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The Impact of Nutrition-Teaching Self-Efficacy on Daily Fruit and Vegetable Intake

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Abstract

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M.Ed., Liberty University, 2008

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Dissertation Submitted in Partial Fulfillment

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Abstract

Lack of fruit and vegetable (FV) consumption is directly linked to the prevalence of obesity and chronic disease in the United States. The USDA Fresh Fruit and Vegetable Program (FFVP) offers elementary school teachers access to healthy foods as part of the public school classroom experience. The purpose of this study—which was based on self-efficacy theory and the socio-ecological model—was to examine if an association exists between selected factors:(a) daily fruit and vegetable consumption, training statusin the USDA Fresh Fruit and Vegetable Program (FFVP), and an established school nutrition policy and (b) nutrition-teaching self-efficacy (NTSE) among elementary school teachers who participated in the FFVP. Using an online survey, 66 teachers out of 114 (58% response rate) completed a 26-question surveyadapted from the Nutrition-Teaching Self-Efficacy Scale and the National Cancer Institute's Food Attitude and Behavior Survey.Based on the results of the chi-square test of association ($p = 0.031$), an association between daily FV intake and NTSEamong teachers involved in the USDA FFVP was confirmed. The odds of having high NTSE are 3.45 higher in those who consume more than 3 cups of combined FV each day ($p = 0.029$). There were no significant associations between NTSE and FFVP training and established school nutrition policy. The social change implication of this study is that healthier, confident teachers build healthier school environmentsand createthe impetus for increasing FV consumption in the community at large, thereby helping to reduce the risk of obesity and chronic diseases.

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Dedication

I dedicate this dissertation to my food-literate family, especially my five children: Quentin, Jasmine, Joel, Elise, and Miles. Thank you for caring about what you eat and knowing the importance of FV on a daily basis. I love that you love carrots, apples, bananas, blueberries, celery, green beans, peppers, broccoli, tomatoes, cucumbers, pineapple, potatoes, beets, radishes, and everything else from the ground, tree, or patch that I offer you. I hope our decisions to focus on real food and healthy choices stay with you forever.

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To the most amazing, supportive and honorable man, my husband, Todd, you have sacrificed much to help me reach this goal in my life. I thought when we were married that I would have to give up my desires for continuing my education, but you never said no. Thank you for believing in me and loving me through this process.

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To my whole family, thank you for instilling in me a love of lifelong education. I knew from an early age I loved to learn and explore the world around me. Your confidence in me has kept me moving forward by staying relentless to the goal.

To my chair and commit, Chapin said, "Not in achievement, but in endurance, of the human soul, does it show its divine grandeur and its alliance with the infinite." Thank you for believing in my desire to endure and finish this race. Your example and support will be forever remembered and paid forward.

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Chapter 1: Introduction to the Study

Background

Fruits and vegetables (FV) are critical to promoting good health because of their nutritional value and their role in reducing the risk for developing chronic disease (Hung et al., 2004; Casagrande, Wang, Anderson, & Gary, 2007; Yeh et al., 2008; Fisk, Middaugh, Rhee, & Brunt, 2011).This study examinedwhether an association exists between daily FV consumption and nutrition-teaching self-efficacy (NTSE)among teachers who participated in the USDA Fresh Fruit and Vegetable Program (FFVP), a program targeted atlow-income schools to increase the FV consumption of students. The study helped to determine (a) if there is an association betweenthe daily FV consumption of teachers and their self-efficacy for teaching nutrition in the classroom setting, and (b) how FFVP training and established school nutrition policy might impact NTSE. These factors are important to understand in the context of the policies, systems, and environmental supports that enable or reduce teachers' ability to serve as healthy-eating role models and satisfactorynutrition educators as part of the FFVP.

First Lady Michelle Obama often comments in her remarks for the Let's Move! Campaign (2010) that peoplemust work together to eliminate childhood obesity in one generation. Broadly speaking, the intent of this study wasto determine whether the schools and teachers have what they need to synergize with Mrs. Obama's mission to promote the health and value of eating FV and being knowledgeable about nutrition. Specifically, the goal was to determine whether FFVP teacherswere well-prepared and confident because of their own self-efficacy and positive food attitudes and behaviors.

The implications of the study are many and focus on the social-environmental strategies and approaches that are helpful to increase FV consumption among adult role models. The FFVP has four goals thatrequire support and investment from adults who influence students directly within the school (USDA, 2010). If there is an association between teachers' FV consumption and the capacity of teachers to confidently teach nutrition, then the FFVP could be taken to scale in other settings – middle schools, high schools, early childhood centers, worksites, healthcare facilities, etc.

Approximately 1.7 million deaths globally are attributable to low FV consumption, which also attributed 678,282 deaths in the U.S. in 2010 (WHO, 2013a; U.S. Burden of Disease Collaborators et al., 2013). Low FV consumption is associated with micronutrient deficiencies that lead to birth defects and weakened immune systems (FAO, 2003). Cardiovascular diseases – ischemic heart disease and strokes – and certain cancers are associated with low levels of FV intake (WHO, 2003). FV provide a protective effect and may mediate against carcinogens and prevent oxidative DNA damage (WHO, 2003).

Consumption of an adequate daily amount of FV is strongly recommended to reduce the risk of chronic diseases (Hung et al., 2004; Fisk et al., 2011). The large majority of American adults do not consume the recommended number of FV daily. Over 67% of adults fail to eat at least twoservings of fruit and over 73% of adults do not eat at least three servings of vegetables each day (CDC, 2010). The knowledge gap, related to the health benefits of eating FV,added with the reality of what people consume are recognized problems in public health. Obesity in adults has increased to over 35% of men

and women and far exceeds the Healthy People 2010 goal of 15% obesity among adults (Ogden, Carroll, Kit, & Flegel, 2012). In Virginia, where this study took place, there is 29.2% obesity in adults (CDC, 2012a).

Two-thirds of U.S. adults and one-third of U.S. children are overweight or obese (CDC, 2012a; Ogden, Carroll, Curtin, Lamb, & Flegal, 2010). In order to reduce obesity, elementary school teachers who participate in the FFVP are best suited when they have a high level of NTSE, which is supported by being(a) a FV consumer whomeets daily dietary guidance, specificallyat least five servings per day (two one-half cups of fruit and three one-half cups of vegetables), (b) a participant in FFVP training, and(c) a follower of established school nutrition policy. Right now, it can only be estimated how effective elementary school teachers are in the FFVP as NTSErelates to the three selected factors.NTSEalso involves a relationship to socio-ecological dynamics and how school policies, systems, programs, and environmental supports affect a teacher's ability to provide nutrition education and promote healthy eating to students. If the teachers participatingin the FFVP are to have a positive impact on low-income students by increasing their FV consumption, the teachers must (a) be well trained through higher education coursework or professional development on nutrition and (b) exude a high confidence level to instruct them about healthy eating. Teachers need to understand their role in the FFVP and the chance they haveto change the food environment of the school into one that is health-promoting and consistent with established policy and systems approaches. By measuring NTSE and daily FV consumption of teachers, recommendations for improvement in the overall FFVP delivery canbe made.

I investigatedthe impact NTSEon daily FV intake and examined the relationship of training elementary school teachers on nutrition and school nutrition policy. Research suggests that Americans eat more calories than recommended, but they do not eat enough fruit, vegetables, and whole grains because of limited access to healthier foods (National Cancer Institute, 2010). Over 6.7 million faculty and staff are employed in U.S. public schools and are susceptible to the same disease risks as the general population; there is a lack of nutrition and physical opportunities in the workplace (Eaton, Marx & Bowie, 2007; Foltz, Harris & Blanck, 2012). Elementary school teachers whoimplement the FFVP have a unique opportunity to address obesity and chronic diseases with their students, families, friends, and the community at large.

Schools are ideal settings to demonstrate leadership on nutrition education because of their ability to reach a wide-ranging community of people. When schools implement policies and programs, they enable positive attitudes and behaviors about food toward healthier options like fruits and vegetables(Foltz et al., 2012; McCullum-Gomez et al., 2006). Even with implementation of the recent USDA changes to school lunch and breakfast programs, the Dietary Guidelines for Americans (DGA) and MyPlate food icon have been established but with little zeal (Public Health Law Center, 2008; U.S. Department of Agriculture and Department of Health & Human Services, 2010). Accountability is needed to maintain consistency. In Virginia, aSchool Health Advisory Board (SHAB) has beeninstituted in each school district to advise on matters related to health policy development and implementation. Virginia SHABs report a high level of training on nutrition education (75% of staff surveyed) and a focus on improving student

and staff wellness (Kowalewska, Hosig, Serrano & Fuller, 2012). This does not include the FFVP and its influence on teacher FV consumption and NTSE.

Even when a nutrition education curriculum is in place with the FFVP, it cannot be assumed that teachers are trained and confident to carry out an effective lesson. The studysought to ascertain what involvement that qualified, trained teachers have in the FFVP and if curriculum, policies, and other interventions promote self-efficacy among teachers. Teachers are gatekeepers to nutrition education in the classroom setting and modeling healthy eating behavior includes the teacher's policies on food in the classroom, for example, candy as a reward or incentive (Auld, Romaniello, Heimendinger, Hambidge, & Hambidge, 1999). Their self-efficacy is advanced through interest and awareness, training, policy and environmental supports as well as leadership in administration at all levels (Auld et al., 1999; Murimi et al., 2007; Prelip, Slusser, Thai, Kinsler, & Erausquin, 2011).

With respect to the FFVP, impact and outcome evaluation wasconducted after a brief pilot year in 2003 and 5years later in 2008. Both studies were sanctioned by the USDA as a report to Congress (Buzby, Guthrie & Kantor, 2003; Olsho, Klerman & Bartlett, 2011). A new evaluation was conducted and it was expanded to include data on implementation of the FFVP (Bartlettet al., 2013). The evaluation explored nutrition education provided to students as part of FFVP implementation, distribution methods and frequency, types of FV offered, and satisfaction with the program as reported by students, parents, and other stakeholders (Bartlett et al., 2013). With an increasing number of schools being accepted to offer the program each year ($6 million allocated in 2002 to

$150 million in 2011), it is time to determine if this program could be used as a means change the way society uses food in institutional-to-community settings to reduce the risk of obesity and chronic diseases. Or at least it is an opportunity to provide better training and professional development to the teachers who implement the FFVP so they have a high level of NTSE.

Many factors affect FV consumption and ateacher's belief that she is well-equipped to teach nutrition. There are barriers to strengthening an individual's confidence in practicing and teaching nutrition to others; implementing systemic, comprehensive strategies to improve availability, accessibility, and affordability of FV may yield higher rates of consumption (Yeh et al., 2008; Casagrande et al., 2007; Blanck, Gillespie, Kimmons, Seymour, & Serdula, 2008; CDC, 2010; Backman, Gonzaga, Sugeman, Francis, & Cook, 2011; Erinosho et al., 2012). Targeted workplace opportunities have the potential to improve adult behaviors, especially those who are at risk for chronic diseases (Pomerleau, Lock, Knai, & McKee, 2005).

Therefore, schools are cited as having an integral role in addressing the problems of obesity and chronic disease because they can implement practices, programs, and policies to enable both students and teachers to improve their health status (Snelling, Belson, & Young, 2012; Murimi, Sample, & Hunt, 2008). Teachers are role models of healthy eating behavior in the school environment and they believe that health education in schools is very important for students (Snellinget al., 2012; Murimi et al., 2008; Bauer, Patel, Prokop, & Austin, 2006; McCullum-Gomez, Barroso, Hoelscher, Ward, & Kelder, 2006). Yet, some studies have demonstrated that teachers do not practice daily habits that

promote health and are not adequately trained to teach nutrition (Kubik, Lytle, Hannan, Story, & Perry, 2002; Rossiter, Glanville, Taylor, & Blum, 2007; Lanier, Wagstaff, DeMill, Friedrichs, & Metos, 2012; Brenowitz & Tuttle, 2003; McCullum-Gomez, et al., 2006; Jamelske, Bica, McCarty, & Meinen, 2008; Hendy, 1999). Therefore, it is necessary to identify opportunities for teachers to improve self-efficacy, attitudes, and behaviors to benefit their students' nutrition education, attitude toward food and healthy eating behavior. The study sought to identify factors that improve the quality of health among teachers by enhancing the health-promoting environment through the FFVP.

The USDA FFVP was created to improve nutrition and reduce the burden of childhood obesity in America through increased FV consumption by eligible elementary school children (Jamelske et al., 2008; USDA, 2010). The goals of the FFVP according to the USDA (2010) are to:

- Create healthier school environments by providing healthier food choices.
- Expand the variety of FV children experience.
- Increase children's fruit and vegetable consumption.
- Make a difference in children's diets to impact their present and future health.

This program is seen as an important catalyst for change in efforts to combat childhood obesity by helping children learn more healthful eating habits. Having exposure to a variety of produce that they might not otherwise have was expected toencourage more healthful eating habits (USDA, 2010). Therefore, the FFVP could demonstrate an association between FV consumption of participating teachers and NTSE. The research sought to answer this important question.

The FFVP delineates two primary best practices for participating teachers. The first recommendation is that teachers serving FV to their students model healthful eating habits by participating with their students and including a nutrition education lesson (USDA, 2010). Additionally, teachers can help monitor and direct the food distribution, and use the opportunity to talk with students about nutrition and health (USDA, 2010).

Chapter 1covers the study's problem, purpose, research questions, nature of the study, definitions, assumptions, scope and delimitations, limitations, and significance.

Problem Statement

Increasing access to healthy foods –particularlyFV – may have an impact on adults in the role of educator and using healthy foods, through practice and policy, as part of the public school classroom experience. The issue of daily FV consumption and NTSEis a relevant and significant problem because teachers are not prepared for this role in undergraduate degree programs, nor are they given annual opportunities to learn more about nutrition and school health (Rossiter et al., 2007; Kubik et al., 2002; Celebuski & Farrin, 2000; Falciglia, Norton,& Wagner, 1997). Teachers have a responsibility not only to be positive role models but educated ones;they must be confident in seeing the systemic view of their efforts beyond the classroom walls. It is estimated that to impact healthy eating behavior of students, a minimum of 50 hours of nutrition education is required learning for teachers (Celebuski & Farrin, 2000). Teachers spend 10 or fewer hours teaching nutrition over the entire school year (Brenowitz & Tuttle, 2003). Research has shown that the time spent teaching nutrition increases NTSE (Brenowitz & Tuttle, 2003), but there are no studies that evaluate the effect of the FFVP on NTSE and on

teacher FV consumption. Surrounding the problem that teachers are ill-equipped and ill-prepared for such a role is the fact that schoolsmay or may not establish nutrition policies and programs that facilitate a health-promoting school environment.

Purpose of the Study

The purpose of this quantitative study wasto examine if an association exists between daily FV consumption, FFVP training, and established school nutrition policy withNTSEamong teachers who participated in the FFVP. The relationship between teacher self-efficacy and their ability to bring about desired outcomes is shaped by experiences that enable mastery of knowledge or skills, social and environmental influences, and emotions. These factors are germane inside the field of practice and outside in the classroom (Williams, 2009; Bandura, 1977).

This research was undergirded by the literature on U.S. adult consumption of FV,along with adult food attitudes and behaviors that incorporate school teacher health and wellness, teacher training about nutrition, school-based nutrition policies, interventions and self-efficacy to teach nutrition. A brief is provided about the USDA FFVP to explainthe context in which teachers are to model healthy eating behavior and to provide nutrition education. Consequently, the independent variablesaredaily FV consumption, FFVP training status, and established school nutrition policy; the dependent variable isNTSE.

Research Questions and Hypotheses

This study was based on three research questions, each of which generated related hypotheses:

Research Question 1 (RQ1): Does an association exist between daily FV intake and NTSEamong teachers involved in the USDA FFVP?

H_01: There is no association between daily FV intake and NTSEamong teachers involved in the USDA FFVP.

H_a1: There is an association between daily FV intake and NTSEamong teachers involved in the USDA FFVP.

Research Question 2 (RQ2): Does an association exist between FFVP training status and NTSEamong teachers involved in the USDA FFVP?

H_02: There is no association between FFVP training status and NTSEamong teachers involved in the USDA FFVP.

H_a2: There is an association between FFVP training status and NTSEamong teachers involved in the USDA FFVP.

Research Question 3 (RQ3): Does an association exist between established school nutrition policy and NTSEamong teachers involved in the USDA FFVP?

H_03: There is no association between established school nutrition policy and NTSEamong teachers involved in the USDA FFVP.

H_a3: There is an association between established school nutrition policy and NTSEamong teachers involved in the USDA FFVP.

According to Bartlett et al. (2013), since the program has demonstrated effectiveness in increasing FV consumption in children, a similar effect on teachers is possible. In addition, a teacher's self-efficacy forproviding nutrition education may be higher if she or heparticipates in FFVP training before implementing the program or have established school nutrition policy that encourages frequent opportunities to offer FV at school. These variables weremeasured with26 questions in an online survey that assessed(a) NTSE and (b) attitudes and behaviors related to FV consumption.

The Nutrition-Teaching Self-Efficacy Scale (Brenowitz & Tuttle, 2003) and the National Cancer Institute's (2011) Food Attitude and Behavior Survey (FABS) served as the source for the validated questions. Their questions, which are consistent with the socio-ecological model and self-efficacy theory, evaluate the following qualities.

- Self-efficacy of teacher to confidently provide nutrition education and consume fruits and vegetables
- Knowledge about nutrition and fruit and vegetable consumption
- Intrinsic and extrinsic motivations for educating students about nutrition and consumption of fruits and vegetables
- Environmental influences on the results of consuming FV and providing nutrition education.

General demographic variablesof the elementary school teacher population participating in the FFVP (e.g., gender, age, grade taught, years teaching, educational attainment, income/economic status, class size, and school size) were also collected, along with the variables of interest to this study:

- training on FFVP and/or nutrition at start of school year (yes, no)
- intake level of FV per day: low intake (less than 3 combined cups) or high intake (more than 3 combined cups)
- established school policies on nutrition in the classroom (yes, no)
- NTSE score

An attempt to recruit teachers across distributed grade levels was made. Analytical strategies included contingency tables with chi-square analysis and multiple regression analysis. The study sought todetermine the association of variables that influence NTSE: daily fruit and vegetable consumption, FFVP training status, and an established, school nutrition policy. SPSS v. 21 (IBM) was used for data analysis and included descriptive statistics of the sample population.

Theoretical Foundation and Conceptual Framework of the Study

The quantitative study wasfounded on self-efficacy theory (SET) and framed by the socio-ecological model (SEM). SET is the basis of investigating a teacher's ability to perform a specific behavior, that is, the selected factorsidentified in this study (Bandura, 1977; Glanz & Bishop 2010). The higher the level of self-efficacy, the more likely it is that the teacher willmodel healthy eating of the fruit or vegetable in front of students, as well as be a high FV consumer outside of the classroom and provide nutrition education to her or his students.

Within the framework of the SEM, a teacher can have a higher self-efficacy due tothe cumulative impact of a health-promoting environment on teachers' physical, emotional, and social well-being. SEM explores environmental impacts that facilitate

improvements in knowledge, skills, and abilities. The belief is that dailyFV consumption, established school nutrition policies, and nutrition training all promote higher self-efficacy when the selected factors are adopted and leadership is provided (Glanz & Bishop, 2010). Transactions in the teacher-classroom environment are marked by mutual effect, meaning that the physical and social elements – such as foods used during celebrations –may directly influence teachers' food attitudes and behaviors as they modify the NTSE of their setting through social actions (Stokols, 1996).

The socio-ecological model enables the study of teachers in the school and the influences that exist in the context ofthe FFVP (Stokols, 1996). Embedded in the socio-ecological model are interrelated core principles among (a) environmental conditions and (b) human behavior and well-being (Stokols, 1996). No studies were found that examined the impact of the FFVP on teachers' self-efficacy to teach nutrition as implementers of the program. A more detailed explanation is provided in Chapter 2.

Nature of the Study

This quantitative research study used the Nutrition-Teaching Self-Efficacy Scale (NTSES) and Section 4of the Food Attitudes and Behaviors Survey (FABS), "What You Eat and Drink." The NTSES is a validated instrument with high levels of internal consistency andrealiability (Cronbach's alphas > .82). The instrument is recommended as part of a needs assessment for nutrition education among teachers (Brenowitz & Tuttle, 2003). The 20-item instrument uses a 4-point Likert-scale. The survey is constructed of 14 questions about efficacy expectations and 6 questions about outcome expectations. It

was adapted for use in the context ofthe FFVP (see example of the NTSES in Appendix A).

The FABS is a survey tool that assesses factors that influence consumption of FV among adults. It measures attitudes and beliefs, general health, shopping habits, eating behaviors, and food preferences (NCI, 2011). The survey was developed by National Cancer Institute researchers and was conducted nationally in 2007. Section 4, "What You Eat and Drink,"wasselected for this study because it focuses on FV consumption.

An online survey, using SurveyMonkey (SM; http://www.surveymonkey.com),was used to measure efficacy and outcome expectations, as well as food attitudes and behaviors of teachers implementing the FFVP. The interventions of the study were targeted atelementary school teachers who implemented the USDA FFVP in Lynchburg,Virginia during the 2013-2014 academic year. The targeted school districtwas selected because they operate the FFVP in six or more schools. At the time of the study, there wereapproximately 114 teachers implementing the FFVP in the 6 participating schools.To reach that wide number of teachers an online survey allowed for reaching the greatest number of teachers. Additionally, e-mail reminders permittedongoing invitation to the elementary school teachers. The survey wasanticipated to take no longer than 20 minutes to complete. The survey tool, SM, also offeredanalytical tools and exporting data to SPSS to allow for ease of organization and processing. Walden Institutional Review Board (IRB) approval was obtained prior to beginning the research study (01-03-14-0126173; expires January 2, 2015). The research

risks were described online.A checkbox indicating consent had tobe checked beforea respondent could proceed with the online survey.

Definitions

Nutrition-Teaching Self-Efficacy: The measure of a teacher's belief that he/she can confidently teach about nutrition and lead to changes in nutrition-related attitudes and behaviors in self and others (Bandura, 1977; Brenowitz & Tuttle, 2003).

Fruit and Vegetable Consumption: Eating FV as part of daily dietary intake, measured in cups.

USDA Fresh Fruit and Vegetable Program (FFVP): USDA-funded fruit and vegetable program in eligible U.S. elementary schools(with 50% or more students entitled to reduced or free school lunch) to familiarize students with FV to learn long-term healthy eating habits (USDA, 2010).

Elementary School Teacher: A person hired to instruct children in a school usually with grades Kindergarten through 5th grade.

FFVP Training: The provision of and participation in educational lessons, by the school district, on the implementation of the FFVP and nutrition education for elementary school teachers.

Established School Nutrition Policy: A school district policy that clearly states the content and quality of school meals, and implements nutrition standards in the classrooms and cafeteria. The policy supports offering of healthy foods (fruit and vegetables) for a consistent message about positive eating habits and healthy diet, and is seen as an integral part of the school program.

Assumptions

It is important to understand the nature of elementary school teachers and their relationship to FV as similar to that of the general population. The sample population in the survey was assumed to be honest and accurate. For elementary schools that implemented the FFVP,it wasassumed that at least half of their student population were low income and thus eligible for free or reduced priced breakfast and lunch. These conditionsimplied that (a) access and availability to healthy FV was limited and (b) that teachers lacked nutrition-related resources.

Elementary school teachers have a baseline of education attainment in at least a Bachelor's degree, which means that the sample population has been given training in how to teach and prepare lessons. Likewise, using an online methodology to collect data is a common practice and is employed for various purposes to gather information within educational settings. These facts are noted to give clarity and support to the research methodology.

Scope and Delimitations

The study population was limited to elementary school teachers in Lynchburg, Virginia schools that implemented the FFVP. This excluded teachers in elementary schools that had not implemented FFVP.Questions on the survey were asked in the context of MyPlate icon recommendations and resources that are suggested for use by the

USDA. Daily FV consumption was compared to the recommendations in the 2010 Dietary Guidelines for Americans.

Thestudy results could not be generalized. If generalizability were sought, then the sample size should have been representative of teachers from across the Commonwealth of Virginia or FFVP-participating schools in other states.

Limitations

This study was subject to three weaknesses. The threat to validity due to cognitive processes is real especially while taking a survey; retrieving information from memory involves a four-step process of retrieval, (a) comprehension of the question, (b) retrieval of information, (c) judgment process, and (d) response generation (Crosby, DiClemente, & Salazar, 2006).

A disadvantage of an online survey was unknown representativeness of sample, although demographics helped to determine representativeness.Couper (2007) writes that research designs are engineered along three facets – representation, randomization, and realism – and one facet usually is minimized to enhance the other two facets. The ideal design yields a sample that represents the target population with similar distributions, but where randomization strengthens the methodology to control for potentially confounding factors (Couper, 2007). For example, some school districts may have all teachers submit a survey and other school districts may have none submit a survey.

Concerns about identity and eligibility of respondents were considered and discussed. To mitigate these threats, a random sample was used to reduce selection and response bias through voluntary participation in the survey. The response rate

wasenhanced by offeringparticipantsincentives for completing the survey (vouchers to thelocal farmers market or the online retailer, Amazon.com).

Significance

The studywas the first of its kind to research the impact of the FFVP on teachers who implementedthe FFVPwith regards to (a) their daily consumption of FV, (b) FFVP training, (c) school nutrition policy and (d) NTSE. Previous studies have focused only on the students (Buzby et al., 2003; Olsho et al., 2011; Bartlett et al., 2013).

Understanding the influence of teachers' food attitudes and behaviors has the potential to improve NTSE, which is linked to time spent (a) teaching nutrition (Brenowitz & Tuttle, 2003) and (b) training on nutrition, which may promote congruent food attitudes and behaviors among teachers and higher self-efficacy. A stronger impact in the classroom may be evidencedby changes in nutrition policy and practicerelated to nutrition knowledge, attitudes, and behaviorsof the school.

Intervention strategies for healthier school food environments and reducing the burden of obesity are immediate public health issues. It is anticipated that significantly improving the NTSE and food attitudes and behaviors of elementary school teachers would allow the FFVP tobe taken to scale.

Summary

The following was explored in this study: the association between teacher FV consumption per day and individualself-efficacy forteaching about nutrition in the classroom, as well as how FFVP training and established school nutrition policy might impact NTSE. The national crisis of obesity and other chronic diseases continues to

burden the current medical system. Increasing access to healthy foods – FV – in the environment may have an impact on adults who are in the role of educator and using the healthy foods as part of the classroom experience through practice and policy.

The value of exploring how NTSEis influenced by daily FV intake, FFVP training, and established school nutrition policy is critical to understanding more about the impact of the program. Millions of dollars are spent on FFVP each year and recognizing the effect the program has on children cannot be overlooked. FFVP teachers, in the social environment of a school, may have an advantage when it comes to instruction on nutrition and healthy diets. This study explored the association of identified, select factors for consideration of improving or expanding the FFVP at the local school district level.

The following chapters include the literature review, research method, results, and discussion and recommendations.

Chapter 2: Literature Review

Introduction

Consumption of an adequate daily amount of FV is recommended to reduce the risk of chronic diseases, including cancer, diabetes, heart disease, and obesity (Hung et al., 2004; Casagrande et al., 2007; Yeh et al., 2008; Fisk et al., 2011). In the United States, roughly one-third (32.5%) of adults consume fruit two or more times daily (CDC, 2010), and over a quarter of adults (26.3%) consume vegetables three or more times per day (CDC, 2010). Chronic disease rates, specifically for obesity and heart disease, continue at peak levels and therefore, developing integrated strategies are essential. Cross-sector collaboration to reduce the social and economic burdens of chronic disease is also critical. According to the Centers for Disease Control and Prevention (CDC, 2012a), more than one-third of U.S. adults (35.7%) are obese and approximately 17% of children and adolescents aged 2—19 years are obese (CDC, 2012b).

The purpose of this quantitative study wasto examine the effects of a national school-based nutrition program on NTSE, food attitudes, and behaviors among elementary school teachers who implemented the United States Department of Agriculture (USDA) Fresh Fruit and Vegetable Program (FFVP). The relationship between teacher self-efficacy and ability to facilitate desired outcomes is shaped by experiences that enable mastery of knowledge or skills, social and environmental influences, and emotions, both inside and outside of the direct field of practice, that is, the classroom (Williams, 2009; Bandura, 1977).

This wasthe first study of its kind to research the impact of the FFVP on teachers who implement it with regards to their daily consumption of FV and NTSE. Previous studies have focused on the students (Buzby et al., 2003; Jamelske et al., 2008; USDA, 2010). Understanding the influences of teachers' food attitudes and behaviors has the potential to improve NTSE. NTSE is linked to time spent teaching nutrition (Brenowitz & Tuttle, 2003). Teacher training on nutrition may promote congruent food attitudes and behaviors as well ashigher self-efficacy. Improved self-efficacy, in turn, leads to greater impact in the classroom to facilitate changes in school nutrition knowledge, attitudes, and behaviors.

Greater impact from classroom nutrition education then creates opportunities for intervention strategies for healthier school food environments and reducing the burden of obesity. It is also anticipated that having significant influence on the NTSE and food attitudes and behaviors of elementary school teachers, the FFVP could be taken to scale.

Literature Search Strategy

Relevant literature was found through primary searches of the accessible databases provided by the Walden University Library. Under the category of Health Sciences, MEDLINE (with full text) and Cumulative Index to Nursing and Allied Health Literature (CINAHL with full text) were searched simultaneously to avoid duplication. Three education databases were used: ERIC, Education Research Complete, and SAGE. Four multidisciplinary databases were used: ProQuest Central, ScienceDirect, Academic Search Complete, and Google Scholar.

In searching the ninedatabases, the following 39 keywords were used. They reflect the independent and dependent variables and the theoretical and conceptual framework(Table 1). Variouscombinations were used to yield a broad range of articles on self-efficacy theory, socio-ecological model, fruit and vegetable intake, teachers, and nutrition education.Weekly e-mails were received with current research publications through Google Scholars notification system. The emails included literature that met the search criteria: "teacher AND nutrition AND education," "childhood AND obesity AND teacher AND school." Literature searching and research began in February 2012 and concluded in December 2012, resulting in 117 articles relevant to the research study. Articles that were accepted included those published in English both in the United States and in other countries about self-efficacy, U.S. adult FV intake and interventions promoting FV consumption.

Table 1

Literature Review Search Keywords

Teacher	Wellness	Fruit(s)
Education	Policy	Vegetable(s)
School	Program	Health
Self-efficacy	Administration	U.S. Department of Agriculture
Socio-ecological	Nutrition	Elementary
Training	Obesity	Chronic
Disease	Attitudes	Behaviors
Consumption	Model	Eating
Lesson	Community	Norms
Values	Environment	Action
Expectations	Outcomes	Food
Intake	Survey	Motivation
Faculty	Confidence	Teaching

Theoretical Foundation

Self-efficacy theory (SET) supports the notion that teachers influence their students' nutrition knowledge and healthy eating behavior through instruction and modeling as self-efficacy is a person's confidence in his or her ability to perform a specific behavior (Bandura, 1977; Glanz & Bishop, 2010). People-environment transactions are marked by mutual effect, meaning the physical and social elements should directly influence teachers' food attitudes and behaviors as they modify the NTSE of their setting through social actions (Stokols, 1996). This research explored the effect of FFVP on NTSE and outcomes such as daily consumption of fruit and vegetables, and what factors influence these variables (Figure 1).

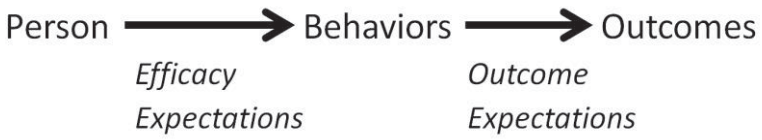

Figure 1. Self-efficacy and expectations.

SET is used to predict how well one performs after specific interventions and is mediate by four sources—performance accomplishments, vicarious experiences, verbal persuasion, and physiological states (Bandura, 1977). Efficacy and outcome expectations of this study operated on the belief that teachers who participate in the FFVP can confidently teach nutrition (the desired behavior) and consume recommended servings of FV daily to be a role model to their students (the desired outcome).

The FFVP is delivered in a variety of different methods, but primarily as a classroom food service, kiosk, or free vending machine (Buzby et al., 2003). Increased

availability of fresh fruit and vegetables in the classroom or school environment is thought to give opportunities for personal consumption and experience in taste-testing. Through nutrition education (verbal persuasion) and positive emotive associations with healthy food presentation, this stimuli influenced the likelihood that new thoughts, feelings, and behaviors around healthy eating, which serve as a guide for action (Bandura, 1977). Teachers may believe that eating FV is essential for good health, but that belief may not lend itself to adequate or confident knowledge in their ability to teach nutrition or model healthy eating behavior in the school environment. If doubts exist (indicated by low self-efficacy) among teachers who implement the FFVP, knowledge alone does not change behavior (Bandura, 1977). Glanz & Bishop (2010) acknowledge three strategies that teachers can use to increase self-efficacy: 1) establish incremental goals, 2) contract and commit to action steps to achieve goals, and 3) document steps taken to reinforce and account for progress. This fits well within the conceptual framework of this study through reciprocal determinism – changes in the individual, system, or environment can stimulate individual change or cause a reaction to changing (Glanz & Bishop, 2010).

At the center of SET is the strength of people's convictions, or fixed belief, into their own effectiveness, which affects how they will or will not perform a certain behavior. Further, if a teacher fails to consume a diet that includes fresh fruit and vegetables, the likelihood of his/her confidence to model healthy eating behavior may be diminished. Likewise, if a teacher does not have sufficient knowledge to teach nutrition to students, the probability of instruction about nutrition is reduced. SET efficacy

expectations of main interest in this study are: participation and live modeling (teacher eating fruit or vegetable with students), suggestion, and exhortation through instruction about nutrition. FFVP teachers are asked to integrate a myriad sources of information regarding their capacity to teach nutrition and model healthy eating behavior. Not all teachers are affected uniformly by efficacy-altering experiences, demands, or stimuli (Bandura, 1977). The extent to which they are affected is attributable to past successes, aligned beliefs, and regulation of behaviors.

Conceptual Framework

In concert with SET, using the social-ecological model (SEM) as a framework examined inputs, processes, and results of the individual teacher, interpersonal/social relationships (within schools), organizational and community levels (school district), and public policy (Virginia Department of Education, U.S. Department of Agriculture) dynamic. SEM enables the study of teachers in the school and the influences of beliefs and behaviors that exist in context to the FFVP (Stokols, 1996). Embedded in the socio-ecological model are interrelated core principles among environmental conditions and human behavior and well-being (Stokols, 1996). The cumulative impact of a health-promoting environment on teachers' physical, emotional, and social well-being is explored in this study (Figure 2). No studies have been found that examine the impact of FFVP on teachers' attitudes and behaviors as implementers of the program through multiple levels of influence (Glanz & Bishop, 2010).

Further, teachers influence their students' behavior through role modeling, normative practices and social support (Murimi et al., 2007). The social environment

enables success of programs that utilize changing behavior of those in the environments. The FFVP is not exclusive to just students – as the intended receivers of the program outputs – to promote changes in food attitudes and behaviors. Thus, environments that welcome improvements in knowledge, skills, and abilities are required if adoption of healthy eating behaviors, nutrition policies, and curricula are facilitated (Glanz & Bishop, 2010).

The study used a quantitative survey of elementary school teachers to understand how NTSE is influenced by the social environment constructs within schools, school districts, communities and state education agency policy. SEM is based on growing teacher knowledge and skills, promoting community and provider education, cultivating coalitions and partnerships within the school district, changing practices to support goals and intended outcomes, mobilizing and accessing support from the community at large, and endorsing and approving policy (Glanz & Bishop, 2010). As focus shifts toward preventive health and health promotion due to the Affordable Care Act of 2010, SEM has the opportunity to articulate the relationship between multiple levels and mediators of influence and the specific behaviors needed to implement the FFVP to increase NTSE and healthy eating behavior.

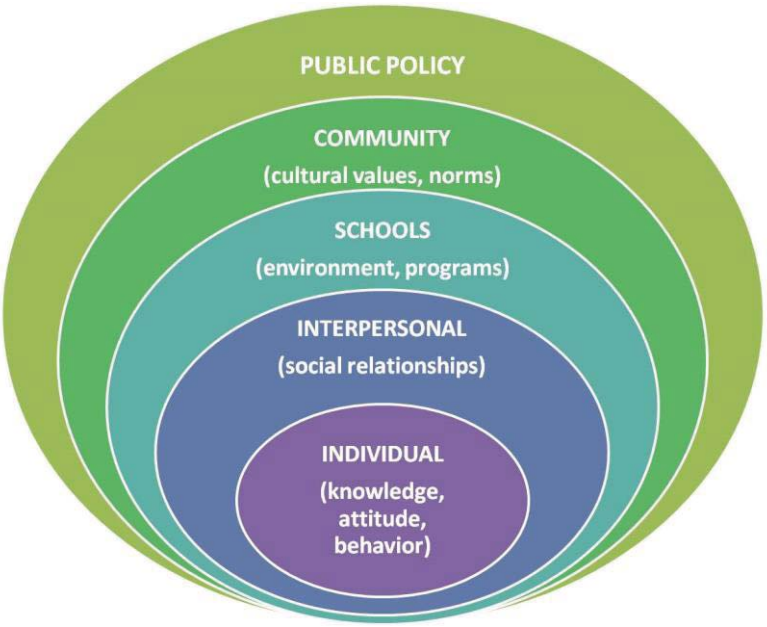

Figure 2. Socio-ecological model.

SEM advances societal attitudes that appreciate work done collectively to solve or remediate a problem like obesity (Schee, 2009). Programs are implemented successfully by leveraging high impact influencers and mediators to ensure that (Schee, 2009). Obesity and chronic diseases have many variables that affect their development and progression. Using SEM takes into account a population-focused intervention for long-lasting policy, system, and environmental change (Glanz & Bishop, 2010). A school environment, that consists of teachers with high self-efficacy to teach nutrition and consume fruits and vegetables, combined with school district and state department of education policy,that supports professional development, adequate resources, and aligned school food policies, is the idealFFVP. Therefore, the FFVP can potentially have a massive impact on obesity and chronic disease reduction.

Literature Review

U.S. Adult Consumption of Fruits and Vegetables

A diet rich in FV can have a significant impact on maintaining a healthy weight and ensures adequate amounts of essential nutrients (CDC, 2010; Demydas, 2011). In the United States, adult FV consumption is low and has continued to be less than 5 servings per day. The median FV intake is 3.5 servings per day (Serdula et al., 1995; Thompson et al., 1999). Approximately 1 in 3 adults consume at least 2 or more fruit servings and 1 in 4 adults has at least 3 or more vegetable servings each day. Overall fruit intake (two or more servings per day) decreased by 2% and overall vegetable intake (three or more servings per day) remained stagnant from 1994 to 2009 (CDC, 2010; Blanck et al., 2008). Researchers call into question why adult daily FV intake fails to meet national targets (CDC, 2010; Erinosho et al., 2012; Blanck et al., 2008; Demydas, 2011), and advocate the need for interventions that improve access, availability and affordability of FV.

Thompson etal. (1999) examined baseline daily FV consumption rates among U.S. adults to determine if any differences were present between regions and sociodemographics. Variables related to FV intake included age, marital status, and race, but education and food shopping responsibility were the strongest indicators. Noted regional differences were reported in FV consumption by race and gender, with more daily intake by whites, blacks, and women (Thompson et al., 1999). Higher intakes were reported in New York and Tennessee, and lower intakes were in Illinois, Idaho, and North Dakota (Serdula et al., 1995). Historically, FV consumption is lower in the south and higher in the West (Serdula et al., 1995).

Nationally, the Behavioral Risk Factor Surveillance System (BRFSS) is used to survey U.S. citizens on health behaviors that aid in population health awareness. Prevalence estimates from the BRFSS help to contextualize progress on goals and serve as a gauge on adult consumption of FV. There are six questions that assess intake of FV during the past 30 days. FV in any form (cooked, raw, fresh, or canned) consumed during meals, snacks, at home and away from home, are acceptable to report as part of the survey. The survey is important for many reasons as it relates to daily FV consumption, but not attitudes or behaviors related to their intake.

The National Health Nutrition and Examination Survey (NHANES) assesses American health and nutrition status through interviews and physical examinations. NHANES data also confirms the low rates of FV consumption among adult Americans – plateaued at 9-10% of adults consume at least 5 FV servings per day – since 1976 (Casagrandeet al., 2007). Dietary data from NHANES is closely linked to numerous other data sets to estimate the prevalence of certain biometrics and risk factors, nutritional status and health risk factors, and to develop suppositions about the nature of chronic diseases. The health information that NHANES offers, along with BRFSS, helps to contextualize the interrelated status of FV consumption among adult Americans.

Beyond the above named sources of data, there are many known factors that affect whether FV are purchased and consumed. Demdyas (2011) explored FV consumption patterns of U.S. adults, and how they were prepared and consumed (i.e., deep-fat frying, serving with high-fat dressings or sauces, canned, dried, juices with high amounts of sugar). There are specific demographic groups – low to moderate income

status and African Americans – that are less likely to meet recommended dietary guidelines and targeted interventions, policy or system changes are critical (Casagrande et al., 2007). According to Yeh et al.(2008), focus groups revealed that costs, inaccessibility, and preparation time are barriers to consuming adequate FV servings. Family tradition and cultural upbringing are influences on FV consumption, as well as age (Yeh et al., 2008). Adults over age 50 grew up with free, homegrown FV while those under age 50 purchase overpriced FV from the grocery stores (Yeh et al., 2008).

Studies on adult FV consumption conclude similar findings that improving availability, accessibility, and affordability should be considered to enable higher rates of consumption (Yeh et al., 2008; Casagrande et al., 2007; Blanck et al., 2008; CDC, 2010; Backman et al., 2011; Erinosho et al., 2012). This also includes FV promotion messages that focus on FV with high-nutrient density options and healthier FV preparation (Demydas, 2011). Pomerleau et al. (2005) determined that adults who were at high risk of disease were more motivated to change to healthier eating, which is different from general, population-based intervention approaches. Workplace interventions targeted atadults offers many advantages – wide reach, social influence, collaboration with a variety of partners – but effect sizes have not been impressive.

Adult Food Attitudes and Behaviors

National objectives through Healthy People 2010 have long held the ideal of 75% of Americans aged 2 years and older eat at least 2 servings of fruit daily and at least 50% eat at least 3 servings of vegetables each day (Blanck et al., 2008). In industrialized countries like the U.S., the priority of daily FV consumption is to reduce obesity and

chronic diseases, as opposed to the burden of under-nutrition and nutritional deficiencies as in developing countries (Pomerleau et al., 2005). Understanding how to move closer to these goals has required ongoing inquiry and research, which advocates for greater efforts to enable healthy eating in the U.S. (Casagrande et al., 2007). Clearly children are getting the message that FV is healthy (Prelip et al., 2011), but what about the impact on adult food attitudes and behavior? For teachers, moving beyond interventions that simply seek to improve individual awareness and educate about the importance of FV is now the priority. Social marketing, printed health education materials, and environmental approaches are a start, but not thorough enough to improve access, availability, and affordability in multisector, mass settings (CDC, 2010; Yeh et al., 2008).

Resnicowet al.(2008) substantiated that individual facilitators and barriers must be assessed in focusing on constructs that change food attitudes and behaviors. Foltz et al. (2012) demonstrated that to change individual food attitudes and behaviors improving access through policy and environmental approaches could increase daily FV consumption. In addition, using communication styles, that incorporate interpersonal conversation to support a teacher's intrinsic motivation and internalization, can influence perceived relevance toward self-efficacy and self-determination to consume FV (Reeve, Bolt & Cai, 1999). Farm-to-consumer programs (like the FFVP), access to FV in the work site, school and community gardens, and community supported agriculture (CSA) subsidy are intervention opportunities to engage teachers to assess attitudes about FV consumption. Further, food attitudes and behaviors are impacted by individual

differences and relevant social constructs (Williams, Grow, Freedman, Ryan, & Deci, 1996; Resnicow et al., 2008; Foltz et al., 2012).

Assessing teachers' attitudes towards and perceptions of food and nutrition is a critical first step to understanding self-efficacy (Perez-Rodrigo & Aranceta, 2001). Nutrition education and knowledge are not enough to influence teacher attitudes and perceptions. Skill development through healthy food preparation and experience with the subject matter (i.e., the whole spectrum of fruits and vegetables) enables self-efficacy. This leads the intentions of others toward expected outcomes – increased knowledge, appreciation and consumption of FV (Perez-Rodrigo & Aranceta, 2001; NCI, 2011). Better understanding of the attitudes, beliefs, and social factors that enable increased FV consumption of adults in the U.S. (Pomerleau et al., 2005; NCI, 2011).

School Teacher Health and Wellness

Schools are cited as having an integral role in addressing the problems of obesity and chronic disease by implementing practices, programs, and policies to enable both students and teachers to improve their health status (Snelling et al., 2012; Murimi et al., 2008; Prelip et al., 2011; Steele, 2011). Teachers are role models of healthy eating behavior in the school environment and believe that health education in schools is very important for students (Schee, 2009; Snelling et al., 2012; Murimi et al., 2008; Bauer et al., 2006; McCullum-Gomez et al., 2006). Yet, studies have demonstrated that teachers do not practice daily habits that promote health, and are not adequately trained to teach about nutrition (Chen et al., 2009; Kubik et al., 2002; Rossiter et al., 2007; Lanier et al., 2012; Brenowitz & Tuttle, 2003; McCullum-Gomez et al., 2006; Jamelskeet al., 2008;

Hendy, 1999). Therefore, it is necessary to identify opportunities for teachers to improve self-efficacy, attitudes, and behaviors to benefit their students' nutrition education, food attitude and behavior of healthful eating.

With over 6.7 million faculty and staff employed within U.S. schools, teachers are vulnerable to the same health risks and diseases that affect adults in other work sites (Eaton et al., 2007). Teachers lack adequate physical activity and proper nutrition; they are affected in the same ways by chronic diseases like diabetes, obesity, cancer, asthma, and experience high levels of stress (Foltz et al., 2012; Eaton et al., 2007). Findings of the School Health Policies and Programs Study (SHPPS), a national survey conducted in 2006 that assessed school health at state, district, school, and classroom levels, offered a baseline on school and teacher health and wellness.The study reported nutrition education was provided or offered in 8% of states, 32.1% of school districts, and 17.1% of schools, less than emergency preparedness activities and tobacco-use cessation programs and more often than crisis intervention for personal problems, physical activity and fitness counseling, stress management education, and weight management (Foltz et al., 2012).

Health insurance, required health examinations and screenings, health promotion activities and services, employee assistance programs, health risk appraisals, off-site health promotion opportunities, planning and coordination are typical resources for employee health and wellness within the school system (Eaton et al., 2007). While all of these services and programs in place, school-site health promotion is often dependent on and facilitators for school health programs that are targeted to the students (Eaton et al., 2007). School-based employee wellness programs hold the potential for improving health

outcomes for teachers by reduced occupational injuries, sick leave, and health care costs. Synchronizing school employee wellness programs with comprehensive school health programs – inclusive of nutrition education, food policy, and a priority on healthy eating – are most effective (Eaton et al., 2007).

Chen, et al. (2009) investigated the impact of a Health Promoting Schools (HPS) initiative on teachers' nutritional knowledge and dietary intake. Results indicated that teachers in schools with comprehensive school health programming, ongoing training, and enforced policies that are consistent to the overall school health objectives, have significantly more nutrition knowledge and slightly more fruit and vegetable consumption. A greater impact was evidenced among older teachers and those with a prior background in nutrition and health education (Chen et al., 2009). A health promoting school, a construct promoted by the World Health Organization (2013), seeks to reinforce and intensify efforts that create a healthy school environment. HPS operates on the socio-ecological model as it seeks to foster health through engagement with teachers, professionals, parents, students, and community leaders through implementation of programs, services, policies, environmental strategies, employee wellness approaches, and community health collaboration overall (WHO, 2013b). HPS success depends on the teachers' understanding of these multilevel principles and multilevel concepts (Chen et al., 2009). This study is foundational to the idea that the FFVP may have an impact on NTSE and daily consumption of FV, as Chen et al. (2009) noted that teachers with nutrition knowledge consumed more FV than fatty foods and snacks. Ultimately, and

critical for the study, teachers are recognized as nutrition educators by students (Prelip et al., 2011).

Teacher Training about Nutrition

Education and health promotion research clearly demonstrates that school officials desire ways to improve student academic and social behavior (Telfair & Shelton, 2012). Teachers with an undergraduate degree have lower mortality rates, lower heart disease and diabetes risks than those without additional education (Cutler & Lleras-Muney, 2007). There is a relationship between educational attainment and health for both of these chronic diseases. The more educated a person is, the lower his morbidity from common chronic diseases overall (e.g., heart disease, stroke, hypertension, high cholesterol, obesity, diabetes, etc.) (Cutler & Lleras-Muney, 2007). Being an educator is a profession that requires higher education, and those with more education are healthier both mentally and physically (Telfair & Shelton, 2012). An integrated effect is observed; those who have higher education are likely to have jobs, live in safe neighborhoods, have access to grocery stores that stock fresh fruits and vegetables, have outdoor recreation facilities, and other determinants known to shape a person's health throughout the lifespan (Telfair & Shelton, 2012).

Teacher preparation programs do not have compulsory nutrition education (Rossiter et al., 2007). Prospective teacher education degree programs incorporate limited modeling healthy eating behavior and learning the necessary knowledge and skills to teach nutrition as part of classroom management practices (Kubik et al., 2002). Only 37% of elementary school teachers reported training as part of a degree program,

and 26% participated in a workshop, in-service (Celebuski & Farrin, 2000). Survey questionnaire results of student teachers asserted that the school food environment is where children develop knowledge of making healthy food choices through observation and modeling by teachers (Rossiter et al., 2007). Contrary to the SEM, student teachers supported the belief and attitude that personal values shaped the school food environment instead of the school health climate or tenure of teaching. Student teachers, however, were more likely to use candy as rewards, which show a limited scope on classroom management techniques (Rossiter et al., 2007). The majority of teachers expressed interest in teaching nutrition (82%), yet only 49% had intentions to teach it (Murimi, et al., 2008). In one study, 56% of surveyed teachers were provided training to teach nutrition, but additional supports and materials were needed to facilitate their confidence (Falcigliaet al., 1997). The majority of teachers (84%) performed their own research for materials and resources to teach nutrition (Celebuski & Farrin, 2000).

Personal health practices of aspiring teachers are barriers, as there was a discrepancy to connect belief and classroom practices. This contributes to a lack of knowledge to nutrition-teaching and diminishes self-efficacy (Rossiter et al., 2007). The lack of attention on nutrition education as an aspect of classroom management in preparing future generations of teaching professionals cannot be overlooked; professional development once in the career field of education is sufficient to address obesity and healthy school environments (Rossiter et al., 2007). Teacher preparation and professional development programs that include nutrition education are likely to increase interest and attitudes toward teaching nutrition and modeling health eating behaviors (Murimi et al.,

2008). It is estimated to require 50 hours of nutrition education in an elementary school classroom to impact behavior (Celebuski & Farrin, 2000).

The SHPPS 2006 results reflected an increase in funding for staff development on nutrition to those who teach health education by 12% among states and 22% among school districts from 2000 to 2006 (Kann, Telljohann,& Wooley, 2007). About 77% of elementary schools included nutrition curricula which used food guidance using MyPyramid and preparing healthy meals and snacks for an average 3.4 hours of instruction (Kann et al., 2007). Most teachers spent 10 or fewer hours on nutrition education over the entire school year, not a sufficient amount of time to make an impact on dietary intake (Brenowitz & Tuttle, 2003).

Bittle, McClain, Hibler & Ditmyer (2012) asserted that standardized nutrition education curricula for elementary school students was lacking in the literature, despite the plethora of resources like the CDC's coordinated school health programs (CSHP) and other organizations. More than half of teachers (55%) were not provided with nutrition curriculum or guidelines, and 88% failed to receive in-service training in nutrition (Murimi et al., 2008; Murimi, Sample, Guthrie & Landry, 2007). CSHP focuses on coordinated local action to improve school health by employing services in eight areas, including staff health promotion (Public Health Law Center, 2008). The web-based survey revealed that over half (54%) of the teachers were providing nutrition education less than 4 times per year including non-standardized, unscientific sources. Little has been assessed in the United States on the frequency and content of nutrition education since 2000, yet we know that proper nutrition is vital to academic success (Bittle et al.,

2012; Celebuski & Farrin, 2000). Further, training and education that teachers receive has a direct impact on students, yet studies on school-based nutrition education suggest programs have minimal impact on children's eating behaviors (Falciglia et al., 1997). Often, the only opportunity to receive nutrition education is during elementary school education (Perez-Rodrigo & Aranceta, 2001; Public Health Law Center, 2008).

A range of staff development trainings were provided as part of the SHPPS 2006 including the following: competitive food policies (90% of states; 60% of school districts), food service for students with special dietary needs (100% of states; 91% of school districts), menu planning for healthy meals (96% of states; 82% of school districts) and using the cafeteria for nutrition education (86% of states; 55% of school districts) (O'Toole, Anderson, Miller & Guthrie, 2007). Competitive foods – those that compete with the nutritionally regulated school breakfast and lunch programs – need restriction in the school food environment, because 33% of elementary schools have student accessible vending machines or snack bar (Story, Nanney & Schwartz, 2009). In summary, faculty and staff of U.S. schools have a serious responsibility to be well educated about nutrition to help them and students achieve their full potential – one that is healthy and reduces chronic disease risk through fruit and vegetable consumption (Public Health Law Center, 2008). It is impossible for schools to achieve their primary mission of education if students – and their teachers – are not healthy (Story et al., 2009).

Not all school personnel embrace healthy eating nor possess the capacity to teach about nutrition effectively, even as part of the core mission or value system of the state department of education, school district, or individual school (Chen et al., 2009; Kubik et

al., 2002; Rossiter et al., 2007; Lanier et al., 2012; Brenowitz & Tuttle, 2003; McCullum-Gomez et al., 2006; Jamelske et al., 2008; Hendy, 1999). Yet in schools with high levels of support for nutrition education (28%), teachers are more likely to have curriculum, materials, and training (Celebuski & Farrin, 2000). Many stakeholders do not integrate healthy eating practices and policies with those of academic goals and objectives, and unknowingly categorize nutrition education as a distraction (Public Health Law Center, 2008; Falciglia et al., 1997). Nutrition education activities should be coordinated between teachers and food service workers (Celebuski & Farrin, 2000). Even if intentions are good and schools aim to assimilate nutrition as important to students' academic success, most states' departments of education lack the resources – financial and human – to provide essential support and training to school districts to make significant changes that would alter the school food environment for everyone – students, parents, teachers, administrators, board members, etc. (Public Health Law Center, 2008). Nonetheless, some teachers are becoming increasingly more aware of the issue of childhood obesity, which motivates them to desire more training and competency to teach nutrition (Kirkpatrick, Briggs & Zidenberg-Cherr, 2007; Falciglia et al., 1997).

Falciglia et al. (1997) asked teachers to rank the use of funds to support food and nutrition teaching. Grants for buying food and equipment, development of teacher materials and a food and nutrition curriculum topped the list. Other areas listed were more nutrition education throughout the school cafeteria and building, teaching training on nutrition, and the hiring of a nutrition consultant to help plan and coordinate school health activities. Teachers also reported that involvement from parents would increase the

likelihood that they would teach about nutrition. Training ideas that were rated high included school-based food fairs with taste-testing, healthy recipe demonstrations, parental involvement in classroom celebrations using food, and nutritional information included on school menus. However, slightly more than half of the teachers in the study (55%) felt that they were provided with adequate training on nutrition (Falciglia et al., 1997).

School-Based Nutrition Policies and Interventions

Policies and interventions that target the individual teacher, school and district culture, and the entire department of education have the ability to influence the wide-reaching impact on health and disease prevention. In the general population, interventions in the grocery store, worksite, and healthcare settings have demonstrated cost-effectiveness but low potential for increasing FV intake, and rely on individual counseling, mailed educational materials, community-based events, and cafeteria changes (Cobiac, Vos & Veerman, 2010). The school is an ideal setting to address nutrition education and self-efficacy because of the ability to reach a wide ranging group of people or target community. District and school level wellness policies that improve access to FV may help instill healthy eating habits and food attitudes to reduce the risk of chronic disease development (Foltz et al., 2012; McCullum-Gomez et al., 2006). Classroom practices that support positive nutrition education are not enough; resources and training must be provided (Murimi et al., 2008). Food service venues and the school food environment must also support effective teacher role modeling, health messaging, and the

opportunity to make healthy decisions (Robinson-O'Brien, Burgess-Champoux, Haines, Hannan, & Neumark-Sztainer, 2010).

MyPlate is a new meal planning icon, published in 2011, that is formulated on the necessary servings of FV per day. Essentially half of one's plate for breakfast lunch and dinner should include servings of fruit and vegetable for a minimum of 6 servings per day. It is a simple design that is easy to use by persons of all ages. MyPlate replaces the Food Guide Pyramid and is girded by the DGA for persons ages 2 and up. The DGA is the scientific source for all Federal food policy initiatives and nutrition education (Public Health Law Center, 2008), including 23 key recommendations for the general population (U.S. Department of Agriculture and Department of Health & Human Services, 2010).

Additional policies and interventions that establish a comprehensive approach to nutrition education includes the CSHP, local school wellness policies, reports by the Institute of Medicine, USDA team nutrition and the FFVP, National School Breakfast and Lunch Programs, Federal commodity food procurement, among others (Public Health Law Center, 2008). Story et al. (2009) discussed how improvements can be gained through strict policies on the school food environment. The recommended policies include providing healthier meals and snacks and limiting access to low-nutrient, energy-dense foods during the school day if a reduction in childhood obesity is to be achieved (Story et al., 2009; Schee, 2009; Robinson-O'Brien et al., 2010). Farm-to-school programs and school garden development for food are evolving options for elementary schools to incorporate healthy eating into curriculum standards. There are other interventions, programs, and policies that seek to accomplish the same goal: to improve

nutrition education and promote healthy eating through consumption of FV (Story et al., 2009).

In Virginia, each public school must have a school health advisory board (SHAB) in place that espouses a matrix of community representatives to advise the school district on the development of health policy (Code of Virginia §22.1-275.1). In addition, SHAB assists with the evaluation of school health, health education, the school environment, and the provision and referral to health services. While this type of board structure is considered meaningful, many SHABs in the Commonwealth of Virginia lack real authority or influence to create change or improve access, affordability, and availability of healthy policy, system, and environmental strategies (Kowalewska et al., 2012).

SHABs are meant to advise the school board and district administrators about factors that build a coordinated school health program (Virginia Department of Education, 2009). The functions and primary focus areas for SHAB members are varied – ensure visibility and advocacy for coordinated school health, invite parent and community involvement, serve as a forum for health issues, recruit community health resources, facilitate understanding of schools and communities, engage in public relations, and enable innovation (Virginia Department of Education, 2009). In a review of the success of Virginia SHABs, Kowalewska et al.(2012) reported that school nutrition program revisions, procedures and offerings, conducting needs assessments and collecting data, improving student and staff wellness, and reviewing emergency response plans as the top five goals achieved. Of relevance to nutrition education, 70% of staff who teach nutrition were provided training in Virginia schools (Kowalewska et al.,

2012). Slightly more than 75% of K-12 students received interactive nutrition education during the 2010-2011 academic year in Virginia (Kowalewska et al., 2012).

In regards to nutrition, SHABs were supportive of reviewing school nutrition programs and offerings, and school food policies to limit food as rewards in 2010-2011 academic year (Kowaleweska et al., 2012). Over 92% of school districts had set guidelines for foods and beverages sold a la carte, and over 70% sold in vending machines, snack bars, school stores and concessions (Kowaleweska et al., 2012). Lesser supported policies in place in Virginia public schools were restrictions on foods and beverages sold as part of school-sponsored fundraising activities (43%), and guidelines for refreshments at parties, celebrations, meetings, and rewards (48%). Observation of practice was the primary method of measurement in over 92% of school districts in lieu of other forms of evaluation.

Fifty-seven percent (57%) of school districts provided ongoing professional training for food service staff and teachers in nutrition, and 73% of school districts encouraged and provided opportunities to practice healthy eating (Kowaleweska et al., 2012). One type of health eating opportunity is a FV distribution program with nutrition education curriculum using classroom teachers to confidently teach students about a variety of fresh produce. Reinaerts, de Nooijer & de Vries (2007) concluded that training teachers is critical if there is to be consistency in how nutrition education programs are implemented and to have the best possible chance of affecting positive teacher food attitudes and behaviors.

Policies and initiatives influence school environments no matter what level they are adopted – state law, state department of education, local school board, individual schools and classrooms (Story et al., 2009). Strong policies at the highest level of the socio-ecological model, (i.e., Federal nutrition policy), may have the most significant impact if the underlying ecosystems have the resources to implement them. This is a strong criticism of the FFVP (Story et al., 2009).

Self-Efficacy to Teach Nutrition

Teachers are role models, encouragers, leaders, influencers, and hold the responsibility of helping to shape the children in their care. This requires a specialized skill set and knowledge base in a variety of different topics and life areas. Schools must integrate and synergize efforts with stakeholders at all levels as to develop a neighborhood and community that is healthy (Story et al., 2009). Teacher training, self-efficacy and teachers' comfortability influences the likelihood that nutrition education is provided, even without curricular expectations (Auld et al., 1999). In addition, time spent teaching nutrition is correlated to high self-efficacy (Brenowitz & Tuttle, 2003).

In-service training increased the self-efficacy for intervention teachers to conduct nutrition education lessons (Fahlman et al., 2009). Self-efficacy is associated with teacher effectiveness so ongoing teacher training is recommended (Fahlman et al., 2009). Teachers can be motivated to achieve expected outcomes and, through professional development training opportunities, can be positively influenced to strengthen self-efficacy on nutritional concepts (Ferry et al., 2008). Teacher who participate in in-service training become more efficacious in their ability to teach their students.

Special resource teachers (SRT) are trained in experiential learning and serve as a role model for healthy eating behavior. SRTs alternated time in the classroom with the regular teacher in an integrated school nutrition program (Auld et al., 1999). While the focus was to increase consumption of fruits and vegetables, increase nutrition knowledge, and change attitudes toward FV of the students, there was also a benefit to the regular classroom teacher. SRTs alternated lessons giving classroom teachers the opportunity to try newly learned content and interactive experiences that were modeled by the specialists (Auld et al., 1999). Additionally in-service training was a critical part of the program which promoted self-efficacy which is essential for readiness to teach nutrition (Auld et al., 1999).

Teachers support the inclusion of nutrition education in the school setting by curricula and through supportive policies and program interventions. Whether teachers feel they have the self-efficacy to be the primary educators on nutrition is another issue, and not the priority of this study. Teachers are gatekeepers on whether nutrition education even occurs in the classroom setting and modeling healthy eating behavior includes the teacher's policies on food in the classroom, i.e., candy as reward (Auld et al., 1999). Lack of time, training, and resources are the limiting barriers to enhanced NTSE and using SRTs, who have the knowledge and skills, is also an effective way to empower classroom teacher self-efficacy (Resnicow et al., 1992; Auld et al., 1999; Robinson-O'Brien et al., 2010).

A comparison study of teachers with and without family consumer science or health education background was conducted in relation to self-efficacy in teaching

nutrition (Murimi et al., 2008). Higher self-efficacy is associated with expending more time teaching nutrition and engaging in ongoing nutrition training (Kubik et al., 2002; Murimi et al., 2008). Logically, teachers with FCS background had higher self-efficacy and more willingness to use curriculum and resources in teaching nutrition (Murimi et al., 2008). The research literature supports the idea that teachers with specialized education on nutrition are more confident and possess a higher self-efficacy to teach healthy nutrition habits even without the provision of standardized curriculum and professional development (Murimi et al., 2008; Auld et al., 1999; Lanier et al., 2012). These professionals should actively engage other teachers advocating policies and practices that develop a health school food environment (Kubik, Lytle & Story, 2005).

Having standardized, institutional curriculum and resources are a widely recommended strategy to motivate teachers to teach nutrition and improve self-efficacy (Auld et al., 1999; Murimi et al., 2008). Structural and personal barriers (money, equipment, supplies, time, self-efficacy, confidence, role modeling) could potentially be resolved if state departments of education would enact a unified approach to nutrition education across all school districts (Auld et al., 1999; Murimi et al., 2007). Teachers are the key but the community and systems that surround the teacher are equally important, yet it is difficult for teachers to feel they have the freedom to go beyond strict curriculum mandates in other subject areas (Prelip et al., 2011). Self-efficacy is precipitated by interest and awareness, including motivation, and support by the administration and resources that enable confidence (Murimi et al., 2007). Cantrell, Young & Moore (2003) concluded that a teacher's self-efficacy is one of the few attributes consistently related to

student achievement because of greater diversity in teaching methods, empowered sense of health-information seeking behavior, and the implementation of more challenging lessons.

The U.S. Department of Agriculture Fresh Fruit and Vegetable Program

The United States Department of Agriculture's (USDA) Fresh Fruit and Vegetable Program (FFVP) was created in 2002 to improve nutrition and reduce the burden of childhood obesity in America through increased fruit and vegetable consumption by eligible elementary school children (Jamelske et al., 2008; USDA 2010). The program is seen as an important catalyst for change in efforts to combat childhood obesity by helping children learn more healthy eating habits. Having exposure to a variety of produce that they might not otherwise have encourages more healthful eating habits (USDA, 2010). Might the program also demonstrate similar effects on teachers implementing the program in their schools as part of a coordinated school health program or employee wellness program? The research attempted to answer this important question.

Purpose and Goals

The goals of the FFVP according to the USDA (2010) are to

- Create healthier school environments by providing healthier food choices
- Expand the variety of FV children experience
- Increase children's fruit and vegetable consumption
- Make a difference in children's diets to impact their present and future health

The FFVP delineates two primary best purposes for participating teachers. The first recommendation is that teachers serving FV to their students model healthful eating habits by participating with their students and including a nutrition education lesson (USDA, 2010). Additionally, teachers can help monitor and direct the food distribution, and use the opportunity to talk with students about nutrition and health (USDA, 2010).

History

The 2002 Farm Bill (Public Law 107-171 Farm Security and Rural Investment Act 2002) allocated $6 million created the pilot program to offer free fresh fruit and vegetable snacks to 25 schools in six states (Story et al., 2009). The FFVP is intended to familiarize elementary school students with FV in order to inculcate long-term healthy eating habits and reduce the burden of obesity and chronic disease among U.S. children (Buzby et al., 2003). USDA allocation for the FFVP in 2012-2013 academic year is $150 million.

In subsequent years, 2004 and 2008, the Farm Bill renewed and expanded the FFVP to all states with limited implementation in low-income elementary schools in each school district. The program is a permanent part of the Farm Bill and continued expansion is expected despite little evaluation of the program's impact (Story et al., 2009).

The initial steering partnership was comprised of the USDA, American School Food Service Association, and the National Cancer Institute 5-A-Day for Better Health Program.

Impact and Outcome Evaluation

The FFVP has experienced growth and expansion over the past 10years. Following the pilot study, acceptability of the program was high among all stakeholders and students (Buzby et al., 2003). At the 1-year baseline, 105 schools participated and 93% provided nutrition education – incorporating into health or physical education classes, adapting lesson plans, school assemblies, health fairs, kickoff events, information materials, t-shirts, posters, and public service announcements – with the program (Buzby et al., 2003). The perceived value of the program was very high, and a number of different benefits were noted.

- The risk of obesity was reduced.
- Improved attention and focus in class.
- Less consumption of unhealthy foods and snacks.
- Increased acceptability of fruits and vegetables.
- Provided a snack opportunity for food insecure children.
- Increase fruit and vegetable consumption at lunch.

Success of the pilot year (95% of participating schools) was built on the cooperation among stakeholders in the school and those in other states, including non-school entities, using flexibility in program implementation provided by ample funding (Buzby et al. 2003). Nutrition education and promotion were highlighted as necessary parts of an expanded FFVP program moving forward from the pilot year since schools reported needing more time to preplan and develop related activities and lessons.

The FFVP was evaluated, as directed by Congress, to determine if the program was adequate to continue for another year. Fruit and vegetable purchases were analyzed, implementation reports were reviewed, school site visits were made, focus groups with stakeholders were conducted, and a March 2003 FFVP conference was held to highlight lesson learned and next steps(Buzby et al., 2003). The short time frame in which the pilot program was launched was not sufficient to offer data and evaluation recommendations. Therefore, the following variables could not be analyzed: effects on student diet quality and patterns, daily FV intake, restriction of non-nutrition foods, the effects of long-term intake of FV and nutrition education, comparison of non-participating schools, and cost-effectiveness of alternative strategies (Buzby et al., 2003).

From the beginning, nutrition education was not a required part of the FFVP, but still strongly encouraged. A high percentage of schools (93%) did provide nutrition education because of this flexibility. Elementary schools were reported to be most likely to adapt lessons and incorporate into the daily school experience rather than as a unrelated subject. Many challenges were reported including FV distribution, storage and refrigeration, sourcing and selecting FV, student behavior, food waste and clean-up, staffing issues, and managing FV demand (Buzby et al., 2003).

A majority (77%) of teachers were interested in the pilot program, but many perceived extra work and responsibilities to implement it. Nutrition education and promotion were viewed as a separate element of the FFVP, not one that would strengthen its effects. There was no preemptive information, training, curriculum or resources provided to the teachers in the pilot program. Food service workers and principals all had

high satisfaction of the pilot program (64% and 83% respectively) as long as operations proceeded smoothly, and a burdensome feeling was not perceived. Recommendations that were made to improve the experience for schools and teachers that are relevant to this study included:

- Anticipation for additional time to plan for FV consumption
- Coordinated efforts to unify stakeholders on implementation practices
- Provide resources and curricula for nutrition education
- Identify local sources for FV
- Guidance and technical assistance on nutrition education (Buzby et al., 2003)

In 2008, when the Farm Bill (PL 110-234) made the FFVP permanent, USDA was asked to evaluate the program's effectiveness to determine the impact on children's consumption of FV if less healthy foods were decreased, and other dietary changes and outcomes (Olsho et al., 2011). In the interim report, 214 schools and 4,696 students were screened on diary-assisted, 24-hour dietary recall interviews. Findings indicated that the FFVP increased FV consumption on days in which the program was held and represented a 15% increase over FV consumption levels when there is no FFVP. Olsho et al. (2011) concluded that, because the FFVP targets poorer schools (with students with the lowest FV intakes and greatest risk for poor health outcomes), any increase of FV consumption is significant. Knowing the impact on students, the question can be asked about the effect on teacher FV consumption.

Lastly, the USDA Food and Nutrition Service (FNS; 2012) published in the Federal Register the rule to establish basic operation requirements for the FFVP to

ensure that elementary schools encouraged FV consumption for long-term health. In order for schools to participate in FFVP, they must meet the following criteria

- Elementary schools that offer National School Lunch Program
- At least 50% or more of enrolled students are eligible for free or reduced price meals
- Priority given to schools with the highest percentage of need
- Submit an application to state agency representative for FFVP
- No delinquency or outstanding issues found by the USDA FNS

Other recommendations in the rule include integrating FFVP into other school wellness programs, and a program implementation plan describing integrated approach and partnership activities to enhance FFVP operation (USDA, 2012). It is clearly stated as a matter of practice, "It is proposed that it be acceptable for teachers who are in the classroom with the children during the FFVP service to partake of the fruit or vegetable being served to the children in order to reinforce the nutrition education message of the FFVP*"* (USDA, 2012, p. 10981).This teacher behavior is based on the fact that teachers are positive role models if they consume FV in the presence of their students (USDA, 2012). The USDA (2012) admitted that funding is not available to support these additional recommendations.

Summary

Most studies focus on the status of FV intake and interventions to increase FV among children (Yeh et al., 2008). Impact on NTSE and teacher FV consumption is not explored and examined in the literature even though teachers desires more training and

resources. From an employee wellness program perspective, if teachers who implement this program have higher rates of self-efficacy to teach nutrition and have higher daily FV intake, the FFVP could serve as a model for integration into any worksite. Additionally, schools with nutrition and wellness policies and programs that integrate FFVP, the impact on school health may be a mediating factor on teacher health and wellness.

Schools are a prime setting for health promotion of proper nutrition and FV consumption since students spend a considerable amount of time there weekly. FFVP seeks to encourage both short- and long-term effects on increased FV consumption to reduce childhood obesity and better health outcomes. Teachers are no different in their needs to increase FV consumption and to confidently teach children solid nutritional information and concepts for life-long healthy eating habits. Healthier teachers build healthier school environments, which impacts the community at large.

Chapter 3 will discuss the research methodology, design and rationale, sample and recruiting, instruments used, data analysis plan, and ethical issues.

Chapter 3: Research Method

Introduction

The study examinedthe relationship between (a) FV consumption, (b) the FFVP training, and (c) established school nutrition policy and the NTSE of elementary school teachers who participated in the USDA FFVP, a program targeted atlow-income schools to increase the FV consumption of students. These factors (a, b, and c) are important to understand in the context of the policies, systems, and environmental supports that enable or reduce teachers' ability to serve as role models for healthy eating and as adequate nutrition educators as part of the FFVP.

The research design and methodology, sampling and sampling procedures are discussed in this chapter. Procedures for recruitment, survey participation, and data collection are also presented. Two instruments, the NTSES and Section 4, "What You Eat and Drink," of the FABS, are used; the rationale for their useis provided. The ethical procedures are outlined according to IRB guidelines.

Research Design and Rationale

An online,quantitative survey wasused to measure efficacy and outcome expectations, food attitudes and the behaviors of teachers implementing the FFVP.Specifically, the survey measuredteachers' consumption of FV,their training on FFVP and nutrition at start of school year, and theirknowledge of established school nutrition policy.The survey design sought to answer three research questions:

RQ1: Does an association exist betweendaily FV intake and NTSEamong teachers involved in the USDA FFVP?

H_01: There is no association between daily FV intake and NTSEamong teachers involved in the USDA FFVP.

H_a1: There is an association between daily FV intake and NTSEamong teachers involved in the USDA FFVP.

RQ2: Does an association exist between FFVP training status and NTSEamong teachers involved in the USDA FFVP?

H_02: There is no association between FFVP training status and NTSEamong teachers involved in the USDA FFVP.

H_a2: There is an association between FFVP training status and NTSEamong teachers involved in the USDA FFVP.

RQ3: Does an association exist between established school nutrition policy and NTSEamong teachers involved in the USDA FFVP?

H_03: There is no association between established school nutrition policy and NTSEamong teachers involved in the USDA FFVP.

H_a3: There is an association between established school nutrition policy and NTSEamong teachers involved in the USDA FFVP.

Since the FFVP demonstrated effectiveness in increasing FV consumption in children,FFVP could have a similar effect on elementary school teachers. In addition, teachers participating in the FFVP have more frequent opportunities to discuss nutritional value of FV, so their self-efficacy to provide nutrition education may increase. These variables were measured through key questions in an online survey that assessesNTSE and attitudes and behaviors towardFV consumption.

Methodology

Population

The study population was the114elementary school teachers who implement the USDA FFVP in six public schools in Lynchburg, Virginia during the 2013-2014 academic years. Other Virginia school districts have only one or two schools that participate in the FFVP, so localities like Lynchburg that have six or more schools implementing FFVP are prime targets for this study. An online survey allows for maximum impact by reaching a highpercentage of teachers in Lynchburg. Additionally, direct email reminders to the six schools permitted ongoing dissemination to the elementary school teachers.

Sampling and Sampling Procedures

Due to the small number of elementary school teachers (*N*=114) who implement the USDA FFVP in Lynchburg, VA, the entire target population was invited to complete the survey. The school nutrition manager fiscally operates the FFVP through the procurement and preparation of the fresh fruits and vegetables. Teachers receive the prepared food for distribution in the classroom according to the USDA FFVP handbook recommendations. School nutrition supervisors are asked to aid in survey distribution to the teachers who implement FFVP in their classes. Once the online survey was ready for dissemination, contact was made with the school nutrition manager via email regarding the survey. The survey link was circulated for 7 weeks to the entirety of the target population. In addition, two email reminders to participate weresent directly to each teacher. Approval through the central administrative office was made to the

Superintendent's office to ensure collaboration and ethical participation of their employees.

Anticipated time constraints were related to administrative responsibilities to organize contact information, notify and inform teachers and schools, and to coordinate overall efforts with the public school district. Timing of data collection occurredafterteachers returned to school following a two-week break. Significant inclement weather did cause school to be closed on many days during the data collection period. These constraints may have reducedthe response rate if teachers are not checking emails or managing a myriad of other responsibilities. Conversely, it may not have been a concern as teachers may have had more time to respond to emails and thus participate in the survey.

Acceptable use policies for technology are in place in all six schools. Communications via school distribution lists is considered public information and subject to all laws under the Freedom of Information Act and the Family Educational Rights and Privacy Act. The Lynchburg City Schoolshas an express written policy that, "End users should check e-mail daily" (2012; http://www.lcsedu.net/schoolboard/policymanual/p6-48). There is no measure in the public domain to know whether or not teachers check their school email accounts during the summer, but anecdotal conversations with Virginia elementary school teachers conducted on June 9, 2013, via a Facebook post, indicated that most teachers do at least weekly.

The online survey design was selected due to advances in technology and the ease with which survey links can be shared and disseminated. Using a quantitative survey

allows for speedy survey deliveryand data collection, data transfer to SPSS v. 21 (IBM), andcost-effective analysis. This methodology fits well with elementary school teachers who have access to computers and the Internet and are considered professional users of online systems and technology for various aspects of teaching and learning. Personalization of survey dissemination emails and control of sample size are also easier to manage by using an online survey methodology.

Inclusion criteria are elementary school teachers in sixLynchburg City Schools, employed during the 2013-2014 academic year, who implement the USDA FFVP in their schools. Teachers in grades pre-kindergarten through fifth grade were qualified to be part of the study sample. Factors that would prevent inclusion in the study are teachers outside of Lynchburg City Schools, or in schools that did not implement the USDA FFVP in 2013-2014.

Procedures for Recruitment, Participation, and Data Collection

Recruitment for teachers for this study was conducted with the assistance of the school nutrition manager and subordinate staff at each of the six schools. Using school districtsupport, teachers were invited to participate in the online survey through adisseminated link. At the conclusion of the Teacher Food Survey, the teachers were prompted to click on a separate web link to provide a mailing address or email address to receive an incentive. This ensured that they received an incentive for completing the survey without connecting them to their survey response.The initial section of the surveycollected the following information:

- Gender (male, female)

- Age (20-29, 30-39, 40-49, 50-59, 60+)
- Grade taught (Kindergarten, 1st Grade, 2nd Grade, 3rd Grade, 4th Grade, 5th Grade)
- Years teaching (0-5, 6-10, 11-15, 16-20, 21-25, 26-30, 30+)
- Educational attainment (Bachelors, Masters, Doctorate)
- Income/economic status (25,000-34,999; 35,000-44,999; 45,000-54,999; 55,000-64,999; 65,000-74,999; 75,000+)
- Class size (0-10, 11-20, 21-30, 30+)
- School size (0-149, 150-299, 300-449, 450-599, 600+)

Once the survey was completed and they provided their contact information in the separate form, an incentive was sent to the teacher via their mailing or email address, whichever was preferred. Incentives selections were $10gift cards to the Lynchburg Community Marketor www.Amazon.com.

Teachers at the following schools wererecruited to participate:

- Dearington Elementary/Innovation
- T.C. Miller Elementary/Innovation
- Perrymont Elementary
- Robert S. Payne Elementary
- Linkhorne Elementary
- William M. Bass Elementary

Walden Institutional Review Board (IRB) approval was obtained prior to beginning the research study (approval #01-03-14-0126173). Consent was obtained via an online description of the research risks. A checkbox indicating consent was checked before being able to proceed on to the online survey.Participants were informed that the survey is voluntary. Appropriate IRB disclosures and notifications were well-indicated and the survey did not commence once all consent procedures were agreed upon.

A pilot test of the survey was decided not to be essentialto conduct, per IRB,with elementary school teachers at Bedford Hills Elementary School (a non-FFVP school). Feedback from the small pilot would have been used to allow for refinement and revision, if needed, before disseminating the survey link to the teachers in the targets schools. The pilot survey was not conducted.

For theTeacher Food Survey, data is collected through the online tool called SM. The survey is anticipated to take no more than 20 minutes to complete. SM offers real-time results which allows for trend identification, filtering and mining of data to specific criteria, and transfer to SPPS.Data collected in SM is formatted to match the SPSS structure for analysis and is available for download. Because the sample population is identified as teachers in specific school districts, using a web link that is disseminated via email and/or embedding the survey into the schools' website may be the ideal methods for collecting data. Using social media outlets, like Facebook or Twitter, was notconsidered unless access is provided by the school district to collect data.

Study participants completed the study online and a message of appreciation appeared following their submission of data. In addition, an incentive was be mailed or

emailed, depending on their selection, with an opportunity to receive an executive summary of the study once it is completed. There were no requirements to return for follow-up or additional information requested.

Instrumentation and Operationalization of Constructs

Published instruments. The NTSES(Brenowitz & Tuttle, 2003) and the FABS (National Cancer Institute, 2011) serve as sources for validated questions. Questions are consistent with the socio-ecological model and self-efficacy theory and evaluate the following concepts.

- Self-efficacy of teacher to confidently provide nutrition education and consume fruits and vegetables,
- Knowledge about nutrition and fruit and vegetable consumption
- Intrinsic and extrinsic motivations for educating students about nutrition and consumption of fruits and vegetables, and
- Environmental influences on outcomes of consuming FV and providing nutrition education.

Brenowitz and Tuttle (2003) developed the NTSES to determine NTSE of Maryland elementary school teachers. The NTSES was also a means to explore time spent teaching nutrition in school. Brenowitz published the scale as result of research for a master in nutrition degree at the University of Maryland, College Park (2003). The FABS was created by staffin 2005 to assess American adult fruit and vegetable consumption.

NTSES and FABS are both appropriate to this study because they are validated, published instruments and garner data on the key selected factors of interest. NTSES can be used as a pre- and post-testing tool to evaluate training programs for teachers on nutrition and NTSE and is recommended by the authors to be adapted for use by middle and high school teachers (Brenowitz & Tuttle, 2003). FABS is a lengthy instrument, so for the purposes of this research, only Section 4, which assesses fruit and vegetable consumption, was used.

Permission was granted by Dr. Tuttle to use the NTSES through amessage on LinkedIn on May 31, 2013. Brenowitz is retired and I was unable to locate hercontact information. There was no forwarding address given when inquiries were made at the Department of Nutrition and Food Science, University of Maryland. Additionally, I received e-mails from Dr. Nebeling and Dr. Oh of the National Cancer Institute on June 10, 2013, granting permission to use Section 4 of the FABS. The FABS is a government-developed survey and is in the public domain.

Brenowitz and Tuttle (2003) report that "factor analysis and Cronbach's α suggest that the NTSES is a valid measure of NTSE," and that if used to evaluate the subscales of efficacy and outcome expectations separately, the measure is remains valid (p.310). Although a small sample, 80 elementary school teachers in Maryland were used as the population for the testing of the NTSES, and validity was established through extensive pretesting, review by experts and analysis of internal reliability.

FABS is validated through key informant interviews and psychometric testing during a pilot study to "identify distinct correlates of fruit and vegetable intake" (NCI,

2011, p. 2). Final versions of the survey were disseminated in 2007 and the initial sample population was 3,397 adults, a response rate of 57% with oversampling of African Americans.

Operationalization

NTSE is the measure of a teacher's belief that he/she can confidently teach about nutrition and lead to changes in nutrition-related attitudes and behaviors in self and others (Bandura, 1977; Brenowitz & Tuttle, 2003). Based on a 20-question assessment, teachers can score as low as 20 (all responses are 1 (*not at all)*) or as high as 80 (all responses are 4 (*very confident*)). Categories of means may include: not confident (max score of 20), somewhat confident (max score of 40), confident (max score of 60), and very confident (max score of 80). In the original study of 80 teachers, the mean score was 55.4 ± 10 (Brenowitz & Tuttle, 2003). This is a nominal level of measurement using labels to identify low (score below 50)and high (scores of 50 and above) levels of NTSE.

Training on the FFVP and/or nutrition at start of school year is defined as the provision of and participation in educational lessons, by the school or school district, on the implementation of the FFVP and/or nutrition education for elementary school teachers. This is measured with a yes or no response. Some teachers may be provided with pre-FFVP implementation training and others may not. Training may vary and can be in the form of orientation training, faculty meetings, materials or curriculum outlines, school nutrition program meetings in which teachers are invited to participate, videos on school closed-circuit TV, or dissemination of online resources, etc. This selected factor

could be associated with NTSE if provided by the school or school district. This is nominal level of measurement using labels for yes and no.

Fruit and vegetable consumption by teachers is measured by the frequency of intake of fruits or vegetablesper the number of days per week. Two questions measured how many cups of fruit and vegetables that teachers eat (or drink as 100% juice) each day. Choices ranged from “none” to “4 cups or more” per day. A serving size of a fruit or vegetable is quantified as one-half cup. Daily adult consumption is a minimum of 1 cup of fruit and 1.5 cups of vegetables. Also, teachers are asked how often they eat fresh fruit and vegetables, from “more than once a week” to “yearly or not at all.” The measure of intake gave context to the selected factor’s association to NTSE. This is a nominal level of measurement using labels to describe low intake (fewer than 3 cups of combined servings per day) and high intake (more than 3 cups of combined servings per day) of fruits and vegetables.

Established school policies on nutrition in the classroom are measured by a yes or no response by asking the question,Are there established school policies on nutrition in the classroom?A school district policy that clearly states the content and quality of school food, and requires nutrition education in the classrooms and cafeteria defines established school policies on nutrition. The policy should support the offering of healthy foods (fruit and vegetables) for a consistent message about positive eating habits and healthy diet, and is seen as an integral part of the school program.Four additional questionswere asked related to understanding school policies on vending machines, classroom snacks, food as rewards or incentives, and foods used in school celebrations. Collecting additional data

on the policy variable may indicate if teachers understand school policies on nutrition, and further if it relates to NTSE. This is a nominal level of measurement using labels for yes and no.

Data Analysis Plan

SPSS v. 21 (IBM) is the software that was used for data analysis after downloading the files from SM. All survey responses were reviewed individually for completeness. Some data cleaning was done, that is, converting text to numbers, ensuring that data field entries match the specified categories.

Descriptive statistics were used to depict the teacher characteristics of the sample population: gender, age, years taught, etc. Frequency distributions of each characteristic provided a sense of the sample population and a means to determine representativeness. A confidence interval of 95% was used. Inferential statistics were utilized to allow for generalizations to be made and contingency tables with chi-square analysis and multiple regression wereemployed to determine association of selected factors and NTSE.

The research study seeks to examine an association between three selected factors – fruit and vegetable consumption (daily cup intake and low/high categories), FFVP training status (yes/no), and established school nutrition policy (yes/no) – and NTSE (numerical score between 20-80 and low/high categories). Contingency tables of data pertaining to low NTSE (scores below 50) and high NTSE (scoresof 50 and above) as contrasted to (a) fruit and vegetable consumption at low levels versus high levels of daily cups, (b) having FFVP or nutrition training versus not having training, and (c) having established school nutrition policy versus not having school policy. The chi-square

statistic reveals whether there is significant difference between the groups of what is observed and expected.

The chi-square test for independence focuses on the relationship between the nominal variables and the null hypotheses suggest that the variables are unrelated. The alternative hypotheses propose that there is a relationship between the variables. The degrees of freedom must be reflected as 1. An alpha level of .05 was used. The critical value of chi-square is 3.84 with 1 degree of freedom (*df = (r – 1)(c – 1)),* so to reject the null hypothesis the X^2 must fall beyond 3.84 (Sullivan, 2008). Using SPSS output summaries, analysis of the Pearson Chi-Square value and the Continuity Correction directed whether to reject the null hypotheses or fail to reject the null hypotheses.

Multiple regression analysis was also used as a means to see if selected factors predict NTSE levels. Scatterplots of the three independent variable (along the x-axis) and NTSE scores (dependent variables along the y-axis) gave a visual indication to make predictions about the variables. To determine the effect of all three selected factors on predicting NTSE, multiple regression wascompleted. Regression analysis of the selected factors as a set to ascertain if a relationship exists to the dependent variable is indicated by the Sig. box in the output ANOVA summary (p-value less than .05 indicates significant model). In the coefficients output box of the multiple regression of the set of selected factors, the alpha at each t-test indicated which factors account for a significant portion of the variance of the dependent variable. This does not imply causation, rather, these statistical analyses account for relationship and association among the variables.

Multiple regression analysis can also be used to assess and account for confounding and to calculate effect modification.

Threats to Validity

Generalizing results from the sample population can be compromised if the population is not well-defined or known.It is not recommended that results are generalized beyond the scope of the cohort. When planning research, it is not always known if fair representation of teachers can be recruited to participate in the study. External validity is threatened when we try to relate findings to other persons, places or times that are not similar to this research design (Crosbyet al., 2006).

Perceived threats to external validity in this study may include teachers who do not participate in the USDA FFVP or those who work in other states where different FFVP implementation practices may exist. Additionally, survey results reflect a single point in time and selected factors and variables may change synchronously to research dissemination, but not as a response the results of the study. Several other factors that may cause threats to external validity include a stalled Farm Bill in the U.S. Congress, decreased funding of the USDA FFVP, school districts reducing the number of schools operating the program, school districts who create or revise new wellness policies and guidelines, the influence of the new USDA school nutrition policies (per the Healthy Hunger-Free Kids Act of 2010), or schools with FFVP who have a disproportionate of young teachers.

To avoid these threats, all steps were taken to ensure solid recruitment of the 114 teachers in the six schools who operate the FFVP. All attempts were made to encourage

random and grade representative selection through incentives. Using the results to adequately describe similarities between the six schools may also alleviate threats to external validity. Replication of the study could also contribute to a stronger ability to generalize the findings. Surveys with incomplete or missing data were used after cleaning the data set by comparing to completed data within the individual survey. Each of the 31 survey questions required an answer. Oversampling may alleviate the chance of incomplete or missing data.

Because this study is looking at associations between selected factors and NTSE, and not causation, threats to internal validity may not be as obvious (Crosbyet al., 2006).However, because data is collected via an online survey methodology, threats to internal validity are real. Selection-maturation may pose a conflict in that some teachers may have been involved with the FFVP for 5 or more years, while others may have only a brief (1-2 years) experience with the program. The topic of nutrition may solicit teachers with high self-efficacy and create a response bias between teachers who do not have an interest in nutrition or personal wellness. There are some social threats to internal validity that may play a role in the results including diffusion of treatment (teachers discussing and sharing their survey responses within the school) and compensatory rivalry (a competitive approach among teachers due to offered incentive for completing survey). Using a control group (teachers in schools that do not implement the FFVP) could alleviate these threats to internal validity, as well as random assignment of teachers across the City of Lynchburg to both the experimental and control groups (Crosbyet al.,

2006). These arenot part of the study's exploratory research design but could be considered in future research.

According to Crosby et al. (2006), threats to statistical conclusion include low statistical power (small sample size or alpha is too low; Type II errors or accepting the null hypothesis when it's false), reliability of treatment implementation (FFVP is implemented at the school's discretion and effort, which can decrease the chance a true difference was detected), and random irrelevancies in the experimental setting (some schools may have more proactive approaches to FFVP or nutrition education than others as a matter of leadership or community-based partnerships that provide additional programs on nutrition in the classroom). Random sampling is the primary remedy for these threats. However, bootstrapping the sample obtained to 1,000 alternate versions was used to increase power and give more stability to the analyses.

Ethical Procedures

This minimal risk study acknowledgedthe principles of beneficence, justice, and respect for personsfor all participants. Based on the Walden University'sIRB's assessment of the potential risks and benefits, the study was aligned and complied with the university's ethical standards, U.S. federal regulations, and other guidelines set forth by the participating school district.

Consent forms were provided to all participants in the online survey. A letter of cooperation was obtained fromthe Superintendent of LCS. Protected health information was not solicited as part of this survey. A data use agreement was not necessary because nonpublic records were not requested. An executive summary of the research results

wasmade available to any participant, school district contact, or representative of the VDOE and USDA.

Relying on a network of contacts within the public school district's identified schools may cause some issues with teacher recruitment and survey completion. Timing may not be consistent in dispersing the survey web link among the schools, or some school nutrition staff may be better connected and respected by the teachers in their district, which may improve participation rates. Prior to data collection, there were pending discussion about the wellness policy occurring within the school district; this could complicate responses adversely.

Data integrity and confidentiality was taken seriously. All hard copy data is stored in a locked file cabinet and I have the key. All electronic data is secured on SM's serversfor as long as I maintain active subscription to the service, and in Excel and SPPS files on the researcher's password-protected laptop computer and USB flash drive (for backup). All data in my possession will be kept for a minimum 5 years. No one else willbe given access to the raw data unless approval is granted by IRB.

There is nothing in the survey questionnaire that would stop the recruitment of surveys or cause an adverse event. All data is confidential due to the request for contact information to issue incentives for participating in the survey. Using incentives is considered a gesture of appreciation for the teacher's time in completing the survey. Realizing that teachers are asked to complete many tasks daily, by asking them to participate in the survey is extracurricular. Also, the $10incentives offered are intended to give access to healthy foods (Lynchburg Community Market) or classroom supplies

(Amazon.com gift card). Teachers were able to choose which incentive they want to receive. The first 100 surveys submitted were eligible to receive an incentive. This may be a strong social motivator to participate in the survey, but is not meant to exert power over the recruited teachers.

A potential conflict of interest may exist with the inclusion of Lynchburg City Schools in the study, as the researcher has children who are enrolled in a FFVP-participating school and knows some of the teachers who were recruited. The researcher's professional role is with the Virginia Department of Health. The researcher has presented at local and statewide conferences and interacted at statewide coalition meetings involving VDOE and local school district personnel. Especially locally, the researcher serves on the School Health Advisory Board for Lynchburg City Schools and has assisted with wellness policy revisions in the past. No attempts were made to exclude the known teachers from participating. Concern for ethical action and integrity was upheld throughout each step in the research process.

Summary

The study examinedthe role of selected factors with NTSEamong elementary school teachers who participate in the USDA FFVP. Using an online survey adapted from the NTSES and FABS Section 4, the study collected data to help to determine if there is a relationshipbetween these selected factors and teacher self-efficacy to instruct on nutrition in the classroom setting. Recruiting the cohort sample of teachers ($N = 114$) from sixparticipating schoolsin Lynchburg, Virginiawas accomplished through theassistance and cooperation with the school nutrition manager and staff, while taking

into account appropriate ethical procedures. It is the goal of the research design and methodology to collect data for analysis to determine the relationship and association between daily fruit and vegetable consumption, FFVP training status, and established school nutrition policy with NTSE. The results are presented in Chapter 4.

Chapter 4: Results

Introduction

The purpose of this quantitative study wasto explore daily FV consumption, Fresh Fruit and Vegetable Program (FFVP) training, and established school nutrition policy with respect to NTSEamong teachers who participated in the USDA FFVP. Understanding more about a teacher's confidence in teaching nutrition could promote changes in school nutrition throughout the country, such as, the use of healthy foods for academic instruction in math, science, social studies, and language arts. Teachers participating in the FFVP were suggested to model healthy eating behavior and to provide nutrition education in the classroom several times each week. Self-efficacy and behavior may be influenced through training on nutrition or participating in the FFVP, and understanding established school nutrition policies. The research questions and hypotheses reflect the purpose of the study.

RQ1: Does an association exist between daily FV intake and NTSE among teachers involved in the USDA FFVP?

H_01: There is no association between daily FV intake and NTSE among teachers involved in the USDA FFVP.

H_a1: There is an association between daily FV intake and NTSE among teachers involved in the USDA FFVP.

RQ2: Does an association exist between FFVP training status and NTSE among teachers involved in the USDA FFVP?

H_02: There is no association between FFVP training status and NTSE among teachers involved in the USDA FFVP.

H_a2: There is an association between FFVP training status and NTSE among teachers involved in the USDA FFVP.

RQ3: Does an association exist between established school nutrition policy and NTSE among teachers involved in the USDA FFVP?

H_03: There is no association between established school nutrition policy and NTSE among teachers involved in the USDA FFVP.

H_a3: There is an association between established school nutrition policy and NTSE among teachers involved in the USDA FFVP.

In this chapter, the data collection process and statistical procedures are discussed along with the analysis of the survey data.

Data Collection

Following IRB approval on January 2, 2014, the Teacher Food Survey (mounted on SM) was finalized with the approval number and additional edits that were requested. In coordination with the Lynchburg City Schools' school nutrition manager,the survey was e-mailed to targeted elementary school teachers on Friday, January 10, 2014. The survey was open for 7 weeks and closed on Friday, February 28, 2014. Two additional reminders were sent by the school nutrition manager through email on Friday, January 20, 2014 and Friday, February 14, 2014 to stimulate interest and increase response to the survey.

Teachers from six Lynchburg City Schools that participate in the USDA FFVP were included in recruitment. There are 114 teachers who assist with the program's implementation by serving their students a fruit or vegetable in the classroom 2–3 times each week. After 7 weeks, a total of 66 teachers completed the survey. This is a response rate of 58%. Details of the response rate are discussed in detail later in Chapter 4.

Upon clicking on the survey link, teachers were provided with the approved consent form and informed that the survey was voluntary. Participants had to select the "I consent" button on the form in order to access the survey questions. The initial email invitation recruited 20 teachers, the second reminder enlisted 41 teachers, and the final email drafted 5 teachers. There were an unusual amount of snow days experienced during the recruitment period giving teachers additional time off to respond to the survey invitation. All communication regarding recruitment to the survey was conducted through the school nutrition manager.

Incentives to www.Amazon.com or the Lynchburg Community Market were provided to those teachers who offered their contact information. Only 48 teachers collected the $10 incentive, representing 73% of the survey participants. All incentives were emailed or mailed within two weeks of receiving the contact information. The researcher receivedseven emails by teachers who did not follow the closing instructions on how to obtain their incentive. These teachers were given the link to provide their contact information directly from the researcher. Following the close of the survey, a thank you incentive was also mailed to the school nutrition manager in appreciation for her support and collaboration.

Data were easily downloaded from SM into an Excel spreadsheet. All data were reviewed and cleaned, as well as organized into separate worksheets for each variable during March 2014. There were no missing data from the key variables related to the research questions. Data were then transferred to SPSS v. 21 for analysis.

Sample Characteristics and Demographics

The target population for this study was elementary school teachers who participate in the USDA FFVP. A listing of the six schools and 114 employed teachers were provided by the school superintendent for recruitment in December 2013. Baseline demographics were collected as the first section of the online Teacher Food Survey, which included the school where they taught, gender, age, grade, years teaching, highest level of education completed, approximate annual salary, average class size, and school student population.

The initial intent was to collect a minimum of 100 survey responses from the population of 114 teachers. This was to ensure necessary power because of the limited sample size. However, after three invitations to participate in the survey over a seven week period, obtaining this number of responses was determined to take too much time. Therefore, only 66 survey responses were collected for analysis. The demographic characteristics are presented in Table 2.

School participation is not included in Table 2 to protect privacy. The vast majority of participants were female (92.4%). Age ranges were comparatively dispersed with teachers of ages 30 – 39 years (30.3%) reflecting the highest participation. Teachers in 2nd grade had the highest representation (22.7%) and pre-kindergarten teachers were

the least (7.6%). Overwhelmingly, teachers with 0 – 15 years of experience were well represented (74%), specifically those with 11 – 15 years of experience (28.8%). Teachers reported evenly that they had a bachelor's degree (50%) or a masters/specialist degree (47%).

Due to missing data, approximate annual salary(N = 64) and average class size (N = 65) were not included in Table 2. Median salary range was $25,000 - $49,000 (87.5%). Average class size was 11 – 20 students (66.2%), however, almost a third of teachers reported class size of 21-30 students (30.8%).

Table 2

Sample Demographic Information

Variable category	Total (N= 66) N (%)
Gender	
Male	5 (7.60)
Female	61 (92.4)
Age	
20 to 29 years	16 (24.2)
30 to 39 years	20 (30.3)
40 to 49 years	11 (16.7)
50 to 59 years	17 (25.8)
60 and > years	2 (3.00)
Grade taught	
Pre-kindergarten	5 (7.60)
Kindergarten	11 (16.7)
1st Grade	10 (15.2)
2nd Grade	15 (22.7)
3rd Grade	12 (18.2)
4th Grade	6 (9.10)
5th Grade	12 (18.2)

Years teaching	
0 – 5 years	15 (22.7)
6 – 10 years	15 (22.7)
11 – 15 years	19 (28.8)
16 – 20 years	9 (13.6)
21 – 25 years	2 (3.00)
26 – 30 years	2 (3.00)
30 and > years	4 (6.10)
Highest level of education	
Bachelors	33 (50.0)
Graduate Certificate	2 (3.00)
Masters or Specialist	31 (47.0)
Doctoral	0 (0.00)
School population size	
0 – 149 students	1 (1.50)
150 – 299 students	22 (33.3)
300 – 449 students	17 (25.8)
450 – 599 students	25 (37.9)
600 or > students	1 (1.50)

Summary statistics for the dependent and independent variables of interest to this study are presented in Table 3. The dependent variable is NTSE (NTSE). The independent variables include daily fruit and vegetable consumption (measured as combined cups; a serving size is equivalent to one-half cup of fruit or vegetable), training on the FFVP or nutrition in general, and expressed awareness and understanding of school nutrition policies that govern the food environment.

Table 3

Summary Statistics for Variables

	Total Sample *N* = 66 (%)
NTSE score	
Mean	47.3
Standard Dev.	11.3
Median	46.5
Minimum	24.0
Maximum	80.0
Daily fruit and vegetable intake (combined cups)	
Mean	4.27
Standard Dev.	1.90
Median	4.00
Minimum	1.00
Maximum	8.00
FFVP or nutrition training	
Yes	6 (9.10)
No	60 (90.9)
Established school policies	
Yes	55 (83.3)
No	11 (16.7)
School vending policy	
Yes	40 (60.6)
No	26 (39.4)
Classroom snack policy	
Yes	59 (89.4)
No	7 (10.6)
Food as rewards or incentives policy	
Yes	61 (92.4)
No	5 (7.60)
Food for school celebrations policy	
Yes	61 (92.4)
No	5 (7.60)

The sample population of the study is 66 elementary school teachers. Because of this small size, all data analyses were conducted using the following bootstrap specifications: 1,000 samples and a confidence interval of 95%. Bootstrapping is statistical method that enables stability of analytical models and procedures by easily estimating the sampling distribution through re-sampling the original sample. It creates a thousand of alternate versions of the data set for a more accurate depiction of what is expected in the population. All results reported herein were completed with bootstrapping analysis in SPSS.

The dependent variable, NTSE, was measured using a 20-question assessment with a 4-point Likert scale, authored by Brenowitz and Tuttle (2003). As noted in Chapter 3, Brenowitz and Tuttle (2003) reported that "factor analysis and Cronbach's α suggest that the NTSES is a valid measure of NTSE," and that if used to evaluate the subscales of efficacy and outcome expectations separately, the measure is valid (p. 310). Teachers in this study had a mean NTSE score of 47.4 ± 11 and a median score of 46.5. The minimum score was 24 and the maximum was 80. All scores were categorized as either a high or low NTSE score. There were 41 teachers (62.1%) with a score of 49 or less (low NTSE), and 25 teachers (37.9%) with a score of 50 or higher (high NTSE).

Of the 20 questions, there were four that the majority of teachers indicated they were "not at all confident" in teaching students. Two questions solicited the same rating counts in two categories: 1) which foods belong to each food group on the MyPlate (32.3%), and 2) gaining the interest of students in the subject of nutrition (42.4%). There were no questions in which the majority of teachers selected as "very confident." All

other questions were rated as “somewhat confident” or “confident.” Table 4 provides the details on the rating counts measuring confidence related to teaching about nutrition.

Table 4

NTSE Scale Rating Counts

	Total Sample N=66 (%)
Not confident at all	
What MyPlate is	29 (43.9)
What food groups make up MyPlate	23 (35.4)
Which foods belong to each food group	21 (32.3)
Which nutrients come from each food group	27 (40.9)
Somewhat confident	
Adequate training to teach nutrition	33 (50.0)
Understand nutrition concept to teach them	32 (48.5)
Have the skills needed to teach nutrition concepts	30 (45.5)
Can answer nutrition-related questions	33 (50.0)
What the dietary guidelines are	27 (40.9)
Can interest students in subject of nutrition	28 (42.4)
Can change students’ nutrition-related attitudes	32 (49.2)
Can change students’ nutrition-related behaviors	34 (52.3)
Teaching more about nutrition has a greater impact	30 (45.5)
Confident	
Teach students about eating a balanced diet	33 (50.0)
Which foods belong to each food group	21 (32.3)
Can teach about fat, sugar, and salt in fast food	31 (47.0)
Can teach about reducing fat, sugar, and salt in diet	29 (44.6)
Increase fruits, vegetables, grains, protein in diet	33 (50.0)
How to keep foods safe	33 (50.0)
Can interest students in subject of nutrition	28 (42.4)
Teaching nutrition well makes students interested	31 (47.7)
Increase students’ nutrition knowledge	38 (57.6)

The first independent variable is daily fruit and vegetable consumption. Figures 3 and 4 depict percentages of daily intake of FV by the teachers in this study.There were 24 teachers who consumed less than 3 cups of FV (low FV intake) and 42 teachers who ate

more than 3 cups each day (high FV intake). The mean number of cups of fruit and vegetables consumed each day is 2.1 and 2.2 respectively. The mean combined cups of FV consumed daily are 4.3. This is shown in Table 5.

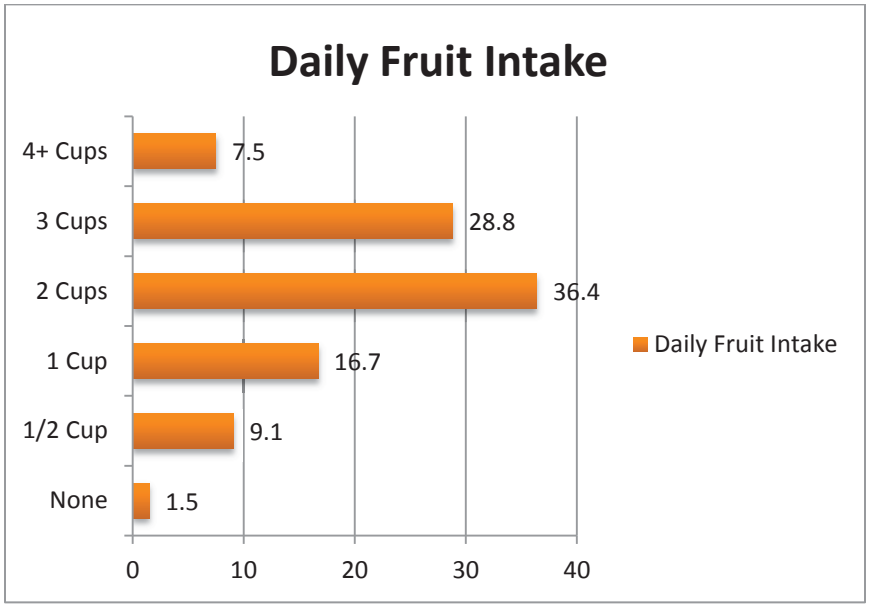

Figure 3. Cups of fruit consumed daily by elementary school teachers.

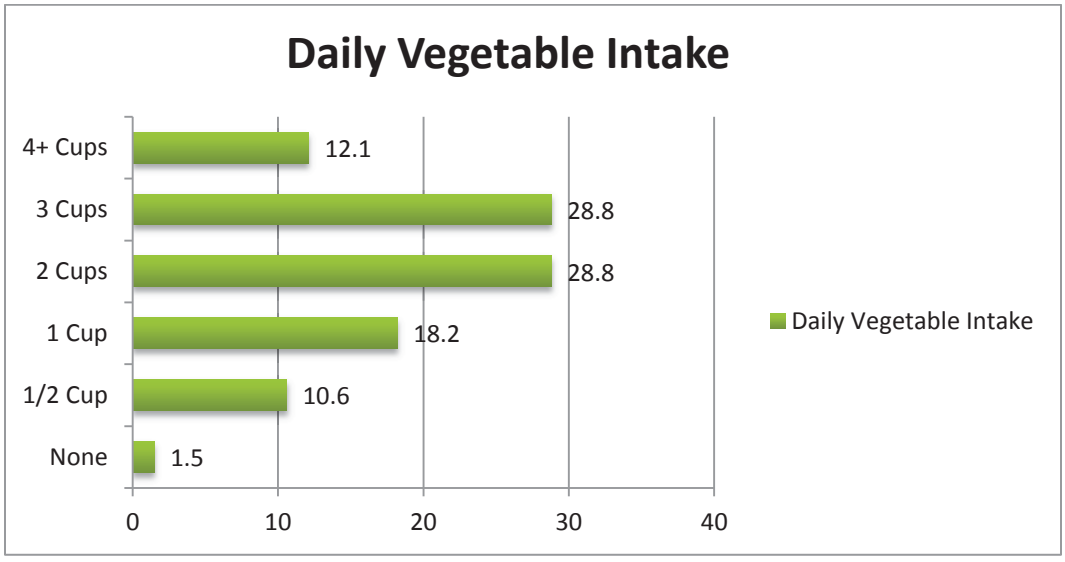

Figure 4. Cups of vegetables consumed daily by elementary school teachers.

Table 5

Daily Fruit and Vegetable Consumption by Elementary School Teachers

Cups	Fruit *N* (Total Cups)	Vegetable *N* (Total Cups)	Combined Total Cups
None	1 (0.0)	1 (0.0) 0.0	
½ cup or less	6 (3.0)	7 (3.5)	6.5
1 cup	11 (11)	12 (12)	23
2 cups	24 (48)	19 (38)	86
3 cups	19 (57)	19 (57)	114
4 or more cups	5 (20)	8 (32)	52
Total Cups	139.0	142.5	281.5
Average Cups	2.1	2.2	4.3

Teacher Food Attitudes and Behaviors

Using Section 4 of the National Cancer Institute's Food Attitudes and Behaviors Survey (FABS), factors influencing consumption of fruit and vegetables among the teachers was assessed. The survey was conducted nationally among U.S. adults in 2007 and validated by experts in the field. Teachers reported an average frequency of eating any meal while watching television (3.06 meals per week), eating dinner around a table with family and friends (5.44 meals per week), eating a fruit or vegetable in front of students (3.34 days per week), and providing nutrition education and/or activities to students (1.09 days per week).

Teachers were also asked to think about if they were to eat plenty of FV each day, how likely would they be to feel or experience certain attributes. The majority of teachers reported that they were likely to have more energy (44.3%), live a long life (50.8%), look better (40.0%), and feel good about themselves (47.5%). Teachers were extremely likely

to control weight (47.5%) and have regular bowel movements (41.0%) as a result of eating the recommended daily servings of fruits and vegetables.

Teachers are not motivated to eat FV because others would be upset if they did not (80.3%), they felt pressure from others (70.5%), and others' approval of them (77.0%). They are also unmotivated by being told what to eat (82.0%), others seeing they can do it (65.6%), and feeling like they are letting others down (77.0%). Motivating factors to eat FV that are usually true for teachers in this study include:

- Feeling in control of health (62.3%)
- Setting a good example for family (49.2%)
- Strong value for eating healthy (41%)
- Belief that it is a good thing for health (50.8%)
- Belief that it is very important to do (41.7%)
- Feel better about self (54.1%)
- Improve physical health (49.2%)
- Important personal choice to make (47.5%)
- Consistent with life goal (38.3%)
- Important for being as healthy as possible (52.5%)
- Take responsibility for own health (47.5%)
- Set a good example for students and community (34.4%)
- Treat body with respect (49.2%)

These additional questions were part of the established NCI Food Attitude and Behavior Survey (2011) and included as part the online survey. The percentages help to give context to and quantify the sample's attitudes and beliefs about fruit and vegetable consumption and how their attitudes and beliefsinfluence their daily intake. Moreover, comparisons of this sample to the U.S. adult population (CDC, 2010; Serdula et al., 1995; Thompson et al., 1999) are represented in Table 6. Surveyed teachers are 2.2 times more likely to eat 2 or more servings of fruit and 2.7 times more likely to eat 3 or more servings of vegetables compared to the general U.S. adult population. Median daily FV intake is one-half cup more among, elementary school teacherswho participated in FFVP.

Table 6

Summary Comparison to U.S. Adult Population

	U.S. (2010) %	Teachers %	Healthy People Goal %*
2+ servings* of fruit	32.5	72.7	75.0
3+ servings of vegetables	26.3	69.7	50.0

* *A serving of fruit or vegetable is quantified as one-half cup.*

	Cups	Cups	Cups
Median daily FV intake	1.75	4.0	2.5

Note: Data from the Healthy People 2020 goals, 2013, Food and Nutrient Consumption NWS-14 and NWS-15.1, www.healthypeople.gov

The second independent variable is the status of whether teachers had received training in any form about the FFVP or nutrition in general. The vast majority of teachers (90.9%) said they were not provided with any training during the current school year. Six teachers did have training of some kind, but the survey did not ask for additional

details.The third independent variable is related to awareness and understanding of established school nutrition policies that govern the food environment.

Fifty-five (83.3%) teachers affirmed there are school policies on nutrition, while 11 (16.7%) did not. Awareness of policy is different than understanding. Further, the researcher added four additional policy questions at the recommendation of the dissertation committee. Table 3 highlights the teachers' understanding of school nutrition policies. Overwhelmingly, teachers reported understanding of the classroom snack policy (89.4%), foods used as rewards or incentives policy (92.4%), and foods used in school celebrations policy (92.4%). While still the majority, 60.6% of teachers expressed understanding of the school vending machine policy.

While the research design is purely quantitative, several emails were received by the researcher from teachers expressing appreciation for the $10 gift card incentives and for conducting the study. Two teachers shared that taking the survey was influential in causing them to think about how they go about teaching nutrition to their students, as well as that they now realize they are role models.

Data Analysis

Data analysis was performed using the independent and dependent variables described in the three hypotheses being investigated in this study. All data analyses reported herein were completed with bootstrapping. Bivariate analysis and regression analysis were performed, including scatterplots, Pearson correlation, chi-square test for independence, and multiple regression. Using these analyses, the study seeks to examine an association between three selected factors – fruit and vegetable consumption

(combined daily cup intake; low and high intake categories), FFVP or nutrition training status (yes/no), and established school nutrition policy (yes/no) – and NTSE (low and high score categories).

Figure 5 is a scatterplot of NTSE scores and daily fruit and vegetable consumption. Pearson correlation (*r*) indicated in this plot is +.338. The data are highly scattered ($r^2 = 0.114$) in a way that suggests a positive relationship. The level of significance is .005; the correlation is significant. With 64 *df*, and for $p < .05$, the critical value of *r* is .250. The correlation coefficient is above the critical value, therefore, we can reject the null hypothesis and accept the alternative hypothesis: there is a statistically significant relationship between NTSE and daily FV intake among teachers involved in the USDA FFVP. The Pearson correlation is depicted in Table 7.

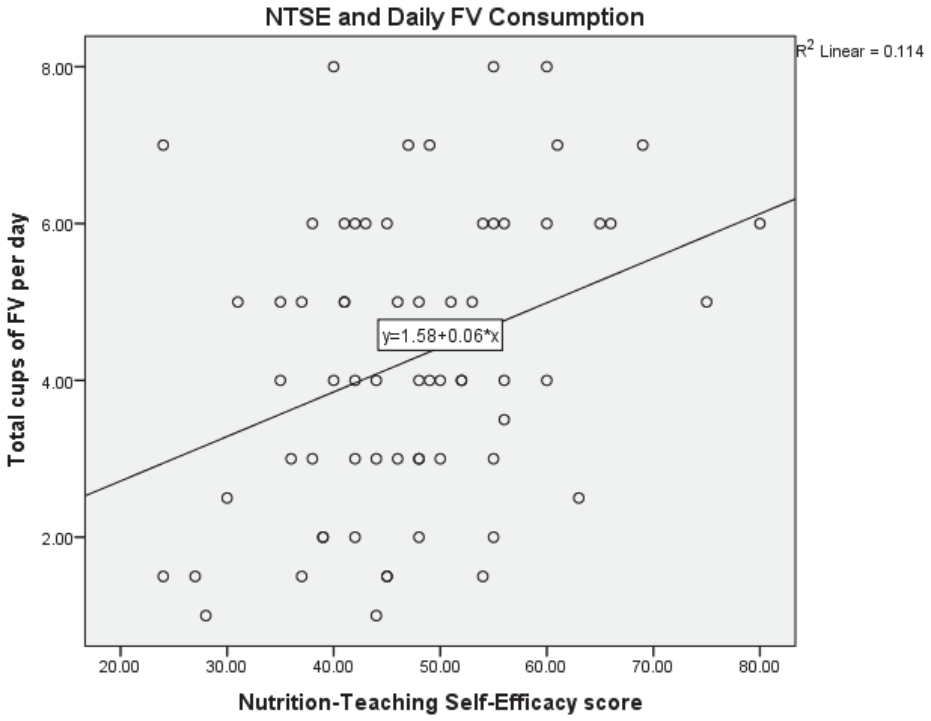

Figure 5. NTSE score and daily FV cups scatterplot.

Table 7

Correlation between NTSE& Daily FV Intake*

		NTSE	Daily FV Intake
NTSE	Pearson Correlation	1	.338**
	Sig. (2-tailed)	-	.005
	N	66	66
Daily FV Intake	Pearson Correlation	.338**	1
	Sig. (2-tailed)	.005	-
	N	66	66

* Unless otherwise noted, bootstrap results are based on 1000 bootstrap samples
**Correlation is significant at the .01 level (2-tailed).

Chi-square tests were used for the three independent categorical variables. Chi-square test for independence for the relationships being studied has a critical value of 3.84, which the value of X^2 must fall beyond to reject the null hypotheses. Based on these findings, it appears that a significant associations exist between NTSE and daily FV intake ($p = 0.031$), reflecting the prior data analysis above. There were no relationships found for FFVP or nutrition training and awareness of established school policy. Therefore, we fail to reject the null hypotheses for RQ2 and RQ3.

Table 8 presents the results of the chi-square testing of NTSE and the three independent variables.

Table 8

Chi-square Analysis Results of Selected Factors

	Teachers (N = 66)	X^2	df	P-value
Daily FV Intake				
Low FV Intake	24	4.657	1	0.031
High FV Intake	42			
FFVP/Nutrition Training				
Yes Training	6	2.324	1	0.127
No Training	60			
Established School Policy				
Yes Policy	55	0.013	1	0.910
No Policy	11			
Classroom Snack Policy				
Yes Understanding	59	4.775	1	0.029
No Understanding	7			

Further chi-square testing was performed to determine if understanding of specific school nutrition policies were related with NTSE. No significant associations exist between NTSE and understanding of the vending machine policy (p = 0.337), foods used as rewards or incentives (p = 0.069), and foods used for school or classroom celebrations (p = 0.919). However, there was a relationship between NTSE and understanding the classroom snack policy (X^2 = 4.775; p = 0.029) as shown in Table 7.

Additional chi-square testing was conducted with common demographic factors – age, gender, school, grade taught, years teaching, degree earned – to see if any had a significant association with NTSE. Table 9 summarizes the non-significant findings of these results.

Table 9

Chi-square Analysis Results for Demographic Variables

	Teachers ($N = 66$)	X^2	*df*	P-value
Age				
20-29 years	16	1.459	4	0.834
30-39 years	20			
40-49 years	11			
50-59 years	17			
60 and > years	2			
Gender				
Female	61	0.010	1	0.919
Male	5			
School				
Elementary Sch. 1	10	4.462	5	0.485
Elementary Sch. 2	6			
Elementary Sch. 3	14			
Elementary Sch. 4	19			
Elementary Sch. 5	11			
Elementary Sch. 6	6			
Grade taught				
Pre-kindergarten	5	7.905	6	0.245
Kindergarten	11			
1st Grade	10			
2nd Grade	15			
3rd Grade	12			
4th Grade	6			
5th Grade	12			
Years teaching				
0 – 5 years	15	5.254	6	0.512
6 – 10 years	15			
11 – 15 years	19			
16 – 20 years	9			
21 – 25 years	2			
26 – 30 years	2			
30 and > years	4			

Highest level of education				
Bachelors	33	0.233	2	0.890
Graduate Certificate	2			
Masters or Specialist	31			
Doctoral	0			

With the results of the bivariate analyses in mind, multiple regression analysis was performed as planned in Chapter 3. The research questions being examined within this study aimed to determine how the three independent variables relate to the level of NTSE among elementary school teachers. Bivariate analysis indicated that only one of the independent variables had a significant association with NTSE. However, bivariate analysis is limited to control for other significant predictors and a multivariate analysis test can provide a means to determine the role that each independent variable has on NTSE.

The outcome variable was low or high NTSE and the predictor variables were those shown to have significant associations: daily FV consumption. The demographic covariates were not included into the model due to the lack of statistical significance found in the bivariate analyses.

Table 10 reviews the results of the multivariate regression model.

Table 10

Results of Multivariate Analysis

	Odds Ratio	95% CI	Coefficient	S.E.	*t*	P-value
Daily FV Intake	3.45	1.087-10.98	0.265	0.434	2.178	0.029
FFVP or Nutrition Training	0.27	0.045-1.594	-0.305	0.116	-1.489	0.064
Established School Nutrition Policies	0.925	0.241-3.546	-0.014	0.183	-0.087	0.918

The results of this regression model validated again that there is a significant association between NTSE and daily FV intake (*OR* = 3.45, *p* = 0.029). The odds of having high NTSE are 3.45 higher in those who consume more than 3 cups of combined FV each day. The model confirmed a lack of significant relationship of two independent variables, FFVP or nutrition training and established school nutrition policies.

Other variables were added to the model to check for associations with non-significant variables. Interactions between each independent variable were tested through a series of logistic regression tests.The only confounding variable found in the models was the understanding of policy on classroom snacks, which had a significant associationin chi-square analysis (*p* = 0.029).

Based on the results of the data analysis and hypothesis testing, the following results were found for each of the research questions in this study:

RQ1: Does an association exist between FV daily intake and NTSE among teachers involved in the USDA FFVP?

RQ1 – Findings: Based on the results of the chi-square test of association (p = 0.031) and the multivariate logistic regression model (p = 0.029), the null hypothesis, which stated there was no association between daily FV intake and NTSEamong teachers involved in the USDA FFVP, was rejected. The alternate hypothesis is there is an association between daily FV intake and NTSE among teachers involved in the USDA FFVP.

RQ2: Does an association exist between FFVP training statusandNTSE among teachers involved in the USDA FFVP?

RQ2 – Findings: Based on the results of the chi-square test of association (p = 0.127) and the multivariate logistic regression model (p = 0.064), the null hypothesis, which stated there was no association between FFVP training status and NTSEamong teachers involved in the USDA FFVP, failed to be rejected.

RQ3: Does an association exist between established school nutrition policy and NTSE among teachers involved in the USDA FFVP?

RQ3 – Findings: Based on the results of the chi-square test of association (p = 0.910) and the multivariate logistic regression model (p = 0.918), the null hypothesis, which stated there was no association between established school nutrition policy and NTSEamong teachers involved in the USDA FFVP, failed to be rejected.

Summary

Data analysis using bivariate and multivariate statistical tests determined if a significant association existed between NTSE and three independent variables. Both bivariate and multivariate tests found that a statistically significant association existed between NTSE and one independent variable, daily FV consumption, when controlling for demographic variables. The results of the first research question indicate that as NTSE increases, so does daily FV intake. For the second and third research hypotheses, which stated that associations existed between FFVP or nutrition training, and school nutrition policies, with NTSE, there were no associations found.

An observation regarding daily FV consumption among surveyed teachers and comparison to the U.S. adult population was noted. Surveyed teachers are 2.2 times more likely to eat 2 or more servings of fruit and 2.7 times more likely to eat 3 or more servings of vegetables compared to the general U.S. adult population. Median daily FV intake is one-half cup more among FFVP-participating, elementary school teachers.

Chapter 5 discusses the correlation between the theoretical and conceptual framework, research underpinnings from the literature review, and provides detailed results.A thorough exploration of how the information learned through this study has expanded the body of knowledge of NTSEamong elementary school teachers who participate in the USDA FFVP is presented. Moreover, limitations of the study and implications of the results are applied to make recommendations for positive social change and research going forward.

Chapter 5: Discussion, Conclusions, andRecommendations

Introduction

The primary purpose of this study was to examine if an association exists between NTSEand daily (FV) consumption among teachers who participated in the USDA (FFVP). FV are critical to promoting good health because of their nutritional value and role in reducing the risk for chronic disease development (Hung et al., 2004; Casagrande, Wang, Anderson, & Gary, 2007; Yeh et al., 2008; Fisk, Middaugh, Rhee, & Brunt, 2011).Additionally, the study helped to determine if FFVP or nutrition training and established school nutrition policy might impact NTSE. These factors are important to understand in the context of the policies, systems, and environmental supports that enable or reduce teachers' ability to serve as healthy-eating role models and adequate nutrition educators as part of the FFVP.

This quantitative research studyused the NTSES and Section 4, "What You Eat and Drink,"of the Food Attitudes and Behaviors Survey (FABS). An online survey was used to (a) measure efficacy and outcome expectations and (b) food attitudes and behaviors of teachers who implemented the FFVP. The study wasdirected at114 elementary school teachers in six schools who implemented the FFVP in Virginia during the 2013-2014 academic year. Survey response rate was 58% with 66 teachers participating.

The key finding was the statistically significant association between NTSE and daily FV consumption($p = 0.031$), when controlling for demographic variables. The answerto RQ1indicated that as NTSE increases, so does daily FV intake. The odds of

having high NTSE are 3.45 times higher in those who consume more than 3 cups of combined FV each day($p = 0.029$). For RQ2 and RQ3,no associations were found between FFVP or nutrition training, and school nutrition policies, with NTSE. The results of the bivariate and multivariate statistical testing warranted rejection of only RQ1's hypothesis.

Additionally, an observation regarding daily FV consumption among surveyed teachers and comparison to the U.S. adult population was noted. Surveyed teachers are 2.2 times more likely to eat 2 or more servings of fruit and 2.7 times more likely to eat 3 or more servings of vegetables compared to the general U.S. adult population. Median daily FV intake is one-half cup more among FFVP-participating, elementary school teachers. The study sample had a higher daily FV intake than the general U.S. adult population, which also demonstrates that Healthy People 2020 goals can be met – from 0.5 cups of fruit to 0.9 cups per 1,000 calories, and from 0.8 cups of vegetables to 1.1 cups per 1,000 calories (DHHS, 2013).

The rest of this chapter is organized into five parts. The first section outlines my interpretation of these results while considering prior research literature along with the conceptual and theoretical frameworks. The second section highlights limitations of the study. Recommendations for future research investigations are made in the third section, and the social change implications of the findings are outlined in the fourth section. The final section provide my closing comments regarding this study.

Interpretation of the Findings

The findings of the studyextend knowledge about teachers'self-efficacy to provide nutrition education and adult fruit and vegetable consumption. Since there were no studies found that examined the impact of FFVP on teachers' nutrition attitudes and behaviors, we now know NTSE and daily FV intake among elementary school teachers in FFVP-participating schools are significantly associated. The FFVP is not exclusive to just students – as the intended receivers of the program outputs – to promote changes in food attitudes and behaviors.This study has shown that teachers with high NTSE have 3.45 times the odds of having high daily FV intake. Therefore, this correlates succinctly with the theoretical underpinnings of the study, the self-efficacy theory.

Adult FV consumption is low and continues to be less than the recommended 5 servings (or 2.5 cups) per day, with median FV intake of 3.5 servings (or 1.75 cups) per day(Serdula et al., 1995; Thompson et al., 1999). Prior research questioned why adult daily FV intake failed to meet recommended dietary targets of 75% of people eating at least 2 servings of fruit and 50% eating at least 3 servings of vegetables each day (CDC, 2010; Erinosho et al., 2012; Blanck et al., 2008; Demydas, 2011). Yet this study revealed that 72.7% of teachers consume 2 or more servings of fruit and 69.7% consume 3 or more servings of vegetables each day, with a median FV intake of 4 cups (8 servings).

Because NTSE and daily FV intake are highly correlated, the FFVP may have an impact as a workplace intervention for teacher wellness and a means to recognize teachers as nutrition educators.Teachers are role models of healthy eating behavior (Schee, 2009; Snelling et al., 2012; Murimi et al., 2008; Bauer et al., 2006; McCullum-

Gomez et al., 2006). This study confirms that teachers are eating a fruit or vegetable in front of students 3.34 days per week, and providing nutrition education and/or activities to students 1.09 days per week. Almost 88% of teachers reported approximate annual salaries in the $25,000–$49,000 range, which coincides with 100% of teachers having a Bachelors degree or higher. Teachers who have higher education are likely to live in higher standard housing, have access to grocery stores and farmers markets, and other social determinants that shape a person's health (Telfair & Shelton, 2012).

At least half of the survey participants expressed confidence in teaching students about eating a balanced diet (50%), how to increase FV in their diet (50%), and increasing their nutrition knowledge (57.6%). Prior literature has shown that assessing teacher's attitudes towards and perceptions of nutrition is an essential step to understanding self-efficacy (Perez-Rodrigo & Aranceta, 2001).

There were no associations found between NTSE and FFVP training (RQ2) and established school nutrition policy (RQ3). Contrary to these results, improving access through policy and environmental approaches is said to increase daily FV consumption (Foltz et al., 2012). Overwhelmingly, 90.8% of teachers did not receive training on the FFVP or nutrition yet prior research demonstrated at least 70% of staff in Virginia schools were provided nutrition education training (Kowalewska et al., 2012).This study's findings also indicate that teachers are not at all confident with the MyPlate (43.9%), what food groups make up MyPlate (35.4%), and which foods belong to each food group (32.3%). This is a criticism of the FFVP given the fact that the MyPlate replaced the Food Guide Pyramid by the USDA in 2011.

School nutrition policies influence the classroom food environment, regardless of the level they are adopted, that is provided they have the resources to implement them (Story et al., 2009). Being aware of established school policies may not be enough to mediate outcomes to improve self-efficacy or increase FV consumption, especially when one understands how the specific policies change the nature of how food is offered or used (Foltz et al., 2012; McCullum-Gomez et al., 2006). In bivariate analysis, understanding of the classroom snack policy was associated with NTSE ($p = 0.029$), but foods used as rewards or incentives policy, foods used in school celebrations policy, and the school vending machine policy were not.

Regarding the USDA FFVP, this study's findings also coincide with previous studies' impact by increase fruit and vegetable consumption, although in this case with teachers and not children (Jamelske et al., 2008; USDA 2010). It is congruent in this study that having exposure to fresh produce several times each week is accompanied by teacher modeling and the provision of nutrition education (USDA, 2010). The evidence furnished by this study enhances our understanding of the relationship between NTSE and daily FV intake and how it may impact teachers overall desire for improved health outcomes (Olsho et al., 2011).

The results of the study also demonstrate the barriers and challenges related to implementation of the new school nutrition standards as part of the Healthy, Hunger-Free Kids Act of 2010. Improving child nutrition is the focal point of this legislation. By default, the FFVP and new school nutrition standards that were phased in 2013 permit the improvement of adult nutrition as well. Politics and media discourse often cloud public

health advancements and schools must understand their role in enabling health promotion through healthy eating. Instead of waiving or ceasing what is hard to implement, it is important to find ways through barriers and challenges like sustaining a healthy school nutrition program despite decreased federal funding. Especially related to this study's findings, using elementary school teachers with high NTSE to facilitate positive regard for school nutrition changes is an avenue to be considered when national policy changes are made.

When analyzing the findings through the theoretical and conceptual frameworks, it appeared that the application of self-efficacy theory supports the result. As teachers who participate in the FFVP increase their confidence to teach nutrition, they in turn increase the behavior ofconsuming recommended servings of FV daily. The literature review highlighted the need to better understand the influences of teachers' food attitudes and behaviors as a means to improving daily fruit and vegetable consumption. Teachers can be motivated and positively influenced to strengthen self-efficacy (Ferry et al., 2008). This study, along with prior research, substantiated the fact that when students increased FV consumption and changed food attitudes, there was anadvantage to the regular classroom teacher to do the same (Auld et al., 1999).

This directly relates to the social-ecological model and the person-environment interactions that precipitate interest and awareness, motivation and support, thus enabling confidence to teach nutrition and meet daily recommendations for FV servings (Murimi et al., 2008; Auld et al., 1999; Lanier et al., 2012; Murimi et al., 2007).

The social-ecological model enables collective attitudes in an environment where there is high self-efficacy to teach nutrition and exceed daily FV serving recommendations. While this study did not find that program training and school nutrition policies were significantly related to NTSE, there remains the likelihood that the FFVP may have a massive impact on a teacher's access to FV in the school environment. This study has highlighted a key fact that NTSE and daily FV intake are correlated. This finding suggests that the independent variable could be utilized to motivate and create attitude changes among adults toward consuming FV as part of the daily diet. Future studies should continue to use the theoretical model and conceptual framework to inform work on the topic.

Limitations of the Study

There were several limitations due to a lower than expected response rate (58%); only 66 of 114 teachers voluntarily participated in the study. The sample size was small and there was concern that it would be difficult to find significant associations from the data. A larger sample size would have ensured a representative distribution of the population of interest. It would have been preferable to access more teachers, in which the sample could be drawn from several school districts throughout the Commonwealth of Virginia.

To obtain appropriate statistical power, bootstrapping method was used to create 1,000 alternate versions of the collected data set. This study was exploratory and purposely used a small proportion of elementary school teachers in that offer the USDA

FFVP in their schools. Therefore, generalizing the results of this study beyond the scope of this sample cannot be done.

Achieving representativeness of sample was dependent on random selection to participate in the survey. This is a known disadvantage of using an online survey, although demographics helped to determine representativeness (Couper, 2007).Only teachers who met inclusion criteria were invited to take the survey so concerns about identity and eligibility of respondentswere mitigated. Still, online surveys use self-reported data which must be taken at face value. Asking questions about confidence in teaching and eating behavior are subject to recall of the past and attribution of positive criteria to self and negative outcomes to others.

This study is exploratory in nature because there were no research found that has previously studied the relationship between NTSE and daily FV intake. Prior studies associated students' ability to gain nutrition knowledge and, by having greater access to fresh produce through the FFVP, increased the likelihood of meeting daily FV intake recommendations (Bartlett et al., 2013). Daily FV intake and NTSE is a relevant and significant problem because teachers are not typically prepared to be nutrition educators or health role models (Rossiter et al., 2007; Kubik et al., 2002; Celebuski & Farrin, 2000; Falciglia, Norton & Wagner, 1997). Finding that NTSE and daily FV intake are associated is the impetus needed to further explore and research these associations.

A concern that surfaced during the timeframe of data collection was a letter issued by the superintendent on January 16, 2014 regarding the school board's approval of revisions to Policy 7-51: Wellness. This policy focuses on nutrition and physical activity

in Lynchburg City Schools. The letter outlined the revisions "that relate to classroom snacks, fundraising, celebrations, and recess" (Brabrand, 2014). The school nutrition manager confirmed that the letter was sent to all parents, teachers, and staff in the school district. It is possible that this could have pre-empted the responses to the independent variable, established school nutrition policy awareness (and understanding of key nutrition policies that impact the classroom). Therefore, I argue that this is an additional limitation of the study due to lack of teachers from an adjacent city or county to compare against.

Recommendations

This study has offered evidence to further advance our understanding of the knowledge base of NTSE and daily FV intake among elementary school teachers who participate in the USDA FFVP. The significant finding that NTSE and daily FB intake are associated has opened an opportunity for continued exploration and future research. The two independent variables – FFVP or nutrition training and school nutrition policies – that were not found to be associated with NTSE, are still valuable to study further. Such future research on these two variables should proceed forward with a qualitative study and case-control studies with non-FFVP teachers and in other school districts.

There are several design improvements suggested if the study is to be replicated with a similar sample in another school district. First, a larger sample would give necessary statistical power to avoid using the bootstrapping method and give a better chance for representativeness of the population. Second, more variables related to NTSE – habits of attribution like shopping preferences, food groups knowledge and practices,

and personal perceptions on access to healthy produce – should be investigated as efficacy and outcome expectations.

This study did not address these external social factors, which might contribute to nutritional choices of teachers, as part of the survey design. As such, the use of a qualitative research design may be warranted to investigate further the constructs of NTSE, for example choices, productivity, thought patterns, motivation, social persuasion, and modeling. Qualitative research would allow for in-depth examination of how teachers become confident about nutrition.

Building on this study and future qualitative investigation, another recommendation is to conduct a case-control study comparing NTSE and daily FV intake between groups of FFVP teachers and non-FFVP teachers. This gave greater insight as to differences that may exist to give the significant findings of this study credibility as a potential worksite wellness program, stimulus to scale the FFVP to all schools, or motivation to provide nutrition education in teacher preparation degree programs.

Whether qualitative or quantitative, additional recommendations for interventional research includes the planning involved by teachers for FV consumption, implemented resources and/or curricula for nutrition education, and how technical assistance on nutrition education relate to NTSE and daily FV intake. This corresponds well with suggestions from other research (Buzby et al, 2003). While this study was the first attempt to learn more about FFVP or nutrition training and school nutrition policies, more data is needed to clarify how these may impact NTSE. Revisions to the existing school wellness policy were enacted during the data collection of this study, thus

potentially complicating responses to the questions pertaining to awareness and understanding of the policies. A pre-/post-revised policy intervention using the NTSE Scale (Brenowitz & Tuttle, 2003) could identify relationships of effectiveness that align with the constructs of the social-ecological model.

In going forward with the recommended avenues of future research, one of the strengths of this present study was the use of validated survey instruments in a snapshot design where the researcher maintained objectivity, reducing researcher bias. However, this is also an opportunity for public health to work collaboratively with professionals in education. Many positive examples of health-promoting schools and school-based health centers have contributed to a collective approach toward student health. Using the FFVP as a means to identify schools that have high percentages of children living in poverty, the findings of this study with other related studies should enable more teachers to serve as nutrition role models. Schools need teachers who care about their students' health and well-being, just as much as their own nutrition and level of fitness.

Future research should begin with qualitative exploration of self-efficacy and nutrition knowledge, and then move on to intervention or case-control studies as it relates to FFVP teachers in elementary schools. The work of Perez-Rodrigo & Aranceta (2001) should be expanded for better understanding of the attitudes, beliefs, and social factors that enable increased FV consumption of adults in the U.S. (Pomerleau et al., 2005; NCI, 2011). Approaching the issue from a health promotion standpoint, and using the NTSE scale as a barometer of how interventions enable confidence, would most likely produce the best and most practical methods for increasing daily FV intake in adults.

Implications

The results of this research are that teachers with high NTSEtend to consume greater amounts of fruit and vegetables. There is little to no evidence in the research literature that highlights this relationship between variables of interest to this study. Most studies focus on the status of FV intake and interventions to increase FV among children (Yeh et al., 2008). Because teachers in schools that participated in the USDA FFVP have higher nutrition-teacher self-efficacy and higher consumption rates of FV (compared to average U.S. adults), the program could be taken to scale as a health promotion program for adults.This study's findings support that healthier, confident teachers build healthier school environmentsand create the impetus for increasing fruit and vegetable consumption in the community.

From a community perspective, NTSE has major educational impacts on teachers, along with students and their families, when coupled with congruent food attitudes and behaviors. This study produces positive social change because it demonstrates the relationship between a belief in one's capabilities to teach nutrition and meet daily FV intake recommendations. It also indicates a sense of accountability to the role of educator and being able to practice what they teach.

Lack of adequate FV in the daily diet is a national public health problem that leads to the development of chronic diseases and obesity.Consumption of an adequate daily amount of FV is strongly recommended to reduce the risk of chronic diseases (Hung et al., 2004; Fisk et al., 2011). The large majority of American adults do not consume the recommended number of FV daily, yet FFVP teachers in this study

demonstrated fidelity to a median 4 combined cups. Public health and nutrition professionals continually seek to understand how to motivate people to consume at least 2.5-3 cups of FV each day.

From an employee wellness program perspective, since teachers who implement this program have higher rates of self-efficacy to teach nutrition and have higher daily FV intake, the FFVP could serve as a model for integration into any worksite. The school division in which the elementary school teachers were recruited report having no employee wellness program at this time. There are also five other schools in the school division studied that do not offer the USDA FFVP because they do not meet the eligibility criteria. Through community-based funding, an employee wellness program and expansion to the schools that do not offer FFVP could be employed to increase the NTSE of more teachers while improving consumption of FV.Moreover, if more schools integrate the FFVP, the impact on school health may be a mediating factor on teacher health and wellness. Therefore, the USDA FFVP provides a unique workplace-based opportunity for role models in a social environment to confidently teach about nutrition and eat an adequate daily amount of FV.

Overall, the knowledge generated by this study offers the potential to produce a great deal of social change by demonstrating an association that has not previously been known within the evaluation of the FFVP. Therefore, it is critical that the findings be disseminated through peer-review publications to allow FFVP staff, education professionals, and those in the public health nutrition field to integrate into their planning and practice. Teachers with high NTSE could be employed by public health to

collaborate on community-based interventions targeted to increase daily consumption of FV. It is critical to disseminate the results to FFVP-participating elementary school teachers since they are the individuals who are directly impacted by the new knowledge for the social change to occur.

Conclusion

This study aimed to determine if daily FV intake, FFVP or nutrition training, and established school nutrition policy were significant determinants of NTSEamong elementary school teachers who participate in the USDA FFVP. No prior studies have investigated the impact that the program has on teachers who model eating FV and provide nutrition education to their students. The results have found that there is a significant relationship between NTSE and daily FV intake.Based on this finding, further studies should be conducted which aim to identify more constructs of NTSE in the teacher population and determine what interventions can be used to expand and promote adequate daily FV intake.

Teachers,as adults in general, still have the need to increase FV consumption and to confidently teach children solid nutritional information and concepts for life-long healthy eating habits. Healthier teachers build healthier school environments, which impacts the community at large. The results of this study indicate that as NTSE increases, so does daily FV intake. Such evidence has the potential to transform current health promotion practices by empowering teachers to take a more confident role in teaching about nutrition in non-educational settings. Therefore, this study is aligned with national public health goals to increase consumption of FV among adults and

establisheselementary school teachers who participate in the USDA FFVP as NTSE leaders in this effort.

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Appendix A: Nutrition-Teaching Self-Efficacy Scale

1 (*not at all confident*), 2 (*somewhat confident*), 3 (*confident*), 4 (*very confident*)

How confident are you that:

1. You have adequate training to teach nutrition?
2. You understand nutrition concepts well enough to teach them to your students?
3. You have the skills necessary to teach nutrition concepts effectively?
4. You can answer students' nutrition-related questions?
5. You can do a good job teaching students what MyPlate is?
6. You can do a good job teaching students what food groups make up the MyPlate?
7. You can do a good job teaching students about eating a balanced diet?
8. You can do a good job teaching students which foods belong to each food group on the MyPlate?
9. You can do a good job teaching students which nutrients (vitamins and minerals) come from each food group on the MyPlate?
10. You can do a good job teaching students about fat, sugar, and salt in fast foods and snack foods?
11. You can do a good job teaching students what the Dietary Guidelines are?
12. You can do a good job teaching students about reducing fat, sugar, and salt in their diets?

13. You can do a good job teaching students about increasing fruits, vegetables, whole grains, and proteins in their diets?
14. You can do a good job teaching students about ways to keep foods safe?
15. You can interest students in the subject of nutrition?
16. If you do a good job teaching nutrition, your students will be interested in nutrition?
17. If you do a good job teaching nutrition, your students will increase their nutrition knowledge?
18. If you do a good job teaching nutrition, your students will change their nutrition-related attitudes?
19. If you do a good job teaching nutrition, your students will change their nutrition-related behaviors?
20. If you teach more hours of nutrition, you will have a greater impact on your students' nutrition-related knowledge, attitude, and behaviors?

Appendix B: Section 4, Food Attitudes and Behaviors Survey

1. How often do you eat pre-washed/pre-cut FV such as bags of salad, baby carrots, or cut-up fruit? (Do not count frozen or canned fruits and vegetables.)

   _ More than once a week

   _ Once a week

   _ Every other week

   _ Once a month

   _ Every other month

   _ 2-3 times a year

   _ Yearly or not at all

   _ Don't know

2. How many times a week do you eat a meal while watching television? Consider breakfast, lunch, and dinner. (Write in number) ____ Meals per week
3. How many times a week do you eat <u>dinner</u> sitting around a table with family or friends? (Write in number) ____Dinners per week
4. Have you received training on nutrition or the Fresh Fruit and Vegetable Program at the start of the school year? (yes, no)
5. How many days a week do you model eating the fruit or vegetable in front of your students? (Write in number) _____Days per week
6. How many days a week do you provide nutrition education or instruction to your students? (Write in number) ____Days per week

7. Are there established school policies on nutrition in the classroom? (yes, no)
8. Do you understand the school vending machine policy? (yes, no)
9. Do you understand the classroom snack policy? (yes, no)
10. Do you understand the policy on use of foods as rewards or incentives? (yes, no)
11. Do you understand the policy on use of foods for classroom or school celebrations? (yes, no)

The next two questions ask about cups of fruits and vegetables. The following boxes provide some examples of how much counts as one cup.

1 cup of fruit could be:	1 cup of vegetables could be:
1 small apple	3 broccoli spears, 5 in. long
1 large banana	1 cup of cooked leafy greens
1 large orange	2 cups of lettuce or raw greens
8 large strawberries	12 baby carrots
1 medium pear	1 medium potato
2 large plums	1 large sweet potato
32 seedless grapes	1 large ear of corn
1 cup (8 oz.) of 100% juice	1 large raw tomato
½ cup of dried fruit	2 large celery stalks
1 small wedge of watermelon	1 cup of cooked beans

12. About how many cups of fruit (including 100% pure fruit juice) do you eat or drink each day?

_ None

_ ½ cup or less

_ ½ to 1 cup

_ 1 – 2 cups

_ 2 – 3 cups

_ 3 – 4 cups

_ 4 cups or more

13. About how many cups of vegetables (including 100% vegetable juice) do you eat or drink each day?

_ None

_ ½ cup or less

_ ½ to 1 cup

_ 1 – 2 cups

_ 2 – 3 cups

_ 3 – 4 cups

_ 4 cups or more

14. Thinking about yourself, if you were to eat plenty of FV every day, how likely would you be to … (Use the scale of 1, not at all likely, to 5, very likely.)

- Have more energy
- Live a long life
- Control your weight
- Look better (appearance)
- Be "regular" (have regular bowel movements)
- Feel good about yourself

15. The following questions are about what motivates you to eat fruits and vegetables. People have different reasons for eating fruits and vegetables, and I want to know how true the following reasons are for you. Please indicate the extent to which

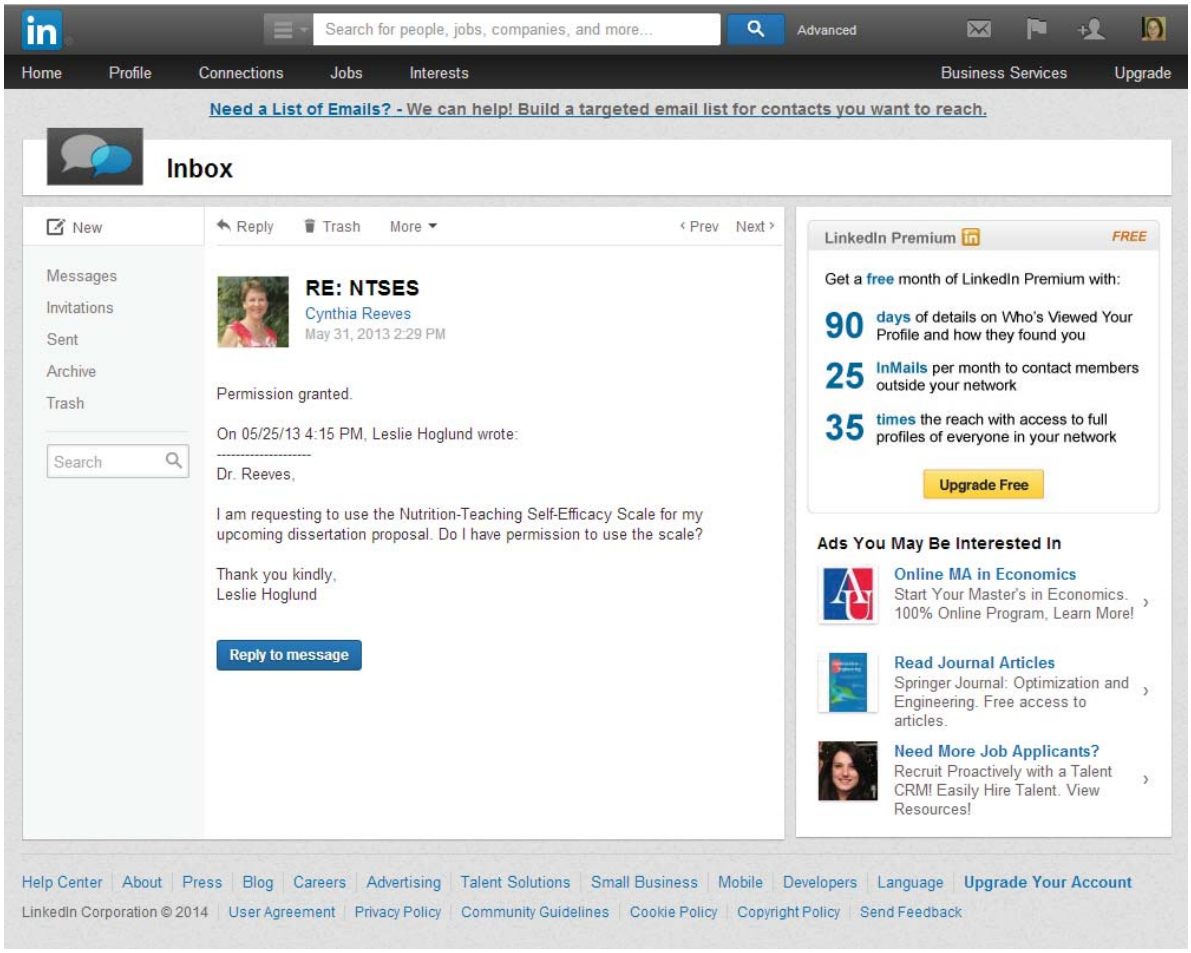
each reason is true for you, using the 5-point scale (1 (*not true at all*) to 5 (*very true*)).

- Because I want to feel in control of my health
- Because I want to set a good example for my family
- Because I have a strong value for eating healthy
- Because I personally believe it is a good thing for my health
- Because others would be upset with me if I did not
- Because I have carefully thought about it and believe it is very important to me
- Because I would feel better about myself if I did eat a healthy diet
- Because I would like to improve my physical health
- Because it is an important choice I really want to make
- Because I feel pressure from others to eat fruits and vegetables
- Because it is consistent with my life goals
- Because I want others to approve of me
- Because it is important for being as healthy as possible
- Because it is easier to do what I am told than to think about it
- Because I want others to see I can do it
- Because I want to take responsibility for my own health
- Because I want to set a good example for my students and community
- Because it is important to treat my body with respect

- Because I don’t want to let others down

Appendix C: Approvals to Use Survey Instruments

Approval Email to use Nutrition-Teaching Self-Efficacy Scale



Approval Email to use Food Attitude and Behavior Survey

From: Oh, April (NIH/NCI) [C] [mailto:ohay@mail.nih.gov]
Sent: Monday, June 10, 2013 12:39 PM
To: Hoglund, Leslie (VDH)
Cc: Nebeling, Linda (NIH/NCI) [E]
Subject: RE: NCI 2007 FAB data and files

Please do call or email if you have any questions. Good luck with your research!
Best,
April

From: Hoglund, Leslie (VDH) [mailto:Leslie.Hoglund@vdh.virginia.gov]
Sent: Monday, June 10, 2013 11:36 AM
To: Oh, April (NIH/NCI) [C]
Cc: Nebeling, Linda (NIH/NCI) [E]
Subject: RE: NCI 2007 FAB data and files

This is wonderful! Thank you so much!!

Leslie Hoglund, Ph.D. Candidate, M.Ed., CHES | Senior Health Educator & PIO
Virginia Department of Health | Central Virginia Health District
Lynchburg Health Department, 1900 Thomson Drive, Lynchburg, Virginia 24501
Office: 434.947.2629 | Cell: 434.238.5569 | Fax: 434.947.2338

From: Oh, April (NIH/NCI) [C] [mailto:ohay@mail.nih.gov]
Sent: Monday, June 10, 2013 11:32 AM
To: Hoglund, Leslie (VDH)
Subject: NCI 2007 FAB data and files

Hi Leslie,
My apologies for the delay. You are welcome to use the FAB survey data and items for your research. In the attached zip file please find a data users agreement. You are most welcome to use the survey items in your work. We ask that you cite the survey in any references in the format most appropriate for your purpose.

All the best,
April

From: Oh, April (NIH/NCI) [C]
Sent: Wednesday, October 19, 2011 1:43 PM
To: Oh, April (NIH/NCI) [C]
Subject: NCI 2007 FAB data and files

Thank you for your interest in the National Cancer Institute's Food, Attitudes and Behaviors (FAB) Survey.

Attached, please find a zip file with the SAS and SPSS data files as well as a FAB data users agreement. Please carefully review the FAB data users agreement. We will assume your use of the data implies you will adhere to our data users guidelines.
To access the FAB survey, survey instrument, related sources, analytic guide and codebook, please visit:
http://cancercontrol.cancer.gov/brp/fab/index.html

We plan to track planned manuscripts, presentations and in general how data are being used for internal monitoring purposes. Please let us know how you plan to use the data (e.g. topics being explored or research questions) and if you publish or present with the data, let us know so we can update the FAB website with FAB-related publications. If you are

interested in linking to other FAB users that may be interested in similar constructs or topic areas, please email Dr. April Oh at ohay@mail.nih.gov.

Please let us know if you have any questions! Thank you again for your interest in FAB!

April Oh, PhD, MPH (Contractor)
Senior Behavioral Scientist
Support to National Cancer Institute
Health Behaviors Research Branch
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Curriculum Vitae

Leslie E. Rawls Hoglund

Summary

As an educator and social change advocate, Leslie has dedicated her career to inspiring individuals and communities to succeed through evidence-based policy, system, and environmental changes that promote health and wellness. She exhibits leadership and is responsible for many public health initiatives including a Center for Disease Control and Prevention grant focused on a collaboratively-designed community action plan to help individuals make the healthy choice the easy choice. Leslie is passionate about public health, leadership and promoting healthy environments to reduce and prevent the burden of chronic diseases.

Education

Master of Education in Teaching and Learning/Counseling,Liberty University, 2008

Graduate Certificate in Public Health, George Washington University, 2003

Bachelor of Science in Health Promotion, Liberty University, 1999 (Cum Laude)

Career Experience

Senior Health Educator/Public Information Officer (Full-Time; March 2011 to Present). Central Virginia Health District, Virginia Department of Health. Provides and coordinates all health education services in the Central VA Health District by planning, implementing, and evaluating health education activities. Establish goals and objectives

for assigned programs. Prepares and submits grant applications. Delivers educational programs to clients and staff. Conducts health education training, and develops educational materials. Collects program-specific data and writes reports. Conducts needs assessments and provides technical assistance to local and community agencies/organizations regarding program planning. Serve as public information officer (PIO) about services and activities of the CVHD. Prepares news releases and coordinates District media contacts and activities. Serve as a member of the District's Executive Management Team working closely with the Health Director and Team to achieve VA Department of Health mission.

Residential Adjunct Faculty (Part-Time Contract; August 2012 to Present). Liberty University, School of Health Sciences. Serve as an Instructor for HLTH 340 course (Women's Health Issues).

Program Manager (Full-Time; January 2009 to March 2011). Central Virginia Community Services Board, Therapeutic Day Treatment Program. Promoted to oversee 11 school-based mental health programs in Lynchburg City Schools. Supervise 11 site supervisors and 30+ clinicians/behavior specialists. Maintain and improve the clinical skills of the entire day treatment team through training, individual and group supervision. Coordinate with school principals and faculty, and central office administrators, to ensure a seamless delivery of mental health services (play therapy, recreation and physical activity therapy, art and music therapy, cognitive-behavioral therapy, etc) for elementary and middle school-age students in the traditional public school setting. Establish and evaluate program goals: integration of mental health supports in the school environment,

i.e., the inclusion of mental health professionals in the school's regular processes for identifying, assessing, planning for and delivering services to children with emotional/behavioral issues; mental health training for families and school staff; the development or enhancement of family involvement mechanisms; mental health treatment services; coordination of health and mental health services; evidence-based clinical protocols; and linkages to community-based services.

Site Supervisor III (Full-Time; June 2008 to January 2009). Central Virginia Community Services Board, Therapeutic Day Treatment Program. Plans, organizes, delivers mental health services including therapeutic individual and group counseling, psycho-education, and medication management at Dunbar Middle School. Provide direct supervision to four clinicians and provide monthly staffing documentation as required. Takes referrals, completes intakes, and schedules licensed assessments. Develops impression and treatment plans, and presents to the team (supervisor and psychiatrist) for approval. Monitors progress towards identified goals and the continuation of needed services/resources. Crisis intervention when needed. Ability to establish and maintain rapport with severe-emotionally disordered children and their families on a social-problem solving level.

Residential Adjunct Faculty (Part-Time Contract; August 2007 to December 2009). Liberty University, Developmental Math Department, Bruckner Learning Center. Serve as an Instructor for Math 100 courses (Beginning Algebra).

Outpatient Addictions Counselor (Full-Time; December 2006 – May 2007). Walden/Sierra, Inc. Provide assessment, individual and group treatment services to a

caseload of 50+ outpatient clients. Maintain all clinical and administrative records to program standards in an appropriate and timely manner. Participate in weekly team meetings following established procedures for case assignment and review. Provide hotline, crisis, and inpatient care facility coverage as assigned. Provide outreach services to other community agencies and assist in community prevention programs (i.e., lecturing and training). Maintain and enforce all agency policies, procedures, and regulations. Respond appropriately to the cultural differences of clients and residents.

Health & Safety Educator/Trainer (Part-Time Contract; November 2002 to May 2007). Southern Maryland Child Care Resource Center. Instructed child-care providers on hand washing and hygiene, dangers of secondhand smoke, SIDS, stress management, nutrition and exercise, allergies and asthma, smoking cessation, behavior management strategies, and improving communication with children and parents. Taught approximately 30 workshops from 2002-2007.

Outreach Worker (Part-Time Contract; October 2006 – May 2007). Minority Outreach and Technical Assistance (MOTA), Black Leadership Council for Excellence (BLCE). Provide outreach and technical assistance to minorities for the purpose of organizing effective participation in the Cigarette Restitution Fund Program (CRFP), Maryland Department of Health and Mental Hygiene. Encourage minority participation in local community health coalitions. Support and educate local minority non-profits in applying for Charles County Department of Health grants for the purpose of decreasing the incidence of cancer and cancer deaths and the prevention and control of tobacco use

in minority communities. Promote and assist with seasonal grant writing workshops, five cultural festivals, and the general activities of BLCE.

Community Organizer/Consultant (Part-Time Contract; January–May 2006). American Cancer Society, South Atlantic Division. Led grassroots advocacy efforts in support of legislation to ban smoking in bars and restaurants in Maryland. This short-term contract expired in May 2006. Mobilize ACS supporters and recruit new supporters to call their legislators, send post cards, write letters to the editor, and do door-to-door canvassing. Contact and recruit restaurant and bar owners supportive of smoke-free legislation. Lobby other organizations to endorse Smoke-free legislation. Arrange meetings between district legislators and Smoke-free activists. Assisted Charles County Commissioners in passing a smoking ban in restaurants, which took effect on June 15, 2006, as well as a comprehensive ban on smoking in bars and restaurants in the town of La Plata (effective October 15, 2006).

Community Organizer/Consultant (Part-Time Contract; January–April, August–December 2004). On behalf of Smoke Free Maryland, conduct and coordinate an educational campaign in Charles County on the dangers of secondhand smoke and the health and economic benefits of smoke free policies. Activities include, but not limited to, conducting educational presentations to community organizations; recruiting organizational and individual supporters; recruiting spokespersons for media and/or public testimony with an emphasis on restaurant and bar workers; coordinating media advocacy efforts, to include drafting and submission of letters to the editor and opinion editorials to local media outlets; and coordinating grassroots recruitment and

mobilization. Continue outreach efforts to add additional supportive members to the Smoke Free Maryland coalition.

Community Health Educator II/Tobacco Cessation Counselor (Full-Time; March 2002–August 2004). Charles County Health Department. Provide community health education in the areas of tobacco use prevention and cessation, cancer prevention, cardiovascular disease prevention, and other community health education topics. Write and submit program grants to state health department for approval. Plan, conduct, evaluate and report activities for the Tobacco Prevention, Tobacco Restitution (CRF), and Oral Cancer Prevention grants. Teach community and worksite smoking cessation classes and monthly teen tobacco education classes. Lead and participate actively on the *Partnership for A Healthier Charles County* (PHCC) Cancer Team and Cardiovascular Disease Team and assists with other PHCC activities. Serve as the community contact for tobacco prevention, education, and cessation services and resources. Select strategies most appropriate for implementation of health promotion programs. Design and select appropriate and scientifically accurate health education mediums for each specific audience. Initiated a smoking ban policy at the Charles County Health Department which took effect in May 2004. Served as a consultant for the Charles County Park and Recreation Director in establishing smoke-free parks on March 1, 2005. Assisted in Civista Medical Center's initial policy development sessions to create a smoking ban on the entire hospital grounds. This policy took effect on September 1, 2005.

Senior Health Information Specialist (Full-Time; October 2001–February 2002). Eagle Design and Management, Inc. Supported the National Institute on Deafness and

Other Communication Disorders Information Clearinghouse (NIDCD). Disseminated and interpreted complex information on the causes, prevention, detection, diagnosis, and treatment of deafness and other communication disorders to patients and their families, health professionals, and the public. Responded to electronic, written, and telephone inquiries. Maintained up-to-date files of reference materials on deafness and other communication disorders. Reviewed professional and patient materials in the current literature. Reviewed the content of NIDCD materials. Represented NIDCD at professional meetings. Managed exhibit schedules, travel information, and arrangements for both contracted external organizations and NIH staff. Transcribed working group meetings and other dictations as necessary.

Materials Development Coordinator/Health Information Specialist (Full-Time; December 1999–October 2001). Eagle Design & Management, Inc. Supported the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) Information Clearinghouses by managing the flow of print and electronic publication development. Ensured proper documentation of all materials and coordinates the activities of writers, editors, the graphics team, the field testing staff, the printer, the project manager, and the NIDDK project officer. Responsible for obtaining necessary government clearances and reviews as well as project officer approval. Maintained a tracking system to monitor each publication to make the development process efficient and to prevent slowdown. Conducted weekly status meetings of managers and production staff. Produced and distributed a materials development status report weekly. Disseminated and interpreted information on the causes, prevention, detection, diagnosis, and treatment of diabetes and

digestive, kidney, and urologic diseases for patients and their families, health professionals, and the public. Provided inquiry response for the clearinghouses, including e-mail and fax responses; provided custom searches on diabetes-related topics; and developed materials pertaining to diabetes. Represented the NIDDK at professional meetings and coordinated the dissemination of health information at other meetings. Published articles in the clearinghouse newsletters. Facilitated field testing for digestive diseases publications and evaluated the results.

Health Educator Intern (May–August 1999). Virginia Department of Health (VDH), Three Rivers Health District, Gloucester Health Department. Conducted Breast Self-Exam training for women enrolled in the Breast and Cervical Cancer Early Detection Program (BCCEDP) funded by the Centers for Disease Control and Prevention. Participated in the Regional Evaluation Meeting of the BCCEDP and the American Cancer Society. Researched potential foundations for grants to supplement the BCCEDP to eliminate transportation barriers. Accompanied the resource mother during home visits to pregnant teens. Aided in Virginia Cardiovascular Risk Reduction (VCRR) counseling sessions and screenings at local worksites. Developed a fat-tube display and diabetes brochure for the VCRR program. Promoted breast and cervical cancer and cardiovascular awareness at the Mattaponi Indian Reservation Pow-Wow. Co-taught nutrition classes as part of the VDH Women, Infants, and Children (WIC) program.

Intern and Volunteer (August–December 1999). American Diabetes Association, Virginia. Editor for the statewide youth newsletter titled “No Sugar News,” fall and winter 1999 publications. Corresponded with local African-American churches to initiate

partnership for Diabetes Education Programs. Promoted November as American Diabetes Month by sending press releases to area media outlets (TV, radio, and newspapers). Helped, as a volunteer, with operating functions of the annual America's Walk for Diabetes, golf tournament, and Tour De Cure fundraisers, since 1994. Advocates diabetes awareness through blood glucose screenings at several community health fairs.

Certifications and Awards

- Certified Health Education Specialist (CHES #7899; Active certification since 1999). Health educators are professionals who design, conduct and evaluate activities that help improve the health of all people. CHES are those who have met the standards of competence established by the National Commission for Health Education Credentialing Inc. (NCHEC) and have successfully passed the national examination.
- Professional Quality Achievement Award, Liberty University, Department of Health Sciences, 1999–2000. This award is given to the top student in the major, based on GPA and contribution to the field of health promotion. In my senior year, I completed two internships with the American Diabetes Association (Virginia Affiliate), and the Virginia Department of Health – Three Rivers Health District, as well as restarted the Health Sciences Club at Liberty University. In their first year, the Health Sciences Club held a Diabetes Foot Screening and a Campus Health Fair.

- Distinguished Service Award in Clean Air, American Lung Association of Maryland, 2006. The award was presented for my advocacy work in Maryland and in the three counties that comprise the southern region of the state: Charles, Calvert, and St. Mary's. I actively worked on this public health issue from a grassroots advocacy level for four years until 2007 when the Maryland General Assembly passed Clean Indoor Air legislation protecting all Maryland citizens. The law took effect statewide on February 1, 2008.
- Athena Leadership Award®, Lynchburg Regional Chamber of Commerce, 2013. http://www.athenainternational.org/pages/athena_leadership_award_/14.php The award is inspired by the goddess of Greek mythology known for her strength, courage, wisdom and enlightenment, and is presented to a woman for professional excellence, contributing time and energy to improve the quality of life for others in the community, and for actively assisting women in their attainment of professional excellence and leadership skills.
- Vice Mayor's Young Adult Award of Excellence, City of Lynchburg, Virginia, 2013. Honoree's Video: http://www.youtube.com/watch?v=zVIQjdpryQw. The City of Lynchburg honors citizens who make lasting and high-impact service to the community.