Examination of an Online Cooking Education Program to Improve Shopping Skills, Attitudes toward Cooking and Cooking Confidence among Participants of the Ventura County WIC Program

A thesis submitted in partial fulfillment of the requirements
For the degree of Master of Science in
Human Nutrition

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Thank you to all of the students assisting. This study would not have gotten off the ground without your efforts. I am incredibly grateful to you.
DEDICATION

This thesis is dedicated to:

This thesis study is dedicated to my family for your continuous support throughout my educational journey, to Laura Flores and Amy Avelar, who played an integral role in the development of this study, as well as the Family Kitchen team. My hope is that your time and efforts on this study will create positive changes to the nutrition education curriculum for WIC programs, emphasizing the value of online cooking education for families.
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ABSTRACT

Examination of an Online Cooking Education Program to Improve Shopping Skills, Attitudes toward Cooking and Cooking Confidence among Participants of the Ventura County WIC Program

By
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This study aimed to first, provide evidence that a pre-recorded online cooking education program, modeled after Cooking Matters/Share Our Strength, for Ventura County WIC participants produces similar results to the standard in-person cooking education traditionally offered by Cooking Matters/ Share Our Strength. Second, for WIC participants to better meet their nutritional needs. This study examined if a pre-recorded online cooking education program resulted in improvements in shopping skills, attitudes towards cooking, and feelings of confidence in cooking habits from baseline to post-intervention. This was a multi-method correlational study, March 2021- January 2022, with adult English- and Spanish speaking WIC clients (n=257) utilizing the Family Kitchen online cooking education program to meet their WIC nutrition education requirements. Surveys were self-administered before and after watching a pre-recorded online cooking education video. Factor analysis revealed a four factor structure, identical in the pre-and post-survey. The Cronbach alpha score of .70 and higher provides
evidence of the reliability of the exploratory factor analysis to demonstrate that the Cooking Matters instrument behaves similarly in an online environment as it does in an in-person environment. Descriptive statistics determined the association between certain demographic variables and whether improvements were observed in shopping skills, attitudes towards cooking, and feeling of confidence from baseline to post-intervention. General Linear Modeling, repeated measures ANOVA, revealed a decrease in shopping skills from baseline to post-intervention, (F=5.91; p=<.05), that was consistent across age groups (F=3.20; p=<.05), and food security status (F=7.48; p.<.01) with a larger decrease among the food insecure (FI). There was an increase in positive attitudes toward cooking with income (F=2.85; p=<.05), specifically those with incomes <$20,000 and those with incomes between $30-39,000 having the greatest improvements in attitudes. There was an increase in cooking confidence from baseline to post-intervention (F=27.2, p<0.01) and an interaction effect between the intervention program and food security status (F=7.45; p=<.01) with a larger increase in cooking confidence for the FI in comparison to the FS. The use of the nutrition facts label increased on average the most for those 30-39 years old (F=7.72; p=<.01) and for those who were FI (F=5.37; p=0.02).
INTRODUCTION

The Ventura County Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) serves a diverse population, of which 43.2% is Hispanic/Latinx, 7.9% is Asian, and 1.9% is American Indian/Alaska Native (United States Census Bureau, 2021). The population is low income, with incomes below 185% of the federal poverty limit (USDA Food and Nutrition Service, 2021). The WIC population is at an increased risk for health disparities and may have reduced access to healthy foods to support them during critical periods of growth and development. Nutritional risks affecting this population include obesity, pregnancy complications, folate deficiency, and gestational diabetes, among other negative health outcomes (Rasmussen et al., 2016)

The WIC program provides specific, high quality supplementary foods to meet specific nutritional needs during growth and development, referrals to health care providers, health screenings, breastfeeding education and support, and nutrition education (Benefits.gov, 2020). The nutrition education provided by WIC is required monthly in order for WIC recipients to receive their benefits. Educational topics include healthy recipes, how to utilize a limited budget to shop for foods, how to address feeding challenges for children, and dietary tips during pregnancy, among others. Nutrition education is a unique aspect of the WIC program, and is not a required part of any other nutrition assistance program in the United States (USDA Food and Nutrition Service & National Agricultural Library’s Food and Nutrition Information Center, 2006). Traditionally, nutrition education and other WIC services were offered to client’s in-person. However, prior to the Covid-19 pandemic in March 2020, the majority of State WIC agencies had pilot tested offering remote nutrition education to their clients through telephone appointments or via a website to better meet client needs. The WIC agencies that did not pilot
test remote services were the ones that did not have the technical abilities to do so. The state WIC agencies that were considered “offline” occurred in nine states: Arkansas, Louisiana, Missouri, New Mexico, Ohio, Pennsylvania, Texas, Utah, and Wyoming (National WIC Association, 2022; Vasan et al., 2021). Once the Covid-19 pandemic began, the Families First Coronavirus Response Act allowed states to receive waivers and the resources needed to offer all WIC services remotely, including appointments for certification and recertification of WIC eligibility (Neuberger, 2020).

There is evidence that those who participate in nutrition education programs specifically geared toward low-income individuals and families are more likely to have a high amount of self-efficacy in their food resource management skills. This increased self-confidence is associated with a reduced risk of high food insecurity rates for these participants (Jomaa et al., 2020). Food insecurity without hunger, also called low food security, refers to not having an adequate amount of quality, variety, or desirability of foods in the diet, while still maintaining an adequate quantity of food. Food insecurity with hunger, also known as very low food security, refers to changes in eating habits and a reduced quantity of food intake (USDA Economic Research Service, 2021). Research indicates that WIC participants are often considered food insecure and have the potential to benefit from cooking education programs (Herman et al., 2004). A research study conducted by Herman et al. (2004) looked at the rates of food insecurity among WIC participants and pregnant mothers. The results showed that 110 participants, or 40% of the sample, were considered food insecure at the start of the study. After receiving WIC benefits for 1 year, 50% of food insecure participants became food secure (Herman et al., 2004). In addition, recent data on Los Angeles County WIC participants’ reveals that in 2017, 40% of WIC households were considered food insecure, having low or very low levels of food.
insecurity. This rate is two and a half times higher than the percentage of food insecurity experienced by the rest of the population in Los Angeles County (Lawicdata.org, 2019).

Cooking Matters, run by the non-profit Share Our Strength, is a validated cooking education program for low-income families and teaches parents and caregivers how to shop for and cook healthy meals on a budget. Cooking Matters offers community-based free cooking education classes, as well as other resources, and has developed validated curriculum and assessments for such events. Educational topics include cooking, meal preparation, grocery shopping and budgeting, and nutrition information (Cooking Matters, 2022). The Altarum Institute (2015) conducted a national one-year longitudinal study of 1,600 participants of Cooking Matters and found that 83% of parents and caregivers felt confident in their readiness to adopt healthier, more affordable dietary shopping habits after completion of the cooking education program (Cooking Matters, 2022). Additionally, research by Pooler et al. (2017) supports using Cooking Matters as an educational tool to benefit low-income families and teaches them how to choose and cook healthy foods. This longitudinal research study, conducted from April 2014 to March 2015, focused on the effects of the Cooking Matters curriculum on food resource management skills, and self-confidence in shopping for and preparing healthy foods on a budget for low-income adults. The results revealed that participants receiving benefits from WIC and the Supplemental Nutrition Assistance Program (SNAP) experienced a 17% increase in their confidence in managing their budget for purchasing and preparing healthy meals, which was sustained 6 months after finishing the Cooking Matters nutrition education program (Pooler et al., 2017; SNAP-Ed, 2021).

Cooking Matters has traditionally been offered in an in-person setting and in 2020, with the start of the Covid-19 pandemic, transitioned into offering the program in an online format.
Given the recency of this shift, there is a need for research evidence to support the use of the Cooking Matters curriculum in a virtual environment (Cooking Matters, 2020). In Fall 2021, Share Our Strength provided funding opportunities for exploratory research to pilot test the use and reliability of the in-person Cooking Matters curriculum and assessments in an online/virtual setting, specifically for low-income parents, caregivers, and their children. Thus, the Family Kitchen project was created in March 2021, modeled after Cooking Matters, to provide online pre-recorded cooking education videos to Ventura County WIC participants. These participants can meet their WIC nutrition education requirements by watching one of the Family Kitchen online pre-recorded cooking education videos. The goal of the Family Kitchen project is to provide evidence for the reliability of the Cooking Matters program implemented in an online/virtual setting as well as improve shopping skills, attitudes, and confidence in cooking healthy on a budget among WIC participants.

Given the ongoing challenges with the COVID-19 pandemic for WIC participants to receive services while meeting their needs for more scheduling flexibility, there is a unique opportunity for sharing a cooking education program in a recorded online format. A recent study compared online versus in-person nutrition education for WIC participants in the Los Angeles area. Study results indicated that the online nutrition education program resulted in equal increases in knowledge, self-efficacy, and healthy behaviors compared to in-person over the course of nine-months. However, the online nutrition education had the added potential benefit of reaching a larger audience and influencing long-term positive dietary changes due to flexibility and ease of access (Au et al., 2017).
A key objective of the current study is that by focusing on WIC parents and children under the age of five years, it is anticipated that not only will parents learn about the importance of consuming healthy foods, they will also gain skills in how to budget for them and therefore gain better and more consistent access. This is accomplished by framing the content of the Family Kitchen cooking education lessons on shopping for nutritious foods on a budget and optimizing the use of WIC foods for their intended purpose. A desired outcome is for these cooking education lessons to further enforce the nutrition education lessons that the Ventura County WIC program already provides, thus improving knowledge about these topics and also modeling healthy behaviors for both parents and children to replicate at home. According to the Ventura County WIC program director, L. Flores (personal communication, August 27, 2021) WIChealth.org, which is where WIC clients access their nutrition education curriculum, does not focus on teaching cooking and meal preparation skills. There is a gap in the educational content for Ventura County WIC clients, which is filled through the Family Kitchen cooking education program.

Background information on the WIC population, socioeconomic status, and demographic characteristics such as age, race/ethnicity and their influence on nutrition education outcomes has guided the formation of hypotheses for the current research study. Research by Lavelle et al. (2016) provides evidence that as the age of individuals increase, they are less likely to learn new information from cooking education programs compared to younger individuals with less knowledge of nutrition and cooking skills (Lavelle et al., 2016). Considering educational level, the Cooking Matters nutrition education curriculum was created specifically for low-income parents and caregivers and the course content is formatted in an easy-to-understand manner, with a reading and comprehension level of less than a high school education. This provides as much
opportunity as possible for socioeconomically disadvantaged individuals to learn from the Cooking Matters curriculum. (Cooking Matters, 2020). Research by Azizi Fard et al. (2021) analyzed the relationship between educational level and diet quality and found that the lower the educational attainment of an individual the more likely they are to consume an unhealthy diet, high in carbohydrates and low in fiber. This may be attributed to a lack of nutrition education as well as a lack of resources to purchase affordable, nutritious foods. (Azizi Fard et al., 2021). For the present study, given that the majority, 43.2%, of the Ventura County WIC population is Hispanic/Latinx, the pre-recorded online cooking education content was tailored to be culturally relevant for this population, meeting the needs of the community of interest. Thus, a positive improvement in shopping skills, attitudes, and confidence in cooking healthy on a budget between enrollment and completion of the study is expected to be seen among participants who identify as Hispanic/Latinx (United States Census Bureau, 2021).

The Covid-19 pandemic has caused a surge in food insecurity levels for Americans and increased the use of food assistance programs. In Los Angeles County, 47% of households below 100% of the federal poverty limit classified as being food insecure between April and May 2020. Additionally, those who identified as Latino experienced the highest rates of food insecurity compared to other racial and ethnic groups. Thus, the Covid-19 pandemic has likely increased food insecurity levels among the Ventura County WIC population, who are predominantly Hispanic/Latinx and living below 185% of the federal poverty limit (United States Census Bureau, 2021; Whaley & Anderson, 2021). Research by Pooler et al. (2017) has provided evidence for the positive outcomes of the Cooking Matters curriculum for those who are food insecure, such as increases in food resource management skills and self-confidence in shopping for and preparing healthy meals on a budget (Pooler et al., 2017).
The main research questions for the current study are first as follows:

1) RQ1: Will offering the Cooking Matters program in a pre-recorded online format produce similar outcomes as the in-person cooking education program?
   a) Hypothesis 1: Offering the Cooking Matters program in a pre-recorded online format will produce similar outcomes as the in-person program.

2) RQ2: Is there a relationship between participating in a pre-recorded online cooking education program and 1) improved shopping skills to purchase healthy foods on a budget?
   a) Hypothesis 2: Participating in a pre-recorded online cooking education program is related to an improvement in shopping skills to purchase healthy foods on a budget.
      i) Hypothesis 2a: Improved shopping skills are related to participants age
      ii) Hypothesis 2b: Improved shopping skills are related to participants’ level of education.
      iii) Hypothesis 2c: Improved shopping skills are related to participants’ race/ethnicity.
      iv) Hypothesis 2d: Improved shopping skills are related to participants’ food security status.
      v) Hypothesis 2e: Improved shopping skills are related to participants’ income.

3) RQ3: Is there a relationship between participating in a pre-recorded online cooking education program and 2) improved attitudes toward cooking?
   a) Hypothesis 3: Participating in a pre-recorded online cooking education program is related to an improvement in attitudes toward cooking.
      i) Hypothesis 2a: Improved attitudes toward cooking are related to participants age.
      ii) Hypothesis 2b: Improved attitudes toward cooking are related to participants’ level of education.
iii) Hypothesis 2c: Improved attitudes toward cooking are related to participants’ race/ethnicity.

iv) Hypothesis 2d: Improved attitudes toward cooking are related to participants’ food security status.

v) Hypothesis 2e: Improved attitudes toward cooking are related to participants’ income.

4) RQ4: Is there a relationship between participating in a pre-recorded online cooking education program and 3) increased feelings of confidence in cooking habits?

a) Hypothesis 4: Participating in a pre-recorded online cooking education program is related to increased feelings of confidence in cooking habits.

i) Hypothesis 2a: Increased feelings of confidence are related to participants age.

ii) Hypothesis 2b: Increased feelings of confidence are related to participants’ level of education.

iii) Hypothesis 2c: Increased feelings of confidence are related to participants’ race/ethnicity.

iv) Hypothesis 2d: Increased feelings of confidence are related to participants’ food security status.

v) Hypothesis 2e: Improved feelings of confidence are related to participants’ income.
METHODOLOGY

Study Design

This 10-month (March 11th 2021 – January 3rd 2022), multi-method correlational study assessed whether offering the Cooking Matters program in a pre-recorded online format will produce similar outcomes to the same in-person cooking education program. In addition, the study assessed the impact of delivering a pre-recorded online cooking education program on healthy eating practices for participants in the Ventura County, California WIC program. A Community-Based Participatory Research (CBPR) model was used in the design and implementation of the study.

Participants and Recruitment

Participant recruitment occurred in collaboration with the Ventura County WIC program. Following CBPR methods, Ventura County WIC staff were actively involved in asking their clients about their preferred communication methods, testing initial ideas for the Family Kitchen website, and were ultimately involved in participant recruitment due to their regular interaction with them on monthly WIC program calls. They assisted in participant recruitment by informing their clients of the opportunity to take part in the Family Kitchen cooking education program. This opportunity was also made available through mass email communications regularly sent to WIC clients by the WIC directorship. The staff at WIC are from the community being studied and are representative of the population of interest, being mainly Hispanic/Latinx. Many of them were once WIC participants themselves. Eligibility criteria included: current Ventura County WIC participant, over the age of 18 and English- or Spanish-speaking. WIC staff spoke with eligible clients during regularly scheduled bi-monthly phone visit appointments and offered the Family Kitchen cooking education program as an option for their clients to meet their nutrition
education requirement for the month. Recruitment flyers and text messages were also sent out by WIC staff once monthly to eligible clients offering the Family Kitchen cooking education program. Standardized scripts were created in English and Spanish for all recruitment efforts. The Spanish translations that were used for all materials provided to participants in this study were from the Mexican dialect of Spanish. This was decided based on feedback of Spanish translation provided by the Ventura County WIC staff, who indicated their clients are mainly Mexican-American. Those interested in participating in the study were instructed to visit the project website: https://familykitchenvc.info, accessible on a mobile device or computer, where screening, consent, cooking education videos, and all surveys were located. In consultation with the WIC staff and directorship, it was recommended that the best way to reach clients would be through cell phone access. Thus, all Family Kitchen project content was set-up and tested to work equally well on a mobile device and computer. Cell phone providers in Ventura County, California include AT&T Wireless, T-Mobile, Verizon Wireless, and Mint, all of which provide coverage for 99% of Ventura County (Bestneighborhood.org, 2022). In addition, according to the United States Census Bureau, 93.4% of households in Ventura County have a computer and 89.6% have a broadband internet subscription (United States Census Bureau, 2021). Considering cell phone and internet access by race and ethnicity, research by the Pew Research Center (2021) reveals that Hispanic and Black adults in the United States are less likely than those who are White to own a computer at home or have high-speed internet access. Although no statistically significant differences by race and ethnicity were found to exist for smartphone ownership, Hispanics are more likely than any other racial or ethnic group to access the internet solely through their smartphone (Atske & Perrin, 2021).
Incentives for Family Kitchen program participation included fulfilling WIC’s nutrition education requirement for the month in order to receive WIC benefits. The study was approved by the California State University Northridge Institutional Review Board.

**Intervention**

The Family Kitchen cooking education videos were created in a pre-recorded format and offered in English and Spanish. The objectives of the cooking education videos included learning how to choose and cook healthy, WIC approved, culturally appropriate foods and ways to include children in the kitchen. For each pre-recorded video, standardized scripts were created by the Family Kitchen team using Cooking Matters curriculum. English class scripts were translated into Spanish and reviewed for consistency and understanding by a second Spanish-speaker. Recipes were adapted from the Cooking Matters program to include WIC-approved foods and to be culturally appropriate for the study population. Given that the population in Ventura County is 43.2% Hispanic or Latino, the recipes that were created included foods traditionally eaten by this study population (United States Census Bureau, 2021). The community partners at Ventura County WIC provided recipe recommendations that represented the diet and culture of the community members they serve. Although in general the Hispanic and Latino culture emphasizes family rituals, including mealtime rituals, there is not a focus on including young children in the kitchen and in mealtime preparation (Coe et al., 2018; D. R. Herman, personal communication, July 1, 2021). Thus, messages in the pre-recorded cooking education content focused on including children in the kitchen, a beneficial habit for the development of healthy eating behaviors for children and the entire family (van der Horst et al., 2014). Family Kitchen team members filmed the pre-recorded videos. These team members underwent CITI training for
Human Subjects Research and were also trained in trauma-informed approaches using Leah’s Pantry and Cooking Matters trainings.

The Family Kitchen project was funded by Cooking Matters/Share our Strength. As part of the requirement to receive funding, the Family Kitchen project was required to use the Cooking Matters nutrition education curriculum, and adapt it to our study population, as we were part of a larger project from Share our Strength to pilot test the Cooking Matters course content in a pre-recorded online setting. The specific nutrition education curriculum used was offered to everyone who was funded by Share Our Strength in various settings, and included five modules, in addition to an introductory knife skills video, which we added to ensure study participant safety while cooking in the kitchen with small children. The topics of the modules included “No More Mealtime Madness,” “Hack Your Snack,” “Drink to Your Health,” “The Family Kitchen,” and “Kids Say Yes to Fruits and Veggies.” Table 1 lists the learning objectives of each module. From these learning modules, a total of seven, 20-minute pre-recorded videos in English and Spanish were created and made available for participants to watch on the Family Kitchen website, and were released one at a time on a monthly basis from March to August 202. The initial six pre-recorded videos covered Cooking Matters course topics, and the final video was developed by Family Kitchen team members under the guidance of Ventura County WIC staff and directorship. Participants and their children, under the age of five years were instructed to watch at least one pre-recorded cooking education video, in addition to the introductory “Knife Skills” video in order to meet their WIC nutrition education requirement for the month (Table 1).
Table 1. Overview of Pre-Recorded Video Content and How Many Participants Watched

<table>
<thead>
<tr>
<th>Pre-Recorded Video</th>
<th>Learning Topic</th>
<th>Release Date</th>
<th>Number of Participants That Watched Once</th>
<th>Percent of Participants That Watched Once</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knife Skills Video</td>
<td>Tips to buy, use, and care for your knives</td>
<td>Mar-21</td>
<td>Not Available</td>
<td>Not Available</td>
</tr>
<tr>
<td></td>
<td>Planning and preparing quick, chaos-free meals at home (use WIC foods, model how to involve kids in meal preparation)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Encourage making smart choices about snacks (make your own snacks, focus on fruits and vegetables, model healthy eating habits for kids)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No More Mealtime Madness</td>
<td>WIC foods, model how to involve kids in meal preparation</td>
<td>Mar-21</td>
<td>33</td>
<td>12.90%</td>
</tr>
<tr>
<td></td>
<td>Planning and preparing quick, chaos-free meals at home (use WIC foods, model how to involve kids in meal preparation)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Encourage making smart choices about snacks (make your own snacks, focus on fruits and vegetables, model healthy eating habits for kids)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hack Your Snack</td>
<td>Encourage families to drink more water and less beverages with added sugar</td>
<td>Apr-21</td>
<td>29</td>
<td>11.30%</td>
</tr>
<tr>
<td></td>
<td>Work together as a family to make healthy meals and snacks</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(kids more likely to try new foods when they help choose and prepare them)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drink to Your Health</td>
<td>Encourage families to drink more water and less beverages with added sugar</td>
<td>May-21</td>
<td>34</td>
<td>13.20%</td>
</tr>
<tr>
<td></td>
<td>Work together as a family to make healthy meals and snacks</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(kids more likely to try new foods when they help choose and prepare them)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The Family Kitchen</td>
<td>Essentials of how to cook dried beans</td>
<td>Jun-21</td>
<td>86</td>
<td>33.50%</td>
</tr>
<tr>
<td>Kids Say Yes to Fruits and Veggies</td>
<td>Essentials of how to incorporate more fruits and vegetables into family meals and snacks</td>
<td>Jul-21</td>
<td>42</td>
<td>16.30%</td>
</tr>
<tr>
<td>How to Make Pinto Beans</td>
<td>Essentials of how to cook dried beans</td>
<td>Aug-21</td>
<td>3</td>
<td>1.20%</td>
</tr>
</tbody>
</table>

Instruments, Measures, Procedures

The impact of the Family Kitchen program on participants’ healthy eating practices was measured using a prospective, mixed methods, pre-post survey design. All surveys, available in English and Spanish, were self-administered online via Qualtrics, accessed through the project.
website. The Family Kitchen project was part of a larger pilot study conducted by Cooking Matters/Share our Strength to test the feasibility of delivering the Cooking Matters nutrition education curriculum in an online/virtual format in comparison to its usual delivery method of in-person. As such, the Family Kitchen project was instructed to use Cooking Matters validated survey instruments to assess changes in shopping skills, attitudes, and confidence in cooking healthy on a budget prior to and post-viewing the pre-recorded online content. Additional questions were added to the Family Kitchen pre-survey to determine the demographic characteristics of participants and food security status.

The screening, consent, and pre-survey presented itself on the project website before participants could access any of the pre-recorded video content. The screening form ensured that study inclusion and exclusion criteria were met. Inclusion criteria included being over the age of 18, a current Ventura County WIC client, and speaking English and/or Spanish. Those who did not qualify to participate in the study were taken to the end of the survey through skip logic on Qualtrics. Written consent was obtained online, modeled after the California State University Northridge IRB guidelines, and included a section for participants to fill in their name and WIC family ID number if they would like to receive credit toward their WIC nutrition education requirement.

Pre-survey questions included a set of seven demographics, four of which were derived from the Cooking Matters standardized participant survey and included sex, highest level of education, Hispanic or Latino, and race (Cooking Matters, 2017). The remaining three demographic questions included household earnings, and how many people live in the household excluding and including children under the age of five. Food security status was included in the pre-survey and was measured using the validated United States Department of Agriculture
(USDA) six-item short form Household Food Security Survey Module (Economic Research Service, USDA, 2012). Additionally, 10-validated questions from the Cooking Matters program were included to assess food shopping habits using budget friendly, nutritious ingredients, and attitudes toward and confidence in cooking for the family (Cooking Matters, 2017). Of the 10 Cooking Matters questions, three assessed shopping skills using a Likert scale including “never”, “rarely”, “sometimes”, “often”, “always”, “does not apply.” Two questions assessed attitude towards cooking using a Likert scale including “strongly disagree”, “disagree”, “neither agree nor disagree”, “agree”, “strongly agree.” The remaining five questions assessed feelings of confidence using a Likert scale of “not very confident”, “neutral”, “somewhat confident”, “very confident”, “does not apply” (see Appendix C). The Cooking Matters evaluation tool used was designed as a pre-test or post-test format to monitor changes in participant’s knowledge, attitudes, skills, confidence, and behavior as a result of any quantity of Cooking Matters content. The research consulting firm IMPAQ tested the survey for validity and reliability with 100 randomly selected participant surveys. There was high internal consistency with a Cronbach’s alpha of 0.87 (R. Elena, personal communication, March 15, 2022; Share Our Strength. Cooking Matters., 2016).

Once the screening, consent, and pre-survey forms were completed, the pre-recorded videos were accessible. Participants were instructed on the project website to complete a post-survey after watching a pre-recorded video. The post-survey consisted of the same 10-validated questions from the Cooking Matters program that were included on the pre-survey (Cooking Matters, 2017). Two additional questions asked for name and which pre-recorded video was watched so that participants could receive their WIC education credit, if desired. Family Kitchen team members sent text and phone call reminders to registered participants, once weekly as
needed, using a standardized script to encourage completion of pre-and post-surveys. When participants requested, pre-and post-surveys, identical to the questions self-administered, were conducted over the phone by Family Kitchen team members. Once pre-and post-surveys were complete, the Family Kitchen team shared with Ventura County WIC staff the names and WIC family ID numbers of participants that indicated they wanted to receive WIC education credit. Criteria for survey completion included not missing more than 3 survey questions. Only complete pre-and post-surveys are presented here and included in the analysis.

**Data Analysis**

Complete pre- and post-surveys in English and Spanish (N=257) were analyzed quantitatively using IBM SPSS Statistics software, version 17.0. Frequencies were calculated for the categorical variables of age, language, sex, education, income, race and ethnicity and food security status. Using the USDA 6-item short form, the prevalence of food security was calculated based on the number of affirmative responses to the survey questions, indicating either “yes”, “often”, “sometimes”, “almost every month” and “some months but not every month.” A score of 0-1 indicated high or marginal food security, 2-4 indicated low food security, and 5-6 indicated very low food security. Methods recommended by the USDA Economic Research Service (ERS) for calculating food security and food insecurity were used. (Economic Research Service, USDA, 2012). Following the USDA self-administration guidelines, two questions were combined into one for a total of 5 questions assessing food security. For this question, either of the first two responses, “yes, almost every month” or “yes, some months but not every month”, was scored as two affirmative responses. (Economic Research Service, USDA, 2012).

Likert-scale responses from the 10-validated Cooking Matters questions that were included on the pre- and post-survey were coded numerically into a five-point Likert scale, with
a ranking of 0-4, 0 indicating “never” or “strongly disagree” and 4 indicating “always” or “strongly agree”. The proportion of responses in each category of the Likert-scaled questions was determined. To test the first research aim of whether the Cooking Matters educational curriculum and assessments implemented in a pre-recorded online setting measure the same constructs consistently with what was delivered in the in-person format, exploratory factor analysis was conducted on the pre- and post-survey Cooking Matters questions. Exploratory factor analysis was used as opposed to confirmatory factor analysis because this was the first time the Cooking Matters 10-item scale was used to assess outcomes from the Cooking Matters curriculum in an online virtual format. Previously, Cooking Matters/Share Our Strength used the research consulting firm IMPAQ to test the 10-item survey for validity and reliability with 100 randomly selected participants. The results found that the survey indicated high internal consistency, with a Cronbach’s alpha of 0.87. In addition, participants, in general, understood what the questions were asking and felt the questions were easy to answer through cognitive testing for face validity. However, the Cooking Matters 10-item survey was not designed to be used as a pre-post tool. It is meant to capture the participants’ thoughts and attitudes as a result of any quantity of Cooking Matters content, not to measure change (R. Elena, personal communication, March 15, 2022). Thus, exploratory factor analysis was used here as this was the first the 10-item survey was used in the manner described here. Factor loading determined which factors on the Cooking Matters scale grouped together (shopping skills, attitudes, and confidence). Composite scores, an average of the test scores, was calculated for each variable assessed (shopping skills, attitudes, confidence) to determine how well the items on the scale work together to assess the variable of interest. A Cronbach’s alpha was used to determine Cooking Matters survey reliability (Van den Berg, 2021).
To test the second research aim of whether there is a relationship between participating in a pre-recorded online cooking education program and 1) improved shopping skills to purchase healthy foods on a budget, 2) improved attitudes toward cooking, 3) increased feeling of confidence in cooking habits, a five-point Likert scale was used to calculate change scores. This will determine if a difference exists between the pre- and post-survey responses for the three variable categories of interest, which include shopping skills, attitudes, and confidence in cooking healthy on a budget. Data were examined to determine if assumptions for parametric testing were met. Mixed-subjects Analysis of Variance (ANOVA), a type of General Linear Modeling (GLM), was used to assess the pre-survey and post-survey responses to determine if changes exist, and if so, are there any between-subjects and within-subject variables. The mixed-subjects model was used because it looks at the independent and interactive effects of between-subjects and within-subject variables. Between-subjects factors included age, education, race/ethnicity, income and food security status. The within-subject variable included the intervention program. Using the GLM analysis, the null hypotheses about the effects of both the between-subjects factors and the within-subject factors was tested. Interactions between the within-subjects factors and the between-subjects factors as well as the effects of individual factors were also assessed, as shown in table 2 (UCLA Statistical Methods and Data Analytics, 2021).

### Table 2. Interaction Effects Tested

<table>
<thead>
<tr>
<th>Relationship between Shopping Skills and X</th>
<th>Relationship between Attitudes Towards Cooking and X</th>
<th>Relationship between Feelings of Confidence in Cooking Habits and X</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>Age</td>
<td>Age</td>
</tr>
<tr>
<td>Level of education</td>
<td>Level of education</td>
<td>Level of education</td>
</tr>
<tr>
<td>Race/ethnicity</td>
<td>Race/ethnicity</td>
<td>Race/ethnicity</td>
</tr>
<tr>
<td>---------------</td>
<td>---------------</td>
<td>---------------</td>
</tr>
<tr>
<td>Income</td>
<td>Income</td>
<td>Income</td>
</tr>
<tr>
<td>Food security status</td>
<td>Food security status</td>
<td>Food security status</td>
</tr>
<tr>
<td>Intervention program</td>
<td>Intervention program</td>
<td>Intervention program</td>
</tr>
</tbody>
</table>
RESULTS

Demographics

A total of 257 participants, English- and Spanish-speaking, had matched pre-and post-surveys. Of the 257 study participants, the majority, 51.8% were between the ages of 30-39 years, followed by 30.7% being between 18-29 years of age, 15.6% between 40-49 years, 1.2% 60 and over and .8% indicated they were between 50 and 59 years. Among all participants, 164 individuals (63.8%) were English-speakers and 93 individuals (36.2%) were Spanish-speakers. In addition, 252 (98%) indicated they were female, one individual identified as male and one individual indicated they identified as non-binary or third gender, the remainder of which indicated they preferred not to answer. Considering household earnings for 2020, the majority of participants (43.6%) reported that they made less than $20,000. This was followed by 21% indicating that they earned between $20,000-$29,999 and 13.6% earning between $30,000-$39,999. In terms of food security status, 55% of participants earned a score of 0-1, indicating high or marginal food security, 35% earned a score of 2-4, indicating low food security, and 9.3% earned a score of 5, indicating very low food security (Economic Research Service, USDA, 2012).

Figure 1 shows the educational level of all participants, split between English and Spanish speakers. A greater number of Spanish speakers (13.6%) completed less than a high school degree compared to English speakers while in every other subsequent category English speaker’s earned higher levels of education compared to Spanish-speaking participants.
Figure 2 shows the distribution of categories of race among 213 participants who responded, 82.9% of the total sample size.

*As reported by study participants*
Exploratory Factor Analysis

Table 3 shows the results of the exploratory factor analysis of the pre-survey, used to determine if offering the Cooking Matters program in a pre-recorded online format produces similar outcomes to the in-person cooking education program. Varimax rotated factor loadings, a statistical technique used to clarify the relationship among factors, reveals four factor groupings. The five cooking confidence survey questions formed one factor together, with a Cronbach’s alpha of .80. The shopping skills questions also formed a factor (Cronbach’s alpha of .70), with the exception of the “nutrition facts label” question, which cross-loaded with the other factors. A third factor was formed with the survey questions assessing attitudes towards cooking (Cronbach’s alpha of .71).

Table 3. Cooking Matters Pre-Survey: Exploratory Factor Analysis

<table>
<thead>
<tr>
<th>Questions</th>
<th>Mean</th>
<th>SD</th>
<th>Factor Loading 1 (Confidence)</th>
<th>Factor Loading 2 (Shopping Skills)</th>
<th>Factor Loading 3 (Attitudes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>“how often do you compare prices before you buy food?”</td>
<td>3.19</td>
<td>.98</td>
<td>.02</td>
<td>.86</td>
<td>.08</td>
</tr>
<tr>
<td>“how often do you adjust meals to include specific ingredients that are more ‘budget friendly’ like on sale or in your refrigerator or pantry?”</td>
<td>2.84</td>
<td>1.03</td>
<td>.01</td>
<td>.85</td>
<td>.01</td>
</tr>
<tr>
<td>“how often do you use the ‘nutrition facts’ on food labels?”</td>
<td>2.19</td>
<td>1.17</td>
<td>.35</td>
<td>.43</td>
<td>-.21</td>
</tr>
<tr>
<td>Question</td>
<td>Mean</td>
<td>SD</td>
<td>Skew</td>
<td>Median</td>
<td>Cronbach’s alpha</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------</td>
<td>------</td>
<td>-----</td>
<td>------</td>
<td>--------</td>
<td>------------------</td>
</tr>
<tr>
<td>“cooking takes too much time”</td>
<td>1.85</td>
<td>1.08</td>
<td>-.10</td>
<td>.06</td>
<td>.86</td>
</tr>
<tr>
<td>“cooking is frustrating”</td>
<td>1.44</td>
<td>1.09</td>
<td>-.21</td>
<td>-.05</td>
<td>.85</td>
</tr>
<tr>
<td>“how confident are you that you can use basic cooking skills, like cutting fruits and vegetables, measuring out ingredients, or following a recipe?”</td>
<td>2.45</td>
<td>.81</td>
<td>.48</td>
<td>.10</td>
<td>-.19</td>
</tr>
<tr>
<td>“how confident are you that you can choose the best-priced form of fruits and vegetables, fresh, frozen, or canned?”</td>
<td>2.06</td>
<td>.95</td>
<td>.73</td>
<td>.04</td>
<td>-.09</td>
</tr>
<tr>
<td>“how confident are you that you can buy healthy foods for your family on a budget?”</td>
<td>1.90</td>
<td>.97</td>
<td>.85</td>
<td>-.00</td>
<td>.04</td>
</tr>
<tr>
<td>“how confident are you that you can cook healthy foods for your family on a budget?”</td>
<td>1.85</td>
<td>1.00</td>
<td>.87</td>
<td>0.04</td>
<td>-.11</td>
</tr>
<tr>
<td>“how confident are you that you can help your family eat more healthy?”</td>
<td>2.14</td>
<td>.93</td>
<td>.70</td>
<td>.08</td>
<td>-.22</td>
</tr>
<tr>
<td><strong>Eigen value</strong></td>
<td>3.28</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Cronbach’s alpha</strong></td>
<td>.80</td>
<td></td>
<td></td>
<td></td>
<td>.71</td>
</tr>
</tbody>
</table>
Table 4 shows the results of exploratory factor analysis for the post-survey. Similar to the pre-survey, Varimax rotated factor loadings reveal four factor groupings, consistent with the pre-survey.

Table 4. Cooking Matters Post-Survey: Exploratory Factor Analysis

<table>
<thead>
<tr>
<th>Questions</th>
<th>Mean</th>
<th>SD</th>
<th>Factor Loading 1 (Confidence)</th>
<th>Factor Loading 2 (Shopping Skills)</th>
<th>Factor Loading 3 (Attitudes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>“how often do you compare prices before you buy food?”</td>
<td>3.05</td>
<td>1.05</td>
<td></td>
<td>.88</td>
<td></td>
</tr>
<tr>
<td>“how often do you adjust meals to include specific ingredients that are more ‘budget friendly’ like on sale or in your refrigerator or pantry?”</td>
<td>2.69</td>
<td>1.04</td>
<td>.85</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“how often do you use the ‘nutrition facts’ on food labels?”</td>
<td>2.29</td>
<td>1.18</td>
<td>.31</td>
<td>.61</td>
<td></td>
</tr>
<tr>
<td>“cooking takes too much time”</td>
<td>1.76</td>
<td>1.06</td>
<td></td>
<td></td>
<td>.87</td>
</tr>
<tr>
<td>“cooking is frustrating”</td>
<td>1.35</td>
<td>.97</td>
<td></td>
<td></td>
<td>.86</td>
</tr>
<tr>
<td>“how confident are you that you can use basic cooking skills, like cutting fruits and vegetables, measuring out”</td>
<td>2.52</td>
<td>.77</td>
<td>.66</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Question</td>
<td>Mean</td>
<td>Std Dev</td>
<td>Cronbach’s Alpha</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-------------------------------------------------------------------------</td>
<td>------</td>
<td>---------</td>
<td>-----------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“how confident are you that you can choose the best-priced form of fruits and vegetables, fresh, frozen, or canned?”</td>
<td>2.24</td>
<td>.84</td>
<td>.78</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“how confident are you that you can buy healthy foods for your family on a budget?”</td>
<td>2.02</td>
<td>.96</td>
<td>.76</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“how confident are you that you can cook healthy foods for your family on a budget?”</td>
<td>2.15</td>
<td>.91</td>
<td>.78</td>
<td></td>
<td></td>
</tr>
<tr>
<td>“how confident are you that you can help your family eat more healthy?”</td>
<td>2.34</td>
<td>.79</td>
<td>.68</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eigen value</td>
<td>3.29</td>
<td>1.81</td>
<td>1.26</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cronbach’s alpha</td>
<td>.80</td>
<td>.70</td>
<td>.71</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Primary Analysis**

Mixed-subjects ANOVA of the mean composite scores for shopping skills, attitudes toward cooking, cooking confidence, and nutrition facts label reading are shown below.

Table 5 shows the results for shopping skills by within-subjects (intervention program) and between-subjects factors. There was a decrease in shopping skills from baseline to post-intervention (F=5.91; p=<.05), that was consistent across age groups (F=3.20; p=<.05), and
food security status (F=7.48; p<.01) with a larger decrease among the FI. No interaction effects were found between education, income, nor race. The estimated marginal means reveals that the 95% confidence interval overlaps for education, income, and race, when tested individually against the outcome of interest, shopping skills. An overlapping of estimated marginal means indicates that no differences exist between the different categories.

Table 5. Changes in Shopping Skills from Pre- to Post-Survey by Age, Education, Income, Race/Ethnicity, Food Security Status

<table>
<thead>
<tr>
<th>Variable</th>
<th>Group</th>
<th>Pre (Mean +/- SD)</th>
<th>Post (Mean +/- SD)</th>
<th>Interaction</th>
<th>p-value</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>18-29 years</td>
<td>2.85 +/- .95</td>
<td>2.64 +/- 1.04</td>
<td>Time</td>
<td>&lt;.05</td>
<td>5.91</td>
</tr>
<tr>
<td></td>
<td>30-39 years</td>
<td>3.06 +/- .88</td>
<td>2.98 +/- .89</td>
<td>Group</td>
<td>&lt;.05</td>
<td>3.20</td>
</tr>
<tr>
<td></td>
<td>&gt; 40 years</td>
<td>3.12 +/- .77</td>
<td>3.00 +/- .85</td>
<td>Time x Group</td>
<td>&lt;.05</td>
<td></td>
</tr>
<tr>
<td>Educational Level</td>
<td>Less than a HS degree</td>
<td>2.84 +/- 1.10</td>
<td>2.84 +/- 1.05</td>
<td>Time</td>
<td>.07</td>
<td>3.44</td>
</tr>
<tr>
<td></td>
<td>HS degree or GED</td>
<td>3.00 +/- .91</td>
<td>2.88 +/- .94</td>
<td>Group</td>
<td>.44</td>
<td>.82</td>
</tr>
<tr>
<td></td>
<td>Any college</td>
<td>3.11 +/- .76</td>
<td>2.93 +/- .91</td>
<td>Time x Group</td>
<td>.43</td>
<td>.84</td>
</tr>
<tr>
<td>Income</td>
<td>&lt;20,000</td>
<td>2.91 +/- .91</td>
<td>2.82 +/- .96</td>
<td>Time</td>
<td>&lt;.05</td>
<td>5.91</td>
</tr>
<tr>
<td></td>
<td>20,000-29,999</td>
<td>3.00 +/- 1.00</td>
<td>2.87 +/- 1.06</td>
<td>Group</td>
<td>.307</td>
<td>.08</td>
</tr>
<tr>
<td></td>
<td>30,000-39,000</td>
<td></td>
<td>3.08 +/- .81</td>
<td>Time x Group</td>
<td>.973</td>
<td>.08</td>
</tr>
</tbody>
</table>
Table 6 shows the GLM results for attitudes towards cooking. There was an increase in positive attitudes toward cooking with income (F=2.85; p=<.05), specifically those with incomes <$20,000 and those with incomes between $30-39,000 having the greatest improvements in attitudes. No interaction effects were found between age, education, race, nor the intervention program. The estimated marginal means reveals that the 95% confidence interval overlaps for the intervention program, age, educational level, and race when tested individually against the outcome of interest, attitudes toward cooking. An overlapping of estimated marginal means indicates that no differences exist between the different categories.

Table 6. Changes in Attitudes Towards Cooking from Pre- to Post-Survey by Age, Education, Income, Race/Ethnicity, Food Security Status

<table>
<thead>
<tr>
<th>Variable</th>
<th>Group</th>
<th>Pre</th>
<th>Post</th>
<th>Interaction</th>
<th>p-value</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Race/Ethnicity</td>
<td>White</td>
<td>2.93 ±.94</td>
<td>2.48 ±.99</td>
<td>Time</td>
<td>.53</td>
<td>.40</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>2.78 ±.89</td>
<td>2.90 ±.89</td>
<td>Group</td>
<td>.73</td>
<td>.32</td>
</tr>
<tr>
<td></td>
<td>Latinx/Hisp/Mex</td>
<td>3.04 ±.88</td>
<td>2.88 ±.94</td>
<td>Time x Group</td>
<td>1.40</td>
<td>.25</td>
</tr>
<tr>
<td>Food Security Status</td>
<td>Food Secure</td>
<td>2.86 ±.92</td>
<td>2.78 ±.97</td>
<td>Time</td>
<td>&lt;.05</td>
<td>6.41</td>
</tr>
<tr>
<td></td>
<td>Food Insecure</td>
<td>3.19 ±.82</td>
<td>3.01 ±.89</td>
<td>Group</td>
<td>&lt;.01</td>
<td>7.48</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Time x Group</td>
<td>.360</td>
<td>.84</td>
</tr>
<tr>
<td>Age</td>
<td>18-29 years</td>
<td>1.68 ± .91</td>
<td>1.61 ± .89</td>
<td>Time</td>
<td>.45</td>
<td>.57</td>
</tr>
<tr>
<td></td>
<td>30-39 years</td>
<td>1.63 ± 1.01</td>
<td>1.48 ± .92</td>
<td>Group</td>
<td>.63</td>
<td>.46</td>
</tr>
<tr>
<td></td>
<td>&gt; 40 years</td>
<td>1.62 ± .93</td>
<td>1.70 ± .83</td>
<td>Time x Group</td>
<td>.30</td>
<td>1.20</td>
</tr>
<tr>
<td>Educational Level</td>
<td>Less than a HS degree</td>
<td>1.44 ± 1.00</td>
<td>1.40 ± .98</td>
<td>Time</td>
<td>.24</td>
<td>1.38</td>
</tr>
<tr>
<td></td>
<td>HS degree or GED</td>
<td>1.54 ± .82</td>
<td>1.52 ± .88</td>
<td>Group</td>
<td>.07</td>
<td>2.64</td>
</tr>
<tr>
<td></td>
<td>Any college</td>
<td>1.80 ± 1.02</td>
<td>1.64 ± .86</td>
<td>Time x Group</td>
<td>.49</td>
<td>.72</td>
</tr>
<tr>
<td>Income</td>
<td>&lt;20,000</td>
<td>1.57 ± 1.00</td>
<td>1.50 ± .92</td>
<td>Time</td>
<td>.295</td>
<td>1.10</td>
</tr>
<tr>
<td></td>
<td>20,000-29,999</td>
<td>1.45 ± 1.00</td>
<td>1.42 ± .92</td>
<td>Group</td>
<td>&lt;.05</td>
<td>2.85</td>
</tr>
<tr>
<td></td>
<td>30,000-39,000</td>
<td>1.92 ± .79</td>
<td>1.85 ± .75</td>
<td>Time x Group</td>
<td>.955</td>
<td>.11</td>
</tr>
<tr>
<td></td>
<td>&gt;=40,000</td>
<td>1.81 ± .83</td>
<td>1.70 ± .86</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Race/Ethnicity</td>
<td>White</td>
<td>1.62 ± 1.00</td>
<td>1.57 ± .93</td>
<td>Time</td>
<td>.412</td>
<td>.68</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>1.59 ± .99</td>
<td>1.53 ± .73</td>
<td>Group</td>
<td>.949</td>
<td>.05</td>
</tr>
<tr>
<td></td>
<td>Latinx/Hisp/Mex</td>
<td>1.66 ± .96</td>
<td>1.57 ± .91</td>
<td>Time x Group</td>
<td>.053</td>
<td>.95</td>
</tr>
</tbody>
</table>
**Table 7. Changes in Confidence in Cooking Skills from Pre- to Post-Survey by Age, Education, Income, Race/Ethnicity, Food Security Status**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Group</th>
<th>Pre (Mean ± SD)</th>
<th>Post (Mean ± SD)</th>
<th>Interaction p-value</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>18-29 years</td>
<td>2.03 ± .70</td>
<td>2.16 ± .64</td>
<td>&lt;.01</td>
<td>15.85</td>
</tr>
<tr>
<td></td>
<td>30-39 years</td>
<td>2.06 ± .74</td>
<td>2.30 ± .66</td>
<td>.54</td>
<td>.01</td>
</tr>
<tr>
<td></td>
<td>&gt; 40 years</td>
<td>2.14 ± .68</td>
<td>2.82 ± .64</td>
<td>.42</td>
<td>.866</td>
</tr>
<tr>
<td>Educational Level</td>
<td>Less than a HS degree</td>
<td>2.10 ± .81</td>
<td>2.31 ± .77</td>
<td>Time Group</td>
<td>&lt;.01</td>
</tr>
<tr>
<td>------------------------</td>
<td>-----------------------</td>
<td>------------</td>
<td>------------</td>
<td>------------</td>
<td>------</td>
</tr>
<tr>
<td></td>
<td>HS degree or GED</td>
<td>2.05 ± .68</td>
<td>2.17 ± .60</td>
<td>Time Group</td>
<td>.61</td>
</tr>
<tr>
<td></td>
<td>Any college</td>
<td>2.06 ± .71</td>
<td>2.29 ± .62</td>
<td>Time Group</td>
<td>.42</td>
</tr>
<tr>
<td>Income</td>
<td>&lt;20,000</td>
<td>2.08 ± .74</td>
<td>2.24 ± .64</td>
<td>Time Group</td>
<td>&lt;.01</td>
</tr>
<tr>
<td></td>
<td>20,000-29,999</td>
<td>2.11 ± .76</td>
<td>2.26 ± .74</td>
<td>Time Group</td>
<td>.983</td>
</tr>
<tr>
<td></td>
<td>30,000-39,000</td>
<td>2.03 ± .66</td>
<td>2.27 ± .56</td>
<td>Time Group</td>
<td>.915</td>
</tr>
<tr>
<td></td>
<td>&gt;=40,000</td>
<td>2.06 ± .64</td>
<td>2.22 ± .63</td>
<td>Time Group</td>
<td></td>
</tr>
<tr>
<td>Race/Ethnicity</td>
<td>White</td>
<td>2.19 ± .66</td>
<td>2.38 ± .53</td>
<td>Time Group</td>
<td>&lt;.05</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>2.09 ± .70</td>
<td>2.18 ± .71</td>
<td>Time Group</td>
<td>.439</td>
</tr>
<tr>
<td></td>
<td>Latinx/Hisp/Mex</td>
<td>2.04 ± .73</td>
<td>2.23 ± .66</td>
<td>Time Group</td>
<td>.688</td>
</tr>
<tr>
<td>Food Security Status</td>
<td>Food Secure</td>
<td>2.18 ± .68</td>
<td>2.27 ± .66</td>
<td>Time Group</td>
<td>&lt;.01</td>
</tr>
<tr>
<td></td>
<td>Food Insecure</td>
<td>1.93 ± .73</td>
<td>2.23 ± .64</td>
<td>Time Group</td>
<td>.079</td>
</tr>
</tbody>
</table>

*“Time” is referred to as the intervention program and is a measure of the within-subject effects*
Table 8 shows the results for knowledge of nutrition facts label use by within-subjects (intervention program) and between-subject factors, which demonstrates that the use of the nutrition facts label increased on average the most for those 30-39 years old (F=7.72; p= <0.01) and for those who were FI (F=5.76; p=0.02). There is no interaction between education, income, race. The estimated marginal means reveals that the 95% confidence interval overlaps for education, income, and race when tested individually against the outcome of interest, knowledge of nutrition facts label use. An overlapping of estimated marginal means indicates that no differences exist between the different categories.

**Table 8. Changes in Knowledge of Nutrition Facts Label Use from Pre- to Post-Survey by Age, Education, Income, Race/Ethnicity, Food Security Status**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Group</th>
<th>Pre (Mean +/- SD)</th>
<th>Post (Mean +/- SD)</th>
<th>Interaction</th>
<th>p-value</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>18-29 years</td>
<td>1.88 +/- 1.15</td>
<td>1.86 +/- 1.11</td>
<td>Time Group</td>
<td>.22</td>
<td>1.51</td>
</tr>
<tr>
<td></td>
<td>30-39 years</td>
<td>2.23 +/- 1.22</td>
<td>2.39 +/- 1.23</td>
<td></td>
<td>&lt;.01</td>
<td>7.72</td>
</tr>
<tr>
<td></td>
<td>&gt; 40 years</td>
<td>2.60 +/- .91</td>
<td>2.68 +/- .92</td>
<td>Time x Group</td>
<td>.33</td>
<td>1.11</td>
</tr>
<tr>
<td>Educational Level</td>
<td>Less than a HS degree</td>
<td>2.10 +/- 1.20</td>
<td>2.31 +/- 1.25</td>
<td>Time Group</td>
<td>.06</td>
<td>3.58</td>
</tr>
<tr>
<td></td>
<td>HS degree or GED</td>
<td>2.32 +/- 1.11</td>
<td>2.30 +/- 1.13</td>
<td></td>
<td>.74</td>
<td>.31</td>
</tr>
<tr>
<td></td>
<td>Any college</td>
<td>2.11 +/- 1.21</td>
<td>2.26 +/- 1.20</td>
<td>Time x Group</td>
<td>.24</td>
<td>1.43</td>
</tr>
<tr>
<td>Income</td>
<td>&lt;20,000</td>
<td>2.15 +/− 1.14</td>
<td>2.33 +/− 1.16</td>
<td>Time</td>
<td>.52</td>
<td>.42</td>
</tr>
<tr>
<td></td>
<td>20,000-29,999</td>
<td>2.25 +/− 1.28</td>
<td>2.34 +/− 1.26</td>
<td>Group</td>
<td>.38</td>
<td>1.02</td>
</tr>
<tr>
<td></td>
<td>30,000-39,000</td>
<td>2.02 +/− 1.20</td>
<td>1.97 +/− 1.07</td>
<td>Time x Group</td>
<td>.37</td>
<td>1.07</td>
</tr>
<tr>
<td></td>
<td>&gt;=40,000</td>
<td>2.47 +/− 1.05</td>
<td>2.42 +/− 1.17</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Race/Ethnicity</td>
<td>White</td>
<td>2.33 +/− 1.21</td>
<td>2.42 +/− 1.19</td>
<td>Time</td>
<td>.34</td>
<td>.90</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>2.60 +/− 1.15</td>
<td>2.64 +/− 1.15</td>
<td>Group</td>
<td>.10</td>
<td>2.29</td>
</tr>
<tr>
<td></td>
<td>Latinx/Hisp/Mex</td>
<td>2.11 +/− 1.16</td>
<td>2.20 +/− 1.17</td>
<td>Time x Group</td>
<td>.96</td>
<td>.06</td>
</tr>
<tr>
<td>Food Security Status</td>
<td>Food Secure</td>
<td>2.35 +/− 1.18</td>
<td>2.42 +/− 1.21</td>
<td>Time</td>
<td>.09</td>
<td>2.96</td>
</tr>
<tr>
<td></td>
<td>Food Insecure</td>
<td>2.00 +/− 1.14</td>
<td>2.12 +/− 1.12</td>
<td>Group</td>
<td>&lt;.05</td>
<td>5.37</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Time x Group</td>
<td>.70</td>
<td>.15</td>
</tr>
</tbody>
</table>

*“Time” is referred to as the intervention program and is a measure of the within-subject effects*
DIUSSION

The overall aims of this study were first, to provide evidence that the Cooking Matters nutrition education curriculum offered in a pre-recorded online format produces similar results to the standard in-person program. The second aim was to demonstrate that WIC participants are better able meet their nutrition needs while shopping on a limited budget. The results of this study provide several key contributions to the literature.

When analyzing the data on the educational level of participants, in all categories except “less than a high school degree”, which was the lowest category, English speaking participants experienced higher levels of educational attainment. This is consistent with 2022 demographic data available from the county, which found that in Ventura County, California those who identify as non-Hispanic/Latinx make up the majority of the population who have earned higher levels of education. Specifically, 21.9% have attended some college, but did not earn a degree (HealthMattersinVC.org, 2022). Considering the Hispanic/Latinx community, they make up 44.6% of the population in Ventura County, the largest percentage. Their country of origin is mainly from Mexico (DATA USA, 2022). These Hispanic/Latinx residents who immigrated from Mexico make up a large percentage, 90%, of farm workers within Ventura County, and 88.4% of these individuals have earned a high school diploma or less (Central Coast Alliance United for a Sustainable Economy, 2015).

This was the first study to test the implementation of the Cooking Matters nutrition education curriculum in an online/virtual environment. Exploratory factor analysis showed that the Cooking Matters survey reliably measures the same constructs in an online format as it does in an in-person setting. Cooking Matters tested their survey for validity and reliability in an in-person setting and found high internal consistency with a Cronbach’s alpha of .87 (R. Elena,
personal communication, March 15, 2022). Our results of exploratory factor analysis revealed a Cronbach’s alpha of .70 and higher, indicating a high degree of reliability. Additionally, our analysis revealed that the “nutrition facts label” survey question became a fourth construct on its own, when traditionally it is grouped within the “shopping skills” survey questions. The fact that this item loaded by itself is an indication of the reliability and consistency of the construct as we did not offer any nutrition facts label knowledge in our pre-recorded videos.

The mixed-subjects ANOVA analysis of changes in shopping skills from pre-survey to post-survey reveals that there was a statistically significant decrease in scores over time, no matter the age of participants. Additionally, with greater incomes there was a larger decrease in shopping skills for healthy foods on a budget. One explanation for our findings may be that those earning higher incomes compare prices and incorporate meals that are budget friendly less often than those living on a limited budget. Additionally, research by the USDA has found that those with higher incomes spend more on food, especially ready-prepared meals and at restaurants (Rahkovsky & Jo, 2018). This may explain our findings that those with increased incomes don’t have as much of a need for shopping skills as those living on a more limited budget. Considering food security, it was found that both the food secure and food insecure experienced a decrease in shopping skills for healthy foods on a budget from the start of the study to completion. This may be because during the time the study was conducted, March 2021-Janauary 2022, WIC participants were receiving increased benefits of up to $35 per child and adult per month for fruits and vegetables due to the government’s response to the Covid-19 pandemic, called the American Rescue Plan. These increased cash-value vouchers may have reduced the need for participants to shop for budget friendly foods (USDA, 2021).
Assessing the results of mixed-subjects ANOVA for attitudes toward cooking, participants with the highest levels of income had the greatest decline in scores. Because these survey questions were reverse coded, this in fact means that attitudes toward cooking improved from pre-test to post-test. These results are consistent with research by Mejean et al (2017) who found that those with higher incomes are likely to have more kitchen equipment, more knowledge of how to utilize the cooking equipment, and enjoyed cooking meals more than those of lower socioeconomic status.

Our mixed-subjects ANOVA analysis found a statistically significant relationship between the intervention program and improvements in confidence in cooking healthy on a budget from pre-survey to post-survey. Additionally, both the food secure and food insecure experienced increased feelings of confidence in cooking healthy on a budget. These findings are supported by research by Pooler et al (2017) on the benefits of using the in-person Cooking Matters program for low-income individuals. Specifically, it was found that participants receiving benefits from WIC and SNAP experienced a 17% increase in their confidence in managing their budget and purchasing and preparing healthy meals, which was sustained six months after finishing the Cooking Matters nutrition education program.

Although “nutrition facts label” knowledge was originally part of the “shopping skills” construct, exploratory factor analysis revealed that “nutrition facts label” knowledge cross-loaded and thus did not relate to the other three factors. Thus, this factor was assessed to determine within-subjects and between-subjects relationships. It was found that age is related to an increase in nutrition facts label knowledge from the pre-test to the post-test. Those older than 18-29 years experienced an increase in knowledge. Additionally, it was found that food security status is related to an increase in nutrition facts label knowledge. For both the food secure and food
insecure increases in knowledge were seen, although higher increases for those classified as food secure. Since the Family Kitchen pre-recorded cooking education videos did not teach nutrition facts label knowledge, further research into whether WIChealth.org covers these topics is necessary. Given that food insecurity status is higher for WIC participants in Los Angeles County, and that food insecurity is related to poor health outcomes for WIC participants, who are a vulnerable population and an at-risk group, the results provide additional evidence for the benefits of cooking education programs, similar to Cooking Matters, to reduce food insecurity (Herman et al., 2004; Jomaa et al., 2020; Lawicdata.org, 2019).

Potential biases in the research design may have impacted the results of the study. First, participants were recruited only from the Ventura County WIC Program. Although WIC participants have some similar characteristics in terms of demographic information, the results of this study may not be generalizable to other WIC programs for example in Los Angeles County or across the US. In addition, surveys were translated twice from English to Spanish to ensure accuracy. The research team received input and review from both the directorship and staff at the Ventura County WIC program that the main dialect of Spanish spoken among participants was Mexican-American. Data on the demographic makeup of Ventura County residents reveals that the Hispanic/Latinx community makes up the largest percentage, 44.6%, of the population and their country of origin is mainly from Mexico (DATA USA, 2022). However, it is possible that some participants spoke a different dialect of Spanish that was not represented in the survey translations.

Second, study protocol allowed for research staff to conduct surveys over the phone with hard-to-reach participants. In this situation, there is the potential for interviewer bias that could cause participants to respond in a particular manner, for example to potentially please the
interviewer. Research methods aimed to address this challenge by training all research staff in standardized protocols for conducting the surveys over the phone. Third, access to surveys necessitated using either a mobile device, tablet, or computer with stable internet access. According to the United States Census Bureau, 93.4% of households in Ventura County have a computer and 89.6% have a broadband internet subscription (United States Census Bureau, 2021). However, Hispanic and Black adults are less likely than those who are while to own a computer or have high-speed internet access (Pew Research Center, 2021). Instead, Hispanics were found to be more likely than any other racial or ethnic group to access the internet solely through their smartphone (Atske & Perrin, 2021). Even considering this information, there is the potential that certain areas of Ventura County, California, where our participants resided, experienced varying degrees of internet connectivity and cellular reception. In addition, due to the requirement of having access to either a mobile, tablet, or computer device our results may not be representative of the entire WIC population in Ventura County, and may have left out a number of potential participants without access to such devices. Although the research study could not have controlled for cellular reception or internet connectivity levels among participants, the project website was made viewable in exactly the same format when accessed on either a mobile, tablet, or computer. When designing the research study, we consulted closely with Ventura County WIC staff, who informed us that the majority of their clients used mobile phone devices and staff communicated with clients through such means. Thus, the Family Kitchen study website and all surveys on Qualtrics were made sure to work on these types of devices.

This study used a correlation design comparing subjects to themselves from the baseline survey to post-intervention. While results showed that there was an increase in cooking
confidence, ability to read nutrition facts labels and improved attitudes toward cooking, it is not possible to discern if these results were due exclusively to the intervention implemented or if there were other reason for these improvements due to the lack of a control group.

Future studies assessing the impact of Cooking Matters should be a true experimental study to determine a cause-and-effect relationship.
IMPLICATIONS FOR FUTURE RESEARCH

Results from this study provide support for the benefits of an online cooking education program targeted to WIC participants and reinforces the concepts taught in the existing nutrition education curriculum of WIC. Over the course of the Covid-19 pandemic, congress has allocated 390 million dollars toward enhancing virtual services for WIC sites. There has been a lot of support among WIC participants for continued virtual services past the pandemic as it has reduced barriers to receiving benefits and nutrition education through WIC (van der Horst et al., 2014).

Further research assessing the impact of virtual cooking and nutrition education for WIC participants is needed to provide evidence to policy makers that virtual services should continue to be supported. Additionally, to ensure sustainability of the Family Kitchen project, WIC staff should be trained in the use and implementation of the Family Kitchen pre-recorded online cooking education videos. This can help improve content development for the educational videos, potentially reach a larger audience of WIC clients through referrals, and increase support for continued online educational content for WIC.

Another area that necessitates further research is potential barriers for WIC participants to access these virtual services, which may include whether these individuals have access to a mobile device or computer given their low-income status. In addition, cellular and internet connectivity within different areas of the community need to be assessed as this can impact who is able to access such services. Failure to address these barriers may exacerbate health disparities by allowing for nutrition assistance programs to only reach certain types of community members, potentially more affluent ones or those who have access to more resources.
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Association of Remote vs In-Person Benefit Delivery With WIC Participation During the

Whaley, S. E., & Anderson, C. E. (2021). The Importance of Federal Waivers and Technology in
1009–1012. https://doi.org/10.2105/AJPH.2021.306211
YOU’RE INVITED TO JOIN IN A NEW ONLINE COOKING EDUCATION PROGRAM!

FAMILY KITCHEN
VENTURA COUNTY

A Project to Support Parents with:
How to Shop for Healthy Foods
Cooking Healthy Meals for You and Your Family

Complete your WIC Education at Home by Watching
Pre-Recorded Videos Online (30 Minutes Each) When Convenient for You

Who Can Participate?
Ventura County WIC Participants and their Children Under the Age of 5
Speak English or Spanish

Live Online Cooking Class
After you’ve watched the videos, you’ll be given the chance to join a live online cooking class
(30 Minutes) and receive free food delivered to your home to use for the class recipe
as supplies last

If Interested, Please Visit:
http://familykitchenvc.info
Or Contact:
Dena Herman, PhD, MPH, RD or Rachel Kimmel at:
FamilyKitchen.VC@gmail.com, Phone/text: (805)–399-0597. Any questions, please contact:
rachel.kimmel.839@my.csun.edu.

California State University
Northridge

Contact a WIC representative for more information

A CSUN Research Study
APPENDIX B

Screening Form

1. Are you currently a Ventura County WIC client?
   [ ] Yes
   [ ] No

2. What is your age?
   [ ] under 18
   [ ] 18-29
   [ ] 30-39
   [ ] 40-49
   [ ] 50-59
   [ ] 60 and over

3. What is your preferred language?
   [ ] English
   [ ] Spanish

APPENDIX C

Participant Pre-Survey
Demographics:

1. What is your sex?
   [ ] Male
   [ ] Female
   [ ] Non-binary/third gender
   [ ] Prefer not to say

2. What is the highest level of education you have completed?
   [ ] Less than a high school degree
   [ ] High school degree or GED
   [ ] Some college, but have not graduated
   [ ] Two-year college degree
   [ ] Four-year college degree

3. Are you Hispanic or Latino?
   [ ] Yes
   [ ] No

4. What is your race?
   (You may mark more than one)
   [ ] White
   [ ] Black or African American
   [ ] Asian
   [ ] Native Hawaiian or Pacific Islander
   [ ] American Indian or Alaska Native
   [ ] Other (please specify) ______________________

5. What is your best estimate of your household’s earnings from all jobs including hourly wages, salaries, and tips in 2020?
   a.  $20,000
   b.  20,000 – 29,999
   c.  30,000 – 39,999
   d.  40,000 – 49,999
   e.  50,000 – 59,999
   f.  60,000 – 69,999
   g.  70,000 – 79,999
   h.  > 79,999

6. How many people live in your household, excluding children ages 0-5? (This may include non-relatives who live with you.)
   [ ] 0
7. How many children ages 0-5 live in your household? (This may include non-relatives who live with you.)
   [ ] 0
   [ ] 1
   [ ] 2
   [ ] 3
   [ ] 4
   [ ] 5 or more

**Household Food Insecurity:**
These next questions are about the food eaten in your household in the last 12 months and whether you were able to afford the food you need.

Below are several statements that people have made about their food situation. For these statements, please select whether the statement was often true, sometimes true, or never true for you/your household in the last 12 months.

8. The first statement is, “The food that I/we bought just didn’t last, and I/we didn’t have money to get more.” Was that often, sometimes, or never true for you/your household in the last 12 months?
   [ ] Often true
   [ ] Sometimes true
   [ ] Never true
   [ ] Don’t Know or Refused

9. “I/we couldn’t afford to eat balanced meals.” Was that often, sometimes, or never true for you/your household in the last 12 months?
   [ ] Often true
   [ ] Sometimes true
   [ ] Never true
   [ ] Don’t Know or Refused

10. In the last 12 months, since last January, did you or other adults in your household ever cut the size of your meals or skip meals because there wasn't enough money for food?
    [ ] Yes, almost every month
    [ ] Yes, some months but not every month
    [ ] Yes, only 1 or 2 months
11. In the last 12 months, did you ever eat less than you felt you should because there wasn't enough money for food?
   [ ] Yes
   [ ] No
   [ ] Don’t Know

12. In the last 12 months, were you every hungry but didn't eat because there wasn't enough money for food?
   [ ] Yes
   [ ] No
   [ ] Don’t Know

**Covid-19:**

13. Has Covid-19 had an effect on your family’s access to food?
   [ ] Yes
   [ ] No
   [ ] Please explain: ____________

**Shopping Skills:**

14. How often do you compare prices before you buy food?
   [ ] Never
   [ ] Rarely
   [ ] Sometimes
   [ ] Often
   [ ] Always
   [ ] Does not Apply

15. How often do you adjust meals to include specific ingredients that are more “budget-friendly,” like on sale or in your refrigerator or pantry?
   [ ] Never
   [ ] Rarely
   [ ] Sometimes
   [ ] Often
   [ ] Always
   [ ] Does not Apply

16. How often do you use the “nutrition facts” on food labels?
   [ ] Never
   [ ] Rarely
Sometimes
[ ] Often
[ ] Always
[ ] Does not Apply

**Attitude Towards Cooking:**

17. Cooking takes too much time
   [ ] Strongly Disagree
   [ ] Disagree
   [ ] Neither Agree nor Disagree
   [ ] Agree
   [ ] Strongly Agree

18. Cooking is frustrating
   [ ] Strongly Disagree
   [ ] Disagree
   [ ] Neither Agree nor Disagree
   [ ] Agree
   [ ] Strongly Agree

**Feelings of Confidence:**

19. How confident are you that you can use basic cooking skills, like cutting fruits and vegetables, measuring out ingredients, or following a recipe?
   [ ] Not at all confident
   [ ] Not very confident
   [ ] Neutral
   [ ] Somewhat confident
   [ ] Very confident
   [ ] Does not apply

20. How confident are you that you can choose the best-priced form of fruits and vegetables (fresh, frozen or canned)?
   [ ] Not at all confident
   [ ] Not very confident
   [ ] Neutral
   [ ] Somewhat confident
   [ ] Very confident
   [ ] Does not apply

*Healthy foods include fruits, vegetables, whole grains, lean meats, low-fat or fat-free dairy, and water.*

21. How confident are you that you can **buy** healthy foods for your family on a budget?
22. How confident are you that you can **cook** healthy foods for your family on a budget?
   - Not at all confident
   - Not very confident
   - Neutral
   - Somewhat confident
   - Very confident
   - Does not apply

23. How confident are you that **you can help** your family eat more healthy?
   - Not at all confident
   - Not very confident
   - Neutral
   - Somewhat confident
   - Very confident
   - Does not apply

APPENDIX D

Participant Post-Survey

1. Participant Contact Information

   *Answer to make sure you get your WIC education credit*
First Name, Last _____________

2. Which recorded video did you most recently watch?
   - [ ] No More Mealtime Madness
   - [ ] Hack Your Snack
   - [ ] Drink to Your Health
   - [ ] The Family Kitchen
   - [ ] Kids Say Yes to Fruits and Veggies
   - [ ] How to Make Pinto Beans

**Shopping Skills:**

3. How often do you compare prices before you buy food?
   - [ ] Never
   - [ ] Rarely
   - [ ] Sometimes
   - [ ] Often
   - [ ] Always
   - [ ] Does not Apply

4. How often do you adjust meals to include specific ingredients that are more “budget-friendly,” like on sale or in your refrigerator or pantry?
   - [ ] Never
   - [ ] Rarely
   - [ ] Sometimes
   - [ ] Often
   - [ ] Always
   - [ ] Does not Apply

5. How often do you use the “nutrition facts” on food labels?
   - [ ] Never
   - [ ] Rarely
   - [ ] Sometimes
   - [ ] Often
   - [ ] Always
   - [ ] Does not Apply

**Attitude Towards Cooking:**

6. Cooking takes too much time
   - [ ] Strongly Disagree
   - [ ] Disagree
   - [ ] Neither Agree nor Disagree
   - [ ] Agree
   - [ ] Strongly Agree
7. Cooking is frustrating
   [ ] Strongly Disagree
   [ ] Disagree
   [ ] Neither Agree nor Disagree
   [ ] Agree
   [ ] Strongly Agree

**Feelings of Confidence:**

8. How confident are you that you can use basic cooking skills, like cutting fruits and vegetables, measuring out ingredients, or following a recipe?
   [ ] Not at all confident
   [ ] Not very confident
   [ ] Neutral
   [ ] Somewhat confident
   [ ] Very confident
   [ ] Does not apply

9. How confident are you that you can choose the best-priced form of fruits and vegetables (fresh, frozen or canned)?
   [ ] Not at all confident
   [ ] Not very confident
   [ ] Neutral
   [ ] Somewhat confident
   [ ] Very confident
   [ ] Does not apply

*Healthy foods include fruits, vegetables, whole grains, lean meats, low-fat or fat-free dairy, and water.*

10. How confident are you that you can **buy** healthy foods for your family on a budget?
    [ ] Not at all confident
    [ ] Not very confident
    [ ] Neutral
    [ ] Somewhat confident
    [ ] Very confident
    [ ] Does not apply

11. How confident are you that you can **cook** healthy foods for your family on a budget?
    [ ] Not at all confident
    [ ] Not very confident
    [ ] Neutral
    [ ] Somewhat confident
    [ ] Very confident
12. How confident are you that you can help your family eat more healthy?
   [ ] Not at all confident
   [ ] Not very confident
   [ ] Neutral
   [ ] Somewhat confident
   [ ] Very confident
   [ ] Does not apply

APPENDIX E

Epistemology

This was my first time being involved in creating and running a research study. Thus, I used my past experiences in research methods courses and my studies in nutrition and dietetics to guide my understanding of certain aspects of this study. My background in Psychology has given me a unique perspective on the stresses low-income individuals may be experiencing and this has
shaped my approach when designing a research study for the WIC population, who are low-income and a vulnerable population to be working with. For instance, making sure that the foods that were used in the pre-recorded video recipes were WIC approved and foods participants were likely to already have in their kitchens. In addition, my coursework in nutrition through the life cycle and community nutrition courses have given me a foundation of understanding in the nutritional risks this population faces and a background on the services that WIC offers and the populations they serve. Being a recent recipient of CalFresh, a social assistance program that provides food for low-income individuals, I have a personal understanding of the benefits that receiving food assistance provides. I have also volunteered at a food bank and my time spent there working with community members has shaped my view of the benefits cooking education programs can provide to low-income individuals. The above experiences have provided me with initial expectations for the themes that will emerge in the data analysis, which include seeing an increased rate of food insecurity among the study population and seeing a positive benefit of the pre-recorded videos on the outcome variables assessed in the study. Any biases that could have emerged through my involvement in this study were limited by having my faculty advisor oversee the project design and data analysis, as well as an outside biostatistician from California State University, Northridge review the results and confirm interpretation.