12-2015

Web-Based Nutrition Education Intervention for African American Women Using the Theory of Planned Behavior

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WEB-BASED NUTRITION EDUCATION INTERVENTION FOR AFRICAN AMERICAN WOMEN USING THE THEORY OF PLANNED BEHAVIOR

A Dissertation
Presented to
the Graduate School of
Clemson University

In Partial Fulfillment
of the Requirements for the Degree
Doctor of Philosophy
Food Technology

by
Joyce Senior Angulo
December 2015

Accepted by:
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ABSTRACT

African American women have been disproportionately impacted for decades by the obesity epidemic, which frequently leads to severe chronic diseases such as cardiovascular disease, diabetes and hypertension.

This increase in chronic diseases amongst African American women is the motivation for the design of a culturally tailored nutrition education (NE) program that combines a strong theoretical base with the use of technology such as the Internet, since its usage within the college aged African American community has rapidly increased. Little is known about the variables that motivate behavior change in regards to eating and physical activity habits among college aged African American women.

The Online Nutrition Education for Sisters (ONES) program is a culturally tailored web-based nutrition education intervention for college aged African American women. Its theoretical framework includes health promotion constructs from the Theory of Planned Behavior, Social Cognitive Theory and Self-Determination Theory merged with instructional design principles from Cognitive Load Theory and Multimedia Learning. This one of a kind design can serve as a blueprint for other web-based nutrition education programs targeting minority populations with higher risk of overweight and obesity.

Results from the 6-week pilot testing of ONES demonstrated that the intervention was well accepted and helped improve college aged African American women’s intention to change their eating related behaviors in the short-term; with participant satisfaction rates and motivation rates post intervention above 94%.

Future research should explore the long-term effects of the ONES program to better determine how technology can be incorporated into nutrition education programs to enhance behavior change outcomes.
DEDICATION

To my parents Alder Senior and Marlene Angulo, whose immense love, support and prayers have provided me with the strength to see this project to completion. I love you so much!!

To my sister Diana, who has been a partner and ally in the PhD journey. It’s amazing how we both embarked in the study abroad experience simultaneously and turned our dreams into reality. I’m so proud of you Dr. Diana Senior!

To my brother Alder, for his unconditional support. Love you!

To all the Black women who are striving to live a healthy, happy and long life: Keep pushing. You are worth it!
ACKNOWLEDGMENTS

First and foremost I want to my heavenly Father for His unconditional love and faithfulness. Through Him all things are possible.

I want to thank my advisor, Dr. Cason, for helping me find my passion and giving me the tools to succeed as a graduate student. Your guidance and support made all the difference in the world. Thank you!

I want to thank Dr. Lippert (Tico Bob) for taking a chance on a girl from Costa Rica. If you hadn’t seen the potential I see now I would’ve never made it to Clemson. Muchas gracias!!

I want to thank my Clemson family, Kattia, Alfredo, Isaac and Hanan, as well as Mr. and Mrs. Sharperson for your love, prayers and encouragement. You made grad school so much better and I will always be thankful for that. Love y’all!

I want to thank my wonderful dissertation committee, Dr. Martinez-Dawson, Dr. Visser and Dr. Dawson. Your expertise and support have proven invaluable. Thank you!

I want to thank everyone who in one way or another were part of making this project a reality: Miss Glenda Brown, Miss Adraine Jackson-Garner, Miss LaNita Weisenberger, Dr. Frankie Felder, Miss Lynn Fowler, Gail Whitmire, Kim Collins and Dexter Hawkins. Thank you all from the bottom of my heart!
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CHAPTER ONE
INTRODUCTION AND LITERATURE REVIEW

Introduction

According to the United States (U.S.) 2010 census, African Americans represent 13% of the US population and are the second largest ethnic minority group in the country. ¹ Health disparities have more severely impacted the African American community compared to the general American population. ² Although there has been some improvement in mortality rates in the general population, several studies over the past 3 decades state that the health status of African Americans women continues to lag behind their White counterparts. ²-²⁵ A vast majority (80.5%) of African American women are either overweight or obese. As a result, they are more susceptible to a number of weight-related health issues, including high blood pressure, high cholesterol, arthritis, stroke, heart disease and diabetes. ²⁶

Nonetheless, the complexity of the problem is far more overreaching and it is important to look at these statistics cautiously. The World Health Organization (WHO) defines overweight and obesity as abnormal or excessive body fat that may impair health. ²⁷ WHO relies on body mass index (BMI) cutoffs of 25 to 30 or higher in the assessment if overweight and obesity, respectively. ²⁷ The BMI is a number resulting form dividing the weight in kilograms by the square of the height (Kg/m²) and the validity of this measurement has been questioned for years, especially among minorities. There are limitations in the use of the BMI index to define obesity prevalence in ethnic and racial groups. ²⁸ The BMI measure does not adequately identify the percentage of body fat, nor does it distinguish between fat and tissue. Neither does BMI directly represent adiposity ²⁷ nor determine metabolic health.

African American women tend to have higher lean mass and lower fat mass compared to their White counterparts. ²⁷ Moreover, intra-abdominal adipose tissue, which is the body fat depot
most strongly associated with disease risk, tends to be lower in African American females than in
their White counterparts. This finding suggests that health disparities in the African American
population might also be the result of unhealthy eating and physical activity behaviors. Several
studies have reported disparities between physical activity and healthy eating in African
Americans and Whites. For example, they are 38% less likely to meet fruit and vegetable
recommendations of the Dietary Guidelines for Americans compared to Whites, and similar racial
disparities have been found in intakes of saturated fat.

Since the early 1990s African American women have been reported to be less
preoccupied with dieting and somewhat more tolerant of being overweight than White women. It
has been suggested that the social environment of African American women is less negative
about obesity than might be commonly thought and that being overweight is not necessarily
synonymous with being unattractive. However, these cultural norms concerning body size may
prevent awareness among many African American women about the potential health benefits
they might achieve through lifestyle changes. This less negative perception towards obesity,
coupled with high fat and high calorie diets; low intake of fruits, vegetables, fiber and grains; high
sodium intake; and high intake of salt-cured, smoked, and nitrite-cured foods contribute to the
burden of chronic diseases in this population.

Many historical and cultural factors influence the current dietary intake and food choices
of African Americans. The dietary habits, food choices, and cooking methods of African
Americans evolved from a long history of slavery, persecution, and segregation. Soul food
emphasizes fried, roasted, and boiled food dishes using primarily chicken, pork, pork fat, organ
meats, sweet potatoes, corn, and green leafy vegetables. Although there are no current
statistics on how frequent is the consumption of soul food or comfort foods among this population,
in a qualitative study African American college students remarked that when they went home for
the weekends they expect their mothers to have traditional foods available, such as fried chicken,
barbecued meats, macaroni and cheese and cobblers.
Nutrition-related attitudes and behaviors usually are established early in life and are primarily determined by cultural, psychosocial, and socioeconomic factors. In addition, many aspects of food purchasing, preparation, and eating are culturally defined and individuals may consciously or unconsciously participate in these activities to preserve traditions and maintain group identity.  

The high prevalence of diet-related diseases among African Americans strongly suggests a need for dietary changes at the individual, family, and community levels. African Americans, like the general population, may not feel motivated to change their dietary intake and prevention of chronic diseases because it is not perceived as a priority or as important as the immediate issues of daily living.  

Program planners must determine whom to target—the individual, extended family, or neighborhood—realizing that they are not mutually exclusive. Nutrition education programs for African Americans should primarily target women because they usually are concerned with the family’s health, are responsible for the food preparation, set standards for healthy or unhealthy eating, and provide access to other family members. Programs and materials must be culturally relevant and sensitive to their lifestyles and should reflect a positive image of them as consumers. Individuals must believe nutrition education and health messages are relevant to them and their loved ones for them to want to make changes.  

Indeed, many conditions associated with an increase in mortality and chronic diseases among African Americans are related to their health behaviors. It is important to identify these unhealthy behavior patterns during adolescence and the young adult years and to educate and motivate young people to change their unhealthy behaviors to more positive ones. Studies have found that some reasons college students eat unhealthy diets are frequent meal skipping, inadequate variety of foods, frequent consumption of fast foods, lack of awareness and understanding of the food recommendations and guidelines, and decreased self-efficacy in
making healthy food choices. 34 When considered by gender and race, the college group consuming the smallest amount of recommended servings of fruits and vegetables were African American females. 34

The probability that college students will change their health behaviors increases if the related health issue is perceived as relevant and of concern to them or their peers, 33 but studies examining the health behaviors of minority populations, specifically African American female college students, are relatively rare. 33 This issue makes the problems confronting the health of young African Americans a formidable challenge for health educators and healthcare professionals. 33 Maintaining and improving the well-being of this college population will ultimately have an impact on the overall health status of all African Americans. 33 Data identifying health behaviors must be current and accurate if we are to develop, implement, and improve health promotion programs that focus on primary prevention. 33 Nutrition educators and other health promotion professionals may need to further investigate what are the relevant mediators of behavior change in this population and address motivational issues before teaching methods for achieving healthy lifestyle changes.

The college years are an excellent time for health promotion, 35 since students are still in transition to adulthood and have not yet fully established unhealthy behaviors that are so difficult to modify at later stages in life. It is crucial to educate college youth about the importance of healthy eating and physical activity based on gender and ethnicity. Understanding weight attitudes and dieting tendencies of African American women may provide additional help in the development of culturally tailored obesity prevention programs and specific guidelines toward achievement of healthy body, healthy weight and improving quality of life. 35

African American women still need information on basic nutrition topics such as serving sizes, reading food labels, eating healthy on a low budget, healthy eating when dining out, and food safety. 2 They also need to learn how to discriminate between reliable and unreliable nutrition information, 2 especially given all of the incorrect or misleading information that is present in the Internet. The great diversity of Internet communication technologies available
(devices that allow users to access, store, share and manipulate information, such as cellphones, computers, laptops, tablets, etc.) makes possible a globalized flow of information at unprecedented speed.

A report from the Pew Research Center on African Americans and technology use found that 80% of them are Internet users. Some 92% of Black adults are cell phone owners, and 56% own a smartphone of some kind. Overall, 73% of the African American women included in the study have either a broadband connection or a smartphone. These findings indicate that there is great potential for tailoring and delivering nutrition education to this population with Internet communication technologies.

**Problem Statement**

African American women have been disproportionately impacted for decades by the obesity epidemic and frequently engage in unhealthy eating and physical activity behaviors, which can lead to severe chronic diseases such as cardiovascular disease, diabetes and hypertension. This problematic raises the need to design a culturally tailored nutrition education program that combines a strong theory base and takes advantage of Internet and smartphone frequently used by the young adult African American female population.

**Theoretical Framework**

Several comprehensive reviews of the effectiveness of nutrition education have concluded that nutrition education is more likely to be effective if it is based on clearly articulated theory. Yet, many published reports of nutrition education research and interventions do not systematically use behavior change theory. Theory has been defined as a series of
interrelated concepts that present a systematic view of events by specifying relations among variables to explain and predict the events. Given that theory describes events and explains relationships by organizing principles and concepts, theory-driven research has the potential to greatly improve the effectiveness of nutrition education. When an educator ignores behavior change research in designing an intervention, it weakens the research base of the planned education, mainly because there are no standard procedures in place to evaluate the impact of the intervention. Theory is dynamic rather than static, as empirical testing of theories over time should lead to changes, refinements, and improvements to a theory that increase our ability to understand a given phenomenon.

The gap between theory and practice is rather difficult to bridge, mainly because effective practice depends on using theories and strategies that are appropriate to a situation. It is also well accepted that effective nutrition education programs are informed by theory, research and practice. The actual process of how to design nutrition education using these three interrelated elements still remains a mystery to many health promotion practitioners and researchers, because health practitioners must first understand the characteristics of their target population (e.g., ethnicity, socioeconomic status, gender, age, geographical location and health issues) to use these three components correctly. Applying evidence-based concepts may intuitively seem appropriate but exactly how they inform the program elements for a specific target audience and program is often vague. Thus, when an intervention program results in weak findings, conclusions cannot be drawn as to whether the lack of findings was due to a lack of theoretical fidelity or to threats to study validity.

A health promotion program is most likely to benefit participants and communities when it is guided by social and behavioral science theories of health behavior and health behavior change. Since the body of evidence on health and behavior is in general much stronger than for behavioral determinants, it is often especially necessary to conduct additional research to further explore the determinants of target behaviors. Bartholomew et al (1998) also posits that all problems may profit from a multi-theory approach, on condition that these theories
are applied appropriately and correctly. Moreover, many theories are potentially applicable to behavior at various levels: individual, interpersonal, organizational, community and society, adoption and implementation.\textsuperscript{46}

In other words, health promotion is a planned activity.\textsuperscript{46} Planning models serve as a blueprint for building and improving intervention programs. They instruct the practitioner about which theory or theories should be used and when and how they should be applied.\textsuperscript{45} A widely used health promotion design framework is Green and Kreuter’s (1999) PRECEDE/PROCEED model. The PRECEDE model starts with analyses of quality of life, health behavior and environmental factors, and predisposing, reinforcing and enabling determinants (correlates) of behavior and environmental factors. In PROCEED a health promotion intervention is developed, implemented and evaluated.\textsuperscript{46} This is a popular model, nonetheless, one of the biggest critiques towards this and other planning frameworks for promoting health is that they are not designed to provide information on the specifics of how to actually design educational group sessions and interventions that use theory variables.\textsuperscript{31} The Stepwise Procedure developed by Contento (2011) provides a planning framework specifically for nutrition education and shows how to incorporate theory variables into the planning process.\textsuperscript{31} For this reason, the Stepwise Procedure was the model used to plan the nutrition program used in this study.

The Stepwise Procedure is a systematic step-by-step procedure for designing behavior-focused and evidence-based nutrition education that integrates theory and research with practice at each step.\textsuperscript{31} The first step is extremely important for designing and effective program. This step is often called a needs assessment, needs analysis, issues analysis or formative research.\textsuperscript{31} The process starts when a health issue of concern is considered serious and prevalent enough to justify the expenditure of time and resources.\textsuperscript{31} In step one, the individual behaviors or community practices that contribute to the food or health issue for the given audience are also identified and prioritized, while at the same time major behaviors or practices are selected for the program to address.\textsuperscript{31}
In step two, the theoretical framework for the intervention is selected. Step three is determining theory-based goals and objectives. Step four involves designing educational strategies and practical learning experiences matched to the behavioral theory constructs; step five is the implementation of the intervention, and finally step six is the evaluation.

Several theories from the behavioral and health sciences have been used in designing nutrition education investigations and interventions. The Theory of Planned Behavior, for example, can help us explore African American women’s beliefs and attitudes regarding healthy eating and physical activity; and provide specific guidance regarding program design, implementation and evaluation of an intervention planned specifically for this target population.

**Theory of Planned Behavior**

The Theory of Planned Behavior (TPB) is an extended version of the Theory of Reasoned Action (TRA), which was developed by Fishbein in 1967 to better understand relationships between attitudes, intentions and behaviors. Intentions are assumed to capture the motivational factors that influence a behavior and to indicate how hard people are willing to try or how much effort they would exert to perform the behavior. According to this model, behavioral intention is influenced by: 1) whether the person is in favor of doing the behavior (attitudes), 2) how much the person feels social pressure to do it (subjective norms), and 3) whether the person feels in control of the action in question (perceived behavioral control). TPB is the most extensively studied social cognition theory, and is relevant to both intention and behavior change.

The TRA was expanded by Ajzen and colleagues (1991) and renamed TPB once it included an additional construct: perceived behavioral control over performance of the behavior. Perceived control is determined by control beliefs concerning the presence or absence of facilitators and barriers to behavioral performance, weighed by their perceived power or the impact of each control factor to facilitate or inhibit behavior. The TPB assumes behavioral intention is the most important determinant of behavior. TRA and TPB have been used
successfully to predict and explain a wide range of health behaviors and intentions, including smoking, drinking, health services utilization, exercise, sun protection, breastfeeding, substance abuse, HIV/STD prevention behaviors and use of contraceptives, mammography, safety helmets, and seatbelts.  

Estimating the size of intention–behavior effects therefore affords a critical test of this theory. Estimates of effect size could illuminate whether the concept of intention is needed to understand the process of behavior change, whether additional concepts are needed, or whether researchers need to look to other constructs to understand behavior change. At the applied level, numerous surveys have been conducted to establish what factors should be targeted by interventions in order to change behavioral intentions.

Furthermore, to increase congruence of interventions with target groups’ preferences, intervention designs may need to emphasize certain theoretical factors within social cognitive theories, based on formative research results. In looking at why nutrition education interventions have not been as effective as desired, Baranowski et al (2002) pointed out that more research is needed to identify which mediating variables are actually highly predictive of the behavior(s) of interest and then to embark on studies that demonstrate the effectiveness of intervention strategies directed at these mediating variables before proceeding to efficacy outcome interventions and effectiveness outcome interventions.

A review of studies done by Contento (2002) showed that dietary change depends on individual motivations and a sense of personal relevance of the change, judgments of personal assets or resources to make the change, and willingness to overcome barriers, accompanied by environmental change such as in the availability and accessibility of food, social and cultural norms, and community assets and empowerment. That is, nutrition education interventions have their greatest impacts on behaviors through impacts on individual mediating or intervening variables facilitated by organizational and community changes.
According to this perspective, an individual approach would not be enough to plan an effective nutrition education intervention. This is where the Social Cognitive Theory (SCT) becomes relevant. SCT is one of the most frequently used and robust health behavior theories. It explores the reciprocal interactions of people and their environments, and the psychosocial determinants of health behavior.

Social Cognitive Theory

Building on previous theorization and research by Miller and Dollard (1941) and Rotter (1954), SCT was first known as Social Learning Theory, as it was based on the operation of established principles of learning within the human social context. It was renamed Social Cognitive Theory by Bandura (1977) when concepts from cognitive psychology were integrated to accommodate the growing understanding of human information processing capacities and biases that influence learning from experience, observation, and symbolic communication. With further development, SCT has embraced concepts from sociology and political science to advance the understanding of functioning and adaptive capacities of groups and societies. The theory also has integrated and developed concepts from humanistic psychology by analyzing the processes that underlie self-determination, altruism, and moral behavior.

According to SCT, three main factors affect the likelihood that a person will change a health behavior: (1) self-efficacy, (2) goals, and (3) outcome expectancies. If individuals have a sense of personal agency or self-efficacy, they can change behaviors even when faced with obstacles. If they do not feel that they can exercise control over their health behavior, they are not motivated to act, or to persist through challenges. As a person adopts new behaviors, this causes changes in both the environment and in the person. Behavior is not simply a product of the environment and the person, and environment is not simply a product of the person and behavior.
Self Determination Theory

SDT is an approach to human motivation and personality that uses traditional empirical methods to investigate people’s inherent growth tendencies and innate psychological needs that are the basis for their self-motivation and personality integration, as well as for the conditions that foster those positive processes. SDT identifies the need for competence, relatedness and autonomy as essential needs for facilitating optimal growth, integration, constructive social development and personal well-being. Motivation concerns energy, direction and persistence, which are all aspects of activation and intention, which makes it a good fit to complement TPB and SCT. The issue of whether people stand behind a behavior out of their interests and values, or do it for reasons external to the self, is a matter of significance in every culture and represents a basic dimension by which people make sense of their own and other’s behavior.

Comparisons between people whose motivation is authentic (literally, self-authored or endorsed) and those who are merely externally controlled for an action typically reveal that the former, relative to the latter, have more interest, excitement, and confidence, which in turn is manifest both as enhanced performance, persistence and creativity; and as heightened vitality, self-esteem and general well-being.

A major focus of SDT has been to supply a more differentiated approach to motivation, by asking what kind of motivation is being exhibited at any given time. By considering the perceived forces that move a person to act, SDT has been able to identify several distinct types of motivation, each of which has specifiable consequences for learning, performance, personal experience and well-being. Intrinsic motivation describes this natural inclination toward assimilation, mastery, spontaneous interest, and exploration that is so essential to cognitive development and that represents a principal source of enjoyment and vitality throughout life. Social-contextual events (e.g., feedback, communications, rewards) that conduce toward feeling competence during action can enhance intrinsic motivation for that action. Accordingly, optimal
challenges and freedom from demeaning evaluations were all found to facilitate intrinsic motivation. Extrinsic motivation refers to the performance of an activity in order to attain some separable outcome and, thus, contrasts with intrinsic motivation, which refers to doing an activity for the inherent satisfaction of the activity itself.

Because extrinsically motivated behaviors are not typically interesting, the primary reason people initially perform such actions is because the behaviors are prompted, modeled, or valued by significant others to whom they feel (or want to feel) attached or related. This suggests that relatedness, the need to feel belongingness and connectedness with others, is centrally important for internalization. Based on the focus group results, one of the most salient mediators of behavior change for college aged African American women is the need for relatedness, which also translates into one of the key features they would like to have in an ideal web-based nutrition education program, which is social support.

In the same fashion, several studies have argued that when trying to address nutrition, particularly in ethnic groups that experience disproportionate health problems, such as African American women, it is critical to account for individuals' cultural background. Indeed, taking into account culture can enhance the effectiveness of interventions because eating and nutrition practices are inextricably tied to aspects of culture such as the concerns, needs, interests, traditions and history of a group of people.

Parker (2011) has also stated that while many culturally targeted approaches have resulted in non-technological interventions (such as faith-based programs), few have examined the potential that technology may afford. Thus, there exists an exciting opportunity to explore how Internet communication technologies can be culturally tailored to promote healthy eating practices and physical activity.

On the other hand, the increasing recognition of the importance of behavior for health and the rapidly escalating cost of healthcare conspire to create a strong need for widespread
dissemination of interventions to promote health and prevent disease.\textsuperscript{23,66-68} Thus, web-based nutrition education becomes a promising intervention strategy for African American women. In computer tailoring, a number of important characteristics of interpersonal counseling are mimicked without the necessity of face-to-face contact.\textsuperscript{42} Web-based nutrition education provides people with individualized feedback and advice on personal performance levels (i.e., activity or intake), and awareness of their own performance, as well as personal motivation to change, goals, outcome expectations, subjective norms, self-efficacy, and other possible behavioral determinants.\textsuperscript{69}

**Cognitive Load Theory (CLT) and Multimedia Learning (ML)**

Consequently, the online delivery of the nutrition education program makes necessary the inclusion of the key principles of Instructional Design (ID) and Multimedia Learning (ML), coupled with Theory of Planned Behavior, Social Cognitive Theory and Self Determination Theory that come from the health promotion realm. Multimedia instruction refers to presentations involving words and pictures that are intended to foster learning.\textsuperscript{70} According to Mayer (2009), people learn better from words and pictures than from words alone.\textsuperscript{70} Further, according to Mayer’s modality principle, better learning occurs when words are presented as narration rather than on screen text.

Multimedia represents a potentially powerful learning technology, that is, a system for enhancing human learning.\textsuperscript{70} Multimedia design has two approaches, a technology-centered approach and a learner-centered approach.\textsuperscript{70} Technology-centered approaches focus on cutting-edge advances in multimedia technology and how to incorporate them into emerging communication technologies such as wireless access to the Internet or the construction of interactive multimedia representations in virtual reality.\textsuperscript{70} Learning-centered approaches begin with an understanding of how the human mind works and their underlying premise is that multimedia designs that are consistent with the way the human mind works are more effective in
fostering learning than those that are not.  

One of the most renowned instructional design (ID) theories to better understand how people learn is the Cognitive Load Theory (CLT), proposed by Sweller and colleagues.  The basic premise of CLT is that learners have a subset of the memory system called working memory. The working memory, where thinking and learning occur, has an extremely limited capacity when processing new information, and if not rehearsed, this new information is lost within about 15 to 30 seconds.  Another important characteristic of working memory is that capacity is distributed over two, partially independent processors. This dual processing assumption suggests that there are two separate channels for processing visual and auditory information. The implication of this dual-processing model is that working memory capacity can be effectively expanded by utilizing both visual and auditory channels rather than one channel alone. Information held in long-term memory, another memory subsystem is organized and stored in the form of domain specific knowledge structures known as schemas. Schemas categorize elements of information according to how they will be used; thereby facilitating schema accessibility later when they are needed for related tasks.

According to CLT, three different types of cognitive load can be distinguished: intrinsic cognitive load, extraneous cognitive load and germane cognitive load. Intrinsic load refers to the number of elements that must be processed simultaneously in working memory for schema construction. Extraneous load is the result of instructional techniques that require learners to engage in working memory activities that are not directly related to schema construction (e.g. unnecessary sounds and animation in a PowerPoint presentation); and germane load is the result of effective cognitive processes such as abstractions and elaborations that are promoted by the instructional presentation.

Multimedia messages can be influenced by the delivery media (amplified speaker and computer screen), presentation mode (words and pictures), or sensory modalities (auditory and
The web-based nutrition education program will focus on a sensory modality view, not only because of its learner-centered approach, which concentrates on adapting multimedia to enhance human learning; but also because it involves presenting material that is processed visually and auditorily. The sensory-modalities view of multimedia is consistent with a cognitive theory of learning that assumes humans have separate information-processing channels for auditory and visual processing, and when both channels are used, better learning occurs. Meaningful learning is reflected in the ability to apply what was taught to new situations, and it is commonly measured by using problem-solving transfer tests.

In developing the online nutrition education modules, several ML principles were used in an attempt to reduce extraneous load and increase learning opportunities. These principles are: coherence, signaling, redundancy, spatial contiguity and temporal contiguity. Coherence techniques involve deleting extraneous words, sounds, and pictures from a multimedia lesson. Signaling involves highlighting the essential words and pictures in a multimedia lesson. Redundancy techniques involve removing redundant captions from narrated animations. Spatial contiguity involves placing words next to corresponding graphics on the screen so the learner does not have to unnecessarily scan the screen, temporarily reducing attention. Temporal contiguity involves presenting corresponding narration and graphics simultaneously rather than sequentially. Segmenting involves breaking down large pieces of information into smaller ones to avoid overwhelming the learner with too much information at once. These techniques are intended to help learners use their cognitive capacity for essential and generative processing.

In summary, the design of the web-based nutrition education program for African American women will be guided mainly by five theories. Theory of Planned Behavior is the foundation, which at the same time will be supported by Social Cognitive Theory and Self Determination Theory from the health promotion field; and Cognitive Load Theory and Multimedia Learning from the instructional design field.
Purpose Statement

The purpose of this exploratory sequential study was to first qualitatively explore with a small sample the eating and physical activity behaviors of college aged African American women and then to determine if the qualitative findings generalize to a large sample. The first phase of the study was a qualitative exploration of Theory of Planned Behavior, supported by Social Cognitive Theory and Self Determination Theory, in which focus group data about beliefs, attitudes, and intentions regarding eating and physical activity behaviors were be collected from college aged African American women in the U. S. Southeast area. The theoretical framework was also supported by Cognitive Load Theory and Multimedia Learning to develop ONES (Online Nutrition Education for Sisters), a web-based nutrition education program that was pilot-tested with college aged African American women of the U.S. Southeast. In the quantitative stage, survey data regarding the impact and acceptability of ONES by the target population were collected and analyzed.

Research Questions

(1) What constructs from Theory of Planned Behavior, Social Cognitive Theory and Self Determination Theory might influence intention to change eating and physical activity behaviors among college aged African American women?

(2) What are some of the principles that should be considered when designing a culturally tailored web-based nutrition education program for college aged African American women?

(3) What is the impact and acceptability of a culturally tailored web-based nutrition education intervention integrating Theory of Planned Behavior, Social Cognitive Theory and Self Determination Theory for college aged African American women?
Significance of the study

The research explored, from a theoretical perspective, the beliefs and attitudes that might influence behavior change among college aged African American women, to obtain a better understanding of the underlying reasons that can make a nutrition education program more successful in achieving sustained health behavior changes among minority populations. The study also included a novel approach for its delivery, by using the Internet communication technologies, which have widespread use in the African American population. This approach defined ground breaking parameters for culturally-tailored interventions to promote behavioral changes among populations with higher obesity risk that in the future can facilitate the incorporation of innovative learning technologies into nutrition education programs.

Delimitations

• This study focused on the Theory of Planned Behavior (TPB) to evaluate the intention to change in college aged African American women participating in a web-based nutrition education program. Since this is an area in which research is scarce, the theory was accompanied by SCT, SDT, CLT and ML theory in order to make the theoretical framework more robust.

• Formative evaluation included a series of focus group discussions. Participants were purposefully selected from the Southeast area of the U.S. Purposeful sampling means that the most productive sample to answer the research questions is selected. ⁷¹

• The women included in the data analysis ranged in ages from 18 until 30, this because the use of technology is more widely spread among the young adult population. There were two women older than 30 who participated in the pilot testing, but they were excluded from the data analysis.
The web-based program developed was pilot tested as a 6-week intervention. For future implementations a longitudinal approach would be more appropriate.

The web-based program was set up as an online course at a land-grant university campus. The intervention was delivered through the university’s online content management platform.

Methodology

Research Design

A mixed methods approach was used as the study design. This approach involves combining and integrating qualitative and quantitative research data in a research study. The field of mixed methods research is relatively new, stemming from the middle to late 1980s. This methodology was based on the work from individuals in diverse fields, such as evaluation, education, management, sociology and health sciences. Early thoughts about the value of multiple methods (called mixed methods) resided in the idea that all methods had bias and weaknesses, and the collection of both quantitative and qualitative data neutralized the weaknesses of each form of data.

The particular mixed methods design that was used in this study was an exploratory sequential design. According to the literature, with this type of design the researcher first begins with a qualitative research phase and explores the views of participants. The data are then analyzed, and this information is used as the basis for the second phase, the quantitative phase. The rationale for using this approach is influenced by this study’s research questions. In order to design an effective culturally tailored web-based nutrition education intervention for the target population, performing the qualitative assessment of their attitudes and behaviors in regards to eating and physical activity habits is crucial. The results from this first stage were included as formative research in the design and evaluation of the nutrition education program.

Qualitative and quantitative approaches in a single study complement each other by
providing results with greater scope and depth, and this in turn adds richness to the explanation of the data. With quantitative methods, large amounts of data can be summarized to reach generalizations based on statistical projections. Qualitative research tells a story from the viewpoint of the participants that provides rich descriptive detail. 75

Particular challenges to this design reside in the time-intensive nature of analyzing both qualitative and quantitative data, focusing on the appropriate qualitative findings to use and the sample selection for both phases of research. 71 In order to address these challenges the design was sequential, which means the qualitative data collection and analysis took place before the quantitative phase. This also ensured enough focus on each stage of the process so that the most relevant qualitative results are the ones that are included in the subsequent stages of the research.

Population and Sample

According to the U.S. Census Bureau (2014), the current African American female population of South Carolina is 685,333. 76 However, since no further data about how many adult African American women have Internet access through a computer or mobile device was available at the state level, a purposeful sample was the appropriate sampling method for the focus group sessions. In purposeful sampling the researcher actively selects the most productive sample to answer the research questions. 74 Moreover, the purposeful sampling type selected was criterion sampling, since only individuals who met the criteria of having Internet access, either via a computer or a mobile device, were included in the study. 74

If the sample were more homogeneous in terms socioeconomic status, education and access to Internet communication technologies, a cluster design would be more appropriate. According to Creswell (2014), cluster sampling is ideal when it is impossible or impractical to compile a list of the elements composing the population. In a multistage or clustering procedure, the researcher first identifies clusters (groups or organizations), obtains names of individuals within those clusters, and then samples within them. 74
Thus, a total of 16 African American participated in the focus groups (qualitative stage). Two of the sessions were held on a land-grant university campus, and the other two in a local community center near the university campus. The women were recruited via email on campus and through a flyer posted at the community center. Criteria for participation included being an African American female, between 18 and 30 years of age.

The pilot testing of the program (quantitative stage) included participants from the African American female population from a land-grant university. Based on information obtained from Institutional Research department at the university, there were 680 African American female students enrolled. Email was the preferred method to disseminate the information about the program, which was offered as a Special Topics class through the university’s website. A total of 40 participants enrolled in the intervention. Criteria for participation included being African American, female, between 18 and 30 years of age and enrolled as a full time student. Students were randomized into two separate groups with the same number of participants.

The treatment condition applied, based on the qualitative results, was motivation. The treatment group received extra resources on motivation every week and had access to an online forum, called Sister Talk, with the purpose of creating an online social support network. The control group did not receive any motivational components during the intervention.

Instrumentation

*Focus group protocol (Qualitative Stage)*

Prior to the start of the session, a participant screening survey was administered in order to obtain basic demographics to characterize the target population for the program. This screening survey was based on the Client Enrollment Form utilized by the Expanded Food and Nutrition Education Program (EFNEP) at Clemson University.

The focus group guide developed had three components: 1) questions concerning their perspectives on healthy eating and physical activity, 2) perceptions about their own eating and physical activity habits; 3) questions about the features they would like to have in an ideal web-
based nutrition education program. The protocol was designed based on the Focus Group Guidebook. Detailed description of the guide is included in Manuscript 1.

Survey research (Quantitative Stage)

Baseline data collection included a pre-intervention survey that included information on demographics as well as food and physical activity related behaviors. In addition to this, participants were given two questionnaires each week that included information to address TPB, SCT and SDT constructs. The post-intervention survey included information on demographics, food and physical activity behaviors, as well as questions addressing the acceptability of the program. The program evaluation tools were developed using Qualtrics, an online survey creation tool, and sent to the students via email, in order to control the data collection process and keep track of response rates. Detailed description of the survey measures is included in Manuscript 3. All data collection instruments (see Appendix B) and protocols were approved by the university's Institutional Review Board prior to the start of the study. IRB documentation is included in Appendix A.

Data Collection Procedures

In the qualitative stage, beliefs and attitudes that were believed to influence the women's eating and physical activity behaviors were obtained. Focus group discussions were conducted with a small sample of the population. A focus group discussion usually consists of a semi-structured interview with a group of around 6-8 people. Qualitative research is particularly relevant for health research that investigates human behavior and relationships, because it explores how and why people behave in certain ways. Much of the work conducted in dietetics and nutrition education is aimed at changing people's eating and physical activity behavior to improve their health. Despite the fact that the type of evidence produced by most qualitative research is not empirically generalizable, where the findings can be used to infer about the characteristics of a wider population; it can undoubtedly be
This means that the findings can be used to develop concepts, understand phenomena and theoretical propositions that are relevant to address the obesity epidemic in African American women from all over the U.S. territory.

According to Morgan (1998), focus groups draw on three of the fundamental strengths that are shared by all qualitative methods: (1) exploration and discovery, (2) context and depth, and (3) interpretation. For each of these general strengths, what focus groups emphasize are the specific strengths that come from collecting qualitative data through group discussions.

Qualitative methods are especially useful for exploration and discovery. Focus groups are frequently used to learn about either topics or groups of people that are poorly understood. In terms to the questioning strategy for the sessions, there are two different currently in use. The topic guide is a list of issues or topics to be pursued in the focus group, while the questioning route is a sequence of questions in complete, conversational sentences. The questioning route was selected over the topic route due to the following advantages: (1) increased confidence since the questions address the topics precisely as intended, (2) quality analysis, because it minimized subtle differences in questions that could alter the intent, and (3) increased consistency, since the same moderator conducted all of the sessions. The interviewer had an interview protocol with open-ended questions and probes for each question, so that participants could explain in more detail or elaborate on what they just said. Each session was also audio recorded to facilitate the transcription procedure, which included listening carefully to the recordings and transcribing them verbatim. Finally, the researcher listened the recordings a second time to make sure all comments are properly noted in the transcription.

The second stage involved the web-base program design; based on the qualitative results and theoretical framework. The educational objectives, lesson plan, content and evaluation tools for each one of the modules of the web-based nutrition education program were developed. Survey instruments were utilized for the quantitative data collection process, which included a pre-test for the intervention, pre and post tests for each of the weekly modules, a post-test for the intervention and a 2-week follow up. Likert scales were used for the majority of the
variables measured. The pilot testing of the program had a cross-sectional design, which means that the information was collected at a certain moment in time, and not over long periods of time as in a longitudinal study. With this approach a picture of a certain period in time was obtained, from which inferences and recommendations for a larger scale study were extracted. The scales for each survey are thoroughly explained in Manuscript 3.

Survey research had the best fit for the pilot-testing, considering that the intervention was web-based. Surveys were disseminated in a quick, standardized and inexpensive way to all the participants in the study without introducing interviewer bias. Moreover, the use of computerized survey software also optimized the analysis of the data, by providing the possibility of computing statistical analyses in a relatively short amount of time.

Both focus groups and survey research complemented each other in this dissertation, although it is important to keep in mind the main differences between the two approaches. In surveys, there are well-defined sampling procedures that rely on statistical formulas. In focus groups, the researcher uses its judgment to select purposeful samples of participants who meet the needs of a particular project. Surveys use a fixed set of questions, and every respondent is asked exactly the same questions, with exactly the same set of predetermined response options. Focus groups allow considerable flexibility in how questions are asked from group to group; in addition, the nature of the responses is inherently up to the participants themselves. When it comes to analysis, surveys lend themselves to numerical summaries that reduce the data to tables and figures. The analysis of focus groups, however, involves a more subjective process of listening to and making sense of what was said in the groups, and it is up to the researcher to analyze this information and relate the results to the original research questions.

Data Analysis

Qualitative phase: Once the focus groups were fully transcribed and reviewed for errors in the transcription process, the data were organized by codes and categories of analysis. The
software used in the analysis was NVivo 10 (QSR International Pty Ltd. Version 10, 2014), which is one of the most widely used softwares for qualitative analysis. 81-83 Coding and categories emerged from both the data itself and the theoretical framework (mainly Theory of Planned Behavior, Social Cognitive Theory and Self Determination Theory). All codes were analyzed as part of the validation strategies for the results. Triangulation of the results (comparing data from different sources) was applied as an additional validation strategy.

**Quantitative phase:** Survey responses were compiled using Qualtrics, an online survey platform, and extracted as Excel files, which were later used to create data files on SPSS for Mac (version 22.0, 2013, IBM Corp). SPSS was the statistical analysis software used for this stage. Descriptive statistics (means, medians, standard deviations, standard error, and range) were calculated for each of the variables measured. Since most of the survey scales were 7-point Likert scales (meaning they were categorical or nominal), non-parametric statistical procedures were more appropriate. The Wilcoxon Signed Rank test and the Mann-Whitney U test were the main non-parametric analyses conducted on the survey data.

The Wilcoxon Signed Rank test is usually used to determine whether there is a median difference between paired or matched observations. 84 This test can be considered as the nonparametric equivalent to the paired samples t-test, 84 and it was used to determine significant differences in responses between treatment and control group. It was used for the weekly pre/post tests participants had to complete for each module, as well as to analyze the pre/post tests for the overall intervention. The level of significance was set at 0.05 and statistical significance was determined for p-values less than 0.05.

The Mann-Whitney U test (also known as the Wilcoxon-Mann-Whitney test) is a rank-based nonparametric test that can be used to determine if there are differences between two groups on an ordinal dependent variable. 84 It is often presented as the nonparametric alternative to the independent samples t-test when you have an ordinal variable. 84
The comments made by participants on the weekly post surveys were used to better understand the differences obtained through the statistical tests and to ascertain the main reasons for which the treatment and control group had more positive responses.

The description of each stage of this research is detailed in Manuscripts 1, 2 and 3, as follows.

**Organization of the Study**

The following chapters of the study were organized into three manuscripts, conclusions, a bibliography and appendixes. Manuscript 1 includes the results of the focus groups conducted with the sample population in order to determine the determinants of change among African Americans women. Manuscript 2 delineates the design of the nutrition education program based on the results from the focus group, the TPB and SCT. Manuscript 3 details an analysis of the results obtained from the web-based nutrition education intervention and the intention to change variable. The last chapter focuses on general conclusions, recommendations and limitations of the study, followed by the bibliography for the introduction and literature review, and appendixes.
CHAPTER TWO
MANUSCRIPT 1

QUALITATIVE EXPLORATION OF COLLEGE AGED AFRICAN AMERICAN WOMEN’S EATING AND PHYSICAL ACTIVITY HABITS, AND PERSPECTIVES ON KEY ELEMENTS TO DESIGN A WEB-BASED NUTRITION EDUCATION PROGRAM

Introduction

According to the United States (U.S.) 2010 census, African Americans represent 13% of the U.S. population and are the second largest ethnic minority group in the country. A vast majority (80.5%) of African American women are either overweight or obese. As a result, they are more susceptible to a number of weight-related health issues, including high blood pressure, high cholesterol, arthritis, stroke, heart disease and diabetes. Although there has been some improvement in mortality rates in the general population, several studies over the past 3 decades indicate that the health status of African American women continue to lag behind their White counterparts. The African American population continue to be two times more likely than Whites to have hypertension, obesity, and high fat intake.

Since the early 1990s African American women have been reported to be less preoccupied with dieting and somewhat more tolerant of being overweight than White women. It has been suggested that the social environment of African American women is less negative about obesity than might be commonly assumed and that being overweight is not necessarily synonymous with being unattractive. These cultural norms concerning body size may reduce awareness among many African American women about the potential health benefits they might achieve through lifestyle changes. This less negative perception towards obesity, coupled with high fat and high calorie diets; low intake of fruits, vegetables, fiber and grains; high sodium intake; and high intake of salt-cured, smoked, and nitrite-cured foods contribute to the burden of chronic diseases in this population.
Many conditions associated with an increase in mortality and chronic diseases among African Americans are related to their health behaviors. It is important to identify these unhealthy behavior patterns during adolescence and the young adult years and to educate and motivate young people to change their unhealthy behaviors to more positive ones. Studies have found that some reasons college students eat unhealthy diets are frequent meal skipping, inadequate variety of foods, frequent consumption of fast foods, lack of awareness and understanding of the food recommendations and guidelines, and decreased self-efficacy in making healthy food choices. When considered by gender and race, the college group consuming the smallest amount of recommended servings of fruits and vegetables were African American females. The probability that college students will change their health behaviors increases if the related health issue is perceived as relevant and of concern to them or their peers.

Studies examining health behaviors of minority populations, specifically African American female college students, are relatively rare. This makes the problems confronting the health of young African Americans a formidable challenge for health educators and healthcare professionals. Maintaining and improving the well-being of this college population will ultimately have an impact on the overall health status of all African Americans. Data identifying health behaviors must be current and accurate if we are to develop, implement, and improve health promotion programs that focus on primary prevention.

Furthermore, evidence exists that diet and exercise interventions are having less impact on the African American population based on research from several randomized clinical trials demonstrating that African American women achieve smaller weight losses than White peers exposed to the same interventions and that trajectories of weight loss differ for African Americans and Whites. This also indicates that nutrition educators and other health promotion professionals may need to further investigate the relevant mediators of behavior change in this population and address motivational issues before teaching methods for achieving healthy lifestyle changes.
The college years are an excellent time for health promotion, since students are still in transition to adulthood and have not yet fully established unhealthy behaviors that are so difficult to modify at later stages in life. It is crucial to educate college youth about the importance of healthy eating and physical activity based on gender and ethnicity. Understanding weight attitudes, dieting and physical activity tendencies and mediators of behavior change in college aged African American women may provide additional help in the development of culturally tailored obesity prevention programs and specific guidelines toward achievement of healthy body, healthy weight and improving quality of life. This is where health promotion theory makes a relevant contribution.

The Theory of Planned Behavior (TPB) is an extended version of the Theory of Reasoned Action (TRA), which was developed by Fishbein in 1967 to better understand relationships between attitudes, intentions and behaviors. Intentions are assumed to capture the motivational factors that influence a behavior and to indicate how hard people are willing to try or how much effort they would exert to perform the behavior. According to this model, behavioral intention is influenced by: 1) whether the person is in favor of doing the behavior (attitudes), 2) how much the person feels social pressure to do it (subjective norms) and 3) whether the person feels in control of the action in question (perceived behavioral control). TPB is the most extensively studied social cognition theory, and is relevant to both intention and behavior change.

Thus, intention and TPB constitute the foundation driving this research, and given the nature of the challenge, which is to promote better dietary and physical activity patterns in African American women, the use of web-based nutrition education is a promising approach. Web-based nutrition education can ensure consistent delivery of nutrition and physical activity messages that can be available to these women wherever they may be through their laptops and smartphones. The broad-reaching implications of this approach truly deserve a much deeper inquiry through qualitative research methods.

Qualitative research is particularly relevant for health research that investigates human behavior and relationships, because it explores how and why people behave in certain ways.
Much of the work conducted in dietetics and nutrition education is aimed at changing people’s eating and physical activity behavior to improve their health.\textsuperscript{34} Despite the fact that the type of evidence produced by most qualitative research is not empirically generalizable, where the findings can be used to infer about the characteristics of a wider population, it can undoubtedly be theoretically generalizable.\textsuperscript{34} This means that the findings can be used to develop concepts, understand phenomena and theoretical propositions\textsuperscript{34} that are relevant to address the obesity epidemic in African American women from all over the U.S. territory.

The purpose of this study was to explore the views on healthy eating and physical activity of college-aged African American women in the U.S. Southeast area and identify key elements that should be included to design a culturally tailored web-based nutrition education program for this population.

**Methods**

**Study Population and Design**

Four focus groups with a total of 16 African American women from the Southeast area of the U.S. were conducted. Sessions ranged in duration from 30 minutes up to 70 minutes. Participants’ availability was taken into consideration to schedule the sessions, and all of them took place either on Thursday or Friday afternoon. The women were recruited via email with the help of the Office of Diversity of land-grant universities in the upstate area and received a $10 gift card as incentive for their participation.

**Focus Group Protocol**

Prior to the start of the session, a participant screening survey was administered in order to obtain basic demographics to characterize the target population for the program. This screening survey was based on the Client Enrollment Form utilized by the Expanded Food and Nutrition Education Program (EFNEP).
The focus group guide developed (Table 1.1) addressed three main topics: 1) questions concerning their perspectives on healthy eating and physical activity, 2) perceptions about their own eating and physical activity habits; and 3) questions about the features they would like to have in an ideal web-based nutrition education program. The questions stemmed from the study’s research questions and the protocol was designed based on Morgan and Krueger’s (1998) Focus Group Guidebook.  

Table 1.1. Focus Group Guide

<table>
<thead>
<tr>
<th>INTRODUCTORY QUESTIONS</th>
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<tbody>
<tr>
<td>1. Now, when you hear “eating healthy” what is the first thing that comes to mind?</td>
</tr>
<tr>
<td>2. When you hear “doing physical activity” what is the first thing that comes to mind?</td>
</tr>
<tr>
<td>3. Ok, so thinking on your definitions of eating healthy, do you think your own habits are healthy? Yes? No? Why?</td>
</tr>
<tr>
<td>4. And thinking on your definitions of doing physical activity, do you think your own habits are healthy? Yes? No? Why?</td>
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<tr>
<th>TRANSITION QUESTIONS</th>
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<tr>
<td>5. Current national statistics show that 4 out of 5 African American women in the United States are either overweight or obese. Why do you think this is happening? What else?</td>
</tr>
<tr>
<td>6. Have you ever participated in a healthy eating, weight loss or nutrition education program? If yes, could you share a little about your experience? If no, would you be willing to participate in one? Why yes? Or why not?</td>
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</tbody>
</table>

<table>
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<tr>
<th>KEY QUESTIONS</th>
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<tr>
<td>7. What would your ideal healthy eating, weight loss or nutrition education program look like?</td>
</tr>
<tr>
<td>8. Some programs out there offer features on mobile devices or through a website. How would you feel about participating in an online nutrition education program that you could access through your laptop or cellphone?</td>
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<tr>
<th>ENDING QUESTION</th>
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<tr>
<td>9. What are some of the things that you think should be included in that program that would make it more appealing to you and that are not currently being covered by any other program?</td>
</tr>
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</table>
Three sessions took place between the months of September and November 2014. The last session took place in March 2015. Additional probing questions were added to the focus group guide in order to uncover more detail on the participant’s opinions in terms of contents and duration of the program. This last session also served as corroboration that an appropriate level of saturation of information had been reached.

The screening survey data was compiled in Excel and distribution frequencies were obtained using SPSS. Two of the focus groups were conducted on campus and two on a community center near campus. Consent form signatures were obtained prior to each session and participants were given a copy for their own records. The sessions were recorded via a digital audio device and each had the presence of at least one trained note taker. In order to increase the reliability of the data the same moderator and note taker participated in all the sessions. At the end of the session, each participant received a $10 gift card as incentive for their participation.

Data Analysis

The moderator was in charge of transcribing the audio recordings. Each transcript was then simultaneously read through while listening to the audio recording to check for inconsistencies and ensure the highest level of fidelity to the session recordings.

For the focus group data analysis the qualitative software NVivo 10 (QSR International Pty Ltd. Version 10, 2014), was used to analyze the transcripts obtained from the focus group sessions. All transcripts and observations were uploaded to NVivo and saved in a single project. A coding list had been previously prepared, based on the most salient concepts of the Theory of Planned Behavior (TPB), the Social Cognitive Theory (SCT) and the Self Determination Theory (SDT). However, a new set of qualitative codes emerged and helped identify the key elements to design a web-based nutrition education program. Once the coding was completed, the Query Wizard function of NVivo was used to further investigate possible associations among the coded items. In order to have a quick visual representation of the results, conceptual maps were
created using the IHMC Cmap Tools (Institute for Human & Machine Cognition, version 6.01, 2014) program.

Results

Demographics

The screening survey data from the 16 focus group participants revealed that seven of them were full time students, while six were both students and employed, and three participants were employed but were not students. Regarding the highest level of education completed 11 women had "some college". The majority (15) of women were single and three of them had at least one child. The monthly income for six of them was between $500 and $800, while only two women reported monthly incomes above $1000. Thirteen of the participants had a smartphone and 12 had a laptop computer. All the women reported using some sort of social media, but the two most popular among them were Facebook and Instagram.

Focus Group Findings

The discussions led in the topics previously outlined in the focus group guide dealt with perspectives on healthy eating and physical activity, perceptions about their eating and physical activity habits and ideal features of a web-based nutrition education program. Underlying each of these topics and embedded throughout the whole discussion was the issue with motivation, making this one of the central themes that emerged, as summarized in Figure 1. 1. The complete categorization of nodes by their source of origin (Theory of Planned Behavior, Social Cognitive Theory, Self Determination Theory and emergent categories) with their corresponding number of references is displayed in Figure 1.2. All references from each of the categories were carefully read in order to identify the themes included in Figure 1.1, making sure that the analysis focused primarily on the concepts that better answered the study research questions.
Figure 1.1. Focus groups findings
A. Perspectives on healthy eating and physical activity

Variety

When asked what eating healthy meant, some of the most common answers were “eating a lot of fruits and vegetables” and “drinking a lot of water.” Participants had a clear notion that fruits and vegetables are part of a healthy eating plan, which had to be complemented by drinking enough liquids. They also mentioned whole grains, and protein as main components of healthy eating.
Balance and portion control

According to participants' comments healthy eating also meant balance and portion control. They tried to make sure they were not eating "the same thing everyday". They believed that eating what they want without over doing it and watching the sizes of portions is what makes their meals balanced:

... I also think like balanced eating, because you can't just eat vegetables or just eat protein, you have to have like an equal amount of everything so people may focus on just eating fruits and vegetables and like the protein side, but you got to have some carbs… having like the right amount so that you get everything for your body…

Sacrifice and restriction

The word and the notion of sacrifice were present in their definitions of healthy eating. Terms such as “no sweets”, “don’t eat anything”, “no bread” and “dieting” made reference to some of the things they believed they had to give up in order to achieve healthier eating habits. In regards to physical activity there was also a widespread notion of punishment. Many used the words “sweat”, “time”, “pain” when describing what doing physical activity meant to them. Overall, the participants also acknowledged that physical activity goes beyond doing “crunches”, “sports” and “cardio”, but also “dancing” and everyday chores or work related activities, such as “taking the stairs”, “walking to class”, “moving chairs” and “being standing on their feet all day”.

B. Perceptions on their eating and physical activity habits

The particular notion of restriction and punishment encompassing their views on healthy eating and physical activity was also present when talking about their own habits. The great majority admitted that their habits were not healthy, and gave several reasons to explain their situation, among them lack of motivation, the cost of healthy foods, lack of time, self-image issues, self-efficacy issues and environment-related issues.
Lack of motivation

The most predominant barrier for both eating healthy and physical activity was lack of motivation. It was the term with the biggest number of references across all the focus groups transcriptions, moderator notes and observations written by the note takers who participated in the sessions. For these women motivation was the key ingredient when it came to making better choices that would impact their lifestyles:

… And then you have a long day in class and at work you don’t want to do anything, just want to go home, get a bowl of cereal and go to sleep…

Many of them mentioned that having support from a friend, relative or a trainer would be the only way to get them started towards achieving a healthier life:

… That helps when it’s a group of people cuz that means you have someone there to push and motivate you… so I was… if I were able to do that again I would definitely do it… because it helps…

… Someone who can listen to you and who you can contact on a regular basis, who can be there and say: it’s ok, to help them and tell them not to worry about it… I guess just having like that mentor and friend for support because when you’re doing it by yourself there are so many things you don’t pay attention to… so you just need that extra push…

Cost of healthy foods

Some of the women mentioned the cost of having healthier habits, and how healthy food options were not always the cheapest:

…Well, in general like the healthy food like Subway… they don’t have a Dollar Menu… So that’s why I don’t really choose them… you know… they don’t have… I mean, they definitely have the healthy alternatives which is good, but as far as price… it’s not cheap…

Not only do they thought that the healthy food options were more expensive, but also that they lacked the ingredients that make food taste good:
... The only thing is... they’re marketed as being healthy, but the only thing that is healthy is when you get all veggies... when you start adding the meats and packing on to that it just isn't good (healthy) eating...

Lack of time

One of the barriers to exercise expressed by participants was lack of time. As college students, they have a number of obligations to attend and doing physical activity is not one of their priorities:
... I feel like it’s based on that we are now in college and you know, we don’t have time to go to the gym everyday... I don’t have time...

Self-image

Based of the impressions gathered from the focus group sessions these African American women do not believe in national statistics that state that about 80% of them are overweight or obese. They thought that the BMI standard used for these studies does not apply to their body types, since BMI doesn’t account for total body composition:
... That doesn’t apply with women of color anyway... I don’t like going by... BMIs or national statistics... because the way that measurement is does not account for how much muscle do I have...

They also believed that BMI doesn’t account for the diversity in shapes and sizes within the African American female community, and so it should not be taken as a standard for categorizing people as healthy or unhealthy:
... I might be classified as overweight even though I’m healthy because I have... some extra weight in places where... you just got extra weight... you know, your arms, your legs, everything is big... your thighs, your waist...

Another salient comment in the discussions was not having someone who would set the example and helped them modify their habits or make healthier choices. Some of them had to figure out on their own that they were unhealthy and needed a change:
… So it didn’t hit me I guess… until I got to college and gained more weight and I was like…

wow… I’m pretty… big… so it took me like realizing it personally like I was big, but being obese

when you see other people around you, you don’t have a problem with it or don’t say anything

about it or bring your attention to it, it makes you feel like it’s okay… so like… I was obese, but

nobody ever told me like oh… you’re getting kinda big, nobody ever said anything so to me it

seemed ok…

Self-efficacy issues

Many of these women still need simple guidance on how to incorporate healthy habits in

their lives, by learning skills such as how to cook or fix quick snacks, strategies to eat out or while

they’re traveling, and how to start a simple physical activity routine. These are all skills that they

know they are lacking and keeping them from making healthier choices:

… I just sometimes don’t know how to cook some stuff and like… I might go get a hamburger; you

know something fast, just some type of fast food, like the dollar menu that doesn’t cost a lot of

money…

… If you travel too… like I always eat out when I travel… it’s really bad…

… It is kinda hard to just jump into something if you don’t know what to do or where you’re

going…

Environment-related issues

The family environment and group of peers play a key role in the food and physical

activity habits of these African American women. Many admitted that following their home

traditions and customs when it comes to food choices can put them off track of their regular

eating practices:

… When I’m at home is where I eat unhealthy and stuff… it’s rough to eat healthy and my

parents… they like everything so that’s what they buy… when I’m here I have my option whether I

want to buy pork ribs or I don’t… so if I don’t have it in there I don’t really think about it or not

typically go overboard… back home they just got everything… I mean, not that they don’t care
about healthy eating, but they got discipline in them so they buy it and not eat it… I eat it as soon as I buy it…

Also, they mentioned their tendency to go with the flow, especially when nobody really tells them they need to make better choices:

… So if nobody is bringing your attention to it or pointing it out, or your friends are eating the same stuff that you’re eating, your family is eating the same stuff that you’re eating, you don’t see like what’s the difference between me and them, even though they may be smaller or even bigger… especially if they’re bigger it’s kinda like… oh… well, it makes you feel like you’re doing the right thing or that you know… you’re okay…

… Growing up, if you don’t… if that example is not set for you at home and stuff like that… or your peers…. Ummm… you won’t do it… unless you make that change…

They also mentioned how they perceived their environment as a barrier to exercising regularly and how unsafe they feel doing physical activity outdoors:

…it’s just the society we live in… we don’t workout outside… we just don’t do that… and we just have to find ways to work around that… you know the barriers…

The environment definitely plays a very important role in determining the food and physical activity habits of African American women, and it’s an element that must be tied in to every nutrition education intervention for this population.

C. Features of ideal web-based nutrition education program

In addition to discussing their definitions of eating healthy and physical activity, examining their own habits and reflecting on self-image perceptions; focus group participants also gave ideas in regards to components that should be part of a web-based nutrition education program. In terms of the online delivery of the program through a laptop or cellphone, the women were very open to the possibility of having access to an interactive program through a device they use on a daily basis. Among the most important features they would like to have in the program were
peer/expert support, cooking and grocery shopping tips, gradual lifestyle changes and individual/budget tailoring.

Peer/expert support (motivation)

The component that was present in all focus groups was peer and expert support, and there was consensus in the fact that it would be one of the best ways in which they would actually get motivated to start and continue to make healthier choices:

…I would need support… that is a really big thing with me cuz… you know… after five days I'd be like this isn't working, I quit…

… In order to motivate me I need a partner… Gotta have somebody to communicate with… to keep it going…

… And also include support, where you can see people that have gone through what I’m going through so that you can say if she did it I can do that…

Cooking and grocery shopping tips

The second component that was predominant was including recipes, cooking and grocery shopping tips. This would help them increase their self-confidence and self-efficacy, and would prevent them from relying so much on fast food options:

… It needs to have a cooking course or aspect to it… Because… even if you know a lot about health… if you don’t know how to get, or find or make those things connected to it… you’re kind of at a loss…

… Knowing how to take foods and make different things with them…

… Just give us like options of what to eat and what not to eat… just give us some good options to eat…

… Just that kind of stuff like food alternatives for like cooking methods…
Gradual lifestyle changes

The third component most highlighted by the women was that the program allows them to have gradual lifestyle changes, realistic and with short-term goals:

... Yeah, something that fits your lifestyle... Just like was said something that’s like short term is something I could get used to and it wouldn’t be hard to... do...

... Nothing like too harsh in the beginning...

... Not doing drastic changes...

... I guess working on short-term goals...

... To me like, it has to be oriented to lifestyles, so that you’re not doing all that hard work and then stopping... and have like... something to help you achieve that consistency...

Individual/budget tailoring

The fourth predominant component suggested during the focus group discussions was to have a program tailored to the individual and their personal budget:

... It should try to be based on the individual as possible. Make the person feel like it’s for them...

... You have different types of people so you have to... tailor from the beginning...

... That would be pretty awesome... kinda just ask them like what is their weekly shopping budget... Cuz you have some people who have like thirty dollars when they go in there and you have some people willing to spend a hundred per week... and you get different stuff for the thirty dollar budget, versus the hundred dollar budget...

Discussion

This study explored college aged African American women’s views on eating healthy, physical activity, perceptions of their own habits and features they would like to have in an ideal web-based nutrition education program. Despite of the differences in opinions and views there were clear themes in participants’ responses, which indicated that an appropriate level of saturation of the information had been reached with four focus groups. The main goal of these
discussions was to identify elements that would make this population feel engaged in a culturally tailored web-based intervention aimed at influencing their intention to change, as is described in the Theory of Planned Behavior (TPB).

Nonetheless, during the focus group analysis, particular constructs belonging to the Self Determination Theory (SDT) and the Social Cognitive Theory (SCT) were identified. From SDT the need for relatedness, which involves feeling connected, supported or feeling that one belongs \(^37\); and from SCT the construct of self-efficacy, which is the confidence in one’s ability to take action and overcome barriers, and reciprocal determinism, which is the dynamic interaction of the person, behavior, and the environment in which the behavior is performed. \(^37\) The aforementioned concepts will also be used to describe some of the comments made by the women who participated in the sessions.

In terms of their perspectives on healthy eating and physical activity the comments indicated that they had a good understanding of what eating healthy entails, such as variety, balance and portion control. They also saw eating healthy as something that can be adapted to personal preference and budget.

However, the idea of sacrifice, restriction and punishment was also present, not only for eating healthy, but also when describing what physical activity meant to them. These negative views (or attitudes) might give some insight into why it may be harder for African American women to achieve significant changes when participating in healthy lifestyle interventions. \(^6\)

Consequently, these same negative attitudes carried on to the perceptions they expressed about their own habits. Most admitted that their eating and physical activity practices were not healthy, while at the same time offered their main reasons to be in that situation, such as the cost of healthy foods, lack of cooking skills (or lack of self-efficacy), eating out too often and living in an environment that does not promote healthy habits.

Family traditions and peer group also seemed to shape their perceived norms regarding eating and physical activity habits, as well as motivation, in both positive and negative ways, which can be described as reciprocal determinism. Some of the participants have families where eating healthy was made a priority and while they were back home they fell into that same
routine; the same occurred with their peers, who could motivate them to do more exercise. On the contrary, some other women had families where everyone was heavy set and no one worried about the quantity and quality of what was consumed; and had friends that did not care about eating healthy or exercising either.

Another way in which the family and group of peers could influence both positively or negatively African American women’s perceived norms was in regards to their self-image views. If their family and friends did not consider being overweight or obese as a problem it made it much harder for them to realize that they might need to change their eating and physical activity habits in order to achieve a healthier life, and avoid some of the chronic diseases that have been well documented to be growing at staggering rates among the African American community (especially females), such as diabetes, hypertension and heart disease.

Pertaining to the features desired in a web-based nutrition education program the most salient component was support (either from an expert or a peer) or need for relatedness, meaning that people were more likely to adopt values and behaviors promoted by those to whom they felt connected with and in whom they trusted. According to Ryan and Deci (2000), motivation concerns activation and intention, so both TPB and SDT point at the fact that support would be one of the key components to modify African American women’s intention to change their eating and physical activity behaviors.

The second component dealt with their cooking skills, or as TPB and SCT describe it, their self-efficacy. The results suggested that the nutrition education program must have a cooking or recipe component, so that African American women could increase their cooking skills and, by realizing they can actually prepare healthy meals, they could decrease the frequency of meals they consumed outside the home.

The self-efficacy construct is also present on the third component, which is gradual lifestyle changes and short-term goals, which implies that the nutrition education program would have to approach behavior change in small steps to ensure success, and be specific about the desired change. The fifth component, addressing self-image and confidence issues would also
fall into self-efficacy, by making sure the nutrition education program also targets African American women's confidence in their ability to overcome barriers.

The fourth component, tailoring to the person and their budget, touched upon the cultural tailoring and relevance of the program, which can be achieved, according to Grimes and Grinter (2007), when an intervention designed for a specific group reflects an understanding of the group’s particular needs, beliefs, norms and behaviors. Although this cultural relevancy cannot automatically guarantee the success of the program, understanding of these cultural dimensions will increase the likelihood that the intervention is culturally meaningful to the target population. 40

The web-based delivery of the program would appear to be well accepted by this population. Most of the participants mentioned that having something available, especially on their phones, would be a great aid to motivate them to make some lifestyle changes. Since it is an avenue that has not been fully explored yet, and considering the increasing access and use of smartphones and laptops among African American women, the use of technology to promote healthy eating and physical activity among college aged African American women can certainly be a promising approach.

Implications for Research and Practice

Findings suggest that a culturally tailored web-based nutrition education program would be well accepted among college aged African American women in South Carolina. This population expressed that the cost of healthy food, the lack of time and motivation and their living environment were some of the biggest barriers to healthier habits; while support (from family, experts or peers) and working with short term goals were perceived to be the biggest facilitators for achieving healthier eating and physical activity habits.

In order to fully understand which of the aforementioned factors would significantly influence their intention to change and motivation, the TPB would serve as an ideal foundation for the theoretical framework. Additionally, particular constructs from the focus groups analysis such
as the need for relatedness from SDT, and self-efficacy and reciprocal determinism from SCT, would also need to be included to make the intervention’s theoretical framework more robust.

The health disparities are certainly alarming among African American women, while at the same time the use of technology is growing at a fast pace and becoming more popular within this community. The design of a culturally tailored web-based program to influence their intention to change eating and physical activity behaviors does represent many challenges, but also constitutes very promising approach to promote and deliver nutrition education to this population.
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CHAPTER THREE
MANUSCRIPT 2

DEVELOPMENT OF A WEB-BASED NUTRITION EDUCATION PROGRAM FOR COLLEGE AGED AFRICAN AMERICAN WOMEN: A STEPWISE THEORY-BASED PROGRAM PLANNING MODEL

Introduction

Several comprehensive reviews of the effectiveness of nutrition education have concluded that nutrition education is more likely to be effective if it is based on clearly articulated theory. Nutrition education can be a factor in improving dietary practices when changing behavior was clearly specified as a goal, when appropriate educational methods were used, when individuals themselves were actively involved in problem solving, and when an integrated community approach was used. Yet, many published reports of nutrition education research and interventions do not systematically use behavior change theory.

Theory has been defined as a series of interrelated concepts that present a systematic view of events by specifying relations among variables to explain and predict the events. Given that theory describes events and explains relationships by organizing principles and concepts, theory-driven research has the potential to greatly improve the effectiveness of nutrition education. When an educator ignores behavior change research in designing an intervention, it weakens the research base of the planned education, because there are no standard procedures in place to evaluate the impact of the intervention. Conducting nutrition education requires considerable resources in terms of time, money, and personnel, which are all usually in short supply. If theory is the interpreted summary of evidence, presented in the form of a conceptual map, then theory is needed as guidance otherwise the work would rely on the subjective experience of the researcher. Theory is dynamic rather than static, as empirical
testing of theories over time should lead to changes, refinements, and improvements to a theory that increase our ability to understand a given phenomenon.  

The gap between theory and practice is rather difficult to bridge, mainly because effective practice depends on using theories and strategies that are appropriate to a situation. It is also well accepted that effective nutrition education programs are informed by theory, research and practice. The actual process of how to design nutrition education using these three interrelated elements still remains a mystery to many health promotion practitioners and researchers, because health practitioners must first understand the characteristics of their target population (e.g., ethnicity, socioeconomic status, gender, age, geographical location and health issues) to use these three components correctly. Applying evidence-based concepts may intuitively seem appropriate but exactly how they inform the program elements for a specific target audience and program is often vague. Thus, when an intervention program results in weak findings, conclusions cannot be drawn as to whether the lack of findings was due to a lack of theoretical fidelity or to threats to study validity.  

A health promotion program is most likely to benefit participants and communities when it is guided by social and behavioral science theories of health behavior and health behavior change. Since the body of evidence on health and behavior is generally much stronger than for behavioral determinants, it is often necessary to conduct additional research to further explore the determinants of target behaviors. Bartholomew et al. (1998) also posit that all problems may profit from a multi-theory approach, on condition that these theories are applied appropriately and correctly. Moreover, many theories are potentially applicable to behavior at various levels: individual, interpersonal, organizational, community and society, adoption and implementation.  

In other words, health promotion is a planned activity. Planning models serve as a blueprint for building and improving intervention programs. They instruct the practitioner about which theory or theories should be used and when and how they should be applied. A widely used health promotion design framework is Green and Kreuter's (1999) PRECEDE/PROCEED model. The PRECEDE model starts with analyses of quality of life, health behavior and
environmental factors, and predisposing, reinforcing and enabling determinants (correlates) of behavior and environmental factors. In PROCEED a health promotion intervention is developed, implemented and evaluated. 41 This is a popular model, nonetheless, one of the biggest critiques towards this and other planning frameworks for promoting health is that they are not designed to provide information on the specifics of how to actually design educational group sessions and interventions that use theory variables. 39 The Stepwise Procedure developed by Contento (2011) provides a planning framework specifically for nutrition education and shows how to incorporate theory variables into the planning process. 39 For this reason, the Stepwise Procedure was the model used to plan the nutrition education program used in this study. The purpose of this manuscript is to offer an overview of how a theory-driven approach to program planning was used to inform and guide the development of a web-based nutrition education program for college aged African American women.

Description of the intervention

The Online Nutrition Education for Sisters (ONES) program was designed and implemented using the Stepwise Procedure for Designing Theory-Based Nutrition Education proposed by Contento. 39 It consists of 6 steps. Step 1, involves the analysis of issues of concern and needs to state program behavioral goals. In step 2, theory and evidence are used to identify mediators of targeted behaviors (why do people do what they do and how do they change); step 3, is selecting a theory or model to guide program, clarifying philosophy and choosing components; step 4, is stating objectives for mediators; step 5, is designing theory-based strategies and practical activities to address mediators; and step 6 is planning the theory-based evaluation. 39 This manuscript will focus mainly on steps 1 through 5 since the evaluation will be thoroughly discussed in a subsequent manuscript; however, a brief overview of the evaluation is presented.
Step 1. Assessment of Needs, Interests and Assets of the audience

According to the United States (U.S.) 2010 census, African Americans represent 13% of the U.S. population and are the second largest ethnic minority group in the country. \(^1\) A vast majority (80.5%) of African American women are either overweight or obese. As a result, they are more susceptible to a number of weight-related health issues, including high blood pressure, high cholesterol, arthritis, stroke, heart disease and diabetes. \(^{26-25}\)

Furthermore, evidence exists that interventions are having less impact on the African American population based on research from several randomized clinical trials demonstrating that African American women achieve smaller weight losses than White peers exposed to the same interventions and that trajectories of weight loss differ for African American and Whites. \(^{18}\) These findings suggest that programs designed to promote behavior change elicit lower levels of adherence in African Americans than Whites. \(^{23}\) Concern has arisen that this weight focused paradigm is not only ineffective at producing thinner, healthier bodies, but also damaging, contributing to food and body preoccupation, repeated cycles of weight loss and weight regain, distraction from other personal health goals and wider health determinants, reduced self-esteem, and weight stigmatization and discrimination. \(^{46}\) Emphasis on health benefits achieved through modest weight losses may be more appropriate when motivating Black women to lose weight than stressing issues of ideal weight or attractiveness. \(^4\) This also indicates that nutrition educators and other health professionals focused on improving diet-related behaviors may need to address motivational issues \(^{24}\) and shift the focus from weight management to health promotion. \(^{46}\)

Brug (2005) outlines three criteria for effective nutrition education. First, attention should be given to motivators and reinforcements that are personally relevant to the people in the target group; second, personalized self-evaluation or self-assessment techniques should be employed; and third, people in the target group should have the opportunity to actively participate in the intervention. \(^1\) These criteria were explored in this study during the focus group phase (formative evaluation).
The focus groups used in this study were conducted with college aged African American women in the U.S. Southeast, to explore the eating and physical activity habits of African American women, facilitators and barriers that might influence their intention to change and also to get a better idea of what features they would like to have in a web-based nutrition education program. The focus group protocol was previously described in chapter 2.  

Based on the focus group data there were several identified barriers and facilitators that could influence the women’s intention to change their behaviors. Barriers included the cost of healthy foods, lack of time, lack of motivation, self-image issues, lack of cooking skills and the intimidating atmosphere at the gym or while working out outdoors. The most significant facilitator was social support, either from their family (for those women whose families have healthy habits) or their group of peers.

The key elements for a successful web-based nutrition education program included individual tailoring, gradual lifestyle changes, cooking and grocery shopping tips, and peer and/or expert support, as their main sources to achieve motivation to change.

The demographic data also suggested that most African American women have access to a laptop, a smartphone and social media. As Parker Grimes (2008) argues, few researchers have examined how technology might address some of the health disparities that exist in the U.S., which would make a web-based intervention a novel approach to develop, deliver and to study. The Internet enables a swift and inexpensive distribution of content to help professionals prepare and develop nutrition education materials. It also can be used as a channel to easily distribute nutrition education information and to make nutrition education more available and accessible, and at the same time tailored to a target population.
Step 2. Selecting the Theoretical Framework

Several theories from the behavioral and health sciences have been used in designing nutrition education investigations and interventions. This study includes Theory of Planned Behavior (TPB), Social Cognitive Theory (SCT) and Self Determination Theory (SDT). The combination of these three theories addresses individual, behavioral and environmental factors that could influence behavior change in college aged African American women.

Theory of Planned Behavior (TPB)

The Theory of Reasoned Action (TRA) and the Theory of Planned Behavior (TPB) focus on theoretical constructs concerned with individual motivational factors as determinants of the likelihood of performing a specific behavior. TRA was developed by Fishbein (1967) to better understand relationships between attitudes, intentions and behaviors. Ajzen and colleagues (1986) added perceived behavioral control to TRA to account for factors outside of individual control that may affect intentions and behaviors, so TPB is an extension of the TRA. TRA and TPB both assume the best predictor of a behavior is behavioral intention, which in turn is determined by attitude toward the behavior and social normative perceptions regarding it.

Attitude is determined by the individual’s beliefs about outcomes or attributes of performing the behavior (behavioral beliefs). Similarly, a person’s subjective norm is determined by his or her normative beliefs, or whether important referent individuals approve or disapprove of performing the behavior, weighted by his or her motivation to comply with those referents. Perceived behavioral control is determined by control beliefs concerning the presence or absence of facilitators and barriers to behavioral performance, weighted by their perceived power or the impact of each control factor to facilitate or inhibit the behavior. Self-efficacy has been viewed as a construct conceptually related to perceived behavior control. Self-efficacy is defined as a person’s belief in his/her capabilities to achieve different levels of performance attainment.
Social Cognitive Theory (SCT)

Social Cognitive Theory (SCT) serves as a useful rubric for explaining the etiology of the behavior and for helping identify behavior change activities. Building on previous theorization and research by Miller and Dollard (1941) and Rotter (1954), SCT was first known as Social Learning Theory, as it was based on the operation of established principles of learning within the human social context. It was renamed Social Cognitive Theory when concepts from cognitive psychology, sociology, and political science were included. SCT posits that environmental, individual, and behavioral factors work in a dynamic and reciprocal interaction to influence behavior, including health habits. The environmental factors include the physical, social, cultural and normative environments. The individual level factors include elements that reflect one’s knowledge and motivations towards specific behaviors, including dietary behaviors. The behavioral factors are those that directly affect the enactment of the behavior, incentives and reinforcements, behavioral skills and intentions.

Self-efficacy is found in both TPB and SCT and has been identified as an important predictor of health behavior and relates to one’s confidence in his or her ability to perform a specific behavior. One key factor that can influence intention to change in African American women that was identified through the needs assessment was motivation, which is thoroughly explored in Self-Determination Theory (SDT) postulated by Ryan and Deci (1985).

Self-Determination Theory (SDT)

SDT is an approach to human motivation and personality that uses traditional empirical methods to investigate people’s inherent growth tendencies and innate psychological needs that are the basis for their self-motivation and personality integration, as well as for the conditions that foster those positive processes. SDT identifies the need for competence, relatedness and autonomy as essential needs for facilitating optimal growth, integration, constructive social development and personal well being. Motivation concerns energy, direction and persistence, which are all aspects of activation and intention, which makes it a good fit to complement TPB and SCT. Based on the focus group results, one of the most salient mediators of behavior change...
for the women is the need for relatedness, which also translates into one of the key features they would like to have in an ideal web-based nutrition education program, which is social support.

**Cognitive Load Theory (CLT) and Multimedia Learning (ML)**

Consequently, the online delivery of the nutrition education program makes necessary the inclusion of the key principles of Instructional Design (ID) and Multimedia Learning (ML), coupled with TPB, SCT and SDT that come from the health promotion realm. Multimedia instruction refers to presentations involving words and pictures that are intended to foster learning. According to Mayer (2009), people learn better from words and pictures than from words alone. Further, according to Mayer’s modality principle, better learning occurs when words are presented as narration rather than on screen text.

One of the most renowned instructional design (ID) theories to better understand how people learn is the Cognitive Load Theory (CLT), proposed by Sweller and colleagues (1985). The basic premise of CLT is that learners have a subset of the memory system called working memory. The working memory, where thinking and learning occur, has an extremely limited capacity when processing new information, and if not rehearsed, this new information is lost within about 15 to 30 seconds. Another important characteristic of working memory is that its capacity is distributed over two, partially independent processors. This dual processing assumption suggests that there are two separate channels for processing visual and auditory information. The implication of this dual-processing model is that working memory capacity can be effectively expanded by utilizing both visual and auditory channels rather than one channel alone. Information held in long-term memory, another memory subsystem is organized and stored in the form of domain specific knowledge structures known as schemas. Schemas categorize elements of information according to how they will be used; thereby facilitating schema accessibility later when they are needed for related tasks.

According to CLT, three different types of cognitive load can be distinguished: intrinsic cognitive load, extraneous cognitive load and germane cognitive load. Intrinsic load refers to the number of elements that must be processed simultaneously in working memory for schema
construction. Extraneous load is the result of instructional techniques that require learners to engage in working memory activities that are not directly related to schema construction (e.g. unnecessary sounds and animation in a PowerPoint presentation); and germane load is the result of effective cognitive processes such as abstractions and elaborations that are promoted by the instructional presentation. In other words, one of the goals of the web-based nutrition education program design is to reduce the extraneous load and enhance the germane load, using the basic principles of ML.

According to Mayer (2009), there are six main principles for reducing extraneous processing: coherence, signaling, redundancy, segmenting, spatial contiguity and temporal contiguity. Coherence techniques involve deleting extraneous words, sounds, and pictures from a multimedia lesson. Signaling involves highlighting the essential words and pictures in a multimedia lesson. Redundancy techniques involve removing redundant captions from narrated animations. Segmenting involves breaking down large pieces of information into smaller ones to avoid overwhelming the learner with too much information at once. Spatial contiguity involves placing words next to corresponding graphics on the screen so the learner does not have to unnecessarily scan the screen, temporarily reducing attention. Temporal contiguity involves presenting corresponding narration and graphics simultaneously rather than sequentially. These techniques are intended to help learners use their cognitive capacity for essential and generative processing.

These are two examples of how CLT and ML theory were used in hopes that better learning would occur: the web-based nutrition education program included segmenting, since it was delivered in 6 modules, each one with a specific topic and each topic was divided into 4-6 sections each in order to avoid saturating the participants with too much information. Temporal contiguity was included by synchronizing the time each slide was presented with the length of the narrations. Lastly, the personalization effect was applied to the narration; the script was written with a conversational tone in order to increase the learner’s engagement.

The web-based nutrition education program focused on a sensory modality view, not only because of its learner-centered approach, which concentrates on adapting multimedia to enhance
human learning; but also because it involved presenting material that is processed visually and auditorially. In short, the sensory-modalities view of multimedia was consistent with a cognitive theory of learning that assumes humans have separate information-processing channels for auditory and visual processing, and when both channels are used, better learning occurs.

In summary, the design of the web-based nutrition education program for college aged African American women was guided mainly by TPB, which at the same time was supported by SCT, SDT, CLT and ML.

**Step 3. Determining Theory-Based Goals and Objectives**

**General Educational Objectives**

- Behavioral intention (TPB): At the end of the program, the women will be able to demonstrate increased intention to improve their eating and physical activity habits.

- Perceived behavioral control (TPB): At the end of the program, the women will be able to identify some of their own barriers to eating healthy and doing physical activity.

- Self-efficacy (SCT): At the end of the program, the women will be able to apply a variety of strategies to eat healthy and exercise regularly.

- Need for relatedness (SDT): At the end of the program, the women will be able to connect with a peer or friend who can motivate them to continue to eat healthy and exercise.

**Specific Educational Objectives**

According to Contento (2011), people are more likely to take action or make changes in their lives if they participate in activities that engage their heads, hearts, and hands. Thus, effectiveness of nutrition education is improved if nutrition educators design learning experiences that fully engage participants by providing opportunities for thinking (head), feeling (hearts), and doing (hands). This correlates well to Bloom’s taxonomy (1956), a learning model used in Education, as it categorizes learning objectives into three domains: cognitive, affective and
psychomotor. Cognitive domain objectives aim to promote abilities in thought, understanding, and cognitive skills. Affective domain objectives aim to promote changes in attitude, feeling or emotion. Psychomotor domain objectives aim to promote improvement in physical or manipulative skills.  

The following are the specific objectives for the web-based nutrition education program:

Students will be able to:

- List the different food groups; identify foods belonging to each group and their corresponding serving size (Cognitive domain, level of thinking: knowledge).
- Describe the benefits of physical activity and identity ways to increase it in their daily life (Cognitive domain, level of thinking: comprehension).
- Categorize food groups based on the MyPlate distribution (Cognitive domain, level of thinking: application).
- Distinguish the components of a Nutrition Facts panel and how to use it to make healthier eating choices (Cognitive domain, level of thinking: analysis).
- Plan a food budget and grocery-shopping list to get the most value for their money (Cognitive domain, level of thinking: synthesis).
- Apply simple guidelines to prepare healthy and flavorful meals (Cognitive domain, level of thinking: application).
- Identify, share and discuss strategies to manage their weight and keep it in check (Affective domain, level of affective engagement: responding).
- Practice easy workout routines and healthy recipes at home (Psychomotor domain, level of psychomotor skills: practicing)

Step 4. Designing the Theory-Based Nutrition Education Intervention

The major task in translating theory into practice was to design, sequence, and deliver theory-based educational strategies in such a way as to achieve the behavioral goals and educational objectives outlined for the program.
The first step in the intervention design was creating a name that was easy to remember and that related to the content, delivery mode and target population. Thus, the Online Nutrition Education for Sisters (ONES) program was created. The slogan for the program “Providing access to a healthier you” also makes a direct reference to the delivery mode of the intervention and the program’s philosophy.

The second step was the selection of topics and sections for each of the online modules. The focus groups results served as a very useful resource to guide this decision, as well as the instructional design principles. James’ Right Size for Me: Weight Management Guide for African American women published by the Academy of Nutrition and Dietetics (AND) was also consulted to ensure the cultural appropriateness of the content.

The topics are as follows:

1. Back to basics-part 1: nutrition basics
2. Back to basics-part 2: physical activity basics
3. It’s all about Quality and Quantity: MyPlate and Food labels
4. Grocery shopping: how to buy healthy food on a budget
5. Cooking healthy: how to fix quick, healthy, delicious and inexpensive meals
6. Weight management: tips for losing weight and keeping it off

Additionally, each module was divided into 4-6 sections, following the aforementioned theoretical guidelines of CLT and the ML principles (segmenting). The main goal was to avoid creating sources of extraneous cognitive load.

The sections for each module are outlined in Table 2.1.
Table 2.1. Sections of the ONES Program

<table>
<thead>
<tr>
<th>Back to basics-part 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Healthy eating as part of a healthy lifestyle</td>
</tr>
<tr>
<td>b. Food groups: Vegetables</td>
</tr>
<tr>
<td>c. Food groups: Fruits</td>
</tr>
<tr>
<td>d. Food groups: Proteins</td>
</tr>
<tr>
<td>e. Food groups: Whole grains</td>
</tr>
<tr>
<td>f. Food groups: Dairy</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Back to basics-part 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Physical activity as part of a healthy lifestyle</td>
</tr>
<tr>
<td>b. Physical activity and its benefits</td>
</tr>
<tr>
<td>c. Recommended levels of physical activity for sisters</td>
</tr>
<tr>
<td>d. What can I do to move more?</td>
</tr>
<tr>
<td>e. Keeping track of how much I move</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>It’s all about quality… and quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. MyPlate distribution</td>
</tr>
<tr>
<td>b. What is a Nutrition facts panel?</td>
</tr>
<tr>
<td>c. Components of a Nutrition facts panel</td>
</tr>
<tr>
<td>d. How to read a Nutrition facts panel</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Grocery shopping</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Make a food budget</td>
</tr>
<tr>
<td>b. Make weekly menus</td>
</tr>
<tr>
<td>c. Make a shopping list</td>
</tr>
<tr>
<td>d. Get the most value for your money</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cooking healthy</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Reduce fats</td>
</tr>
<tr>
<td>b. Reduce salt</td>
</tr>
<tr>
<td>c. Alternative cooking techniques: steaming, grilling, sautéing and baking</td>
</tr>
<tr>
<td>d. Add flavor with herbs and spices</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Weight management</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Eat smaller portions</td>
</tr>
<tr>
<td>b. Choose healthy snacks</td>
</tr>
<tr>
<td>c. Don’t skip meals!</td>
</tr>
<tr>
<td>d. Watch what you drink</td>
</tr>
<tr>
<td>e. Get moving!</td>
</tr>
</tbody>
</table>
The third step was content development. The majority of the content was adapted from AND’s weight management guide for African American women. In order to comply with copyright laws, proper written authorization to use the guide was obtained from the Academy prior to including any of its material in the modules. This guide mainly served as model to create the scripts for the modules and make sure that the language was colloquial and easy to understand. Online resources such as the USDA and FDA websites were also consulted to gather the necessary material for each online lesson. Among the strategies implemented for potential mediators of behavior change used there was persuasive communication about positive outcomes (outcome expectations), information about perceived benefits of taking action or motivators with personal meaning for the target audience (perceived benefits), decrease perception of barriers or negative outcomes (self-efficacy and perceived barriers), awareness of social norms and social expectations (social norms), choice among actions, resolving resistance and ambivalences (behavioral intention). 39

The fourth step was the visual design of the modules. Power Point slides were created for each topic, with their corresponding visuals. A 1-month subscription to an online stock photo service was purchased in order to include high-quality images that better represented the African American female community. There was constant revision in order to make sure that the principles of ML to reduce extraneous processing (coherence, signaling, redundancy, spatial contiguity and temporal contiguity) were being properly followed.

The fifth step involved the audio design for the modules. Once the Power Point slides were developed and revised, they were imported into Adobe Captivate 8 ® (8.0.1, 2014), an application used to develop screen-captured videos. For each module, a script with the complete narration for each topic was developed and revised; making sure it had a proper conversational tone (personalization effect from ML theory) that could enhance the engagement of the learners with the material presented. All the audio was recorded directly into the modules using the audio recording feature available on the Captivate 8 platform. Visual effects were added at this point to match the audio and revised to check their accordance with the ML principles of signaling, spatial contiguity and temporal contiguity.
The sixth and last step was launching the modules as videos on mp4 format. Feedback from expert reviewers was received during each step of the module development process.

Step 5. Implementing the Nutrition Education Intervention

Behavioral theory proposes that progress toward engaging individuals in an action or practice will not occur simply because individuals judge that the behavior or practice is highly desirable and feasible. In her book, Contento (2011) posits that motivation alone is not sufficient to initiate health-promoting personal change and that evidence suggests that there are two major approaches to bridging this gap. First, nutrition educators can provide relevant knowledge and skills and assist individuals to strengthen their self-regulation skills, particularly the skill of setting goals. Second, educators can integrate supportive social environments, which according to SCT and SDT can increase the likelihood that the desired action is accomplished.

ONES consists of 6 online modules, comprising a 6-week long intervention. The modules are complemented with online resources for healthy recipes and easy to follow workout videos featuring African American women. Participants cover one module each week and are expected to cover all activities related to it in order to move to the next topic.

The following deliberations were put in place in order to launch the pilot testing of ONES:

• A land-grant institution of the U.S. Southeast area was selected for the pilot implementation of the program. Recruitment of participants was made through the institution’s email.

• The program was offered as a 1-credit course at the start of the academic year, in order to offer an incentive for participation and attract a larger study sample. The course was free of charge for full time students (taking 12 credits or more). In order to ensure an appropriate level of engagement with the course a grade was given for every module and survey completed by the student. Final grades for the course were based on the number of completed modules and surveys during the 6-week course.
• Two sections of the course were offered in order to have a control and treatment group. Participants were randomly assigned to either the treatment (section 004) or control group (section 005). The element of motivation that emerged from the focus group analysis served to establish the treatment condition for the study. Besides the weekly workout videos and recipe links the intervention group had access to a motivational video featuring African American women promoting healthier lifestyles and exercising either in groups or by themselves. They also had access to a forum called Sister Talk, where they could share impressions on the materials and give each other support. Participation on the forum was optional. The control group had access to the modules, workout videos and recipes, but they received no other motivational component during the duration of the course.

• Blackboard®, the institution’s content management platform was used to upload all materials. The modules were uploaded to YouTube and subsequently embedded in Blackboard for easier access. Students could access the resources either through their laptop or smartphone and had the option to complete the modules whenever was most convenient for them.

• The program evaluation tools were developed on Qualtrics, an online survey creation tool, and sent to the students via email, in order to control the data collection process and keep track of response rates for each one.

Step 6. Evaluating the Nutrition Education Intervention

Contento’s Stepwise Procedure (2011) serves as a way to translate theory into intervention practice and to provide ways to implement theory. In general, with the word value embedded in the term evaluation, it is not surprising that a simple definition of the term is that evaluation is the process of determining the value or worth of an enterprise. Consequently, evaluation serves research purposes, program evaluation purposes, or both.
For research purposes, nutrition educators investigate whether and how interventions influence potential mediators and how mediating variables influence nutrition behavior so that they can learn exactly how and why interventions do or do not work. Such understandings can be incorporated into evidence-based theory to enhance the effectiveness of nutrition education. 39

Evaluation can serve many purposes and for the ONES program it was important to determine whether the goals and objectives of the nutrition education intervention were met; judge whether the program had impacts on the targeted behaviors or on the mediating variables of the behaviors; determine whether the message or content was suitable for the target group; provide information on whether the educational strategies and activities (such as online format, duration of the modules and weekly frequency) were appropriate for the given group and contributed to the achievement of the behavioral goals and educational objectives; determine whether the program was implemented as planned and if not, why not; and obtain feedback from the students enrolled in the online course. As was mentioned previously, these results were described in detail in manuscript 3.

Discussion

The Stepwise Procedure served as an essential tool to guide the design of the ONES program. One of the most complex steps in the process was the selection of theories and creation of a theoretical framework that merged nutrition education with health promotion and instructional design, which is something not commonly done in the nutrition education field. However, through an extensive literature review a sound combination of these distinct fields was achieved. This approach will certainly become more widespread in the future, since the traditional means of delivering nutrition education are shifting their focus to online resources, health promotion and fitness apps, as well as social media.

Nonetheless, further research is also very much needed on how to use the Internet optimally as a channel for effective nutrition education. Such research should be targeted at content and level of interactivity of web-based interventions, strategies to induce sufficient
exposure to the intervention, use and processing of information provided through interactive channels and dose needed for optimal effects. Web-based nutrition education should also aim to incorporate strategies that may help people improve their abilities and opportunities for healthy eating.\(^1\) and physical activity.

There is no way to guarantee that a program will be 100% effective. In fact, health promotion research suggests that even the best designed, state of the art theory-based programs are only moderately effective in positively affecting behavior change.\(^43\) This is not a reason to abandon theory or systematic program planning, but rather a call to action to study what influences people’s health behavior and to design theory-driven interventions to help people make healthier choices. An intervention may or may not be successful in the short run, but as Lytle & Perry (2001) argue, they will be building a knowledge base, for content as well as process, that will be invaluable in creating effective interventions for the future.

**Implications for Research and Practice**

The ONES program stepwise design takes into consideration not only health promotion theories, but also instructional design and multimedia learning principles that must be followed when designing web-based educational materials. This unique approach can serve as stepping stone in online nutrition education design, especially for minority populations at risk, such as African American women. We hope that this planning procedure can be used, adapted and further explored to implement and deliver interventions that can help the population make healthier choices and acquire a better quality of life.
References


47. Senior Angulo J, Cason K, Martinez-Dawson R, Visser R, Dawson P. Qualitative exploration of african american women’s eating and physical activity habits, and perspectives on key elements to design a web-based nutrition education program. 2015.


CHAPTER FOUR
MANUSCRIPT 3
PILOT TESTING OF ONES: ONLINE NUTRITION EDUCATION FOR SISTERS. A WEB-BASED NUTRITION EDUCATION PROGRAM FOR COLLEGE AGED AFRICAN AMERICAN WOMEN

Introduction

According to the United States (U.S.) 2010 census, African Americans represent 13% of the U.S. population and are the second largest ethnic minority group in the country. 1 A vast majority (80.5%) of African American women are either overweight or obese. As a result, they are more susceptible to a number of weight-related health issues, including high blood pressure, high cholesterol, arthritis, stroke, heart disease and diabetes. 2 When considered by gender and race, the college group consuming the lowest amount of recommended servings of fruits and vegetables were African American females. 3 Moreover, the campus environment may contribute to poor food choices and subsequent development of poor dietary patterns. 4

College attendance typically occurs during young adulthood, during which time students gain independence as they transition from high school to college and make most of their decisions without parental guidance. This period is characterized by change in which students explore new environments and adopt new behaviors. 4 One of these behaviors includes dietary choices and habits. Young adults in college tend to engage in poor dietary behaviors that may put them at risk of rapid weight gain and poor nutritional status. 4 Studies have found that some reasons college students eat unhealthy diets are frequent meal skipping, inadequate variety of foods, frequent consumption of fast foods, lack of awareness and understanding of the food recommendations and guidelines, and decreased self-efficacy in making healthy food choices. 3

The probability that college students will change their health behaviors increases if the related health issue is perceived as relevant and of concern to them or their peers. 5 Moreover, compared to older adults, college students may be more receptive to new advice, 4 since they are still in a transitional stage into adulthood. Therefore, nutrition education interventions targeting
eating and physical activity habits may be successful in young adult African American women, with positive effects continuing into later stages in their lives.

Web-based nutrition education is a growing field that provides an opportunity to overcome traditional access barriers. A web-based program has the advantage of being available at any time and in any location as long as a computer/smartphone and the Internet can be accessed. It also has the advantage of being standardized, as opposed to face-to-face instruction, which may be altered by the instructor or time allotted for the session, especially when the lesson includes physical activity or a food preparation component.

The Online Nutrition Education for Sisters (ONES) program is a culturally tailored web-based nutrition education intervention for college aged African American women. It was designed using the Stepwise Procedure developed by Contento (2011), and its theoretical framework includes health promotion constructs from the Theory of Planned Behavior (behavioral intention, perceived behavioral control), Social Cognitive Theory (self-efficacy) and Self-Determination Theory (motivation, need for relatedness), merged with instructional design principles from Cognitive Load Theory and Multimedia Learning. The Stepwise Procedure and theoretical framework have been described in manuscript 2.

The main purpose of this study was to determine the impact and acceptability of a culturally tailored web-based nutrition education program for college aged African American women. The secondary purpose was to determine if the program would increase their intention or motivation to change their eating and physical activity behaviors.

Methods

The study protocol was approved by the Institutional Review Board for Human Subjects at a land grant university in the U.S. Southeast area. Informed consent was obtained from each subject before participation in the study (Appendix A).
Recruitment

Participants were recruited from the student body during the Fall 2015 semester. The online program was setup as a Special Topics class and a recruitment announcement was sent via email by the Office of Diversity in order to specifically reach the African American female population on campus. Based on information obtained from Institutional Research department at the university, there were 680 African American female students enrolled. A promotional table to inform this demographic about the course was also set up at a multicultural event on campus. Students who enrolled in the course received a letter grade and 1-hour course credit for their participation in the program. Two sections were offered simultaneously in order to have a treatment and control group. Students had the option to sign in either one of the sections, but could only enroll in one group.

Inclusion Criteria

In order to be part of the class students had to be African American, females, between 18 and 30 years of age and enrolled full time. College students who were under age were not allowed to take the class and those who were over 30 years of age were allowed to take the course, but were excluded from the data analysis.

Study Design

Forty students in total enrolled in the study, 20 in the control group and 20 in the treatment group.

The treatment condition applied, based on the qualitative results, was motivation. The treatment group received extra resources on motivation each week and had access to an online forum, called Sister Talk, with the purpose of creating an online social support network. The control group did not receive any motivational components during the intervention.

Baseline data collection included a pre-intervention survey that included information on demographics as well as food and physical activity related behaviors. In addition to this, participants were given two questionnaires every week that included information to address TPB,
SCT and SDT constructs. The post-intervention survey included information on demographics, food and physical activity behaviors, as well as questions addressing the acceptability of the program, and then a 2-week follow up was administered to contrast responses with the pre and post-intervention findings.

**Measures**

**Process Evaluation**

During the implementation of the pilot testing the researcher collected and tracked various data, such as demographics (information on age, marital status, college major, college meal plan participation, income and participation in weight loss programs), program activities and reach, program implementation and fidelity and program design review and program management.  

**Outcome Evaluation**

**Food and physical activity related behaviors:** participants completed a series of questions adapted from EFNEP’s Behavior Checklist. This questionnaire was modified and validated in a variety of populations, especially in minorities. Items included how often they plan meals ahead of time, buy groceries, prepare their own meals and eat fast food meals, measured in days per week (0-7). Using a 4-point scale (where never=1, sometimes=2, often=3 and always=4), participants also reported how often they shop with a grocery shopping list, think about healthy food choices and use the nutrition facts panel to make food choices.

**TPB variables:** behavioral intentions, beliefs and attitudes were measured using a 7-point Likert scale (where strongly agree=7 and strongly disagree=1). Participants rated their intentions to change their eating habits on a weekly pre-survey based on the information learned on each module, as well as their intention to try to make the recipe and do the workout video of the week. A weekly post-survey asked whether they were able to accomplish during that week what they had intended to do using a yes/no scale, with corresponding open-ended questions.
where they could expand on the reasons for not doing what they intended to do and express any other changes they tried instead.

**Impact and User acceptance**: as part of the post-intervention survey participants were asked to assess the usability and acceptability of the online modules in terms of attributes such as the visual appeal of the slides (from strongly agree=7 to strongly disagree=1), the length of the modules (where too short=1, proper length=2 and too long=3) and their level of satisfaction with the topics developed in the modules (from very satisfied=7 to very dissatisfied=1).

**Implementation**

The intervention was designed based on formative data collected from the target population. Focus groups were conducted with college aged African American women to explore the eating and physical activity habits of college aged African American women, facilitators and barriers that might influence their intention to change; and also to get a better idea on what features they would like to have on a web-based nutrition education program. The program was created using the Stepwise Procedure for Designing Theory-Based Nutrition Education proposed by Contento (2011) and the Weight Management Guide for African American women published by the Academy of Nutrition and Dietetics (AND) was used to verify the cultural appropriateness of the content. The program was named ONES (Online Nutrition Education for Sisters) and consisted of a 6-week intervention. The course was available to the students as a Special Topics class through the university’s online course management system. One module with a new topic was delivered every week, and participants had to check the previous module as reviewed and complete in order to move on to the following. Two sections of the course were offered to have an treatment group (section 004) and control (group 005). Participants signed up for either one of the sections and were randomly distributed (20 students in each section) to ensure a more even comparison between the groups.
The treatment and control group received the same 6 modules and had access to one healthy recipe and one workout video every week. From the focus group analysis motivation emerged as one of the key features for a web-based nutrition education program with this population, and it served as the treatment condition for the study. The motivational component for the treatment group included access to a motivational video featuring African American women promoting healthier lifestyles and exercising either in groups or by themselves, and a forum called Sister Talk, where they could share impressions on the materials and give each other support. Participation on the forum was optional. As was previously mentioned, the control group had access to the modules, workout videos and recipes, but they received no other motivational component during the duration of the course.

All evaluation tools were designed using Qualtrics, an online survey creation tool and sent via email to students. Two surveys were sent each week, the first one (pre-survey) to assess their intentions and the second one (post-survey) to follow up on whether they did what they intended or not. Every time a student would check a module as reviewed or completed a corresponding survey the instructor for the course would give them a grade on their work. The final letter grades for the course were based on the number of assignments (modules and surveys) completed by the students and all students received 1-hour course credit as incentive for their participation.

Statistical analyses: data were collected between August 2015 (baseline) and October 2015 (end point) and analyzed using SPSS for Mac (version 22.0, 2013, IBM Corp). First, an exhaustive review of the data were conducted to check for missing responses and errors. Once all the data files were clean they were organized as data sets for analysis for SPSS. Codebooks were created for all of the surveys to facilitate coding and interpretation. Variables for behaviors measured in days per week (meal planning, preparing their own meals, fast food eating, exercise and online search for nutrition/health related topics) were collapsed and transformed into categorical measures (1-2 days=seldom, 3-5 days=sometimes and 6-7 days=always) to facilitate the analysis. Pre and post responses for the intervention and weekly surveys were paired by participant in order to investigate trends in responses. Second, descriptive statistics (mean,
median, standard deviation, range and standard error) were computed for all surveys to check the overall distribution of the data. Third, non-parametric statistical tests, Mann-Whitney U test and Wilcoxon Signed Rank test were selected for the analysis based on the fact that most of the variables were measured in an ordinal or nominal scale (Likert scales). The Mann-Whitney U test was conducted to determine if there were differences in the medians obtained from the treatment and control group. The Wilcoxon Signed Rank test, used for paired data, was conducted to determine if there were differences within pre and post evaluations. Statistical significance for all analyses was set at $P<0.05$ and 95% confidence level.

Results

Process Evaluation

Demographics

Characteristics of the participants can be found in Table 3.1. The majority of the students in the study (92.5%) were between 18 and 24 years of age. The students represented all the academic colleges of the institution, with a slight predominance (32.4%) of majors from the College of Agriculture, Forestry and Life Sciences (CAFLS). There were no significant differences in demographic characteristics between the groups pre (n=40) and post intervention (n=36).
Table 3.1. Demographic characteristics of participants of the ONES program

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Section 004/ Treatment (N=20)</th>
<th>Section 005/ Control (N=20)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18-24</td>
<td>18 (45%)</td>
<td>19 (47.5%)</td>
<td>37 (92.5%)</td>
</tr>
<tr>
<td>25-30</td>
<td>2 (5%)</td>
<td>1 (2.5%)</td>
<td>3 (7.5%)</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>College of Agriculture, Forestry and Life Sciences</td>
<td>5 (13.5%)</td>
<td>7 (18.9%)</td>
<td>12 (32.4%)</td>
</tr>
<tr>
<td>College of Architecture, Arts and Humanities</td>
<td>0 (0%)</td>
<td>1 (2.7%)</td>
<td>1 (2.7%)</td>
</tr>
<tr>
<td>College of Business and Behavioral Science</td>
<td>6 (16.2%)</td>
<td>3 (8.1%)</td>
<td>9 (24.3%)</td>
</tr>
<tr>
<td>College of Engineering and Science</td>
<td>3 (8.1%)</td>
<td>5 (13.5%)</td>
<td>8 (22.6%)</td>
</tr>
<tr>
<td>College of Health, Education and Human Development</td>
<td>4 (10.8%)</td>
<td>3 (8.1%)</td>
<td>7 (18.9%)</td>
</tr>
<tr>
<td>Marital status</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>19 (48.7%)</td>
<td>18 (46.1%)</td>
<td>37 (94.8%)</td>
</tr>
<tr>
<td>Married</td>
<td>1 (2.5%)</td>
<td>1 (2.5%)</td>
<td>2 (5.1%)</td>
</tr>
<tr>
<td>College meal plan participation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All access 7 day</td>
<td>6 (25%)</td>
<td>9 (37.5%)</td>
<td>15 (62.5%)</td>
</tr>
<tr>
<td>Commuter 75</td>
<td>1 (4.2%)</td>
<td>3 (12.5%)</td>
<td>4 (16.7%)</td>
</tr>
<tr>
<td>Commuter 30</td>
<td>3 (12.5%)</td>
<td>2 (8.3%)</td>
<td>5 (20.8%)</td>
</tr>
<tr>
<td>Household income</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$0-$20,000</td>
<td>8 (23.5%)</td>
<td>6 (17.6%)</td>
<td>14 (41.2%)</td>
</tr>
<tr>
<td>$20,001-$30,000</td>
<td>2 (5.9%)</td>
<td>2 (5.9%)</td>
<td>4 (11.8%)</td>
</tr>
<tr>
<td>$30,001-$40,000</td>
<td>1 (2.9%)</td>
<td>3 (8.8%)</td>
<td>4 (11.8%)</td>
</tr>
<tr>
<td>$40,001-$50,000</td>
<td>0 (0%)</td>
<td>2 (5.9%)</td>
<td>2 (5.9%)</td>
</tr>
<tr>
<td>More than $50,000</td>
<td>4 (11.8%)</td>
<td>6 (17.6%)</td>
<td>10 (29.4%)</td>
</tr>
<tr>
<td>Weight loss program participation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight Watchers</td>
<td>6 (46.2%)</td>
<td>7 (53.8%)</td>
<td>13 (32.5%)</td>
</tr>
<tr>
<td>Grocery shopping</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wal-Mart</td>
<td>13 (32.5%)</td>
<td>14 (35%)</td>
<td>27 (67.5%)</td>
</tr>
<tr>
<td>BI-LO</td>
<td>2 (5%)</td>
<td>4 (10%)</td>
<td>6 (15%)</td>
</tr>
<tr>
<td>Publix</td>
<td>2 (5%)</td>
<td>1 (2.5%)</td>
<td>3 (7.5%)</td>
</tr>
</tbody>
</table>
Sixty percent of the students \((n=24)\) had a college meal plan, and 32.5\% \((n=13)\) reported having participated in a diet or weight loss program in the past. They had tried a great variety of weight loss strategies, such as fasting, juicing and low carb diets, but the weight loss program with more mentions was Weight Watchers.

Program activities and reach

The six modules of the ONES program were complemented with a series of workout videos along with easy and affordable recipes that participants could try on their own and as many times as they wanted. Formative evaluation for the program included a series of focus groups; from which it was found that young adult African American women have safety concerns when it comes to doing physical activity outdoors. They also mentioned not having a lot of time during the day to include physical activity, so it was decided to include simple exercise videos they could do even at their dorms or apartments.

Findings from a web-based physical activity intervention that reported less than ideal adherence to exercise in African American women suggested placing greater emphasis on the physical and mental health benefits of exercise as opposed to focusing on weight loss, and using active African American women as role models (i.e. celebrities, community leaders) to promote physical activity. \(^{12}\) After an intensive search, a set of six workouts from a YouTube channel featuring an African American were chosen to be part of the intervention. The routines were enjoyable, easy to follow and require minimum or no equipment at all. They promote fitness as part of a healthy lifestyle and not a quick fix for weight loss and also encourage African American women to love and take care of their bodies.

Another barrier that emerged from the program’s formative evaluation stage was a lack of cooking skills, so to address this issue a number of healthy, quick and affordable recipes were selected, keeping in mind that some of the audience participating in the course did not have access to a fully equipped kitchen. Some of the recipes were selected from a webpage featuring an African American female chef. The page included the recipe with ingredients and preparation time, as well as a quick video that demonstrated how to make the recipe. The recipe websites
were selected with similar role model element as in the workout videos and to reinforce the idea that they could do it too. Also, the recipes related to some of the healthy eating tips or cooking techniques featured in the modules (e.g. one of the alternative cooking techniques introduced in module five was sautéing and the recipe of that week was sautéed mustard greens).

In addition to the workouts and recipes the treatment group received every week a motivational video from YouTube that was supposed to serve as extra support for the intervention was included. Some of the videos presented exercise initiatives started by African American women and others showcased the stories of everyday and celebrity African American females who were on a quest to achieve their fitness or career goals. The main message conveyed by this piece of the intervention was that regardless of status all African American women must face a number of challenges, but with determination anything is possible. A summary with the links to the workouts, recipes and motivational videos can be found in Table 3.2.
<table>
<thead>
<tr>
<th>Week</th>
<th>Workout</th>
<th>Recipe</th>
<th>Motivational video (treatment group only)</th>
</tr>
</thead>
</table>
| 1    | Tiffany Rothe’s 10 min hip shaking workout part 1  
https://www.youtube.com/watch?v=r_J8btmlEKQ&feature=youtu.be | Quick and creamy fruit salad  
https://www.youtube.com/watch?v=l7gTMTr69N0&feature=youtu.be |
| 2    | Tiffany Rothe’s 10 min hip shaking workout part 2  
https://www.youtube.com/watch?v=ViPA373we14&feature=youtu.be | Black bean quesadillas  
https://youtu.be/leHdPEG9EDc |
| 3    | Tiffany Rothe’s low impact butt sculpting workout  
https://www.youtube.com/watch?v=Lmfk8POp6fQ&feature=youtu.be | Hot chile grilled cheese  
http://www.eatingwell.com/recipes/hot_chile_grilled_cheese.html | Zumba story  
https://www.youtube.com/watch?v=fJ6w42c52w0&feature=youtu.be |
| 4    | Tiffany Rothe’s 10 min towel workout  
https://www.youtube.com/watch?v=iaLm_UTF9aA&feature=youtu.be | Turkey, corn and sun dried tomato wraps  
http://www.eatingwell.com/recipes/turkey_corn_wrap.html | Serena Williams  
https://www.youtube.com/watch?v=t3Dpq9Y4F0&feature=youtu.be |
| 5    | Tiffany Rothe’s fat burning, calorie blasting, body sculpting workout  
https://www.youtube.com/watch?v=IOZDN1UnZ9U&feature=youtu.be | Simple sautéed mustard greens  
https://www.youtube.com/watch?v=CGPvAhbpqqk&feature=youtu.be |
| 6    | Tiffany Rothe’s 10 min cardio workout  
https://www.youtube.com/watch?v=i85WUbYQSbl&feature=youtu.be | Roasted corn with basil-shallot vinaigrette  
http://www.eatingwell.com/recipes/roasted_corn_with_basil_shallot_vinaigrette.html%26layout=standard%26show_faces=false%26width=310%26action=like%26colorscheme=light%22 | Alicia Keys  
https://www.youtube.com/watch?v=J9t1iMpdHA&feature=youtu.be |
The treatment group also had access to an online forum called Sister Talk, through the university’s online course management system so they could share comments, discuss ideas and look for workout buddies if needed. Despite the availability of the forum, none of the students accessed it. This suggested that further research is needed with alternative platforms or social media to better understand the approaches required to better connect with this audience.

In terms of the reach of the program (i.e. proportion of the intended audience that participated), approximately 6% (40 of 680) of the total African American female population on campus participated in the pilot testing. The levels of satisfaction with the content of materials, online resources and the form in which they were delivered were above 90% and some even expressed via email that they “would have participated even without the 1 credit incentive.”

However, it is important to keep in mind that the total student population of this institution is almost 22,000, meaning that the pilot testing results cannot be generalized to the entire African American female college population. A future implementation with a larger sample that includes students from several Historically Black Colleges or Universities (HBCUs) would increase the representativeness of the sample and help confirm these preliminary results.

Program implementation and fidelity

Participants were able to receive all modules and evaluation instruments each week during the six weeks of the intervention; however, the biggest issue was that the modules with the corresponding additional materials were uploaded to the university’s online platform, while the online surveys were sent via email through Qualtrics, so there was no integrated system that could check when participants had completed the modules and then automatically send the surveys, and keep track of survey responses. All of this process was done manually, which required a considerable amount of time, effort and concentration. The second issue that emerged with the survey responses was that in occasions Qualtrics would not count a particular survey as completed, so it was necessary to re-send the missing survey to each participant, and this meant that in some cases not all the surveys were submitted in the same week that the module was completed. Two solutions were implemented to try to correct as much as possible this situation:
number one, consistent email communication with the students, in order to find out if they were experiencing trouble with any of the materials; and number two a grading system was put in place so that the students could stay on track and complete the assignments for each week and not leave them all for the end of the program. Response rates for weekly surveys increased from around 50% to 90% by including grades.

Program design review

The first three out of the four general educational objectives outlined for the ONES program were met during the intervention. These objectives were selected using a theory based approach and were the following:

1. Behavioral intention (TPB): At the end of the program, the women will be able to demonstrate increased intention to improve their eating and physical activity habits.
2. Perceived behavioral control (TPB): At the end of the program, the women will be able to identify some of their own barriers to eating healthy and doing physical activity.
3. Self-efficacy (SCT): At the end of the program, the women will be able to apply in their everyday life a variety of strategies to eat healthy and exercise regularly.
4. Need for relatedness (SDT): At the end of the program, the women will be able to connect with a peer or friend who can motivate them to continue to eat healthy and exercise.

Objective number four, that stems from the SDT construct need for relatedness was supposed to be covered by the online forum Sister Talk that was available for the treatment group. The forum was part of the same online course platform where the modules, workout videos and recipes were available. Participants were informed from the beginning of the intervention about it (it was a space where they could comment on the modules, share strategies they were trying to incorporate, challenges to make changes, or find a workout buddy) and were also made aware that participation on it was completely voluntary. The instructor posted a trigger question based on the motivational video for the first two weeks (e.g. do you think this university could have its own Black Girls Run movement?), but no one even viewed the questions posted. There might be two explanations for this: first, since the forum was not part of the evaluation for
the course the students did not feel the need to use it, or second, perhaps the online course management system was not the best platform to stimulate that kind of interaction between the participants. Nonetheless, this is an area that requires further inquiry, so this objective will have to be addressed on a future implementation of the program.

**Program management**

The ONES program was cost-effective by the implementation of several strategies:

- Most of the program content was adapted from an already validated resource, which is Right Size for Me: Weight Management Guide for African American women \(^\text{11}\) published by the Academy of Nutrition and Dietetics (AND). A proper written authorization request was submitted to AND. Once this process concluded permission to use the guide was obtained free of charge.

- The modules were created using Power Point and Adobe Captivate on a Mac laptop. The audio recording equipment was borrowed from a lab on campus.

- In order to make the visual appeal of the slides more culturally sensitive a 1-month subscription to an online photo stock service was purchased. The subscription was $169 and this was the only pilot-testing expense.

- The modules were saved in video format and uploaded to YouTube, which made them easier to access and share.

- The program was offered free of charge to full time students through the online course system of the university, which also meant not having to invest in website design or in contracting an outside platform to setup the course.

- Using a web-based delivery for the intervention resulted to be a very environmentally friendly approach compared to in-person nutrition education. Having all the materials and surveys in digital format eliminated the use of supplies such as paper, pens, printing machines, brochures and handouts, etc.
Outcome Evaluation

Food and physical activity related behaviors

Baseline results showed that 95% (n=38) of students seldom (only 1-2 days per week) plan their meals ahead of time and 77.5% (n=31) seldom prepare their own meals. Only 15% (n=6) always think about healthy food choices when deciding what to eat, 47.5% (n=19) never use the nutrition facts panel on the food label to make food choices and 92.5% (n=37) exercise only 1-2 days per week. In terms of going online to search for nutrition and/or health related information all of them (n=40) do it just 1-2 days per week. There were no significant differences between intervention and control group at baseline for any of the aforementioned variables.

TPB variables

Cronbach’s α for each week’s survey were respectively for module 1=0.579, module 2=0.735, module 3=0.813, module 4=0.702, module 5=0.824 and module 6=0.709), indicating an acceptable level of internal consistency. Treatment (section 004) and control group (section 005) responses to the weekly pre and post-surveys were analyzed using the Wilcoxon Signed Rank test (95% confidence level, significance level $P<0.05$) to detect any differences between what they intended to do and what they actually did during that week. For the weekly pre-surveys the scale was regrouped so that the categories strongly agree, agree and somewhat agree were taken as positive responses (yes), while the strongly disagree, disagree and somewhat disagree were negative responses (no). Next, the Mann-Whitney U test (95% confidence level, significance level $P<0.05$) was used to investigate overall differences in responses to the pre-surveys sent every week, which are the ones that focused more on their behavioral intentions. The results are summarized in Table 3.3 and Table 3.5, respectively. The main reasons for significant differences in variables for the Wilcoxon Signed Rank test and the Mann-Whitney U test are summarized in Table 3.4 and 3.6, respectively.

When comparing their initial behavioral intention and what they actually did during every week we noticed that in week 1, which covered Nutrition Basics, of the 19 students from the treatment group who said they intended to do the workout video, 16 (84%) actually did it, and
from 17 who intended to change their eating habits only 10 (59%) did. The weekly post survey offered a space to comment on why they were not able to do the changes intended and the most common responses were either they had a busy week or they did not have the money to buy healthy food that week. Others mentioned having already healthy eating habits as the reason for not making any changes.

Week 3, which covered MyPlate and how to read food labels was the only week that produced data with significant differences for both the intervention and control group in changing their eating habits. For the treatment group 10 (59%) of 17 students who declared their intention to change eating habits actually changed them, while for the control group 14 (74%) of the 19 who had originally intended to make changes actually did. During week 3, in the control group had only 7 (54%) of the 13 participants who intended to make the recipe were able to make the food. In this case their most common reasons for not making the recipe were busy schedule and not liking or not having some of the ingredients to make it.

On week 5, 17 participants from the treatment group reported that they intended to change their eating habits, but only 11 (65%) did make those changes. In this case the most common reason was that they realized they had established good eating habits already. The observed trend indicates that the statistically significant differences were basically a result of participants not following through with what they had originally intended to do during that week and not because they did more than what they had planned to do.
Table 3. Weekly pre/post p-values obtained in the treatment and control group using the Wilcoxon Signed Rank test for non-parametric related samples

<table>
<thead>
<tr>
<th>Pre/post variables comparison</th>
<th>Week 1 Nutrition Basics</th>
<th>Week 2 Physical Activity Basics</th>
<th>Week 3 MyPlate and food labels</th>
<th>Week 4 Grocery Shopping</th>
<th>Week 5 Cooking Healthy</th>
<th>Week 6 Weight Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>T</td>
<td>C</td>
<td>T</td>
<td>C</td>
<td>T</td>
<td>C</td>
<td>T</td>
</tr>
<tr>
<td>Plan to do recipe/Did recipe</td>
<td>0.157</td>
<td>0.096</td>
<td>1.000</td>
<td>0.083</td>
<td>0.317</td>
<td>0.025*</td>
</tr>
<tr>
<td>Plan to do workout/Did workout</td>
<td>0.046*</td>
<td>0.083</td>
<td>0.317</td>
<td>1.000</td>
<td>1.000</td>
<td>0.083</td>
</tr>
<tr>
<td>Plan to change eating habits/Did change eating habits</td>
<td>0.020*</td>
<td>0.083</td>
<td>0.157</td>
<td>0.317</td>
<td>0.025*</td>
<td>0.046*</td>
</tr>
</tbody>
</table>

T: Treatment group, C: Control group
* Significance level P<0.05

When grouping the main reasons for the observed differences a clear trend emerged from the comments, with *didn’t have the time* and *I already have good habits* as the most popular explanations among the participants who responded to this section of the survey. Students in both the treatment and control group gave these two responses, but they were more common in the treatment group, with 3 or more women giving these same reasons. During week 3, both the treatment and control group had significant differences in responses, and when looking at their comments, in the treatment group a participant mentioned that *it’s hard to break old habits*, this indicated that halfway through the intervention there were important barriers that these women were still trying to overcome.
Table 3.4. Main reasons identified for significant differences in Wilcoxon Signed Rank test p-values

<table>
<thead>
<tr>
<th>Week</th>
<th>Variable</th>
<th>Group</th>
<th>P-Value</th>
<th>Main reasons</th>
</tr>
</thead>
</table>
| 1    | Plan to do workout/ Did workout | T     | 0.046*  | Didn’t have the time (2)  
I have my own workout plan (1) |
| 1    | Plan to change eating habits/ Did change eating habits | T     | 0.020*  | I already have good eating habits (3)  
Didn’t have the money to eat healthier (1) |
| 3    | Plan to change eating habits/ Did change eating habits | T     | 0.025*  | I already have good eating habits (3)  
Didn’t have the time (2)  
It’s hard to break old habits (1) |
| 3    | Plan to change eating habits/ Did change eating habits | C     | 0.046*  | I already have good eating habits (3)  
Busy week (1) |
| 5    | Plan to change eating habits/ Did change eating habits | T     | 0.014*  | I already have good eating habits (3)  
Didn’t have the time (2) |

T: Treatment group, C: Control group  
* Significance level $P<0.05$

The overall comparison of the pre-surveys administered every week revealed that there were no significant differences in weeks 1 through 5. On the other hand, week 6, which covered weight management, reported significant differences in four of the six items on the survey. These items included: *this module covered information I can apply to my daily life*, *I plan to use at least one of the weight management tips presented in this module*, *I plan to change my eating habits based on the information I learned from this module and the information provided motivates me to make healthier choices*. To better understand this result, careful review of the distribution of responses for each of the variables was conducted and a comparison table (Table 3.6) was created with the category with the highest percentages of agreement with the items evaluated, which was the “strongly agree” category.
Table 3.5. Weekly variables evaluated and their corresponding analysis using the Mann-Whitney U test for non-parametric independent samples

<table>
<thead>
<tr>
<th>Variable</th>
<th>Week 1 Nutrition Basics</th>
<th>Week 2 Physical Activity Basics</th>
<th>Week 3 MyPlate and food labels</th>
<th>Week 4 Grocery Shopping</th>
<th>Week 5 Cooking Healthy</th>
<th>Week 6 Weight Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>This module covered information I can apply to my daily life</td>
<td>0.784</td>
<td>0.429</td>
<td>0.687</td>
<td>0.235</td>
<td>0.258</td>
<td>0.038*</td>
</tr>
<tr>
<td>I plan to try the recipe</td>
<td>0.973</td>
<td>0.005*</td>
<td>0.081</td>
<td>0.214</td>
<td>0.223</td>
<td>0.165</td>
</tr>
<tr>
<td>I plan to do the workout video</td>
<td>0.302</td>
<td>0.445</td>
<td>0.728</td>
<td>0.322</td>
<td>0.402</td>
<td>0.244</td>
</tr>
<tr>
<td>I plan to use MyPlate</td>
<td>N/A</td>
<td>N/A</td>
<td>0.627</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>I plan to use food labels</td>
<td>N/A</td>
<td>N/A</td>
<td>0.070</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>I plan to use grocery shopping tips</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>0.184</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>I plan to use cooking healthy tips</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>0.563</td>
<td>N/A</td>
</tr>
<tr>
<td>I plan to use weight management tips</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>0.001*</td>
</tr>
<tr>
<td>I plan to change my eating habits</td>
<td>0.837</td>
<td>0.072</td>
<td>0.336</td>
<td>0.247</td>
<td>0.271</td>
<td>0.019*</td>
</tr>
<tr>
<td>The information provided motivates me to make healthier choices</td>
<td>0.493</td>
<td>0.157</td>
<td>0.923</td>
<td>0.309</td>
<td>0.418</td>
<td>0.023*</td>
</tr>
</tbody>
</table>

* Significance level $P<0.05$

Opposite of what was expected, the percentages of "strongly agree" responses for the items with significant differences were larger in the control group than in the treatment group. This finding suggests that the program in itself without the extra motivational component did help increase the intention to change the behaviors of these women. It also suggests that is very likely that the women in the control group by the last week of the course were more internally motivated to make changes.
Post-intervention impact and user acceptance

The post-intervention survey was completed by 36 (90%) of the 40 students enrolled in the course. Items measuring food and physical activity related behaviors pre and post-intervention are summarized in Table 3.7. Three out of the nine items reported a statistically significant difference at the end of the program. These included: think about healthy food choices when deciding what to eat, use the nutrition facts on the food label to make food choices and number of days you go online to look for nutrition and/or related health information. The Wilcoxon Signed Rank test for paired samples was used for the analysis (95% confidence level, significance level $P<0.05$)
Table 3.7. Pre and post responses by treatment and control group and analysis using the Wilcoxon Signed Rank test for non-parametric related samples

<table>
<thead>
<tr>
<th>Variables</th>
<th>Pre-Test</th>
<th></th>
<th>Post-Test</th>
<th></th>
<th>Wilcoxon Signed Rank test (p-value)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Treatment</td>
<td>Control</td>
<td>Total</td>
<td>Treatment</td>
<td>Control</td>
</tr>
<tr>
<td>Plan meals ahead of time</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seldom (1-2 days)</td>
<td>18(45%)</td>
<td>20 (50%)</td>
<td>38 (95%)</td>
<td>4 (11%)</td>
<td>12 (33%)</td>
</tr>
<tr>
<td>Sometimes (3-5 days)</td>
<td>1 (2%)</td>
<td>0 (0%)</td>
<td>1 (2%)</td>
<td>2 (5%)</td>
<td>4 (11%)</td>
</tr>
<tr>
<td>Often (6-7 days)</td>
<td>1 (2%)</td>
<td>0 (0%)</td>
<td>1 (2%)</td>
<td>2 (5%)</td>
<td>4 (11%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prepare own meals</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seldom (1-2 days)</td>
<td>15 (38%)</td>
<td>16 (40%)</td>
<td>31 (77%)</td>
<td>4 (11%)</td>
<td>7 (18%)</td>
</tr>
<tr>
<td>Sometimes (3-5 days)</td>
<td>4 (10%)</td>
<td>3 (8%)</td>
<td>7 (18%)</td>
<td>2 (5%)</td>
<td>12 (33%)</td>
</tr>
<tr>
<td>Often (6-7 days)</td>
<td>1 (2%)</td>
<td>1 (2%)</td>
<td>2 (5%)</td>
<td>7 (19%)</td>
<td>4 (11%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eat fast food</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seldom (1-2 days)</td>
<td>14 (35%)</td>
<td>18 (45%)</td>
<td>32 (80%)</td>
<td>8 (22%)</td>
<td>5 (14%)</td>
</tr>
<tr>
<td>Sometimes (3-5 days)</td>
<td>6 (15%)</td>
<td>2 (5%)</td>
<td>8 (20%)</td>
<td>6 (17%)</td>
<td>9 (25%)</td>
</tr>
<tr>
<td>Often (6-7 days)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>4 (11%)</td>
<td>4 (11%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shop with grocery shopping list</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Never</td>
<td>5 (12%)</td>
<td>1 (2%)</td>
<td>6 (15%)</td>
<td>3 (8%)</td>
<td>2 (5%)</td>
</tr>
<tr>
<td>Sometimes</td>
<td>10 (25%)</td>
<td>7 (17.5%)</td>
<td>17 (42%)</td>
<td>4 (11%)</td>
<td>6 (17%)</td>
</tr>
<tr>
<td>Often</td>
<td>2 (5%)</td>
<td>6 (15%)</td>
<td>8 (20%)</td>
<td>9 (25%)</td>
<td>7 (19%)</td>
</tr>
<tr>
<td>Always</td>
<td>3 (7%)</td>
<td>6 (15%)</td>
<td>9 (22%)</td>
<td>2 (5%)</td>
<td>3 (8%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Think about healthy food choices</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Never</td>
<td>1 (2%)</td>
<td>1 (2.5%)</td>
<td>2 (5%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Sometimes</td>
<td>10 (25%)</td>
<td>6 (15%)</td>
<td>16 (40%)</td>
<td>5 (14%)</td>
<td>8 (22%)</td>
</tr>
<tr>
<td>Often</td>
<td>2 (5%)</td>
<td>8 (20%)</td>
<td>16 (40%)</td>
<td>7 (19%)</td>
<td>15 (44%)</td>
</tr>
<tr>
<td>Always</td>
<td>3 (7%)</td>
<td>6 (15%)</td>
<td>9 (22%)</td>
<td>6 (17%)</td>
<td>7 (19%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use the nutrition facts panel</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Never</td>
<td>11 (28%)</td>
<td>8 (20%)</td>
<td>19 (48%)</td>
<td>4 (11%)</td>
<td>8 (22%)</td>
</tr>
<tr>
<td>Sometimes</td>
<td>6 (15%)</td>
<td>8 (20%)</td>
<td>14 (35%)</td>
<td>8 (22%)</td>
<td>19 (47%)</td>
</tr>
<tr>
<td>Often</td>
<td>3 (7%)</td>
<td>1 (2.5%)</td>
<td>4 (10%)</td>
<td>4 (11%)</td>
<td>3 (8%)</td>
</tr>
<tr>
<td>Always</td>
<td>0 (0%)</td>
<td>3 (7.5%)</td>
<td>3 (7%)</td>
<td>2 (5%)</td>
<td>5 (14%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Exercise</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seldom (1-2 days)</td>
<td>18 (45%)</td>
<td>19 (48%)</td>
<td>37 (92.5%)</td>
<td>3 (8%)</td>
<td>14 (33%)</td>
</tr>
<tr>
<td>Sometimes (3-5 days)</td>
<td>2 (5%)</td>
<td>1 (2%)</td>
<td>3 (7.5%)</td>
<td>1 (5%)</td>
<td>2 (5%)</td>
</tr>
<tr>
<td>Often (6-7 days)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>1 (5%)</td>
<td>2 (5%)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Length of typical workout session</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 15 minutes</td>
<td>1 (3%)</td>
<td>0 (0%)</td>
<td>1 (3%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>15-30 minutes</td>
<td>4 (12%)</td>
<td>2 (6%)</td>
<td>6 (18%)</td>
<td>3 (10%)</td>
<td>4 (13%)</td>
</tr>
<tr>
<td>30-45 minutes</td>
<td>7 (21%)</td>
<td>5 (15%)</td>
<td>12 (36%)</td>
<td>9 (29%)</td>
<td>4 (13%)</td>
</tr>
<tr>
<td>45-60 minutes</td>
<td>2 (6%)</td>
<td>4 (12%)</td>
<td>6 (18%)</td>
<td>3 (10%)</td>
<td>4 (13%)</td>
</tr>
<tr>
<td>&gt; 1 hour</td>
<td>3 (9%)</td>
<td>5 (15%)</td>
<td>8 (24%)</td>
<td>1 (3%)</td>
<td>2 (6%)</td>
</tr>
</tbody>
</table>
The 2-week follow up had a 55% response rate (it was completed by 22 participants, 9 from the treatment group and 13 from the control group). The limited sample and the lack of significant differences in responses between groups and compared to post intervention, indicated the necessity of a larger scale longitudinal study to make any inferences from these results. However, it is interesting that the control group had a bigger response rate than the treatment group, which again indicates that there was a stronger element of internal motivation still present for these women two weeks after the intervention had concluded. Responses are summarized in Table 3.8.

<table>
<thead>
<tr>
<th>Online search for nutrition/health topics</th>
<th>20 (50%)</th>
<th>20 (50%)</th>
<th>40 (100%)</th>
<th>11 (30%)</th>
<th>13 (36%)</th>
<th>24 (67%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seldom (1-2 days)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Sometimes (3-5 days)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Often (6-7 days)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td></td>
<td>40 (100%)</td>
<td>0 (0%)</td>
<td>11 (30%)</td>
<td>7 (19%)</td>
<td>5 (14%)</td>
<td>12 (33%)</td>
</tr>
</tbody>
</table>

* Significance level $P<0.05$
Table 3.8. Responses to TPB variables by treatment and control group, at 2-week follow up

<table>
<thead>
<tr>
<th>Variables</th>
<th>Group</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>T (N=9)</td>
<td>C (N=13)</td>
</tr>
<tr>
<td>Plan meals ahead of time</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seldom</td>
<td>8 (89%)</td>
<td>9 (69%)</td>
</tr>
<tr>
<td>Sometimes</td>
<td>1 (11%)</td>
<td>3 (23%)</td>
</tr>
<tr>
<td>Often</td>
<td>0 (0%)</td>
<td>1 (8%)</td>
</tr>
<tr>
<td>Prepare own meals</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seldom</td>
<td>7 (78%)</td>
<td>9 (69%)</td>
</tr>
<tr>
<td>Sometimes</td>
<td>2 (22%)</td>
<td>4 (31%)</td>
</tr>
<tr>
<td>Eat fast food</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seldom</td>
<td>9 (100%)</td>
<td>11 (85%)</td>
</tr>
<tr>
<td>Sometimes</td>
<td>0 (0%)</td>
<td>2 (15%)</td>
</tr>
<tr>
<td>Shop with grocery shopping list</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Never</td>
<td>4 (44%)</td>
<td>3 (23%)</td>
</tr>
<tr>
<td>Sometimes</td>
<td>1 (11%)</td>
<td>3 (23%)</td>
</tr>
<tr>
<td>Often</td>
<td>3 (33%)</td>
<td>3 (23%)</td>
</tr>
<tr>
<td>Always</td>
<td>1 (11%)</td>
<td>4 (315%)</td>
</tr>
<tr>
<td>Think about healthy food choices</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Never</td>
<td>0 (0%)</td>
<td>1 (8%)</td>
</tr>
<tr>
<td>Sometimes</td>
<td>2 (22%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Often</td>
<td>3 (33%)</td>
<td>6 (46%)</td>
</tr>
<tr>
<td>Always</td>
<td>4 (44%)</td>
<td>6 (46%)</td>
</tr>
<tr>
<td>Use the nutrition facts panel</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Never</td>
<td>4 (44%)</td>
<td>1 (8%)</td>
</tr>
<tr>
<td>Sometimes</td>
<td>2 (22%)</td>
<td>6 (46%)</td>
</tr>
<tr>
<td>Often</td>
<td>1 (11%)</td>
<td>3 (23%)</td>
</tr>
<tr>
<td>Always</td>
<td>2 (22%)</td>
<td>3 (23%)</td>
</tr>
<tr>
<td>Exercise</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seldom</td>
<td>8 (89%)</td>
<td>6 (46%)</td>
</tr>
<tr>
<td>Sometimes</td>
<td>1 (11%)</td>
<td>7 (54%)</td>
</tr>
<tr>
<td>Length of typical workout session</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15-30 minutes</td>
<td>2 (22%)</td>
<td>5 (38%)</td>
</tr>
<tr>
<td>30-45 minutes</td>
<td>4 (44%)</td>
<td>3 (23%)</td>
</tr>
<tr>
<td>45-60 minutes</td>
<td>2 (22%)</td>
<td>3 (23%)</td>
</tr>
<tr>
<td>&gt; 1 hour</td>
<td>0 (0%)</td>
<td>1 (8%)</td>
</tr>
<tr>
<td>Online search for nutrition/health topics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seldom</td>
<td>8 (89%)</td>
<td>13 (100%)</td>
</tr>
<tr>
<td>Sometimes</td>
<td>1 (11%)</td>
<td>0 (0%)</td>
</tr>
</tbody>
</table>

T: Treatment group, C: Control group

The variables measuring user acceptance of several features of the program are summarized in Table 3.9. Cronbach’s α for this set of measures was .860, indicating a high level of internal consistency. The device most frequently used to watch the modules was a laptop (34 students, 94.4%) and only one student mentioned watching them from her smartphone. To facilitate the tabulation and interpretation of these results, the strongly agree, agree and somewhat agree categories were collapsed as positive responses (yes), while the strongly
disagree, disagree and somewhat disagree were collapsed as negative responses (no). The slogan for the program (ONES: Providing access to a healthier you) was considered appropriate by 94% of participants (34 students). The visual appeal of the slides was also accepted by 94% (34) of the women. The weekly exercise videos and recipes were valued as beneficial by 94% (34) and 83% (30) of the students, respectively. Having a 1-hour course credit was considered enough incentive to participate in the program by 94% (34) of participants.

The duration of all 6 modules and the overall program was considered to be appropriate by 94% (34) of the survey respondents, and the level of satisfaction for all modules combined was 100% (36). Overall there were no statistically significant differences in the aforementioned features between intervention and control group. The last question, which asked participants if the ONES program motivated them to make changes in their lifestyle, received a positive response (yes) from 94% (34) of respondents, which clearly shows that the program did increase their intention and motivation to change their eating and physical activity behaviors.

Table 3.9. Features, percentage of acceptance and their corresponding analysis using the Mann-Whitney U test for non-parametric independent samples

<table>
<thead>
<tr>
<th>Features</th>
<th>Percentage of acceptance</th>
<th>Mann-Whitney U test (p-values)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>T (N=18)</td>
<td>C (N=18)</td>
</tr>
<tr>
<td>Device (laptop)</td>
<td>16 (89%)</td>
<td>18 (100%)</td>
</tr>
<tr>
<td>Slogan</td>
<td>18 (100%)</td>
<td>18 (100%)</td>
</tr>
<tr>
<td>Visual appeal</td>
<td>16 (89%)</td>
<td>18 (100%)</td>
</tr>
<tr>
<td>Exercise videos</td>
<td>16 (89%)</td>
<td>18 (100%)</td>
</tr>
<tr>
<td>Recipes</td>
<td>13 (72%)</td>
<td>17 (94%)</td>
</tr>
<tr>
<td>Incentive</td>
<td>17 (94%)</td>
<td>17 (94%)</td>
</tr>
<tr>
<td>Length of modules and program*</td>
<td>16 (89%)</td>
<td>18 (100%)</td>
</tr>
<tr>
<td>Level of satisfaction*</td>
<td>18 (100%)</td>
<td>18 (100%)</td>
</tr>
<tr>
<td>Motivation</td>
<td>17 (94%)</td>
<td>17 (94%)</td>
</tr>
</tbody>
</table>

T: Treatment group, C: Control group
*Based on average
Discussion

The main purpose of this study was to determine the impact and acceptability of a culturally tailored web-based nutrition education program for college aged African American women. Results from the study indicated that the 6-week intervention was able to reach the intended audience, most of the program components were executed as planned and participants’ satisfaction rates were above 94% for the modules and above 83% for the additional online resources provided during the course.

The treatment condition, which included an extra resource on motivation and a forum for participants to share their weekly experiences, did not produce any significant improvement in motivation compared to the control group. Nonetheless, motivation rates for both control and treatment group at post-test were 94%. This indicated that the modules on their own helped improve African American women’s intention to change their behaviors. The 1-hour course credit, which was the incentive for participating in the program did not serve either as a motivational factor, however, having the students enrolled in a standard online course from the university helped remove the high attrition rates that are normally observed in technology-based nutrition interventions. 12-16

The literature offers little information about how existing members of large Internet communities experience social support for weight management. 17 In a systematic review of commercial weight loss programs, 18 participants in Weight Watchers who attended the most group sessions over a 2-year randomized trial study maintained the largest weight losses at the end of this period. 18 In the same fashion, more favorable results were obtained on an eDiets.com intervention where participants received 11 on-site assessment visits in which they were weighed plus five brief consultations with a psychologist. The visits were signaled as enhancers of motivation and adherence to recommendations for diet and activity modification. 18

In a more recent study conducted on SparkPeople.com, a free Internet weight loss community with over 250,000 members, the discussion forums were found to be a viable means to exchange social support in the form of encouragement and motivation, information, and shared
experiences. The support was similar to face-to-face social support, but also offered the unique aspects of convenience, anonymity, and non-judgmental interactions. The study also suggested that online peers might be more accessible and helpful than clinicians or offline friends who are not experiencing the same challenges. SparkPeople members seemed to value the ability to receive such support conveniently and without fear of judgment.

Although further research is needed to better understand the effects of social support in online weight management programs, these findings underline the importance of support and the need for relatedness described in Self Determination Theory (SDT) as major sources of motivation in order to achieve sustained behavior changes. A future implementation of the ONES program should include a weekly support group session where participants can share their ideas and challenges in achieving their healthy eating and physical activity goals. Although the main focus of the program is not weight loss, having a weekly interaction with other women on the same path, being able to share their experiences and emotions through this journey, and most importantly, develop a sense of community and that they are not alone, can be a key factor in making the program sustainable in the long term. For the participants of the ONES program weight loss would be a natural consequence of their improved habits, but not necessarily the ultimate goal of the program.

Another strategy that could also strengthen the element of support is having an online forum available as part of a social media group or a more interactive platform than the university's online course management system. Students who were part of the pilot testing of ONES did not use the forum, most likely because it was not part of the course requirements or simply because they were not interested. In order to determine if this approach would be effective with this population a social media platform such as Facebook would be ideal to further explore social support and interactions among these women. A recent study stated that Facebook is being used as an innovative means to infuse health education through social media and it was found to be an effective recruitment tool for nutrition education interventions for low-income women.

Another web-based intervention promoting physical activity in African American women combined exercise sessions at a university recreation center supervised by research staff and a
system that awarded points based on the amount of time spent on the website and the type of activities completed, such as requesting being friends with another user, posting on another user's wall, replying to a message board thread and setting up a personal blog. Although no significant results were found for physical activity related behaviors, the researchers found a trend in enhanced social support through the message boards, blog posts and social networking tools available on the study website, so the idea of incorporating a forum and a more interactive social platform really deserves consideration for a future research study.

The last module, which dealt with weight management was the only module that showed significant differences between groups, having the control group and not the treatment group with more positive responses (“strongly agree”) in four of the six variables evaluated during that week. It is possible that the weight management information presented on the last module had a deeper impact in the control group as it related to their own personal goals, weight loss motivations or prior experiences with weight loss programs.

However, based on this particular scenario observed at the end of the program it may be the case that the control group exhibited greater amounts of a natural inclination toward assimilation, spontaneous interest, and exploration, which is what known in Self Determination Theory as intrinsic motivation. Responses from the weight management post-survey support this idea, since 14 (78%) of the 18 women who completed that evaluation in the control group described the changes they had implemented during that week, while in the treatment group only 10 (55%) of 18 were able to describe the changes they did. In other words, the control group might have been more motivated by internal influences than the treatment group.

It may also be the case that the women in the treatment group were already content with their current weight and nutrition related practices. This was supported by the main reasons obtained from the comments recorded for the post surveys of modules 1, 3 and 5, in which they mentioned already having pretty good habits or that they just did not have the time to make any changes to their eating habits. Despite of the fact that not all participants recorded comments, there was a clear trend in the answers that is consistent with previous research that indicated that African American women are less preoccupied with dieting. In either case, these preliminary
results should be investigated further in a larger scale program implementation with a longitudinal design.

The secondary purpose of this study was to determine if the program would increase their intention or motivation to change their eating and physical activity behaviors. Significant differences were found in three of the nine variables measured post-intervention compared to baseline: think about healthy food choices, use the nutrition facts panel and online search for nutrition/health related topics.

For African American women thinking about healthy food choices whenever they are deciding what to eat shows that the program has helped them interiorize what healthy food is and what benefits they get from making healthy eating choices, which can definitely increase their intention to improve their eating behaviors. Furthermore, from the Cognitive Load Theory (CLT) perspective, which posits that learners have a working memory with very limited capacity when dealing with new information, these results indicate that the message really resonated with the target audience, since people restrict their information-processing capacity to information that is relevant to them. A study in computer-tailored nutrition education also found evidence that computer-tailored information led to more positive thoughts, more personally relevant thoughts, stronger motivational thoughts and more self-assessment thoughts related to weight and weight loss related behaviors.

Also, the use of the nutrition facts panel is an excellent tool that improves their self-efficacy skills by helping them make better-informed decisions every time they have to buy a food item. Self-efficacy is the concept for which the Social Cognitive Theory (SCT) is more widely known and it consists of a person’s beliefs about her capacity to influence the quality of functioning and the events that affect her life.

Spending more days searching online for nutrition or health related information could signify that they are more concerned about these topics and are more accepting of using online resources as a way to stay informed and find answers when needed. As technology changes it is also necessary to upgrade the strategies used to promote healthy eating and physical activity and ensure that behavior change is still an attainable goal, especially among minority and at risk
populations, such as African American women.

Strengths of this program include a clearly outlined theoretical framework that comprises guidelines to promote health behavior change (TPB, SCT and SDT) as well as a better understanding of how to include learning technologies into nutrition education programs (CLT and ML theory); a technology-based approach that is cost-effective, environmentally friendly and easily disseminated; culturally tailored content designed specifically for African American women; and formative, process and outcome evaluation measures that contribute compelling evidence to the body of knowledge of web-based nutrition education interventions.

Like all studies, this one has limitations, such as the technical issues in keeping track of survey responses, the small number of open-ended responses from the weekly post surveys and the absence of the support element that was outlined as one of the educational objectives for this program. The cross sectional design also means that only a snapshot of a specific moment in time was obtained; however, the theory based approach utilized for the design of the intervention can be implemented as a longitudinal study with more behavior change variables measured, as well as include cross-cultural comparisons to investigate possible differences between ethnic groups.

Nutrition education for college students and especially for African American college aged women is vital considering the national statistics of obesity and overweight. Web-based nutrition education is likely to be a helpful tool in enabling and encouraging college students to make smart food choices. 28 This research is a contribution to the mounting evidence that indicates that tailored web-based nutrition education is a viable means to promote healthy eating and physical activity behaviors. 23,28,29

The ONES program was created with a clearly outlined theoretical framework that can serve as a blueprint for other web-based nutrition education programs targeting minority populations with higher risk of overweight and obesity. Mobile devices such as handheld computers, cellphones and text messaging devices are emerging as new platforms for delivering nutrition education information. 30 Using these types of interactive technologies may offer lower costs, better interaction and opportunities for combining web-based feedback with a socially
supportive environment. Thus, more research is needed to better determine how technology can be incorporated into nutrition education programs to enhance behavior change outcomes.

**Implications for Research and Practice**

This research demonstrated that a web-based culturally tailored nutrition education intervention such as the ONES program is a viable way to expose college aged African American women to healthy eating and physical activity strategies they can incorporate in their every day life. ONES program participants achieved improvements in their intention to change their eating and physical activity behaviors. Whether it is delivered as an online course, transformed into a smartphone app or included in another type of social media outlet, future research should explore the long-term effects of the ONES program in the eating and physical activity behaviors of the African American female community.
References


19. Lohse B. Facebook is an effective strategy to recruit low-income women to online nutrition education. *Journal of nutrition education and behavior*. 2013;45(1):69-76.


CHAPTER 5

CONCLUSIONS

Conclusions

The rates of overweight, obesity and chronic diseases are certainly alarming among African American women when compared with the rest of the U.S. population. However, studies examining the health behaviors of minority populations, specifically African American female college students, are relatively rare. Understanding weight attitudes, dieting and physical activity tendencies and mediators of behavior change in college aged African American women may provide additional help in the development of culturally tailored obesity prevention programs and specific guidelines toward achievement of healthy body, healthy weight and improving quality of life.

Based on focus groups results, the cost of healthy food, the lack of time and motivation and living environment are some of the biggest barriers to having healthier habits for college aged African American women; while support (from family, experts or peers) and short term goals are perceived to be the biggest facilitators to achieve healthier eating and physical activity habits. Also, the most important features African American women are looking for in a web-based nutrition education program are peer/expert support, cooking and grocery shopping tips, gradual lifestyle changes and individual/budget tailoring.

The Online Nutrition Education for Sisters (ONES) program is a culturally tailored web-based nutrition education intervention for college aged African American women. Its theoretical framework includes health promotion constructs from the Theory of Planned Behavior (behavioral intention, perceived behavioral control), Social Cognitive Theory (self-efficacy) and Self-Determination Theory (motivation, need for relatedness), merged with instructional design principles from Cognitive Load Theory and Multimedia Learning. This one of a kind design can serve as a blueprint for other web-based nutrition education programs targeting minority populations with higher risk of overweight and obesity. Results from the 6-week pilot testing of
ONES demonstrate that the intervention was well accepted and did help improve African American women’s intention to change their eating related behaviors in the short-term; with participant satisfaction rates and motivation rates post intervention above 94%.

Strengths of the ONES program include a clearly outlined theoretical framework that comprises guidelines to promote health behavior change (Theory of Planned Behavior, Social Cognitive Theory and Self Determination Theory) as well as a better understanding of how to include learning technologies into nutrition education programs (Cognitive Load Theory and Multimedia Learning); a technology-based approach that is cost-effective, environmentally friendly and easily disseminated; culturally tailored content designed specifically for African American women; and formative, process and outcome evaluation measures that contribute compelling evidence to the body of knowledge of web-based nutrition education interventions. Limitations include the cross-sectional design of the intervention; the technical issues in keeping track of survey responses, and the absence of the support element that was outlined as one of the educational objectives for the program.

Future research should explore the long-term effects of the ONES program to better determine how technology can be incorporated into nutrition education programs to enhance behavior change outcomes, as well as the effectiveness of social media (such as Facebook) or alternative platforms to strengthen the social support and motivation to achieve healthy lifestyle changes in minority populations.


65. Parker AG. *A cultural, community-based approach to health technology design*. [PhD]. Georgia Institute of Technology; 2011.


APPENDICES
Appendix A

IRB Consent Forms

1. Focus groups consent form

Information about Being in a Research Study
Clemson University

Web-based Nutrition Education Intervention for African American Women using the
Theory of Planned Behavior

Description of the Study and Your Part in It
Dr. Katherine Cason and Joyce Senior, B.S. are inviting you to take part in a research study. Dr. Cason is a researcher from the Department of Food, Nutrition and Packaging Sciences at Clemson University. Joyce Senior is a graduate student at Clemson University, running this study with the help of Dr. Cason. The purpose of this research is to explore your eating and physical activity habits, discuss your beliefs and attitudes towards them, and obtain ideas to design a web-based nutrition education program tailored to your needs and preferences.

Your part in the study will be to participate in one focus group session during the summer of 2014. During the session you will be able to share freely your opinions and ideas. The session will be tape-recorded. The audio recordings will only be used for the research purpose previously stated. Please initial here __________ to acknowledge that you’re fully aware and agree with this.

It will take you about 60 minutes to be in this study.

Risks and Discomforts
We do not know of any risks or discomforts to you in this research study. You may refuse to answer or skip any question if you feel uncomfortable answering them. We cannot guarantee that discussion group participants will maintain the confidentiality of other participants, however, we will request that all of the participants respect the privacy and confidentiality of others who take part in the group.

Possible Benefits
We do not know of any way you would benefit directly from taking part in this study. However, this research will help us better understand how to design a web-based nutrition education program tailored to your needs.

Incentives
You will receive a $10 incentive after the focus group session for your collaboration.

Protection of Privacy and Confidentiality
We will do everything we can to protect your privacy and confidentiality. We will not tell anybody outside of the research team that you were in this study or what information we collected about you in particular. Your name will not be associated with any forms, questionnaires, and/or recordings. You will be assigned an identification number, which will be used on all of the questionnaires and forms you fill out. All forms and recordings will be kept in a locked location up to 5 years, following federal regulations and Clemson University policy.
Choosing to Be in the Study
You do not have to be in this study. You may choose not to take part and you may choose to stop taking part at any time. You will not be punished in any way if you decide not to be in the study or to stop taking part in the study.

Contact Information
If you have any questions or concerns about this study or if any problems arise, please contact Dr. Katherine Cason at Clemson University at 864-723-4520.

If you have any questions or concerns about your rights in this research study, please contact the Clemson University Office of Research Compliance (ORC) at 864-656-6460 or irb@clemson.edu. If you are outside of the Upstate South Carolina area, please use the ORC’s toll-free number, 866-297-3071.

Consent
I have read this form and have been allowed to ask any questions I might have. I agree to take part in this study.

Participant’s signature: ________________________ Date:
_________________

A copy of this form will be given to you.
2. ONES Program Consent Form

Information about Being in a Research Study
Clemson University

Web-based Nutrition Education Intervention for African American Women using the Theory of Planned Behavior

Description of the Study and Your Part in It
Dr. Katherine Cason and Joyce Senior, B.S. are inviting you to take part in a research study. Dr. Cason is a researcher from the Department of Food, Nutrition and Packaging Sciences at Clemson University. Joyce Senior is a graduate student at Clemson University, running this study with the help of Dr. Cason. The purpose of this research is to pilot test a 6-week online nutrition education program tailored for college aged African American women.

Your part in the study will be to participate in all 6 weeks of the online intervention and complete a pre and post intervention survey. There will be one module with a specific topic per week sent to you via email, which should take no more than 30 minutes of your time to complete. Each module comes with a weekly survey you must complete before moving forward to the next module.

Risks and Discomforts
We do not know of any risks or discomforts to you in this research study.

Possible Benefits
By taking part in this study you will receive culturally tailored nutrition information that might encourage you to adopt healthier eating and physical activity behaviors. Also, this research will help us evaluate the viability and effectiveness of a web-based nutrition education program designed for college aged African American women.

Incentives
Upon completion of the 6-week program you will receive 1 course credit for your collaboration.

Protection of Privacy and Confidentiality
We will do everything we can to protect your privacy and confidentiality. Your survey answers will be sent to a link at Qualtrics.com where data will be stored in a password protected electronic format. Qualtrics does not collect identifying information such as your name, email address, or IP address. Therefore, your responses will remain anonymous. No one will be able to identify you or your answers, and no one will know whether or not you participated in the study.

Choosing to Be in the Study
You do not have to be in this study. You may choose not to take part and you may choose to stop taking part at any time. You will not be punished in any way if you decide not to be in the study or to stop taking part in the study.

Contact Information
If you have any questions or concerns about this study or if any problems arise, please contact Dr. Katherine Cason at Clemson University at kcason@clemson.edu.

If you have any questions or concerns about your rights in this research study, please contact the Clemson University Office of Research Compliance (ORC) at 864-656-6460 or irb@clemson.edu. If you are outside of the Upstate South Carolina area, please use the ORC’s toll-free number, 866-297-3071.
Electronic Consent

Please select your choice below. You may print a copy of this consent form for your records. Clicking on the “Agree” button indicates that:

- You have read the above information
- You voluntarily agree to participate
- You are 18 years of age or older

☐ Agree

☐ Disagree
1. ONES pre survey

Please answer the following demographic questions.

Age

Occupation
- Student (1)
- Clemson employee (2)

Marital status
- Single (1)
- Married or domestic partnership (2)
- Divorced (3)
- Widowed (4)
- Prefer not to answer (5)

Where do you currently live?
- On campus (1)
- 4 miles or less from campus (2)
- More than 4 miles away from campus (3)

Are you on a college meal plan?
- Yes (1)
- No (2)

Annual household income before taxes:
- $0 - $20,000 (1)
- $20,001 - $30,000 (2)
- $30,001 - $40,000 (3)
- $40,001 - $50,000 (4)
- More than $50,000 (5)
- I prefer not to answer (6)
Have you ever been part of a diet or weight loss program?
- Yes (1)
- No (2)

**Answer If Have you ever been part of a diet or weight loss program? Yes Is Selected**

Which diet or weight loss program?
- Wal-Mart (1)
- Ingles (2)
- BI-LO (3)
- Publix (4)
- Food Lion (5)
- Sam’s Club (6)
- ALDI (7)
- Other (8)

Where do you do most of your grocery shopping?
- Wal-Mart (1)
- Ingles (2)
- BI-LO (3)
- Publix (4)
- Food Lion (5)
- Sam’s Club (6)
- ALDI (7)
- Other (8)

This is a survey about your eating and physical activity habits. As you read each question, think about the past month. There are no wrong answers.

During a typical week, how often do you...

<table>
<thead>
<tr>
<th></th>
<th>0 (1)</th>
<th>1 (2)</th>
<th>2 (3)</th>
<th>3 (4)</th>
<th>4 (5)</th>
<th>5 (6)</th>
<th>6 (7)</th>
<th>7 (8)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plan meals ahead of time</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Buy groceries</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prepare your own meals</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eat fast food meals</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
During a typical week, how often do you... 

<table>
<thead>
<tr>
<th>Activity</th>
<th>Never (1)</th>
<th>Sometimes (2)</th>
<th>Often (3)</th>
<th>Always (4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shop with a grocery list (1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Think about healthy food choices when deciding what to eat (2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use the &quot;Nutrition Facts&quot; on the food label to make food choices (3)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

During a typical week, how many days do you exercise?
- 0 (1)
- 1 (2)
- 2 (3)
- 3 (4)
- 4 (5)
- 5 (6)
- 6 (7)
- 7 (8)

Answer If During a typical week, how many days do you exercise? 0 Is Not Selected

How long is your typical workout session?
- Less than 15 minutes (1)
- 15-30 minutes (2)
- 30-45 minutes (3)
- 45-60 minutes (4)
- More than an hour (5)

During a typical week, how many days do you go online to look for nutrition and/or health related information?
- 0 (1)
- 1 (2)
- 2 (3)
- 3 (4)
- 4 (5)
- 5 (6)
- 6 (7)
- 7 (8)

Answer If During a typical week, how many days do you go online to look for nutrition and/or health related... 0 Is Not Selected

What websites do you usually visit?
2. ONES Module 1A

Please rate the following statements with respect to Module 1: Nutrition Basics

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Disagree (1)</th>
<th>Disagree (2)</th>
<th>Somewhat Disagree (3)</th>
<th>Neither Agree nor Disagree (4)</th>
<th>Somewhat Agree (5)</th>
<th>Agree (6)</th>
<th>Strongly Agree (7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>This module covered information I can apply to my daily life (1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I plan to try the recipe provided this week (2)</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I plan to do the workout video at least once this week (3)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I plan to change my eating habits based on the information I learned from this module (4)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The information presented in this module motivates me to make healthier choices (5)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
3. ONES Module 1B

This is a survey about your eating and physical activity habits. As you read each question, think about the past week and what was presented on Module 1: Nutrition Basics. There are no wrong answers.

Did you try the recipe provided this week?

☑ Yes (1)
☐ No (2)

**Answer** If Did you try the recipe provided this week? No Is Selected

Why didn't you try the recipe?

Did you do the workout video this week?

☑ Yes (1)
☐ No (2)

**Answer** If Did you do the workout video this week? Yes Is Selected

How many times this week did you do the workout video?

☑ 1 (1)
☑ 2 (2)
☑ 3 (3)
☑ 4 (4)
☑ 5 (5)
☑ 6 (6)
☑ 7 (7)

**Answer** If Did you do the workout video this week? No Is Selected

Why didn't you do the workout video this week?

Did you change any eating habits based on the information learned in module 1?

☑ Yes (1)
☐ No (2)

**Answer** If Did you change any eating habits based on the information learned in module 1? Yes Is Selected

What changes did you make to your eating habits?

**Answer** If Did you change any eating habits based on the information learned in module 1? No Is Selected

Why didn't you make any changes to your eating habits?

Did you make any other lifestyle changes based on the information learned in module 1?

☑ Yes (1)
☐ No (2)

**Answer** If Did you make any other lifestyle changes based on the information learned in module 1? Yes Is Selected

What lifestyle changes did you make?
Answer: If Did you make any other lifestyle changes based on the information learned in module 1? No is selected.

Why didn't you make any lifestyle changes?
### 4. ONES Module 2A

Please rate the following statements with respect to Module 2: Physical Activity Basics

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Disagree (1)</th>
<th>Disagree (2)</th>
<th>Somewhat Disagree (3)</th>
<th>Neither Agree nor Disagree (4)</th>
<th>Somewhat Agree (5)</th>
<th>Agree (6)</th>
<th>Strongly Agree (7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>This module covered information I can apply to my daily life (1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I plan to try the recipe provided this week (2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I plan to do the workout video at least once this week (3)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I plan to change my eating habits based on the information I learned from this module (4)</td>
<td></td>
<td></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>The information presented in this module motivates me to make healthier choices (5)</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>
5. ONES Module 2B

This is a survey about your eating and physical activity habits. As you read each question, think about the past week and what was presented on Module 2: Physical Activity Basics. There are no wrong answers.

Did you try the recipe provided this week?
- Yes (1)
- No (2)

Answer If Did you try the recipe provided this week? No Is Selected

Did you do the workout video this week?
- Yes (1)
- No (2)

Answer If Did you do the workout video this week? Yes Is Selected

How many times this week did you do the workout video?
- 1 (1)
- 2 (2)
- 3 (3)
- 4 (4)
- 5 (5)
- 6 (6)
- 7 (7)

Answer If Did you do the workout video this week? No Is Selected

Did you change any eating habits based on the information learned in module 1?
- Yes (1)
- No (2)

Answer If Did you change any eating habits based on the information learned in module 1? Yes Is Selected

What eating habits did you change?

Answer If Did you change any eating habits based on the information learned in module 1? No Is Selected

Why didn't you change any eating habits?

Did you make any other lifestyle changes based on the information learned in module 2?
- Yes (1)
- No (2)

Answer If Did you make any other lifestyle changes based on the information learned in module 2? Yes Is Selected

What other lifestyle changes did you make?
Answer: If Did you make any other lifestyle changes based on the information learned in module 2? No Is Selected
Why didn't you make any other lifestyle changes?
This is a survey about your eating and physical activity habits. As you read each question, think about the past week and what was presented on Module 2: Physical Activity Basics. There are no wrong answers.

Did you try the recipe provided this week?
- Yes (1)
- No (2)

Answer If Did you try the recipe provided this week? No Is Selected

Did you do the workout video this week?
- Yes (1)
- No (2)

Answer If Did you do the workout video this week? Yes Is Selected

How many times this week did you do the workout video?
- 1 (1)
- 2 (2)
- 3 (3)
- 4 (4)
- 5 (5)
- 6 (6)
- 7 (7)

Answer If Did you do the workout video this week? No Is Selected

Did you change any eating habits based on the information learned in module 1?
- Yes (1)
- No (2)

Answer If Did you change any eating habits based on the information learned in module 1? Yes Is Selected

What eating habits did you change?

Answer If Did you change any eating habits based on the information learned in module 1? No Is Selected

Why didn't you change any eating habits?

Did the motivational video encourage you to make any lifestyle changes this week?
- Yes (1)
- No (2)

Answer If Did the motivational video encourage you to make any lifestyle changes this week? Yes Is Selected

What lifestyle changes did you make?
<table>
<thead>
<tr>
<th>Answer If</th>
<th>Did the motivational video encourage you to make any lifestyle changes this week? No Is Selected</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Why didn't the motivational video this week encourage you?</td>
</tr>
</tbody>
</table>

| Did you make any other lifestyle changes based on the information learned in module 2? |
|---------------------------------|--------------------------------------------------------------------------------------------------|
| Yes (1)                         |                                                                                                 |
| No (2)                          |                                                                                                 |

<table>
<thead>
<tr>
<th>Answer If</th>
<th>Did you make any other lifestyle changes based on the information learned in module 2? Yes Is Selected</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>What other lifestyle changes did you make?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Answer If</th>
<th>Did you make any other lifestyle changes based on the information learned in module 2? No Is Selected</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Why didn't you make any other lifestyle changes?</td>
</tr>
</tbody>
</table>
7. **ONES Module 3A**

Please rate the following statements with respect to Module 3: It’s all about Quality and Quantity

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Disagree (1)</th>
<th>Disagree (2)</th>
<th>Somewhat Disagree (3)</th>
<th>Neither Agree nor Disagree (4)</th>
<th>Somewhat Agree (5)</th>
<th>Agree (6)</th>
<th>Strongly Agree (7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>This module covered information I can apply to my daily life (1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I plan to try the recipe provided this week (2)</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I plan to do the workout video at least once this week (3)</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>I plan to use the MyPlate distribution as a healthy eating guide for my meals (4)</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>I plan to read labels of processed foods to check their nutritional quality (5)</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>I plan to change my eating habits based on the information I learned from this module (6)</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The information presented in this module motivates me to make healthier choices (7)</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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8. ONES Module 3B

This is a survey about your eating and physical activity habits. As you read each question, think about the past week and what was presented on Module 3: It's all about Quality and Quantity. There are no wrong answers.

Did you try the recipe provided this week?
- Yes (1)
- No (2)

Did you do the workout video this week?
- Yes (1)
- No (2)

Did you use MyPlate as a healthy guide for your meals this week?
- Yes (1)
- No (2)

Did you change any eating habits based on the information learned in module 3?
- Yes (1)
- No (2)
<table>
<thead>
<tr>
<th>Answer</th>
<th>Did you change any eating habits based on the information learned in module 3?</th>
<th>Yes Is Selected</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>What eating habits did you change?</td>
<td></td>
</tr>
<tr>
<td>Answer</td>
<td>Did you change any eating habits based on the information learned in module 3?</td>
<td>No Is Selected</td>
</tr>
<tr>
<td></td>
<td>Why didn't you change any eating habits?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Did you make any other lifestyle changes based on the information learned in module 3?</td>
<td>Yes (1) Is Selected</td>
</tr>
<tr>
<td>☐️</td>
<td>Yes (1)</td>
<td></td>
</tr>
<tr>
<td>☐️</td>
<td>No (2)</td>
<td></td>
</tr>
<tr>
<td>Answer</td>
<td>Did you make any other lifestyle changes based on the information learned in module 3?</td>
<td>No Is Selected</td>
</tr>
<tr>
<td></td>
<td>Why didn't you make any other lifestyle changes?</td>
<td></td>
</tr>
</tbody>
</table>
Did you try the recipe provided this week?
- Yes (1)
- No (2)

Did you do the workout video this week?
- Yes (1)
- No (2)

Did the motivational video encourage you to make any lifestyle changes this week?
- Yes (1)
- No (2)

Did you use MyPlate as a healthy guide for your meals this week?
- Yes (1)
- No (2)
<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Did you use MyPlate as a healthy guide for your meals this week?</td>
<td></td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>How many times did you use MyPlate?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 (1)</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>2 (2)</td>
<td></td>
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<tr>
<td>3 (3)</td>
<td></td>
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<td></td>
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<tr>
<td>4 (4)</td>
<td></td>
<td></td>
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<tr>
<td>5 (5)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 (6)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 (7)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Did you use MyPlate as a healthy guide for your meals this week?</td>
<td></td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Why didn't you use MyPlate?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Did you change any eating habits based on the information learned in module 3?</td>
<td></td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Yes (1)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No (2)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Did you change any eating habits based on the information learned in module 3?</td>
<td></td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>What eating habits did you change?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Did you change any eating habits based on the information learned in module 3?</td>
<td></td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Why didn't you change any eating habits?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Did you make any other lifestyle changes based on the information learned in module 3?</td>
<td></td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Yes (1)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No (2)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Did you make any other lifestyle changes based on the information learned in module 3?</td>
<td></td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Why didn't you make any other lifestyle changes?</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### 10. ONES Module 4A

Please rate the following statements with respect to Module 4: Grocery Shopping

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Disagree (1)</th>
<th>Disagree (2)</th>
<th>Somewhat Disagree (3)</th>
<th>Neither Agree nor Disagree (4)</th>
<th>Somewhat Agree (5)</th>
<th>Agree (6)</th>
<th>Strongly Agree (7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>This module covered information I can apply to my daily life (1)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>I plan to try the recipe provided this week (2)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
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</tr>
<tr>
<td>I plan to do the workout video at least once this week (3)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>I plan to use at least one of the grocery shopping tips presented in the module (4)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>I plan to change my eating habits based on the information I learned from this module (5)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>The information presented in this module motivates me to make healthier choices (6)</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
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</tr>
</tbody>
</table>
11. ONES Module 4B

This is a survey about your eating and physical activity habits. As you read each question, think about the past week and what was presented on Module 4: Grocery Shopping. There are no wrong answers.

Did you try the recipe provided this week?
- Yes (1)
- No (2)

Answer: If Did you try the recipe provided this week? No Is Selected
Why didn’t you try the recipe?

Did you do the workout video this week?
- Yes (1)
- No (2)

Answer: If Did you do the workout video this week? Yes Is Selected
How many times this week did you do the workout video?
- 1 (1)
- 2 (2)
- 3 (3)
- 4 (4)
- 5 (5)
- 6 (6)
- 7 (7)

Answer: If Did you do the workout video this week? No Is Selected
Why didn’t you do the workout video?

Did you use any of the grocery shopping tips provided this week?
- Yes (1)
- No (2)

Answer: If Did you use any of the grocery shopping tips provided this week? Yes Is Selected
Which tips did you use? (You can choose more than one)
- Make a food budget (1)
- Make weekly menus (2)
- Make a shopping list (3)
- Get the most value for your money (4)

Answer: If Did you use any of the grocery shopping tips provided this week? No Is Selected
Why didn’t you use any of the grocery shopping tips?

Did you change any eating habits based on the information learned in module 4?
- Yes (1)
- No (2)

Answer: If Did you change any eating habits based on the information learned in module 4? Yes Is Selected
What eating habits did you change?
Did you change any eating habits based on the information learned in module 4? No Is Selected

Why didn't you change any eating habits?

Did you make any other lifestyle changes based on the information learned in module 4?
☐ Yes (1)
☐ No (2)

Did you make any other lifestyle changes based on the information learned in module 4? Yes Is Selected

What other lifestyle changes did you make?

Did you make any other lifestyle changes based on the information learned in module 4? No Is Selected

Why didn't you make any other lifestyle changes?
12. ONES Module 4B - 004

This is a survey about your eating and physical activity habits. As you read each question, think about the past week and what was presented on Module 4: Grocery Shopping. There are no wrong answers.

Did you try the recipe provided this week?
- Yes (1)
- No (2)

Answer If Did you try the recipe provided this week? No Is Selected
Why didn’t you try the recipe?

Did you do the workout video this week?
- Yes (1)
- No (2)

Answer If Did you do the workout video this week? Yes Is Selected
How many times this week did you do the workout video?
- 1 (1)
- 2 (2)
- 3 (3)
- 4 (4)
- 5 (5)
- 6 (6)
- 7 (7)

Answer If Did you do the workout video this week? No Is Selected
Why didn’t you do the workout video?

Did the motivational video encourage you to make any lifestyle changes this week?
- Yes (1)
- No (2)

Answer If Did the motivational video encourage you to make any lifestyle changes this week? Yes Is Selected
What lifestyle changes did you make?

Answer If Did the motivational video encourage you to make any lifestyle changes this week? No Is Selected
Why didn’t the motivational video encourage you?

Did you use any of the grocery shopping tips provided this week?
- Yes (1)
- No (2)
<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Did you use any of the grocery shopping tips provided this week?</td>
<td>Yes Is Selected</td>
</tr>
<tr>
<td>Which tips did you use? (You can choose more than one)</td>
<td></td>
</tr>
<tr>
<td>Make a food budget (1)</td>
<td></td>
</tr>
<tr>
<td>Make weekly menus (2)</td>
<td></td>
</tr>
<tr>
<td>Make a shopping list (3)</td>
<td></td>
</tr>
<tr>
<td>Get the most value for your money (4)</td>
<td></td>
</tr>
<tr>
<td>Why didn't you use any of the grocery shopping tips?</td>
<td></td>
</tr>
<tr>
<td>Did you change any eating habits based on the information learned in module 4?</td>
<td>Yes (1)</td>
</tr>
<tr>
<td></td>
<td>No (2)</td>
</tr>
<tr>
<td>What eating habits did you change?</td>
<td></td>
</tr>
<tr>
<td>Why didn't you change any eating habits?</td>
<td></td>
</tr>
<tr>
<td>Did you make any other lifestyle changes based on the information learned in module 4?</td>
<td>Yes (1)</td>
</tr>
<tr>
<td></td>
<td>No (2)</td>
</tr>
<tr>
<td>What other lifestyle changes did you make?</td>
<td></td>
</tr>
<tr>
<td>Why didn't you make any other lifestyle changes?</td>
<td></td>
</tr>
</tbody>
</table>
# 13. ONES Module 5A

Please rate the following statements with respect to Module 5: Cooking Healthy

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Disagree (1)</th>
<th>Disagree (2)</th>
<th>Somewhat Disagree (3)</th>
<th>Neither Agree nor Disagree (4)</th>
<th>Somewhat Agree (5)</th>
<th>Agree (6)</th>
<th>Strongly Agree (7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>This module covered information I can apply to my daily life (1)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>I plan to try the recipe provided this week (2)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>I plan to do the workout video at least once this week (3)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>I plan to use at least one of the cooking healthy tips presented in this module (4)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>I plan to change my eating habits based on the information I learned from this module (5)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>The information presented in this module motivates me to make healthier choices (6)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td></td>
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</tbody>
</table>
14. ONES Module 5B

This is a survey about your eating and physical activity habits. As you read each question, think about the past week and what was presented on Module 5: Cooking Healthy. There are no wrong answers.

Did you try the recipe provided this week?
- Yes (1)
- No (2)

Answer If Did you try the recipe provided this week? No Is Selected

Why didn’t you try the recipe?

Did you do the workout video this week?
- Yes (1)
- No (2)

Answer If Did you do the workout video this week? Yes Is Selected

How many times this week did you do the workout video?
- 1 (1)
- 2 (2)
- 3 (3)
- 4 (4)
- 5 (5)
- 6 (6)
- 7 (7)

Answer If Did you do the workout video this week? No Is Selected

Why didn’t you do the workout video?

Did you use any of the cooking healthy tips provided this week?
- Yes (1)
- No (2)

Answer If Did you use any of the cooking healthy tips provided this week? Yes Is Selected

Which tips did you use? (You can choose more than one)
- Reduce fats (1)
- Reduce salt (2)
- Alternative cooking techniques (3)
- Add flavor with herbs and spices (4)

Answer If Did you use any of the cooking healthy tips provided this week? No Is Selected

Why didn’t you use any of the cooking healthy tips?

Did you change any eating habits based on the information learned in module 5?
- Yes (1)
- No (2)

Answer If Did you change any eating habits based on the information learned in module 5? Yes Is Selected

What eating habits did you change?
Answer If Did you change any eating habits based on the information learned in module 5? No Is Selected
Why didn't you change any eating habits?

Did you make any other lifestyle changes based on the information learned in module 5?
☒ Yes (1)
☒ No (2)

Answer If Did you make any other lifestyle changes based on the information learned in module 5? Yes Is Selected
What other lifestyle changes did you make?

Answer If Did you make any other lifestyle changes based on the information learned in module 5? No Is Selected
Why didn't you make any other lifestyle changes?
15. ONES Module 5B - 004

This is a survey about your eating and physical activity habits. As you read each question, think about the past week and what was presented on Module 5: Cooking Healthy. There are no wrong answers.

Did you try the recipe provided this week?
- Yes (1)
- No (2)

Answer: If Did you try the recipe provided this week? No Is Selected

Why didn’t you try the recipe?

Did you do the workout video this week?
- Yes (1)
- No (2)

Answer: If Did you do the workout video this week? Yes Is Selected

How many times this week did you do the workout video?
- 1 (1)
- 2 (2)
- 3 (3)
- 4 (4)
- 5 (5)
- 6 (6)
- 7 (7)

Answer: If Did you do the workout video this week? No Is Selected

Why didn’t you do the workout video?

Did the motivational video encourage you to make any lifestyle changes this week?
- Yes (1)
- No (2)

Answer: If Did the motivational video encourage you to make any lifestyle changes this week? Yes Is Selected

What lifestyle changes did you make?

Answer: If Did the motivational video encourage you to make any lifestyle changes this week? No Is Selected

Why didn’t the motivational video encourage you?

Did you use any of the cooking healthy tips provided this week?
- Yes (1)
- No (2)
<table>
<thead>
<tr>
<th>Answer If Did you use any of the cooking healthy tips provided this week?</th>
<th>Yes Is Selected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Which tips did you use? (You can choose more than one)</td>
<td></td>
</tr>
<tr>
<td>☑ Reduce fats (1)</td>
<td></td>
</tr>
<tr>
<td>☑ Reduce salt (2)</td>
<td></td>
</tr>
<tr>
<td>☑ Alternative cooking techniques (3)</td>
<td></td>
</tr>
<tr>
<td>☑ Add flavor with herbs and spices (4)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Answer If Did you use any of the cooking healthy tips provided this week?</th>
<th>No Is Selected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Why didn't you use any of the cooking healthy tips?</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Did you change any eating habits based on the information learned in module 5?</th>
<th>Yes (1)</th>
<th>No (2)</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Answer If Did you change any eating habits based on the information learned in module 5?</th>
<th>Yes Is Selected</th>
</tr>
</thead>
<tbody>
<tr>
<td>What eating habits did you change?</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Answer If Did you change any eating habits based on the information learned in module 5?</th>
<th>No Is Selected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Why didn't you change any eating habits?</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Did you make any other lifestyle changes based on the information learned in module 5?</th>
<th>Yes (1)</th>
<th>No (2)</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Answer If Did you make any other lifestyle changes based on the information learned in module 5?</th>
<th>Yes Is Selected</th>
</tr>
</thead>
<tbody>
<tr>
<td>What other lifestyle changes did you make?</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Answer If Did you make any other lifestyle changes based on the information learned in module 5?</th>
<th>No Is Selected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Why didn't you make any other lifestyle changes?</td>
<td></td>
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</table>
## 16. ONES Module 6A

Please rate the following statements with respect to Module 6: Weight Management

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Disagree (1)</th>
<th>Disagree (2)</th>
<th>Somewhat Disagree (3)</th>
<th>Neither Agree nor Disagree (4)</th>
<th>Somewhat Agree (5)</th>
<th>Agree (6)</th>
<th>Strongly Agree (7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>This module covered information I can apply to my daily life (1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I plan to try the recipe provided this week (2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I plan to do the workout video at least once this week (3)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I plan to use at least one of the weight management tips presented in this module (4)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I plan to change my eating habits based on the information I learned from this module (5)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The information presented in this module motivates me to make healthier choices (6)</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>
17. ONES Module 6B

This is a survey about your eating and physical activity habits. As you read each question, think about the past week and what was presented on Module 6: Weight Management. There are no wrong answers.

Did you try the recipe provided this week?
- Yes (1)
- No (2)

Answer If Did you try the recipe provided this week? No Is Selected
Why didn’t you try the recipe?

Did you do the workout video this week?
- Yes (1)
- No (2)

Answer If Did you do the workout video this week? Yes Is Selected
How many times this week did you do the workout video?
- 1 (1)
- 2 (2)
- 3 (3)
- 4 (4)
- 5 (5)
- 6 (6)
- 7 (7)

Answer If Did you do the workout video this week? No Is Selected
Why didn’t you do the workout video?

Did you use any of the weight management tips provided this week?
- Yes (1)
- No (2)

Answer If Did you use any of the weight management tips provided this week? Yes Is Selected
Which tips did you use? (You can choose more than one)
- Eat smaller portions (1)
- Choose healthy snacks (2)
- Don’t skip meals! (3)
- Watch what you drink (4)
- Get moving! (5)

Answer If Did you use any of the weight management tips provided this week? No Is Selected
Why didn’t you use any of the weight management tips?

Did you change any eating habits based on the information learned in module 5?
- Yes (1)
- No (2)
<table>
<thead>
<tr>
<th>Answer If Did you change any eating habits based on the information learned in module 5? Yes Is Selected</th>
</tr>
</thead>
<tbody>
<tr>
<td>What eating habits did you change?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Answer If Did you change any eating habits based on the information learned in module 5? No Is Selected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Why didn't you change any eating habits?</td>
</tr>
</tbody>
</table>

Did you make any other lifestyle changes based on the information learned in module 5?
- Yes (1)
- No (2)

<table>
<thead>
<tr>
<th>Answer If Did you make any other lifestyle changes based on the information learned in module 5? Yes Is Selected</th>
</tr>
</thead>
<tbody>
<tr>
<td>What other lifestyle changes did you make?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Answer If Did you make any other lifestyle changes based on the information learned in module 5? No Is Selected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Why didn't you make any other lifestyle changes?</td>
</tr>
</tbody>
</table>
This is a survey about your eating and physical activity habits. As you read each question, think about the past week and what was presented on Module 6: Weight Management. There are no wrong answers.

Did you try the recipe provided this week?
- Yes (1)
- No (2)

**Answer If Did you try the recipe provided this week? No Is Selected**

Why didn’t you try the recipe?

Did you do the workout video this week?
- Yes (1)
- No (2)

**Answer If Did you do the workout video this week? Yes Is Selected**

How many times this week did you do the workout video?
- 1 (1)
- 2 (2)
- 3 (3)
- 4 (4)
- 5 (5)
- 6 (6)
- 7 (7)

**Answer If Did you do the workout video this week? No Is Selected**

Why didn’t you do the workout video?

Did the motivational video encourage you to make any lifestyle changes this week?
- Yes (1)
- No (2)

**Answer If Did the motivational video encourage you to make any lifestyle changes this week? Yes Is Selected**

What lifestyle changes did you make?

**Answer If Did the motivational video encourage you to make any lifestyle changes this week? No Is Selected**

Why didn’t the motivational video encourage you?

Did you use any of the weight management tips provided this week?
- Yes (1)
- No (2)
<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Did you use any of the weight management tips provided this week?</td>
<td>Yes</td>
</tr>
<tr>
<td>Which tips did you use? (You can choose more than one)</td>
<td>Eat smaller portions (1)</td>
</tr>
<tr>
<td></td>
<td>Choose healthy snacks (2)</td>
</tr>
<tr>
<td></td>
<td>Don't skip meals! (3)</td>
</tr>
<tr>
<td></td>
<td>Watch what you drink (4)</td>
</tr>
<tr>
<td></td>
<td>Get moving! (5)</td>
</tr>
<tr>
<td>Did you use any of the weight management tips provided this week?</td>
<td>No</td>
</tr>
<tr>
<td>Why didn't you use any of the weight management tips?</td>
<td></td>
</tr>
<tr>
<td>Did you change any eating habits based on the information learned in module 5?</td>
<td>Yes (1)</td>
</tr>
<tr>
<td></td>
<td>No (2)</td>
</tr>
<tr>
<td>What eating habits did you change?</td>
<td></td>
</tr>
<tr>
<td>Did you change any eating habits based on the information learned in module 5?</td>
<td>No</td>
</tr>
<tr>
<td>Why didn't you change any eating habits?</td>
<td></td>
</tr>
<tr>
<td>Did you make any other lifestyle changes based on the information learned in module 5?</td>
<td>Yes (1)</td>
</tr>
<tr>
<td></td>
<td>No (2)</td>
</tr>
<tr>
<td>What other lifestyle changes did you make?</td>
<td></td>
</tr>
<tr>
<td>Did you make any other lifestyle changes based on the information learned in module 5?</td>
<td>No</td>
</tr>
<tr>
<td>Why didn't you make any other lifestyle changes?</td>
<td></td>
</tr>
</tbody>
</table>
This is a survey about your eating and physical activity habits. As you read each question, think about the past week and what was presented on Module 6: Weight Management. There are no wrong answers.

Did you try the recipe provided this week?
- Yes (1)
- No (2)

Answer If Did you try the recipe provided this week? No Is Selected
Why didn’t you try the recipe?

Did you do the workout video this week?
- Yes (1)
- No (2)

Answer If Did you do the workout video this week? Yes Is Selected
How many times this week did you do the workout video?
- 1 (1)
- 2 (2)
- 3 (3)
- 4 (4)
- 5 (5)
- 6 (6)
- 7 (7)

Answer If Did you do the workout video this week? No Is Selected
Why didn’t you do the workout video?

Did the motivational video encourage you to make any lifestyle changes this week?
- Yes (1)
- No (2)

Answer If Did the motivational video encourage you to make any lifestyle changes this week? Yes Is Selected
What lifestyle changes did you make?

Answer If Did the motivational video encourage you to make any lifestyle changes this week? No Is Selected
Why didn't the motivational video encourage you?

Did you use any of the weight management tips provided this week?
- Yes (1)
- No (2)
Answer If Did you use any of the weight management tips provided this week? Yes Is Selected
Which tips did you use? (You can choose more than one)
- Eat smaller portions (1)
- Choose healthy snacks (2)
- Don't skip meals! (3)
- Watch what you drink (4)
- Get moving! (5)

Answer If Did you use any of the weight management tips provided this week? No Is Selected
Why didn't you use any of the weight management tips?

Did you change any eating habits based on the information learned in module 5?
- Yes (1)
- No (2)

Answer If Did you change any eating habits based on the information learned in module 5? Yes Is Selected
What eating habits did you change?

Answer If Did you change any eating habits based on the information learned in module 5? No Is Selected
Why didn't you change any eating habits?

Did you make any other lifestyle changes based on the information learned in module 5?
- Yes (1)
- No (2)

Answer If Did you make any other lifestyle changes based on the information learned in module 5? Yes Is Selected
What other lifestyle changes did you make?

Answer If Did you make any other lifestyle changes based on the information learned in module 5? No Is Selected
Why didn't you make any other lifestyle changes?
20. ONES post survey

Please answer the following demographic questions.

Age

Occupation
☐ Student (1)
☐ Clemson employee (2)

Answer If Occupation Student Is Selected

Major:

Marital status
☐ Single (1)
☐ Married or domestic partnership (2)
☐ Divorced (3)
☐ Widowed (4)
☐ Prefer not to answer (5)

Where do you currently live?
☐ On campus (1)
☐ 4 miles or less from campus (2)
☐ More than 4 miles away from campus (3)

Are you on a college meal plan?
☐ Yes (1)
☐ No (2)

Answer If Are you on a college meal plan? Yes Is Selected

What type?
☐ All access 7 day (1)
☐ All access 5 day (2)
☐ Weekly 15 (3)
☐ Commuter 75 (4)
☐ Commuter 30 (5)

Annual household income before taxes:
☐ $0 - $20,000 (1)
☐ $20,001 - $30,000 (2)
☐ $30,001 - $40,000 (3)
☐ $40,001 - $50,000 (4)
☐ More than $50,000 (5)
☐ I prefer not to answer (6)

Have you ever been part of a diet or weight loss program?
☐ Yes (1)
☐ No (2)

Answer If Have you ever been part of a diet or weight loss program? Yes Is Selected

Which diet or weight loss program?
Where do you do most of your grocery shopping?
- Wal-Mart (1)
- Ingles (2)
- BI-LO (3)
- Publix (4)
- Food Lion (5)
- Sam’s Club (6)
- ALDI (7)
- Other (8)

This is a survey about your eating and physical activity habits. As you read each question, think about the past 6 weeks. There are no wrong answers.

During a typical week, how often do you...

<table>
<thead>
<tr>
<th>Plan meals ahead of time (1)</th>
<th>0 (1)</th>
<th>1 (2)</th>
<th>2 (3)</th>
<th>3 (4)</th>
<th>4 (5)</th>
<th>5 (6)</th>
<th>6 (7)</th>
<th>7 (8)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buy groceries (2)</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>Prepare your own meals (3)</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>Eat fast food meals (4)</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
</tbody>
</table>

During a typical week, how often do you...

<table>
<thead>
<tr>
<th>Shop with a grocery list (1)</th>
<th>Never (1)</th>
<th>Sometimes (2)</th>
<th>Often (3)</th>
<th>Always (4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Think about healthy food choices when deciding what to eat (2)</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>Use the &quot;Nutrition Facts&quot; on the food label to make food choices (3)</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
</tbody>
</table>
During a typical week, how many days do you exercise?
- 0 (1)
- 1 (2)
- 2 (3)
- 3 (4)
- 4 (5)
- 5 (6)
- 6 (7)
- 7 (8)

Answer If During a typical week, how many days do you exercise? 0 Is Not Selected

How long is your typical workout session?
- Less than 15 minutes (1)
- 15-30 minutes (2)
- 30-45 minutes (3)
- 45-60 minutes (4)
- More than an hour (5)

During a typical week, how many days do you go online to look for nutrition and/or health related information?
- 0 (1)
- 1 (2)
- 2 (4)
- 3 (5)
- 4 (6)
- 5 (7)
- 6 (8)

Answer If During a typical week, how many days do you go online to look for nutrition and/or health related... 0 Is Not Selected

What websites do you usually visit?

Which of the following devices did you use most frequently to watch the modules?
- Laptop (1)
- Smartphone (2)
- Desktop (3)
Please rate the following statements

<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Disagree (14)</th>
<th>Disagree (15)</th>
<th>Somewhat Disagree (16)</th>
<th>Neither Agree nor Disagree (17)</th>
<th>Somewhat Agree (18)</th>
<th>Agree (19)</th>
<th>Strongly Agree (20)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The slogan for the program is appropriate for its content (ONES: Providing access to a healthier you) (1)</td>
<td>◼️</td>
<td>◼️</td>
<td>◼️</td>
<td>◼️</td>
<td>◼️</td>
<td>◼️</td>
<td>◼️</td>
</tr>
<tr>
<td>The module slides had a nice visual appeal (2)</td>
<td>◼️</td>
<td>◼️</td>
<td>◼️</td>
<td>◼️</td>
<td>◼️</td>
<td>◼️</td>
<td>◼️</td>
</tr>
<tr>
<td>Overall, the weekly exercise videos were a beneficial complement to the ONES program (3)</td>
<td>◼️</td>
<td>◼️</td>
<td>◼️</td>
<td>◼️</td>
<td>◼️</td>
<td>◼️</td>
<td>◼️</td>
</tr>
<tr>
<td>Overall, the weekly recipe links were a beneficial complement to the ONES program (4)</td>
<td>◼️</td>
<td>◼️</td>
<td>◼️</td>
<td>◼️</td>
<td>◼️</td>
<td>◼️</td>
<td>◼️</td>
</tr>
<tr>
<td>Getting 1 course credit was enough incentive to participate in the ONES program (5)</td>
<td>◼️</td>
<td>◼️</td>
<td>◼️</td>
<td>◼️</td>
<td>◼️</td>
<td>◼️</td>
<td>◼️</td>
</tr>
</tbody>
</table>
Please rate the length of each of the following:

<table>
<thead>
<tr>
<th>Module</th>
<th>Topic</th>
<th>Too short (1)</th>
<th>Proper length (2)</th>
<th>Too long (3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Nutrition basics (1)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Physical activity basics (2)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>It's all about quality and quantity (3)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Grocery shopping (4)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Cooking healthy (5)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Weight management (6)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Overall length of the program (7)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Please rate your level of satisfaction with each of the following topics developed in the modules:

<table>
<thead>
<tr>
<th>Module</th>
<th>Topic</th>
<th>Very Dissatisfied (1)</th>
<th>Dissatisfied (2)</th>
<th>Somewhat Dissatisfied (3)</th>
<th>Neither Satisfied nor Dissatisfied (4)</th>
<th>Somewhat Satisfied (5)</th>
<th>Satisfied (6)</th>
<th>Very Satisfied (7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Nutrition basics (1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Physical activity basics (2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>It's all about quality and quantity (3)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Grocery shopping (4)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Cooking healthy (5)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Weight management (6)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Overall, did the ONES program motivate you to make any lifestyle changes?

- Yes (1)
- No (2)

What lifestyle changes did you make?

Why didn't the ONES program motivate you?

What suggestions, if any, do you have to improve the ONES program?
21. ONES 2-week follow up

This is a survey about your eating and physical activity habits. As you read each question, think about the past 2 weeks since the ONES program ended. There are no wrong answers.

During the past 2 weeks, how many days have you...

<table>
<thead>
<tr>
<th></th>
<th>0 (1)</th>
<th>1 (2)</th>
<th>2 (3)</th>
<th>3 (4)</th>
<th>4 (5)</th>
<th>5 (6)</th>
<th>6 (7)</th>
<th>7 (8)</th>
<th>8 (9)</th>
<th>9 (10)</th>
<th>10 (11)</th>
<th>11 (12)</th>
<th>12 (13)</th>
<th>13 (14)</th>
<th>14 (15)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planned meals ahead of time (1)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bought groceries (2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prepared your own meals (3)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eaten fast food meals (4)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

During the past 2 weeks, how often have you...

<table>
<thead>
<tr>
<th></th>
<th>Never (1)</th>
<th>Sometimes (2)</th>
<th>Often (3)</th>
<th>Always (4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shopped with a grocery list (1)</td>
<td></td>
<td>○</td>
<td></td>
<td>○</td>
</tr>
<tr>
<td>Thought about healthy food choices when deciding what to eat (2)</td>
<td></td>
<td>○</td>
<td></td>
<td>○</td>
</tr>
<tr>
<td>Used the &quot;Nutrition Facts&quot; on the food label to make food choices (3)</td>
<td></td>
<td>○</td>
<td></td>
<td>○</td>
</tr>
</tbody>
</table>
During the past 2 weeks, how many days have you exercised?
- 0 (1)
- 1 (3)
- 2 (4)
- 3 (5)
- 4 (6)
- 5 (7)
- 6 (8)
- 7 (9)
- 8 (10)
- 9 (11)
- 10 (12)
- 11 (13)
- 12 (14)
- 13 (15)
- 14 (16)

Answer If During the past 2 weeks, how many days have you exercised? 0 Is Not Selected

How long is your typical workout session?
- Less than 15 minutes (1)
- 15-30 minutes (2)
- 30-45 minutes (3)
- 45-60 minutes (4)
- More than an hour (5)

During the past 2 weeks, how many days have you been online looking for nutrition and/or health related information?
- 0 (1)
- 1 (2)
- 2 (3)
- 3 (4)
- 4 (5)
- 5 (6)
- 6 (7)
- 7 (8)
- 8 (9)
- 9 (10)
- 10 (11)
- 11 (12)
- 12 (13)
- 13 (14)
- 14 (15)

Answer If During the past 2 weeks, how many days have you been online looking for nutrition and/or health related information? 0 Is Not Selected

What websites did you visit?
Overall, did the ONES program motivate you to make any lifestyle changes?
☑ Yes (1)
☑ No (2)

Answer If Overall, did the ONES program motivate you to make any lifestyle changes? Yes Is Selected
What lifestyle changes did you make?

Answer If Overall, did the ONES program motivate you to make any lifestyle changes? No Is Selected
Why didn't the ONES program motivate you?