document the different time of impact (e.g. 1-5 years and 5-10 years post WIC).

Recommendations for Actions

The initial step in this process is to appeal to the USDA and specifically to the Economic Research Service and Food Nutrition department, charged with administering nutrition assistance programs for WIC, SNAP and 13 other USDA food subsidy programs to consider conducting research studies in areas surrounding behavior change of its participants. In March of 2007 the Food and Nutrition Service issued a report titled "Implication of Restricting the Use of Food Stamps Benefits". The report lists several reasons why limiting purchase of select foods with food subsidy benefits by SNAP

participants is not sensible. The report cites the following implications of restricting use of SNAP benefits:

- "No clear standards exist for defining foods as good or bad, or unhealthy or not healthy" (USDA, 2007, p. 1),
- "Implementation of food restrictions would increase program complexity and cost" (USDA, 2007, p. 3),
- "Restrictions may be ineffective in changing the purchases of food stamp participants" (USDA, 2007, p. 5), and
- "No evidence exist that food stamp participants contributes to poor diet quality or obesity" (USDA, 2007, p. 6).

The Food Nutrition Service has stated that it is impossible to define a food as healthy or unhealthy, and that attempting to do this would 1) increase program complexity and cost and 2) because approximately 12,000 new food products introduced to the market annually, attempting to identify if these food items meet federal guidelines would be next to impossible to accomplish by the USDA yearly. If WIC administrators and stakeholders are able to identify foods that meet federal eligibility guidelines using a defined criteria for food categories (e.g. cereal, breads, juice) resulting in WIC Approved Food lists, the Food Nutrition Service administrators should be able to follow accordingly for the federally funded food subsidy programs.

Finally, utilizing state and local government agencies to push for pilot studies to be conducted by the USDA or independent research teams to examine nutritional behaviors of SNAP recipients would be the second tier of action that should be

considered. Every entity and level of government has a responsibility to advance initiatives that promote the health and the wellbeing of the people it is charged to protect. Efforts should be devoted to implement health policy when considering effective approaches to address the obesity epidemic. According to the World Health Organization's Adelaide Statement on Health in All Policies report, assistance should be provided to and encouraged by "leaders and policymakers to integrate considerations of health, well-being and equity during the development, implementation and evaluation of policies and services" (WHO, 2013, para. 1). Health in All Policies utilizes a multidisciplinary paradigm to introduce policy to government entities and others positioned to encourage policy by the public health community and other advocates and stakeholders for health.

Summary

Obesity is not relegated to one sector of people it affects all no matter the race, ethnicity, gender, age, or socioeconomic status. We all know someone who may be overweight or obese. Approximately 12.7 million children and 78.6 million adult Americans are overweight or obese. Medical cost associated with this condition was 14.8 billion dollars annually in 2008. Most importantly, overweight and obesity are chronic diseases that are preventable. If action is taken during the formidable years in life by encouraging a lifestyle that promotes eating in moderation, engaging in physical activity, and eating a nutritious well balanced diet the obesity epidemic may begin to abate, while behaviors that define an enhanced quality of life may prevail.

The impact participation in the USDA WIC program had on influencing purchase of wheat bread/buns and how frequent recipients chose this option was explored. Results, indicate an association between the participation in WIC and an influence on the purchase of wheat bread/buns ($Z = -2.00$, $p = 0.46$). These results are promising and lends to future study regarding the impact participating in WIC has on short and long-term behaviors.

In conclusion, this research study provided an opportunity to justify why additional study of former program participants of USDA Food Nutrition Service food subsidy programs is warranted. "Policing unhealthy food purchases may appear as a truncation or violation of one's civil liberties; however, the intent is not to insult, dehumanize, stigmatize, stereotype, or even single out a select population or culture of people, it is instead, a fresh and innovative way to identify windows of opportunity to change the course of this epidemic and the physical health of (Terrell, 2009, p. 9) the 57,000,000 million recipients of federally funded food benefits. Change is now. Limiting the use of SNAP food subsidy benefits to the purchase of healthy foods is possible; WIC has been practicing this method for 40 years now……as this approach is not innovative but necessary.

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Appendix A: Letter to Prospective Study Participants

Greetings Prospective Study Participant,

My name is Joyce L. Terrell, and this letter is extended to you as an invitation to participate in a research study I am conducting as partial requirement for fulfillment of my Ph.D. in Public Health/Epidemiology. I am a student at Walden University, Minneapolis, MN and the University, along with my committee chairperson Dr. Carla Riemersma has granted me permission to precede with my research study titled "The Social Ecological Influences of WIC Programming Survey on Behavior Change of Former WIC Participants".

The study I am conducting is designed to determine influences of food choices made by recipients of Women, Infants, and Children (W.I.C.) benefits, while grocery shopping. If you are female between the ages of 18-50 years, have received W.I.C. benefits a minimum of 6 months or never received W.I.C. benefits, have one or more child, the primary purchaser of groceries for the household, and income at or below %185 of U.S. Poverty Income Guidelines you are eligible to participate in this study The purpose of this study is to determine if your decisions to purchase select food items are influenced because of health concerns or if your choices may be influenced by other factor(s). There are minimal risks in completing this survey and your participation is strictly voluntary. This study has the potential to help improve government program(s). To ensure your identity is protected, no identifying information is requested and only cumulative results will be reported. Because your participation is anonymous, it will not have any impact on your ability to continue receiving any government assistance (if you receive benefits) or affect your ability to participate in any USDA food subsidy program going forward. If you initially decide to participate, please know that you may discontinue your participation at any time. In order to protect your privacy, signatures are not being collected and your completion and submission of completed survey serves as your implied consent to participate, should you choose to participate. If you would like a copy of the consent form, please let me know and I will provide you with a paper copy.

The survey will take approximately ten (10) minutes to complete. For your participation in the study you will receive a Wal-Mart gift card, a $5.00 value. Should you have additional questions regarding this research study, please contact the principal researcher, Joyce L. Terrell, at joyce.terrell@waldenu.edu or at 6784714615. Should you have questions regarding your rights as a participant, please contact the Walden University Institutional Review Board at irb@waldenu.edu.

Sincerely,
Joyce L. Terrell, M.S., ATC., MPH

Saludos participantes del estudio prospectivo,

Mi nombre es Joyce L. Terrell, y esta carta se extiende a usted como una invitación para participar en un estudio de investigación que estoy realizando como requisito parcial para el cumplimiento de mi doctorado en Salud Pública / Epidemiología. Soy un estudiante de la Universidad Walden, Minneapolis, MN y la Universidad, junto con mi comité presidente Dr. Carla Riemersma me ha dado permiso para preceder con mi estudio de investigación titulado " Las Influencias Ecológicas Sociales de Encuesta Programación WIC en el cambio de comportamiento de los ex WIC Los participantes".

El estudio estoy llevando a cabo está diseñado para determinar la influencia de la elección de alimentos realizadas por los beneficiarios de las Mujeres, Infantes y Niños (WIC) beneficios, mientras que las compras de comestibles. Si usted es mujer entre las edades de 18 a 50 años, han recibido WIC beneficia a un mínimo de 6 meses o nunca recibió WIC beneficios, tienen uno o más hijos, el comprador principal de víveres para el hogar, y los ingresos en o debajo de 185% de pobreza en Estados Unidos Pautas de ingresos que son elegibles para participar en este estudio El objetivo de este estudio es determinar si sus decisiones a la compra Seleccione alimentos están influenciados por cuestiones de salud o si sus decisiones pueden ser influenciados por otros factores (s). Hay riesgos mínimos para completar esta encuesta y su participación es estrictamente voluntaria. Este estudio tiene el potencial de ayudar a mejorar el programa (s) del gobierno. Para asegurar que su identidad está protegida, no se solicita información de identificación y se informará sólo los resultados acumulados. Debido a que su participación es anónima, no tendrá ningún impacto en su capacidad para seguir recibiendo ninguna ayuda del gobierno (si usted recibe beneficios) o afectar su capacidad de participar en cualquier programa de subsidio de alimentos del USDA en el futuro. Si en un inicio se decide participar, por favor sepa que usted puede suspender su participación en cualquier momento.

Para proteger su privacidad, las firmas no están siendo recogidas y su finalización y presentación de encuesta completada sirve como su consentimiento tácito a participar, si decide participar. Si desea una copia del formulario de consentimiento, por favor hágamelo saber y yo le proporcionará con una copia en papel.

La encuesta tardará aproximadamente diez (10) minutos para completar. Para su participación en el estudio, usted recibirá una tarjeta de regalo de Wal-Mart, un valor de $5.00. Si usted tiene preguntas adicionales con respecto a este estudio de investigación, por favor póngase en contacto con el investigador principal, Joyce L. Terrell, en joyce.terrell@waldenu.edu o al 6784714615. Si tiene preguntas acerca de sus derechos como participante, por favor póngase en contacto con la Universidad Walden Institucional Revise Junta en irb@waldenu.edu.

Atentamente,
Joyce L. Terrell, M. S., ATC., MPH

Appendix B: WIC Approved Food List

WIC APPROVED FOODS LIST

100% Juice

Vitamin C fortified, Calcium fortified allowed

- *No organic or sugar added*
- *No V-8 Splash or vegetable juice cocktail*
- *No infant juice, juice drinks, or sports drink*
- *No cartons of juice other than orange*

Ready Serve Juice

LEAST EXPENSIVE BRAND
(of these types)

- *Orange*
- *Pineapple*
- *Grapefruit*
- *Tomato 100% juice*
- *Vegetable 100% juice*

64 ounce and 46–48 ounces
5.5–6 ounce *(when listed on voucher)*

WELCH'S

- *Apple*
- *Grape*
- *White Grape*

64 ounce and 46–48 ounces

NESTLE JUICY JUICE

- *All flavors including Apple, Grape, and White Grape*

64 ounce and 46–48 ounces

REFRIGERATED CARTONS

LEAST EXPENSIVE BRAND

- *Orange juice only*

64 ounce refrigerated carton

Juice Concentrates

NON-FROZEN POURABLE

NESTLE JUICY JUICE

- *All flavors (including apple, grape and white grape)*

11.5 ounces

WELCH'S

- *Apple*
- *Grape*
- *White Grape*

11.5 ounces

FROZEN CONCENTRATES

LEAST EXPENSIVE BRAND *(of these types)*

- *Orange*
- *Pineapple*
- *Grapefruit*

11.5–12 ounces

OLD ORCHARD

- *Apple*
- *Grape*
- *White Grape*

12 ounces

WELCH'S

- *Apple*
- *Grape*
- *White Grape*

11.5 ounces

Fruits & Vegetables

- *No potato except for yam and sweet potato*
- *No variety of canned or frozen vegetable or mixture containing white potato, added sugars, fats, oils, or artificial sweeteners*
- *No creamed, sauced, or breaded vegetables*
- *No juice*
- *No herbs or spices*
- *No edible blossoms/flowers*
- *No dried fruit or vegetable, fruit leathers or roll-ups*
- *No sweetened applesauce*
- *No catsup, salsa, or other condiments*
- *No soups*
- *No pickled vegetables or olives*
- *No peanuts or dried legumes (mature beans or peas)*
- *No vegetable-grain mixtures such as rice, noodles, or pasta*
- *No fruit baskets, party trays, purchases from salad bars, or fruits packed in syrup*

FROZEN

Any brand or variety (including plain frozen beans/peas/legumes) with no added sugars

See WIC voucher for dollar amounts

CANNED

Any brand or variety including unsweetened applesauce

See WIC voucher for dollar amounts

FRESH FRUITS & VEGETABLES

Any brand/variety of fruit or vegetable, including organic, without added sugars, fats, and oils

See WIC voucher for dollar amounts

SAMPLE COSTS OF ITEMS PRICED BY THE POUND

Price per pound	1 pound	1½ pound	2 pounds	2½ pounds	3 pounds	3½ pound	4 pounds
$ 0.49	$ 0.49	$ 0.74	$ 0.98	$ 1.23	$ 1.47	$ 1.72	$ 1.96
$ 0.59	$ 0.59	$ 0.89	$ 1.18	$ 1.48	$ 1.77	$ 2.07	$ 2.36
$ 0.69	$ 0.69	$ 1.04	$ 1.38	$ 1.73	$ 2.07	$ 2.42	$ 2.76
$ 0.79	$ 0.79	$ 1.19	$ 1.58	$ 1.98	$ 2.37	$ 2.77	$ 3.16
$ 0.89	$ 0.89	$ 1.34	$ 1.78	$ 2.23	$ 2.67	$ 3.12	$ 3.56
$ 0.99	$ 0.99	$ 1.49	$ 1.98	$ 2.48	$ 2.97	$ 3.47	$ 3.96
$ 1.09	$ 1.09	$ 1.64	$ 2.18	$ 2.73	$ 3.27	$ 3.82	$ 4.36
$ 1.19	$ 1.19	$ 1.79	$ 2.38	$ 2.98	$ 3.57	$ 4.17	$ 4.76
$ 1.29	$ 1.29	$ 1.94	$ 2.58	$ 3.23	$ 3.87	$ 4.52	$ 5.16
$ 1.39	$ 1.39	$ 2.09	$ 2.78	$ 3.48	$ 4.17	$ 4.87	$ 5.56
$ 1.49	$ 1.49	$ 2.24	$ 2.98	$ 3.73	$ 4.47	$ 5.22	$ 5.96
$ 1.59	$ 1.59	$ 2.39	$ 3.18	$ 3.98	$ 4.77	$ 5.57	$ 6.36
$ 1.69	$ 1.69	$ 2.54	$ 3.38	$ 4.23	$ 5.07	$ 5.92	$ 6.76
$ 1.79	$ 1.79	$ 2.69	$ 3.58	$ 4.48	$ 5.37	$ 6.27	$ 7.16
$ 1.89	$ 1.89	$ 2.84	$ 3.78	$ 4.73	$ 5.67	$ 6.62	$ 7.56
$ 1.99	$ 1.99	$ 2.99	$ 3.98	$ 4.98	$ 5.97	$ 6.97	$ 7.96
$ 2.09	$ 2.09	$ 3.14	$ 4.18	$ 5.23	$ 6.27	$ 7.32	$ 8.36
$ 2.19	$ 2.19	$ 3.29	$ 4.38	$ 5.48	$ 6.57	$ 7.67	$ 8.76
$ 2.29	$ 2.29	$ 3.44	$ 4.58	$ 5.73	$ 6.87	$ 8.02	$ 9.16
$ 2.39	$ 2.39	$ 3.59	$ 4.78	$ 5.98	$ 7.17	$ 8.37	$ 9.56
$ 2.49	$ 2.49	$ 3.74	$ 4.98	$ 6.23	$ 7.47	$ 8.72	$ 9.96

12-2011

Appendix C: Behavioral Frequency Rating Scale for Controls

Food Item	**Purchases made past 2 years**	**Purchases made during last 1 year**	**Purchases made 6 months ago**
Bread	If you needed bread during six separate grocery store visits five years ago, how often would you have purchased **100% whole wheat bread, rolls, or buns** during these visits? ☐ 100% of the time/Always 6 ☐ 90% of the time/Usually 5 ☐ 80% of the time/Often 4 ☐ 70% of the time/Sometimes 3 ☐ 60% of the time/Seldom 2 ☐ 0% of the time/Never 1 Was your selection based on: ☐ Taste ☐ Nutritional benefits ☐ Cultural influence ☐ Price ☐ other	If you needed bread during six separate grocery store visits three years ago, how often would you have purchased **100% whole wheat bread, rolls, or buns** during these visits? ☐ 100% of the time/Always 6 ☐ 90% of the time/Usually 5 ☐ 80% of the time/Often 4 ☐ 70% of the time/Sometimes 3 ☐ 60% of the time/Seldom 2 ☐ 0% of the time/Never 1 Was your selection based on: ☐ Taste ☐ Nutritional benefits ☐ Cultural influence ☐ Price ☐ other	If you needed bread during six separate grocery store visits during the last year, how often would you have purchased **100% whole wheat bread, rolls, or buns** during these visits? ☐ 100% of the time/Always 6 ☐ 90% of the time/Usually 5 ☐ 80% of the time/Often 4 ☐ 70% of the time/Sometimes 3 ☐ 60% of the time/Seldom 2 ☐ 0% of the time/Never 1 Was your selection based on: ☐ Taste ☐ Nutritional benefits ☐ Cultural influence ☐ Price ☐ other

Instructions: This survey is designed to identify how often you purchase select food items. Please check the box that corresponds to your answer/response.

Appendix D: Behavioral Frequency Rating Scale for Study Group

Food Item	**Pre-WIC**	**During WIC**	**Post-WIC**
Bread	If you needed bread on six separate grocery store visits before you received WIC, how often would your purchase **100% whole wheat bread, rolls, or buns** during these visits? ☐ 100% of the time/Always 6 ☐ 90% of the time/Usually 5 ☐ 80% of the time/Often 4 ☐ 70% of the time/Sometimes 3 ☐ 60% of the time/Seldom 2 ☐ 0% of the time/Never 1 Was your selection based on: ☐ Taste ☐ Nutritional benefits ☐ Cultural influence ☐ Price ☐ other	If you needed bread on six separate grocery store visits when you were enrolled in WIC, how often would your purchase **100% whole wheat bread rolls, or buns** during these grocery visits? ☐ 100% of the time/Always 6 ☐ 90% of the time/Usually 5 ☐ 80% of the time/Often 4 ☐ 70% of the time/Sometimes 3 ☐ 60% of the time/Seldom 2 ☐ 0% of the time/Never 1 Was your selection based on: ☐ Taste ☐ Nutritional benefits ☐ Cultural influence ☐ Price ☐ other	If you needed bread when you no longer received WIC, how often would your purchase **100% whole wheat bread, rolls, or buns** during these visits? ☐ 100% of the time/Always 6 ☐ 90% of the time/Usually 5 ☐ 80% of the time/Often 4 ☐ 70% of the time/Sometimes 3 ☐ 60% of the time/Seldom 2 ☐ 0% of the time/Never 1 Was your selection based on: ☐ Taste ☐ Nutritional benefits ☐ Cultural influence ☐ Price ☐ other

Instructions: This survey is designed to identify how often you purchase select food items. Please check the box that corresponds to your answer/response.

If your selection was influenced by your participation in WIC, rate which influence had the greatest impact on your choice: Circle the number next to your choice:
1= greatest amount of influence 2=little amount of influence 3= no influence

Literature 1---------- 2 ----------3

Counseling 1 --------- 2---------- 3

Requirement to use food benefits to purchase from WIC approved food list
1---------- 2----------3

Appendix E: Survey Questions

Being overweight may contribute to health problems? Yes/No

Obesity may contribute to health problems? Yes/No

Which USDA food subsidy (ies) do you currently receive? SNAP/TANF/School Breakfast-Lunch Program

How many years did you receive WIC benefits?

Which of the following categories best describes your primary area of employment?

Are you currently on a special diet?

How would you describe yourself? Underweight/Normal weight/Overweight/Obese/Morbidly obese

Do you have any medical/health/dental problems? If yes proceed to the next question

What year did you last receive WIC benefits?

How many children do you have?

How many children 16 years old or younger live in your household?

What is your primary language?

What is your Age?

What is your current income in US dollars?

What is the highest level of education you have completed?

Has a health care provider ever told you that you are overweight?

Has a health care provider ever told you that you are obese?

Bread Category

Do you or a family member have an allergy that prevents you from eating bread? If yes skip to the next food category

Does a religious belief prevent you from eating bread? If yes proceed to next food category

Please select grain of bread purchased PRE-WIC

Please select grain of bread purchased while enrolled in WIC

Please select grain of bread purchased POST-WIC

If there is a difference in the grain of bread purchased POST-WIC? If yes proceed to next question?

Appendix F: State of Georgia Demographics (2010)

Female 50.2%

White 38.4%

Black/African American 54%

American Indian/Alaskan Native 2%

Asian 3.1%

Hispanic/Latino 5.2%

White/non-Hispanic or Latino 36.3%

Language other than English spoken at home aged 5+ 10.5%

High school graduate or higher persons aged 25+ 87.3%

Bachelor's degree or higher aged 25+ 46.1%

Median household income $45,946

Persons below poverty level 23.2%

Persons per household 2.18

Source: Georgia Bureau of Statistics (2010)

Georgia WIC Demographics

Number of WIC participants 303,000

Average number of persons in a WIC family 4

Average income $10,808

Age of 83% of participants 18-34

17 years or younger 10%

White 40%

Hispanic 31%

Black/African American 24%

Average participant has 12 years of education

More than 1/3 do not participate in other federal assistance programs

Source: Georgia Department of Human Resources (2012).

Fulton County, GA

Population 977,773

Female..... 51.2%

White..... 47%

Black/African American 44.6%

American Indian/Alaska Native..... 0.3%

Asian 6%

Language other than English spoken at home aged 5+..... 16.1%

Median household income $57,582

Persons below poverty level 15.9%

Source: United States Census Bureau (2012).

Native Hawaiian/Pacific Islander 0.1%

Language other than English spoken at home aged 5+..... 18.1%

Median household income $51,712

Persons below poverty level 17.1%

Source: United States Census Bureau (2012).

These numbers reflect approximately 2.5 million potential study participants from which the researcher will draw the sample.

Appendix G: Letter to Wal-Mart

From: jltatc <jltatc@aol.com>
To: jltatc <jltatc@aol.com>
Subject: Fwd: Letter to Walmart
Date: Mon, Feb 17, 2014 7:22 pm

Greetings Walmart Representative:

My name is Joyce L. Terrell, and this communique serves as an inquiry on how I would proceed to request permission to conduct a survey at the Walmart in my neighborhood. I am conducting research as partial fulfillment for requirement for my Ph.D. in Public Health/Epidemiology. I am a student at Walden University and the University along with my committee chair has given me permission to proceed with my research, titled "The Social Ecological Influences of W.I.C. Programming on Behavior Change; A Causal Comparative Study.

The Special Supplemental Nutrition Program for Women, Infants, and Children (W.I.C.) provides Federal grants to states for supplemental foods, health care referrals, and nutrition education for low-income pregnant, breastfeeding, and non-breastfeeding postpartum women, and to infants and children up to age five who are found to be at nutritional risk. The study I am conducting is designed to determine influences of food choices made by recipients of Women, Infants, and Children (W.I.C.) benefits and to compare their choices with women who have never received W.I.C. I would like to investigate if decisions to purchase select food items are influenced because of participation in W.I.C. or if choices may be influenced by other factor(s). Participation in this study has the potential to help improve government program(s). All responses will remain anonymous and because participation is completely voluntary, it will not have any impact on one's ability to continue receiving any government assistance (if they receive benefits) or affect participation in any USDA food subsidy program going forward.

The survey will take approximately ten (10) minutes to complete. As a "thank you" for completing the survey participants will receive a McDonalds or Subway gift card, a $5 value. All responses will be reported in cumulative format to ensure protection of the identity of all respondents. Neither I nor Walden University has a conflict of interest with the results. The survey asks questions regarding basic demographic information (i.e. education attained) and questions about food purchase habits. I have included a link to the survey for your review (see below).

I would like to set-up a table outside of any of the Walmart stores in the metropolitan Atlanta area entrances to invite customers to answer this survey. Again the gift card will be issued upon completion of the survey. The opportunity to collect this data from your shoppers would be invaluable to my research and the public health community at large. Should you have additional questions regarding this research study, please contact the principal researcher, Joyce L. Terrell, jltatc@aol.com, 678-471-4615.

Link to site:(Copy and paste in browser)
https://www.surveymonkey.com/s/WICSurvey1 ;

Sincerely,
Joyce L. Terrell, M.S.,ATC.,MPH

jltatc@aol.com
Joyce L Terrell

-----Original Message-----
From: jltatc <jltatc@aol.com>
To: jltatc <jltatc@aol.ccom>
Sent: Mon, Feb 17, 2014 7:14 pm
Subject: Letter to Walmart

Greetings Walmart Representative:

My name is Joyce L. Terrell, and this communique serves as an inquiry on how I would proceed to request

From: Walmart Customer Service <cstreply@wal-mart.com>
To: 'jltatc@aol.com' <jltatc@aol.com>
Subject: Response from Wal-Mart Stores, Inc. (Ref #000000039891765)
Date: Wed, Feb 19, 2014 11:24 am

Thank you for your message.

Dear Joyce,

Thank you for taking the time to write us. All requests to solicit and/or distribute literature outside one of our facilities must be approved by the facility manager (Store Manager) at least three days in advance. Any group or individual wanting to solicit must also agree to the rules set forth in the agreement, which the Store Manager will provide.

Please contact the store you wish to operate outside of and speak with a member of management. To find the phone number for Walmart store, please visit the www.walmart.com website and click on Store Finder at the bottom of the page.

If you are seeking a donation, please visit our website, www.walmartfoundation.org, for more information on our community and giving programs. Please remember, only schools, civic organizations, government agencies, and organizations that carry a 501(c)3 tax status that have a program that benefits the local community may be eligible for grant support from our local stores or clubs.

Funding is directed locally by our associates and remains in the local community. Our giving guidelines do not allow support for individuals, activities outside the United States and Puerto Rico, or projects and organizations where funding does not remain in the community where the funding is received. Therefore, the best way for individuals to seek assistance would be to contact one of the organizations that Walmart supports. Such organizations as:

The United Way (800) 892-2757
The Salvation Army (800) SAL-ARMY
The American Red Cross (800) HELP-NOW

Thank you again for your inquiry.

Sincerely,
Walmart Customer Care

For further correspondence regarding this issue, please reply to this email.

----Your Original Comments Were----

This email and any files transmitted with it are confidential and intended solely for the individual or entity to whom they are addressed. If you have received this email in error destroy it immediately. *** Walmart Confidential ***

Appendix H: Comments on the Food and Nutrition Service Rule: Special SNAP for Women, Infants and Children

Comment from WIC Participant, Breezewood, PA

"*Overall I am pleased with the new WIC food package. However, there are a few items that concern me. First is the juice sizes and selections. It is extrememly confusing when purchasing for a child and a pregnant woman, it would be easier if the selections and sizes were the same for both. Second is the requirements of the grocery store. Since they are not required to carry ALL WIC items, there are times when no items in the wholegrain section are purchased because preferred items are not available. I was also disappointed when cheese was decreased. Cheese is so versatile and comes in many forms, tastes, and selections. This isn't necessarily a WIC problem, but since cereal manufacturers changed the sizes of their boxes, it isn't always easy to get the most for your money. For example, Rice Chex comes in size 12.6 oz (or something like that) and if you are allowed 36 oz then you lose close to 11 oz by choosing that particular cereal.*

The fresh fruits and vegetables are great, but it is hard to judge how much you are spending since we are allowed a dollar amount and fruit is sold by the price per pound and usually the pounds aren't determined until you are at the checkout. I realize that some stores have places to give you an estimate, but that isn't always accurate.

Thank you for giving me an opportunity to express my concerns"

Posted: 03/22/2010

Comment from WIC Participant, Port Richey, FL

I was looking forward to the new packages, but in the preliminary articles I'd read, it said that tofu would be made available. I was looking forward to that. I'm so happy that FINALLY there's soy milk and fruits/veggies, but I'd really like the tofu instead of cheese.

Posted: 03/19/2010

Comment from WIC Local Agency, Hutchinson, KS

Thank you for the terrific changes made to the WIC food packages. It may have taken 35 years, but the new packages are dynamite. The clients we serve will meet their nutrition needs from whole grains, whole fruits and vegetables and lower fat dairy products. The clients are very excited and so is our staff.

Posted: 03/19/2010

Comment from General Public, Kenmore, WA

To the Washington State Department of Health members,

Whoever is making the decision to cut organic milk and cereal from the W.I.C. program might think they are saving money, but they're not! There's plenty of research supporting the fact that organic milk, cereal, etc. is healthier for us than those treated with so many pesticides and antibiotics. In the long run, your decision to eliminate the organic products will cost us, the taxpayer, more in the future, with all the medical bills for these W.I.C recepients. Shouldn't we all be acting proactively to conserve state and federal government spending?
These organic products can be affordable to these W.I.C. recepients with your assistance. Without them being part of the W.I.C. package, the recepients won't be able to afford them. Let them have the choice of organic or non.
Posted: Mar 15, 2010

Comment from General Public, Rochester, NY
Suggest other varieties of Honey Bunches of Oats-not just vanilla clusters.
Suggest yogurt and whole grain pasta be added in the future.
Participants have been unable to find 48 oz. plastic containers of juice.
New recommendation is not to give peanut butter until two years old but it is still an option on the WIC checks. Can a different alternative be offered between 1-2 years old.
Posted: Mar 19, 2010

Comment from General Public, Berkeley, CA
I have spent 25 years working to improve the health of low income pregnant women. In the last 10 years, I have been alarmed at the increasing rates of obesity and diabetes that are leading to poor birth outcomes and chronic illness for both the mother and her child. I have tremendous respect for the WIC program and was delighted to see the new food package. It will go a long way in promoting more healthy food choices for the recipients: fresh fruits and vegetables, whole grains and low fat milk. Also, the increased emphasis on breastfeeding has the potential to improve better health not just for the baby, but also for the mother.
I urge the adoption of the new WIC final rules.
Posted: *Mar 22, 2010*

Comment from WIC Participant, Poulsbo, WA
I am unhappy with the new wic food choices. I am only receiving 16oz of a Whole Grain choice. It says in the brochure i should be able to receive bread but that is not the chase you can only get Oat Meal in the tubs, brown rice or Tortillas. I dont use any of those. I am also unhappy with the amount of cheese I use to recive 2 lbs and now only getting 1lbs. My family goes through almost 2 lbs a month. As for the milk please bring back the organic milk as that is what I drink and go through the most. Over all I am not happy with the changes to the program as they do not benefit me as much as the old program did.
Posted: Mar 19, 2010

Comment from WIC Participant, Los Angeles, CA
What I like about the new WIC foods:
I appreciate the fact that fresh, high quality, locally grown foods are available for purchase in WIC only stores in Los Angeles.
What I don't like about the new WIC foods:
Messages such as "value-first", buy for quantity and other such messaging to WIC moms is detrimental and counter to the work that local food activist are doing to increase WIC moms access to fresh, high quality and locally grown foods. If moms are encouraged to buy as much as they can with vouchers they may be encouraged to purchase foods based solely on price and not taste or nutritional value. Local foods are high quality foods which are fresh and tasty, by offering such products to WIC moms we expose them to better and tastier foods which will make them want to eat more of such foods.
Thank you for reading my comments.
Posted: Mar 22, 2010

Comment from Health Professional, San Rafael, CA
As a physician I am very concerned about "chunk light" or canned "light tuna" being included in food packages for women receiving assistance through the Women, Infants and Children program. Studies have shown that canned "light tuna" contains high levels of mercury, sometimes as high as canned albacore tuna. I applaud the USDA's decision to remove albacore tuna from WIC food packages due to mercury concerns and believe the USDA needs to do more to protect vulnerable women and children by removing all canned tuna.
Methylmercury is a known neurotoxin, with children being at greatest risks from its effects. As stated by the U.S. Environmental Protection Agency an estimated 630,000 children born in the US are at risk each year from neurological defects due to mercury contamination.
I would like to see the USDA take the following actions to reduce low income women and children's exposure to mercury:
• Eliminate all canned tuna from WIC food packages
• Offer canned fish alternatives such as canned wild salmon, anchovies, sardines and mackerel
• Embark on a public education effort in order to assist women in deciding which fish are healthiest for their diet
Sincerely,
Posted: Mar 22, 2010