2020

ENCOURAGING HEALTHY EATING AMONG OLDER ADULTS USING THE TRANSTHEORETICAL MODEL: AN EVALUATION OF A PILOT INTERVENTION

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Digital Object Identifier: https://doi.org/10.13023/etd.2020.314

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DISSERTATION

A dissertation submitted in partial fulfillment of the
requirements for the degree of Doctor of Philosophy in the
College of Communication and Information
at the University of Kentucky

By
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Lexington, KY

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ABSTRACT OF DISSERTATION

ENCOURAGING HEALTHY EATING AMONG OLDER ADULTS USING THE TRANSTHEORETICAL MODEL: AN EVALUATION OF A PILOT INTERVENTION

Older adults, defined as those age 60 and above, are at an increased risk for many health-related complications that are directly related to nutrition (Centers for Disease Control and Prevention, 2015). This study highlights the lack of nutrition education material developed for older adults in Kentucky. Such material has great potential to influence the health of older adults (Chernoff, 2001). This study evaluated an intervention developed, by means of formative research, to teach older adults nutrition basics. Both direct and indirect measures related to stages of change for healthy eating behaviors were collected six weeks pre-intervention and then immediately post-intervention. Grocery store receipts (behavioral measure), Pfizer's (2011) "Newest Vital Sign (NVS)" tool (cognitive measure), a modified version of Andres et al. (2011) S-Weight and P-Weight questionnaire (attitudinal measure) and focus groups with staff, caretakers, and administrators working with older adults, served as tools for data collection. In addition, participants were interviewed, either one-on-one or in a focus group setting after the conclusion of the intervention. The goal was to assess general feedback with regards to intervention implementation and areas for improvement. While none of the quantitative data achieved statistical significance, qualitative data showed promise with regards to the intervention having a positive effect on participants. Specifically, the intervention had a positive impact on nutrition behavior, knowledge, and attitudes. Older adults indicated increased knowledge in relation to reading a nutrition facts label and judging appropriate portion size. In addition, participants indicated behavior change via decreased calorie intake due to portion size awareness, intentional food choice, and decreased grocery spending. Likewise, participants conveyed positive attitudes towards eating healthy, preparing food at home, and monitoring their caloric intake. While the intervention was influenced by the novel COVID-19, results offer many theoretical and practical implications; both of which are discussed.

KEYWORDS: Nutrition Education, Older Adults,
Malnutrition, Transtheoretical Model, Evaluation

Lauren Brinkman Roberson

July 21st, 2020

Date

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DEDICATION

Few people can honestly say that they have found their calling. That special niche where they fit. I am both grateful and blessed to have been given the opportunity to find mine. I am forever grateful. I am happy. I am confident. I am home in academia doing research and teaching with potential to impart change. Thank you, Dr. Kimberly Parker and Dr. Bobi Ivanov for giving me that chance. I dedicate this work to you as a token of my appreciation. Thank you both!

ACKNOWLEDGEMENTS

This dissertation could not have been completed without the guidance and support of many people. I would first like to thank Dr. Kimberly Parker. The amount of time, love, and energy that you invested in me, helping me to reach my true potential, has not gone unnoticed. I am so fortunate to have you in my life, both as a mentor and a friend. I look forward to our future journey, in scholarship and in life. I would like to second this moment of gratitude by thanking Dr. Bobi Ivanov, my dissertation co-chair, for believing in me and enabling me to pursue my research interests. Your guidance, encouragement, and expertise are both inspiring and invaluable. Thank you for helping me to accomplish my greatest achievement thus far in life – finding myself.

In addition to my dissertation co-chairs, I would like to extend my appreciation for my dissertation committee. First, I would like to thank Dr. Beth Barnes for her ingenuity and guidance in data collection. Her experience in community-based participatory research is empowering. I have learned a great deal about the intricacies of field work as a result. Thank you! Second, I would like to thank Dr. Tina Studts for her direction in terms of measurement and evaluation design. I am honored that I was able to take a methods class with you. The emphasis that you place on developing and using rigorous instruments will stick with me forever. I appreciate your generosity in sharing your wisdom and your kind heart and support throughout this journey. Thank you! Lastly, I would like to thank Dr. Martha Biddle for her willingness to serve as an outside examiner on my committee. Your time and expertise are greatly appreciated as well, thank you!

In keeping with the theme of gratitude, I would like to express my appreciation and thanks to the Graduate Program in Communication within the College of Communication and Information at the University of Kentucky. This program is second to none. Every faculty member, staff member, and administrator that I have had the pleasure to interact with has been extraordinarily, kind, helpful, and genuine. The plethora of experience that our college represents is phenomenal. I am both lucky and honored to have had the opportunity to study under such amazing people! Specifically, I would like to thank the following: Ms. Laure Ziembroski-Smith, Dr. Anthony Limperos, Dr. Nancy Harrington, Dr. Donald Helme, Dr. Allison Gordon, Dr. Kevin Real, and Dr. Renee Kaufman.

Laure, from day one your warmth was infectious. Your encouragement and positive attitude really helped me to stay focused and succeed when writing my qualifying exams. Thank you! Dr. Limperos, you are the best professor. I am so thankful to have been able to take two classes with you. Your down-to-earth nature and ability to connect content with the real-world makes learning fun and accessible. One day, I hope to be half the professor that you are. Dr. Harrington, Dr. Helme, Dr. Gordon, and Dr. Real, I want to thank you for the opportunity to work with each of you on various research proposals and projects. I have learned and continue to learn so much from your collective experience and brilliance. Thank you for the opportunity to work together! Lastly, I would like to thank Dr. Kaufman for teaching me the ins and outs of assessment. Your class was remarkable! I was able to apply this knowledge in my dissertation and will forever utilize these principles, whether it be in the classroom or in a community setting. Thank you for inspiring me to get onboard the assessment train!

As for my family, I would like to thank my parents, Gary and Lisa Brinkman, my sister, Abby Brinkman, and my brother, Nick Brinkman for your unconditional love and support. Never once did you doubt me or my abilities. You pushed me to be my best self, even when times were tough. I am in awe of how lucky I am to have such a loving family. Thank you for always being there, through the good and the bad. This degree is as much yours as it is mine.

I would also like to take this opportunity to thank Ms. Kelly Bond, Human Service Specialist with the Northern Kentucky Area Development district and friend. Thank you for broadening my perspectives when it comes to working with older adults, for believing in me and my vision for nutrition education, and for your guidance and support along the way. You have been such a blessing in my life. I am continuously inspired by the work that you do. In addition, I would like to thank the following Senior Center Managers that have worked alongside me in the trenches when piloting my program. Thank you, Sally Goffman, Cindy Ray, and Jenny Trapp, especially, for the work that you do and for your help in facilitating my program. The love, enthusiasm, and time that you spend working to make the lives of seniors better is infectious. I am humbled to have had the opportunity to know you and call you friends. Thank you!

In addition, I would like to commend Ms. Erin Hester for her timely contribution to data analysis and interpretation. You offered your time, energy, and resources to help make this dissertation possible. I cannot thank you enough for the many Zoom calls where we tossed ideas and themes back and forth. You are a remarkable human being, and will no doubt go far. I am forever grateful for your help, your love, your support, and most of all, for your friendship.

In closing, I would also like to thank all of the individuals who participated in my nutrition program. Your eagerness to participate, enthusiasm for learning about nutrition, and knowledge are motivating. There was never a dull moment. You kept a smile on my face and continue to keep me laughing with all of the wonderful memories we have created. Most of all, you have reminded me of my Grandmother, whom I miss dearly. Thank you for bringing Vera Sue Brinkman into the work that I do each and every day. I am truly blessed.

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CHAPTER ONE: INTRODUCTION

There is no doubt that the population, both globally, and nationally, is aging (Drewnowski & Evans, 2001). Thus, it is of paramount importance to address the health status of this aging population. Older adults (defined as those age 65 and above per Medicare status) face numerous health issues (Centers for Disease Control and Prevention, 2015). Perez-Sanchez, Torres, and Morante (2018) claimed that old age was associated with many chronic and degenerative diseases, all of which can impact eating habits and attitudes. Diseases include cognitive impairment, diabetes, dyslipidemia, and periodontal disease, among others.

A crucial and often unrecognized health issue is that of inadequate dietary intake. Medical problems, such as poor dentition, dysphagia, and a poor appetite can lead to decreased intake among older adults. For example, Han and Kim (2014) found that older adults without dentures had a risk of malnourishment 1.89 times higher than those with dentures. In addition, they discovered that those living at home may be unable or unwilling to cook for themselves and eat properly. Likewise, cognitive disorders, such as dementia and depression, can cause decreased intake (Hickson, 2006). Inadequate nutrition, due to reasons mentioned above, can cause an increased risk of morbidity and mortality, increased hospital admissions, longer hospital stays, impaired cognition, impaired physical and social function, falls, infection, reduced quality of life, and increased healthcare costs (Win, Ceresa, Arnold, & Allison, 2017).

As a result of these serious health consequences, the Defeat Malnutrition Today Coalition suggested, “high-quality nutrition and malnutrition care for older adults should be at the top of the U.S. national agenda as we develop population health strategies to

improve health and to deliver consistent quality healthcare at an affordable cost" (The Malnutrition Quality Collaborative, 2017, p. 6). The proposed study focused on promoting healthy eating behavior, knowledge, and attitudes among older adults participating in the Nutrition Program in Kentucky.

As a result of the morbidities often associated with aging, the present study attempted to address some of these adverse health outcomes. Specifically, poor nutrition was addressed as it is often a contributing factor to these outcomes (Perez-Sanchez, Torres, & Morante, 2018). If left untreated, poor nutrition can lead to an increased risk of malnutrition, morbidity, and mortality (Craven, Pelly, Isenring, & Lovell, 2017). It is the responsibility of health practitioners, scholars, and community members to do their part in addressing poor nutrition in order to prevent these comorbidities from occurring. This can be done through educational interventions aimed at increasing awareness of malnutrition risk, the importance of adequate nutrition, in addition to increasing knowledge and self-efficacy to make dietary changes. Such programs can provide individuals with the knowledge, skills, and tools necessary to adopt healthy eating habits in both the short and long-term.

CHAPTER TWO: REVIEW OF LITERATURE

Health Status of Older Adults

Poignantly stated, "it is beyond doubt that nutrition is related to health and disease" (Dijkstra, Neter, Brouwer, Huisman, & Visser, 2014a, p. 166). Quandt, Arcury, Bell, McDonald, and Vitolins (2001) argued that older adults in the U.S. were considered to be nutritionally vulnerable. Drewnowski and Evans (2001) contended that "optimal diets have been associated with lower risk of chronic diseases, notably coronary heart disease, obesity, diabetes, and some forms of cancer" (p. 90). In addition, others posited that proper nutrition, or healthy eating, was associated with self-sufficiency and independent living, as well as enhanced quality of life among older adults (De Almeida, Graca, Afonso, Kearney, & Gibney, 2001).

Older adults living at home, in residential care facilities, and those in the hospital setting are at risk for poor nutrient intake, which can lead to malnutrition (Craven, Pelly, Isenring, & Lovell, 2017). The World Health Organization (2016) defines malnutrition as a deficiency, excess, or imbalance in nutrient and/or energy intake. There are two types. The first type, and one many associate with malnutrition, is undernutrition (Saunders & Smith, 2010). Undernutrition involves low body mass index (BMI), or low body weight, and nutrient deficiencies. The second type is obesity and diet-related diseases. Often, this too is associated with inadequate nutrient stores. In the literature, percentages of those at-risk for malnutrition ranged from 24.4 – 61% (Adams, Bowie, Simmance, Murray, & Crowe, 2008; Chen, et al., 2019; Khole & Soletti, 2018; Lin et al., 2017).

This study took place in Kentucky, as older adults in this geographic region continue to be at considerable nutritional risk. According to the United Health

Foundation (2018), Kentucky was ranked number 48 out of 50 states in terms of health status of older adults. This metric factored in chronic disease diagnoses, physical activity levels, obesity, and food insecurity, among others. Specific to nutritional status, data were collected during intake and reassessment for services rendered by the Department of Aging and Independent Living (DAIL) from October 2017 through April 2018. Data indicated that 15.98 – 46.91% of older adults in Kentucky were at-risk for malnutrition, depending on their region of residence. Specifically, 16.43% of older adults in the Northern Kentucky region, the focus of this study, were at-risk for malnutrition. Malnutrition risk was assessed using the malnutrition screening tool (MST). Power et al. (2019) found the MST to be one of the most validated tools for screening for malnutrition risk among older adults. It is already evident that older adults in the target population of the present study were at-risk for malnutrition. However, in order to better understand their level of risk, it was necessary to learn their eating habits. Therefore, the following research question was posited:

RQ1: What are the current eating habits of older adults participating in the Nutrition Program?

The following section describes past and ongoing efforts to address both the health status and malnutrition risk of older adults, both globally and nationally.

Current Efforts to Improve Health of Older Adults

The literature is plentiful with efforts geared towards improving the health of older adults. This review focuses on nutrition-related interventions and what is currently being done to address the nutritional status of this population. Six different approaches are considered below: nutrition-related needs assessments, nutrition education programs,

meal programs, randomized controlled trials, other general programs, and interventions with a technological aspect. These six approaches were chosen as they encompass the majority of nutrition-related interventions that have been implemented to-date. While not all six approaches are addressed in the present study, they are worthy of review as they directly relate to nutrition interventions targeting older adults.

Nutrition-related Needs Assessments

In an attempt to determine nutrition information needs among older adults, Schultz, Nothwehr, Hanson, Chrisman, and Haines (2012) surveyed 321 older adults in the Midwest United States. A 95% majority of respondents indicated that their nutrition knowledge and interest in nutrition was either excellent, very good, or good. It is worthy to note that this self-reported interest does not necessarily translate into actual healthy eating behavior. If seeking nutrition information, respondents preferred to look towards their healthcare providers. Other sources of nutrition information included nutrition classes, flyers, brochures, newsletters, and information accessed from the public library. As far as types of information, respondents were most interested in general information related to eating healthy, heart healthy diets, and strategies to improve their eating habits (Schultz et al., 2012).

Nutrition Education Programs

Nutrition education is the core component of the present study. Therefore, this section of the literature review identifies nutrition education programs that have been developed and tested with the older adult population.

In an effort geared towards immigrant older adults at the global level, Garcia and Johnson (2003) developed seven modules on nutrition and six modules on physical

activity. They recognized the fact that diet and physical activity go hand in hand when it comes to managing chronic disease. Using the learning characteristics of older adults as a guide, these researchers developed a series of thirteen modules. Based on the needs identified, topics ranged from general nutrition information to food preparation, shopping, food safety, and disease-related food needs. Their evaluation supported the notion that older adults can benefit from nutrition education. It can help them to change their eating habits by increasing fruit and vegetable consumption and consumption of dairy. In addition, it can increase their awareness of the role that food can play in overall health (Garcia & Johnson, 2003). Additional benefits were thought to be observed following a similar intervention. The present study, therefore, posed the following hypotheses:

H1a: After participation in the nutrition education intervention, older adults will increase their purchase of (a) fruit, (b) vegetables, (c) lean sources of protein, and (d) low-fat dairy products.

H1b: After participation in the nutrition education intervention, older adults will decrease their purchase of (a) foods high in added sugar, (b) foods high in fat, (c) foods high in calorie-rich, non-nutrient-dense carbohydrates, and (d) foods high in sodium.

Focusing on older adults in another global setting: Meethien, Pothiban, Ostwald, Sucamvang, and Panuthai (2011) assessed a nutrition education program delivered by nurses in Thailand. Those receiving the intervention had significantly higher scores on overall healthy eating and sub-dimensions of healthy eating than did those in the control group. In addition, healthy eating scores were higher among intervention participants (Meethien et al., 2011).

As a result of conference proceedings, Robinson (2018) recognized the difficulties associated with food access, food preparation, and aging at the national level. Calling for a need to screen for malnutrition, Robinson (2018) argued for the development of future interventions that address the personal and contextual influences related to food choice and intake among older adults. Similarly, with respect to oral health status, Quandt and colleagues (2009) identified oral health factors related to nutrition, including: periodontal disease, bleeding gums, oral pain, dry mouth, and fit of dentures. They found that oral health problems were related to both ethnicity and socioeconomic status. For example, African Americans were more likely to have fewer teeth. These researchers argued for the importance of an intervention approach that is tailored to certain ethnicities in order to address the existing health disparities. Some researchers took heed of this advice, utilizing a participatory approach to development, modification, and implementation of nutrition education materials and protocol.

In Ivery, Benton, Harrison, Paul, and Cortes' (2017) approach, graduate students developed nutrition education materials to be used with older adults in senior centers. After presentation of materials, they conducted focus groups with participants to obtain feedback. Using a social marketing approach to health promotion, the materials were

geared towards the DASH diet, or Dietary Approaches to Stopping Hypertension. Emphasis was placed on eating vegetables, fruit, whole grains, low-fat or non-fat dairy products, lean meats, and healthy fats. After receiving the intervention, participants reported an increased knowledge about the nutritional value of food. Likewise, they valued the group atmosphere and social aspect to learning about nutrition. In addition, the importance of addressing cultural and individual needs were identified (Ivery et al., 2017).

Similarly, Puccarielli (2019) recently received funds to evaluate the Pennsylvania State Cooperative Extension nutrition intervention. At the conclusion of the intervention, the researcher found that there was a significant gain in nutrition knowledge post-intervention. Likewise, participants experienced a greater degree of intention to change behavior, especially after the grains lesson. The importance of a tailored approach to nutrition education was also emphasized (Pucciarelli, 2019).

With respect to the importance of increased nutrition knowledge garnered via nutrition education programs, the present study postulated the following in relation to knowledge gained post-intervention:

> **H2:** After participation in the nutrition education intervention, older adults will be able to demonstrate how to read a nutrition label by, (a) identifying caloric content, (b) identifying grams of carbohydrate per serving, (c) identifying amount of saturated fat, and (d) identifying potential allergens from the ingredient list.

Wallace and Devine (2016) evaluated a nutrition education program tailored specifically for older adults with dementia. Their 4-week intervention resulted in an increase in total knowledge, increased consumption of a variety of vegetables, and

reduced sodium intake. Qualitative findings revealed that participants were able to overcome many of the barriers to eating healthy identified in the literature. In addition, the group component of the intervention was appreciated, allowing an opportunity to share with others and to learn from them as well (Wallace & Devine, 2016).

Schultz and colleagues (2016) conducted a systematic review of nutrition interventions. One portion covered the impact of nutrition counseling and education on the health and body composition of older adults. Use of oral nutrition supplements, in conjunction with nutrition counseling, improved body composition and weight gain for participants that were underweight. The researchers asserted that multiple interventions that support one another's objectives were most effective in changing nutritional status among this population. Therefore, sustainability and coordination of these programs is essential (Schultz et al., 2016).

Lemon et al. (2004) assessed health and quality of life outcomes associated with a nutrition intervention for adults with type 2 diabetes. Nutrition counseling was provided by a registered dietitian. At 3-months and then 6-months, participants showed significant improvement in their self-management behaviors from baseline. The authors suggested that ongoing counseling and education are essential as results were more significant between baseline and three months (Lemon et al., 2004).

In a more specified approach, Fernandez-Barres et al. (2017) assessed the efficacy of a trial aimed at preventing the risk of malnutrition in older adults receiving home health. In this approach, nurses provided education to patient caregivers and then followed up at six and twelve months. Scores on the mini-nutritional assessment (MNA), which is used to assess risk for malnutrition, improved for those in the intervention

group. A likely contributing factor was the increased protein intake observed in the intervention group. Fernandez and colleagues (2017) argued for the involvement of caregivers in the education process, as this can have a significant impact on nutritional status.

Meal Programs

Across the country there are many programs, similar to the one provided by the Northern Kentucky Area Development District (NKADD), that provide meals on a weekly basis for older adults that qualify. This portion of the review explores exemplars where outcomes were measured to assess meal program's impact on health status of older adults. Globally, in the "Let's Do Lunch" program in Toronto, Ontario, researchers conducted a needs assessment and feasibility study to determine the appropriateness of offering meals on a regular basis at an urban senior center. Staff and stakeholders felt that providing meals twice a week was doable. After six months of piloting the program, stakeholders indicated that it was well-received, feasible, and cost-effective (Sheppard, Dube, Ducak, & Myers, 2018). In a similar capacity nationally, other researchers evaluated congregate meal site participation among rural adults in Iowa. According to Hoerr, Francis, Margrett, Peterson, and Franke (2016) older adults were motivated to participate if there was an educational component. In addition, the fact that they were receiving food and had the opportunity to interact with others was seen as positive. Barriers to participation included negative perceptions and stereotypes associated with such programming (Hoerr et al., 2016).

Other researchers assessed the feasibility of providing home-delivered meals to older adults after hospital discharge. Findings indicated that the intervention was feasible.

It was found that home-delivered meals increased calorie intake among intervention participants when compared to those in the control group. Those that participated reported being highly satisfied with the meal quality, delivery process, and performance of staff during the intervention period (Buys et al., 2017). While the value of meal programs for older adults is evident in existing literature, the present study does not address this component as meals are already provided to individuals participating in the nutrition program. However, an assessment of this aspect of the program may be warranted in the future.

Randomized Controlled Trials

Other researchers adopted a more rigorous approach to nutrition interventions. Abroad, researchers promoted the Mediterranean diet to British older adults. Preference and understanding of the diet were examined in phase one with educational sessions. In phase two, the feasibility of a 3-week Mediterranean diet was assessed. One group of participants received an educational group session on the diet while the other group received extra support in addition to the group session. The feasibility study indicated that the intervention was useful. Participants exhibited significant increases in fish intake. Lara et al. (2015) identified the Mediterranean diet as an acceptable approach to eating healthy for older adults.

On a national scale, Wyers and colleagues (2018) included weekly nutrition counseling, a diet high in protein and calories, and an oral nutrition supplement for three months in their intervention group. Their control group received usual nutrition care. The intervention improved nutritional status for up to three months in the experimental group. Researchers concluded that after a major surgery or illness, such as a hip fracture, this

type of intervention can improve nutritional intake and status (Wyers et al., 2018). In a 2-year lifestyle intervention, Lehtisalo and colleagues (2017) assessed the impact of dietary counseling and strength training on older adults' health and cognitive status. As a result, they concluded that nutrition education and counseling that is tailored to each individual's needs has the potential to prevent age-related decline and improve diet quality among this population.

Other General Programs

There are many other programs in the U.S. that strive to improve nutritional status of older adults. One such program is the Supplemental Nutrition Assistance Program, or SNAP. Samuel and co-authors (2018) assessed whether participation in such a program would impact hospital and emergency room utilization by older adults. The monthly financial benefits were found to be associated with a decreased risk of hospitalization, thereby decreasing healthcare costs for all involved. Another SNAP program geared towards older adults, Fresh Conversations, was evaluated by program facilitators. The programming was well-received, with staff believing in the potential interest in content by other older adults during congregate mealtime (Bahl, Francis, Yap, Montgomery, & Lillehoj, 2019).

Other programs aimed at nutrition that are not related to SNAP include a garden intervention whereby older adults were taught how to grow their own gardens. In the GROW: Green Organic Vegetable Gardens study, researchers explored the feasibility of getting older adults of low-socioeconomic status involved in an effort to grow their own produce. For those that participated, positive nutrition and cognitive outcomes resulted (Strout, Jemison, O'Brien, Wihry, & Waterman, 2017).

Interventions with a Technological Aspect

Some older adults indicated that technology was a facilitator to eating healthy. Some researchers took advantage of this, exploring the use of technology in the promotion of healthy eating habits. For example, Watkins and Xie (2015) tested iPad-based interventions and whether or not they improved fruit and vegetable consumption among older adults. Prior to the intervention, participants received significant training on iPads and the three related apps targeting fruit and vegetable consumption. Some aspects of the technology proved beneficial to participants, including the touchscreen and ease of portability. In addition, participants expressed the ease of using an iPad to locate less expensive fruit and vegetable grocers, identify recipes, and connect with doctors and other healthcare providers to make note of their intake. Some feedback was not so positive, as some experienced difficulty learning the iPad's functions in addition to fear of technology use. These are important considerations for the development of any intervention involving technology for the older adult population.

Takemoto and colleagues (2018) identified the barriers and facilitators to using technology for health promotion interventions among older adults. Researchers indicated that although the barriers may be extensive at the onset, it is worthy to focus on facilitators as technology offers many advantages in health interventions. They recommended extensive training with older adults, including them in every step of the intervention design process. Similarly, from the perspective of healthcare professionals, use of a tablet-based nutrition intervention tool, Appetitus, was assessed. Providers reported appreciation for the ease of communication with patients about their diet, which this app provided. It was also seen as a valuable tool for documenting diet and health

information. With the limited time devoted to each patient in the healthcare setting, such a convenient approach should be considered to improve communication and treatment related to nutrition status (Farsjo, Kluge, & Moen, 2018).

Barriers to Healthy Eating for Older Adults

There are many barriers to eating healthy among older adults. To some, it may appear that the barriers far outweigh the motivators for eating healthy. Some individuals may argue that this is the reason that older adults are at such nutritional risk. Likewise, McLaughlin, Whitlock, Lester, and McGraw (2017) made a noteworthy statement that "there are likely differences in how older persons perceive barriers to dietary changes and how they develop strategies to address the barriers" (p. 357). Further, several scholars contended that "it is important, therefore, to identify factors that encourage or hinder engagement in different classes of health behaviors in high-functioning older adults, and to use this information to more successfully promote healthy lifestyle choices in this group" (Whitehead, 2017, p. 1652). Whatever the argument, barriers are presented under three overarching categories: psychosocial, physical, and socioeconomic factors.

Psychosocial Factors

Carstensen and Mikels (2005) argued that older adults prioritize emotional and psychosocial needs as they get older. Such needs take priority as these individuals tend to be more isolated, with irregular social interactions than those encountered by middle-aged or younger adults. These factors significantly impact morale in addition to psychological and physical wellbeing. Therefore, they are of utmost importance to many at this stage in life. In this instance, psychosocial factors relate to the psychological and

emotional aspects of eating healthy. Psychosocial factors can further be broken down into three categories: psychological and emotional, intrapersonal, and interpersonal.

Psychological and Emotional Factors. In terms of psychological factors, the literature indicated that the stress associated with dietary management and eating healthy was a significant barrier. Moss, Still, Jones, Blackshire, and Wright (2019) explored African American older adults' perspectives on self-management of hypertension through diet. Their participants indicated that the constant struggle of watching sodium intake in order to maintain normal blood pressure was exhausting, thereby contributing to their overall stress; making maintenance of these eating behaviors difficult. Likewise, in a sample of older adults with HIV, Muhammed et al. (2019) found that depression and perceived stress from making dietary changes were a consistent barrier to a healthy eating lifestyle. Further, they found that food insecurity was related to perceived stress associated with eating healthy. Another contributor to stress was loneliness. In another study, loneliness and depression exhibited a direct relationship. This link had a significant negative relationship with nutritional status among rural older adults (Jung et al., 2017). Authors concluded that emotional wellbeing was just as important as physical wellbeing when it came to health.

Another psychological barrier to healthy eating is the prevalence of eating disorders among this older adult population. Examples of eating disorders include anorexia and bulimia. Both are a direct result of abnormal eating attitudes. Perez-Sanchez, Torres, and Morante (2018) have identified that disordered eating can be prevalent among older adults, especially those residing in nursing homes or assisted-care facilities. They postulated that these individuals are more susceptible to abnormal eating

attitudes that can lead to the development of eating disorders, if left unchecked. Factors such as unattractive and boring menus, lack of assistance during mealtime (if required), and even the distraction of other residents can contribute to a decreased appetite and aversion to eating (Perez-Sanchez et al., 2018).

Intrapersonal Factors. In addition to psychological factors, intrapersonal factors can also cause barriers to adhering to a healthy diet. For example, individuals may just prefer the taste of unhealthy foods, believing that healthy foods taste bad. This barrier was most frequently listed by participants in McLaughlin, Whitlock, Lester, and McGraw's (2017) study. More specifically, participants in a study by Lee et al. (2017) emphasized the fact that food low in salt lacked taste or appeal. The fact that they were used to eating foods high in salt made it that much more difficult to adjust to foods with little to no salt. Some participants admitted that they just assumed unsalted foods tasted bad without even trying them first. Participants in another study by Dye, Haley-Zitlin, and Willoughby (2003) mentioned missing the taste of favorite foods that contained salt. Others expressed a craving for sweets that was often difficult to overcome (Dye et al., 2003). Similarly, older African American adults in another study echoed the belief that healthy foods tasted bad (James, 2004).

Such cravings contributed to another major barrier to eating healthy: self-control and the resistance to change old dietary habits. De Almeida, Graca, Afonso, Kearney, and Gibney's (2001) participants identified self-control and resistance to change as the topmost barriers to eating healthy among their European sample. Kearney et al. (2001) cited many beliefs that were associated with resistance to change dietary behavior. For example, some individuals had minimal, if any, interest in nutrition information.

Therefore, they may not seek out or pay attention to diet-related information. Ho and colleagues (1991) offered up another explanation for this barrier, stating that old habits are hard to break, and many are reluctant to try after years of food preferences and eating patterns (Nestle et al., 1998). Other scholars postulated that the perceived duration of the illness in which they were directed to manage by diet may prevent them from modifying dietary behaviors. Specifically, if the disease and associated symptoms were perceived to be abstract, or temporary, then the individual saw little value in changing eating habits. However, if the disease was perceived to be more concrete, or long-lasting, then the individual may have been motivated to gradually break old habits and modify eating behaviors (Hemphill, Parris Stephens, Rook, Franks, & Salem, 2013). James' (2004) findings indicated that some may be unwilling to make dietary changes because it meant giving up a traditional aspect of their culture. Delaney and McCarthy (2014) mirrored this sentiment. They stated, "each culture and generation's perception of eating well is developed through evolving schema for making food choices learnt through changing social and cultural processes over time" (p. 106). No doubt, schemata are hard to change, thus contributing to another barrier for many.

In another intrapersonal lens, often a lack of knowledge of health and nutrition information, or health illiteracy, contributed to the difficulties associated with changing diet. In McLaughlin et al.'s (2017) study, lack of knowledge was the second-most expressed barrier to eating healthy. Specifically, this lack of knowledge related to a lack of creativity or notion of where to start for meal-planning. Also, others expressed not knowing how to read food labels and how to choose the best foods possible while grocery shopping. Lack of knowledge with regards to appropriate portion size was also expressed

as a barrier (McLaughlin et al., 2017). Sometimes, insufficient provision of information by healthcare providers contributed to this knowledge gap (De Almeida et al., 2001). Other scholars pointed out that dietary recommendations were not always understood, especially by those of low socioeconomic status (Buttriss, 1997; Hansbro et al., 1997; Tate & Cade, 1990).

Aihara and Minai (2011) defined nutrition literacy as "the degree to which people have the ability to obtain, process, and understand basic diet information and the tools needed to make appropriate nutrition decisions" (p. 422). Chen and colleagues (2016) sought to understand the perceptions surrounding eating experiences of low-literate older adults with heart disease. They found that low-literacy contributed to eating-related hardships, including difficulty making recommended adjustments and receipt of misinformation related to diet and heart disease. They concluded that low-literacy severely inhibited these individual's ability to modify their diets for heart disease (Chen et al., 2016). As a result, the difficulty contributed to a fatalistic belief towards diet and disease, as is discussed in detail in the next section.

Interpersonal Factors. In addition to internal factors, relationships with others have been shown to impede attempts to make dietary modifications (De Almeida et al., 2001). In some cases, individuals do not perceive the need to change because they believe the locus of control for their health is attributed to someone, or something else. McLaughlin and colleagues (2017) called this health locus of control. Wallston and Wallston (1981) defined health locus of control as the extent to which the individual has control over his or her own health and health outcomes. According to McLaughlin et al. (2017), there are three primary categories under which that control lies: intrapersonal,

chance, and others such as healthcare providers and family. Therefore, an individual's perception that he or she does not have control may impact his or her willingness to make dietary changes.

In other cases, participants identified communication issues between themselves and their provider as a barrier to effective diet changes. Sometimes personality-clashes and different perspectives made it difficult for patients to both receive and understand the necessary health information (McLaughlin et al., 2017). Ross and co-authors (2011) identified that the lack of coordinated care between healthcare providers also contributed to this difficulty. Oftentimes, a short staff with minimal knowledge and/or resources to direct the patient can inhibit one from making dietary changes necessary to manage his/her condition.

Another source of frustration for many when it comes to eating habits was the influence of family and friends (Schure, Turner Goins, Jones, Winchester, & Bradley, 2019). Specifically, one participant in the Moss et al. (2019) study expressed, "that her younger out-of-town friends continued to expect her to cook, clean, and host them the same as she had done when she was younger" (p. 674). Participants in another study conveyed the temptation of eating forbidden foods with others when required to adhere to a restrictive diet. Also, when others cook, there was limited control over the contents that went into the food, making sodium restriction difficult, for example (Lee et al., 2017). One participant in James' (2004) study poignantly stated:

> Friends and relatives are usually not supportive of changes in the diet. Women said male partners and children were barriers to healthful eating and were

> concerned with the waste and cost of introducing new foods that may be rejected by their families (p. 360).

Similarly, participants in the Dye et al. (2003) study indicated that many family members were not supportive of their diet restrictions, eating foods high in fat or sugar right in front of them.

Physical Factors

There are many physical factors that impact an individual's ability to eat healthy. For example, physical strength and stamina can determine whether an individual has capacity to get to the grocery store, lift heavy food items, put them in their proper place, and then access them while cooking. Physical barriers are categorized as either internal or external below.

Internal Factors. In a physical sense, there are many physiological barriers that impact one's eating habits, such as loss of vision, hearing impairment, edentulism, and cognitive impairment (Alizadeh & Salehi, 2015; Iinuma et al., 2017; Moynihan et al., 2007; Neill, Leipert, Garcia, Kloseck, 2011; Perez-Sanchez, Torres, Morante, 2018). Frailty is a common contributor to physical difficulties associated with aging and dietary intake (Aihara & Minai, 2011). In terms of physically carrying groceries and putting them away once at home, participants in the Neill et al. (2011) study indicated that their limited strength made it difficult for them to open jars, bend over to reach the oven or cupboards, or even to maintain a garden. Similarly, Perez-Sanchez, Torres, and Morante (2018) found that some older adults experienced difficulty using utensils and feeding themselves, making eating a variety of foods all the more difficult. In addition,

swallowing disorders, or dysphagia, also contributed to limited means to consume adequate nutrition. Dental disease, too, was found to be commonly associated with aging.

Loss of teeth, or edentulism, makes it difficult to eat certain foods considered to be healthy, such as fresh fruits, vegetables, and tough meats (Moynihan et al., 2007). Specifically, in the Watson et al. (2019) study, participants edentate with dentures and those dentate with dentures reported trouble eating apples, raw carrots, lettuce, nuts, well-cooked steak, and crusty bread. These individuals were also found to have lower intake of many important nutrients. Not only does tooth decay and loss impact nutritional status, Jung and Shin (2008) also indicated that it impacts older adult's quality of life in general.

In addition to physiological difficulties, time manifested as a barrier to healthy eating. For example, African American women in James' (2004) study indicated a willingness to eat healthy, but the time involved in food shopping and preparation was a significant deterrent, given their competing responsibilities. Participants in another study also indicated that time required for food preparation significantly impacted their ability to eat healthy (De Almeida, Graca, Afonso, Kearney, & Gibney, 2001).

Another noteworthy physical barrier to eating healthy was the decreased household size. Many individuals indicated that cooking for one became tedious, tiresome, and not worth the effort. Some indicated that food could not be purchased in individual-sized portions at many grocery stores. Others claimed that they were used to cooking for a large family. Now that it was just them and sometimes a spouse to feed, it was hard to adjust recipes to deliver smaller portions. Others were irritated by the monotony of eating leftovers all week (Neill et al., 2011).

External Factors. In terms of food shopping, the grocery store location and setup itself proved challenging for older adults. Participants in the Moss et al. (2019) study reported that the grocery store environment was unfavorable, adding to their stress levels. They indicated that often the crowd was too large with not enough staff to help with checkout and other services. Others indicated that the grocery stores often did not have appropriate resources to help them with their shopping. For example, Neill et al. (2011) found that the size of the shopping carts were too large and therefore not conducive to individuals shopping for a one or two-person household. With respect to location and convenience, some in the McLaughlin et al. (2017) study frankly admitted that unhealthy foods were more easily accessible and that grocery shopping and preparing healthier foods was inconvenient. Likewise, Skinner, Hanning, and Tsuji (2006) and Bardach, Schoenberg, and Howell (2016) found both accessibility and availability of healthier food choices to be a significant barrier to healthy eating.

It is interesting to note the impact of online grocery shopping on experiences of older adults and their food purchasing behavior. Hiser, Rodolfo, and Oral (1999) discovered that those age 50 and older tended to shop online less frequently than those in younger age groups. Likewise, Naseri and Elliot (2011) found online food purchasing behavior decreased with age. Although research in this area is sparse, Gorkovenko, Tigwell, Norrie, Waite, and Herron (2017) examined older adult's perceptions of online shopping. Focus group participants expressed joy at the opportunity to socialize while grocery shopping in the physical environment, among other benefits. However, some reported seeing value in the opportunity to shop online. Specifically, they were intrigued by the ability to save time and money by comparing prices. On the other hand, others did

not trust online retailers. They worried that they could easily be scammed when making an online purchase. While some expressed hesitation, participants overall were receptive to trying an online shopping platform. Findings supported the development of ShopComm, a program designed to help older adults shop in the digital age (Gorkovenko et al., 2017). Perhaps such technological advancements in grocery retail present themselves as a barrier to some while presenting as a facilitator to others when attempting to eat healthy.

Transportation to and from the grocery store was a significant obstacle for some. For example, inclement weather in the wintertime made getting fresh food from the local grocery store treacherous and impossible (Neill et al., 2011). For some in rural areas, grocery stores were located far away, requiring lots of time and money in gas in order to obtain fresh foods. In addition, a lack of public transportation made it difficult for those who were unable to drive or lacked a vehicle. Likewise, for stores that were close by, walking was not ideal for fear of falling and the effort required to carry the groceries all the way home (Neill et al., 2011). In the event that local grocery stores were present, they often had higher prices, limited variety, limited quality of items offered, and did not have new products and healthier choices for diabetics, for example (Neill et al., 2011).

Socioeconomic Factors

Many older adults are restricted by their monthly income; therefore, socioeconomic status serves as a major barrier to eating healthy (Bardach, Schoenberg, & Howell, 2016; Dijkstra, Neter, Brouwer, Huisman, & Visser, 2014; Watson et al., 2019). For example, 15% of participants in the De Almeida et al. (2001) study identified cost as a major barrier to eating healthy. Likewise, a significant majority of participants in other

studies indicated that price of healthy foods was a major barrier (James, 2004; Lopez-Azpiazu, Martinez-Gonzalez, Kearney, Gibney, & Martinez, 1999). For others, purchasing diabetic-friendly foods, too, proved costly (Schure et al., 2019).

On another note, Moynihan et al. (2007) found socioeconomic status to be significantly associated with nutrition knowledge. The authors posited that for those living in socially-deprived areas, cost was a forefront factor in determining dietary intake. Socially-deprived areas are often food deserts, whereby many experience food insecurity. Briefly, food insecurity is a lack of access to healthy and nutritious foods necessary for optimal health and wellbeing. Skinner et al. (2006) found food insecurity to be associated with a decreased availability of healthy foods, decreased food quality, and a decreased variety of healthy foods. In turn, this contributed to an increased cost in food products and an increased cost associated with transportation. Muhammed et al. (2019) found that food insecurity was independently associated with poor diet quality and poor dietary intake.

As made evident by the wide array of barriers faced by older adults who intend to eat healthy, obstacles vary. Therefore, the present study sought to further refine and understand the barriers associated with eating healthy for an older adult population in Kentucky. Rather than speaking directly with older adults, as other scholars have done, the present study sought insight from those working directly with older adults. Perspectives from those with regular contact with older adults served useful in identifying specific barriers that the present intervention could target in the future. Such an approach has been applied elsewhere. For example, Gorkovenko and colleagues (2017) interviewed staff members who worked directly with older adults at a local Food Bank. The staff

members provided additional rationale for the shopping behavior of older adults. The researchers highlighted the value of third party perspectives. In the present study, administrators and senior center managers helped to identify individual strengths and weaknesses that could be utilized to address barriers and facilitators to eating healthy. Such an approach is called for by Lee and Kotler (2016) in step two of the social marketing plan, the situation analysis. Therefore, the following research question was presented:

> **RQ2:** From a staff, caregiver, and administrator's perspective, what are the barriers to eating healthy for older adults?

Facilitators to Healthy Eating for Older Adults

While there are many barriers associated with healthy eating among the older adult population, there are many facilitators, or motivators, that can help this group to achieve a healthier lifestyle. Whitehead (2017) found that many older adults were motivated to eat healthier in order to manage disease states. The facilitators are divided into psychosocial, physical, and motivational or efficacious factors.

Psychosocial Factors

Fellowship and social support were prevalent in much of the literature as motivating factors for healthy eating habits. Interpersonal relationships, such as positive relationships with grocery store staff and sharing of produce and meals among neighbors helped some in the Neill et al. (2011) study to eat healthier. In terms of managing diabetes, participants in another study felt that having supportive family members that were willing to adjust their diets along with them was a significant factor contributing to their success at dietary management of their condition. Likewise, the mealtime

environment, whether at home or in an institutional setting, was found to be pleasurable, thereby encouraging individuals to eat healthier (Wikby & Fagerskiold, 2003). In other cases, learning from other's personal experiences and using healthcare professionals as role models helped them to accomplish their dietary goals (Dye et al., 2003). More broadly, others expressed that community support was crucial in order for them to successfully make dietary changes (Skinner et al., 2006).

Physical Factors

For a great many individuals, their disease state was a significant motivating factor in their decision to change their eating habits. For example, Dijkstra et al. (2014b) identified that those with poorer health status were more likely to be motivated to eat healthier due to their disease state. Specific to diabetes, Schure et al. (2019) found that some individuals felt that a diagnosis as chronic and diet-related as type 2 diabetes was enough to motivate them to change their diet. Similarly, James (2004) also found that individuals were most likely to make dietary changes after receiving a disease diagnosis. Oftentimes, after such a diagnosis, the individuals perceived themselves to be at a greater risk and were therefore more conscientious about their food choices. Ultimately, for many, this led to dietary changes (Delaney & McCarthy, 2014).

In addition, many barriers to healthy eating can also be operationalized as facilitators. Take provision of appropriate resources and availability of healthy foods for example. In Neill et al.'s (2011) analysis of facilitators and barriers to food acquisition among rural older women, participants came up with many strategies that made it easier to eat healthy. For example, buying in bulk and stockpiling non-perishable foods was seen as a doable approach. In addition, if they were able, some indicated that having a

homegrown garden made access to fresh fruits and vegetables much easier. Further, resources offered by grocery stores, such as discounts and sales, were reported by some to help them achieve their healthy eating goals. Other resources, like technology, were indicated as a primary motivator. Using the internet to search for recipes in addition to having greater capacity to store and freeze foods was also viewed as helpful (Neill et al., 2011).

Motivational/Efficacious Factors

In terms of motivation, much of the literature talks about the necessity of a sense of empowerment, or willpower to put in the necessary effort to eat healthy (Skinner et al., 2006). One participant in the Dye et al. (2003) study stated that an individual's mind has to be willing, rather, in the right place before a dietary change can be made. Other scholars also found that empowerment and a perception of control have been associated with improved adherence to dietary restrictions for diabetes (White et al., 2010). According to Wikby and Fagerskiold (2003) this willingness to eat was central to appetite and the desire to live. Some also found motivation to cook knowing that family meals brought people together. Also, preparing food with younger generations helped to pass on family traditions and was seen as a valuable legacy that was important to many older adults (Neill et al., 2011). In a similar vein, many older adults expressed that this was an important responsibility for them, serving as role models for their kid's health (James, 2004). Ho et al. (1991) called this empowerment personal efficacy, or the "anticipated success and willingness to follow the dietary guidelines" (p. 37). These authors stated that this was a necessary component in order for individuals to be motivated to make

dietary changes. In addition, Alizadeh and colleagues (2015) found that an appropriate level of self-efficacy in following dietary recommendations was another key motivator.

For others, personally valuing a healthy diet and the associated health benefits was a significant motivator (Neill et al., 2011). For example, Ho and colleagues (1991) found taste and the health benefits associated with eating healthy to be motivators to complying with dietary guidelines. In De Almedia et al.'s (2001) study, participants indicated that they were motivated to change their diet in order to stay healthy, prevent disease, and to promote their quality of life. In an exploration of adherence to dietary guidelines and its impact on quality of life and functional status of older adults, Gopinath and colleagues (2014) found that higher diet quality was associated with both better quality of life and increased functional ability. For many, this was a main motivating factor in adherence to dietary guidelines.

As there are a variety of barriers associated with healthy eating, so too are there a variety of facilitators. The present study sought to examine facilitators, or motivators, to eating healthy for older adults from the perspective of senior center staff and administrators. As previously alluded, such an approach allows for a holistic understanding of the problem from both the individual and organizational perspectives, as advocated by the social marketing steps proposed by Kotler and Lee in 2016. In order to fill this gap, the following question was asked:

RQ3: From a staff, caregiver, and administrator's perspective, what are the facilitators to eating healthy for older adults?

Older Adults' Attitudes related to Healthy Eating

As one can surmise, older adults' attitudes towards healthy eating are as diverse and individual as are their barriers and facilitators to eating healthy. Kearney et al. (2001) claimed that "for effective healthy eating promotion, it is necessary to understand the attitudes towards and beliefs about nutrition of the general public" (p. 1117). Further, Shepherd and Stockley (1985) mimicked the necessity, indicating that a participant's attitudes towards eating was an adequate predictor of actual intake. Hence, the present study examined attitudes towards healthy eating among the older adult population. The literature is saturated with older adults' attitudes related to healthy eating. The following review divides attitudes into two groups: favorable or positive attitudes related to healthy eating and unfavorable or negative attitudes related to healthy eating.

Favorable Attitudes Towards Healthy Eating

The overarching belief regarding eating a healthy diet is that it will improve health and wellness (Ho, Lee, & Meyskens, 1991). In addition, Ho et al. (1991) found that participants who believed in the health benefits were more amenable to the idea of adopting the advocated behavior in their own diet. With respect to bowel function, participants in the Ho et al. (1991) study perceived that healthy eating habits could help them mitigate and control bowel problems. Participants in James' (2004) study were specific regarding the nature of their attitudes. They indicated that women's interest in eating healthy was to lose weight; for both health and cosmetic reasons. Similarly, other participants in this study believed that each food item was associated with a specific health benefit. Take dairy for example, Kim, Reicks, and Sjoberg (2003) found that older adults believed that strong bones were a nutritional benefit associated with consuming

dairy products. Other researchers identified that older adults' beliefs regarding both the health benefits and risks of eating certain foods had an impact on their food consumption (Crockett, Heller, & Merkel, 1990; Ho, Lee, Meyskens, 1991; Rainey, Mayo, Haley-Zitlin, Kemper, & Cason, 2000).

Similarly, other researchers found that older adults seemed to possess a more favorable attitude towards healthy eating if the disease(s) they were trying to manage was long-term, or chronic. Hemphill, Parris Stephens, Rook, Franks, and Salem (2013) offered insight that this may be due to the fact that chronic diseases were perceived as more severe than temporary or acute diseases. Therefore, individuals with chronic conditions were more likely to make lifestyle changes, including eating healthy (Byrne, Walsh, & Murphy, 2005; Halm, Mora, & Leventhal, 2006; Meyer, Leventhal, & Gutman, 1985). In a similar thread, Kearney et al. (2001) identified that older adults, who presumably have more experience with chronic health conditions than younger adults, were more likely to make conscious efforts at eating healthy.

In terms of aging well, Halaweh, Dahlin-Ivanoff, Svantesson, and Willen (2018) revealed that older adults associate healthy eating habits with aging well. In a physical sense, this means good physical health, wellbeing, and longevity (Alizadeh & Salehi, 2015). Aging well, or active aging, includes cognitive components such as maintaining memory function, preventing cognitive decline, positive mental attitudes, increased life satisfaction, and low levels of anxiety and depression (Halaweh et al., 2018). The World Health Organization (WHO, 2002) defined active aging as "the process of optimizing opportunities for health, participation, and security in order to enhance quality of life as people age" (p. 12).

Interestingly, Delaney and McCarthy (2014) took their study in another direction, examining the moral, religious, and cultural aspects of food and related attitudes. They found that many described healthy eating as a continuous goal, one in which they must constantly strive to achieve. To these participants, eating healthy involved self-reflection, a change in perspective regarding eating as a source of pleasure, constant effort, and sacrifice of "bad" foods that taste good. Such an undertaking was viewed as "a morally good and virtuous endeavor, both for the spirit and the body" (Delaney & McCarthy, 2014, p. 108).

Apart from the health benefits, the literature cites many other reasons that influence favorable attitudes towards eating healthy. For example, in reference to dairy, Kim et al. (2003) identified practical reasons for eating healthy and consuming dairy. These practical reasons included taste, pairing well with other foods, and serving as a snack. In addition to the practical aspect, Bardach, Schoenberg, and Howell (2016) identified other attitudinal aspects related to healthy eating, including value and confidence. According to Bardach and colleagues (2016), value refers to the level, or degree of importance that the individual places on eating healthy. In terms of confidence, older adults indicated that they were more likely to eat healthy if they were confident in their ability to do so. In addition, confidence also referred to the belief that health benefits were attainable from eating better. Oftentimes, previous experiences heavily influenced this belief (Bardach et al., 2016).

For many, eating was both a cultural and a social experience (Schure, Turner Goins, Jones, Winchester, & Bradley, 2019). This social aspect was associated with positive affect and helped to motivate older adults to eat healthy. Mealtime at sites like

senior centers and assisted living facilities were favorably viewed as an opportunity to try new things, including seasonal vegetables, and an opportunity to interact with others (Iinuma et al., 2017). It is worthy to note that some cognitive disorders (e.g., eating disorders, depression, dementia) can contribute to aversive attitudes towards eating in general (Perez-Sanchez, Torres, & Morante, 2018).

Unfavorable Attitudes Towards Healthy Eating

Eating healthy is perceived as a stressful undertaking. Factors such as access to healthy foods, cost, and limited knowledge of preparation of healthy foods often contribute to this stress. The stress of it all generates negative attitudes towards healthy eating, which will be discussed at present. Participants in Moss, Still, Jones, Blackshire, and Wright's (2019) study even claimed that the word "diet" was problematic and unfavorable. The general consensus across the literature was that eating healthy is difficult. Similarly, these same participants reported that some unhealthy foods (e.g., salty kimchi) are a part of their culture; making it hard to eliminate. Delaney and McCarthy (2014) offered a good point. They stated, "different cultures have various socially constructed rules and taboos regarding "good" and "bad" ways of eating, many religiously influenced" (p. 105). To some, the idea of giving up their cultural heritage and adopting food of the dominant culture appeared offensive (James, 2004). Other scholars reported that attitudes related to eating were formulated and engrained from an early age and were also influenced by psychosocial and socioeconomic factors in addition to culture (Crockett & Sims, 1995; Hochbaum, 1981).

Participants in one study indicated that adhering to a restrictive diet (low-sodium in this case) was hard to do when you cook and/or eat with others who are not on

restrictive diets. In addition, the prevalence of "unhealthy" foods on restaurant menus made the prospect of eating out almost impossible. Likewise, the process, from meal planning, to grocery shopping and cooking, can be burdensome as all require reading food labels and learning new practices (Lee et al., 2017). In addition, some may not tolerate recommended foods, thereby further limiting their food selection. This was the case for some participants as Kim et al. (2003) identified. With respect to dairy, some were lactose-intolerant and foods containing dairy tended to cause an upset stomach. The same was also true with other healthy foods such as high fiber and high protein foods.

Others across the literature expressed a fatalistic attitude towards healthy eating. For example, participants in James' (2004) study indicated that they had to die of something, therefore a change in dietary habits was unnecessary. In Bardach, Schoenberg, and Howell's (2016) study, this concept of fatalism was influenced by individual's perception of old age. This perception was one where old age was expected to come with health problems and concerns as it was a normal part of aging, and there really was nothing that could be done about it. These low expectations associated with old age disincentivized people from making dietary modifications (Bardach et al., 2016). Likewise, others justified this fatalistic attitude by claiming that the locus of control for their health was on the provider, religion (e.g., God), family influences, genetics, and not themselves (Chen et al., 2016; Delaney & McCarthy, 2014). In one sample, 52% of participants asserted that no changes were necessary as their eating habits were already "good enough" (Kearney et al., 2001). Kearney and co-authors (2001) coined this notion as "optimistic bias" whereby others made social comparisons and considered themselves to be in better health than their counterparts. Sometimes this attitude was shaped by lack

of awareness of proper nutrition. Other times, the attitude was a result of the fatalistic beliefs described above. Likewise, some, including African Americans in the case of the James (2004) study, found that much of the nutrition-information lacked both personal and cultural relevance, making them less inclined to adhere to those recommendations. Similarly, Kearney et al. (2001) found that in their sample of adults in Ireland, many found nutrition-related advice lacked personal nuance. These researchers hinted at the need for tailored messaging in educational materials and health interventions. Chen et al. (2016) also found that low-literacy, too, impacted individual's locus of control when it came to eating healthy.

Other unfavorable attitudes related to healthy eating in the literature are the lack of taste associated with foods deemed "healthy." Some participants indicated that they automatically assumed that healthy foods were tasteless without even trying them first. For example, participants in Lee et al.'s (2017) study on sodium reduction felt that foods without salt had minimal taste. Oftentimes, healthy foods were thought of as boring and unsatisfying (Delaney & McCarthy, 2014). Similarly, social norms and the push for a healthful diet made others feel guilty and shameful, causing humiliation when eating foods deemed "unhealthy" (Chen et al., 2016; Delaney & McCarthy, 2014). One theoretical approach to measuring attitudes as they relate to behavior change, or rather, stages of behavior change, is the transtheoretical model first proposed by Prochaska in 1979. This model was used in evaluation of the present intervention.

Transtheoretical Model

There are many health behavior theories and models used in a wide variety of disciplines. The present study utilized the transtheoretical model, or stages of change

model (Prochaska, 1979), as there is sufficient evidence to support its efficacy in assessing how people change (Prochaska, Norcross, Fowler, Follick, & Abrams, 1992a). In addition, it has been utilized in related behavioral interventions involving smoking, exercise, and diet (Sutton, 1997).

First developed for utilization in psychotherapy, the transtheoretical model manifested as a result of the stages that individuals seemed to progress through during their attempt to quit smoking (Prochaska, Crimi, Lapsanski, Martel, & Reid, 1982). The central tenet of the model is that individuals progress cyclically through a series of stages when attempting to change a behavior. Therefore, each intervention aimed at behavior change should be tailored to the stage that the individual is in at that point in time. According to Prochaska, DiClemente, and Norcross (1992b) there are five stages that individuals pass through in a non-linear fashion. In the first stage, precontemplation, the individual has no desire or intention to change behavior. Prochaska, DiClemente, and Norcross (1992b) place individuals in this stage if they have no desire or intention to change within the next six months. The individual may not realize the need to make a change or may not want to make a change at that point in time. In the next stage, contemplation, the individual recognizes the need to make a change. The model's creators contend that in the contemplation stage, the individual considers making a change within the next six months (Prochaska, DiClemente, & Norcross, 1992b). The individual may think about making a change, weighing both the pros and cons of doing so, for a significant period of time. But at this point, the individual has not made a commitment to change. In the third stage, or preparation, the individual intends to take action to make a change relatively soon. Prochaska and colleagues (1992b) posited that

the individual intends to take action within the next month, having unsuccessfully made a change within the last year. During this stage, small changes may be made, however, no plans for action have been generated. In the fourth stage, action, the individual actually starts making recognizable changes. Individuals are usually considered to be in this stage if they are actively making behavioral changes within a period of one day to six months (Prochaska, DiClemente, & Norcross, 1992b). Notable time, energy, and effort are expended in this stage. During the last stage, maintenance, the individual is working to maintain the behavior change. This effort is ongoing, lasting from six months to an indefinite period of time (Prochaska, DiClemente, & Norcross, 1992b).

In addition to the stages of change, the second major dimension of this model is the processes of change, or mechanisms that the individual uses to make the change. There are 10 processes that have received the most support in the literature: consciousness raising, self-reevaluation, self-liberation, counterconditioning, stimulus control, reinforcement management, helping relationships, dramatic relief, environmental reevaluation, and social liberation. Consciousness raising is when the individual starts to gain self-awareness of the problem behavior through observations, confrontations, and information gleaning. Self-reevaluation is a reflective process involving a rethinking of values, emotions, and past behavior. Self-liberation is the commitment and belief in one's ability to change. Counterconditioning is when the individual replaces the problem behavior with something else, thus making a substitution. Stimulus control involves the avoidance of objects, people, situations, etc. that may tempt or encourage the problem behavior. This may involve changing the environment and one's social network. Reinforcement management is the act of rewarding oneself for the changes and

accomplishments made. Helping relationships refers to reliance on social support. Dramatic relief involves emotional expression and healing. Environmental reevaluation is a reflection of the physical environment through observation and gleaning of information. Lastly, social liberation is moving beyond the self, working to help others with problem behaviors through empowerment, policy, and intervention (Prochaska, DiClemente, & Norcross, 1992b). It is worthy to note that each process can involve a wide variety of actions, activities, and techniques.

Both the stages and processes of change have a systematic relationship as certain processes are utilized at different stages in the change process (Prochaska & DiClemente, 1983, 1984, 1986). For example, consciousness raising, dramatic relief, and environmental reevaluation are most commonly utilized in the precontemplative stage. Self-reevaluation tends to be associated with contemplation. Self-liberation is a process reserved for preparation. Likewise, reinforcement management, helping relationships, counterconditioning, and stimulus control are processes for the action and maintenance stages (Prochaska, DiClemente, & Norcross, 1992b).

As previously alluded, the processes of change can indicate the stage at which an individual is in with regards to changing his/her behavior. The present study intended to measure the processes of change utilized by participants both pre- and post-intervention. Therefore, the following hypothesis was conceived:

H3: After participation in the nutrition education intervention, older adults will portray a more favorable attitude towards each of the following processes of change as they relate to healthy eating behaviors: (a) consciousness raising, (b) self-reevaluation, (c) social liberation, (d) stimulus control, (e) reinforcement management, and (f) helping relationships.

Other constructs associated with the transtheoretical model are self-efficacy and decisional balance. Self-efficacy refers to the degree to which an individual believes that he/she has the capacity to perform the change in behavior. Decisional balance, as alluded to earlier, is the weighing of the pros and cons of engaging/not engaging in a given behavior. According to DiClemente (2003) and Velicer et al. (1998) these two constructs serve as dependent outcomes or variables.

The present study utilized the transtheoretical model to assess stage of change and processes of change pre- and post-intervention. This allowed the researcher to determine whether the intervention impacted participants' readiness to change with regards to healthy eating behaviors. As there is minimal evidence dictating the time period within which an individual can be expected to move from one stage to another during an intervention, the following research question was posited:

RQ4: After participation in the nutrition education intervention, will older adults move through any of the stages on the transtheoretical model from where they were at baseline with regards to healthy eating?

Conceptual Framework

The present study utilized both social marketing principles and pillars of the RE-AIM framework as both have been widely applied in similar interventions, as cited

below. However, it is worthy to note that very few studies have used both frameworks in concert with one another. This is something that sets the present study apart from other interventions.

More specifically, social marketing principles were used to guide collection of formative data to gain a better understanding of the target audience and the behavior in question. This perspective factors in costs, benefits, and barriers to adoption of the advocated behavior that may not have been considered otherwise. In addition, this approach helped to identify strengths and weaknesses that are internal to the DAIL. Likewise, opportunities and threats external to the DAIL were accounted for and built upon. Likewise, the five pillars of the RE-AIM framework (reach, efficiency, adoption, implementation, and maintenance, Glasgow, 1999) were used to supplement several of the social marketing steps, including development of both the evaluation and implementation plans. The two frameworks complement each other as both are involved with similar aspects of intervention development, monitoring, and maintenance. Taken together, this approach allows for a more precise perspective on the implementation, evaluation, and sustainability of the proposed intervention.

Social Marketing

There are many different definitions of social marketing available in the numerous textbook editions. For example, Lee and Kotler (2016) define social marketing as "[the process of] influencing behaviors, utilizing systematic planning processes that apply marketing principles and techniques, focus on the priority of the target audience segments, and deliver positive benefit for the individual and society" (p. 8). Many advocate that social marketing applies traditional marketing principles in combination

with social science theories to promote behavior change (Truss, Marshall, & Blair-Stevens, 2010). Some argue that social marketing specifically utilizes social science theories and approaches that relate specifically to health education and health interventions (Andreasen, 2015). The goal of any social marketing endeavor is to do one or more of the following: influence the target audience to a) accept a new behavior, b) reject an undesirable behavior, c) modify a current behavior, or d) abandon an undesirable behavior. Put briefly, social marketing is a systematic, customer-focused process for developing behavioral interventions (Lee & Kotler, 2016). Therefore, as traditional marketing promotes purchase of goods and services, social marketing promotes acknowledgement, elimination, or desertion of a behavior (Kotler, Roberto, & Lee, 2002). The behavior is generally one that enhances individual or societal wellbeing (Andreasen, 2015).

Social marketing takes a bottom-up, participatory approach to the design of products and/or services that are generated for both individual and societal good (Evans, Silber-Ashley, & Gard, 2007). In addition, the competition in social marketing are existing behaviors in which the target audience engages and receives some benefit from. Likewise, the target audience is selected based on the prevalence of the problem, the marketer's ability to reach the target audience, and each individual's readiness to change (Lee & Kotler, 2016).

Contexts. Since its inception in the 1970's, social marketing has been applied in numerous contexts, including: environmental protection, public health, and worksite wellness (Lee & Kotler, 2016). More specific to a health context, it has been utilized to raise awareness of prescription drug abuse (Yanovitsky, 2017), initiate conversations

about HIV/AIDS status with casual sex partners for men who have sex with men (Lombardo & Leger, 2007), and to encourage physical activity among youth (Asbury, Wong, Price, & Nolin, 2008) to name a few.

Steps. According to Lee and Kotler (2016) there are ten steps in the social marketing process, each of which are outlined as follows:

1. The social issue, background, purpose, and focus are described. Based on statistics and the researcher's area of interest, a problem, or social issue is selected. A thorough literature search is conducted in order to paint a more complete picture of the problem background. In addition, this information is used to define the purpose of the social marketing plan and to justify the focus and methods used to attain study objectives.
2. A situation analysis is conducted. This involves an assessment where the strengths, weaknesses, opportunities, and threats (SWOT) are considered independently. This process typically consists of formative research involving both primary and secondary sources.
3. A target audience is selected. This process relies heavily on the prevalence of the problem, the ability to reach the audience, and the prospective audience's readiness to change.
4. Behavior objectives and goals are set. This process involves the careful construction of both program outcomes and overarching goals. All objectives should be based on the SMART framework, whereby they are specific, measurable, achievable, relevant, and time-bound.

5. Target audience benefits, barriers, motivators, competition, and influential others are all identified. This step shares a great deal of commonality with the formative research process.
6. A positioning statement is developed. A positioning statement is the way in which the advocated behavior is framed for target audience consumption. It includes information related to the benefits of adopting the behavior and how the behavior can be more easily implemented into daily life.
7. A strategic marketing mix is developed. The marketing mix involves conceptualization and development of the four P's of marketing: product, price, place, and promotion. The product is broken down into three types: actual product, core product, and augmented product. The actual product is the behavior that the social marketer is promoting (e.g., healthy eating in the case of this study). The core product consists of the benefits associated with the advocated behavior (e.g., weight loss, improved blood sugar control, decrease in hypertension, etc. in the present study). The augmented products are the tangible or intangible goods and services that make the advocated behavior easier to adopt. In the case of the present study, augmented products included the handouts, visuals, and other information provided during the intervention. Each of these products were carefully crafted and included in the positioning statement. The price is the cost associated with performing the behavior. This can be either a monetary or non-monetary cost (e.g., resources such as time). The place is the location (physical or otherwise) where the advocated behavior can be performed. It also encompasses the means by which the advocated behavior is accessible.

Placement is critical and needs to be based on considerable formative research. Finally, promotion involves the direct messaging of the advocated behavior, messengers, and the strategies employed to get the message out (e.g., communication channels, message format, source, etc.).

8. A plan for monitoring and evaluation is created. This plan should involve routine evaluation procedures that allow for continual intervention improvement such that the assessment loop can be closed (Maki, 2002).
9. A budget is developed and funding sources are pursued. This step may involve the exploration of funding opportunities and subsequent write-up of grants. Such funding is necessary to promote the sustainability of the intervention.
10. An implementation plan is generated. This plan often involves procedures, a protocol, and a timeline for program adoption, evaluation, and revision.

RE-AIM

As previously mentioned, the RE-AIM framework is one approach to designing, implementing, and evaluating public health programs. Its developers posited that it be used to conceptualize the public health impact of an intervention (Glasgow, Vogt, & Boles, 1999). In the present study, this framework comes into play in step eight of the social marketing plan. There are five different dimensions associated with RE-AIM, each of which were incorporated into the present evaluation.

Dimensions.

Reach. This dimension is measured at the individual level in terms of the number of participants (participation rate) and the representativeness of the participants. Rather, how does the sample of individuals that participated in the program differ from the

general target population (Glasgow et al., 1999)? This dimension reflects step three of the social marketing plan whereby the target audience is described in addition to potential secondary audiences.

Effectiveness. This dimension, too, is measured at the individual level. Akin to level eight in Lee and Kotler's (2016) social marketing approach, it is the level of impact on outcomes and quality of life imparted by the intervention.

Adoption. This dimension is measured at both the setting and organizational levels. It constitutes the participation rate and representativeness of the setting. More specifically, it illuminates the number of organizations that adopted the program and how reflective those organizations (and the people they serve) are of the target population (Glasgow et al., 1999). This dimension is another part of the monitoring and evaluation required in step eight of the social marketing plan.

Implementation. This dimension is measured at both the setting and organizational levels as well. It involves a rigorous evaluation of the program delivery process and considers factors such as facilitator fidelity to program content and materials. It answers whether the program was delivered as intended by the developers. For example, were any modifications made? Was the recruitment process followed? Was any of the material eliminated? If so, what was the reasoning (Glasgow et al., 1999)? Such outcome measures, too, are consistent with social marketing practices of intervention monitoring and evaluation.

Maintenance. This dimension is measured at both the individual and setting levels. It entails measuring the long-term effectiveness of the program on participants, similar to step ten in the social marketing process. More specifically, did participants

continue the advocated behaviors at six-months post-intervention? What about a year later (Glasgow et al., 1999)? Longitudinal data are critical to determining what works and what does not in terms of tactics to elicit long-term health behavior change. In addition, data collected under this dimension offer insight into processes that can be used to sustain the program long after the researcher, and even the funding source(s) are gone. Likewise, it helps the developers to determine necessary modifications that need to be made to improve the program for future implementation and use.

In summary, Glasgow and colleagues (1999) contended that these are the five most important dimensions for evaluating the potential public health impact of various programs. They argued that an equal emphasis should be placed on both internal and external validity in the research design, methods, and data collection procedures. In addition, the framework was intended to offer the bridge that moves best processes into best practices. Finally, this framework, if applied correctly, ensures that all essential program elements are considered throughout the process. It is for these reasons that RE-AIM moves researchers beyond traditional efficacy and effectiveness trials as a holistic approach is undertaken systematically and rigorously.

It is worthy to note that while all dimensions are important in their own unique way, not all dimensions have to be included and assessed at the same time point. Likewise, a mixed-methods approach is ideal in order to triangulate the data and make best-practice decisions (Glasgow et al., 1999; Glasgow et al., 2019). Fink (2013) explains, "the public health literature is filled with examples of well-intentioned but unevaluated programs" (p. 3). The present study intended to contribute to filling this gap in the realm of healthy eating behaviors among older adults.

Healthy People 2020

The definition of healthy eating proposed by Healthy People 2020 was adopted for this study.

> According to the U. S. Department of Health and Human Services and the U. S. Department of Agriculture (2005), Americans with a healthy diet: a) consume a variety of nutrient-dense foods within and across the food groups, especially whole grains, fruits, vegetables, low-fat or fat-free milk or milk products, and lean meats and other protein sources, b) limit the intake of saturated and trans fats, cholesterol, added sugars, sodium (salt), and alcohol, and c) limit calorie intake to meet caloric needs.

In addition, the study aims are in line with many of the Healthy People 2020 objectives. Briefly, the U. S. Department of Health and Human Services identifies national health priorities in the form of objectives every decade. At present, the 2020 objectives encompass 42 content areas with 1,300 objectives. The National Center for Health Statistics (NCHS) ensures the nation is making progress towards meeting the objectives during the 10-year period. Two of the four overarching Healthy People 2020 objectives are related to this study. First, "to create social and physical environments that promote good health for all" and second, "to promote quality of life, healthy development, and healthy behaviors across all life stages" (CDC, National Center for Health Statistics, 2019).

In addition, the present study addressed four of the 42 content areas (health communication and health information technology (HC/HIT); educational and

community-based programs (ECBP), nutrition and weight status (NWS), and older adults (OA)) with the following objectives:

HC/HIT-13: Increase social marketing in health promotion and disease prevention.

ECBP: Increase the number of community-based organizations (including local health departments, Tribal health services, nongovernmental organizations, and State agencies) providing population-based primary prevention services in chronic disease and nutrition.

NWS-7: Increase the proportion of worksites that offer nutrition or weight management classes or counseling.

NWS-14: Increase the contribution of fruits to the diets of the population aged two years and older.

NWS-15: Increase the variety and contribution of vegetables to the diets of the population aged two years and older.

NWS-16: Increase the contribution of whole grains to the diets of the population aged two years and older.

NWS-17: Reduce consumption of calories from solid fats and added sugars in the population aged two years and older.

NWS-18: Reduce consumption of saturated fat in the population aged two years and older.

NWS-19: Reduce consumption of sodium in the population aged two years and older.

OA-3: Increase the proportion of older adults with one or more chronic health conditions who report confidence in managing their conditions.

Source: U.S. Department of Health and Human Services (2019a-d).

Justification

It is evident that there is a gap in the literature related to interventions promoting healthy eating habits among older adults using the transtheoretical model. Filling this gap is directly in-line with the mission, goals, and objectives of the Nutrition Program in Kentucky. Therefore, the present study attempted to fill that void and to contribute to the literature. Moynihan et al. (2007) indicated that a great majority of older adults lack basic nutrition knowledge. Therefore, Moynihan and colleagues (2007) charged health practitioners and scholars alike to address this barrier to healthy eating. The U.S. Department of Health and Human Services (1998) argued that older adults are readily seeking health information and that they are willing to make behavior changes in order to maintain their health and independence. Wei and co-authors (2018) argued for the usefulness of community-based, nutrition-specific programs to address malnutrition among older adults. Khole and Soletti (2018) echoed this statement, claiming the inherent need to encourage healthy eating among this population. Likewise, Prochaska, DiClemente, and Norcross, (1992a) argued for the "need to assess the stage of a client's readiness for change and to tailor interventions accordingly" (p. 1110).

CHAPTER THREE: METHODS

Elderly Nutrition Program Overview

One mean of providing high-quality nutrition care is through the services rendered by the Kentucky Cabinet for Health and Family Services, Department for Aging and Independent Living (DAIL). The department is partitioned into fifteen area agencies in Kentucky. The agency working with the researcher on this study is the Northern Kentucky Area Development District (NKADD). Each area agency oversees the Nutrition Program for the Elderly as mandated by the Older Americans Act of 1965 (910 KAR 1:190). The Nutrition Program is responsible for the following: providing home-delivered and congregate meals, coordinating services in the community, and delivering nutrition education to qualified individuals (Kentucky Cabinet for Health and Family Services, 2014).

To qualify for DAIL services, a case manager or independent care coordinator reviews documentation to ensure that the individual is aged 60 or older and/or, due to illness or incapacity, is unable to attend congregate meal services and does not have a qualified member in the household to prepare nutritious foods (Kentucky Cabinet for Health and Family Services, 2014a).

Intervention Overview

The Nutrition Education intervention, as required by the Older Americans Act of 1965 as amended 910 KAR 1:190, was designed to provide older adults participating in the Nutrition Program with nutrition education on a monthly basis. At present, no standardized nutrition education is provided across sites. Therefore, the intervention piloted in the present study was developed to fulfill this requirement. The intervention

provided 12 lesson plans, the required handouts for each lesson, and an outline to help the instructor facilitate each lesson. Lesson topics were based on multiple factors, including results of a nutrition education survey distributed to congregate meal recipients and the policy and procedures mandated in the Standard Operating Procedures (Kentucky Cabinet for Health and Family Services, 2014b). Lesson topics included an overview of nutrition basics, such as an explanation of each of the five food groups, appropriate portion sizes, and how to read food labels for nutrient content. As the material progressed, specific macronutrients were covered, such as fat, carbohydrates, and protein. Each were discussed as they related to chronic health conditions or disease states such as diabetes and heart disease. Further, other nutrients were covered, including added sugars and fiber. Participants learned to identify foods high in each and how much to consume. Lastly, other components of the intervention were practical tips for grocery shopping on a tight budget, healthy cooking and snacking for one, and food safety. Refer to Appendix A for a more detailed description of lesson content. Topics were intended to give participants a well-rounded nutrition education that was both relevant to individual dietary needs and health conditions and necessary to improve health and wellness.

Study Aims

The primary purpose of this study was to evaluate the overall impact of a nutrition education intervention developed specifically for older adults aged 60-95. In so doing, the intervention aimed to do the following among this population:

A. Assess barriers and facilitators to healthy eating for older adults from the perspective of senior center managers and administrators who work closely with them.

B. Increase intention to adopt healthy eating behaviors by moving participants through the stages of change.
C. Improve agreement with processes of change related to a healthy diet, including:
    a. Consciousness raising
    b. Self-reevaluation
    c. Self-liberation
    d. Stimulus control
    e. Reinforcement management
    f. Helping relationships
D. Increase knowledge of how to properly read a nutrition label for:
    a. Calorie content
    b. Grams of carbohydrate and how they translate into carbohydrate servings
    c. Saturated fat content
    d. Percentage of daily value of calories
    e. Ingredients, including potential allergens
E. Promote behavior change by increasing the purchase of fruits, vegetables, whole grains, lean protein, and dairy as observed through comparison of grocery store receipts from pre- to post-intervention.

The secondary aim was to decrease the risk of malnutrition among older adults, aged 60-95 that participated in the Nutrition Program. Although the Centers for Disease Control and Prevention (2015) define older adults as those age 65 and older, the present study targeted those age 60 and older as 60 is the age at which an individual becomes eligible for DAIL services. Therefore, some participants were included even though they did not

technically classify as older adults. Assumptions surrounding causation cannot be established in this research design as it was not a true experiment with a control group. Therefore, any information gleaned from this study will be used to guide future research efforts.

Research Design

In order to address the hypotheses and research questions posed, a mixed methods, multi-component research approach was warranted. Data was collected by both qualitative and quantitative means. Each method is discussed at length below.

Formative Focus Group

Qualitative data was collected via focus groups with senior center managers and administrators. Prior to the beginning of the focus group, the principle investigator (PI) reviewed consent procedures. Then, the PI collected signed consent documents prior to beginning the session. The goal of this component was to establish barriers and facilitators to providing a health intervention in the senior center setting. Sessions lasted approximately 90 minutes. The researcher aimed to have six to twelve participants in the focus group in order to foster a feeling of comfort and to generate good discussion (Lindlof & Taylor, 2011). Information gleaned from the focus group helped the researcher to better explain changes in data from pre- to post- in the quantitative component. Likewise, these data helped to illuminate areas in which the intervention can be adapted for improved outcomes in the future.

Participant Sample. For the formative focus group, the participant sample was drawn via convenience and snowball sampling from individuals currently working as administrators or staff at a senior center or nutrition site in one or more of the following

counties: Boone, Campbell, Carroll, Gallatin, Grant, Owen, Kenton, and Pendleton. These counties were chosen as they represent the region through which the PI has a partnership. In addition, senior center administrators and older adults in each of these counties were briefed and were eager to implement the intervention. Likewise, the human service specialist in this region had been collaborating on the intervention development for several years and had achieved buy-in and interest from site administrators in each of these counties.

Measure. A focus group protocol was developed to glean current practices of older adults related to healthy eating. In addition, the questions were geared to assess barriers and facilitators to healthy eating among this population from the perspective of those who work closely with them. Prior to the scheduled focus group, the protocol was reviewed by individuals similar in age and other demographic factors to the target participant sample for accuracy.

Quantitative Assessment of Intervention

A pre/post design was utilized for the quantitative component of this study. Prospective participants were guided through the consent procedure prior to data collection and at the beginning of the intervention. The PI collected all signed consent forms. No research activities took place until all consent forms were signed and questions were sufficiently answered. All data collection measures (demographic survey, modified S-weight & P-weight healthy eating questionnaire, grocery store receipts, and the knowledge assessment) were collected at the start of the intervention.

The intervention consisted of 12 units pertaining to nutrition-related topics of interest among older adults. Each unit was delivered in a one-hour, interactive, face-to-

face session by a registered dietitian. The intervention was taught over a six-week period. Behavioral, cognitive, and attitudinal data were collected at two time points. Time one served as baseline data collected pre-intervention. Time two was immediately post-intervention and served as outcome data. The same individuals were sampled at both points in time.

Participant Sample. For the quantitative assessment, the participant sample consisted of older adults (aged 60-95) who participated in the Nutrition Program at either a nutrition site or their local senior center in one of the following counties: Boone, Campbell, Carroll, Gallatin, Grant, Owen, Kenton, and Pendleton. While older adults are defined as those age 65 and above for Medicare purposes, the present study included individuals aged 60 and older as that is the age at which they become eligible for DAIL services (Centers for Disease Control and Prevention, 2015).

The following were inclusion criteria used to screen each prospective participant: men and women aged 60 to 95 who were either a participant in the Nutrition Program or were eligible to receive Nutrition Program services. Prospective participants were excluded from the study if they were age 59 or under, above the age of 95, or did not qualify for Nutrition Program services.

Knowledge Measure. Originally developed to assess health literacy, Pfizer's (2011) "Newest Vital Sign (NVS)" tool was used to assess participant's knowledge of basic nutrition information. This measure has been validated in multiple studies and is intended to evaluate health, and further, nutrition knowledge (Osborn et al., 2007; Rowlands et al., 2013; Shah et al., 2010; Stagliano & Wallace, 2013; Weiss et al., 2005). Therefore, it was selected to assess nutrition knowledge in the present study. Procedure

for administration of this measure included provision of a mock nutrition label. Participants were then guided through a series of six questions, each referencing a different part of the label. For example, the first question solicited participants to indicate the total number of calories in the ice cream container. Likewise, the second question asked participants to identify the number of grams of carbohydrate contained in one serving. The instrument was scored based on whether the answer to each of the six questions was correct. If the answer was correct, a score of one was assigned. Alternatively, if the answer was incorrect, a score of zero was assigned. The total number of points were summed. A score of zero to one suggested a 50% or greater likelihood of limited health literacy. A score of two to three indicated the potential for limited health literacy. Lastly, a score of four to six indicated adequate health literacy. For the purposes of the present study, scores were assigned as mentioned above, based on correctness. Each question was then independently evaluated to assess knowledge related to reading the following aspects of a food label: caloric content, grams of carbohydrate, saturated fat content, and determination of the presence of allergens. See Appendix B for a copy of this measure.

Attitudinal Measure. The S-Weight and P-Weight questionnaire was modified to reflect healthy eating habits (Andres, Saldana, & Gomez-Benito, 2009; Andres, Saldana, & Gomez-Benito, 2011; Andres, Saldana, & Beeken, 2015). The modified questionnaire contained 61 items. It assessed the stage of change that an individual was in with respect to diet. In addition, the modified version of this measure assessed five of the 10 processes of change. Processes of change incorporated were consciousness raising, self-reevaluation, stimulus control, reinforcement management, and helping relationships

(Prochaska, DiClemente, & Norcross, 1992b). Statements were grouped into the following sections: overall health, fruits and vegetables, carbohydrates, protein, fat, and salt. Items were evaluated on a 5-point Likert scale with endpoints ranging from one = strongly disagree, to five = strongly agree.

Behavioral Measure. Itemized grocery receipts from Nutrition Program clients were collected pre- and post-intervention. Receipts were analyzed for food purchasing behavior. Food items were coded by food group (i.e. low-fat versus high-fat dairy, lean versus high-fat protein, fruits, and vegetables). In addition, this instrument also assessed food purchasing behaviors among the target sample. These questions were modified from Thompson et al. (2011) and a survey administered by the National Grocer's Association in 2018.

CHAPTER FOUR: RESULTS

This chapter provides a comprehensive overview of the three components included in this study. Each component addressed certain research questions and hypotheses. The mixed methods approach allowed for a more complete picture of the phenomena under question; eating habits and nutrition education among the older adult population (those aged 60 and older) (Creswell & Creswell, 2018). The formative focus group and process evaluation focus groups comprised the qualitative portion, while the modified S-weight and P-weight healthy eating questionnaire, grocery store receipts, and the "Newest Vital Signs" tool (Pfizer, 2011) comprised the quantitative portion. Findings from the formative focus group with senior center managers and administrators who oversee components of the Elderly Nutrition Program, as mandated by the Older Adults Act of 1965, will be discussed first (910 KAR 1:190) (Kentucky Cabinet for Health and Family Services, 2014). This focus group was conducted independently of the intervention. In addition, the formative focus group sought to address research questions one through three: current eating habits of older adults, barriers to eating healthy, and motivators to eating healthy among this population, respectively.

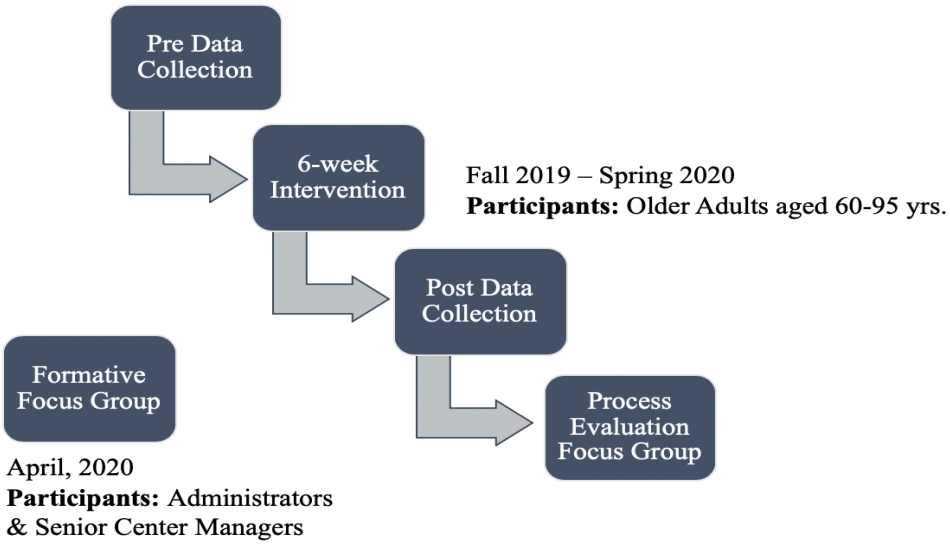
The second component involved the six-week, 12-unit intervention itself. The researcher administered the following survey instruments (demographic questionnaire, Pfizer's (2011) Newest Vital Signs tool, and the modified S-Weight and P-Weight questionnaire for healthy eating) to all participants at the beginning, prior to the first lesson. In addition, participants received both written and verbal instruction on collection of the grocery store receipts for a month prior to the intervention. After the intervention was completed, participants were administered the same three survey instruments. In

addition, they were given both written and verbal instructions on submitting grocery store receipts for the month following the intervention. This component allowed for a quantitative evaluation of the intervention using the transtheoretical model as a guide.

The last component consisted of two focus groups and one in-depth interview, all of which occurred after the intervention was completed at each site. Participants included those who had participated in the 12-unit curriculum. This phase was considered to be a process evaluation, as it examined intervention facilitation, including effective strategies and potential areas for improvement. In addition, this component provided participants an opportunity to offer feedback on the program in multiple areas, including: lesson length, content, means of instruction, and retention strategies. Combined, quantitative and qualitative data will offer the researcher additional insight into ways to modify and improve the intervention for future use. See Figure 1 below for a depiction of the data collection process.

Figure 1.

Data Collection Process



Formative Focus Group Results

The first component consisted of a focus group with individuals who work with older adults in the community. The focus group was conducted independent of the intervention. A total of eight participants (N=8) took part in the focus group in April, 2020 via teleconference. At the time of the study, each participant served either in an administrative capacity or as a senior center manager in one or more senior centers across the eight counties included in this study. A mix of administrators and senior center managers from urban and rural areas participated, giving a broader perspective on the eating habits of older adults in Kentucky. Data were audio-recorded during the focus group session. The audio recording was then transcribed verbatim. The purpose of this component was to gain a better understanding of the current dietary habits of older adults in addition to both barriers and motivators to eating healthy. This component addressed the following research questions:

> **RQ1:** What are the current eating habits of older adults participating in the Nutrition Program?
>
> **RQ2:** From a staff, caregiver, and administrator's perspective, what are the barriers to eating healthy for older adults?
>
> **RQ3:** From a staff, caregiver, and administrator's perspective, what are the facilitators to eating healthy for older adults?

It is important to get multiple perspectives on an issue. Therefore, input from these providers was sought to help the researcher better understand inadequate dietary intake and malnutrition risk among older adults that the study, and further, the nutrition intervention itself, seek to address.

Reliability

Two researchers independently coded the entire transcript using thematic analysis (Braun & Clarke, 2012). The principal investigator first read the transcript in total, making notes and forming a broad overview of potential themes. Next, the principal investigator organized the data into themes to create "patterns of meaning" (Braun & Clarke, 2012, p. 57). Afterwards, a codebook was developed. Both researchers worked to refine the codebook iteratively, as new themes emerged throughout the dataset. NVivo 12 software (QSR International Pty Ltd., 2020) was used to organize and code the data. The codebook was organized into four main themes: current eating patterns, barriers to eating healthy, attitudes towards eating healthy, and motivators to eating healthy. Further, each main theme was divided into either three or four subthemes, as outlined below. Each theme was designed to be mutually exclusive. Therefore, phrases of text were assigned to a theme if the meaning in the text fell within the definition established in the codebook. After the transcript was coded, both researchers discussed discrepancies, refined the codebook, and adjusted the coding accordingly. A percent agreement ranged between 96% and 100% for the 14 total themes. This percent agreement was achieved among the two researchers. See appendix C for a copy of the codebook.

Current Eating Habits of Older Adults

In response to RQ1 on current eating habits of older adults, the formative focus group discussion was conducted with women working with this population. Three subthemes emerged during the discussion on current eating habits: 1) convenience foods, 2) grazing, and 3) home cooking. Convenience foods encompassed dining out or preparing meals at home with minimal stovetop cooking (e.g., heating up a frozen meal

in the microwave). Grazing involved snacking throughout the day, often on whatever food was available, regardless of whether or not it was healthy. Home cooking involved preparing meals with multiple ingredients using a stove and often a recipe. Each of these subthemes is discussed in greater detail below.

Table 1.

Emerging Subthemes for Current Eating Habits of Older Adults

Theme	**Subtheme**
Current Eating Patterns	Convenience Foods
	Graze
	Home Cooking

Note. This table previews the three major subthemes identified in the formative focus group dataset under the theme: current eating patterns.

Convenience Foods. The most prevalent reoccurring theme with regards to eating habits revolved around convenience foods. For the purpose of this study, convenience foods were defined as: 1) eating snack items or foods that do not require cooking, 2) heating food up in the microwave (e.g., pre-packaged items, fast food), or 3) dining outside of the home. In terms of snack items, participants indicated that older adults tended to snack out of boredom, grabbing whatever was available. For example, one participant contended, *"no they're really not eating healthy because they're bored. And so they're eating the cakes, the candy, and stuff that's not nutritious."* Not only was boredom a factor in snacking, so too was social isolation, or loneliness, as exhibited by this participant,

> *And then also our seniors, when they leave from us, they're alone. And it's a lot easier to open up something that is pre-packaged, I mean a little bit more convenient. So fixing a meal and things like that it's just like, "eh, it's just me, I'm*

alone. I'm just going to get this Debbie snack cake or something like that." So it's – the healthier stuff is not exactly convenient.

In addition to boredom and social isolation, older adults were simply unmotivated to put in the necessary time and effort required to cook, as expressed here, *"but I also think that, um, it's just out of convenience. So not wanting to make something – and if they do make something it's quick or – or maybe not as healthy."* In response to this lack of motivation, older adults succumbed to the convenience of heating food up in the microwave, as illustrated below,

The Home Chef meals…a lot of the seniors said that even though things are already portioned out for them, already cut up or whatever, there was too many steps and they didn't like doing that and most of them just even said that they just use their microwave. I mean, I think that the convenience of a microwave…they just say, "if it's not something I can fix in the microwave…" So even though it was portioned out there for them, there were too many steps, so it seems like at home a lot of them like to utilize that, they just don't use their stove anymore.

Leftovers were viewed as a convenience food as well with many older adults taking food to-go from the senior centers. In response to leftovers, one participant elaborated,

If they go home…if they're home by themselves, they're not going to eat that much or they're not going to cook for themselves. Um, they will eat everything in sight when they're at the center [laughs] and even if there's something – if it's something leftover, like when we have a potluck or something like that, they'll take a bunch of everything home with them. Oh yeah! But, um, when they get

home they're not going to open up that can or fix a regular meal. They're just going to eat whatever is convenient there.

Many individuals dined out at the senior center on a regular basis, as meals are served once per day, five days a week. For the purpose of this study, eating at the senior center was considered dining out. One participant commented on this habit,

They come in, they have coffee. There's always something there for breakfast so they eat what is there for breakfast even though it may say on the schedule that we'll eat at 12, they're hungry at 11:30 [laughs] and they'll want to eat then. Um, they get upset if they're waiting on the congregate meal and they're [the congregate meal provider] running a little bit late and we're like, "where is he?" [Laughs]. I mean, you just can't get it ready for them fast enough. We know that they're eating most everything that they eat during the day when they come to the center.

Another participant agreed that many older adults rely on food provided at the senior centers, *"a lot of my seniors, they get most of their food – the majority of their food when they're at the center."* Others spoke of the temptation to grab fast food since it was close by in more urban settings, *"fast food is what they most get here is fast food. It's more convenient."* Another claimed, *"it's probably not as healthy as it would be if you had, you know, the fresh vegetables and fruits, so I would say the convenience of fast food."* In addition, another participant expanded on the tendency to dine out, *"but for the most part the drive-thru is the more convenient choice, not necessarily the healthiest choice. But I do see more people gravitating towards the restaurants versus, you know, packing or eating the congregate meal."* In conclusion, while the congregate meals are popular, for

some, fast food is even more popular due to the added convenience. Another eating habit that is convenient is grazing, which will be discussed next.

Grazing. Related to this notion of convenience foods, many participants reported that seniors prefer to snack throughout the day as opposed to eating a complete meal. Conceicao et al. (2014) conceptualized grazing as a pattern of eating a series of small portions of food at least two or more times throughout a 24-hour period. According to these authors, most individuals engage in this behavior unintentionally (Conceicao et al., 2014). Some participants attributed this tendency to graze out of a desire for convenience, as illustrated in the preceding theme. Some participants mentioned more specific, intentional, health-related reasons for grazing; particularly sleeping quality, as evidenced below,

> *But there is something to that that they don't like to eat large quantities. A lot of them, before they go to bed, because they don't sleep well or it [food] gets them upset, because they have to get up through the night. I mean, I think they kind of tend to have a snack around…I mean for a bunch of reasons, but that's just one reason. They don't like to have a lot [to eat] when they go to bed.*

Another participant reiterated this habit of grazing throughout the day as opposed to eating a larger meal before bedtime, *"some of the seniors say that they actually want to eat lightly because they actually sleep better when they don't have too much dinner. And I know that joke where they say, "seniors are eating dinner at 4 o'clock."* For some, the tendency to graze may be unintentional, while for others, it may be entirely intentional. One participant elaborated on the unintentional side to this habit; snacking out of boredom, *"no, they're really not eating healthy because they're bored. And so they're*

eating the cakes, the candy, and stuff that's not nutritious because some of them can't get to the store to get the healthy foods they need." In response to this inconvenience, one participant suggested teaching older adults how to prepare nutritious snacks to go along with their lifestyle,

> *Maybe focusing on like, um, you know, a lot of people have said that they just don't want to fiddle with doing a lot – maybe like simple, healthy snacks in the evening. You know, something that they can actually be like, "this is the healthiest, simple thing if you're just going to be a grazer or you're going to be someone that's not going to eat a full meal in the evening.- here's where you can get the most, um, nutrition for your bang." You know, just something simple you know that they know that's just simple that wouldn't be work that they're actually having to cook, "this is just a simple thing, and this is the most nutritious snack you can go for."*

These findings suggest that the present intervention may be more effective if it is tailored to the eating habits of the intended population; that is, the tendency to graze as opposed to eating large meals. The TTM supports a tailored intervention (Prochaska et al., 1992b). The next theme, home cooking, is often performed both intentionally and unintentionally. For example, food is intentionally prepared in the home when the individual enjoys the cooking process. On the flip side, food may be unintentionally prepared at home if there are no other convenient options to satisfy hunger.

Home Cooking. Intentional or not, the propensity to cook appeared to depend on geographic location, according to some participants. Those in rural areas were more likely to cook and to pack a snack or lunch when going to the senior center. This was

primarily due to the fact that there were fewer convenient options (e.g., fast food). One participant expressed the following, *"we don't have fast food down here. We have a Dairy Queen and a Subway, so I'm with [participant's name]. I think a lot of mine either eat here or they cook at home."* Another indicated that fresh food was convenient and readily available. In her opinion, older adults did not mind cooking, as they did not want food to go to waste. She elaborated here,

> *For my center, I think it's a little different because we give away a lot of meat and a lot of fresh vegetables and stuff at least two and three times a week; so, a lot of my seniors I do believe cook a lot of chicken and stuff like that. So, … mine very rarely eat fast food.*

Likewise, another participant observed that older adults do in fact prepare foods at home, bringing them to the center not only to snack, but during potluck and other events, *"I have people who do eat healthy and they'll pack their lunch and they'll bring grapes and peanut butter and crackers and things like that."* It appears that the current eating habits of older adults vary, with the likelihood of cooking at home increasing in more rural regions where fresh produce is readily available and fast food and other convenience items are not.

In sum, grazing behaviors appeared to be both intentional and unintentional in nature. Participants indicated that some older adults have a passion for cooking and feel obligated to make use of ingredients that are given to them. Others, due to lack of available convenient food, out of concern for health, or unintentionally, tended to eat small portions of snack items often throughout the day. Many of the foods grazed upon ended up being unhealthy (e.g., chips, Little Debbie snack cakes). The next theme

attempts to address some of these barriers so that the current intervention, and others, can factor them into the equation when attempting to facilitate dietary behavior change.

Barriers to Eating Healthy for Older Adults

In response to RQ2, four primary barriers to eating healthy were identified: physiological concerns, food preferences, fear of waste, and accessibility. Physiological concerns refer to physical health conditions such as poor dentition or swallowing difficulty. Food preferences consist of dietary habits, with some foods favored over others. Fear of waste is defined as a desire to avoid throwing out unused food. Lastly, accessibility refers to the degree to which healthy foods are available and easily connected to the consumer.

Table 2.

Emerging Subthemes for Barriers to Eating Healthy

Theme	**Subtheme**
Barriers to Eating Healthy	Physiological Concerns
	Food Preferences
	Fear of Waste
	Accessibility

Note. This table previews the four major subthemes identified in the formative focus group dataset under the theme: barriers to eating healthy.

Physiological Concerns. As identified in the literature, many older adults are prone to both physical and psychological ailments that may inhibit them from eating properly (Han & Kim, 2014; Hickson, 2006; Perez- Sanchez, Torres, & Morante, 2018). Physical ailments include, but are not limited to, dental issues (e.g., edentulism), difficulty swallowing (e.g., dysphagia), and digestive problems (e.g., gastroesophageal reflux disease, decreased gut motility, etc.). In addition, some medications used to

manage various health conditions may have side effects, such as decreased appetite and taste changes. One participant explicated this observation,

> *One thing that comes to mind is dental issues or choking hazards. A lot of times the healthier choices are either a little bit more crisp or they're a little bit more hard of a texture or that sort of thing [e.g., apple with the skin]. So I know that issue may sometimes be a problem.*

Likewise, another participant commented on the impact that chemotherapy has on food intake for some individuals. Chemotherapy is a medical treatment that is common amongst this population,

> *The chemotherapy – my father-in-law to be is…doing radiation and chemo and also different medicines like they said, it is…they have no appetite at all. Like, it's hard to get them to take a couple of bites of something because their taste buds have changed.*

While physical conditions can certainly impact dietary intake, so too can psychological ones. From a psychological perspective, some older adults cope with loneliness, depression, social isolation, and cognitive impairment (e.g., dementia or Alzheimer disease). Each of these can contribute to a decreased appetite; thereby leading to decreased food intake in general. One participant discussed the desire of older adults at her center to eat with company,

> *A lot of mine are – like, we really get a hot meal served every day here at the center and a lot of them depend on that meal because some of them eat alone and they don't like to eat alone. So, when they're by their self, just like we said earlier, they're going to find whatever; or sometimes they might go without because they*

don't want to eat alone. But when they're here at the center, they're with their friends and someone to talk to and they know they're going to get a hot meal.

To provide some context, congregate meals are provided once each day from a nearby food vendor. In some cases, this is a larger foodservice distributor. Other times, it is either a detention center, a nursing home, or a local grocery store deli that produce these meals. All meals are pre-approved by a registered dietitian to ensure that they meet one-third of the dietary reference intakes (DRI's) (U.S. Department of Health and Human Services, National Institutes of Health, 2020). Participants that receive meals are required to eat them on-site. Part of the logic behind this requirement is the importance of social interaction and adequate nutrient intake (Jung et al., 2017; Muhammed et al., 2019). For the older adults, the security of knowing that a meal will be provided, in addition to the opportunity to eat among friends, can have a significant impact on actual food intake. So, too, do preferences for some foods over others, as elaborated on in the following theme.

Food Preferences. Another barrier to eating healthy were preferences for one food over another. Like many habits, eating habits are difficult to change. Some individuals preferred the taste of foods they grew up on, which may have been prepared in an unhealthy way (e.g., frying food using lard). Others argued they preferred meat and potatoes, while omitting vegetables, as evidenced by one participant, *"I'm going to add – I think a lot of our seniors…I see it more so with men maybe than women – they are kind of more of the meat and potatoes type people."* Likewise, another mentioned this resistance to change, *"we're more apt to be creatures of habit and revert back to those habits."* Another emphasized that these food preferences are so ingrained that foods are consumed without much thought, *"a lot of it is just simply kind of like attitude and what*

they've been accustomed to before." As evidenced in the literature (Prochaska et al., 2004), behavior change is a gradual process. Therefore, interventionists and researchers should expect some resistance to change, as evidenced by this statement, *"but, I also think that we as humans, human nature, you know, if it's something that we want, sometimes it doesn't matter what it costs, we'll make sure we get it."* Therefore, it is crucial that interventionists recognize that some food preferences cannot be changed. Registered dietitians and clinicians should emphasize the moderation approach to healthy eating. This approach grants individuals the opportunity to eat unhealthy favorites by balancing them with healthier options throughout the day. The same approach can also be utilized to address older adults' mindfulness on food waste, and their desire to minimize it, as presented next.

Fear of Waste. As previously alluded, some older adults do not want to waste preferred junk foods that have accumulated in the pantry. The same sentiment continues due to limited financial means in many cases. For example, some older adults were hesitant to try new foods out of a fear of waste. The following questions are worth considering when attempting to understand this theme: what if older adults were to purchase a new, healthier food item while dining out but did not end up liking it? They would feel a sense of obligation to finish the item regardless. Likewise, what if older adults were to attempt a new, healthy recipe and it did not work out? The same fear of wasting food, especially on a limited budget, interfered. Therefore, cost was a significant factor in the decision whether to purchase ingredients for a new recipe, as showcased below,

> *You have a limited income, which we all could say most of ours do, you know, they do have to be thrifty when buying things so they may not be as experimental or may not want to try something new just based on a recipe.*

Many conceived of trying a new recipe as an experiment of sorts. Another participant reiterated this concern, *"so they may be fearful to waste what they do have on an experiment or something."* With any experiment, there is some degree of uncertainty. In the case of cooking, that uncertainty is whether or not the end product will turn out as intended. Older adults feared that if the food did not turn out correctly, then they would either be forced to consume it anyway or would have to discard it; thereby wasting food. Sometimes food is hard to come by, both physically and logistically, as explored in the next theme on accessibility.

Accessibility. Accessibility, or lack of access to appropriate cooking equipment, prevented some older adults from eating healthy, This lack of access to cooking equipment (e.g., pots, pans, utensils) could be a result of limited financial means, downsizing, and so forth. One participant eloquently explained this phenomena of reduced kitchen capacity,

> *Some of our seniors have downsized and have gone from their own homes where they had a refrigerator; they had a big freezer and now maybe they live in an apartment with just a little freezer over top of that little refrigerator.*

This situation was particularly prevalent in one of the intervention sites where participants resided in small, subsidized apartments. They often lamented the fact that their refrigerator or freezer could only hold so much food. Another participant reasoned, *"I think it could be a combination of all that, you know. Maybe they don't have… the*

particular pot or utensil that they were shown in a demonstration or that the recipe may call for." Therefore, lack of access could refer to cooking equipment, but it could also refer to specific ingredients that a recipe may require. Some of these ingredients are not readily available. This is especially true for participants living in more rural areas.

Consequently, another facet of accessibility is the limited access to healthy foods based on geographical location and distance from grocery stores. Often times, this is called living in a food desert in the literature (Dubowitz et al., 2015; Larsen & Gilliland, 2009; Whelan, Wrigley, Warm, & Cannings, 2002). Wrigley, Warm, Margetts, and Whelan (2002) define food deserts as "areas of poor access to retail provision of healthy, affordable food where the population is characterized by deprivation and compound social exclusion" (p. 2061). Transportation, or lack thereof, may factor into accessibility as well. One participant poignantly described this barrier,

> *We can try to influence them or encourage them but until – even the ones that grew up eating a certain way – even if those wanted to try to do something different, it may be in an area where a lot of those options are just not readily available.*

This participant furthered with an anecdote that helps to illustrate the idea of a food desert,

> *They [older adults] want to eat better or they would like the fresher foods, but they're not in that particular area, so I think that would help motivate some people who want to do it and just don't have the means to get to it. You know, sometimes, you know, I grew up in the city and I'm just amazed at the number of miles that folks have to put on their cars just to go to the grocery store. Where I*

can pick five grocery stores – different grocery stores within a mile of each other – to go to. And, um, just understanding that not everybody has that option.

This quote poignantly depicts the difference in food access between rural and urban areas. The next theme, motivators to eating healthy, offers strategies for combatting some of the barriers just identified.

Motivators to Eating Healthy for Older Adults

In order to address RQ3, participants were asked about factors that would encourage or support healthy eating behaviors among older adults. Three themes arose: simplicity, pre-existing condition, and incentives. Each are discussed in this order, respectively.

Table 3.

Emerging Subthemes for Motivators to Eating Healthy

Theme	**Subthemes**
Motivators to Eating Healthy	Simplicity Pre-Existing Condition Incentives

Note. This table previews the three major subthemes identified in the formative focus group dataset under the theme: motivators to eating healthy.

Simplicity. The term simplicity can be ambiguous. However, for the purposes of the present study, it is defined as a minimal, easily comprehensible delivery of nutrition content. Participants indicated that simplicity was important in all aspects of nutrition education and healthy eating. Some examples of simplicity include simple messages, or key takeaways, condensed recipes with minimal ingredients and instructions, shorter nutrition lessons, convenient tips, and hands-on demonstrations to enhance understanding. One participant summarized here,

A lot of people have said that they just don't want to fiddle with doing a lot – maybe like simple, healthy snacks in the evening. You know, something that they can actually be like, "this is the healthiest, simple thing if you're just going to be a grazer or you're going to be someone that's not going to eat a full meal in the evening – here's where you can get the most, um, nutrition for your bang." You know, just something simple… that wouldn't be work that they're actually going to have to cook, "this is just a simple thing, and this is the most nutritious snack you can go for."

In addition to structuring each lesson in a concise manner with no more than three main points, participants argued that endorsed recipes should be basic, with few ingredients and minimal steps. Participants felt that older adults were likely to have basic ingredients in their pantry that a simple recipe may require (e.g., flour, sugar, salt, frozen vegetables, etc.). Therefore, they felt that these ingredients should be considered when deciding which recipes to encourage participants to attempt. In addition, participants also acknowledged the physical inability that some older adults experience when it comes to cooking lengthy recipes. The following participant elaborated,

I would think that it may help if you have something that would be maybe of shorter time, you know, like if it was something that took 30 minutes to fix and it only took 15 minutes instead of having to stand and either watch the stove or, you know, or if it's a recipe you kind of got to hover over, um, they may not be able to stand very long or – you know, um, something like that. You may think of the timeframe it takes to do something.

To close, participants indicated that the simpler, the better when it comes to promoting healthy eating. One participant summed this sentiment up nicely, *"just the fact that they didn't know the simplicity behind it [eating healthy]. You know, fixing a healthy meal is not that hard. And showing them how to do it – and doing it [a food demonstration] is an asset to us to get them to do anything in the future."* Interventionists should take this theme into consideration when designing individual lessons and interventions to influence behavior change.

Pre-Existing Condition. Likewise, interventionists should also take heed of the fact that older adults were more likely to have an interest in eating healthy if they had a pre-existing condition and held the belief that diet was connected to that condition. The interest to learn more about nutrition and to eat healthier stemmed from the possibility of managing a current health condition(s) with diet or preventing the development of future health conditions through diet. One participant commented on the promise of motivating older adults to eat healthier with this angle,

> *I think with you coming into the centers – a lot of my people were asking a lot of good questions and they were making the connection between nutrition and their health and they were venturing off and trying new things that they had not tried before, and I think if we could have continued on rather than unfortunately having to stop, we might have started seeing some changes. And I mean we could have incorporated some of those changes – and having hummus for potluck [laughter]. Things like that but, um, I thoroughly think – overall, I'm seeing more of the diabetes too. And I'm seeing more ask questions about that and seeing what they can do as far as their diets.*

Another echoed the idea that educating older adults on diets appropriate for specific health conditions could motivate them to eat healthier, *"I don't know of too many that are really into eating healthy unless they have something specific – like you know, they have the… celiac or whatever where they have to eat a very limited diet."* Whether it be celiac disease or diabetes, participants consistently reinforced the importance of making this connection for older adults when presenting them with nutrition information. For example, one participant drove this point home,

> *I think nutrition should always be talked about to the seniors for the simple fact that as they get older and their metabolism and everything slows down – they themselves slow down and I think they need to be taught about nutrition because most of them become diabetic as they get older and I think a lot of them don't know how to eat and what to eat. And I think that's why we definitely need to always be talking to them about nutrition because their metabolism slows down so much. For one, they don't eat as much as they did, say when they're 30 or 40.*

Many older adults in this study were interested in either maintaining or improving their health status. Therefore, those teaching specifically about nutrition should continue to strengthen the association between diet and disease for their participants. Another way to draw interest in nutrition-related programming is through the use of incentives.

Incentives. Incentives come in all shapes and sizes. Examples include monetary compensation, tangible gifts (e.g., cookbook), or food. Participants in the present study felt that older adults would be more inclined to eat healthier and attend nutrition education programs if there was some sort of palpable benefit. Some of the benefits, or incentives, suggested include: farmers' market vouchers, free food or groceries, and

samples of healthy recipes. For example, one participant exclaimed, *"if you give them food and a sample and they can taste it, they're more than likely to go home and do it."* Similarly, another compared the benefits provided by a similar nutrition program,

> *In my area, which is…county, they also had through the Extension offices they were giving out vouchers to use at the farmers' market, um, and so that kind of – I don't want to say forced them – but encouraged them, you know, to use those, um, you know those extra dollars to buy those types of items at the farmers' markets and things like that because that had a limit…what you could and couldn't buy.*

From another perspective, some participants indicated that another incentive to motivate older adults to eat healthy would be to keep them connected with resources. Resources could either be in the form of in-person experts (e.g., community members, dietitians, and physicians) or written material. Written material was identified as the most helpful type of resource, as explicated in the following statement,

> *I just think sending out literature like you've been doing and sending out posts or sharing, um, information with each other, um, as far as what may be available or in your neighborhood or in your neighboring county or whichever. You know – I mean sometimes they are county-driven programs, um, but lots of times, you know, they do have that cross where it doesn't matter necessarily where you're from, you can still access the same services. Um, you know, so I think just keeping us aware of those things and if you know something; just sharing it with us all – I think that's a great way to start.*

Information was seen as a valuable resource that could keep older adults interested in nutrition programming. This sentiment should be forefront in the minds of

interventionists as they continue to refine programming, as in the case with the intervention and process evaluation components.

The formative focus group, conducted independently of the intervention, revealed valuable insight into the complex attitudes and behaviors that older adults either possess or engage in with respect to eating. For many, current eating patterns are contingent upon geographic location; with those in more rural areas forced to cook at home out of necessity. Just the opposite, those in more urban areas are often tempted to consume fast or convenience foods because they are readily accessible. In addition, the eating habits of older adults are routine. Many of these individuals are resistant to change, considering they have likely fostered these attitudes and engaged in these eating behaviors for a number of years, perhaps even a lifetime. Therefore, any intervention attempting to change attitudes and behavior with this population in general, need to include strategies for combatting this resistance.

This formative focus group identified both barriers and motivators to eating healthy among this population. Barriers comprised both physiological and psychological factors; some of which are easily addressed. Physiological barriers include edentulism, dysphagia, and appetite or taste changes as a side effect of various medications. Psychological barriers primarily centered around the ingrained food preferences mentioned above. Motivators to eating healthy included the belief that diet was connected to disease, incentives for participating in health and wellness activities, and the simplistic nature of the content provided. The motivators that were identified can be used to help combat some of these barriers; thereby promoting healthy eating habits. Perhaps more formative work is needed in this area to flesh out factors that could facilitate change

among this population. Some of these factors are mentioned below as they surfaced during the process evaluation focus groups.

Results of the Quantitative Assessment of the Intervention

Another component of the study involved the six-week implementation of the 12-unit program at four sites. The researcher administered the following instruments prior to beginning the first lesson: Pfizer's (2011) Newest Vital Signs questionnaire and the S-Weight and P-Weight modified healthy eating questionnaire. Participants were also instructed on the procedure for collecting grocery store receipts from the month prior to the intervention. Then, after the last lesson, participants responded to the same measures. Participants were also instructed on the procedure for collecting grocery store receipts for the month after the intervention was completed. The researcher then matched each individual participant's pre-intervention responses to their post-intervention responses.

The results are presented in the order of the hypotheses posed in chapter two. Therefore, food purchasing behavior (grocery store receipt collection) is discussed first, followed by the knowledge assessment results (Pfizer's (2011) Newest Vital Signs tool), and then attitudinal findings (S-Weight and P-Weight modified healthy eating questionnaire).

Participant Demographics

In order to qualify for participation in this study, participants had to be between the ages of 60 and 95. Two participants were excluded from analyses as they were under the age of 60. A total of 79 older adults participated to some degree in this six-week intervention. However, 30 of those 79 actually completed the entire intervention (N = 30). Demographic data were analyzed, indicating the average age was 72.57 years (*SD* =

7.3). The majority of participants were female (80.8%), widowed (34.7%), had a high school diploma or GED equivalent (41.2%), earned between $10,000-$19,999 per year (28.9%), were not of Hispanic, Latino, or Spanish origin (98%), and were white (88.5%).

Table 4.
Participant Demographics

Characteristic	*N*	%
Gender		
Male	10	19.2
Female	42	80.8
Marital Status		
Married	15	30.6
Widowed	17	34.7
Divorced or separated	9	18.4
Single	7	14.3
Never married	1	2.0
Education		
Less than a high school diploma	10	19.6
High school diploma or GED equivalent	21	41.2
Some college	13	25.5
College degree	7	13.7
Annual Household Income		
Less than $10,000	10	22.2
$10,000 - $19,999	13	28.9
$20,000 - $29,999	3	6.7
$30,000 - $39,999	2	4.4
$40,000 - $49,999	6	13.3
$50,000 - $59,999	1	2.2
$70,000 - $79,999	1	2.2
$100,000 or more	2	4.4
Choose not to answer	7	15.6
Ethnicity		
Hispanic, Latino, or Spanish origin	1	2.0
Non-Hispanic	48	98.0
Race		
White	46	88.5
Black or African American	4	7.7
Multiracial	1	1.9
Other	1	1.9

Food Purchasing Behavior of Older Adults.

Hypothesis 1a, a-d, predicted an increase in the purchase of fruit, vegetables, lean sources of protein, and low-fat dairy products post-intervention. On the flip side, hypothesis 1b, a-d, predicted a decrease in the purchase of foods high in added sugar, foods high in fat, foods high in calorie-rich, non-nutrient dense carbohydrates, and foods high in sodium. A total of five grocery store receipts were paired pre and post intervention to assess hypothesis 1a, a-d and 1b, a-d. While numerous participants submitted receipts, often times they submitted multiple receipts prior to the intervention or multiple receipts after the intervention; but not both. Two researchers independently coded all items on each receipt into ten mutually exclusive categories (see appendix D for the full codebook). Reliability was assessed after the researchers independently coded ten percent of the data. For each category, Cohen's kappa averaged 0.86 between all ten categories. ReCal version 2.0 was used to calculate reliability (Freelon, 2010; 2013). From there, variables were created to reflect percent of purchase in each of the ten categories. Calculations were based on the subtotal, thereby excluding tax (Cullen et al., 2007). Paired-samples t-tests were then run on each of the ten categories, comparing pre purchasing behavior to post purchasing behavior. The means refer to the percent of each grocery store receipt spent in each of the ten categories.

Hypothesis 1a. The first portion of Hypothesis 1 posited that as a result of participating in the nutrition education intervention, older adults would *increase* purchases of fruit (H1aa), vegetables (H1ab), lean sources of protein (H1ac), and low-fat dairy products (H1ad). To test this portion of the hypothesis, a series of paired samples t-

test were run. None of the paired samples t-tests detected significant differences between the pre and post-intervention pairs.

More specifically, there was no difference in participant fruit purchases when assessed before (M = 10%, SD = 9%, n = 5) and after (M = 4%, SD = 4%, n = 5) the intervention, $t(4) = 2.55$, $p = .06$ at $\alpha < .05$. Stated differently, H1aa was not supported. In addition, a paired sample t-test was run to test H1ab. Results did not indicate a significant difference in participant vegetable purchases when assessed before (M = 2%, SD = 4%, n =5) and after (M = 3%, SD = 5%, n = 5) the intervention, $t(4) = -0.28$, $p = .80$ at $\alpha < .05$. Therefore, H1ab was not supported. Similarly, a paired sample t-test was run to test H1ac. Findings do not show a significant difference in participant lean protein purchases when assessed before (M = 10%, SD = 5%, n = 5) and after (M = 30%, SD = 40%, n = 5) the intervention, $t(4) = -1.75$, $p = .16$ at $\alpha < .05$. Therefore, H1ac was not supported. Next, a paired sample t-test was run to test H1ad. Results did not indicate a significant difference in participant low-fat dairy purchases when assessed before (M = 4%, SD = 4%, n = 5) and after (M = 1%, SD = 1%, n =5) the intervention, $t(4) = 1.48$, $p = .21$ at $\alpha < .05$. Therefore, H1ad was not supported.

Hypothesis 1b. The second portion of Hypothesis 1 posited that as a result of participating in the nutrition education intervention, older adults would *decrease* purchases of foods high in added sugar (H1ba), foods high in fat (H1bb), foods high in calorie-rich, non-nutrient dense carbohydrates (H1bc), and foods high in sodium (H1bd). To test this portion of the hypothesis, a series of paired samples t-test were run. None of the paired samples t-tests detected significant differences between the pre and post-intervention pairs.

More specifically, there was not a difference in participant purchases of foods high in added sugar when assessed before (M = 20%, SD = 20%, n = 5) and after (M = 20%, SD = 7%, n = 5) the intervention, $t(4) = 0.24$, $p = .82$ at $\alpha < .05$. Stated differently, H1ba was not supported. In addition, a paired sample t-test was run to test H1bb. Results did not indicate a significant difference in participant purchases of high-fat proteins when assessed before (M = 10%, SD = 6%, n = 5) and after (M = 2%, SD = 2%, n = 5) the intervention, $t(4) = 1.09$, $p = .34$ at $\alpha < .05$. Likewise, results also did not indicate a significant difference in participant purchases of high-fat dairy when assessed before (M = 4%, SD = 4%, n = 5) and after (M = 3%, SD = 4%, n = 5) the intervention, $t(4) = 0.53$, $p = .62$ at $\alpha < .05$. Similarly, results did not indicate a significant difference in participant purchases of high-fat foods in general when assessed before (M = 1%, SD = 1%, n = 5) and after (M = 2%, SD = 3%, n = 5) the intervention, $t(4) = -0.47$, $p = .66$ at $\alpha < .05$. Therefore, H1bb was not supported.

Similarly, a paired sample t-test was run to test H1bc. Findings do not show a significant difference in participant purchases of foods high in calorie-rich, non-nutrient dense carbohydrates when assessed before (M = 20%, SD = 20%, n = 5) and after (M = 20%, SD = 7%, n = 5) the intervention, $t(4) = 0.24$, $p = .82$ at $\alpha < .05$. Therefore, H1bc was not supported. Next, a paired sample t-test was run to test H1bd. Results did not indicate a significant difference in participant purchases of foods high in sodium when assessed before (M = 10%, SD = 7%, n = 5) and after (M = 10%, SD = 9%, n = 5) the intervention, $t(4) = -0.07$, $p = .95$ at $\alpha < .05$. Therefore, H1bd was not supported.

Table 5.

Mean Differences in Percentage of Dollar Amount Spent at the Grocery Store Before and After the Intervention: 10 Mutually Exclusive Categories

	M (%)	*SD* (%)	*t*(4)	*P*
Fruit	8	7	2.55	.06
Vegetables	-1	7	-0.28	.80
Lean Protein	-30	30	-1.75	.16
High-Fat Protein	3	3	1.09	.34
Low-Fat Dairy	3	5	1.48	.21
High-Fat Dairy	1	5	0.53	.62
Carbohydrates	2	20	0.24	.82
High-Fat	-1	2	-0.47	.66
High-Sodium	-0.3	8	-0.07	.95
Other	10	40	0.70	.52

Note. This table presents the mean difference in percentage of dollars spent in each of the ten food groups with respect to the subtotal from pre to post intervention.

Knowledge Assessment: Cognitive Ability to Read Food Labels.

Pfizer's (2011) Newest Vital Signs tool was used to assess hypothesis 2 (a-d). Originally intended to measure health literacy, this measure was used in the present study to evaluate one aspect of cognition: knowledge. Or, in the case of the present study, nutrition knowledge as it relates to reading a nutrition facts label. Of the 30 participants, 25 completed both the pre and post cognitive measure. An aggregate variable was created to assess number of correct responses on the six-item questionnaire. The aggregate score ranged from zero (no correct responses) to six (all correct responses) on a 7-point scale. Further, dichotomized variables were created for each of the six questions. Each response was assigned a value of one for a correct answer and zero for an incorrect answer. Paired samples t-tests were used to compare responses before and after the intervention for the aggregate variable and for the variables created for each of the six questions. Results are

reported below for both the aggregate variable and for each of the six questions, independently.

The aggregate cognitive score, as mentioned above, did not show a significant difference when assessed before ($M = 3.6$, $SD = 2.02$, $n = 25$) and after ($M = 3.3$, $SD = 1.93$, $n = 25$) the intervention, $t(24) = 0.87$, $p = .39$ at $\alpha < .05$.

Hypothesis 2. Hypothesis 2a predicted that after participation in the nutrition education intervention, older adults will be able to demonstrate how to read a nutrition label by identifying caloric content. Findings do not show a significant difference in participant's ability to identify caloric content when assessed before ($M = 0.68$, $SD = 0.48$, $n = 25$) and after ($M = 0.56$, $SD = 0.51$, $n = 25$) the intervention, $t(24) = -0.90$, $p = .38$ at $\alpha < .05$. Therefore, H2a was not supported. Hypothesis 2b predicted that after participation in the nutrition education intervention, older adults will be able to identify grams of carbohydrate per serving on a nutrition facts label. Findings reveal no significant difference in participant's ability to identify grams of carbohydrate per serving before ($M = 0.56$, $SD = 0.51$, $n = 25$) and after ($M = 0.56$, $SD = 0.51$, $n = 25$) the intervention, $t(24) = 0.00$, $p = 1.0$ at $\alpha < .05$. Therefore, hypothesis 2b was not supported. Hypothesis 2c predicted that after participation in the nutrition education intervention, older adults will be able to identify amount of saturated fat on a nutrition facts label. Findings reveal no significant difference in participant's ability to identify the amount of saturated fat before ($M = 0.56$, $SD = 0.51$, $n = 25$) and after ($M = 0.56$, $SD = 0.51$, $n = 25$) the intervention, $t(24) = 0.00$, $p = 1.0$ at $\alpha < .05$. Therefore, hypothesis 2c was not supported. Hypothesis 2d predicted that after participation in the nutrition education intervention, older adults will be able to identify potential allergens from the ingredient

list of a nutrition facts label. Findings reveal no significant difference in participant's ability to identify potential allergens before ($M = 0.72$, $SD = 0.46$, $n = 25$) and after ($M = 0.64$, $SD = 0.49$, $n = 25$) the intervention, $t(24) = -0.81$, $p = .43$ at $\alpha < .05$. Therefore, hypothesis 2d was not supported.

Table 6.

Mean Differences in Nutrition Knowledge Before and After the Intervention

	M	*SD*	*t*(24)	*P*
Cognitive Aggregate	0.30	1.8	0.87	.39
Calories	0.12	0.7	-0.90	.38
Carbohydrates	0.00	0.8	0.00	1.00
Fat	0.00	0.6	0.00	1.00
Percent Daily Value	-0.04	0.6	0.33	.75
Allergens	0.08	0.5	-0.81	.43
Reasoning Behind Allergen Response	0.16	0.6	-1.28	.21

Note. This table presents the mean difference in scores on the knowledge assessment tool pre to post intervention.

Attitudes towards Processes of Change.

Hypothesis 3 predicted that after participation in the nutrition education intervention, older adults will portray a more favorable attitude towards six of the ten processes of change. All 30 participants filled out the attitudinal questionnaire pre and post intervention. The 61-item survey was used to assess attitudes related to healthy eating behaviors. Questions were grouped based on five processes of change: reinforcement management, stimulus control, emotional reevaluation, helping relationships, and consciousness raising. The sixth process of change outlined in the original hypothesis, social liberation, did not end up being measured on the S-Weight and

P-Weight modified healthy eating questionnaire. More specifically, no questions were asked that encompassed this process of change. Briefly, social liberation refers to moving beyond the self, working to help others with problem behaviors through empowerment, policy, and intervention (Prochaska, DiClemente, & Norcross, 1992b). Unfortunately, this insight was missed during the proposal phase of this project. In addition, only one question fell into the reinforcement management process of change. Reinforcement management is the act of rewarding oneself for the changes and accomplishments made. Only one question on this instrument truly assessed this process of change. That question was, "my family and friends congratulate me when I manage to eat healthy" (Andres, Saldana, & Gomez-Benito, 2009; Andres, Saldana, & Gomez-Benito, 2011; Andres, Saldana, & Beeken, 2015). Reliabilities for the other four processes of change are listed here: Cronbach's $\alpha = 0.93$ for stimulus control, Cronbach's $\alpha = 0.87$ for self-reevaluation, Cronbach's $\alpha = 0.72$ for helping relationships, and Cronbach's $\alpha = 0.74$ for consciousness raising. Paired samples t-tests were used to evaluate the differences in the five processes of change pre and post intervention.

Table 7.

Reliability for Processes of Change Constructs on Modified S-Weight and P-Weight Healthy Eating Questionnaire

	Number of Items	*N*	Cronbach's α
Self-Reevaluation	37	31	0.87
Helping Relationships	10	31	0.72
Stimulus Control	64	31	0.93
Consciousness Raising	8	31	0.74

Note. This table indicates the reliability scores for items measuring each of the four processes of change constructs on the instrument.

Hypothesis 3. Findings do not show a significant difference in participant's attitude towards consciousness raising (H3a) when assessed before (M = 2.8, SD = 0.88, n = 21) and after (M = 2.8, SD = 1.13, n = 21) the intervention, $t(29) = -0.06$, $p = .95$ at $\alpha < .05$. Therefore, H3a was not supported. Similarly, findings do not indicate a significant difference in participant's attitude towards self-reevaluation (H3b) when assessed before (M = 3.6, SD = 0.58, n =19) and after (M = 3.6, SD = 0.70, n = 19) the intervention, $t(29) = 0.4$, $p = .70$ at $\alpha < .05$. Therefore, H3b was not supported. Hypothesis 3c was unable to be tested for reasons mentioned above. As for H3d, findings do not reveal a significant difference in participant's attitude towards stimulus control when assessed before (M = 3.6, SD = 0.65, n = 14) and after (M = 3.4, SD = 0.57, n = 19) the intervention, $t(29) = 0.79$, $p = .44$ at $\alpha < .05$. Therefore, H3d is not supported. As for H3e, findings do not indicate a significant difference in participant's attitude towards reinforcement management when assessed before (M = 3.2, SD = 1.18, n = 30) and after (M = 3.1, SD = 1.36, n = 30) the intervention, $t(29) = 0.30$, $p = .76$ at $\alpha < .05$. Therefore, H3e was not supported. Lastly, with regards to H3f, findings did not illustrate a significant difference in participant's attitude towards helping relationships when assessed before (M = 2.9, SD = 0.90, n = 22) and after (M = 2.9, SD = 1.08, n = 22) the intervention, $t(29) = 0.15$, $p = .89$ at $\alpha < .05$. Therefore, H3f was not supported.

Table 8.

Mean Differences in Processes of Change Constructs Before and After the Intervention

	M	*SD*	*t*(13-21)	*P*
Stimulus Control	0.2	0.9	0.79	.44
Self-Reevaluation	0.1	0.9	0.40	.70
Helping Relationships	0.1	1.5	0.15	.89
Consciousness Raising	-0.02	0.3	-0.60	.95

Note. This table presents the mean difference in participants' attitudes towards each of the four processes of change pre and post intervention.

Stages of Change.

One question on the attitudinal measure was specifically designed to assess stage of change, thus answering RQ4. Research question four posited whether older adults would move through any of the stages of change on the transtheoretical model after participating in the nutrition education intervention. Out of the 30 participants, 21 completed this question on both the pre and post survey. A paired samples t-test was used to compare differences between stages of change before and after the intervention. Findings did not reveal a significant difference in movement across the stages of change when assessed before ($M = 3.4$, $SD = 1.66$, $n = 21$) and after ($M = 3.8$, $SD = 1.4$, $n = 21$) the intervention, $t(20) = -0.83$, $p = .42$ at $\alpha < .05$. Therefore, participants did not move through any of the stages of change with regards to healthy eating post-intervention.

Process Evaluation Focus Group Results

The final component of the present study consisted of two process evaluation focus groups and one in-depth interview. The purpose of this component was supplemental in nature. This component does not address any of the research questions or

hypotheses posed in chapter two. It was intended to provide a qualitative picture of the processes behind implementing the intervention, as well as areas that could be improved upon, were the intervention to be revised and reimplemented at a later date. Both focus groups and the in-depth interview were conducted after completion of the six-week intervention at two sites. Due to COVID-19, the intervention was unable to be completed as intended at the Williamstown site in Grant county and the Walton site in Boone county. Therefore, those participants were not interviewed or included in focus groups separately. A total of 14 individuals participated in either the focus groups or in-depth interviews (N = 14). Two out of the 14 participants were male.

Two trained researchers independently coded 10% of the data, establishing a percent agreement of 90.4%. In addition, Scott's pi was used to establish intercoder reliability ($\pi = 0.77$) (Freelon, 2010; 2013). After discussing areas of disagreement, the codebook was further refined. The remaining 90% of the data were then coded independently by one of the researchers, given that acceptable reliability was achieved. Both researchers used NVivo 12 software (QSR International Pty Ltd., 2020) to organize and code the data using thematic analysis, as outlined in the formative focus group component (Guest, MacQueen, & Namey, 2012).

Five separate themes emerged in the process evaluation data: qualities of instruction, structure of the program, curriculum highlights, recruitment strategies/marketing, and retention strategies. Each of these categories relate to both the process of intervention implementation and the qualitative discussion on areas of improvement for future programming. Each of these themes are dissected and explored as multiple subthemes emerged from each.

Qualities of Instruction

There are many means for conveying instructional content (e.g., lecture format, written, audio-visual). Each of these means are multi-faceted, incorporating numerous instructional techniques (images, detailed verbal explanations, interaction, message reinforcement, etc.). The intervention evaluated in the present study used primarily lecture, written, and visual strategies. Refer to appendix E for a list of materials used throughout the duration of the intervention. While some of these vehicles for delivering content were deemed effective, participants suggested additional considerations. Therefore, the qualities of instruction theme was broken down further into five subthemes: visuals, interactivity, simplicity, repetition, and facilitator credibility. Each are discussed separately.

Table 9.

Emerging Process Evaluation Subthemes for Qualities of Instruction

Theme	**Subthemes**
Qualities of Instruction	Visuals Interactivity Simplicity Repetition Facilitator Credibility

Note. This table previews the five major subthemes identified in the process and outcome evaluation focus groups and in-depth interview dataset under the theme: qualities of instruction.

Visuals. Intervention participants indicated that visuals were a preferred method for learning. Examples of visuals include: food packaging with food labels, food models, and exercise equipment. Overall, participants felt the more visuals that could be incorporated into the intervention, the better. While the facilitator included food models

indicating portion size, participants indicated that visuals in multiple forms should be included. One participant explained, *"showing them what an actual portion size is and that's what's in this…so, if you had more than this size, you're going to get double this amount kind of thing."* This participant indicated that multiple visuals depicting the same portion of a given food item would be helpful in driving the point home. Another reiterated the importance of multiple types of visuals, *"anything they can see visual that helps them, I mean it really does. It helps them – because a lot of people don't understand…"* For the visuals that were provided during the intervention, participants expressed, *"the visuals were beautiful because it showed you the portion size."* The principal investigator displayed a model consisting of test tubes with a synthetic amount of fat that corresponded to popular food items (e.g., hamburger, hot dog, ice cream, etc.). This visual was particularly powerful and well-received. In response to this visual, one participant stated, *"and the things that you brought that showed us what you get out of – the fat in the tubes."* Likewise, *"that was very amazing that we have never ever thought if we eat that hamburger that we was going to get that much fat out of it – out of that hamburger, you know?"* Sometimes a picture really is worth a thousand words as images tended to resonate most with intervention participants. In addition to this strategy, participants also indicated that they would prefer to be more involved in the instruction, as illustrated by the next subtheme.

Interactivity. In addition to the preference for multiple visual components, participants also indicated that each lesson should include an interactive portion. For the purposes of the present study, interactivity is defined as an activity(ies) that enables the audience to partake in the content in an active capacity as opposed to a passive one. An

example of interactivity includes hands-on demonstrations. Stated simply, one participant argued, *"I think the more hands-on stuff is better, isn't it?"* Another participant expressed her interest in a convenient cooking method, the air fryer, and how that could easily comprise an interactive component of a lesson, *"hands-on. We can hook up a little air fryer in here or whatever you want to do."* Another example of an interactive portion would be a food demonstration where participants were asked to assist. Participants indicated they would be happy to bring ingredients and materials related to the lesson of the day. One participant offered, *"you know if you brought something – and tell us what to bring, you know, we'll help you bring it."* Another participant reinforced the benefits of an interactive instructional style, *"see when you demonstrate that teaches about how big the size of the portion is."* Many more participants strengthened this sentiment. They stated the following, *"oh God, yeah right,* or *that would be great!"* For those that do cook at home, quick and easy methods for preparing wholesome meals are desirable. Many of them have attempted to use equipment such as a crockpot or an air fryer with little success. Therefore, participants indicated that multiple demonstrations whereby this equipment was used to prepare healthy meals would be beneficial. Many cited that seeing such recipes completed successfully with these types of equipment would give them the knowledge, skills, and confidence to continue to attempt such meals at home. In addition to the desire for interactivity, participants also indicated that simple, easy to follow information and recipes would motivate them further to attempt such cooking experiments. This notion is covered in detail in the next theme.

Simplicity. As was noted in the formative focus group, intervention participants, too, commented on the importance of keeping things simple. The same definition for

simplicity applies in this dataset: minimal, and easily comprehensible delivery of nutrition content. Examples of simplicity include simple messages, or key takeaways, condensed recipes with minimal ingredients and instructions, shorter nutrition lessons, and convenient tips. For example, one participant argued, *"you could afford to cut down on a lot of the main facts."* Another added, *"not that it's too much, but it could probably be lessened to where maybe one or two items off of that list. And if you have five items, break it down to maybe two items."* In addition, keeping all written materials in a booklet or binder at the senior center for ease of access was mentioned as an important component of simplicity. One participant mentioned the idea of combining all intervention content into a booklet for convenience. He elaborated,

> *If you had the handout, I mean I would say something, I mean it sounds kind of goofy to coordinate with the coordinators that are here, but if you built a book of some sort. A little book and – for your sequence of classes – they got the same book every single time. So, like if they came here to the senior center, you say, "hey, get your book. Go over there." And at the end of the class they get the book with a graduation ceremony or something with like, "here's your information, all here at once, right now." Instead of one piece of paper at a time.*

Another echoed the idea of creating a program booklet,

> *Making something really cool – like you get a pack of stickers, some colored pencils – you get the same book that you have for every program, every single time. And then you take it home. I mean that's going to be like your cookbook at the end of the class.*

The intervention delves into a wide array of nutrition content. While valuable, participants argued that the information should be presented in as concise a format as possible for clarity. In addition, given the intensive nature of the content, participants also indicated that repetition of main ideas is ideal, as evidenced in the next subtheme.

Repetition. In addition to simplicity, some participants mentioned the importance of reinforcing main ideas throughout the duration of the program. This theme shares much in common with the suggestion for increased visuals. Participants valued the content presented, but preferred that it be reinforced throughout the duration of the program so that it could sink in, thereby instilling the information in one's memory. In general, one participant mentioned, *"just bring it up over and over and over."* Another suggested, *"not in great detail, but just talking about it every single time."* Much of the content presented was complex in nature. Therefore, participants felt that reviewing complex material prior to beginning the new material would help them to have a better understanding. In response to this notion, another posed, *"and the more you talk about it, maybe the more they would grasp it."* More specifically, another participant indicated, *"but I do think that if they're a bit more informed on this – on a regular basis, not just a one-time thing, they might start doing that – changing around their dietary habits…like the more vegetables, the more fruit."* Granted, while six-weeks is not much time to make dietary changes, participants expressed increased confidence in their ability to do so if key information were reinforced.

Portion size was the primary topic that participants suggested be reinforced. For example, one participant exclaimed, *"I kind of like what [participant's name] said about the serving size, portion thing. You need to pull that in whenever you're talking about the*

reading label class." Each individual lesson discussed either a different macronutrient or micronutrient. Therefore, portion size and daily recommended intake were repeatedly discussed. Participants indicated that visuals reinforcing appropriate portion sizes would help them to remember how much of each type of nutrient they were supposed to consume on a daily basis.

The literature supports these findings that message repetition and reinforcement aids in attitude formation and/or change and behavioral intentions (Stephens & Rains, 2011). Therefore, interventionists should consider intertwining key ideas throughout the duration of the intervention. Another important factor in a successful intervention is the credibility of the facilitator, as indicated in the next subtheme.

Facilitator Credibility. In addition to other characteristics of quality instruction, some mentioned that facilitator credibility was an important factor in their decision to continue to attend the program. Credibility, or source credibility, is characterized by confidence in a presenter due to a number of traits, including: expertise, trustworthiness, and prestige (Hovland & Weiss, 1951). Confidence in the facilitator was enhanced by education and expertise, in addition to his/her ability to establish rapport and adequately answer questions. One participant commented on the difference that facilitator credibility made in their decision to continue with the program, *"and the fact, knowing what your position is made it even more interesting because you should know, with your job and your education, it's not like somebody just running in here and telling you a little story and leaving."* Another echoed the important role that confidence in the facilitator plays in motivation to attend programming, *"but we had enough confidence in you to do this program and that's the reason that we were here every day for you."* In terms of

personality and demeanor of the facilitator, another component of credibility, one participant mentioned,

> *If you're hiring for the program, the person must have other skills…I mean you didn't go stand in the corner because somebody was discussing something at another table. You didn't let it affect you. Just roll off of you and kept on going…that person has to be resilient like that.*

The above quote was in reference to multiple instances that occurred during the intervention at a particular site. The lessons were given during congregate mealtime. Therefore, some participants were more interested in eating and socializing than in listening attentively. Given the environment, the researcher decided to move forward with the lesson, not letting any side chatter or commentary impede the objectives. During the process evaluation focus group for this site, participants indicated that this was an admirable quality; one that all individuals working with older adults should adopt. In addition to resilience, participants expressed the importance of the facilitator being approachable. For example, one participant claimed, *"you did, you made it very comfortable."* Another said that the facilitator should be *"genuine and authentic."* Rapport is another important facet of credibility. Therefore, interventionists should make a concerted effort to establish rapport with their participants in order to achieve optimal results. In addition to facilitator credibility, the manner in which the program is structured is another area of great importance, as discussed in the next main theme.

Structure of the Program

As there are many means of providing instruction, so too are there many means for constructing an intervention. In the context of this study, structure of the program

involves the protocol for delivering each lesson, in addition to the individual lesson plans and time allotted for each activity. During the process evaluation focus groups and in-depth interview, program structure was discussed in two subtheme categories: opportunity to ask questions and brevity; each of which are discussed independently.

Table 10.

Emerging Process Evaluation Subthemes for Program Structure

Theme	**Subthemes**
Program Structure	Opportunity to ask diet-related questions Brevity

Note. This table previews the two major subthemes identified in the process and outcome evaluation focus groups and in-depth interview dataset under the theme: structure of program.

Opportunity to Ask Questions. Each lesson in the nutrition education program was structured to last between 45 minutes and an hour between three activities. Therefore, there was little time for a question and answer session. Intervention participants indicated that this was something they would be interested in having with future nutrition programming. Some conceptualized this as a nutrition "drop box" whereby any type of dietary question could be posed by an individual and addressed. One participant suggested, *"yeah if you write down – and that's another thing – maybe a homework thing – as far as write down your questions that you have and turn it in to you."* Another affirmed this opportunity to anonymously ask diet-related questions, *"just being nosy about everything, I was afraid to ask the doctor. I felt like I could ask here."* Another commented on the importance of asking questions and how that helped to foster rapport, *"and then taking the other time to, for us to be able to talk to you."* Many participants expressed frustration with their interaction with healthcare providers, citing

that each appointment was so brief and hurried that there was little opportunity to ask important questions. Participants indicated that the nutrition intervention was an opportune time for them to ask diet-related questions that they were unable to ask their provider during an appointment. One participant expanded on the problem with the current intervention structure and lack of question and answer opportunity, *"after your presentation, you're not there to come and say, "now we're pulling you to the side and talking to you…"* Another posed if this component would even be possible, *"[at present] do you have time to sit down and talk to us about…?"* In order to alleviate this problem, participants implored that a specific time be devoted to asking diet-related questions of the facilitator at some point in time either before, during, or after the lesson. One participant elaborated on the benefits of a question and answer session, *"because, I mean, the more…the more you can give them input, the more they can help themselves."* By offering a question and answer session, participants would be given agency in their own health. While a question and answer session conflicts with the importance of brevity, as highlighted in the next theme, it is crucial in order to facilitate rapport, foster agency, and encourage positive behavior change.

Brevity. This theme goes hand-in-hand with the concept of simplicity, mentioned earlier. Most participants expressed that the allotted time for each lesson (e.g., 45 minutes to an hour) was appropriate due to the limited attention span of this population. One mentioned, *"as long as it's a short meeting and brief."* Another commented on older adults' tendency to become easily distracted, *"people lose their attention after about an hour."* Similarly, this notion was echoed by another participant, *"if you go over 45 minutes, you're going to start losing interest."* Some even indicated that 30 minutes or

less was preferable, *"they might start getting, you know what I mean, they might start getting frustrated after 30 minutes."* Many participants agreed with these sentiments, replying with the following, *"exactly, yes, yeah,* and *shorter time."* In addition to the temporal component of this theme, a few participants indicated that the more succinct delivery of the information, the better. One offered that the facilitator should, *"just list it"* in response to key ideas within each lesson. Educators should be mindful of their population, the content they are delivering, and how much is appropriate in a given timeframe. If such things are not considered, then the information will likely go in one ear and out the other. Interventionists should take heed of this advice, condensing information into manageable chunks so as to maintain participant attention, but not overwhelm. The next major theme highlights both positives and negatives of the intervention and what could be done to enhance it for future participants.

Curriculum Highlights

Part of the process evaluation was to point out things that worked well and things that could be improved upon in future interventions. The curriculum highlights, or aspects of a nutrition program that participants felt were important, include: budget-conscious tips and recipes, emphasizing normal levels, and four additional topics. The four additional topics included: ingredient specific lessons (e.g., artificial sweeteners and oils), dining out, convenient cooking methods (e.g., using an air fryer or a crockpot), and diabetes. The four additional topics were condensed into one subtheme. This decision was made as topics that could be added to the program in the future were just one facet of the many areas necessary for improvement. Condensing additional topics into one subtheme will allow the researcher to evaluate nutrition topics on demand in one

convenient location during program revision. In addition, Creswell and Creswell (2018) argue that a qualitative study should have between five and seven themes. Therefore, additional topics were collapsed into one subtheme that covers suggestions for additional program topics.

Table 11.

Emerging Process Evaluation Subthemes for Curriculum Highlights

Theme	**Subtheme**	**Sub-Subtheme**
Curriculum Highlights	Budget-Conscious Tips & Recipes	
	Emphasize Normal Levels (e.g., blood pressure, blood sugar, cholesterol)	
	Additional Topics	Ingredient-Specific Lessons
	Additional Topics	Dining Out
	Additional Topics	Convenient Cooking Methods
	Additional Topics	Diabetes

Note. This table previews the three subthemes identified in the process and outcome evaluation focus groups and in-depth interview dataset under the theme: curriculum highlights. In addition, four sub-subthemes are identified.

Budget-Conscious Tips and Recipes. As previously alluded, many of the participants in this study were on a fixed income between social security and retirement pensions. Therefore, many expressed an interest in recipes with inexpensive, readily available ingredients. Some of the recipes that were showcased during the intervention contained expensive, hard-to-find ingredients, such as quinoa, peanut oil, and rutabaga. One participant expressed the difficulty experienced when attempting to mimic that recipe at home, *"it's some of the ingredients for everybody to start is expensive."* Another participant living in a rural area commented, *"for our area it's hard to get a*

good deal on something – like, if we need seasoning here – like if we go to [name of local store] or the Dollar Store, they're $4 or $5. But if we go downtown, we might get it for $2, you know?" Participants argued that a recipe with minimal ingredients that could be found in the average pantry, in addition to few steps, would be best. For example, one participant spoke to the simplicity of a recipe and how that ties into cost, *"that's my wife's motto. She won't make anything if it's over five ingredients."* Another acknowledged, *"I take it [the recipe] home and I look at it all of the time and think, "that recipe sounds cool, it's easy." And that's another thing – easy to make recipes and things that are just – to put it together and it's there, ready to go."* The interventionists must be mindful of the population they are working with and their access to ingredients. Therefore, it is recommended that each intervention program be tailored to the specific audience as much as possible in order to achieve the best results.

In addition to saving money, other participants had interest in a discussion on alternatives to eating fresh produce. For example, one indicated, "*the doctor put me on frozen vegetables because of my congestive heart failure and I went out and I bought frozen vegetables and I thought, "I can't afford this every month." I go to the food pantries some months and they don't give you that kind of food."* Another emphasized the fact that cost is a barrier when attempting to eat healthy, *"I go to the cheapest stores I can go to. And everything that is lower in cost is in a can."* As a result of these findings, interventionists should incorporate alternative means of consuming fruits and vegetables. For example, the benefits of canned produce could be highlighted; with tips for minimizing the sodium or sugar intake associated with such foods. In addition to taking

cost into consideration, participants also emphasized the importance of reinforcing normal lab values, as indicated by the next subtheme.

Emphasizing Normal Levels. Many of the lessons talked about diets specifically related to various diseases (e.g., diabetes, heart disease, kidney disease). However, some participants indicated that they would like the lessons to provide additional information, including benchmark information on what normal values are for certain tests (e.g., cholesterol and blood sugar). They indicated that this was important, so they could interpret their own bloodwork and vitals and know where they stood with their condition. For example, some expressed the lack of benchmark information provided, even at clinic appointments, *"unless you go to an actual diabetic education, they don't tell you what the regular blood sugars are from time to time."* Another expressed similar frustration when trying to understand her blood pressure reading while at the doctor's office, *"just recently, I had a nurse tell me that my blood pressure was low, and the lower number was 80 – and it's like at 90 they said it was high. So, what's it supposed to be?"* For many of the participants, there appeared to be a lack of consensus as to what appropriate blood levels or vital values are supposed to be. Participants indicated that up-to-date clarification on this matter was of utmost importance. For example, another commented, *"well so I don't even know what my blood pressure should be."* Likewise, another offered, *"and you know, I don't know what the range is anymore as to what is normal."* Another made this powerful statement, *"don't tell me I'm okay. I want to know what it [my lab value] should be."* One participant commented on a specific experience during the intervention, *"remember the day you did the blood pressure? And people don't realize they have these problems because they never have any kind of check. I'm saying*

more blood pressure checks." While specifics with regard to normal blood cholesterol, blood sugar, and blood pressure where mentioned during the intervention, in additional to actual blood pressure monitoring; interventionists in the future need to reinforce these ideas multiple times in order for the participants to retain that information.

Additional Topics. Participants conveyed interest in four additional topics that were not covered during the 12-unit intervention. Three of these topics: nutrient specific discussions surrounding artificial sweeteners, oils, and seasoning; healthy options when dining out; and convenient cooking methods such as the crockpot and air fryer, were not included in the core curriculum as they did not surface as areas of nutrition interest in the formative survey. This formative survey was done prior to the present study to aid in program development. Diabetes, however, was covered during the lesson on carbohydrates. The researcher defined diabetes, identified high-carbohydrate foods, discussed appropriate portion sizes, and elaborated on the relationship between food intake and blood sugar levels. However, participants pointed out that this was not enough. They suggested that an entire lesson be devoted to diabetes as so many of them deal with this chronic health condition.

The first topic encompassed multiple, specific ingredients, including artificial sweeteners, types of oils, and seasonings. For each, participants wanted to know which was best for various applications and for overall health. For example, in terms of artificial sweeteners, one participant pointed out, *"well they tell you this about Splenda and this about one of the others – so I would like to know, which way is the best way to go? Do I go with regular sugar? Do I go with Splenda?"* Another stated, *"but I could use the Splenda – just wanted to know which one is actually best for you."* As evidenced by these

quotes, participants had some degree of confusion with regards to the healthfulness of artificial sweeteners. Perhaps this topic, along with oils, could be covered either in a question and answer session or in a special topics lesson.

With regards to the different types of oils, participants expressed uncertainty related to the types of oils available and their associated cooking application. For example, one participant claimed, *"you know there's so many out there so let's go with whatever is the best. Um, when you're cooking something, it takes oil – is that oil going to affect your food?"* Even though a portion of one lesson was devoted to kitchen basics, including seasonings, participants indicated that more time should be spent on specific ingredients (e.g., artificial sweeteners and oils), including herbs and spices such as thyme, bay leaves, and onion powder.

The second additional topic that was mentioned had to do with dining out. Participants wanted to know how to navigate restaurant menus so that they could select healthier options. In response to this question on the interview protocol, one participant asked, *"did you have a lesson on eating out? That could be a really good thing."* That same participant asserted, *"what's the best option when you go out? You don't always get the option to cook."* The findings indicate that many participants dine out for convenience. Therefore, a lesson on making healthy choices while eating at a restaurant would be beneficial.

Depending on geographic location (e.g., rural versus urban), some individuals either ate convenience foods, grazed, or cooked. Therefore, the third additional topic had to do with convenient cooking methods. These included cooking in the microwave, using an air fryer, and a crockpot. One participant mentioned, *"you know, we could talk about*

dishes in a slow cooker." Another commented on the convenience that a crockpot provides, *"you know, you do this in a slow cooker and that's your full meal. Your potatoes, your carrots, your meat, and everything's there."* Another participant was in favor of a lesson on using a crockpot, *"we're talking about a slow cooker. Put it in a slow cooker and cook it all day."* Another expressed a desire to learn more about cooking in an air fryer for the sake of convenience,

> *The other thing is like our air fryer. I have one. I haven't been able to really use it to get the – to get the…you see the recipe and it looks beautiful and you think, "well, I'm going to try that." So you take that recipe, and of course they put some things in there that you don't normally have in your kitchen…you know, and then when they tell you how to do it and you take it out and you cook with it and you think, "ugh! That don't look nothing like what they done!"*

Another mirrored that frustration, *"yeah, I've tried the recipes but it's just not working out."* It is apparent that older adults prefer convenience foods. Therefore, interventionists working with this population need to take that into consideration; offering lessons specific to cooking conveniently in a healthful manner.

The final additional topic that surfaced was specific to diabetes. Participants wanted to know what foods are high in carbohydrates and how many of those high carbohydrate foods they should be eating each day. Even though some of this information was covered, participants deemed it salient enough to warrant an individual lesson. One participant elaborated on this need by describing her frustration with fluctuating blood sugar levels. She asked for more clarification regarding the connection between certain types of food and blood sugar levels.

You know, like the stuff you were just talking about, the frozen stuff – if I eat that my sugar automatically goes high. So I'm trying to pinpoint what is making it spike. That's where I'm at. If the – if the roast beef, like Campbell [soup] didn't make it spike…certain foods will make it spike…and certain ones don't. So maybe – I'm just saying – maybe diabetes is not controlled by the diet as much as they think – at least for me.

Diabetes was prevalent in this population. Interventionists should take this into account when developing or refining nutrition programming.

Recruitment Strategies and Marketing

Equally important to core curriculum components are the tactics used to recruit prospective participants. When asked what strategies participants felt would be effective in marketing such a nutrition program, the following three themes were identified: emphasize benefits of proper nutrition, combat resistance to change, and advertise "free." Each of these subthemes are discussed in detail below.

Table 12.

Emerging Process Evaluation Subthemes for Recruitment Strategies and Marketing

Theme	**Subtheme**
Recruitment Strategies and Marketing	Emphasize Benefits of Proper Nutrition Combatting Resistance to Change "Free"

Note. This table previews the three major subthemes identified in the process and outcome evaluation focus groups and in-depth interview dataset under the theme: recruitment strategies and marketing.

Emphasize Benefits of Proper Nutrition. As previously mentioned, older adults claimed to be more interested in learning about diet if the facilitator made the connection

for them between diet and disease. Several participants in one process evaluation focus group argued for the importance of taking diabetes into consideration during each lesson since it is so prevalent. One participant in particular argued that the facilitator should emphasize sugar-free, diabetic-friendly options, especially whenever samples are brought that contain carbohydrates. She disclosed, *"the one's that's got diabetes and the ones that's sick, you know what I mean? They're not feeling well or something. Because a lot of times they think it's what they're eating."* Clearly, this participant felt that it was important to reinforce specific healthy dietary habits and the impact that they can have on health; blood sugar control in this case. Another commented on the importance of portion size as it relates to overall physical health,

> *I mean the food size, the portion size and what's good for 'em and stuff like that because a lot of people don't understand that. Because a lot of people don't understand, like I said around here, they don't know their portion size, they don't know…I mean because they can like something but not understand how it affects the body.*

Another made a general comment about the health conditions that this population has to manage, *"I mean everybody here's got a health problem. I mean somebody does. So, that [connecting diet with disease] helps them out too…or what they ate and how they, you know, how they consume it."* Another echoed the benefit of making this connection, *"I mean the more they learn they can look out for themselves or their family members that's sick…I mean it's for their own benefit. That's the way I feel anyway."* Throughout the process evaluation focus groups and in-depth interview, several themes recurred, including the importance of reinforcing key messages. One of those key messages is the

connection between diet and disease, as illustrated by this subtheme. The next subtheme goes a step further in priming interventionists on how to prepare for working with this population.

Combat Resistance to Change. Prior to any intervention, it is vital to become familiar with the audience if one hopes to be effective in changing attitude, behavior, or level of knowledge. This subtheme, encompassing resistance to change, is a critical area that interventionists must prepare for when working with older adults. For example, some participants indicated that some individuals, especially older adults, were unwilling to change. Their best advice for an incoming educator was to expect the resistance and move past it. One participant suggested,

> *There are our people that would not attend anything – regardless of what it is. They come to play cards and that's what they wanna do is play cards…And that's what those eight people are. They come here to play cards. If we have a presentation, I literally have to take the cards away from them. And so now we all come over here and they hate it, but they come, you know?*

Another participant commented on a specific instance of resistance that occurred during the intervention,

> *And we had a couple of people that attended a couple of meetings and when we went over the information that you were giving…the outcry that she had was, "I've done it all my life this way, I'm not going to change now."*

In that instance, the researcher acknowledged and validated the complaint. She reminded participants that engaging in the program was voluntary. She then proceeded with the lesson for the sake of other participants. Another participant reiterated this notion that

older adults tended to be set in their ways, *"so some people, it just doesn't matter, you're not going to change them."* Another reinforced the stereotype that older adults are set in their ways, *"if they're in their sixties or seventies you're not going to change them."* Likewise, one participant commented that learning information to help her eat healthier was not the motivating factor for attendance for many, *"some are not coming for the education…they come for the food."* The importance of food and other incentives are highlighted in the next subtheme. In addition, there are many strategies that can be used to combat resistance, some of which the researcher engaged in out in the field. These strategies are elaborated on in the discussion section.

Advertise "Free." As with many marketing tactics, participants indicated that advertising, and then providing "free" items (e.g., food, information, trinkets) would keep people engaged and coming back to each lesson. One participant exclaimed, *"you start with a flyer that you have "free" at the top – that's how you're going to do it. Free food. Then you'll get more in here with that. If you've got food on there, they'll come again."* Advertising "free" is a tactic for garnering interest in an intervention, similar to offering incentives, as will be discussed further in the following section.

Retention Strategies

Participants were also asked how to keep people engaged in the programming throughout the duration of all twelve units. Participants mentioned that both incentives and social support were important in order to retain interest.

Table 13.

Emerging Process Evaluation Subthemes for Retention Strategies

Theme	Subtheme
Retention Strategies	Incentives
	Social Support

Note. This table previews the two subthemes identified in the process and outcome evaluation focus groups and in-depth interview dataset under the theme: retention strategies.

Incentives. Incentives and "free" items were a recurring trend throughout this dataset. Participants indicated that free food, for example, was a plus because if they could try different foods and visually see that the recipe was doable, they may be more motivated to make dietary changes and attempt the recipe at home. One participant offered, *"if you've got food on there, they'll come again."* Another emphasized the importance of first impressions, *"working really hard on your very first presentation to get them in the room and grasp with them the fact that you're going to have…that they want to come back the next time to see what you got."* Another gave an example of incentives provided by an insurance company, *"now yesterday I had a little guy from [name of insurance company] – he doesn't even talk about his insurance, he just comes. And he brought a whole table full of gifts. But they were all here to get them."* Perhaps the intervention evaluated in the present study could employ this strategy.

Another participant mentioned the importance of sharing recipes as an incentive for attending, *"like if you bring something in – they really like it – and you've got that recipe written down somewhere – then I'm gonna take it. They'll take that and they'll try it."* Another claimed, *"but she introduced us to this salad; that is an awful good nutrition in a salad. That was very helpful for me – but I didn't get the recipe."* Not only can food

serve as an incentive to attend, but it can also enable participants to try new foods and engage in healthy eating habits at home. Oftentimes social support, or encouragement from referent others, provides the motivation to engage in these habits, as indicated in the following subtheme.

Social Support. Participants indicated that word of mouth surrounding the program was important in order to keep people interested. For example, participants expressed the value of chatter specifically surrounding recipe attempts. One participant claimed, *"it was a very good program. I enjoyed it – I enjoyed learning about the new snacks – which I made my own peanut butter and everything else from it."* In relation to interpersonal conversation and support during the program, one participant indicated, *"we talked about food – my mother and I, we talked about food a lot."* Both her and her mother attended intervention sessions together. At one intervention site, the lessons were given during congregate meal time. This opportunity for social interaction, in addition to receiving nutrition education, was seen as a benefit, as articulated here, *"one of the ideas of a congregate meal, it's a time when people can get along and socialize and things."* Therefore, one mechanism for maintaining interest in the program and facilitating behavior change would be to foster conversation amongst participants and their referent others.

In sum, the process evaluation focus groups and in-depth interview sought to a) gain insight into the actual implementation of the intervention and b) secure qualitative feedback from participants as to how the program was received, what was done well, and what could be done better in the future. Therefore, the process evaluation data were also

categorized into outcome themes in relation to knowledge and behavior change following the intervention. Each are discussed independently below.

Knowledge

Knowledge was an outcome hypothesized in chapter two (H2, a-d). Therefore, this portion of the data serves to supplement the quantitative results from the cognitive measure (Pfizer's (2011) Newest Vital Signs tool). Participants indicated that they gained nutrition knowledge in two primary areas: portion size and reading food labels.

Table 14.

Emerging Outcome Evaluation Subthemes for Knowledge Gained

Theme	**Subtheme**
Knowledge Gained	Portion Sizes
	Reading Food Labels

Note. This table previews the two subthemes identified in the process and outcome evaluation focus groups and in-depth interview dataset under the theme: knowledge gained.

Portion Size. Many participants came into the program with no idea of what an appropriate portion size should be for foods in each of the five food groups. After the intervention, participants indicated that they came to learn appropriate portion sizes. One participant talked about her observation of others after the intervention, *"I've heard that comment already – just in the last couple of weeks from [name of local food store]. They've [the participants] opened their things up and they've said, "Look [person's name], look what we get now. Do you think that's a portion of the tapioca?"* Similarly, participants indicated an increased awareness of portion size when preparing or consuming food. For example, one participant said, *"they've got those little plates that have portion sizes on them. You can get, too."* Another commented on her goal coming

into the program, *"that's what I wanted to find out, you know, the portion sizes and what are the portions and stuff like…because, I mean, portions are different in each family's house."* Another connected portion size with information on a food label,

> *It's [the food label] got it on the back if you turn that package around it's got it on the back listed as far as like how many servings of…well, like serving size…maybe three or four ounces…and that way I could see like one serving.*

Therefore, many of the participants that came into the program claiming a lack of knowledge with regards to appropriate portion sizes, ended up completing the program with an understanding of how to determine serving size for a given food using the nutrition facts label, as evidenced in the next subtheme.

Reading Food Labels. Reading a nutrition facts label was not something that many participants were accustomed to pre-intervention. However, after the intervention, participants indicated that they were able to read a nutrition label on multiple types of food packaging. In addition, they were able to identify specific macro and micronutrients, including: calories, protein, carbohydrates, fat, and sodium. One participant expressed her experience reading food labels to help a family member,

> *Read the labels. My brother-in-law had a heart attack and then he was coming home, and he had to get everything set up to where…so we had to go to the grocery store and read every label to find out what he could have to eat and what he couldn't have to eat and stuff, so…*

Another discussed her heightened awareness of reading food labels prior to purchasing at the grocery store,

I learned more about reading labels – when I first was told I had to read a label, I looked at my son and I said, "if it says anything on the can, don't buy it, you know?" And so he would go to the store and say, "Mom, this one just says 14 on it." I says, "it has to be under 10 for the grams."

Others expressed their ability to identify specific quantities of ingredients in a given food product, as advertised on a food label. For example, one person stated, *"and what to look for in the labels. I did not know that they listed certain things first. And then when the things that are really important to you is going to be at the bottom in small print."* Another expressed that she had learned how to identify ingredient quantities in various food products as a result of the intervention, *"as far as like, it's got so much sugar on it. But here on the label on the outside it says this but on the back of the can, you turn it around, your first item that's listed is the primary item that's in it."* Another echoed what she had learned, *"the can, so that makes you think, "okay there, it really only takes a second to start to do that [read the food label]."* For many, this knowledge translated into behavior change, as evidenced in the next section.

Behavior Change

In addition to a gain in knowledge, participants also explicitly stated achieving behavior change with regards to intentional food choice, spending at the grocery store, and portion control; each of which are discussed respectively below.

Table 15.

Emerging Outcome Evaluation Subthemes for Observed Behavior Changes

Theme	**Subtheme**
Behavior Changes	Intentional Food Choices Grocery Spending Portion Control

Note. This table previews the three major subthemes identified in the process and outcome evaluation focus groups and in-depth interview dataset under the theme: behavior changes observed.

Intentional Food Choice. After participating in the program, participants expressed that they had more awareness when shopping, preparing, and consuming food. In general, many expressed learning that many healthy eating behaviors can be simple and doable at home, *"but I do think that if they're [older adults] a little bit more informed on this [healthy eating] – on a regular basis, not just a one-time thing, they might start doing that – changing around their dietary habits. Is that – like the more vegetables, the more fruit."* This anecdote offers support that older adults are willing and motivated to change behavior, if given appropriate information.

One participant spoke to behavior change in terms of making new recipes at home, "*there was a lot of them trying it at home – she tried it at home."* Another participant indicated taking the initiative to make certain food items from scratch that she had sampled during multiple lessons, such as homemade peanut butter, *"yes, it was a very good program. I enjoyed it – I enjoyed learning about the new snacks – which I made my own peanut butter and everything else from it."* She also expanded on making the pumpkin muffins at her parents' inn for guests, "y*es, and I've of course done the pumpkin…Oh I did – like I said – the pumpkin – because I made it for the wool fest."* As evidenced by these anecdotes, several participants experimented in the kitchen as a result of healthy recipes they had learned during the intervention.

In response to high sugar, high carbohydrate, non-nutrient dense beverages, one participant shared,

We always kept tons of pop in the refrigerator. We don't do that anymore. We keep maybe those little bitty bottles and most of its water. So, when you want something to drink and you're reaching there, you think, "Now do I need that Pepsi, or do I need that water? I need that water.

Another made a similar change,

But what would you do with your soft drinks too – because I have to – of course they're diet. I keep for company if I have one, but I'll keep them down in the basement where I'll have to take that exercise to go down there.

In reference to purchasing canned foods, one participant expressed, *"I know now that I should rinse them [canned vegetables]."* Another indicated her preference for purchasing frozen foods,

Well see that's the other thing, too. Freezing – I've got the vacuum-packed thing. And I do my own garden every year, so when I'm chopping up like all of my peppers and stuff like that I'm not using in my stuffed peppers or meatloaf, I will vacuum pack it. I've done that – it takes less space in my freezer.

Other participants indicated a strong desire to *"avoid fast foods"* after learning about the caloric, sodium, and fat intake in them specifically. For example, one participant shared an experience about the realization of the fat content in a typical fast food hamburger, *"that stuck – it just – you know, every time I eat that hamburger and I think, "oh my God! Where did all of that grease go?" But you know what, I've had to go back and order it again! But I do think about it."* Another claimed, *"yeah, from the program I have learned to think about that fat intake."* While six weeks is not much time to observe significant behavior change, the mere awareness among participants of the

nutrient content in foods can be considered a significant achievement. Another participant asserted her decreased reliance on fast food after the program,

> *Well one thing we learned here, when we'd get hungry we'd run to McDonald's and grab a burger. That's what we'd do – we do it every day – you know – well not her, but some of us did. Her, me, and him, you know, we'd go get it. But now we bring things from home.*

One participant explained her approach to eating at one particular fast food restaurant, "*I have a couple of choices if I take somebody and we're going to eat – my sister says we're going there [McDonald's] – it's the southwest salad or the chicken wrap. But other than that I don't eat anything else [there]."* Others learned to watch their sodium and fat intake in other ways, as evidenced by this quote, *"yes, from the program I have learned to think about fat intake."* Likewise, one participant claimed, *"but the salt I do think about and I do think about the fat. And beforehand I would have never thought about either one of them."* Another elaborated on decreasing her intake of junk foods, *"yeah, and I've cut back on chips, so…"* Similarly, another argued, *"I won't bring chips in the house unless the grandkids come because I know I would eat them all. And if I do, I get a small bag."* Finally, one participant indicated that her mentality towards eating has changed since the conclusion of the program. She claimed, *"it's changed and it's like I just have to say to myself it's like, "you didn't need that."* Another summed up her learning experience throughout the program, "*I watch what I eat and I don't eat a lot of sweets, but it was very educational I thought – the whole program."* Intentional food choice contributed to grocery shopping habits; thereby impacting dollar amount spent on food purchases, as explained in the next subtheme.

Grocery Spending. In the formative focus group, senior center managers identified cost as a barrier to eating healthy. Some intervention participants indicated that, as a result of this program, they were able to decrease the amount of money they spent on food each month. One participant simply stated that, as a result of this intervention, she recommended others to, "c*hange your pattern when you go to the grocery store."* Another indicated that she learned tactics for helping her save money and make healthier choices while grocery shopping, *"[I'm] learning how to shop."* Another expressed her insight into the cost and quality of various types of foods. She speaks specifically to canned foods and how they may not be the healthiest option, regardless of how inexpensive they are, *"[when you] go into the store and buy canned. You think you're paying for those canned vegetables – you're paying for the sodium. I buy the frozen, that way you can just take as much out so you can fix it for yourself. You're not wasting money."*

Perhaps the most influential quote from this portion of the focus group was the one shared by this participant. She elaborated on the influence that the intervention had on her grocery bill. Here is her story,

> *I mean I can tell you just from my grocery bill…it's changed. I've spent less and I'm pretty much buying everything that I had bought, say the month before or two months before or whatever. But now I'm leaving certain things off my list because I don't need them. Has this changed as far as the amount of money I've spent? I'm spending a less amount of money on some things…it makes it, so like I said, my grocery bills have changed. It's changed and it's like I just have to say to myself it's like, "you didn't need that."*

Intentional food choice and decreased money spent on food were both positive outcomes of the intervention. While claims regarding decreased grocery spending were few (11 references, or 1.6% of the entire transcript; NVivo 12, QSR International Pty Ltd., 2020), the overall impact cannot be understated as any change in a positive direction is important, as evidenced by a change in portion control behaviors illustrated below.

Portion Control. After the intervention, participants indicated an increased awareness in appropriate serving sizes. For some, this manifested in reduced daily caloric intake. One expressed her take on eating less, *"maybe I can have chips on Monday, but I can't have them again until Friday or something."* Further, she expressed, *"if that's what you got to do to begin weaning yourself off – say like you did that for a couple of months and then you look up one day and it's like, you know what, I haven't had any chips in two weeks."* This anecdote offers evidence that some participants learned to be strategic about food choice. As a whole, the intervention emphasized balance, or the notion that all foods are appropriate, if eaten in moderation. Many participants gained an understanding of this concept and began to implement it in their daily lives. For example, another participant discussed her angle at reducing portion size, *"I use a small plate. I use little plates."* Another claimed, "*You see what I'm saying? I really don't need what I thought I needed."* Another conveyed, *"that's why I buy the individual bags for portion size. I just take out what I'm gonna eat that day. That way you're not wasting…"* Increased awareness in food purchasing, preparation, and consumption behaviors translated into monitoring portion sizes. Each of the subthemes in the outcome portion (e.g., knowledge related to portion size and reading a nutrition facts label, intentional food choice,

decreased grocery spending, and decreased portion size) of this dataset help to inform the quantitative results presented above.

CHAPTER FIVE: DISCUSSION

Triangulation

According to Glasgow et al., (1999) and Glasgow et al., (2019) a mixed-methods approach is ideal in order to triangulate the data and make best-practice decisions. Both quantitative and qualitative data were collected as part of this evaluation. The qualitative data collected post-intervention helped to pick up on nuances that were lacking in the quantitative findings due to small sample size and other factors, as outlined below. This portion of the discussion chapter aims to triangulate these findings, thereby integrating both the qualitative and quantitative components of this study. In addition, findings are compared to those in the literature. Data triangulation will be discussed by hypothesis, followed by the fourth research question. Research questions one through three were addressed in the formative focus group. Therefore, these findings cannot be integrated with the rest of the data. However, practical implications of these findings are discussed.

Hypothesis 1. Food Purchasing Behavior

The quantitative results revealed no significant difference between pre and post intervention food purchasing behavior. This could be attributed to two main factors: 1) comparisons were only made between five grocery store receipts and 2) variables were formulated in terms of the percentage of money spent in each of the ten mutually exclusive categories. The first factor is explained in greater detail in the section dictating the impact of COVID-19 on the intervention. The latter factor is discussed here. Comparisons were made between the subtotals for the five participants from whom receipts could be paired. When such a comparison was made, overall grocery spending decreased from $712.93 to $609.74 (see Table 16 below). Stated differently, amount

spent on groceries decreased from pre to post for three of the five participants. Although minimal, this finding supports the qualitative results from the process evaluation focus groups and in-depth interview. To recap, this dataset displayed testimony that some participants decreased their overall food spending after the intervention. Most notably, one participant dictated a remarkable story where she noticed a decrease in grocery spending. Many others admitted an increased awareness of the healthfulness of the foods they were buying. For some, this translated into smaller grocery bills. Therefore, while the quantitative results may not show support that the intervention had an effect, the qualitative results suggest the possibility of a positive effect in food purchasing behavior.

Table 16.

Subtotal of Food Dollars Spent Before and After the Intervention

Participant	PRE_Receipt Subtotal	POST_Receipt Subtotal
1	138.86	297.94
2	39.1	79.45
3	367.45	193.19
4	33.45	19.58
5	134.07	19.58
TOTAL:	712.93	609.74

Note. This table represents the total dollars spent on grocery store trips before (pre) and after the intervention (post) for the five participants whose data could be paired.

In addition to the overall decrease in food dollars spent among these five participants, comparisons indicated that participants increased their amount spent in the following categories: vegetables, lean protein, high fat foods, and high sodium foods. While purchasing behavior does not translate into actual food consumption, an increased purchase in vegetables and lean protein is positive. As the qualitative findings suggested, perhaps participants were more aware of the importance of vegetable intake and minimal

fat consumption after having participated in the intervention. Gustafson, Ng, and Pitts (2019) too found an eight percent increase in both fruit and vegetable purchases after a grocery store intervention. This intervention provided incentives (e.g., recipe cards, samples) and offered sales on fresh produce. The Healthy Foods, Healthy Families intervention was conducted in a similar manner. Bowling, Moretti, Ringelheim, Tran, and Davison (2016) found that intervention incentives particularly increased participants' purchase of fruits and vegetables. Another intervention conducted within a grocery store found an average 16% increase in food dollars spent on produce post-intervention (Payne, Niculescu, Just, & Kelly, 2015).

On the flip side, comparisons indicated that participants may have decreased the amount spent in the following categories: fruit, high fat protein, low fat dairy, high fat dairy, calorie-rich, non-nutrient dense carbohydrates, and other non-food items. Again, while food purchasing behavior may not necessarily translate into food consumption behavior, a decrease in purchase of high fat protein and carbohydrates would be positive. If there are less of these items in the household, there is a decreased likelihood that the participant would consume them. Other researchers found support that purchase of sugar-sweetened beverages decreased after a grocery store intervention, as discussed in the previous paragraph (Gustafson et al., 2019). While none of these differences were statistically significant in the present study, it is worthy to note the nuances in purchasing behavior and how the intervention may have contributed. See Tables 17 - 22. for a comparison of dollars spent in each of the ten categories.

Granted, limitations to such comparisons must be considered. For example, in a face-to-face setting, participants may be more prone to social desirability bias, thereby

responding in a way they deem favorable to the researcher and their peers (King & Bruner, 2000). In addition, participants may hold the belief that they have made food purchasing changes as a result of the intervention when they in fact had not. In addition, actual number of grocery store trips for each participant was not documented, nor was the individual making the purchase. Therefore, quantitative results are unable to support the qualitative findings. However, the qualitative findings stand on their own in terms of positive effects with regard to behavior change surrounding healthy eating.

Table 17.

Subtotal of Food Dollars Spent on Fruits and Vegetables Before and After the Intervention

PRE_Fruit	POST_Fruit	PRE_Vegetable	POST_Vegetable
34.1	20.95	2	20.86
6.96	4.73	0	0
24.13	12.55	5.79	18.66
3.28	0	0	0
2.54	0	12.68	0
71.01	38.23	20.47	39.52

Note. This table represents the total dollars spent on fruits and vegetables during grocery store trips before (pre) and after the intervention (post) for the five participants whose data could be paired.

Table 18.

Subtotal of Food Dollars Spend on Lean and High-Fat Proteins Before and After the Intervention

PRE_Lean Protein	POST_Lean Protein	PRE_High-Fat Protein	POST_High-Fat Protein
0	29.15	4.49	10.14
0	1	0	1
39.19	11.06	24.63	7.47
1.67	13.76	0	0
14.66	13.76	20.62	0
55.52	68.73	49.74	18.61

Note. This table represents the total dollars spent on lean protein and high-fat protein during grocery store trips before (pre) and after the intervention (post) for the five participants whose data could be paired.

Table 19.

Subtotal of Food Dollars Spent on Low and High-Fat Dairy Before and After the Intervention

PRE_Low-Fat Dairy	POST_Low-Fat Dairy	PRE_High-Fat Dairy	POST_High-Fat Dairy
0	2.29	7.98	17.03
4	0	0	0
15.37	6.29	16.87	15.85
0	0	0	0
6.2	0	12.56	0
25.57	8.58	37.41	32.88

Note. This table represents the total dollars spent on low-fat and high-fat dairy during grocery store trips before (pre) and after the intervention (post) for the five participants whose data could be paired.

Table 20.

Subtotal of Food Dollars Spent on High-Calorie, Non-Nutrient Dense Foods Before and After the Intervention

PRE_Calorie-Rich, Non-Nutrient Dense Carbohydrates	POST_Calorie-Rich, Non-Nutrient Dense Carbohydrates
0.89	44.96
18.49	11.57
56.04	39.54
14.18	5.82
19.95	5.82
109.55	107.71

Note. This table represents the total dollars spent on calorie-rich, non-nutrient dense carbohydrates during grocery store trips before (pre) and after the intervention (post) for the five participants whose data could be paired.

Table 21.

Subtotal of Food Dollars Spent on High-Fat and High-Sodium Foods Before and After the Intervention

PRE_High-Fat Foods	POST_High-Fat Foods	PRE_Foods High in Sodium	POST_Foods High in Sodium
2.99	17.36	2.5	46.23
0	0	4	7.58
1.79	4.58	74.68	37.85
0	0	2.68	0
3.97	0	4.06	0
8.75	21.94	87.92	91.66

Note. This table represents the total dollars spent on high-fat and high-sodium foods during grocery store trips before (pre) and after the intervention (post) for the five participants whose data could be paired.

Table 22.

Subtotal of Food Dollars Spent on Other, Non-Food Items Before and After the Intervention

PRE_Other	POST_Other
82.93	97.11
5.28	52.25
135.12	38.33
13.58	0
33.85	0
270.76	187.69

Note. This table represents the total dollars spent on "other," non-food items during grocery store trips before (pre) and after the intervention (post) for the five participants whose data could be paired.

Another side to this argument is that while there was no significant difference in purchasing behavior in the hypothesized direction (either an increase or a decrease), perhaps participants were engaging in healthy eating behaviors post intervention. The qualitative data would certainly suggest this as participants indicated decreasing their portion size of many unhealthy foods and beverages (e.g., high calorie, non-nutrient dense carbohydrates like chips and soda). They also reported replacing some of these unhealthy items with healthier options prepared from home (e.g., homemade peanut butter, high fiber pumpkin muffins, etc.). So, perhaps there was not enough time, given COVID-19 and other factors towards the end of the intervention at two sites, for the quantitative receipt data to reflect an increase in purchase of healthy foods and a decrease in purchase of unhealthy foods. Therefore, there is a possibility that the intervention was more effective than the quantitative results were able to capture. For example, the sample size in this analysis was five. Five participants is not enough to generate any type of

statistical power in one direction or another (Faul, Erdfelder, Lang, & Buchner, 2007; Faul, Erdfelder, Buchner, & Lang, 2009). In addition, the receipts analyzed were not from the same time period. Some receipts were from participants in the first round of the intervention at site one in Fall 2019, while others were from the Spring of 2020; largely affected by COVID-19. Therefore, while these receipts provide some information, they are unable to determine whether there were significant behavioral changes with regard to grocery store shopping from pre to post intervention due to COVID-19, which may have confounded the findings. Emphasis must be placed on the qualitative component of this evaluation, as acknowledged below.

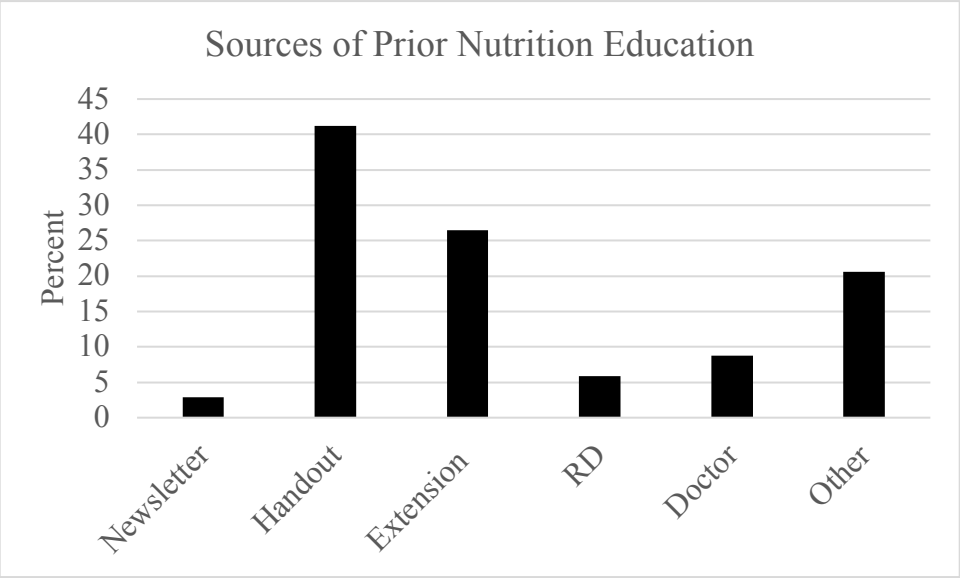
Hypothesis 2. Knowledge

Quantitative findings revealed no significant differences between nutrition knowledge pre and post intervention. One explanation is that many participants had already been exposed to nutrition education and therefore had high nutrition knowledge to begin with. Demographic information was collected at the beginning of this study, during the pre-phase, indicating that some participants had received prior nutrition education. Prior exposure to nutrition education came in the form of advice from a physician or dietitian, a magazine article, or Cooperative Extension programming delivered at the senior center (see Figure 3 below for more details). Therefore, a majority of participants had high levels on knowledge assessment prior to the intervention. For example, the aggregate score on the "Newest Vital Signs" measure (Pfizer, 2011) was 4.6 when considered on a zero to six scale. The variable was created given the number of correct answers, with a score of zero corresponding to no correct answers and a score of six corresponding to all correct answers. With this high of a score initially, it is difficult

for there to be a large enough margin to showcase improvement during the post data collection phase.

Figure 2.

Sources of Prior Nutrition Education Pre-Intervention



However, the qualitative findings from the process evaluation focus groups and in-depth interview paint a different picture. Participants reported that their knowledge increased post intervention with regards to portion size and ability to read a nutrition facts label. As a result, nutrition knowledge may have been present prior to the intervention, but participants may have lacked the capacity to put that information into action by eating healthier. Such capacity is described in many ways in the literature. For example, McLaughlin et al., (2017) and Chen et al., (2016) conceptualized this as the health locus of control; noted in the literature review section as a barrier to healthy eating. Similarly, White and colleagues (2010) and Alizadeh and cohort (2015) conceived of this construct as the perception of control. Rather, an individual's judgment that he or she has agency over his or her health and subsequent behavior. Likewise, Ho et al., (1991) coined this

viewpoint personal efficacy. Other researchers considered this construct to be the value that an individual places on changing a behavior (Bardach et al., 2016). If the value is significant enough, then the individual is more likely to engage in behavior change.

Other interventions found support for knowledge gained after a nutrition intervention. For example, Rustad and Smith (2013) found improved nutrition knowledge following an intervention with low-income women. Another intervention that has gained much support for the low-income audience is the Expanded Food and Nutrition Program (EFNEP). In one evaluation of this program, Arnold and Sobal (2000) found an increase in general nutrition knowledge from pre to post and at follow-up. Follow-up occurred one year after the program was completed. With respect to food safety knowledge following EFNEP, Meer and Misner (2000), too, found improved knowledge of food safety after the program. While many of the nutrition education programs that have been assessed in the literature focus on children, there is still some evidence that nutrition knowledge can be increased in this type of format. The next section discusses attitudinal change post intervention.

Hypothesis 3. Attitudes

As with the cognitive data, participant's mean scores for each of the processes of change on the attitudinal questionnaire did not show significance to indicate development of more favorable attitudes towards healthy eating. The means for the responses to each of the processes of change ranged from 2.8 to 3.6; averaging out to 3.2. An average of 3.2 on a five-point scale indicates neutrality, where participants neither agreed nor disagreed with the statement. The quantitative data, therefore, does not correlate with the qualitative data. During the focus groups and in-depth interview, most participants indicated

favorable attitudes towards the intervention and various healthy eating behaviors (e.g., portion control, intentional food choice, grocery spending, and reading a nutrition facts label). Several provided personal anecdotes on their journey to eating healthier and how the intervention helped to shape that change.

Other researchers found support for positive attitudinal change following a nutrition education intervention. More specifically, after receiving financial education related to food spending, participants indicated more positive attitudes towards their ability to eat healthy on a limited budget (Rustad & Smith, 2012). Another intervention targeted towards elementary school children found improved attitudes related to the taste and preference for vegetables. The intervention had a similar timeframe to the present study, between three and five weeks (Wall, Least, Gromis, & Lohse, 2012). Lee, Chang, and Park (2008) assessed the impact of nutrition education on elementary school-aged children as well, but in Korea. Post intervention, they found improved attitude with respect to healthy eating habits. Again, there is support that food preferences can be altered in a healthier direction, if participants are given the appropriate education.

While the literature supports quantitative findings for improved attitudes related to healthy eating post-intervention, there are several reasons why this may not be the case in the present study. Perhaps one explanation for this dichotomy is the notion proposed by Ajzen (1991) in the theory of planned behavior (TPB) that both attitude and intention do not necessarily predict behavior. According to Azjen (1991),

Intentions are assumed to capture the motivational factors that influence a behavior; they are indications of how hard people are willing to try, of how much of an effort they are planning to exert, in order to perform the behavior (p. 181).

There are other variables that impact behavior, including social norms and perceived behavioral control. An example of a social norm related to healthy eating would be peer pressure to engage in unhealthy eating behaviors while dining outside of the home. Perceived behavioral control, as defined by Azjen (1991), "refers to people's perception of the ease or difficulty of performing the behavior of interest (p. 183)." The researcher argues that the intervention helped to invoke perceived behavioral control by providing participants with a positive mindset surrounding healthy eating. The qualitative data support this notion. Participants expressed improved confidence in their capability to identify healthy foods via nutrition facts labels, serve appropriate portions, and to prepare simple, healthy snacks and meals. Therefore, there is some evidence that aspects of the intervention were effective. These findings also support the claim that when confidence is high, individuals are more likely to take initiative when it comes to their health; thereby making behavioral modifications (Alizadeh et al., 2015; Bardach et al., 2016; Chen et al., 2016; Ho et al., 1991; McLaughlin et al., 2017; White et al., 2010). A critical factor in the behavioral modification journey is the stage of change. Rather, where an individual is at in terms of their readiness to change, as illustrated by the final research question below.

Research Question 4. Stages of Change

There was an increase in the score for stage of change from pre to post (M = 3.4 to 3.8, respectively). This change was not significant. However, there was no definitive movement between stages as this mean score corresponds to the preparation stage of change. It is worthy to note that theoretically, movement through the stages is not linear (Prochaska, 1979; Prochaska, Crimi, Lapsanki, Martel, & Reid, 1982; Prochaska & DiClemente, 1983; Prochaska & DiClemente, 1984; Prochaska & DiClemente, 1986;

Prochaska, Norcross, Fowler, Follick, & Abrams, 1992a; Prochaska, DiClemente, & Norcross, 1992b). Stated differently, behavior change takes time. It is expected that any individual undergoing such a lifestyle change will relapse, or revert back to earlier stages, during their journey. Therefore, the findings addressing RQ4 show that there is movement from pre to post. Movement may not encompass an entire stage (either forward or backward), but it does indicate progress; verifying that the intervention did have some positive effect.

Using the TTM, other scholars evaluated the impact of a nutrition intervention on dietary fat intake. They found support that participants that began in the precontemplation stage of change moved forward into another stage post-intervention. While stage movement occurred within a year post-intervention, it was not maintained at follow-up (Finckenor & Byrd-Bredbenner, 2000). While the quantitative data in the present study did not support this change, the qualitative data collected during the formative focus group did to some degree. During this component of the present study, senior center managers and administrators were questioned on the eating habits, attitudes, barriers, and motivators to healthy eating for the population of older adults that they work with. When coded into each of the stages of change, four of the five stages were represented in the data: pre-contemplation, contemplation, preparation, and action. The following anecdote was coded in the pre-contemplative stage of change,

> *Yeah. That's like me. I was – I'm old and I'll admit it [laughter]. Um, back in – when I was young, think about our parents and our grandparents. Well, we were used to cooking with lard, cooking with bacon grease, and all that good stuff and now they're telling you, you know, "you don't use lard, you don't use bacon*

grease." And a lot of the seniors are my age and older and just like [participant's name] said, that's what you were accustomed to and that's how you were brought up. And even me today – I'm having a hard time cutting out on a lot of stuff because that's how I was raised and that's how I was taught to cook. And now it's like changing – you're like telling them, "you're being bad; or you weren't raised right because you need to be doing it this way here because this is the new and right way." And so it takes a while to adapt to it.

This participant is close in age to the older adult population. She makes a valid argument that many of the older adults share; that ingrained cooking and eating habits are hard to change. In fact, she offered some sound advice that interventionists should consider when attempting to encourage behavior change; be respectful and mindful of cultural and family eating traditions and values (Delaney & McCarthy, 2014).

In response to the contemplative stage of change, one participant asserted her belief that older adults are open to learning about nutrition and to possibly changing behavior. The responsibility lies on the educator and how they present that information. Interventionists should take note,

I think they're [older adults] open to it and I think that they entertain the process. Just not – maybe entertaining may not be the correct verb, but, um, I think that if we do have a presentation or someone who comes in and talks to us about nutrition or healthy eating or whatever or even if we just have a conversation – I think they're very receptive to it and they're open to it. I just don't know – since I don't go home with a lot of them – if this is something they carry on once they leave the conversation or center. I mean, if they come back in and tell me, "oh I

made that wonderful something or another and it was fabulous…" You know, obviously it kind of creates a buzz for some of the other ones to want to try it or you know. Maybe as part of their diet.

As a result, interventionists must consider that dietary change is a gradual process. Participants' barriers and motivators must be considered; with each lesson and piece of material tailored uniquely to their stage of change. Another commented on her own habits and how this reflects some of the thinking of the older adult population when it comes to dietary changes. This was coded as preparation with regards to the stages of change, *"so, I'm gonna have to start doing something different."* Another senior center manager added to the notion that participants were more conscientious of sodium content in canned foods as a result of this intervention. Her story was coded in the action stage of change. She argued that one of the participants reported, *"the point where I put foods, I put a can down in the container of water and sit there and swish it and dump that and then rinse it again to be sure there's nothing left on that vegetable."* These findings are presented here as opposed to in the results section because they were not as prevalent as the other themes. Nonetheless, they offer support for the importance of tailoring interventions to match each participants' stage of change. While these qualitative findings support the observation that some participants started and ended the intervention at different stages; more work needs to be done after certain factors are considered; as discussed below.

Factors Impacting Study Results

When integrating the qualitative and quantitative results, it can be concluded that the intervention was successful to some degree. There are multiple reasons why the quantitative data alone did not support this notion. The first explanation is the impact of

the novel COVID-19. The second explanation is that the timeframe of six weeks was inappropriate to conduct a behavioral intervention of this magnitude. Each factor is explored in detail in the following sections.

Overall Impact of COVID-19

While both improvements in behavior, knowledge, and attitude were qualitatively mentioned as outcomes of this study, there are multiple reasons as to why the quantitative results did not show statistical significance. The first explanation for the findings is the influence of COVID-19. Due to COVID-19, senior centers closed down the week of March 16th, 2020. Therefore, the intervention was postponed at two of the four sites, accounting for about half of the total sample size. One site had one lesson remaining; while the other site had four lessons remaining. Content was delivered in printed form via mail in mid-April 2020. The decision to supply content in this format was made as the researcher contacted each individual participant to determine internet access and preferred method of content delivery. The lack of face-to-face contact at the end of the intervention at these two sites more than likely played a significant role in the findings. Another explanation is discussed below that considers this disruption.

Instructor Immediacy and Impact on Outcomes. The intervention was designed to be face-to-face. Therefore, abruptly ending the face-to-face sessions very well could have contributed to the indifferent results between pre and post scores in quantitative assessment. Face-to-face allows for synchronous interaction, thereby helping rapport to develop between instructor and participant. This phenomena is called instructor immediacy. Arbaugh (2001) defines instructor immediacy behaviors as "attempts to reduce the social distance between themselves and their students" (pp. 42). Research

supports the relationship between both verbal and nonverbal immediacy, student motivation, and learning (Christophel, 1990; Menzel & Carrell, 1999; Myers, Zhong, & Guan,1998). Much of the recent literature on instructor immediacy pertains to the virtual classroom. However, as it relates to synchronicity, one study by Carrell and Menzel (2001) found that both instructor immediacy and learning were perceived to be higher in a live environment. Given the situation with the novel COVID-19, participant's lack of access to internet and technological illiteracy, synchronicity in delivering the remainder of the program was impossible. Therefore, the impact that this may have had in perceptions of instructor immediacy likely impacted motivation and learning.

In addition, without direct, weekly contact with participants, it was difficult for the researcher to remind the participants of the procedures for collecting both grocery store receipts and post survey data (behavioral, cognitive, and attitudinal measures). The researcher sent explicit instructions for returning the post survey data and post grocery store receipts in a prepaid envelope. However, only 17 of the 35 surveys were returned. In addition, most participants that had submitted pre grocery store receipts did not submit post grocery store receipts. Therefore, there was no opportunity to pair the data for comparison after the intervention. In addition to impeding instructor immediacy, the novel COVID-19, too, changed the nature of grocery shopping for many older adults; as explored below.

Impact on Grocery Shopping. Due to the unprecedented nature of COVID-19, many food manufacturing industries were ill-equipped to meet the food supply demands (Mussell, Bilyea, & Hedley, 2020). For example, both importation and exportation of meat and other perishable food goods, including fruits and vegetables, were impacted due

to social distancing guidelines (Nicola et al., 2020). Specific produce items that have been sparse in many food retail outlets include: potatoes, onions, and sweet potatoes. A major contributor to this stockpile shortage has been the tendency to over-purchase and hoard both perishable and non-perishable items (Richards & Rickard, 2020). Likewise, distribution of produce from farm to store to table has been disrupted. Galanakis (2020) claims that many fresh vegetables have gone to waste as a result.

On an individual level, normal shopping routines were, and continue to be, interrupted (Nicola et al., 2020). Many individuals in this population are shopping less, having someone else do their shopping, or are avoiding shopping altogether due to the strict social distancing guidelines (Baker, Farrokhnia, Meyer, Pagel, & Yannelis, 2020). Pre-intervention, participants were asked two questions about food shopping behavior. See Figures 1 and 2 below that illustrate whether the individual participant and/or a family member did the primary grocery shopping prior to COVID-19. As a result of these changes, less grocery store receipts were turned in to study personnel during the post intervention period. This contributed to the limited sample and inability to pair more than five grocery store receipts.

Figure 3.

Primary Person in Household that Shops for Food

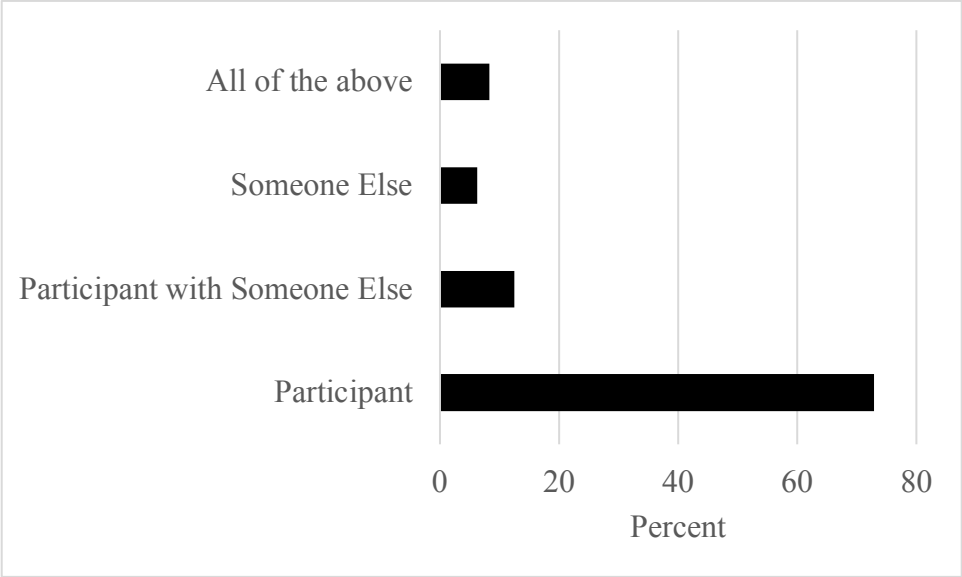
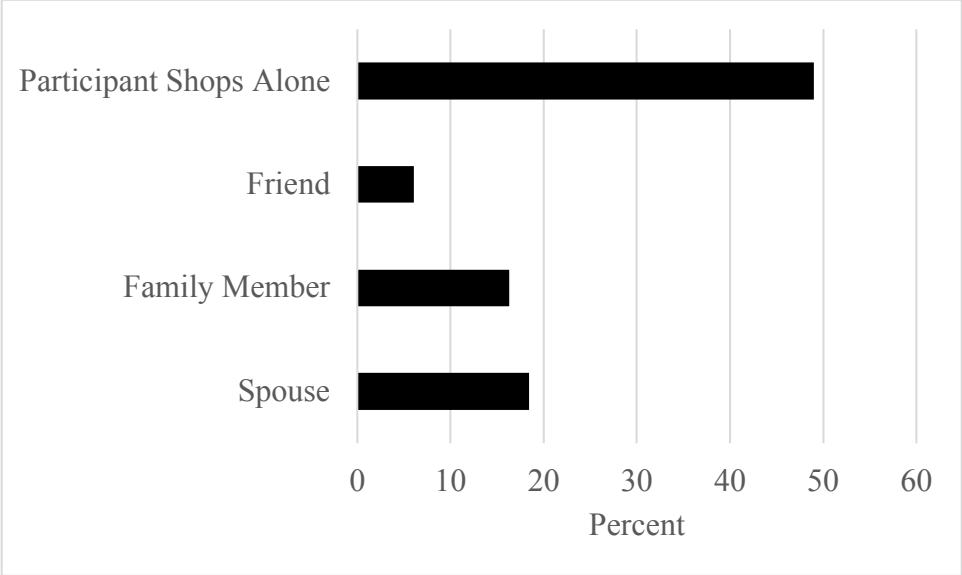


Figure 4.

Other Individuals that Assist Participants with Food Shopping



Impact on Food Consumption Behaviors. Muscogiuri, Barrea, Savastano, and Colao (2020) argue that the relationship between food and COVID-19 goes beyond food purchasing behavior. For example, these researchers contend that many individuals have

increased their intake of calories, fats, carbohydrates, and proteins in general. These researchers argue that these changes in food consumption patterns are a result of quarantine and associated boredom. These researchers add that many are coping with the novel COVID-19 situation via stress eating, or consuming more comfort-type foods than they normally would. The quantitative findings of the present study, though not statistically significant, portray no change in eating behaviors. Therefore, one could argue that the intervention had some degree of success in that it encouraged participants to be mindful of their food consumption, even amidst a pandemic. Stated differently, given the propensity to eat unhealthy foods as a mean of comfort (Muscogiuri et al., 2020), participants in the intervention did not do so. In the qualitative findings, participants expressed an increased awareness and intentional food choice. There is evidence to support that this awareness was maintained post-intervention during the pandemic. Therefore, one could argue that the intervention helped to prevent unhealthy eating behaviors that many engaged in after the novel COVID-19 breakout. While this can certainly be considered a success, there are other factors that impacted the quantitative results in particular. One of those factors is the timeframe of the intervention, as discussed next.

Intervention Timeframe

Any type of change in an individual's lifestyle takes time; especially when the imposed change has behavioral, cognitive, and attitudinal components. The intervention was pilot-tested over a six-week period with two lessons each week. This timeframe was chosen in response to Newcomer, Hatry, and Wholey's (2010) criteria that an evaluation must be completed in a timeframe that allows the evaluator to analyze findings, make

modifications to the program, and reimplement before too many resources are expended. However, in the case of this study, given the novel COVID-19 and the complexity of changing eating behavior, perhaps six weeks was not an adequate amount of time. For example, Issel and Rosenberg (2014) argued that a one to two year timeframe was necessary for direct services, such as a nutrition education intervention. In addition, Prochaska and Velicer (1997) argued that one of the main assumptions of the TTM is that "behavior change is a process that unfolds over time through a sequence of stages (p. 41)." Therefore, perhaps the intervention, when implemented over a longer duration, would have a greater effect.

In closing, the quantitative findings did not show support for any of the hypotheses. However, the qualitative findings show support for increases in behavior, knowledge, and attitude; specifically surrounding portion size and reading a nutrition facts label. Therefore, the researcher cannot claim that the intervention had an impact on behavior, knowledge, or attitude using the quantitative findings alone. The next two sections provide an overview of the implications of these findings and how these findings may be replicated and substantiated in future research.

Theoretical Implications

There are many valid criticisms of the TTM, as previously alluded. One that became apparent in this study was the lack of consideration for level of involvement, or motivation. This construct can have a significant impact on one's decision to engage in a new behavior or to modify an existing one. In the context of physical activity, Hutchison, Breckon, and Johnston (2009) made this very argument. These researchers posited that individuals with varying degrees of motivation (or involvement) may utilize different

processes of change. According to Prochaska and DiClemente (1983; 1984; 1986) certain processes are utilized at different stages in the change process. For example, consciousness raising, dramatic relief, and environmental reevaluation are most commonly utilized in the pre-contemplative stage. Likewise, self-reevaluation tends to be associated with contemplation. Self-liberation is a process reserved for preparation. Finally, reinforcement management, helping relationships, counterconditioning, and stimulus control are processes for the action and maintenance stages (Prochaska, DiClemente, & Norcross, 1992b). Therefore, in the future, it is necessary to measure level of involvement in an attempt to expand the TTM.

At present, the TTM is unable to predict movement through the stages as it is a mere representation of this process. Other mechanisms involved in stage movement must be considered. Motivation is one of those mechanisms. Throughout the literature, many different constructs have been identified that influence motivation: health locus of control (Chen et al., 2016; McLaughlin et al., 2017), perception of control (Alizadeh et al., 2015; White et al., 2010), personal efficacy (Ho et al., 1991), and value (Bardach et al., 2016). However, each of these constructs, while influential, is separate from the motivation construct. Motivation is the innate drive, or initiative, to engage in or not engage in a given behavior, given the weight of importance the individual places on the propensity for that change to make a difference in overall health. While the TTM does consider self-efficacy, the researcher argues that it is time for the TTM to move beyond the model phase, considering movement across stages and the mechanisms that are utilized in each stage. In the case of the present study, doing so would allow researchers to parse out differences in pre and post intervention results. Further, it would provide interventionists

with a wealth of knowledge that could be used when modifying or developing programming for each stage of change.

Practical Implications

The appropriate timeframe for a given intervention is subjective; often contingent upon resources, funding guidelines, and logistics. The final part of this section offers advice intended for interventionists, clinicians, public health workers, and scholars. The information gleaned from the present study is synthesized into guidelines for addressing barriers to healthy eating for older adults, utilizing motivators to encourage healthy eating among older adults, and broad considerations for refining the intervention used, in addition to other similar interventions.

Addressing Older Adult's Barriers to Eating Healthy

There are many barriers that older adults experience when attempting to eat healthy. Some of them can be overcome at the individual level (e.g., food preferences); while others require a societal or public policy level approach (e.g., accessibility). Solutions to these barriers exist on a continuum; with varying levels of involvement required from community members, health professionals, and scholars. For example, physiological concerns such as edentulism and dysphagia can be treated by qualified dentists and speech language pathologists. The gap between the care available and the care actually being received is a subject that warrants future research. As for barriers that can be overcome at the individual level, perhaps health educators can work to educate older adults on the benefits of eating certain foods. Further, dietitians and other care providers can work with those individuals to make healthy foods taste good. Other researchers have successfully helped to modify individuals' preference for healthy foods

(Dye et al., 2003; Ho et al., 1991; James, 2004; Lee et al., 2017; McLaughlin et al., 2017; Nestle et al., 1998). On the other end of the continuum, policy makers, community members, and healthcare providers can work to address accessibility. They can generate programs that provide healthy foods to older adults in areas considered to be food deserts. Skinner et al. (2006) has had success with addressing accessibility at this level. Perhaps legislation and zoning laws might even be modified to require a minimum number of grocery stores per square mile. The possibilities are infinite. The next step is raising awareness and getting the attention of these individuals in order to start proactively addressing this multi-faceted issue.

Combatting Resistance to Change. Another angle to addressing these barriers is for interventionists, health practitioners, and scholars to be trained on combatting resistance among older adults. For example, when the researcher was confronted with criticism, negativity, and overall resistance to change, she probed for factors that were important to those individuals. During the lesson on calorie counting and weight loss, one participant indicated that she was unmotivated to watch her caloric intake because her weight and the way she looked was of no concern due to her age. The researcher validated this claim and followed with several questions inquiring what was important to this individual. After giving it some thought, the individual commented that being able to be active and play with her grandchildren was of utmost importance. The researcher then identified how, by watching caloric intake and maintaining a healthy weight, she could accomplish this goal. The participant was satisfied with that response and proceeded to engage in the remainder of the lesson. The point of this anecdote is that the interventionist or whomever must be able to build rapport and learn what motivates his or

her audience. Therefore, each intervention needs to be tailored to some degree for the specific audience if it is to have optimal impact (De Almeida et al., 2001).

Utilizing Motivators to Encourage Healthy Eating

Formative focus group participants identified three motivators that may enable older adults to eat healthier: simplicity, pre-existing condition, and incentives. Each of these should be incorporated into all health intervention programs targeting the older adult population. For example, interventionists should consider the limited attention span associated with age. Therefore, programming should be short in duration with few key takeaways. Likewise, the present study found that some older adults were encouraged to change their eating habits if they believed that diet could improve or prevent one or more health conditions. There is support in the literature that making this connection has the potential to lead to positive behavior change in the direction of healthy eating (Delaney & McCarthy, 2014; Dijkstra et al., 2014b; Hemphill et al., 2013; James, 2004; Schure et al., 2019).

Therefore, health educators should bridge this gap to prospective participants when advertising, recruiting, and implementing health promotion programs. Health educators should explicitly identify the relationship between food and health; thereby encouraging older adults to consider attending. Lastly, it is highly recommended that future health interventions secure enough funding to be able to provide adequate visuals, food samples, and even potential prizes such as grocery store gift cards. For example, researchers found a positive relationship between incentive value and participation in a health risk assessment (Seaverson, Grossmeier, Miller, & Anderson, 2009). Another mean of encouraging healthy eating is to make revisions to the existing program based on

the recommendations made during the process evaluation focus groups and in-depth interview, as outlined next.

Considerations for Program Refinement

While the quantitative data did not show support that the intervention worked; the qualitative data did. Therefore, it would be wise for the researcher to consider making modifications to the intervention based on these findings. In sum, much can be learned from this study. The three major takeaways that interventionists and future scholars should consider are measuring prospective participants' stage of change, tailoring educational materials to individual participants' stage of change, and including as many visual and interactive components as possible. Researchers have proven that interventions that consider participants' stage of change and then tailor their lessons accordingly have great success (Prochaska et al., 2004). Nutrition educators in particular need to get on this bandwagon and start recognizing where their clients are at prior to determining a care plan. Finally, in terms of the interactivity and visuals recommendations, participants indicated that they learned best via visuals, demonstrations, and hands-on activities. Future educators should consider each of these when lesson planning and teaching.

CHAPTER SIX: CONCLUSION

When integrated, the quantitative and qualitative findings present a somewhat cloudy picture that the intervention may have had some effect in achieving behavioral, cognitive, and attitudinal changes with regard to healthy eating among older adults. The reasons for the cloudy findings, especially in the quantitative data, are complex; most notable is the impact of the novel COVID-19 on the intervention. In any event, qualitatively, participants expressed increased knowledge related to reading a nutrition facts label and recognizing adequate portion size. In addition, perhaps the most telling qualitative outcome was an awareness related to food choice, rather, making healthy food choices intentionally. Likewise, comments related to a decrease in grocery spending post intervention were also promising. This final chapter attempts to identify lessons learned from the present study in an effort to inform future intervention design, theory, and public health practice.

Limitations

There are five primary limitations in this study that should be considered when interpreting the results. First, the quantitative sample size of 30 was exceptionally small. Some analyses had even fewer than 30 participants. To provide more context, the intervention lasted six weeks; therefore, it was difficult to encourage participants to attend all 12 sessions and to submit the pre and post paperwork. Participant dropout was common, with many participating at the beginning of the intervention and then not following through until the end. The opposite occurred as well: some participants did not fill out the paperwork and start the intervention at the very beginning. Therefore, there

was no baseline with which to pair their post data. Multiple strategies for retaining participants are warranted.

Second, the literacy of participants varied. Some could successfully read and understand the content that was delivered; while others experienced significant difficulty. These participants required the assistance of the PI. This certainly could have impacted the results. Additional research assistance and interpersonal instrument administration are warranted. Third, the majority of participants did not keep their grocery store receipts before and after the intervention, as they were asked. This significantly limited the ability to pair and analyze the differences between grocery purchases before and after the intervention. Fourth, a significant proportion of the participants received nutrition education three months prior to the beginning of the intervention. This could have biased the results by giving some participants an advantage in exposure to nutrition knowledge that others did not have. Lastly, the novel COVID-19 pandemic, as articulated above, had a significant impact on the intervention and how it was carried out at two sites. This pandemic serves as a confounding factor and should be considered when assessing the results.

Lessons Learned

Despite the limitations, many lessons were gleaned from the present study. After much reflection, the following three lessons were identified: importance of research assistance, need for funding to successfully implement a public health intervention, and strict procedures for data collection and analysis prior to beginning each of those phases in the research process. Each lesson is discussed below in greater detail.

Importance of Research Assistance

The researcher was solely responsible for many phases of the research project; from delivering the intervention to data collection. In the future, certain tasks should be delegated to other individuals in order for the intervention and data collection, specifically, to function as intended. The researcher recommends training a third party to deliver the educational material. Granted, the researcher is a trained expert in the content area, however, another qualified individual could have facilitated. In addition, it would be wise to have one or two additional research assistants present for data collection. This is specifically important due to the population. Many older adults experience response fatigue and have physical impairments that prevent them from following directions, reading, and completing instruments properly. Therefore, at least one member of the research team should be responsible for either verbally walking participants through each measure or walking around the room, providing assistance where required. In addition, while administrators at some of the intervention sites helped with the recruitment phase, this process should be delegated to a specific individual. This is necessary to promote maximum participation and to ensure that participants meet the inclusion criteria.

Need for Funding

While funding is not always feasible at the beginning of an intervention, it is important to attempt to secure (Lee & Kotler, 2016). Funding would allow the principal investigator to pay the research assistants required to complete the tasks outlined above. In addition, funding would enable the principal investigator to provide incentives to participants; thereby increasing the overall sample. Likewise, funding would enable the research team to purchase visuals and other educational materials that would aid in

content delivery. A small grant would go a long way. Therefore, prior to pilot testing an intervention, it is recommended that the research team secure some funding in order to achieve optimum success.

Development of Strict Procedures

While some data collection and analysis procedures were outlined in the proposal, these two phases should have been explicitly stated in the form of a procedure for both data collection and analysis. For example, in order to keep participants' data paired, all instruments should be stapled together in a packet form, with each participant assigned an arbitrary ID. Likewise, the method for collecting the data (e.g., self-report or via interview) should be outlined. This could have come in handy with collection of the grocery store receipts especially. While the principal investigator provided envelopes to each participant to collect their receipts, a more rigorous procedure could have been developed. Perhaps, in addition to the verbal reminders at each lesson, push notifications or phone call reminders could have better served to keep participants on-track when it came to collecting receipts. Many of the participants indicated that they forgot to save their receipts; throwing them in the garbage out of habit. It would have benefitted the study to have a reminder system in place prior to beginning the intervention.

In terms of data analysis, the paired samples t-tests for the attitudinal and cognitive data were fairly straightforward, in addition to the thematic analyses performed on the qualitative data. However, when it came to the grocery store receipts, developing a coding scheme and converting the data into meaningful variables was much more complex than originally thought. In short, two researchers independently coded each item on each receipt into one of ten categories: fruits, vegetables, lean protein, high fat protein,

lean dairy, high fat dairy, carbohydrates, high fat foods, high sodium foods, and other items (see appendix E for the grocery store receipt codebook). Then, the researcher generated variables quantifying the percent of each purchase that was spent in each of the ten categories. This procedure was adopted from a study by Cullen et al. in 2007. While meaningful data were obtained, this procedure needs refinement. Perhaps it would be helpful to divide receipts into regular shopping trips (e.g., greater than ten items purchased) and supplemental trips (e.g., less than ten items purchased). This would provide a more accurate overview of actual food purchasing behavior. Likewise, more receipts would ideally need to be collected for each participant. Many of the participants stated that they typically shopped once a month. Therefore, perhaps collecting a minimum of three months' worth of grocery store receipts before and after the intervention would be more appropriate. Likewise, grocery store receipts should be collected in the same timeframe throughout the intervention sites as there are seasonal differences in food purchasing behavior.

Future Research

It is highly recommended that the intervention performed in this study be re-implemented after the COVID-19 pandemic has ended. The researcher recommends securing grant funding, hiring a research team, and developing strict protocol for all study-related procedures prior to implementation. It is necessary to measure additional variables that may mediate movement through the stages of change from pre to post intervention. For example, motivation should be measured both pre and post intervention using reliable and valid measures. In addition, level of involvement should also be measured, both pre and post intervention. Perhaps future studies could incorporate the

theory of planned behavior (TPB) as it accounts for behavioral intention and perceived behavioral control (a construct that can significantly influence motivation) (Ajzen, 1991). Adding measures of motivation and level of involvement at each data collection stage would allow for direct comparison of these variables from pre to post intervention. In order for the intervention to have a positive impact, both motivation and level of involvement among participants should be increased throughout the duration of the program. In addition, it is recommended that all instruments be administered in an interpersonal, interview setting for reasons mentioned above.

Appendix A: Lesson Plan Contents for Intervention

Unit	Description of Topics Included	Objectives
The Basics: Food Groups & MyPlate	This lesson introduces MyPlate. The five food groups are discussed (protein, grains, fruits, vegetables and dairy). The lesson explains the importance of each of these groups, the roles that they play in the body, and examples of foods that fit into each group.	1. Participants will be able to recite each of the five food groups; the role that each food group plays in the diet; and examples of foods in each group. 2. Participants will be able to demonstrate appropriate portion sizes for foods in each group. 3. Participants will be able to plan a meal that is well balanced. The meal should include a serving of food from each of the five-food groups.
Food & Nutrition How-To: Food Shopping/Budgeting, Nutrition Facts Label, Food Safety	This lesson covers three main skills that are important for everyone to master. The three skills are food shopping and budgeting, how to read a nutrition facts label and food safety. Each of these skills is important in their own right. This lesson provides participants with the tools necessary in order to: shop for groceries efficiently, read a food label for serving size, nutrient and ingredient content, and to store and prepare food safely.	1. Participants will be able to recite strategies for meal planning and grocery shopping to help them stretch their food dollar further. 2. Participants will be able to explain and interpret the five main parts of the nutrition facts label. 3. Participants will be able to describe and implement five food safety practices to help keep them and their family healthy.
Supplementing Your Diet	This lesson addresses malnutrition. A definition for malnutrition is provided along with signs and symptoms. The lesson explains in detail the essential nutrients that the body needs on a regular	1. Participants will be able to list the three macronutrients. 2. Participants will be able to explain what micronutrients are and the four categories of micronutrients.

	basis. Those nutrients are broken down into macro and micronutrients. Micronutrients are further broken down into four categories: water soluble vitamins, fat soluble vitamins, minerals, and water. Nutrients important for the aging population are highlighted as well as good food sources for those nutrients. Several forms of nutritional drinks and supplements are identified. Nutritional drinks for various health conditions like diabetes, COPD and kidney disease are discussed.	3. Participants will be able to select nutritional drinks that are appropriate for their individual health needs.
Healthy Cooking & Snacking for One	This lesson explores the challenges faced by those living in one or two person households when it comes to cooking and preparing meals or snacks. Strategies for cooking for one will be discussed. Tips for meal planning, grocery shopping and cooking are provided. This lesson features resources to help those that cook for themselves or a few other people. Snacking is also addressed. The lesson explains the benefits of snacking and defines what a healthy snack is. Examples of healthy snacks are provided in addition to tips to make current snacks healthier.	1. Participants will be able to list strategies that can be used to plan and prepare meals for a single or double person household. 2. Participants will be able to define healthy snacking. 3. Participants will be able to provide examples of healthy snacks. They will then be able to implement methods for modifying their snacking habits to make them healthier.
Calorie Needs & Weight Loss	This lesson defines calories, basal metabolic rate (BMR) and body mass	1. Participants will be able to recite their daily calorie needs based on their

	index (BMI). It helps participants to understand what their calorie needs are based on their gender, age, height, and weight. The lesson invites participants to assess their own weight and set weight goals depending on their body mass index. Participants will learn how many calories they need to cut or burn each day in order to meet their weight loss goals. A combination of cutting calories and increased physical activity is recommended. Participants are provided with tips, suggestions, and strategies to help them to successfully lose weight if they so desire.	weight goals. 2. Participants will be able to identify their BMI and interpret their current weight. 3. Participants will be able to implement strategies to help them to be successful in losing weight.
Get Moving! Nutrition for an Active Lifestyle	This lesson outlines physical activity goals and requirements for older adults. The instructor will demonstrate appropriate physical activities for every day, keeping in mind the limited access to exercise equipment and pertinent health conditions. The second part of this lesson will discuss fluid and hydration needs for those that maintain an active lifestyle. The instructor will also highlight specific nutrients important for physical activity.	1. Participants will be able to interpret the amount of physical activity they should be performing each day with respect to their age and any pertinent health conditions. 2. Participants will be able to enact appropriate exercises based on their individual physical activity guidelines. 3. Participants will be able to describe the necessary amount of fluid their body needs to stay properly hydrated each day, with consideration for their individual activity level.
Heart Healthy Eating	This lesson covers two of the three main components to a heart healthy diet; fat and cholesterol.	1. Participants will be able to define the different types of fat and cholesterol and their functions in the

	Definitions of fat and cholesterol are given along with the types of each. The lesson explains the functions that each of these play in the body and why they're important. Examples of foods high in each type of fat and foods high in cholesterol are provided. The recommended intake for each is presented along with tips to reduce intake. The lesson emphasizes the importance of reading nutrition facts labels for fat and cholesterol content.	body. 2. Participants will be able to identify foods high in fat and cholesterol. 3. Participants will be able to implement practices for reducing fat and cholesterol intake in their own diets.
Protein – Our Building Blocks	This lesson will dive deeper into the macronutrient protein. It will describe exactly what it is, its functions and conditions for which monitoring protein intake is important. Protein food sources will be identified with particular emphasis on lean sources of protein. Fish and seafood as protein sources are highlighted. Some tips for getting enough protein for those that follow a vegetarian or vegan diet are discussed. Daily protein requirements are described as well.	1. Participants will be able to explain what proteins are and will be able to interpret their own daily protein requirement. 2. Participants will be able to identify the various functions of proteins and will be able to express their health benefits. 3. Participants will be able to select foods high in protein, lean sources of protein, and protein sources appropriate for vegetarian and vegan diets.
Take Control of Your Sodium	This lesson explores salt. Participants will learn what salt is and the roles that it has in the body. Participants will also learn the recommended amount of salt that they should aim to consume each day. This	1. Participants will be able to recite the recommended sodium intake for American adults. Participants will also be able to list three common health conditions that require reduced salt intake.

	lesson outlines health conditions that require restricted salt intake, or close monitoring of salt intake. The lesson emphasizes the benefits of reducing salt intake. Foods high in salt are highlighted. Finally, this lesson elaborates on cooking and seasoning methods that can be used in place of salt.	2. Participants will be able to name a wide variety of foods that are high in sodium. 3. Participants will be able to implement strategies for reducing sodium intake in their own diet.
Not so Sweet Sugar	This lesson introduces the concept of added sugars. An explanation of the harmful effects of eating too much added sugar is given. The recommended daily intake of added sugars is established. Foods and beverages with high concentrations of added sugar are identified. Participants are advised to read both the nutrition facts label and the ingredient list for sugar content. The lesson provides a wide variety of examples of other names that food manufacturers use in place of sugar on the packaging. The high fructose corn syrup controversy is highlighted. Finally, the lesson provides practical tips for limiting intake of added sugars on a daily basis.	1. Participants will be able to name foods and beverages that contain significant amounts of added sugar. 2. Participants will be able to recite common names that are used to identify sugar on food packaging ingredient lists. 3. Participants will be able to implement practical methods for reducing intake of added sugar on a daily basis.
Watch those Carbs!	Carbohydrates are an essential part of the diet for a variety of reasons. This lesson plan examines carbohydrates, what they are, their role in the body	1. Participants will be able to define carbohydrate and list the functions of carbohydrates. 2. Participants will be able to explain the relationship

	and why they are important to monitor for those with diabetes. The three types of diabetes are also briefly discussed. Participants will learn how to read a nutrition facts label to determine the food's carbohydrate content. Participants will also learn how to determine the right amount of carbohydrates they should be eating each day. This lesson will also provide examples of carbohydrate-containing foods.	between carbohydrates and diabetes. They will be able to interpret the importance of monitoring carbohydrate intake with diabetes. 3. Participants will be able to estimate the appropriate range of carbohydrates they need each day.
Facts on Fiber	This lesson explains what fiber is, the role that it plays in the body and provides examples of foods high in fiber. Participants will learn how much fiber they need each day. There will also be a discussion of tips for reaching the daily fiber goal. This lesson will identify medications that can cause constipation and other GI issues and ways to help resolve those problems.	1. Participants will be able to define fiber and its two forms: soluble and insoluble. 2. Participants will be able to interpret the health benefits that fiber can provide, if eaten in the required amount. 3. Participants will be able to identify foods high in fiber and will be able to incorporate those foods into their daily meal plan.

Appendix B: Data Collection Instruments

Focus Group Protocol
(Geared towards administrators, caretakers, senior center and nutrition site staff)

Hello and welcome. Thank you for being here. The purpose of today's focus group is to learn more about the motivators and barriers to eating healthy among older adults. Healthy eating is when you try to eat a variety of foods from each of the different food groups at each meal. Healthy eating also involves controlling your portion sizes when eating and snacking. You were asked to be here today because you play an important role, working closely with this population. Therefore, we seek to understand these factors from your perspective and from your experience working with older adults.

This focus group meeting will last approximately 90-minutes. You are welcome to stop participation at any point during this time. You are also not required to answer all the questions. There will be no penalty for doing so. Let us begin with your consent to participate. [Review the consent form]. If you would like to move forward and participate, please give your consent by writing and signing your name with today's date on the back page of the form.

Before we get started, it is important to remember that what is said here will be kept confidential by the research team. We want to emphasize that we value your input and hope that you will respond honestly and freely to each of the questions asked; however, we cannot guarantee that other participants will not discuss your responses, so please keep that in mind.

Let us begin by talking about your experience working with older adults.

1. I think each of us should start by why we feel passionate about working with older adults. I'm a registered dietitian. I work closely with older adults to make sure that they are eating the right foods for their health. It is important to me that older adults get the nutrition that they need in order to support an active, high-quality life.

2. Why is it important to you to work with older adults?

3. For our communities?

4. For our families?

5. Is it important to advocate for nutrition in older adults?
    - If so, then why is it important?

6. In your opinion, are the older adults you work with interested in eating healthier?

7. Where do most of the older adults living in your facility eat their meals?

- When do they eat?
- Who do they eat with?
- What do they eat?

8. Do any of these factors impact their eating habits? If so, which ones?
    - For example, if many of the older adults eat alone in their rooms, do you think that this influences the amount of food that they eat? What about the kinds of food that they eat?

9. What attitudes, beliefs, or opinions do older adults have related to nutrition and healthy eating?

Now let us focus on factors that might make it difficult for the older adults you work with to eat healthy. In addition, let's talk about some things that might make it easier for them to eat healthy.

10. What motivates them to eat healthier?
    Probes:
    - Concern expressed by family regarding their health
    - Concern expressed by friends regarding their health
    - Concern for their health
    - Pre-packaged meals or convenience foods (e.g., easy recipes)
    - Help with shopping from others (e.g., transportation to and from the grocery store)
    - Monetary assistance (e.g., benefits from SNAP or the elderly Nutrition Program , congregate meals, etc.)

11. What might help older adults to eat healthier?

12. What are some of their barriers to eating healthier?
    - What stops older adults from eating healthy?

    Probes:
    - Not enough money
    - Lack of transportation
    - Not enough time
    - Inability to cook
    - Poor health

13. What kinds of things do you think could be done to make it easier for older adults to eat healthier?

14. Our goal is to encourage older adults to eat healthier. Is there anything else that you would like to share that may be helpful in achieving this goal?

Thank you all for taking the time to share your experiences. We appreciate you! Just a reminder that what was discussed here will be kept confidential by the researchers. No names will be associated with the data.

Demographic Survey

Please tell us a little bit about yourself. You may leave some answers blank if you do not feel comfortable answering them.

1. What is your date of birth? Please write your answer in the following form (month/year).

   _____ / _____

2. What is your gender? Please circle your answer below.
   a. Male
   b. Female
   c. Other

3. How many people live in your household?

   _____

4. Please circle the answer below that best represents your marital status.
   a. Married
   b. Widowed
   c. Divorced or separated
   d. Single
   e. Never married
   f. Living with a partner

5. Please circle the answer that best represents the highest level of education you have completed.
   a. Less than a high school diploma
   b. High school diploma or GED equivalent
   c. Some college
   d. College degree

6. Please circle that answer that best represents your total annual household income?
   a. Less than $10,000
   b. $10,000 to $19,999
   c. $20,000 to $29,999
   d. $30,000 to $39,999
   e. $40,000 to $49,999
   f. $50,000 to $59,999
   g. $60,000 to $69,999
   h. $70,000 to $79,999
   i. $80,000 to $89,999
   j. $90,000 to $99,999
   k. $100,000 or more
   l. Choose not to answer

7. Are you of Hispanic, Latino or Spanish origin? Please circle your answer below.
    a. No
    b. Yes

8. What best describes your race? Check one or more boxes.

    ☐ White

    ☐ Black or African-American

    ☐ American Indian or Alaska Native

    ☐ Asian

    ☐ Native Hawaiian or Pacific Islander

    ☐ Multiracial

    ☐ Other

The following questions ask about your food shopping habits. Please answer as honestly as possible. For the next X question, circle the number that corresponds to the extent to which you agree or disagree with the statement below, using the following scale:

1 Strongly disagree	2 Disagree	3 Neither agree nor disagree	4 Agree	5 Strongly agree

9. I make a shopping list to guide my food purchases. 1 2 3 4 5

For questions 10 and 11 below, circle the answer that best relates to your food shopping habits.

10. Who does the food shopping?
    a. I do it myself
    b. I do it myself with someone else
    c. Someone does it for me
    d. A bit of both

11. Who else shops with you or for you?
    a. Spouse
    b. Family member
    c. Friend
    d. Other
    e. Shop alone

12. Please list the top 3 places where you do your main food shopping?
    a. _____
    b. _____
    c. _____

The next 2 questions ask about the nutrition information that you access and where you get that information. Please answer as honestly as possible.

13. Please circle where you get most of your health-related information from. If you can think of the specific website, TV program, magazine, newspaper, or radio program, please write it next to the answer choice.
    a. Doctor
    b. Internet _____
    c. TV _____
    d. Family
    e. Friends
    f. Magazines _____
    g. Newspapers _____
    h. Radio _____
    i. Other _____

14. Please circle where you get most of your diet and nutrition-related information from. If you can think of the specific website, TV program, magazine, newspaper, or radio program, please write it next to the answer choice.
    a. Doctor
    b. Internet _____
    c. TV _____
    d. Family
    e. Friends
    f. Magazines _____
    g. Newspapers _____
    h. Radio _____
    i. Other _____

Grocery Store Receipt Collection

Note: The following will appear on a manila envelope. The envelope will be distributed to participants either via the principal investigator or an administrator at the nutrition site or senior center. Receipts will be collected 1 week prior to the intervention and during the last week of the intervention.

Directions: Please save all of your grocery store receipts for the next week. A member of the study staff will collect your receipts on _____. Please do not write your name or any identifying information on the envelope. This will help us to ensure confidentiality. Thank you!

In addition to collecting your grocery store receipts, please answer the following questions about your food shopping habits. Circle the response that best represents *your* answer to the question, unless otherwise indicated.

1. Who does the food shopping?
   a. I do it myself
   b. I do it myself with someone else
   c. Someone else does it for me
   d. A bit of both

2. Who else shops with you or for you?
   a. Spouse
   b. Family member
   c. Other (please specify): _____
   d. Shop alone

3. Where do you do your main food shopping?
   a. Nearest supermarket (e.g., Kroger, Walmart, Meijer)
   b. Nearest convenience or grocery store (e.g., Walgreens, gas station, etc.)
   c. Online
   d. Other (please specify): _____

4. How often do you visit the grocery store?
   a. Daily
   b. At least once weekly
   c. At least once monthly
   d. Infrequently
   e. Never

5. How do you get to the grocery store?
   a. Drive
   b. Someone drives me
   c. Bus
   d. Walk

6. When shopping for groceries, have you ever shopped online?
   a. Yes
   b. No
   c. I don't know how to shop for groceries online

7. If yes on Question #6, why have you shopped for groceries online? (Circle all that apply).
   a. I find it convenient.
   b. I don't have enough time to go to the store.
   c. It's easier to purchase non-perishable items online.
   d. It's easier to find what I need online.
   e. I do not enjoy going to the grocery store.
   f. It is easier to find specialty items.
   g. I am unable to go shopping myself.
   h. It is something new to try.
   i. The prices are better.

8. If you haven't shopped for groceries online, why not? (Circle all that apply.)
   a. I want to see the groceries myself.
   b. I am concerned the food will not be fresh.
   c. I enjoy the social experience of going to the grocery store.
   d. I am concerned that the product will arrive damaged.
   e. The fees for online service delivery are too high.
   f. My local supermarket does not have online delivery service
   g. The fee for pickup is too expensive
   h. I am afraid to provide my information online.
   i. I think sopping for groceries online is too slow.

9. When shopping for food online, do you typically…
   a. Have the food delivered to your home?
   b. Pick the food up from the store?
   c. Have a friend of family member pick up the food?

Stages and processes of change questionnaires in healthy eating

Adapted from:

Andrés, A., Saldaña, C., Gómez-Benito, J. (2009). Establishing the stages and processes of change for weight Loss by consensus of experts. *Obesity, 17*(9), 1717-1723.

Andrés, A., Saldaña, C., Gómez-Benito, J. (2011). The transtheoretical model in weight management: Validation of the processes of change questionnaire. *Obesity Facts, 4*, 433–442.

Andrés, A., Saldaña, C., Beeken, R. (2015). Assessment of processes of change for weight management in a UK sample. *Obesity Facts, 8*, 43-53.

Stages of change questionnaire in healthy eating

Please answer this questionnaire honestly. There are no right or wrong answers. Mark with an "X" the one statement that best describes your current eating habits.

- ☐ At the moment I'm not doing anything to eat healthier. I have no intention of doing anything to eat healthier over the next 6 months.
- ☐ At the moment I'm not doing anything to eat healthier but I'm thinking about doing something over the next 6 months.
- ☐ During the last year I haven't done anything to eat healthier but I'm planning to do something over the next 6 months.
- ☐ I've been making an effort to eat healthier for less than 6 months.
- ☐ I've been making an effort to eat healthier for more than 6 months.

Processes of change questionnaire for healthy eating

Please answer this questionnaire honestly. Mark with an "X" the extent to which you agree or disagree with the statements below, using the following scale:

1 *Strongly disagree*	*2* *Disagree*	*3* *Neither agree nor disagree*	*4* *Agree*	*5* *Strongly agree*

Overall Health

1. I tell myself positive things to avoid overeating.	1	2	3	4	5
2. I try not to have unhealthy food in sight.	1	2	3	4	5
3. I am worried about gaining weight.	1	2	3	4	5
4. My current weight makes my daily life difficult.	1	2	3	4	5
5. Losing weight would help me improve my relationships with others.	1	2	3	4	5
6. I have learned to control my appetite.	1	2	3	4	5
7. I avoid places where people eat unhealthy foods.	1	2	3	4	5
8. My family and friends are worried about my eating habits.	1	2	3	4	5
9. Eating unhealthy makes me feel bad.	1	2	3	4	5
10. I have learned skills that reduce my desire to eat unhealthy foods (e.g., not storing them in the pantry)	1	2	3	4	5
11. When I am on a diet[1] I avoid eating with people who don't eat healthy.	1	2	3	4	5
12. Most of my health problems are due to my eating unhealthy.	1	2	3	4	5
13. I feel guilty when I don't eat healthy.	1	2	3	4	5
14. If I eat healthier, I would feel better about myself.	1	2	3	4	5
15. I am aware that there are more and more people who encourage me to eat healthy.	1	2	3	4	5
16. I'm not happy with my current diet.	1	2	3	4	5
17. To avoid eating unhealthy foods, I prefer eating at home or cooking my own food.	1	2	3	4	5
18. If I ate healthier, I would be happier.	1	2	3	4	5
19. My family and friends praise me for eating healthy.	1	2	3	4	5
20. I feel good about myself when I am able to eat healthy.	1	2	3	4	5
21. My family and friends congratulate me when I manage to eat healthy.	1	2	3	4	5
22. I have people that encourage me to eat healthy.	1	2	3	4	5
23. When I eat healthy I feel proud of myself.	1	2	3	4	5

[1] *Being on a diet means having a well-balanced diet in which fat, sugar and salt consumption are restricted and where greater amounts of fruit, vegetables and pulses are eaten.*

24. People around me support me in trying to eat healthy. 1 2 3 4 5

25. I have someone who listens to me when I need to talk about my unhealthy eating habits. 1 2 3 4 5

26. I am committed to eating healthy. 1 2 3 4 5

27. I measure my food portions when I eat at meals. 1 2 3 4 5

28. I measure my food portions when I eat snacks. 1 2 3 4 5

1 Strongly disagree	*2 Disagree*	*3 Neither agree nor disagree*	*4 Agree*	*5 Strongly agree*

Fruits & Vegetables

29. I try to snack on fruits or vegetables. 1 2 3 4 5

30. I try to eat fruits or vegetables at meals. 1 2 3 4 5

31. I feel that I should eat more fruits or vegetables at meals. 1 2 3 4 5

32. I measure my food portions when I eat fruits or vegetables. 1 2 3 4 5

Carbohydrates

33. I try to snack on healthy carbohydrates. 1 2 3 4 5

34. I try not to snack on high-carb foods. 1 2 3 4 5

35. I try to eat healthy carbs at meals. 1 2 3 4 5

36. I feel I should eat healthy carbohydrates at meals. 1 2 3 4 5

37. I look for information about the carbohydrate content in foods. 1 2 3 4 5

38. I understand how to read food labels for carbohydrate content. 1 2 3 4 5

39. I measure my food portions when I eat carbohydrates. 1 2 3 4 5

Protein

40. I try to snack on lean sources of protein (e.g., fish, chicken, turkey, eggs, and beans). 1 2 3 4 5

41. I try to eat sources of lean protein at meals (e.g., fish, chicken, turkey, eggs, and beans). 1 2 3 4 5

42. I feel I should eat lean protein at meals ((e.g., fish, chicken, turkey, eggs, and beans). 1 2 3 4 5

43. I look for information about the protein content in foods. 1 2 3 4 5

44. I understand how to read food labels for protein content. 1 2 3 4 5

45. I measure my food portions when I eat protein. 1 2 3 4 5

Fat

46. I try to snack on foods low in fat. 1 2 3 4 5

47. I feel I should eat food with less fat at meals. 1 2 3 4 5

48. I avoid buying high-fat food. 1 2 3 4 5

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[1] *Being on a diet means having a well-balanced diet in which fat, sugar and salt consumption are restricted and where greater amounts of fruit, vegetables and pulses are eaten.*

49. I try not to snack on high-fat foods.	1	2	3	4	5
50. I try to eat foods low in fat at meals.	1	2	3	4	5
51. There are no high-fat snacks in my fridge or cupboards.	1	2	3	4	5
52. I look for information about the fat content in foods.	1	2	3	4	5
53. I understand how to read food labels for fat content.	1	2	3	4	5

Salt

54. I try to snack on foods low in salt.	1	2	3	4	5
55. I look for information about the salt content in foods.	1	2	3	4	5
56. There are no salty snack foods in my fridge or cupboards.	1	2	3	4	5
57. I feel I should eat food with less salt at meals.	1	2	3	4	5
58. I avoid buying high-salt food.	1	2	3	4	5
59. I try to eat foods low in salt at meals.	1	2	3	4	5
60. I try not to eat salty snacks.	1	2	3	4	5
61. I understand how to read food labels for salt content.	1	2	3	4	5

[1] Being on a diet means having a well-balanced diet in which fat, sugar and salt consumption are restricted and where greater amounts of fruit, vegetables and pulses are eaten.

Dear Healthcare Professional:

Thank you for your interest in the Newest Vital Sign (NVS), the first tool available to assess health literacy in English and Spanish.

Research shows that patients with low health literacy are less likely to comply with prescribed treatment and medical instructions from their physician. Identifying patients who are at risk for low health literacy allows physicians to apply specific clear health communication techniques that may enhance understanding. The Newest Vital Sign is a simple and fast way to identify those patients. The tool, which tests literacy skills for both numbers and words*, has been validated against a previously validated measure of health literacy (the TOFHLA), and has been shown to take approximately three minutes to administer.

In addition to the NVS tool, we are also including information to help enhance patient-provider communication. In this folder you will find the following materials:

- NVS Tool (nutrition label and scoring sheet tear-off pad, both two-sided in English/Spanish)
- NVS Implemenation Guide
- *Ask Me 3* (fact sheet on free educational materials from the non-profit Partnership for Clear Health Communication)
- *Help Your Patients Succeed* (tips for improving communication with your patients)
- *Why Does An Ice Cream Label Work . . .* (fact sheet explaining the design of the NVS)

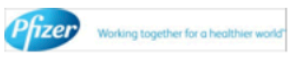
The Newest Vital Sign is Pfizer Inc's most recent contribution to the health literacy movement. For more than nine years, Pfizer has been committed to raising awareness of developing solutions for low health literacy. The overall goal of our Clear Health Communication Initiative is to positively impact the health care system by enhancing patient-provider communication to increase compliance and improve patient health outcomes.

The Newest Vital Sign and companion materials are available to medical and public health providers at no cost. To learn more about our efforts to improve health literacy, please visit www.pfizerhealthliteracy.com.

Sincerely,

Richard C. Hubbard, M.D.
Senior Director, External Medical Affairs
Pfizer Inc

*Literacy is defined as the understanding and application of words (prose), numbers (numeracy), and forms, etc. (document).



February 2011

Implementation Guide for the Newest Vital Sign

Health literacy— the ability to read, understand and act upon health information — is now known to be vital to good patient care and positive health outcomes. According to the Institute of Medicine's groundbreaking report on health literacy, nearly half of all American adults — 90 million people — have difficulty understanding and using health information. When patients lack the ability to understand and act upon medical information, it can put their health at risk.

The Newest Vital Sign is a new tool designed to quickly and simply assess a patient's health literacy skills. It can be administered in only 3 minutes and is available in English and Spanish. The patient is given a specially designed ice cream nutrition label to review and is asked a series of questions about it. Based on the number of correct answers, health care providers can assess the patient's health literacy level and adjust the way they communicate to ensure patient understanding.

There are many ways to integrate the Newest Vital Sign (NVS) into a private practice or clinic setting to improve communication with patients. Improved communication can help increase your patients' ability to understand and act upon the information you provide; ultimately improving patient satisfaction and health outcomes.

How To Use the Newest Vital Sign

1. **Who and when to administer the Newest Vital Sign.**
   - **A nurse (or other trained clinic staff)** is the preferred administrator of the Newest Vital Sign.
   - Administer at the same time that other vital signs are being taken.
2. **Ask the patient to participate.**
   A useful way to ask the patient is an explanation similar to this:
   > *"We are asking our patients to help us learn how well patients can understand the medical information that doctors give them. Would you be willing to help us by looking at some health information and then answering a few questions about that information? Your answers will help our doctors learn how to provide medical information in ways that patients will understand. It will only take about 3 minutes."*
3. **Hand the nutrition label to the patient.**
   The patient can and should retain the nutrition label throughout administration of the Newest Vital Sign. The patient can refer to the label as often as desired.

More...

4. **Start Asking the 6 questions, one by one, giving the patient as much time as needed to refer to the nutrition label to answer the questions.**
    - There is no maximum time allowed to answer the questions. The average time needed to complete all 6 questions is about 3 minutes. However, if a patient is still struggling with the first or second question after 2 or 3 minutes, the likelihood is that the patient has limited literacy and you can stop the assessment.
    - **Ask the questions in sequence.** Continue even if the patient gets the first few questions wrong. However, **if question 5 is answered incorrectly, do not ask question 6.**
    - **You can stop asking questions if a patient gets the first four correct.** With four correct responses, the patient almost certainly has adequate literacy.
    - **Do not prompt patients who are unable to answer a question.** Prompting may jeopardize the accuracy of the test. Just say, "Well, then let's go on to the next question."
    - **Do not show the score sheet to patients.** If they ask to see it, tell them that "I can't show it to you because it contains the answers, and showing you the answers spoils the whole point of asking you the questions."
    - **Do not tell patients if they have answered correctly or incorrectly.** If patients ask, say something like: "I can't show you the answers till you are finished, but for now you are doing fine. Now let's go on to the next question."
5. **Score by giving 1 point for each correct answer (maximum 6 points).**
    - **Score of 0-1** suggests high likelihood (50% or more) of limited literacy.
    - **Score of 2-3** indicates the possibility of limited literacy.
    - **Score of 4-6** almost always indicates adequate literacy.

    Record the NVS score in the patient's medical record, preferably near other vital sign measures.

Best Practices for Implementation: Summary

- A nurse (or other trained clinic staff) is the preferred administrator of the Newest Vital Sign.
- Administer the NVS at the same time that the patient's other vital signs are being taken.
- Record the NVS score in the patient's chart, preferably near other vital sign measures.
- Tailor communication to ensure patient understanding.

Why Does an Ice Cream Label Work as a Predictor of the Ability To Understand Medical Instructions?

A patient's ability to read and analyze any kind of nutrition label requires the same analytical and conceptual skills that are needed to understand and follow a provider's medical instructions. The skills, which are known as *health literacy,* are defined as the understanding and application of words (prose), numbers (numeracy), and forms (documents).

The use of an ice cream label is especially relevant as recent research in the *American Journal of Preventive Medicine* (November 2006) has shown that poor comprehension of food labels correlated highly with low-level literacy and numeracy skills. However, the study found that even patients with better reading skills could have difficulties interpreting the labels.

Whether reading a food label or following medical instructions, patients need to:

- remember numbers and make mathematical calculations.
- identify and be mindful of different ingredients that could be potentially harmful to them.
- make decisions about their actions based on the given information.

PROSE LITERACY:
Clinical example: The patient has scheduled some blood tests and is instructed in writing to fast the night before the tests. The skill needed to follow this instruction is **Prose Literacy.**

Ice cream label example: The patient needs this skill to read the label and determine if he can eat the ice cream if he is allergic to peanuts.

NUMERACY:
Clinical example: A patient is given a prescription for a new medication that needs to be taken at a certain dosage twice a day. The skill needed to take the medication properly is **Numeracy.**

Ice cream label example: The patient needs this same skill to calculate how many calories are in a serving of ice cream.

DOCUMENT LITERACY:
Clinical example: The patient is told to buy a glucose meter and use it 30 minutes before each meal and before going to bed. If the number is higher than 200, he should call the office. The skill needed to follow this instruction is **Document Literacy.**

Ice cream label example: The patient needs this skill to identify the amount of saturated fat in a serving of ice cream and how it will affect his daily diet if he doesn't eat it.

Nutrition Facts

Serving Size	½ cup
Servings per container	4
Amount per serving	
Calories 250	Fat Cal 120
	%DV
Total Fat 13g	20%
Sat Fat 9g	40%
Cholesterol 28mg	12%
Sodium 55mg	2%
Total Carbohydrate 30g	12%
Dietary Fiber 2g	
Sugars 23g	
Protein 4g	8%

*Percentage Daily Values (DV) are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs.

Ingredients: Cream, Skim Milk, Liquid Sugar, Water, Egg Yolks, Brown Sugar, Milkfat, Peanut Oil, Sugar, Butter, Salt, Carrageenan, Vanilla Extract.

Score Sheet for the Newest Vital Sign Questions and Answers

READ TO SUBJECT:
This information is on the back of a container of a pint of ice cream.

ANSWER CORRECT?	
yes	**no**

1. If you eat the entire container, how many calories will you eat?
   Answer: *1,000 is the only correct answer*

2. If you are allowed to eat 60 grams of carbohydrates as a snack, how much ice cream could you have?
   Answer: *Any of the following is correct: 1 cup (or any amount up to 1 cup), half the container. Note: If patient answers "two servings," ask "How much ice cream would that be if you were to measure it into a bowl?"*

3. Your doctor advises you to reduce the amount of saturated fat in your diet. You usually have 42 g of saturated fat each day, which includes one serving of ice cream. If you stop eating ice cream, how many grams of saturated fat would you be consuming each day?
   Answer: *33 is the only correct answer*

4. If you usually eat 2,500 calories in a day, what percentage of your daily value of calories will you be eating if you eat one serving?
   Answer: *10% is the only correct answer*

READ TO SUBJECT:
Pretend that you are allergic to the following substances: penicillin, peanuts, latex gloves, and bee stings.

5. Is it safe for you to eat this ice cream?
   Answer: *No*

6. (Ask only if the patient responds "no" to question 5): Why not?
   Answer: *Because it has peanut oil.*

Number of correct answers:

Interpretation

Score of 0-1 suggests high likelihood (50% or more) of limited literacy.
Score of 2-3 indicates the possibility of limited literacy.
Score of 4-6 almost always indicates adequate literacy.

Working together for a healthier world™

February 2011

Appendix C: Formative Focus Group Codebook

Theme	Sub-Theme	Definition	Example
Current Eating Patterns			
	Convenience Foods	Eating snack items or foods that don't require cooking, just heating up in the microwave (e.g., pre-packaged items, fast food). Also can include dining out in this category (e.g., eating at the Senior Center).	The Home Chef meals. And I was just asking, um, Renee how those went over and actually a lot of the seniors said that even though things are already portioned out for them, already cut up or whatever, there was too many steps and they didn't like doing that and most of them just even said, um that they just use their microwave. I mean I think that the convenience of a microwave. They just say, "if it's not something I can fix in the microwave," and even though, they were too complicated. So even though it was proportioned out and there for them there were too many steps so it seems like at home a lot of them like to utilize that, they just don't use their stove anymore.
	Graze	Rather than eating complete meals, older adults tend to	But there is something to that that they don't like

		snack throughout the day.	to eat large quantities, a lot of them, before they go to bed because they don't sleep as well or it gets them upset because they have to get up through the night. I mean I think they tend to have a kind of snack around – I mean for a bunch of reasons but that's just one reason. They don't like to have a lot when they go to bed.
	Home Cooking	They prepare their own meals.	For my center I think it's a little different because we give away a lot of meat and a lot of fresh vegetables and stuff at least two and three times a week so a lot of my seniors I do believe cook a lot of chicken and stuff like that, so… I don't – mine very rarely eat fast food.
Barriers to Eating Healthy			
	Physiological Concerns	A physiological ailment or health condition that prevents someone from physically being able to eat (e.g., dental issues, trouble swallowing, digestive issues, etc.).	Well I think, you know obviously one thing that comes to mind is dental issues or choking hazards. A lot of times the healthier choices are either a little bit more crisp or they're a little bit more hard of a

		Could be attributed to medications they are taking. Some experience taste-changes (e.g., lack of appetite).	texture or that sort of a thing. So I know that issue may sometimes be a problem. I think sometimes, um, we have become more of a sugar-dependent society to where if we have a choice between a cookie or an apple, which do we choose? The cookie or the apple? So I think that when you, you know, ask them to tell you why they maybe can't eat healthy – I'm sure some of it may be financial, um, but I mainly think of the physical aspect of it. Maybe they have digestive problems that they can't process foods or things like that, so… I was just going to say sometimes too the medication that they take can cause them to have a lack of appetite or also some kinds of foods can just taste metallic.
	Food Preferences	Old eating habits are hard to change. Also, some folks prefer the taste of less healthy	A lot of the people are the meat and potatoes and your basic vegetables and things like that.

		foods (e.g., meat and potatoes).	I mean different times, something different to them is like “oh!” They just don’t really want to do – they don’t give it a chance.
	Fear of Waste	Food or Money. Cost factors into the decision whether or not to purchase ingredients for a recipe.	I think it could be a combination of all of that, you know. Maybe they don’t have, you know, the particular pot or utensil that they were shown in a demonstration or that the recipe may call for. So they may be fearful to waste what they do have on an experiment or something. Um, but I also think that, um, it’s just out of convenience. So not wanting to make something – and if they do make something it’s quick or – or maybe not as healthy. Um, to an extent I would think it would, sure. You have a limited income, which we all could say most of ours do, you know, they do have to be thrifty when buying things so they may not be as experimental or may not want to try

			something new just based on a recipe. Um, but I also think that we as humans, human nature, you know, if it's something that we want, sometimes it doesn't matter what it costs, we'll make sure we get it.
	Accessibility	Lack of Equipment or Ingredients for Cooking. Due to downsizing and other factors, older adults do not have the proper cooking equipment (e.g., pots, pans, utensils) or ingredients required to make many of the recipes they're exposed to. Food Desert. Limited access to healthy foods based on geographical location and distance from grocery stores. Transportation may also factor into this.	That's what it needs to be is something that they already have. Not something that you have to go – they don't have it – and then try another store and it doesn't have it – it has to be something they already have in their refrigerator or pantry. You know, they want to eat better or they would like the fresher foods but they're not in that particular area so I think that would help motivate some people who want to do it and just don't have the means to get to it. You know, sometimes, you know I grew up in the city and I'm just amazed that the number of miles that folks have to put on their cars just to go to the grocery

			store. Where I can pick five grocery stores – different grocery stores within a mile of each other – to go to. And, um, just understanding that not everybody has that option.
Attitudes Toward Eating Healthy			
	Pre-Contemplation	The individual has no desire or intention to change behavior (Prochaska, DiClemente, & Norcross, 1992). Old habits die hard. Resistant to change.	Yeah. That's like me. I was – I'm old and I'll admit it [laughter]. Um, back in – when I was young, think about our parents and our grandparents. Well we were used to cooking with lard, cooking with bacon grease and all that good stuff and now they're telling you, you know, "you don't use lard, you don't use bacon grease." And a lot of the seniors are my age and older and just like Cindy said, that's what you're accustomed to and that's how you were brought up. And even me today – I'm having a hard time cutting out on a lot of stuff because that's how I was raised and that's how I was taught to cook. And

			now it's like changing – you're like telling them, "you're being bad or you weren't raised right because you need to be doing it this way here because this is the new and right way." And so it takes a while to adapt to it.
	Contemplation	The individual recognizes the need to make a change (Prochaska, DiClemente, & Norcross, 1992). Only Willing to Change when Diet is Related to Disease. Older adults are only motivated to learn about nutrition if they think that eating better could help them to prevent or manage a given disease. Receptive. Older adults keep an open mind to learning about nutrition and healthier ways of eating.	I think they're open to it and I think that they entertain the process. Just not – maybe entertaining may not be the correct verb, but um I think that if we do have a presentation or someone who comes in and talks to us about nutrition or healthy eating or whatever or even if we just have a conversation. I think they're very receptive to it and they're open to it. I just don't know – since I don't go home with a lot of them – if this is something they carry on once they leave the conversation or the center. I mean if they come back in and tell me, "oh I made that wonderful something or

			another and it was fabulous." You know obviously it kind of creates a buzz for some of the other ones to want to try it or you know maybe as part of their diet but, um, it's kind of hard to say, um…
	Preparation	The individual intends to take action to make a change relatively soon (Prochaska, DiClemente, & Norcross, 1992).	So I'm gonna have to start doing something different.
	Action	The individual actually starts making recognizable changes (Prochaska, DiClemente, & Norcross, 1992).	The point where I put foods, I put a can down in the container of water and sit there and swish it and dump that and then rinse it again to be sure that there's nothing left on that vegetable. But now I'm leaving certain things off of my list because I don't need them.
Motivators to Eating Healthy			
	Simplicity	Simple takeaways, recipes, shorter lessons, etc. Convenience, hands-on or face-to-face demonstrations, etc. Alternative Options for Fruits & Vegetables (e.g.,	Maybe focusing on like, um, you know, a lot of people have said that they just don't want to fiddle with doing a lot – maybe like simple, healthy snacks in the evening. You know, something

		canned and frozen instead of fresh). Older adults are more engaged and eager to learn about nutrition when the information is presented in a face-to-face setting with lots of visuals (e.g., cooking, reading labels, shopping, trying new recipes).	that they can actually be like, "this is the healthiest, simple thing if you're just going to be a grazer or you're going to be someone that's not going to eat a full meal in the evening – here's where you can get the most, um, nutrition for your bang." You know, just something simple you know that they know that's just simple that wouldn't be work that they're actually having to cook, "this is just a simple thing and this is the most nutritious snack you can go for."
	Pre-Existing Condition	Belief that diet is connected to a chronic health condition. So, there is a desire to learn more in order to manage and/or prevent the development of future health conditions.	Well like I said, I like fruit trays, I don't like the canned. I take frozen vegetables and then I take them as I need them, as I go. And not have canned stuff with sodium because I take three water pills every day because I have congestive heart failure so I avoid salt.
	Incentives	Older adults are motivated to eat healthier if there is	I was just going to say, too, at least in my area, which is

		some benefit given to them (e.g., farmers' market vouchers, free food or groceries, samples, etc.). Connecting Folks with Resources. Providers (community members, dietitians, physicians, etc.) need to continue to provide updated information on nutrition and healthy eating and where they can go/what they can do to make that a reality.	Kenton county, they also had through the Extension offices they were giving out vouchers to use at the farmers' market, um, and so that kind of – I don't want to say forced them – but encouraged them, you know, to use those, um, you know extra dollars to buy those types of items at the farmers' markets and things like that because they had a limited, uh of things, what you could and couldn't buy.

Appendix D: Process Evaluation Focus Group Codebook

Theme	Sub-Theme	Definition	Example
Process Themes			
Qualities of Instruction			
	Visuals	They are powerful resources, so incorporate more of them (e.g., more packages with actual food labels, using the food models more).	P6: Very appropriate, yeah! And the things that you brought that showed us what you get out of – the fat in the tubes – F: Yes, okay. P6: That was very amazing that we have never ever thought if we eat that hamburger that we was going to get that much fat out of it – out of that hamburger, you know? I think after that there wasn't much visual aid in the reading portion.
	Interactive	Hands-on demonstration and visuals help to keep participants engaged and learning (e.g., Food Demo).	F: Okay, you said definitely the more interactive the better. For sure, that really stood out. P6: Yeah, yeah. F: Um… P6: Hands-on. We can hook up a

			little fryer in here or whatever you want to. F: Okay. P6: We can do a little deep fryer, or air fryer, or you know?
	Simplicity	Focus on fewer main points during each session. So, instead of three, maybe have one major takeaway. Consider a booklet that centers keep for participants throughout the program. Then, upon completion, the booklet is theirs to keep (e.g., get rid of handouts).	They were great but I would guarantee, if you're handing out paper, you're wasting your time It's never going to be looked at again. If you had the handout, I mean I would say something, I mean it sounds kind of goofy to coordinate with the coordinators that are here, but if you built a book of some sort. A little book and – for your sequence of classes – they get the same book every single time. So, like if they came here to the senior center, you say, "Hey, get your book. Go over there." And at the end of the class they get the book with a

			graduation ceremony or something with a like, “Here’s your information, all here at once, right now.” Instead of one piece of paper at a time.
	Repetition	Reinforce key ideas throughout the duration of the program. Repetition of key information throughout the series of lessons using visuals (e.g., reinforce portion size).	Just bring it up over and over and over. I mean, you know… I kind of like what XXXXX said about the serving size, portion thing. You need to pull that in whenever you’re talking about the reading label class. Showing them what an actual portion size is and that’s what’s in this… so, if you had more than this size, you’re going to get double this amount kind of thing.
	Facilitator Credibility	Knowledge that the person presenting had the proper education & expertise related to each topic. Confidence in the presenter. Presenter was approachable.	Right, exactly. And the fact, knowing what your position is made it even more interesting because you should know, with your job and your education, it’s not like

			somebody just running in here and telling you a little story and leaving.
Structure of Program			
	Opportunity to Ask Diet-Related Questions	Sort of like a question drop-box where the facilitator can address individual questions during the program, even if they don't relate to the topic being discussed.	Yeah if you write down – and that's another thing – maybe a homework thing – as far as write down your questions that you have and turn it in to you. That should be part of the program. And as far as the next time, you know what the asked question was and that's where you need to start.
	Brevity	No longer than 45 minutes to an hour per session.	Just list it. As long as it's a short meeting and brief.
Curriculum Highlights			
	Budget-Conscious Tips & Recipes (e.g., ingredients in recipes that were presented)	Using ingredients that are more readily available and less expensive (e.g., food preservation).	But I'm like with P6, it's some of the ingredients for everybody to start is expensive.
	Emphasize Normal Levels (e.g., blood pressure, blood sugar, cholesterol)	Offer benchmark information in terms of what normal lab levels are so they know where they stand.	P?: I'm saying more blood pressure checks… F: Okay. P?: Well so I don't even know what my blood pressure should be.

			P?: Making sure someone gets their sugar checked. P?: That would be a good subject. F: Blood sugar checks, okay. P?: She doesn't know what her blood sugar should be – a normal blood sugar is. F: Yeah. P?: What it is. F: I can do that, yeah. Okay, that's a great idea.
	Additional Topics – Ingredient-Specific Lessons	Artificial Sweeteners (e.g., Splenda, Sweet N Low, Equal, Truvia, etc.). Types of Oils (e.g., which oils are healthier & which oils are best for each cooking application).	Well they tell you this about Splenda and this about one of the others – so I would like to know, which way is the best way to go? Do I go with regular sugar? Do I go with Splenda?
	Additional Topics - Dining Out	How to navigate restaurant menus and find the healthier options.	P8: Did you have a lesson on eating out? F: No. P8: That could be a really good thing.

	Additional Topics - Convenient Cooking Methods	Microwave, air fryer, crockpot, frozen meals	The other thing is like our air fryer. I have one. I haven't been able to really use it to get the – to get the…you see the recipe and it looks beautiful and you think, "Well, I'm going to try that." So you take that recipe – and of course they put some things in there that you don't normally have in your kitchen –
	Additional Topics - Diabetes – What Foods Cause your Sugar to Spike (consider doing actual blood glucose and/or A1C checks)	Offer nutrition-specific information on diabetes and high carbohydrate foods.	How to keep your blood sugar from spiking.
Recruitment Strategies/Marketing			
	Emphasize Benefits of Proper Nutrition, Especially related to Pre-existing, Diet-related Health Conditions	Older adults attended the lessons because they believed the information could help them to prevent or manage a chronic disease through diet.	P1: The ones that's got diabetes and the ones that's sick, you know what I mean? They're not feeling well or something. F: Okay. P1: Because a lot of times they think it's what they're eating.

			F: I see, so you're saying the people that were listening, that participated, are the people that have health, diet-related health problems. P1: Health problems. Yeah.
	Combatting Resistance to Change	I've done it all my life this way, I'm not going to change now.	The outcry that she had was, "I've done it all my life this way, I'm not going to change now."
	Free	Advertise that the program is free from the beginning. Provide food at each encounter.	You start with a flyer that you have – free at the top – that's how you're going to do it. [Laughter]. Free food. Then you'll get more in here with that. If you've got food on there, they'll come again. P6: Like if you bring something in – they really like it – and you've got that recipe written down somewhere – F: Yeah. P6: Then I'm gonna take it.

			They'll take that and they'll try it
Retention Strategies			
	Incentives	Providing goodies at each session (e.g., Bring Healthy Food & Provide Recipe for All). If participants can try different foods and visually see that the recipe is doable, they may be more motivated to make dietary changes.	P6: Now yesterday I had a little guy from Aetna insurance – F: Yeah. P6: He doesn't even talk about his insurance, he just comes. And he brought a whole table-full of gifts. F: Goodies, okay. P6: But they were all here to get them. They bring stuff, all here together. F: Okay. So incentives of some sort? P6: Yeah, exactly. Yes, yes. P?: Or an incentive. F: Okay. P?: After so many sessions you get this, that, or the other. P?: Points as far as…

			P?: A point system.
	Social Support	Chatter about participants attempting to make some of the recipes from the samples provided while at home in-between lessons.	Yes, it was a very good program. I enjoyed it – I enjoyed learning about the new snacks – which I made my own peanut butter and everything else from it.
Outcome Themes			
Knowledge			
	Portion Sizes	What an appropriate serving size is.	Portion sizes was one of the main things that – and what to look for in the labels. I did not know that they listed certain things first. And then when the things that are really important to you is going to be at the bottom in small print.
	Reading food labels	How to read a nutrition facts label on food packaging. Ability to identify macronutrient content in foods (e.g., fat, salt, carbohydrates, calories).	Portion sizes was one of the main things that – and what to look for in the labels. I did not know that they listed certain things first. And then when the things that are really important to you is going to be at the bottom in small print.
Behavior Change			
	Intentional Food Choice	Bring food from home when hungry, rather than relying	If that's what you got to do to begin weaning yourself

		on fast food (e.g., avoiding fast food, cooking healthier); food preparation (e.g., trying new recipes).	off – say like you did that for a couple of months and then you look up one day and it's like, you know what, I haven't had any chips in 2 weeks. We always kept tons of pop in the refrigerator. We don't do that anymore. We keep maybe those little bitty bottles and most of its water. So when you want something to drink and you're reaching there, you think, "Now do I need that Pepsi or do I need that water? I need that water." Yeah, from the program I have learned to think about that fat intake. For the better – I mean it makes me think about what I eat. Yeah, I cook better.
	Grocery Spending	Noticeable decrease in bill at the grocery store post-intervention.	I mean I can tell you just from my grocery bill…It's changed. I've

			spent less and I'm pretty much buying everything that I had bought, say the month before or two months before or whatever. But now I'm leaving certain things off of my list because I don't need them.
	Portion Control	Reduce daily caloric intake.	I use those little portion cups that we get and I wash them out and if I have chili I have a cheese cup to go with it. It's like a pack and I take cheese and crackers over with me too.

Appendix E. Codebook for Grocery Store Receipts (Pre & Post)

1	**Fruit**	*canned, frozen, fresh* tomatoes avocadoes fruit juice (OJ)
2	**Vegetable**	*canned, frozen, fresh* V8 Generic "produce"
3	**Lean Protein**	Chicken Turkey plant proteins nuts Protein bars (Luna/Clif)
4	**Hi-Fat Protein**	Bacon Ham 80/20 ground chuck/beef Pork Peanut butter
5	**Lo-Fat Dairy**	skim milk 1 % milk 2% milk white cheese [provolone, swiss, mozz, yogurt] cottage cheese (unless specified hi-fat)
6	**Hi-Fat Dairy**	whole milk buttermilk ice cream cream cheese yellow cheese [cheddar, American, Colby]
7	**Hi-Carb/Cal**	*added sugars or high calorie/non-nutrient* bread dense carbs sports drinks soda fruit juice candy desserts [cakes, cookies, brownies, pie]
8	**Hi-Fat**	fried foods cooking oils (?) butter frozen fries/tots/onion rings
9	**Hi-Sodium**	canned soup frozen meals prepackaged items snack items chips generic "deli" meat

		frozen pizza pickles, sauerkraut
10	**Other**	non-food items water condiments

Appendix F. Intervention Materials

Lesson	Items
The Basics: Food Groups & MyPlate	• MyPlate graphic handout • MyPlate 10 tips handout • Serving size visuals handout • MyPlate (plastic plate) • Food Models • Portion size kit • Newsletter
Food & Nutrition How-To: Food Shopping & Budgeting, Nutrition Facts Label, Food Safety	• Shopping by section handout • Nutrition facts label handout • Food safety practices handout • Newsletter
Supplementing Your Diet	• Boost samples • Ensure samples • Carnation Instant Breakfast samples • Malnutrition – Consequences of not fueling your body handout • Fueling your body, The essential nutrients handout • Newsletter
Healthy Cooking & Snacking for One	• Cookbook 1 • Cookbook 2 • Cookbook 3 • Portion size kit • Food models • Healthy cooking for one handout • Smart snacking handout • Newsletter
Calorie Needs & Weight Loss	• Calculator • Estimated calorie needs handout • Sample meal plan handouts (1600, 1800 & 2000 calories) • Body mass index handout • Scrap paper • Tips for successful weight loss handout • Newsletter
Get Moving! Nutrition for an Active Lifestyle	• Resistance bands • Tin can of food for weight lifting • Exercise benefits & tips handout

	• Moderate intensity physical activities handout • Examples of strength exercises handout • Fluids & hydration handout • Newsletter
Heart Healthy Eating	• Food models • Artery section with blockage model • How much fat part I model • Cut the fat handout • Cholesterol facts handout • Newsletter
Protein – Our Building Blocks	• Basic protein food replica kit • Nutrition facts label • Calculator • Protein – Our building blocks handout • Newsletter
Take Control of Your Sodium	• Herbs & spices jars • Take control of your sodium handout • Newsletter
Not So Sweet Sugar	• Food models • Sugar synonyms poster • How much sugar display • Empty soda bottles filled with sugar • Examples of ingredient lists on food packaging • Not so sweet sugar handout • Newsletter
Watch Those Carbs!	• Food models • Nutrition facts label handout • Blood sugar graph handout • Carbohydrate handout • Calculator • Newsletter
Facts on Fiber	• Mason jars with different types of grains • Whole v. refined grain handout • Facts on fiber handout • Newsletter

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Education

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University of Kentucky 2013	D.P.D.	Dietetic Intern	August
University of Kentucky 2012	B.S.	Dietetics	May

Experience

- Logistical Coordinator, Bluegrass Lions Diabetes Project, July 2019 – present
- Research Assistant, Dr. Gordon, University of Kentucky, Colorectal Screening and Communication Quality Analysis, Fall 2019 - present
- Research Assistant, Dr. Gordon, University of Kentucky, Cost of Cancer Care Project, April 2019 – Fall 2019
- Research Assistant, Dr. Gordon, University of Kentucky, End of Life Conversations and Communication Quality Analysis, Fall 2018 – Fall 2019
- Research Assistant, Dr. Helme, University of Kentucky, Promotion of Opioid Disposal in Appalachia, October 2017 – Spring 2019
- Research Assistant, Drs. Parker and Ivanov, University of Kentucky, 12-Step Programming in a Recovery Housing Environment, Fall 2017 – present
- Teaching Assistant, Department of Communication, University of Kentucky, August 2017 – present
- Research Associate, Nutrition Education Program, University of Kentucky Cooperative Extension, May 2016 – August 2017
- Teaching Assistant, Department of Dietetics and Human Nutrition, University of Kentucky, August 2012 – May 2014

Publications

Helme, D., Egan, K., Lukacena-Buzzetta, K., **Roberson, L.,** Zelaya, C., McLeary, M., & Wolfson, M., (2020). Encouraging disposal of unused opioids analgesics in Appalachia. *Drugs: Education, Prevention & Policy.* DOI: 10.1080/09687637.2020.1711871

Fellowships, Scholarships, and Awards

- Carozza Graduate Fund for Excellence in Health Communication, College of Communication and Information, University of Kentucky, April 24th, 2020
- Carozza Graduate Fund for Excellence in Health Communication, College of Communication and Information, University of Kentucky, March 28th, 2019
- Bruce H. Westley Memorial Scholarship Award, College of Communication and Information, University of Kentucky, April 20th, 2018
- Bluegrass Academy of Nutrition and Dietetics Scholarship, February 24th, 2018
- Alice P. Killpatrick Fellowship, College of Human Environmental Sciences, October 2013, February 2014
- Outstanding Dietetic Intern, Bluegrass Academy of Nutrition and Dietetics, February 2014
- Student Excellence Award: Outstanding Senior, College of Agriculture Student Council, April 25th, 2012
- Turner Leadership Academy graduate, University of Kentucky, September 2010 - May 2012