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Changes in Healthy Eating and Physical Activity Behaviors of Adult Participants in Create Better Health's Education (SNAP-Ed) Program

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CHANGES IN HEALTHY EATING AND PHYSICAL ACTIVITY BEHAVIORS OF ADULT PARTICIPANTS IN CREATE BETTER HEALTH'S EDUCATION (SNAP-ED) PROGRAM

by

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ABSTRACT

Changes In Healthy Eating and Physical Activity Behaviors of Adult Participants in Create Better Health's Education (SNAP-Ed) Program

by

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Food related diseases such as obesity and diabetes are prevalent in the United States. Supplemental Nutrition Assistance Program-Education (SNAP-Ed) programs, such as Utah's Create Better Health (CBH), provide evidence-based obesity prevention strategies and help alleviate food insecurity for individuals with low income.

This study applied the social ecological model; policy, systems, and environmental change efforts; and social cognitive theory to evaluate how the delivery method (online versus in-person) effects changes in healthy eating behaviors, food resource management (FRM) skills, and physical activity in SNAP-Ed participants after participating in a CBH course. The study tested the hypothesis that participants taught in the CBH online courses would demonstrate similar improvement in nutrition, FRM, and physical activity as the participants taught in the in-person courses.

The study used preexisting data collected from 138 respondents who completed

the pre- and post-surveys for either the online or in-person CBH courses offered during 2020-2022. Mann-Whitney U tests compared delivery method on FRM skills and dietary behaviors measured on a 5-point Likert scale: (a) stretch food dollars so there is food to last the entire month, (b) choose a variety of foods based on MyPlate recommendations, (c) use nutrition facts labels to make food choices, (d) shop with a grocery list, (e) follow USDA food safety recommendations, (f) how frequently respondents ate fruit daily, (g) how frequently respondents ate vegetables daily, and (h) how frequently respondents drank regular soda, fruit punch, fruit drinks, sweet tea, or sports drinks. How many days the participants exercised at least 30 minutes in a week was the dependent variable measuring physical activity.

The post-test scores were statistically significantly higher for the online course for choosing foods based on MyPlate, using the nutrition facts label to make food choices, shopping with a grocery list, following USDA food safety recommendations, but lower for drinking soda and other sweetened drinks.

This information would help Extension professionals and similar programs that work with persons with low income to create effective interventions for nutrition and physical activity behavior change. A future recommendation includes tailoring CBH's online and in-person courses to target Utah's Hispanic population.

(113 pages)

PUBLIC ABSTRACT

Changes In Healthy Eating and Physical Activity Behaviors of Adult Participants in Create Better Health's Education (SNAP-Ed) Program

Kami Bullock

The purpose of this study was to compare the effects of delivery method on the nutrition, food resource management (FRM), and physical activity behavior of participants enrolled in either Create Better Health's in-person or online courses. The pre-survey and post-survey included data on nutrition, FRM, and physical activity behaviors. The researcher analyzed preexisting data from 138 SNAP-eligible adults who participated in Create Better Health's online and in-person courses.

Results showed similar improvements in most of the nutrition and physical activity behaviors among those who took the CBH courses online or in-person. The online course showed statistically higher scores for four of the six FRM skills as well as drinking sweetened beverages.

Recommendations for continued research on the effects of the online and in-person Create Better Health courses is recommended. Similar sample sizes for the online and in-person course and data collected when not affected by a pandemic may show different results. The research recommends tailoring the modality to target populations based on needs, interests, and demographics. Technology is becoming more widely used among individuals with low income and research shows that web-based nutrition education can be just as effective or more effective than traditional direct education

interventions among populations with low income.

The findings should encourage Extension and other programs that provide nutrition education for individuals with low income to utilize and continue the use of web-based programming using the CBH online course as a model. The USDA FNS's policy, systems, and environmental framework, social cognitive theory, and social ecological model can serve as a guide for evaluating and creating programs that influence nutrition and physical activity change.

DEDICATION

To my family, extended and immediate, who helped me through this journey for so many years. I could not have done it without you.

ACKNOWLEDGMENTS

I fell in love with learning and school at Utah State University over 20 years ago in Logan where I earned my bachelor's degree in Family and Consumer Science, and I knew that I wanted to pursue a master's degree someday as well. I finally went back to school about 15 years later. It took me over 6 years to finish grad school due to many setbacks and trying to juggle life as a mom of three and a pandemic, among other things, but I have met many wonderful mentors, friends, and professors along the way.

I would be ungrateful not to mention the people who helped me through my journey to pursue my master's degree. First, I want to thank my advisor and committee chair, Dr. Kelsey Hall, for teaching me so many things and not giving up on me. I was in the dark on all the new ways of learning through technology, which was a huge challenge for me. My degree was mostly online, which allowed me to have much needed flexibility as a mom but gave me anxiety as well. Dr. Hall helped me navigate through many of the challenges. She worked tirelessly to help me write and perfect my research. Dr. Hall finds a way to get things done regardless of the challenges and I admire her determination and commitment to her work.

My committee was a wonderful resource in my research efforts. Dr. Debra Spielmaker first got me to think about how to bring my research to a practical and useful purpose. Heidi Wengreen was always kind and encouraging without judgement. Finally, Heidi LeBlanc gave me the push I needed to keep going when I wanted to give up. She worked hard to help give me much needed insight and support on the Create Better Health project. These smart and intelligent women pushed me, inspired me, and

encouraged me to keep going.

My biggest thanks go to my family. My parents, my brothers and sisters, and my children who continued to show love and support even though I know they grew tired of hearing about my schooling and endless projects. I also want to thank my husband, Eric Bullock, for taking the brunt of so much stress and being patient through it all as I went through so many ups and downs during grad school. He made all the difference for me in my ability to succeed and I never could have finished the coursework without him helping with children, cooking, and housework during those busy days. My in-laws were also kind and encouraging in the process.

Kami Bullock

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CHAPTER I

INTRODUCTION

Background

According to the Centers for Disease Control and Prevention (CDC), nothing kills Americans more than heart disease and stroke (National Center for Chronic Disease Prevention and Health Promotion, n.d.). Low physical activity, poor diets, obesity, and diabetes are risk factors that contribute to heart disease. The CDC also states that heart disease and strokes are costing our healthcare system $214 billion per year and causing $138 billion in lost productivity on the job. According to the CDC, obesity affects 19% of children and 42% of adults, putting people at risk for chronic diseases, such as diabetes, heart disease, and some cancers. The total cost of obesity is $173 billion a year for the U.S. healthcare system (National Center for Chronic Disease Prevention and Health Promotion, n.d.). Utah has similar statistics. In 2020, it was reported that Utah has a 29.2% obesity rate, 4% coronary heart disease/myocardial infarction rate, and 8% diabetes (Coombs & LeBlanc, 2020). Utah Supplemental Nutrition Assistance Program-Education (SNAP-Ed) Create Better Health (CBH) helps decrease obesity and other chronic diseases among individuals with low income through a combination of direct education, marketing, policy, systems, and environmental support (Mountain Plains Region SNAP-Ed, 2018).

Due to food insecurity, families with low income are at greater risk for chronic diseases related to poor diets (Rustad & Smith, 2013). Food insecurity, as defined by the

U.S. Department of Agriculture Economic Research Service (ERS), is a household-level economic and social condition of limited or uncertain access to adequate food (Economic Research Service, n.d.). Lee et al. (2012) claimed that food insecurity and the "serious health consequences associated with food insecurity make it the leading nutrition-related public health issue in the United States today" (p. 744). The lack of adequate food for individuals needed for optimal health can create a cycle of food insecurity and chronic disease (David, 2017). This lack of resources for food insecure people can cause poor eating behaviors that include not eating enough or eating less expensive processed foods that have low nutrients. Hunger also limits physical and mental capabilities. These conditions lead to chronic illnesses and financial losses, such as inability to work. The lack of employability causes high stress, which also increases the risks of chronic illness (David, 2017). This is the cycle of food insecurity and chronic disease mentioned by David. This cycle perpetuates poverty and can be difficult to overcome.

Individuals and families in Utah with low income have higher rates of obesity, hypertension, diabetes, heart disease, and stroke than the general population due to food insecurity such as lack of resources and access to healthy foods or opportunities for physical activity (Utah State University Extension Create Better Health, 2021). Utah's SNAP-Ed mirrors the U.S. Department of Agriculture Food and Nutrition Service (FNS) focus, which is to provide interventions and strategies for the "primary prevention of diseases to help the SNAP-Ed target audiences that have risk factors for nutrition-related chronic disease, such as obesity, prevent or postpone the onset of disease by establishing healthier eating habits and being more physically active" (Food and Nutrition Service,

2022, p. 6). In Utah, the CBH curriculum addresses food insecurity and chronic disease by providing education on food resource management (FRM) concepts as well as nutrition and physical activity-related skills and knowledge to individuals with low income, so they can live a healthy and active life on limited resources (Savoie Roskos et al., 2019). Currently, Utah's CBH program is using a comprehensive approach to nutrition education as encouraged by FNS SNAP-Ed guidance, including efforts to improve health outcomes for individuals and communities through policy, systems, and environmental change; social marketing; direct education; indirect education; and social media (Food and Nutrition Service, 2022).

Supplemental Nutrition Assistance Program

SNAP, formerly known as food stamps, is the largest federal nutrition assistance program operated under the USDA. Participants receive a specific amount of money each month to spend on SNAP-approved foods at grocery stores, farmers markets, and farm stands based on their household size and income. To qualify for SNAP benefits, participants or families must be at or below 185% of the Federal Poverty Guidelines (Food and Nutrition Service, 2022).

Supplemental Nutrition Assistance Program-Education

Nutrition education is a component of SNAP. SNAP-Ed is an evidence-based program that helps to alleviate food insecurity by providing access to nutrition education and obesity prevention interventions for individuals eligible for SNAP. CBH provides nutrition education and obesity prevention interventions to individuals with low income

in all 29 counties in the state. The Utah program serves well over 500,000 individuals through online and in-person classes, digital education, social marketing, indirect education, and partnership/coalition work (Mountain West Region and Southwest Region SNAP-Ed, 2020). The goal of CBH is to improve access to nutritious food and physical activity opportunities for SNAP-Ed target audiences in their communities and improve the likelihood that the SNAP-Ed participants will make healthy food choices and choose physically active lifestyles within a limited budget that meets current Dietary Guidelines for Americans and the USDA Food Guidance (Utah State University Extension Create Better Health, 2021).

In Utah, 725,187 (23.8%) residents lived below the 185% poverty line in 2017 (Utah State University Extension Create Better Health, 2021). Furthermore, the number of food-insecure households in Utah totaled 107,107 (10.7%) in 2017. Of the 66,759 households in Utah that receive SNAP assistance, 27.3% of them are single women with children (Utah State University Extension Create Better Health, 2021). This target population faces a few challenges including limited time and resources. Many of these women work multiple jobs and raise their children alone. This in turn could result in health problems for both mother and children due to lack of access to healthy food and the health consequences associated with food insecurity. Other groups in Utah that are SNAP-Ed eligible and are of special concern to CBH include intergenerational poverty families, Latinos, American Indians, seniors, and people with developmental disabilities (Utah State University Extension Create Better Health, 2021).

Traditionally, direct education face-to-face classes have been the focus of SNAP-

Ed and other nutrition education programs until the programs transitioned to a combination of strategies after the Healthy, Hunger-Free Kids Act of 2010 (Savoie-Raskos et al., 2018). The changes included policy, systems, and environment (PSE) interventions to make a greater impact on health outcomes for individuals and communities (Savoie-Raskos et al., 2018). It has been shown that repeated exposure to long-term behaviorally focused nutrition education that uses multiple approaches improves healthy dietary behavior change for households with low income (Gregson et al., 2001).

Technology and Nutrition Education

The rise of technology has provided a new avenue for education. Its benefits are many including but not limited to flexibility, meeting individual needs through tailored programs, convenience, and affordability (Loehmer et al., 2018). Among the opportunities for the use of technology in nutrition education, there can also be challenges, especially for the elderly population who may be less interested in using technology (Loehmer et al., 2018). Face-to-face instruction provides benefits that online education cannot, such as observation and sensory activities (Loehmer et al., 2018). Research also found that minority populations tended to trust health information more when it came from interpersonal contacts (Loehmer et al., 2018). Yet, with the high number of working single mothers needing SNAP-Ed (David, 2017), other modes of instruction besides face-to-face could be valuable and beneficial because of its convenience and flexibility. A study in Indiana showed that participants in a web-based nutrition education intervention had substantial improvements in health-related behaviors

and were similar to outcomes of non-web-based interventions (Neuenschwander et al., 2013).

Problem Statement

The need to be more flexible in the delivery of SNAP-Ed programming is apparent. SNAP-Ed programs are developing online curriculums to broaden participation and decrease barriers to attending in-person classes (Neuenschwander et al., 2013; Swindle et al., 2014). Individuals with low income have better internet access at public spaces and through their mobile devices (File & Ryan, 2014). Online nutrition education can take many forms from nutrition videos (Joy et al., 1999), to tailored soap opera and interactive infomercials (Campbell et al., 1999), to self-paced didactic lessons (Lohse et al., 2015; Neuenschwander et al., 2013). Yet, Loehmer et al. (2018) state there is a growing need for more research in web-based nutrition education.

Create Better Health is the SNAP-Ed program in Utah that teaches both an online and in-person direct education nutrition curriculum called Create Better Health to SNAP-eligible adults in Utah. Yearly, the CBH has evaluated its in-person curriculum for measuring behavior changes related to nutrition, FRM, and physical activity. With the addition of the online course in 2021, the CBH wants to address a research gap by comparing the pre/post-survey results to determine the effects of the delivery method (in-person versus online course) on CBH participants' nutrition, FRM, and physical activity behavior.

Purpose Statement

The purpose of this study was to compare the effects of delivery methods on the nutrition, FRM, and physical activity behavior of participants enrolled in either CBH's in-person or online courses.

Research Objectives and Hypothesis

1. Compare the effects of delivery method on respondents' FRM skills.
2. Compare the effects of delivery method on respondents' nutrition habits.
3. Compare the effects of delivery method on respondents' physical activity.

The hypothesis tested was that participants taught in the CBH online course would demonstrate similar improvement in nutrition, FRM, and physical activity as the participants taught in the in-person courses.

Limitations of the Study

This study was limited to adults, particularly SNAP-eligible adults, who participated in either the online or in-person courses and completed the pre- and post-surveys between 2020-2022. The study relied on a convenience sample of SNAP-eligible adults in Utah, which might not be representative of all state SNAP-eligible adults or generalizable to other state SNAP-Ed programs. Participants might have had outside factors, other than the CBH courses, that could have influenced change in their nutrition, FRM, and physical activity behaviors. Because participants were volunteers who signed up for the courses, they might have been more motivated to make behavior changes,

which could have skewed the data. Behavior change theories such as the social ecological model and social cognitive theory support the idea that factors such as a person's environment, social supports, and attitude can play a large role in an individual's readiness to change their behaviors. If they are ready to change their behavior, they are more likely to attend the courses. Nutrition education programs face this challenging cycle as there are so many factors that play into a person's motivation to change. Participants are not required to take any nutrition education classes to receive SNAP benefits. Data collected for this study during the Covid-19 pandemic might affect the respondents' answers differently than in non-pandemic periods of time due to stresses and additional food-insecurity issues. The quantitative nature of the study did not allow participants to explain their answers in detail.

Delimitations of the Study

SNAP-eligible adults in Utah took an eligibility screener to qualify to participate in the CBH online or in-person courses. The following were requirements to participate in the online course: self-reporting they were at least 18 years old and participating or eligible to participate in one of six federal assistance programs (SNAP, WIC, Temporary Assistance for Needy Families, free or reduced school meal program, Medicaid, or Supplemental Security Income). The in-person participants were also screened through a prior needs assessment and census data to determine eligibility by location. Locations for CBH classes are determined by participation in federal assistance programs as well as persons using the services of food banks, food pantries, soup kitchens, public housing,

SNAP/TANF (Temporary Assistance for Needy Families) readiness program sites or free and reduced priced lunches (Utah State University Extension Create Better Health, 2021). During Covid-19, all schools in Utah qualified for free and reduced priced lunches, so anyone could participate during the pandemic. CBH classes can be held in areas where there are 50% or more residents that qualify for SNAP-Ed (Utah State University Extension Create Better Health, 2021).

Basic Assumptions

1. Each participant had read the surveys' questions thoroughly and truthfully answered the questions about their current nutrition, FRM, and physical activity behaviors.
2. Participants had a basic understanding of the terminology used in the survey questions.
3. Participants completed/attended most of the online modules or in-person courses.

Significance of the Problem

SNAP-eligible adults need nutrition education because they are at a higher risk for diet-related diseases.

> Poor nutrition and negative health outcomes associated with food insecurity, coupled with a 16.5 % national food insecurity prevalence among U.S. households with children, demonstrate the urgency to increase the effectiveness of current food security interventions. (Rivera et al., 2018, p. 959)

National initiatives have promoted nutrition education to the population with low income in the United States. According to Rivera et al. (2018), all states may provide nutrition education to help households with low income improve food insecurity and diet through

federally supported programs. The most common barriers among this population of individuals with low income that may prevent them from consuming adequate nutritious foods include time, cost, access, availability, lack of transportation, and lack of knowledge (Durward et al., 2019). Because the SNAP-Ed population includes persons with limited time and resources such as households with single working caregivers, it is important to be able to provide access to nutrition education through other methods than traditional direct education.

With access to computers and the internet increasing among individuals with low income, different modes of instruction for nutrition education, particularly web-based, are providing more options for how SNAP-Ed programs are delivered (Stotz et al., 2017). Also, groups who were unfamiliar with digital communication prior to the pandemic are likely more familiar with these modes of communication post pandemic. Using online nutrition education could be an equivalent or more effective teaching method to in-person instruction for behavior changes due to ease of accessibility, particularly for the convenience of use in the homes of the SNAP-Ed adults and families, as well as low-cost, speed of delivery, and a decrease in other barriers often faced by the SNAP-Ed population (Neuenschwander et al., 2013). Studies that compare results of in-person and web-based nutrition education should be done to evaluate the need and effectiveness of these programs for the SNAP-eligible population (Long et al., 2014).

The current study added to the growing body of research on the effects of teaching FRM skills and the promotion of other healthy behavior activities through SNAP-Ed programming, particularly through CBH's online and in-person courses.

Create Better Health stakeholders and other statewide SNAP-Ed programs could use the data from this study to determine how effective the online and in-person courses are in changing nutrition, FRM, and physical activity behaviors of its participants. This information would help stakeholders make decisions on how to create programming for future CBH courses.

Definitions of Terms

Create Better Health (CBH): The Create Better Health Utah (SNAP-Ed) program is a partnership of Utah State University Nutrition, Dietetics, and Food Sciences Department, Cooperative Extension Services, Utah Department of Workforce Services, and other collaborating agencies, including Utah's State Nutrition Action Coalition. The program provides nutrition education and obesity prevention interventions to low-income individuals in all 29 counties in the state, including online and/or face-to-face classes for both youth and adults, digital/virtual education, Policy, Systems and Environment (PSE), social marketing, indirect education, and partnerships/coalition work (Utah State University Extension Create Better Health, 2021).

Direct Nutrition Education: Direct education is one component of the Create Better Health Utah (SNAP-Ed) program. Direct education refers to nutrition classes taught individually or in groups to a variety of audiences including adults, youth, and families (Utah State University Extension Create Better Health, 2021).

Environment: Includes the built or physical environments which are visual/observable, but may include economic, social, normative, or message

environments. Modifications in settings where food is sold, served, or distributed may promote healthy food choices. Social changes may include shaping attitudes among administrators, teachers, or service providers about time allotted for school meals or physical activity breaks. Economic changes may include financial disincentives or incentives to encourage a desired behavior, such as purchasing more fruits and vegetables (FNS, 2022).

Food insecurity: A household-level economic and social condition of limited or uncertain access to adequate food (ERS, n.d.).

Food resource management (FRM): The handling of all foods, and resources that may be used to acquire foods, by an individual or family. FRM education typically addresses topics such as meal planning, shopping strategies, food selection, budgeting, food preparation, and cooking strategies for improved household food security and to maximize the nutrition/health return on limited resources (UNC Center for Health Promotion and Disease Prevention, 2016).

Food and Nutrition Service (FNS): Food and Nutrition Service is the branch of the U.S. Department of Agriculture that oversees the SNAP; Women, Infants & Children; and SNAP-Ed programs nationwide. FNS is the funding and leadership group for all SNAP-Ed programming (Utah State University Extension Create Better Health, 2021).

Interventions: A specific set of evidence-based, behaviorally focused activities and/or actions to promote healthy eating and active lifestyles (FNS, 2022).

Physical activity: Any body movement that works muscles and requires more energy than resting (UNC Center for Health Promotion and Disease Prevention, 2016).

Policy, Systems, and Environment (PSE) Policy: A written statement of an organizational position, decision, or course of action. Ideally, policies describe actions, resources, implementation, evaluation, and enforcement. Policies are made in the public, non-profit, and business sectors. Policies help to guide behavioral changes for audiences served through SNAP-Ed programming (FNS, 2022).

Supplemental Nutrition Assistance Program (SNAP): SNAP provides nutrition benefits to supplement the food budget of needy families so they can purchase healthy food and move towards self-sufficiency (FNS, n.d.-a).

Supplemental Nutrition Assistance Program-Ed (SNAP-Ed): An evidence-based program that helps people lead healthy, active lives. SNAP-Ed teaches people how to make their SNAP dollars stretch, how to shop for and cook healthy meals, and how to stay physically active. SNAP-Ed partners with state and local organizations to meet people where they are. SNAP-Ed initiatives include nutrition education classes, social marketing campaigns, and efforts to improve policies, systems, and the environment of communities (FNS, n.d.-b).

Social cognitive theory (SCT): An extension of social learning theory to include the effects of cognitive processes, such as conceptions, judgment, and motivation, on an individual's behavior and on the environment that influences him or her (American Psychological Association, n.d.).

Social ecological model (SEM): A theory used by the Food and Nutrition Service to evaluate overall state SNAP-Ed programs. The model illustrates how all sectors of society, including individuals and families, communities and organizations; small and

large businesses; and policymakers combine to shape an individual's food and physical activity choices (FNS, 2022).

Systems changes: Systems changes are unwritten, ongoing, organizational decisions or changes that result in new activities reaching large proportions of people the organization serves. Systems changes alter how the organization may adopt a new intervention, reallocate other resources, or in significant ways modify its direction to benefit low-income consumers in qualifying sites and communities. Systems changes may precede or follow a written policy (FNS, 2022).

CHAPTER II

LITERATURE REVIEW

Chapter Overview

This study applied the social ecological model; including the policy, systems, and environmental (PSE) change efforts; and social cognitive theory to evaluate how the delivery method effects changes in healthy eating behaviors, nutrition-related behaviors (food resource management), and physical activity in SNAP-Ed participants after participating in an intervention (FNS, 2022). This chapter provided an overview of these theories' components and how researchers used the theories to promote changes in healthy eating and/or physical activity. The SNAP-Ed evaluation framework was addressed as it is used as a guide for measuring outcomes of SNAP-Ed programming.

This literature review describes the impacts of food insecurity on diet and physical activity among SNAP-Ed participants. Relevant literature recounted the results of SNAP-Ed classes and interventions on changes in food and beverage intake, food resource management (FRM) skills, and the amount of physical activity.

Conceptual Framework

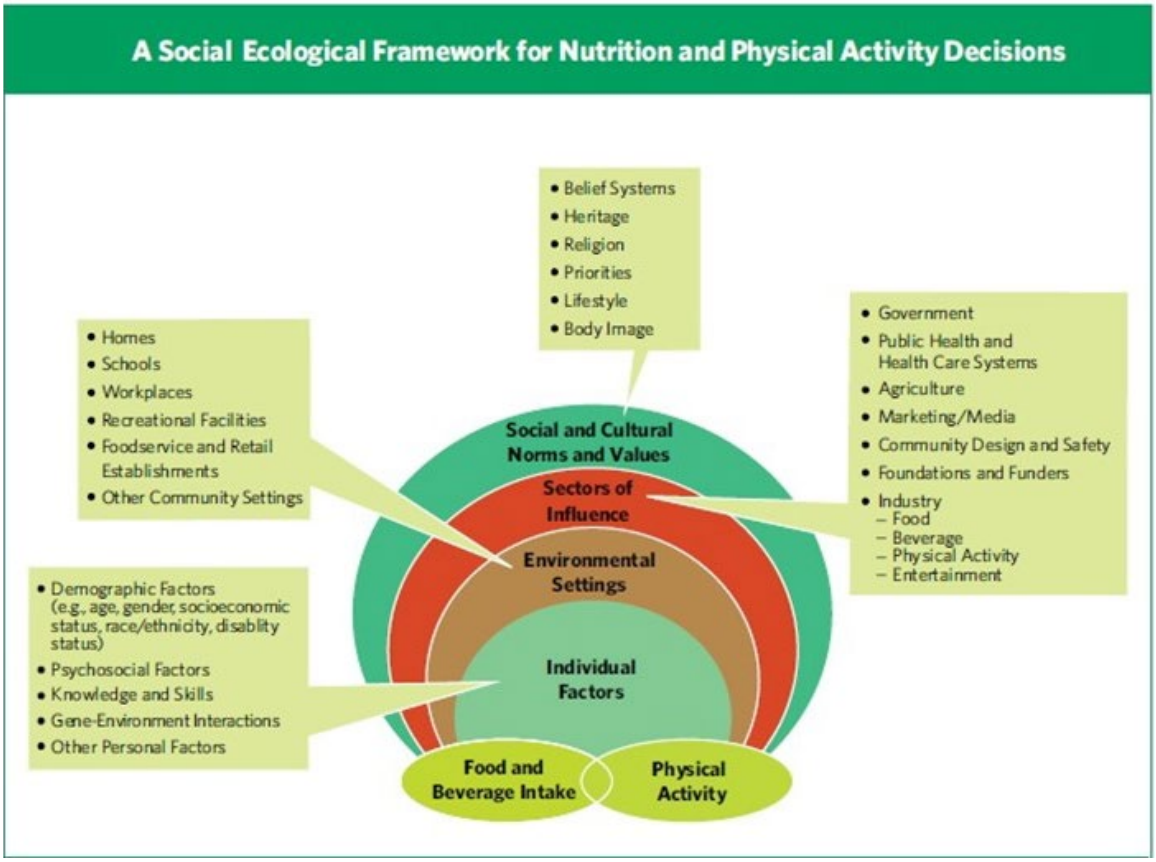
Social Ecological Model

The social ecological model (SEM) was created by Urie Bronfenbrenner in the 1970s to show how different factors influence an individual (Kilanowski, 2017). It was later adopted as a model for health promotion: "social ecological models recognize

individuals as embedded within larger social systems and describe the interactive characteristics of individuals and environments that underlie health outcomes" (Golden & Earp, 2012, p. 364). The USDA FNS uses a modified version of SEM to explain how different areas of society can shape a person's physical activity and food choices (FNS, 2022). Figure 1 shows how SEM is used for food and physical activity decisions and is divided into four different categories: (1) individual factors, (2) environmental settings, (3) sectors of influence, and (4) social and cultural norms and values (Chipman, 2015).

Figure 1

Social Ecological Model for Food and Physical Activity Decisions



Note. Chipman (2015).

Intervention strategies target each of these levels, or sectors of influence on health behavior to create change (Golden & Earp, 2012).

The Social Ecological Model in SNAP-Ed Programming

SNAP-Ed uses comprehensive interventions that address many levels of SEM for nutrition education and obesity prevention services to SNAP-Ed target audiences (FNS, 2022). Three main approaches are recommended to promote health education for SNAP-Ed audiences with SEM: approach one includes individual or group-based direct nutrition education, health promotion, and intervention strategies; approach two uses comprehensive, multi-level interventions at multiple organizational and institutional levels; approach three uses community and public health approaches (FNS, 2022). The FNS requires that states must include one or more approaches along with approach one to reach SNAP-Ed audiences (FNS, 2022). According to DeSalvo (2016), using SEM to implement change at various levels is effective in improving eating and physical activity behaviors.

Individual factors in SEM and How These are Addressed Through Direct Education (Online or Face-to-Face) Curriculum

Evidence-based activities at the individual and interpersonal levels of the SEM are used by SNAP-Ed and are an important approach to nutrition education (FNS, 2022). The direct nutrition and physical activity interventions should include the following components: behaviorally focused strategies; motivators and reinforcements that are personally relevant to the target audience; multiple channels of communication to convey

healthier behaviors; approaches that allow for active personal engagement; and intensity and duration that provide opportunities to reinforce behaviors (FNS, 2022). Examples of these activities include conducting individual or group educational sessions, integrating nutrition education into ongoing physical activity group interventions based on the Department of Health and Human Services Physical Activity Guidelines, implementing classes to build basic skills such as cooking or menu planning and sponsoring communication activities to reinforce education such as interactive websites, social media, visual cues, and reminders like text messages. Utah's SNAP-Ed program, CBH, addresses and evaluates individual level changes including short-term readiness and capacity and medium–term changes over the course of a series of online and in-person classes that teach a nutrition topic, physical activity discussion, and a hands-on cooking demonstration that utilizes a "Create" concept (UNC Center for Health Promotion and Disease Prevention, 2021). Eating Smart Being Active is another evidence-based, healthy eating and active living curriculum used in Colorado that includes physical activity, nutrition, healthy lifestyle choices, food preparation (cooking skill development), food safety, and food resource management on an individual or group level that can be done in-person or at home through the internet (U. S. Department of Agriculture SNAP-Ed Connection, n.d.). A large review was also done that analyzed 26 expanded food and nutrition education programs and four SNAP-Ed programs (both online and in-person settings) for their effectiveness in direct education. The results indicated that most of the studies reported significant improvement in at least one dietary outcome or behavior as well as improvements in overall diet quality (Atoloye et al., 2021).

Social Cognitive Theory

Social cognitive theory (SCT) was developed by Albert Bandura in 1986, which evolved from his social-learning theory (Beauchamp et al., 2019). Bandura expanded on his social-learning theory because he concluded that people were more innovative and could alter the modeled behavior to fit into their own circumstances rather than just imitating what they saw (Bandura, 2005; Conner & Norman, 2005). The American Psychological Association (n.d.) defined SCT as

> …an extension of social-learning theory to include the effects of cognitive processes, such as conceptions, judgment, and motivation, on an individual's behavior and on the environment that influences him or her. (para. 1)

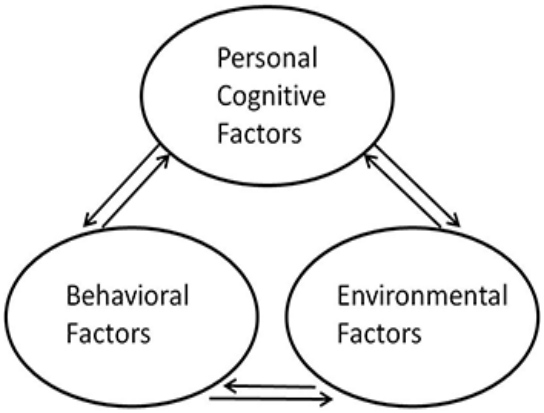
Social cognitive theory includes three main factors that explain and influence human behavior: behavioral, cognitive, and environmental. The interaction of the three factors is referred to as "reciprocal determinism" (LaMorte, 2019). LaMorte described reciprocal determinism as the relationship between a person's personal experiences and knowledge with their environment and behavior and how they interact and influence one another. Figure 2 shows the concept of reciprocal determinism and the influence of the three factors on human behavior in SCT.

Behavioral Factors

Behavioral factors in SCT include practice, skills, and self-efficacy. When making behavioral changes, particularly in health and physical activity, people need the ability to set goals for themselves and the belief that they can accomplish their goals, which can be referred to as a person's self-efficacy, or the "level of a person's confidence in his or her ability to perform a behavior" (LaMorte, 2019, Social Cognitive Theory,

Figure 2

Social Cognitive Theory



Self-Efficacy section). Bandura (2005) believed that people need to feel like they have the power to produce results; otherwise, they will not attempt to make things happen.

Cognitive Factors

Cognitive or "personal" factors play a role in a person's health behaviors. These factors include their knowledge base, expectations, attitudes, and goal setting skills. According to LaMorte (2019), knowledge is based on a person's "behavioral capability" or the person's skills and knowledge on how to perform a behavior. LaMorte explained that people can learn a behavior by observing others who model the behavior. This was called "observational learning." "Outcome expectations" are other cognitive factors based on anticipated consequences of a person's actions mainly determined by prior experiences (Schunk & DiBenedetto, 2020). Other personal factors that play a role in human behavior are goal setting and attitudes. Anderson-Bill et al. (2011) claimed that maintaining behavior change successfully is determined mostly by how well a person can

set goals or monitor and self-regulate changes over time.

Environmental Factors

The last construct of SCT is the idea that people are influenced by their environment. These environmental factors include social influencers, such as people, social norms, or instruction received (Schunk & DiBenedetto, 2020). Schunk and DiBenedetto also explained that observing models of behaviors can increase self-efficacy when the behavior observed is successful. “Reinforcements,” and other environmental responses to a person’s behavior whether positive or negative, could affect the person’s likelihood of continuing a behavior as well (LaMorte, 2019).

Limitations of Social Cognitive Theory

Though a popular choice for use in public health programming and evaluation, SCT has limitations. The theory assumed that behavior would change with the environment, but this might not always be the case (LaMorte, 2019). Also, LaMorte stated that SCT was based on the interplay of the person, behavior, and their environment, but researchers did not know whether one has a bigger influence over another and to what extent. Lastly, SCT focused mostly on the learning process, so the theory ignored biological or physical factors as well as emotions that play into a person’s behaviors despite what experiences a person has had or what their expectations are (LaMorte, 2019).

Social Cognitive Theory's Use in SNAP-Ed Evaluation

Schunk and DiBenedetto (2020) mentioned the wide applicability of SCT in fields such as education, business, and health. According to LaMorte (2019),

> SCT has been widely used in health promotion given the emphasis on the individual and the environment, the latter of which has become a major point of focus in recent years for health promotion activities. (para. 2).

In an evaluation of recent SNAP-Ed studies, Rivera et al. (2019) found that the majority of programs reported using SCT as a basis for their nutrition education programs.

SNAP-Ed programs have used SCT to evaluate programming by measuring how effectively personal, behavioral, and environmental factors are being addressed in classes and interventions to achieve changes in participants' behavior. The program could target knowledge (cognitive factors) to change behavior by giving information as well as demonstrations on how to apply the knowledge successfully, such as in a cooking demonstration or video on reading a nutrition facts label (Neuenschwander et al., 2013). A curriculum in California called Plan, Shop, Save, and Cook, based on SCT, taught adults how to plan meals, read food labels to select healthy foods, compare prices to save money, and implement time saving cooking tips (Kaiser et al., 2015). Based on SCT, Cooking Matters was another curriculum used in 46 states that taught participants cognitive and behavioral skills, such as FRM skills, nutrition knowledge, and food preparation skills (Pooler et al., 2017). Dushuttle et al. (2020) showed that SCT was used as a framework for the 10 Tips for Adults SNAP-Ed direct education intervention in Maine through knowledge of health risks and benefits (cognitive factor) and perceived self-efficacy (behavioral factor). Programs can measure physical activity, which might

require a change in the person's environment to do so (Lee et al., 2019). An intervention on physical activity in Illinois taught working mothers behavior modification strategies based on social cognitive principles (Mailey & McAuley, 2014). The intervention resulted in moderate positive physical activity change in short-term evaluations (Mailey & McAuley, 2014). Communities (environment) can also support healthy behaviors or prevent them. For example, a SNAP-Ed evaluation in Maryland reported lower access to community parks and sports facilities, limited access to fresh foods, and more violence that prevented safe engagement in outdoor physical activity for individuals with low income (Zemeir et al., 2018). Similarly, in Utah, an evaluation was done on CBH's curriculum based on SCT that taught a series of between four and eight classes for SNAP-eligible individuals. The classes taught FRM skills as well as nutrition and physical activity-related skills. There was a positive correlation between the number of CBH classes attended and the ability to stretch food dollars, create meals at home, and generate new ideas for physical activity (Savoie-Roskos et al., 2018).

Policies, Systems, and Environmental Change (PSE) Interventions

Nutrition education in Utah has moved from only focusing on direct education to creating comprehensive nutrition-related behavior changes in an individual to involving multiple sectors of influence such as interpersonal associations, the workplace, communities, policies, and environmental conditions (Savoie-Roskos et al., 2018). This approach, known as PSE interventions, was spurred by the Healthy, Hunger-Free Kids Act of 2010 and the CDC because they wanted to broaden their approach in health

promotion strategies (Savoie-Roskos et al., 2018). An increasing number of nutrition education programs, including SNAP-Ed, have adopted PSE approaches in addition to their interventions. The Dietary Guidelines for Americans "recognize that everyone has a role in helping support healthy eating patterns in multiple settings nationwide, from home to school to work to communities in which people live, learn, work, shop, and play (FNS, 2022, p. 17). CBH utilizes PSE interventions in its comprehensive programming and has been seeing a positive impact in its participants' healthy eating and physical activity behavior (Coombs & LeBlanc, 2020). CBH works to improve healthy food access through changes made to PSEs throughout the state. Priority settings for PSE during 2020 included food pantries and schools (Mountain Plains Region and Southwest Region SNAP-Ed, 2020). As a result of PSEs in Utah, SNAP-Ed partnering agencies adopted 3 policy, 40 system, and 46 environmental supports that helped SNAP-eligible participants make healthy dietary choices (Mountain Plains Region and Southwest Region SNAP-Ed, 2020). These public health approaches are community-focused, population-based interventions that integrate education, marketing/promotion, and PSE interventions and are "aimed at preventing disease or condition or limiting death and disability from a disease or condition" (FNS, 2022, p. 17). Public health approaches can reach large numbers of Americans with low income by focusing activities on settings with large proportions of SNAP-Ed audiences and can have a meaningful impact when using evidence-based interventions that are based on formative research and are more effective together for improving health and preventing obesity than when using only one strategy (FNS, 2022). New PSE interventions used within the SNAP-Ed population should be

evaluated rigorously before it is considered a research-based intervention (FNS, 2022).

Create Better Health's Comprehensive Programming Map

Create Better Health Utah uses a comprehensive approach suggested by the guidance from USDA FNS to promote healthy eating behaviors and physical activity changes within the SEM to individuals with low income (Utah State University Extension Create Better Health, 2021). CBH provides five main program areas: direct education youth; direct education adults; policy, systems, and environment; indirect education (including social media) and social marketing (Utah State University Extension Create Better Health, 2021). This comprehensive approach is illustrated in Figure 3. Through this approach, CBH can influence and support behavior changes in a variety of ways that help make the healthy choice the easy choice (Utah State University Extension Create Better Health, 2021). Multiple approaches include: (1) individual, group, and family nutrition education and physical activity promotion in addition to related interventions; (2) comprehensive, multilevel interventions in environmental settings; and (3) community and public health approaches that reach a large segment of the population (Utah State University Extension Create Better Health, 2021).

SNAP-Ed Evaluation Framework

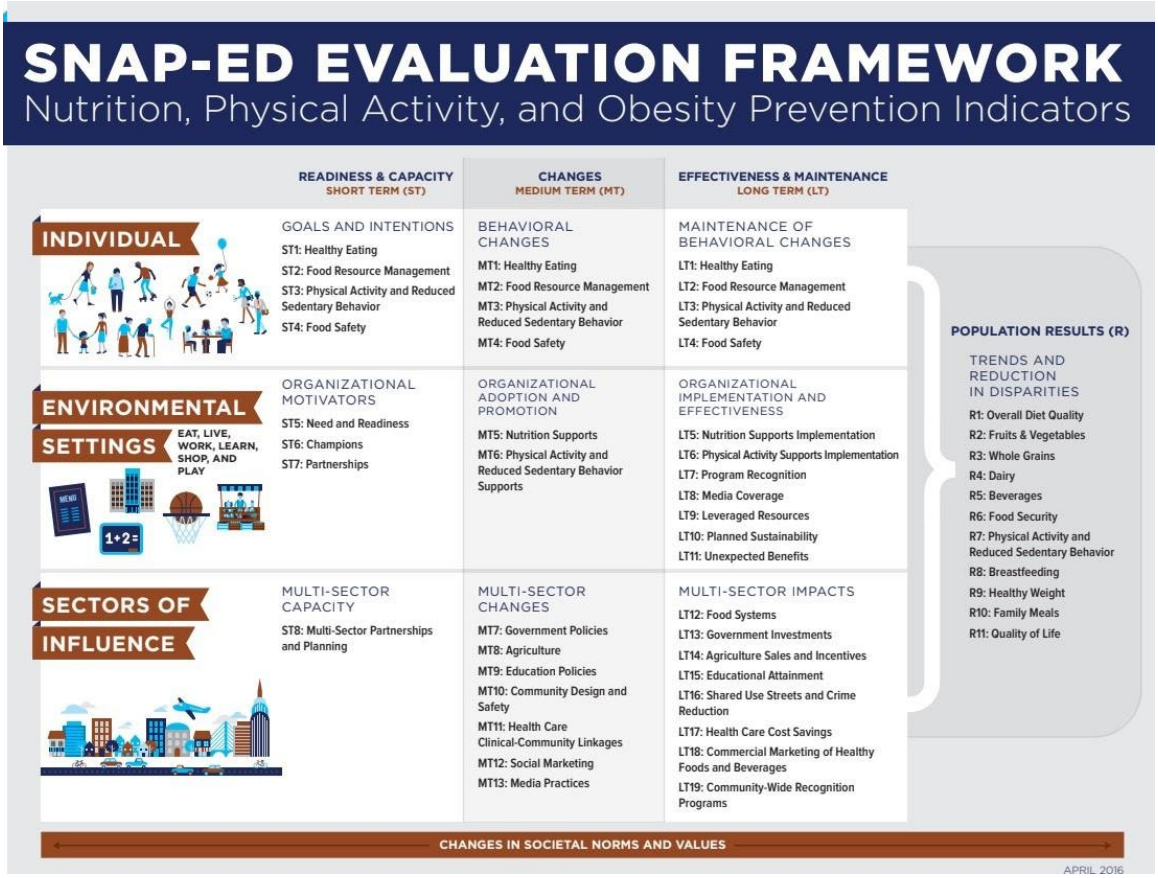
The USDA FNS released the SNAP-Ed Evaluation Framework: Nutrition, Physical Activity, and Obesity Prevention Indicators at a national level in 2016, as shown in Figure 4 (FNS, 2022). The framework includes 51 evaluation indicators that align with SNAP-Ed guiding principles that give support on how to document nutrition and physical

Figure 3

Create Better Health Utah Comprehensive Programming Map

Figure 4

SNAP-Ed Evaluation Framework



activity behavior changes within the program (FNS, 2022). The evaluation includes four groups taken from the SEM: individual, environmental, sectors of influence, and social and cultural norms and values (FNS, 2022). Each setting is given three categories for level of change: short-term (readiness and capacity), medium-term (changes), and long-term (effectiveness and maintenance; FNS, 2022). The SNAP-Ed Evaluation Framework may be used as a guide for measuring outcomes across different settings and maximize program effectiveness (Naja-Riese et al., 2019). The framework utilizes SEM within its

four levels and creates a comprehensive approach to measure and track changes for PSE work as well (Naja-Riese et al., 2019). The short-term indicators that are used for evaluation of goals and intentions in this research study are as follows: ST1-healthy eating, ST2-food resource management, ST3-physical activity and reduced sedentary behavior, and ST4-food safety. Under behavioral changes (medium-term indicators), this research study measures MT1-healthy eating, MT2-food resource management, MT3-physical activity and reduced sedentary behavior, and MT4-food safety.

Relevant Literature

Need for SNAP-Ed Nutrition Education for Individuals with Low Income

There is a scientific connection between the foods and beverages that people consume and their health (U.S. Department of Agriculture & U.S. Department of Health and Human Services, 2020). Following a healthy dietary pattern throughout their lifespan can help people maintain good health and reduce the risk of chronic disease (U.S. Department of Agriculture & U.S. Department of Health and Human Services, 2020). Low income is associated with low diet quality and a higher prevalence of chronic disease (Naja-Riese et al., 2019). Because of the higher risk for chronic disease in populations with low income, SNAP-Ed addresses ways to eliminate diet- and physical activity- related health disparities to individuals with low income using evidence-based interventions (Naja-Riese et al., 2019).

The Goal of SNAP-Ed

The goal of SNAP-Ed is "to improve the likelihood that persons eligible for SNAP will make healthy food choices within a limited budget and choose physically active lifestyles consistent with the current Dietary Guidelines for Americans and the USDA food guidance" (FNS, 2022, p. 5). SNAP-Ed implements strategies or interventions to help the SNAP-Ed's target audience establish healthy eating habits and a physically active lifestyle (FNS, 2022). According to the Supplemental Nutrition Assistance Program's Nutrition Education and Obesity Prevention Grant Program (2016), six guiding principles are encouraged as the basis for SNAP-Ed activities. The first guiding principle is that SNAP-Ed is intended to serve SNAP-eligible participants or other individuals who qualify for federal assistance programs or those who reside in communities with a significant population with low income; the second guiding principle is that the nutrition education services provided by SNAP-Ed must include a combination of educational approaches (the SEM approach). The third guiding principle lets the states determine specific target audiences through a needs assessment that would best be served by SNAP-Ed; the fourth guiding principle is that programs must use evidence-based, behaviorally focused interventions. The fifth guiding principle in SNAP-Ed is that the collaboration of a variety of stakeholders through multiple sources should be used to maximize the benefits of health promotion and obesity prevention strategies. Finally, the sixth guiding principle is that specific roles and responsibilities should be given to local, state, regional, and national agencies to enhance the SNAP-Ed program.

Nutrition Education

MyPlate and The Dietary Guidelines for Americans (DGAs) are the foundation of nutrition education and obesity prevention programs under FNS such as SNAP-Ed (FNS, 2022). The DGAs include four main "make every bite count" guidelines: (1) following a healthy dietary pattern at every life stage; (2) customizing and enjoying nutrient dense food and beverage choices to reflect personal preferences, cultural traditions, and budgetary considerations; (3) focusing on meeting food group needs with nutrient-dense foods and beverages, and staying within calorie limits; and (4) limiting foods and beverages higher in added sugars, saturated fat, and sodium, as well as limiting alcoholic beverages (U.S. Department of Agriculture & U.S. Department of Health and Human Services, 2020). According to the Centers for Disease Control and Prevention (CDC, 2022), sugar-sweetened beverages or sugary drinks are leading sources of added sugars in the American diet and intake is higher among adult males, young adults, non-Hispanic Black or Mexican American adults, or adults with low incomes. The CBH curriculum is based on the 2020-2025 DGAs and its goal is to "improve nutrition and physical activity-related knowledge, skills, and self-efficacy to help SNAP-eligible individuals lead an active and healthy life on limited resources" (Savoie-Roskos et al., 2018, p. 116). CBH also includes lessons on MyPlate in its curriculum to promote healthy eating. CBH lessons refer to Start Simple With MyPlate, which helps consumers eat healthy by providing tips and recipe ideas from the five MyPlate food groups: fruits, vegetables, grains, protein foods, and dairy (FNS, 2022). MyPlate messages state that half of the food on your plate should be fruits and veggies, focusing on whole fruits and varying your

veggies; the other half of your plate should include grains and a variety of protein foods with half of the grains being 100% whole grain; also, fat-free or low-fat dairy milk or yogurt should be included in a balanced diet (U.S. Department of Agriculture, n.d.)

Physical Activity

SNAP-Ed follows resources such as the Physical Activity Guidelines in addressing weight management and obesity prevention (FNS, 2022). The U.S. Department of Health and Human Services created science-based information and guidance on the amounts and types of physical activity to go along with the DGAs. The current recommendation for physical activity for adults (18 years and older) to receive the maximum health benefits is to get at least 150 to 300 minutes of moderate-intensity aerobic activity and at least two days per week of muscle-strengthening activities (Office of Disease Prevention and Health Promotion, 2021). The CBH curriculum includes lessons that give an overview of the HHS Physical Activity Guidelines (Coombs & Neid-Avila, 2020).

Food Resource Management

SNAP-Ed implementing agencies teach FRM skills to help them make healthy food choices on a limited budget (Adedokun et al., 2021). FRM skills include meal planning, shopping with grocery lists, cooking at home, thrifty shopping, and awareness of supermarket persuasion techniques (Adedokun et al., 2021). These skills are vital for individuals with low income, especially those receiving SNAP benefits (Adedokun et al., 2018). FRM skills such as meal planning, shopping tips to save money, and cooking at

home to stretch food dollars are emphasized in CBH's curriculum (Coombs & Neid-Avila, 2020).

Impacts of Food Insecurity on Diet and Physical Activity in SNAP-Ed Participants

Food insecurity is an environmental factor affecting about 90 million Americans with incomes below 185% of the federal poverty level, including about 40 million of those people being SNAP-eligible (Naja-Riese et al., 2021). According to Niles et al. (2021), studies have indicated that SNAP-eligible participants are at higher risk for food insecurity and the levels have risen during the pandemic, particularly for Black, Indigenous, and People of Color. Gundersen and Ziliak (2018) showed that food insecurity is associated with decreased nutrient intakes and other poor health outcomes. A goal of SNAP-Ed is to improve food security among its participants. It uses a combination of educational strategies accompanied by environmental supports delivered by SNAP-Ed programs across the United States to "assist low-resource individuals to make healthy choices on a limited budget in accordance with the Dietary Guidelines for Americans and to provide the skills and knowledge that end the cycle of food insecurity" (Rivera et al., 2018, p. 958).

Studies are currently exploring the connection of nutrition education interventions through SNAP-Ed and their impact on diet-related behaviors and food insecurity (Rivera et al., 2019). A study in Indiana from 2012-2016 was conducted to explore whether environmental factors (i.e., county-level characteristics and availability of nutrition and lifestyle-related resources) were associated with improvement in household food security

after a direct SNAP-Ed intervention (Rivera et al., 2018). Food security score at the household level was measured using the 18-item U.S. Household Food Security Survey Module with a 12-month reference period, from 328 eligible (adult) participants of which about half were in a control group. The intervention consisted of the first four lessons of the Indiana adult SNAP-Ed direct education curriculum, including: teaching concepts of how to use USDA MyPlate guidelines to design a nutrient-dense and balanced meal; how to use food labels to choose healthy foods; and the health benefits of breakfast, whole grains, fiber, fruits, and vegetables. All lessons delivered content on how to make healthy choices on a limited budget. Results from the study indicate that direct SNAP-Ed improves food security across a variety of environments, including rural counties with fewer of the supporting nutrition-related resources as compared with more affluent urban counties (Rivera et al., 2018).

Research has shown the connection between FRM knowledge and improvement in food security and diet quality among the SNAP-Ed population. Rivera et al. (2018) reported that

> Food availability, access and relative cost of food were associated with diet quality...participants' knowledge of community resources in combination with FRM skills were significantly protective against food insecurity. (p. 958)

Adedokun et al. (2021) indicated there is an assumption that by teaching FRM skills (shopping with grocery lists and other skills to stretch the food dollar) through SNAP-Ed programs, participants' diet quality will improve because participants would shift money they would usually spend on nutrient-poor foods to more nutritious options. Adedokun et al. wished to explore the association between FRM skills and diet quality, so they

conducted a study in Kentucky using data from the Healthy Choices for Every Body adult SNAP-Ed nutrition education curriculum. Healthy Choices for Every Body participants were taught a series of 10 units of which three units focused on FRM, three focused on diet quality, and one focused on food safety. The results showed a significantly direct positive effect (0.90) of FRM skills on diet quality on the intervention group (Adedokun et al., 2021). Savoie-Roskos et al. (2019) reports that after taking CBH in-person courses, there was a significant positive correlation between the number of classes attended and the ability to create meals at home (p = .045) as well as stretching food dollars (p = .40), which improves food security.

Nutrition Changes in SNAP-Ed Participants

The current literature shows nutrition education programs impact the dietary choices of SNAP-Ed participants. A study in California wanted to examine the level of reach of SNAP-Ed intervention and dietary changes in programs for mothers with low income across California. SNAP-Ed intervention reach represented the number of SNAP-Ed recipients divided by the SNAP-Ed eligible population per census tract. The study showed that for mothers from a high SNAP-Ed intervention reach, consumption of fruits and vegetables was higher, intake of high-fat foods was lower, and the participants drank less sugar-sweetened beverages (Molitor et al., 2016). However, intake did not differ for mothers with moderate to no/low intervention reach (Molitor et al., 2016). Similarly, Wyoming's Cent$ible Nutrition Program adult graduates maintained many positive food and nutrition-related behaviors one to four years following their participation in the program, and they performed these behaviors more often than they did before they started

the program (Wardlaw & Baker, 2012). The most reported nutrition behaviors in the qualitative survey were increasing consumption of fruits and vegetables and selecting and cooking food lower in fat, sugar, and salt (Wardlaw & Baker, 2012). However, Wardlaw and Baker show the study indicated that the behaviors often were not maintained over the long-term assessments. In Utah's SNAP-Ed program, trained CBH educators teach classes on a nutrition topic and physical activity lessons as well as give hands-on cooking demonstrations from a "create" concept (U. S. Department of Agriculture SNAP-Ed Connection, n.d.). These classes have shown that after at least 6 months of participating in a CBH series of 4-8 classes, 47% of the participants reported eating more vegetables and 53% ate more fruit after the series (Coombs & LeBlanc, 2020).

Food Resource Management Changes in SNAP-Ed Participants

Research shows the benefits of teaching FRM skills to SNAP-Ed participants, and there are a growing number of studies done in the literature to evaluate whether programs improve FRM skills. For example, a program for SNAP-Ed participants and other individuals with low income, called Cooking Matters for Adults, was implemented across 46 different states (Pooler et al., 2017). Six of them (CA, CO, ME, MA, MI, and OR) participated in a study to find out if the intervention would increase FRM skills (Pooler et al., 2017). The participants in the study were asked FRM skills such as whether they planned meals ahead of time, if they used a grocery list when they go shopping, if they compared prices, if they bought things on sale, if they checked their pantries/refrigerators to see if they have what they need before shopping, if they made low-cost meals, did they

make their money last all month, did they choose the best-priced form of fruits and vegetables, and did they buy healthy foods for their family on a budget. The results showed that participants' FRM skills increased 3 to 6 months post intervention (Pooler et al., 2017). Similarly in Utah, Utah's Create Better Health, provides a curriculum that addresses food insecurity by teaching FRM skills across the state (Savoie Roskos et al., 2019). The CBH program teaches a "create" concept, which shows participants how to use foods they have on hand to create recipes that encourage them to eat healthy on a limited availability of foods, with low-cost adaptable recipes, and kitchen appliances. Evaluation of the study showed improvement in FRM skills, such as creating meals at home and stretching food dollars after attending the classes (Savoie Roskos et al., 2019).

A SNAP-Ed program in California called Plan, Shop, Save, and Cook taught these FRM skills: how to plan meals, read nutrition facts labels to select healthy foods, compare prices to save money, and implement time-saving cooking tips (Kaiser et al., 2015). The results showed improvement in FRM with the greatest percentage of participants using the nutrition facts label post intervention. More than a third reported a reduction in the frequency of running out of food before the end of the month ($p < .001$). Greater use of FRM skills in relation to reduction of running out of food before the end of the month in SNAP participants than non-SNAP participants ($p = .001$; Kaiser et al., 2015). Finally, a SNAP-Ed program in Kentucky called Healthy Choices for Every Body taught FRM skills in its curriculum such as knowledge and skills to plan nutritious meals successfully, money saving strategies for planning and purchasing nutritious and appealing meals on a limited budget, as well as reading the Nutrition Facts Label

(Adoduken et al., 2018). Adoduken et al. showed significantly higher improvements in FRM skills for the intervention group (p <.001) with a 0.08 effect size.

Physical Activity Changes

There are studies in the literature that show the impacts of SNAP-Ed interventions on physical activity. A SNAP-Ed program in Minnesota called Simply Good Cooking taught cooking skills as well as gave suggestions for incorporating healthy eating and physical activity into family life (May et al., 2014). Results showed that participants significantly increased physical activity behaviors, such as being physically active for at least 30 minutes per day (p < .001), t = -3.695 (May et al., 2014). Similar results were found in a SNAP-Ed program called Food Talk: Better U in Georgia that included physical activity lessons in its curriculum (Lee et al., 2019). The percent of participants met the guidelines for the medium-term behavior change indicators (Lee et al., 2019). The medium-term behavior change indicators are taken from the SNAP-Ed evaluation framework and include increases in duration, intensity, and frequency of exercise, physical activity, or leisure sport appropriate for the population of interest, as well as decreases in time spent in sedentary behavior (computers, desk sitting, television watching) during the period assessed. The indicators also include increases in health-related physical fitness levels (aerobic or cardio fitness, muscular strength, muscular endurance, and flexibility).

Chapter Summary

Social cognitive theory and the social ecological model are both used as

framework for SNAP-Ed programming to explain changes in healthy eating and physical activity behaviors as well as food resource management skills. Policy, Systems, and Environmental changes along with SNAP-Ed Evaluative Framework work together to achieve “large-scale, sustainable results" within SNAP-Ed interventions (Naja-Riese et al., 2019, p. 970).

Individuals with low income are more susceptible to food insecurity, which puts them at an increased risk of chronic disease and poor dietary intake (Rivera et al., 2019). SNAP-Ed programs work under the USDA FNS to alleviate food insecurity as well as provide nutrition education to the SNAP-eligible population (Utah State University Extension Create Better Health, 2021). Nutrition education, physical activity, and food resource management all play a role in the quality of life and food security for individuals (FNS, 2022). SNAP-Ed programs have been evolving over the years to better meet the needs of individuals with low income to improve food security and health outcomes, and literature shows that programs, such as Utah’s SNAP-Ed program, are making a positive impact on nutrition and physical activity behaviors of their participants (Coombs & LeBlanc, 2020).

Many factors influence dietary and physical activity behavior change in SNAP-Ed participants including but not limited to food insecurity, demographics, delivery format, and content. Of the studies included in this literature review, most of the SNAP-Ed intervention groups saw significant positive changes in dietary, FRM, and/or physical activity (Adoduken et al., 2018; May et al., 2014; Pooler et al., 2017). Utah’s CBH program showed similar improvements in participants’ nutrition, physical activity, and

FRM behaviors after taking the in-person nutrition education classes (Coombs & LeBlanc, 2020; Savoie-Roskos et al., 2019).. Some studies showed that web-based programming is effective in changing healthy eating and physical activity. All these factors should be considered when implementing SNAP-Ed programming.

CHAPTER III

PROCEDURES

The purpose of this study was to compare the effects of delivery method on the nutrition, FRM, and physical activity behavior of participants enrolled in either CBH's in-person or online courses. The research objectives that guided the study were as follows.

1. Compare the effects of delivery method on respondents' FRM skills.
2. Compare the effects of delivery method on respondents' nutrition habits.
3. Compare the effects of delivery method on respondents' physical activity.

The hypothesis tested was that participants taught in the CBH online course would demonstrate similar improvement in nutrition, FRM, and physical activity as the participants taught in the in-person courses.

Setting

Create Better Health In-Person Course

Ambassadors or facilitators from each county are given basic nutrition education, National Nutrition Certification Program (NNCP) training, program evaluation training as well as Collaborative Institutional Training Initiative (CITI) training before teaching the in-person course. CITI training is a research, ethics and compliance training for persons who interact with or use identifiable data when working with human subjects. Both courses use the same teaching materials to limit the variability of what is taught. The in-person CBH course includes eight 30- to 60-minute lessons based on the USDA's

nutrition and physical activity recommendations. The lessons generally focus on a nutrition topic and a recipe demonstration and sample. The curriculum includes an introduction to MyPlate, Dietary Guidelines for Americans (DGAs) as well as FRM skills such as meal planning, grocery shopping, and tips for stretching the food dollar. Skills like goal setting, food safety, and healthy eating patterns are also included in the curriculum. The lessons encourage a healthier lifestyle by teaching about the nutrition facts label, fruits, vegetables, proteins, food safety, grains, dairy, and ways to be physically fit.

Create Better Health Online Course

CBH set up the online course to match the format of its in-person courses but delivered through a series of eight self-paced online lesson modules based on the USDA's nutrition and physical activity recommendations, DGAs and MyPlate. The online course covers the same topics as the in-person course but has a pre-recorded video in each module. Physical activity tips are presented in short YouTube videos. Cooking demonstrations are posted through videos in each module that teach a Create recipe. Prompts for goal setting and real-life application are included in each lesson. Participants have up to 90 days to complete the course.

Research Design

This study used preexisting data that CBH collected from pre-survey and post-survey evaluations of the online course and the in-person course. The in-person survey responses were collected from 2020 to 2022, and survey responses for the online course

were collected from 2021 to 2022. Thus, the research design of this study was informed by the selection of variables available in the dataset, which is contrary to primary research where the research objective informs the data. Using preexisting data has its advantages as CBH has an extensive amount of good quality data available that would benefit from further analysis.

Selection of Participants

The participants for the online and in-person CBH courses were recruited through social media (Facebook, Instagram, other social media platforms), community flyers, and advertisements. The Utah Department of Workforce Services offers a pool of SNAP-eligible and an intergenerational poverty list of approximately 60,000 persons that are contacted about SNAP-Ed programming. Most counties, such as Salt Lake County and Grand County, were unable to hold face-to-face instruction due to Covid-19 restrictions. The participants are male or female of varying race and ethnic backgrounds. CBH uses an eligibility screener to identify participants prior to participating in the online or in-person courses, but no one is turned away who wants to attend the in-person courses. An eligibility screener (Appendix A) was given prior to the online course to determine if participants were at least 18 years old and were participating in federal assistance such as SNAP, WIC, TANF, free or reduced school meal program, Medicaid, or SSI. The sample of participants was nonrandom, and they could choose to participate in the online course after meeting the eligibility requirements. The total number of participants was 46 online participants statewide and 92 participants for the in-person courses statewide.

Instrumentation

Create Better Health employees and professionals developed the pre-survey and post-survey for the in-person and online courses. Data from the in-person pre-survey (Appendix B) and post-survey (Appendix C) and the online pre-survey (Appendix D) and post-survey (Appendix E) were analyzed to answer this study's research objective. The first section of the pre-surveys asked about the participants' demographics, specifically age, gender, ethnicity, and race; food security; and how many months someone in their household has received any benefits from a food assistance program in the past 12 months.

Several Likert-scale items and multiple-choice questions measure healthy behaviors. The Likert-scale has three statements related to food resource management, one statement about using the USDA food safety procedure, one statement about using nutrition facts labels to make food choices, and one statement about using a variety of foods based on MyPlate recommendations in their food selection. These statements are measured on a 5-point scale that ranges from "never" to "always". In a multiple-choice question, participants indicate their daily fruit intake, ranging from "I rarely eat fruit" to "4 or more times a day." Participants answer a question about their daily vegetable consumption, ranging from "I rarely eat vegetables" to "4 or more times a day.. Participants indicate how often they drank regular soda (not diet), fruit punch, fruit drinks, sweet tea, or sports drinks, with answers ranging from "never" to "4 or more times a day." Physical activity is measured with one multiple-choice question that asks how many days the participant engaged in exercise for at least 30 minutes per day in the

past week, with answer choices ranging from 0 to 7 days.

Validity

A team of staff and faculty with expertise in nutrition education and evaluation have established the face validity and content validity of the evaluation instruments against the CBH curriculum (Savoie-Roskos et al., 2018). Additionally, the CBH curriculum and evaluation instruments are published in the National Collaborative on Childhood Obesity Research's (NCCOR) SNAP-Ed Toolkit and have been adopted by other state SNAP-Ed programs. The NCCOR "has worked closely with USDA to rapidly develop, refine, and update the SNAP-Ed Toolkit-a portfolio of existing, evidence-based, and actionable tools consistent with the context and policies of SNAP and incorporating evidence-based obesity strategies" (NCCOR, 2016, para. 1).

Pilot Testing

A pilot test for the in-person course was conducted in 2016. The pilot test for the online course occurred from November 2020 to February 2021. Participants in the pilot test of the online course were given a $25 Amazon gift card, funded through an Extension mini grant, if 80% of the questions were completed for the pre-survey and post-survey. Jewkes (2019-2021) reported that out of 112 participants enrolled in the online course's pilot test, 48 participants completed the entire course. Most of the 48 respondents were female (n = 41, 85%), 6 respondents did not respond (13%), and 1 respondent was male (2%). The ages of the respondents were the following: 18-34 years (n = 19, 40%), 35-59

years (*n* = 23, 48%), and 12% did not respond (*n* = 6). For ethnicity, 39 respondents identified as Non-Hispanic/Non-Latino (81%), 7 did not respond (15%), and 2 (4%) identified as Hispanic/Latino. Last, most of the respondents were white (*n = 39*, 81%), while 8 did not respond to the race question (17%) and 1 reported being Asian (2%). All 48 respondents reported they strongly agreed that the nutrition information was presented in a way that was easy to understand, that the physical activity information was presented in a way that was easy to use, and that the recipe demonstrations (videos) were presented in a way that was easy to understand. Of the 48 respondents, 84% found that the activities in each lesson helped them understand the information better, 93% thought that the amount of information shared in each lesson was just right, 100% thought the length of each lesson was just right, and 96% of respondents thought the entire course was just right. Seventy-five percent of the respondents downloaded some handouts, and out of those who downloaded them, 84% used those handouts at home. After taking the course, 74% of respondents prepared a recipe at home. Furthermore, 34% of the respondents were extremely likely to return to the course for information, 27% were very likely, and 30% were somewhat likely to return for information. After finishing the course, 45% of the respondents reported being extremely likely to recommend the course to a friend or family member, 25% were very likely, and 22% were somewhat likely to recommend the course (Jewkes, 2019-2021).

Based on the results of the pilot test, administrators made few changes to CBH's online SNAP-Ed nutrition education program. Most of the curriculum is the same except for a few interactive activities. The instrumentation also remained the same.

Data Collection

Utah State University's Institutional Review Board approved the use of the preexisting data for this study. This section describes how CBH collected the pre and post-survey data. The pre and post online surveys were administered via Qualtrics immediately before the course and immediately after completion of the course. A pre-survey (filled out on paper) for the in-person course was given at the first lesson of the course by a CBH ambassador at varying locations, and the paper post-survey was given at the last lesson of the course. Graduation gifts for completing the online and in-person course were a lunch box and graduation certificate.

Data Analysis

The data in this study was analyzed using IBM® SPSS Statistics version 28. Respondents were described in the results section by reporting percentages and frequencies for their gender, age, ethnicity, race, food insecurity, and acceptance of benefits from federal food assistance program, as separated by delivery method.

The Mann-Whitney U test is the nonparametric alternative to an independent *t* test, which helps to compare two independent conditions. The Mann-Whitney U test was chosen to answer objectives one, two, and three because it is used to compare differences between two independent groups when the dependent variable is either ordinal or continuous but not normally distributed (Fields, 2018). Mann-Whitney U tests showed no statistically significant differences between the in-person and online respondents' pre-survey scores, so the post-survey scores were used as the dependent variables to compare

differences between delivery method. Visual inspection of the population pyramids indicated whether the distributions of scores for the online course and in-person course have a similar shape and can use medians for comparison. When distributions of the scores were not similar, the mean ranks of each distribution of post-survey scores were used to interpret the results.

For objective one, Mann-Whitney U tests were used to compare the differences between delivery method (online or in-person) and the post-survey scores for FRM skills measured on a Likert-scale: (a) stretching of food dollars so there is food to last the entire month, (b) choosing a variety of foods based on MyPlate recommendations, (c) using the nutrition facts label to make food choices, (d) shopping with a grocery list, and (e) following USDA food safety recommendation. For objective two, Mann-Whitney U tests were run to compare the differences between delivery method and the post-survey scores for dietary behaviors: (a) how many times per day respondents ate fruit, (b) ate vegetables, and (c) drank regular soda, fruit punch, fruit drinks, sweet tea, or sports drinks. For objective three, a Mann-Whitney U test compared the differences between delivery method (online or in-person) and the post-survey score for physical activity.

An a priori significance level of .05 was used to interpret statistical significance of the data because this study compared two independent groups with no control (Fields, 2018). For statistically significant results, Pearson's correlation coefficient r was analyzed to calculate the effect size and standardize the measure of the size of effect that was observed. An *r* value of .10 represents a small effect. An *r* value of .30 represents a medium effect. Finally, an *r* value of .50 represents a large effect (Fields, 2018).

Chapter Summary

This study used preexisting data that the CBH collected from pre-survey and post-survey evaluations of the online course and the in-person course. Adults were screened for eligibility prior to participating in the online and in-person CBH courses. The research objective guiding this study compare the effects of the delivery method (in-person versus online course) on respondents' nutrition, FRM, and physical activity changes. The data was analyzed using IBM® SPSS Statistics to understand the relationships between delivery methods and changes in nutrition, physical activity, and FRM.

CHAPTER IV

RESULTS

The purpose of this study was to compare the food resource management, nutrition, and physical activity behavior in adult participants of CBH's in-person and online courses. This study used Bandura's social cognitive theory, the USDA FNS's social ecological model, and policy, systems, and environmental change efforts to explain and evaluate results of diet-related behavior change.

Response Rate

The total number of combined respondents that completed the survey in both the online and in-person courses was 138. Forty-six respondents completed the pre-survey and post-survey for the online course, while 92 respondents reported pre-survey and post-survey for the in-person course.

Demographics

Demographics of respondents are presented in Table 1. They include gender, age, ethnicity, and race. Respondents were required to reside in Utah and be at least 18 years old. Respondents were pre-screened to see if they received any benefits from a federal assistance program (SNAP-eligible) before taking the online and in-person courses. Out of 46 respondents from the online course, most were female (n = 44, 95.7%). Of the 92 in-person respondents the majority were also female (n = 64, 69.6%). Age was reported in two categories: 18-59 years old and 60 years and older. All respondents in the online

course were between the ages of 18-59 years old (n = 46, 100%). The in-person course reported that most respondents were between the ages of 18-59 (n = 78, 87.6%).

Table 1

Demographic Characteristics of Participants Who Completed the Online or In-person CBH Course (n = 138)

	Online		In-person	
Characteristic	*n*	%	*n*	%
Gender				
Male	2	4.3	28	30.4
Female	44	95.7	64	69.6
Age				
18-59	46	100.0	78	87.6
60 +	0	0.0	11	12.4
Ethnicity				
Hispanic	2	4.4	34	39.1
Non-Hispanic	43	95.6	53	60.9
Race				
American/Indian	0	0.0	5	6.3
Asian	1	2.3	0	0.0
Black/African American	1	2.3	0	0.0
Native Hawaiian or Other Pacific Islander	0	0.0	1	1.3
White	42	95.5	74	92.5

Food Security

Respondents answered how often in the past 12 months they were worried or stressed about having enough money to buy nutritious meals, as reported in Table 2. The online course respondents reported being worried or stressed some months or every month about having enough money to buy nutritious meals in the past 12 months (n = 25, 54.3%). Similarly, the in-person course respondents' highest frequency was never being

worried or stressed about having enough money to buy nutritious meals in the past 12 months (n = 33, 44.6%).

Table 2

How Frequently Respondents Worried or Stressed About Having Enough Money to Buy Nutritious Meals in the Past 12 Months

	Online		In-person	
Frequency	*n*	%	*n*	%
Never	21	45.7	33	44.6
Some months	18	39.1	31	41.9
All months	7	15.2	10	13.5

Table 3 reports how many months in the past 12 months someone in the respondents' household received benefits from a federal food assistance program (SNAP, WIC, free and reduced lunch program, or any other federal food assistance program). For the online course, most respondents reported some months or all months receiving assistance (n = 23, 50.0%). Most of the in-person respondents reported that they never received benefits from a federal food assistance program (n = 46, 63.0%).

Table 3

Frequency of Respondents' Households Receiving Benefits from Federal Food Assistance Program

	Online		In-person	
Frequency	*n*	%	*n*	%
Never	23	50.0	46	63.0
Some months	11	23.9	17	23.3
All months	12	26.1	10	13.7

Objective One: Compare the Effects of Delivery Method on Respondents' Food Resource Management Skills

The dependent variables were the post-survey scores measuring six food resource management (FRM) skills on a Likert scale ranging 1 (*never*) to 5 (*always*). The FRM skills were the following: (1) I stretch my food dollars so there is food to last the entire month, (2) I choose a variety of foods based on MyPlate recommendations, (3) I use the nutrition facts label to make food choices, (4) I shop with a grocery list, (5) I follow USDA food safety recommendations, and (6) I adjust meals to use foods I already have at home. The independent variable was delivery method, which consists of two categorical, independent groups (online course or in-person course). Six Mann-Whitney U tests were used to determine any differences between delivery method (online or in-person) and FRM skills.

A Mann-Whitney U test was run to determine if there were differences in the post-survey score for stretching food dollars between the online course and the in-person course respondents. Distributions of the scores were similar, as assessed by visual inspection of the population pyramid. Median post-survey scores for online course respondents *(Mdn* = 4.00) and in-person course respondents (*Mdn* = 4.00) were not statistically significantly different, $U\ (N_{\text{in-person course}} = 87,\ N_{\text{online course}} = 46) = 1{,}680.50$, $z = -1.60$, $p = .110$.

Using a Mann-Whitney U test, the post-survey scores for choosing foods based on MyPlate were statistically significantly higher for online course respondents (mean rank = 79.01) than for in-person course respondents (mean rank = 61.48), $U\ (N_{\text{in-person course}} =$

88, $N_{\text{online course}}$ = 46) = 1,494.50, z = -2.65, p = .008, r = -0.23. Visual inspection of the population pyramid showed that distributions of the scores for choosing foods based on MyPlate were not similar for the online course respondents and in-person course respondents.

A Mann-Whitney U test was run to determine if there were differences between online course respondents and in-person course respondents in the post test score for using the nutrition facts label to make food choices. Distributions of the scores were not similar, as assessed by visual inspection of the population pyramid. Post test scores were statistically significantly higher for online course respondents (mean rank = 78.52) than for in-person course respondents (mean rank = 59.22), *U ($N_{\text{in-person course}}$ = 85, $N_{\text{online course}}$ = 46)* = 1,379.00, z = -2.88, p = .004, r = -0.25.

A Mann-Whitney U test was run to determine if there were differences in the post-survey score for shopping with a grocery list between online course respondents and in-person course respondents. Distributions of the two groups were similar, as assessed by visual inspection of the population pyramid. Median post-survey scores for online course respondents (*Mdn* = 5.00) were statistically significantly higher than for in-person course respondents (*Mdn* = 4.00), *U ($N_{\text{in-person course}}$ = 88, $N_{\text{online course}}$ = 46)* = 1,176.00, z = -4.26, $p < .001$, r = -0.37.

A Mann-Whitney U test was run to determine if there were differences in the post-survey score for following USDA food safety recommendations between online course respondents and in-person course respondents. Distributions of the post-survey score were similar, as assessed by visual inspection of the population pyramid. Median

post-survey scores for online course respondents (*Mdn* = 5.00) were statistically significantly higher than for in-person course respondents (*Mdn* = 4.00), $U\ (N_{\text{in-person course}} = 87, N_{\text{online course}} = 46) = 1{,}023.50$, $z = -4.85$, $p < .001$, $r = -0.42$.

A Mann-Whitney U test was run to determine if there were differences in the post-survey score for adjusting meals to use foods already at home between online course and in-person course respondents. Distributions of scores were similar, as assessed by visual inspection of the population pyramid. Median post-survey scores for online course respondents (*Mdn* = 4.00) and in-person course respondents *(Mdn* = 4.00) were not statistically significantly different, $U\ (N_{\text{in-person course}} = 86, N_{\text{online course}} = 46) = 1{,}866.50$, $z = -0.57$, $p = .566$.

Objective Two: Compare the Effects of Delivery Method on Respondents' Nutrition Habits

The dependent variables were the post-survey scores measuring three nutrition-related questions. Two nutrition-related items were reported on a Likert scale ranging from 1 (*I rarely eat fruit*) to 6 (*4 or more times a day*). Those nutrition-related questions were the following: (1) How many times a day do you eat fruit? and (2) How many times a day do you eat vegetables?. The question "How often do you drink regular soda (not diet), fruit punch, fruit drinks, sweet tea or sports drinks?" was measured on a different Likert scale ranging from 1 (*never*) to 7 (*4 or more times a day*). The one independent variable was delivery method, consisting of two categorical, independent groups (online course or in-person course). Mann-Whitney U tests were used to determine any

differences between delivery method (online or in-person) and nutrition habits.

A Mann-Whitney U test was run to determine if there were differences in the post-survey score for how many times a day fruit was eaten between online course and in-person course respondents. Distributions of the scores for how often fruit was eaten daily were similar, as assessed by visual inspection of the population pyramid. How often fruit was eaten every day for the online course respondents (*Mdn* = 4.00) and the in-person respondents (*Mdn* = 3.00) were not statistically significantly different, $U\ (N_{\text{in-person course}} = 87, N_{\text{online course}} = 45) = 1{,}694.00$, $z = -1.32$, $p = .187$.

A Mann-Whitney U test was run to determine if there were differences in the post-survey score for how many times vegetables were eaten daily between online course and in-person course respondents. Distributions of the scores for how many times vegetables were eaten daily were similar, as assessed by visual inspection of the population pyramid. The number of times vegetables were eaten daily for the online course respondents (*Mdn* = 4.00) and in-person course respondents (*Mdn* = 4.00) did not differ significantly, $U\ (N_{\text{in-person course}} = 88, N_{\text{online course}} = 46) = 1{,}896.50$, $z = -6.24$, $p = .533$.

A Mann-Whitney U test was run to determine if there were differences between online course and in-person course respondents in the post-survey score for how often respondents drank regular soda, fruit punch, fruit drinks, sweet tea, or sports drinks. Distributions of the scores were similar, as assessed by visual inspection of the population pyramid. Median post-survey scores for online course respondents (*Mdn* = 1.00) were statistically significantly lower than for in-person course respondents (*Mdn* =

2.00), $U\ (N_{\text{in-person course}} = 89,\ N_{\text{online course}} = 46) = 2{,}872.50$, $z = 4.07$, $p < .001$, $r = 0.35$.

Objective Three: Compare the Effects of Delivery Method on Respondents' Physical Activity

The dependent variable was the post test score for the question "In the past week, how many days did you exercise for at least 30 minutes?". Physical activity was measured on a continuous scale ranging from 0 to 7 days. The one independent variable was delivery method, consisting of two categorical, independent groups (online course or in-person course). Distributions of the scores for how often respondents exercised at least 30 minutes in a week were similar, as assessed by visual inspection of the population pyramid. Using a Mann-Whitney U test, the median post-survey physical activity scores for in-person course respondents ($Mdn = 3.00$) and online course respondents ($Mdn = 3.00$) did not differ significantly, $U\ (N_{\text{in-person course}} = 89,\ N_{\text{online course}} = 46) = 2255.00$, $z = 0.98$, $p = .329$.

Chapter Summary

Percentages were reported for the demographics and food security of online and in-person course respondents. Most of the respondents for both the online and in-person course were females. The majority of the respondents identified as White and non-Hispanic for both the online and in-person courses. All the online respondents were between the ages of 18-59. Most of the respondents in the in-person course were between 18-59 years old. The highest frequency of respondents reported never being worried or

stressed about having enough money to buy nutritious meals in the past 12 months, but the second highest response (and close percentage) was being worried some months for both the online and in-person courses. Most of the respondents in both the online and in-person course had never received benefits from a Federal Food Assistance Program.

Mann-Whitney U tests were run to compare the effect of the delivery method on the respondents' FRM, nutrition, and physical activity. Then, Pearson's r was calculated to report the effect size from the *z* score of the Mann Whitney U-tests that were statistically significant. Of the six FRM skills, four were statistically significantly different for online course respondents compared to in-person course respondents: choosing foods based on MyPlate, using the nutrition facts label to make food choices, shopping with a grocery list, and following USDA food safety recommendations. There was a small effect size for choosing foods based on MyPlate and using the nutrition facts label to make food choices. Shopping with a grocery list showed a medium effect size and following USDA food safety recommendations showed a medium effect size as well. There were no statistically significant differences between the online and in-person courses for eating fruits and vegetables. The median post-survey scores for consuming sweet drinks were statistically significantly lower for the online course respondents. No statistically significant difference was found for how often the online course and in-person course respondents exercised at least 30 minutes a week.

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

The conceptual framework for this study was the USDA NFS's adapted social ecological model, Bandura's social cognitive theory, and policies, systems, and environmental (PSE) change interventions. The framework explains how behavior change is influenced by a person's environment such as cultural norms, the workplace, government, community settings, media, lifestyle, belief systems, schools, homes, and many other factors, and implementing or promoting change at these various levels can be effective in improving eating and physical activity behaviors (DeSalvo, 2016; FNS, 2022; Golden & Earp, 2012). Technology has created new opportunities and avenues for nutrition education to address the factors that play into nutrition and physical activity behavior change (David, 2017; Loehmer et al., 2018; Neuenschwander et al., 2013). This chapter discussed conclusions for CBH's online and in-person adult CBH courses, its implications, limitations, recommendations for future research, and recommendations for practice.

Objective One: Compare the Effects of the Delivery Method on Respondents' Food Resource Management Skills

Six Mann-Whitney U tests were run to determine whether post-survey scores for food resource management (FRM) skills differed between the online and in-person CBH courses. The hypothesis was that participants taught in the CBH online course would demonstrate similar improvement as the participants taught in the in-person classes. For

the FRM skills, four of the six scores were statistically significantly higher for online course respondents. These included choosing foods based on MyPlate, using the nutrition facts label to make food choices, shopping with a grocery list, and following USDA food safety recommendations. The null hypothesis was rejected for these four FRM skills reported. The median post-survey scores or mean ranks of the Mann-Whitney U tests for these four FRM skills revealed that the online course respondents more frequently did these tasks than the in-person respondents after taking the CBH course. These conclusions are similar to previous research by Lohse et al. (2015), which found that web-based interventions are effective for improving FRM skills. The null hypothesis was retained for the FRM skills of stretching food dollars and adjusting meals to use foods already at home. These findings indicated that the online course respondents and in-person course respondents had no differences in their median post-survey scores.

Objective Two: Compare the Effects of Delivery Method on Respondents' Nutrition Habits

Mann-Whitney U tests were run to determine whether there were differences in the post-survey scores for nutrition behaviors between the online and in-person CBH courses. The questions asked about daily fruit and vegetable intake as well as how many times participants drank soda or other sweetened drinks during the week. The hypothesis was that participants taught in the CBH online course would demonstrate similar improvement as the participants taught in the in-person classes. The null hypothesis was retained that there were no differences in their median post-survey scores between the

online and in-person course respondents for the number of times a day they ate fruit and vegetables. Similar studies show a similar or greater improvement for fruit and vegetable intake when comparing web-based interventions to traditional in-person courses for people with low income (Bensley et al., 2011; Loehmer et al., 2018; Neuenschwander et al., 2013).

The null hypothesis was rejected for how often respondents drank soda, fruit punch, fruit drinks, sweet tea, or sports drinks because the Mann-Whitney U test showed a lower median post-survey score for online course respondents than in-person course respondents. Therefore, it is interpreted that the online course respondents drank less regular soda, fruit punch, fruit drinks, sweet tea, or sports drinks than the in-person course respondents. A SNAP-Ed in-person intervention in California showed that participants drank less sugar-sweetened beverages post intervention (Moliter et al., 2016). These programs integrate SCT and SEM by targeting cognitive and individual factors to promote behavior change (Neuenschwander et al. 2013).

Environmental factors such as cultural norms influence behavior (Schunk & DiBenedetto, 2020). The Pew Research Center (2022) shows that 55% of Utah's adults belong to The Church of Jesus Christ of Latter-day Saints. Utah's culture promotes a heavy consumption of sweetened beverages due to the popularity of soda and sweet shops that have become rampant in the last decade. In the *New York Times*, Petersen (2021) said

> …a significant portion of the region's population belongs to the Church of Jesus Christ of Latter-day Saints, and the church's prohibition on tea and coffee has spurred a niche beverage market that has intensified in the last decade, hitting a fever pitch during the pandemic. (para. 3)

The Dietary Guidelines for Americans recognizes that a person's environment plays a role in supporting healthy eating behaviors (FNS, 2022). PSE efforts play an important role in improving health and preventing obesity by integrating nutrition education interventions through multiple approaches including individual and group interventions, environmental settings, and community and public health approaches (Utah State University Extension Create Better Health, 2021).

Objective Three: Compare the Effects of Delivery Method on Respondents' Physical Activity

A Mann-Whitney U test was run to determine if a difference in post-survey scores for physical activity existed between online and in-person CBH courses. The null hypothesis for physical activity was retained because there was no difference between the online and in-person median post-survey scores. Both the online and in-person courses showed a median of 3 days, indicating 3 days of exercise for 30 minutes per day, which equals 90 minutes of exercise per week. The CBH curriculum includes lessons that give an overview of the HHS Physical Activity Guides for adults (Coombs & Neid-Avila, 2020). The current recommendation is at least 150 to 300 minutes of moderate-intensity aerobic activity per week (Office of Disease Prevention and Health Promotion, 2021). Create Better Health uses a comprehensive approach suggested by guidance from the USDA FNS to promote physical activity changes within the SEM to individuals with low income (Utah State University Extension Create Better Health, 2021). The CBH online course offers many physical activity tips and interactive videos and other resources

throughout the course to help make the healthy choice the easy choice (Utah State University Extension Create Better Health, 2021). The in-person CBH course also targets SEM and SCT by offering physical activity information and encouraging goal setting. Goal setting is an important behavioral and cognitive factor in SCT for improving a person's self-efficacy to create behavior change (LaMorte, 2019). Other studies showed that physical activity results were similar after online and in-person interventions with person of low-income (Bensley et al., 2011; Loehmer et al., 2018; Neuenschwander et al., 2013).

Limitations

Create Better Health's pre-survey and post-surveys have seven items measured on a Likert-type scale. The internal consistency reliability of Likert-type scales is essential to calculate and report for surveys measuring behavior change. The analysis of the data then must use these summated scales or subscales and not individual items (Gliem & Gliem, 2003). If individual items are reported, the reliability of the items is at best probably low and at worst unknown. Cronbach's alpha does not provide reliability estimates for single items, so the pre-survey and post-survey lack reliability (Gliem & Gliem, 2003).

Findings from this research study should not be generalized to any other SNAP population outside of the sample because the study was limited to Create Better Health's adult participants enrolled in either the in-person or online courses. Also, the participants elected to participate in the CBH courses and were not randomly assigned to treatment groups. Therefore, random assignment to control for extraneous factors was not used.

Several participants did not complete the necessary pre-survey and post-survey. I omitted those cases with the missing data for each dependent variable and analyzed the remaining data.

Complications due to Covid-19 in 2021-2022 might have prevented SNAP participants from signing up for the online CBH course due to factors such as awareness, limited time, and resources. Covid-19 limited the ability to provide in-person courses in some counties from 2020-2022 as well. The in-person data taken was from preexisting in-person classes given from 2020-2022. There was a much smaller sample size for the online course than the in-person course. The nonparametric Mann Whitney U test is not as powerful as parametric tests because of the nonsimilar sample sizes between the online and in-person courses (Sullivan & Artino, 2013).

Recommendations for Research

Factors out of the researchers' control created unequal sample sizes for the online course respondents and in-person course respondents. The online course had about half of the sample size as the in-person courses. Small and unequal sample sizes affect the statistical power and increase the likelihood of Type II errors (rejecting a false null hypothesis). Therefore, future research should be conducted with similar sample sizes for the in-person course and online course to measure the effect of delivery method on FRM skills, nutrition habits, and physical activity.

The pre-survey and post-survey for the online course and in-person course could add questions about marital status and the number of children as well as more specific

age ranges to further understand the characteristics of the participants in the online and in-person courses (Champagne, 2014). Future research could compare the differences in delivery method by demographic characteristics of the CBH course participants. Continued assessments by professionals will be necessary to evaluate the effectiveness of the program for each target population.

Qualitative research could learn more about delivery method preference and perceived barriers to participation in one delivery method versus the other. Exploring and understanding barriers to participating could give CBH more insight into what delivery method would be most effective for specific audiences within the target populations.

The median post-survey scores were 3.00 for the number of days the online and in-person respondents exercised at least 30 minutes per day. To better understand why the study's respondents did not exercise more frequently, future research could examine barriers to exercising. This additional information would address a research gap because previous research shows individuals with low income may experience factors that limit their ability to utilize safe environments and other resources for exercise (Zemeir et al., 2018).

This study focuses on direct education alone. The CBH direct education approach mainly addresses individual factors in its programming such as demographics, knowledge, and skills. This study could not consider all the factors in the social ecological model that influence an individual's nutrition and physical activity decisions. Nutrition and physical activity behaviors are complex and can be influenced by a variety of factors as mentioned in the social ecological model and social cognitive theory

(Golden & Earp, 2012; LaMorte, 2019; FNS, 2022). Future research could examine the other factors and levels of influence that play into CBH's direct education.

This study was limited to the short- or medium-term changes that are evaluated in the SNAP-Ed evaluation framework. Additional data analysis could compare the effects of the delivery method for CBH's in-person and online courses for longer-term effectiveness and maintenance. Create Better Health administers a post term evaluation six months to a year after the intervention; this data could be studied to report on longer-term behavior change.

Recommendations for Practice

Extension professionals can use the information from the study to continue to implement web-based direct nutrition education interventions for SNAP-eligible individuals such as CBH. Create Better Health should market to minority groups that would benefit from the online program in Utah, such as intergenerational poverty families, Latinos, American Indians, seniors, and people with developmental disabilities. Studies show that online interventions can be just as impactful as the in-person interventions and may be more convenient for persons with low income. More elderly people as well as those who identified as Hispanics attended CBH's in-person courses. This finding relates to Loehmer et al.'s (2018) study, which suggested that minorities and elderly people seem to prefer interpersonal contact versus using technology. Offering both in-person and online delivery methods might be the best strategy to reach populations that are less interested or affluent with technology.

Social ecological model and social cognitive theory support interventions that promote self-efficacy when making healthy behavior changes, and these changes are more likely to happen by observing others who model the behavior (LaMorte, 2019). Future in-person courses could emphasize the importance of limiting sugary drinks in the diet.

Create Better Health's online course implements many aspects of SEM and SCT to promote eating and physical activity changes. Videos provide food demonstrations that help respondents develop greater self-efficacy, which is an important component in SEM and SCT. Goal setting is also part of the behavior change models, and CBH's online course allows the participant to set goals at the end of each module. The tips for physical activity through media such as YouTube videos focus on behaviorally focused strategies, which are another component of SEM. Create Better Health's in-person course also give recipe demonstrations that allow for personal engagement, a component of SEM. The lessons in both the online and in-person courses provide nutrition knowledge and FRM skills that target individual and personal factors for nutrition and physical activity behavior change from SEM and SCT. CBH and other Extension professionals can expound on these components throughout the online and in-person courses by using other technologies to reinforce behavior change, such as reminders through texts and social media.

Policy, systems, and environment strategies should continue to be implemented because they support SEM and SCT in addressing factors that promote nutrition and physical activity decisions as well as increase FRM skills. Reaching adults through their

local supermarkets, recreational facilities, workplaces, community centers, churches, and homes as well as other settings and sectors of influence will be important in improving eating and physical activity behaviors. This may require increased marketing efforts to convey healthy behaviors. Direct and indirect education efforts to promote FRM skills will continue to be important in improving food security and diet quality.

While society recognizes the need for improving health, Extension professionals and other health professionals have the challenge of influencing current cultural attitudes and beliefs about eating behaviors, particularly drinking sweetened drinks such as sodas, which has become a fast-growing industry in Utah. These cultural norms could create barriers for Utahns when making nutrition decisions. The CBH direct education curriculum includes information about the effects of sugary drinks in the diet. Social media and other indirect education sources could be used to educate audiences about the negative effects of drinking sodas and other sweetened beverages.

Utah offers a variety of outdoor recreational and physical activities. Educating CBH's target populations about these opportunities and avenues, particularly activities that cost little to nothing, and providing incentives for physical activity are ways to promote health. The FNS suggests motivators and reinforcements that are personally relevant to the target audience (FNS, 2022). Partnering with local organizations, finding vendors that would give discounts to local recreational programs, or creating events that offer free physical activities that cater to the interests of the target population could be an incentive for change. The CBH courses could add information about local recreational programs or incentives for physical activity in the area.

Chapter Summary

This chapter discussed the conclusions, limitations, and recommendations for practice and research based on the results of the study. The online and in-person CBH courses showed similar results in fruit and vegetable intake as well as physical activity after the courses, but the online course had statistically significantly lower post-survey scores for consuming soda and sweet drinks. Similar studies on interventions for populations with low income showed similar improvements between online and in-person instruction for nutrition habits and physical activity. The FRM skills such as choosing foods based on MyPlate, using the nutrition facts label to make food choices, shopping with a grocery list, and following USDA food safety recommendations were not similar for the online and in-person courses. Other studies showed similar improvement for most of the FRM skills in web-based and online courses through other interventions for persons with low income. Extension professionals and other nutrition education interventions, particularly Utah's CBH, can use this information to continue offering online courses as they show positive results in nutrition habits, FRM skills, and physical activity. The online CBH course can be tailored to meet the needs of CBH's target populations to improve healthy eating and physical activity behaviors among Utah's SNAP-eligible population. Further research should be conducted to understand how in-person courses are being taught and ways to improve the FRM scores as well as emphasizing instruction to decrease soda and sweetened drinks consumption. Direct, indirect education, and PSE efforts being made through CBH support SEM and SCT nutrition behavior change. It is recommended that CBH continues efforts to utilize

technology and web-based nutrition education as it has been shown to be as effective or more effective as current in-person instruction. This study took place during a pandemic, which might have skewed some of the results of the study. Little research has been done to compare web-based nutrition education to traditional in-person instruction for nutrition education interventions (Bensley et al., 2011; Neuenschwander et al., 2013). With the rise of internet and technology use among individuals with low income, more programs recognize the benefits of web-based nutrition education (Stotz et al., 2017). It is recommended that additional studies compare online and in-person direct education courses.

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APPENDICES

Appendix A

Online Eligibility Screener

Start of Block: Default Question Block

Thank you for your interest in the Create Better Health Online Course. Please answer the questions below to determine if you are eligible to participate in this free course. You must be 18 years of age or older and live in Utah to participate.

Are you 18 years of age or older?
- o Yes
- o No

Skip To: If Are you 18 years of age or older? = N

Do you currently participate in the following federal assistance programs? (Select all that apply)
- ☐ Supplemental Nutrition Assistance Program (SNAP-formerly known as food stamps)
- ☐ WIC
- ☐ Temporary Assistance for Needy Families (TANF)
- ☐ Free or reduced school meal program
- ☐ Medicaid
- ☐ Supplemental Security Income (SSI)
- ☐ I do not participate in any of these programs.

Display This Question:
If Do you currently participate in the following federal assistance programs? (Select all that apply) = I do not participate in any of these programs.

Please select your zip code. If your zip code is not listed, please select "Other" and enter your zip code.
- o 84024
- o 84034
- o 84080
- o 84083
- o 84085
- o 84112
- o 84520
- o 84531
- o 84534
- o 84536
- o 84540
- o 84606
- o 84623
- o 84627
- o 84630
- o 84719
- o 84745
- o 84753
- o 84766

- 84773
- 84784
- Other, please specify _____

Skip To: If Please select your zip code. If your zip code is not listed, please select "Other" and enter your... = Other, please specify

Display This Question:
If Do you currently participate in the following federal assistance programs? (Select all that apply) != I do not participate in any of these programs.
Or Please select your zip code. If your zip code is not listed, please select "Other" and enter your... != Other, please specify
Or Or Please select your zip code. If your zip code is not listed, please select "Other" and enter your... Other, please specify Is Not Empty

You are eligible to take our Create Better Health Online Course! Please click this link to enroll in the course. **Please copy this link before you hit the blue arrow below to submit your responses.**

https://extension.learn.usu.edu/browse/food-sense/courses/create-better-health

Display This Question:
If Are you 18 years of age or older? = No
Or Please select your zip code. If your zip code is not listed, please select "Other" and enter your... = Other, please specify
Or Or Please select your zip code. If your zip code is not listed, please select "Other" and enter your... Other, please specify Is Not Empty

You are currently not eligible to participate in the Create Better Health (SNAP-Ed) Online Course. Please visit our Create Better Health blog for free nutrition tips, physical activity ideas, and delicious recipes at createbetterhealth.org Thank you!

End of Block: Default Question Block

Appendix B

In-Person Pre-Survey

Create Better Health **Pre-Survey**

Distributed in the FIRST class of a series. Can also be distributed during the 2nd class for new participants.

CREATE BETTER HEALTH PRE SURVEY

Use in the first class of a series

CREATE BETTER HEALTH SNAP-ED

First letter of first name: _____ **First letter of last name:** _____

Birth Month: _____ **Birth Day:** _____

For example, if you were born on May 1st you would write: Birth Month: 05 Birth Day: 01

Gender
- O Male
- O Female

Age
- O 18-59 years
- O 60+ years

Ethnicity
- O Hispanic
- O Non-Hispanic

Race (select all that apply)
- O American Indian/Alaskan Native
- O Asian
- O Black/African American
- O Native Hawaiian or Other Pacific Islander
- O White

How often in the past 12 months would you say you were worried or stressed about having enough money to buy nutritious meals?

O All months O Some months O Never

In the past 12 months, how many months did anyone in your household receive benefits from a federal food assistance program? *(SNAP, WIC, free and reduced lunch program, or any other federal food assistance program)*

O All months O Some months O Never

How many Create Better Health classes have you already attended this year? *(including this one)*

O 1 O 2 O 3 O 4 O 5 O 6 O 7 O 8 or more

How did you hear about the Create Better Health Program?

O Social media O Friends or family O Community organization O School

O Flyers or poster O Other, please explain: _____

1. Prior to taking Create Better Health (SNAP-Ed) classes	Never	Seldom	Sometimes	Usually	Always
I stretch my food dollars so there is food to last the entire month.	O	O	O	O	O
I choose a variety of foods based on MyPlate recommendations.	O	O	O	O	O
I use the nutrition facts label to make food choices.	O	O	O	O	O
I shop with a grocery list.	O	O	O	O	O
I follow USDA food safety recommendations.	O	O	O	O	O
I adjust meals to use foods I already have at home.	O	O	O	O	O

2. How many times a day do you eat fruit?
(Include fresh, frozen, dried and canned fruit. Do not include juice.)

O I rarely eat fruit O Less than 1 time a day (couple times a week) O 1 time a day
O 2 times a day O 3 times a day O 4 or more times a day

3. How many times a day do you eat vegetables?
(Include fresh, frozen and canned vegetables. Do not count french fries, potato chips or rice.)

O I rarely eat vegetables O Less than 1 time a day (couple times a week) O 1 time a day
O 2 times a day O 3 times a day O 4 or more times a day

4. How often do you drink regular soda *(not diet)*, **fruit punch, fruit drinks, sweet tea or sports drinks?**

O Never O 1-3 times a week O 4-6 times a week O 1 time a day
O 2 times a day O 3 times a day O 4 or more times a day

5. In the past week, how many days did you exercise for at least 30 minutes?

O 0 O 1 O 2 O 3 O 4 O 5 O 6 O 7

6. What do think will make it difficult for you to follow MyPlate recommendations for nutrition and physical activity? Select all that apply.

- O It is hard to find all food groups from MyPlate
- O It is hard to find places to exercise
- O Convenience and marketing of less healthy food options
- O Difficulty knowing what food to choose when shopping
- O Other, please describe _____
- O It will not be difficult to follow MyPlate recommendations

Are you willing to take a follow-up survey in 6 months to be entered in a drawing for a $250 prize?

O Yes O No

Are you willing to take a follow-up survey in 1 year to be entered in a drawing for a $250 prize?

O Yes O No

Are you interested in receiving our free Create Better Health Utah Newsletter?

O Yes O No

If you answered yes to any of the above questions, please clearly write your email address.

Email: _____

For Office Use Only:

Ambassador Name: _____ **Lesson:** _____

Location: _____

EXTENSION
UtahStateUniversity.

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Appendix C

In-Person Post-Survey

Distributed during last class in a series

CREATE BETTER HEALTH POST SURVEY

Use in the last class of a series

CREATE BETTER HEALTH SNAP-ED

First letter of first name: _____ **First letter of last name:** _____

Birth Month: _____ **Birth Day:** _____

For example, if you were born on May 1st you would write: Birth Month: 05 Birth Day: 01

Gender	**Age**	**Ethnicity**
O Male	O 18-59 years	O Hispanic
O Female	O 60+ years	O Non-Hispanic

Race (select all that apply)

O American Indian/Alaskan Native
O Asian
O Black/African American
O Native Hawaiian or Other Pacific Islander
O White

How often in the past 12 months would you say you were worried or stressed about having enough money to buy nutritious meals?

O All months O Some months O Never

In the past 12 months, how many months did anyone in your household receive benefits from a federal food assistance program? *(SNAP, WIC, free and reduced lunch program, or any other federal food assistance program)*

O All months O Some months O Never

How many Create Better Health classes have you already attended this year? *(including this one)*

O 1 O 2 O 3 O 4 O 5 O 6 O 7 O 8 or more

How did you hear about the Create Better Health Program?

O Social media O Friends or family O Community organization O School
O Flyers or poster O Other, please explain: _____

1. After taking Create Better Health (SNAP-Ed) classes	Never	Seldom	Sometimes	Usually	Always
I stretch my food dollars so there is food to last the entire month.	O	O	O	O	O
I choose a variety of foods based on MyPlate recommendations.	O	O	O	O	O
I use the nutrition facts label to make food choices.	O	O	O	O	O
I shop with a grocery list.	O	O	O	O	O
I follow USDA food safety recommendations.	O	O	O	O	O
I adjust meals to use foods I already have at home.	O	O	O	O	O

2. How many times a day do you eat fruit?
(Include fresh, frozen, dried and canned fruit. Do not include juice.)

O I rarely eat fruit O Less than 1 time a day (couple times a week) O 1 time a day
O 2 times a day O 3 times a day O 4 or more times a day

3. How many times a day do you eat vegetables?
(Include fresh, frozen and canned vegetables. Do not count french fries, potato chips or rice.)

O I rarely eat vegetables O Less than 1 time a day (couple times a week) O 1 time a day
O 2 times a day O 3 times a day O 4 or more times a day

4. How often do you drink regular soda *(not diet),* **fruit punch, fruit drinks, sweet tea or sports drinks?**

O Never O 1-3 times a week O 4-6 times a week O 1 time a day
O 2 times a day O 3 times a day O 4 or more times a day

5. In the past week, how many days did you exercise for at least 30 minutes?

O 0 O 1 O 2 O 3 O 4 O 5 O 6 O 7

6. What made it difficult for you to follow MyPlate recommendations for nutrition and physical activity that you learned about in this series? Select all that apply.

- O It is hard to find all food groups from MyPlate
- O It is hard to find safe places to exercise
- O Convenience and marketing of less healthy food options
- O Difficulty knowing what food to choose when shopping
- O Other, please describe _____
- O It was not be difficult to follow MyPlate recommendations

How would you rate the content of this class?

O Poor O Fair O Good O Very Good O Exceptional

How would you rate the instructor of this class?

O Poor O Fair O Good O Very Good O Exceptional

Are you willing to take a follow-up survey in 6 months to be entered in a drawing for a $250 prize?

O Yes O No

Are you willing to take a follow-up survey in 1 year to be entered in a drawing for a $250 prize?

O Yes O No

Are you interested in receiving our free Create Better Health Utah Newsletter?

O Yes O No

If you answered yes to any of the above questions, please clearly write your email address.

Email: _____

For Office Use Only:

Ambassador Name: _____ **Lesson:** _____

Location: _____

EXTENSION
UtahStateUniversity.

This material was funded by USDA's Supplemental Nutrition Assistance Program — SNAP. This institution is an equal opportunity provider. Utah State University is an affirmative action/equal opportunity institution and is committed to a learning and working environment free from discrimination, including harassment. For USU's non-discrimination notice, see equity.usu.edu/non-discrimination.

Appendix D

Online Pre-Survey

Start of Block: Default Question Block

Before you start the Create Better Health Online Course, please take a few minutes to tell us a little bit about yourself and your current food and activity behaviors. We will ask you the same questions after you complete the 8 lessons in the course to see if our course is having a positive impact on our participants. Please answer all questions honestly. There are no right answers! Your answers will help us know what parts of our course are working well and what needs improvement. Thank you for your time!

*Please note that the pilot study for this project is over and we are no longer distributing gift cards for course completion.

Please type your first letter of your first name, first letter of your last name, birth month and day. For example if your name is John Smith and your birthday is May, 17th, you would type JS517.

_____

Which county do you live in?

- Beaver
- Box Elder
- Cache
- Carbon
- Daggett
- Davis
- Duchesne
- Emery
- Garfield
- Grand
- Iron
- Juab
- Kane
- Millard
- Morgan
- Piute
- Rich
- Salt Lake
- San Juan
- Sanpete
- Sevier
- Summit
- Tooele
- Uintah
- Utah
- Wasatch

- Washington
- Wayne
- Weber

Gender
- Male
- Female
- Prefer not to respond

Age
- 18-34 years old
- 35-59 years old
- 60 years old or older
- Prefer not to respond

Ethnicity
- Hispanic
- Non-Hispanic
- Prefer not to respond

Race (select all that apply)
- American Indian/Alaskan Native
- Asian
- Black/African American
- Native Hawaiian or Other Pacific Islander
- White
- Prefer not to respond

How often in the past 12 months would you say you were worried or stressed about having enough money to buy nutritious meals?
- All months
- Some months
- Never

In the past 12 months, how many months did anyone in your household receive benefits from a federal food assistance program? (SNAP, WIC, free and reduced school lunch program, or any other federal food assistance program)
- All months
- Some months
- Never

Have you ever attended a Create Better Health (SNAP-Ed) (formerly known as Food $ense) in-person class?
- Yes
- No
- Unsure

Display This Question:
If Have you ever attended a Create Better Health (SNAP-Ed) (formerly known as Food $ense) in-person... = Yes

If yes, how many Create Better Health (SNAP-Ed) in-person classes have you attended?
- o 1
- o 2
- o 3
- o 4
- o 5
- o 6
- o 7
- o 8 or more

How did you hear about the Create Better Health Online Program?
- o Social media
- o Friends or family
- o Community organization
- o School
- o Flyers or posters
- o Other, please specify _____

Prior to taking the Create Better Health Online course...

	Never	Seldom	Sometimes	Usually	Always
I stretch my food dollars so there is food to last the entire month.					
I choose a variety of foods based on MyPlate recommendations.					
I use the nutrition facts label to make food choices.					
I shop with a grocery list.					
I follow USDA food safety recommendations.					
I adjust meals to use foods I already have at home.					

How many times a day do you eat fruit? (Include fresh, frozen, dried, and canned fruit. Do NOT include juice)
- o I rarely eat fruit
- o Less than 1 time a day (couple times a week)
- o 1 time a day
- o 2 times a day
- o 3 times a day
- o 4 or more times a day

How many times a day do you eat vegetables? (Include fresh, frozen, and canned vegetables. Do NOT count French fries, potato chips, or rice)

- I rarely eat vegetables
- Less than 1 time a day (couple times a week)
- 1 time a day
- 2 times a day
- 3 times a day
- 4 or more times a day

How often do you drink regular soda (not diet), fruit punch, fruit drinks, sweet tea, or sports drinks?

- Never
- 1-3 times a week
- 4-6 times a week
- 1 time a day
- 2 times a day
- 3 times a day
- 4 or more times a day

In the past week, how many days did you exercise for at least 30 minutes?

- 0
- 1
- 2
- 3
- 4
- 5
- 6
- 7

Are you willing to take a follow-up survey in 6 months to be entered in a drawing for a $250 prize?

- Yes
- No

Are you willing to take a follow-up survey in 1-year to be entered in a drawing for a $250 prize?

- Yes
- No

Are you interested in receiving our free Create Better Health newsletter?

- Yes
- No

If you responded yes to any of the questions above, please type your email address.

_____

End of Block: Default Question Block

Appendix E

Online Post-Survey

Start of Block: Default Question Block

Thank you for participating in the Create Better Health Online Course. We hope you've learned helpful information throughout the lessons. Please take a few minutes to tell us a little bit about yourself and your current food and activity behaviors. These are the same questions we asked you prior to beginning the course. Please answer all questions honestly. There are no right answers. Your answers will help us know what parts of our course are working well and what needs improvement. Thank you for your time! **Please click the blue arrow at the bottom of the survey to submit your responses.**

Please type your first letter of your first name, first letter of your last name, birth month and day. For example, if your name is John Smith and your birthday is May, 17th, you would type JS517.

_____

Which county do you live in?

- o Beaver
- o Box Elder
- o Cache
- o Carbon
- o Daggett
- o Davis
- o Duchesne
- o Emery
- o Garfield
- o Grand
- o Iron
- o Juab
- o Kane
- o Millard
- o Morgan
- o Piute
- o Rich
- o Salt Lake
- o San Juan
- o Sanpete
- o Sevier
- o Summit
- o Tooele
- o Uintah
- o Utah
- o Wasatch

- Washington
- Wayne
- Weber

Gender
- Male
- Female
- Prefer not to respond

Age
- 18-34 years old
- 35-59 years old
- 60 years old or older
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Ethnicity
- Hispanic
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Race (select all that apply)
- American Indian/Alaskan Native
- Asian
- Black/African American
- Native Hawaiian or Other Pacific Islander
- White
- Prefer not to respond

How often in the past 12 months would you say you were worried or stressed about having enough money to buy nutritious meals?
- All months
- Some months
- Never

In the past 12 months, how many months did anyone in your household receive benefits from a federal food assistance program? (SNAP, WIC, free and reduced school lunch program, or any other federal food assistance program)
- All months
- Some months
- Never

As a result of taking the Create Better Health Online course...

	Never	Seldom	Sometimes	Usually	Always
I stretch my food dollars so there is food to last the entire month.					
I choose a variety of foods based on MyPlate recommendations.					
I use the nutrition facts label to make food choices.					
I shop with a grocery list.					
I follow USDA food safety recommendations.					
I adjust meals to use foods I already have at home.					

How many times a day do you eat fruit? (Include fresh, frozen, dried, and canned fruit. Do NOT include juice)

- o I rarely eat fruit
- o Less than 1 time a day (couple times a week)
- o 1 time a day
- o 2 times a day
- o 3 times a day
- o 4 or more times a day

How many times a day do you eat vegetables? (Include fresh, frozen, and canned vegetables. Do NOT count french fries, potato chips, or rice)

- o I rarely eat vegetables
- o Less than 1 time a day (couple times a week)
- o 1 time a day
- o 2 times a day
- o 3 times a day
- o 4 or more times a day

How often do you drink regular soda (not diet), fruit punch, fruit drinks, sweet tea, or sports drinks?

- o Never
- o 1-3 times a week
- o 4-6 times a week
- o 1 time a day
- o 2 times a day
- o 3 times a day
- o 4 or more times a day

In the past week, how many days did you exercise for at least 30 minutes?

- o 0
- o 1
- o 2
- o 3
- o 4
- o 5
- o 6
- o 7

What, if anything, have you done to improve your eating habits since starting the Create Better Health Online Course?

_____

What, if anything, have you done to improve your physical activity habits since starting the Create Better Health Online Course?

_____

Are you willing to take a follow-up survey in 6-months to be entered in a drawing for a $250 prize?

- o Yes
- o No

Are you willing to take a follow-up survey in 1-year to be entered in a drawing for a $250 prize?

- o Yes
- o No

Are you interested in receiving our free Create Better Health electronic newsletter?

- o Yes
- o No

If you answered yes to any of the questions above, please type your email address.

_____

Display This Question:
What, if anything, have you done to improve your eating habits since starting the Create Better Health Online Course? Text Response Is Displayed

CONGRATULATIONS! You have completed the Create Better Health Online Course. Please enter your contact information below so we can send you your graduation gift.

- Name _____
- Mailing address for graduation gift
  _____

End of Block: Default Question Block