THE DEVELOPMENT AND TESTING OF THE QUESTIONNAIRE FOR THE BE FREE PROGRAM

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ABSTRACT

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Women 40 to 65 years of age experience many life changes including menopausal transition. The BE FREE™ program aims improve overall wellness and enhance quality of life for women in this group. PURPOSE: To test and validate a questionnaire for the BE FREE™ program. METHODS: Two rounds of expert panel testing were conducted to create a 36-question BE FREE™ questionnaire. A target population of women 40 to 65 years old were asked for feedback in a pilot round. The final 36-question questionnaire was administered to the target population for analysis. RESULTS: The questionnaire produced an alpha value of 0.41, and error variance of 0.83. Subscale alpha values included behavior (0.58), environment (-0.54), food (-0.39), rest (-0.52), exercise (0.25), and emotional health (0.05). CONCLUSION: The questionnaire needs to display highly correlated items with higher Cronbach alpha scores to represent reliability with lower error of variance to be considered reliable and valid.

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CHAPTER I
INTRODUCTION

Women's health is a continually growing area of study. Risk factors, onset, diagnosis, prevention, and treatment for disease in women differ from men. In the US, women make up 50.8% of the population (U.S. Department of Commerce, 2016), with increasing numbers of women between 40-65 years of age. This specific age group is important because it encompasses women in midlife going through changes in self, family dynamic, career, and the transition of menopause.

Midlife is a time of many changes in a woman's life. Depending on where she is in midlife, she could have children leaving home, planning for retirement, becoming primary caretaker for aging parents, and/or focusing more on herself for the first time in a while. Women are typically caregivers taking care of family, a spouse, children, or all the above. It is common for a woman to focus more on taking care of others around her, than taking care of herself and her health. In addition to the changes in family, career, and lifestyle, as a woman approaches midlife, her body also begins changing. These changes, such as menopause, will begin in a woman's 40s and can last into her 50s and early 60s. Menopause is a pivotal time for women as they transition from perimenopause to post menopause and experience the various changes that take place. This change of life involves

multiple alterations within a woman's body, some of which can increase the risk for diseases such as cardiovascular disease (CVD), osteoporosis, and diabetes (Monteleone et al., 2018).

The onset of menopause occurs between 45-55 years of age for most women, with 51 years of age being the average age for women in the US (U.S. Department of Health and Human Services, 2017). Life expectancy continues to increase, which means that "women will spend more than one-third of their lives postmenopausal" (Pu, Tan, Yu, & Wu, 2017, p. 1). A woman is considered to be in menopause when she has had the absence of a menstrual cycle for one year (U.S. Department of Health and Human Services, 2017). In menopause, the ovaries stop producing the sex hormones, estrogen and progesterone ((U.S. Department of Health and Human Services, 2017). This decline in hormone levels causes menopausal symptoms including hot flushes ("flashes"), night sweats, mood disorders, sleep disturbances, urogenital disorders, bone loss, and metabolic problems (Pu et al., 2017). In addition to changes in estrogen and progesterone synthesis, women experiencing menopause also have changes in luteinizing hormone (LH) and follicle stimulating hormone (FSH) (Pardhe et al., 2017). The changes in these hormone levels have significant effects on a woman's body and can increase the risk of developing obesity, metabolic syndrome (MetS), CVD, osteoporosis, and diabetes.

Estrogen deficiency after menopause has been associated with increased risk for several diseases and is considered one of the key factors for development of MetS in postmenopausal women (Pu et al., 2017). MetS is diagnosed when a person has at least

three out of five symptoms involving obesity (central adiposity), low high-density lipoprotein (HDL) cholesterol levels (< 50 mg/dL), high triglyceride (TAG) levels (> 150 mg/dL), insulin resistance, and elevated blood pressure (Pu et al., 2017). The incidence of MetS is 31-55% in postmenopausal women (Pu et al., 2017).

Postmenopausal women have increased levels of TAG and low-density lipoprotein (LDL) cholesterol levels, along with an increase in systolic and diastolic blood pressure, body mass index (BMI) and waist circumference, and fasting glucose and insulin levels (Pu et al., 2017). Levels of HDL are conflicting between studies, with some showing a decrease in HDL levels and others showing a slight increase or no change (Pu et al., 2017). The greater incidence of MetS in postmenopausal women is most likely caused by the menopausal transition rather than the postmenopausal status of the women (Pu et al., 2017). Women with surgical menopause experience more severe menopause symptoms than women who experience natural menopause. Surgical menopause is defined as the removal of the ovaries or significant damage to the ovaries that causes them to stop functioning and is associated with a 1.5 greater risk for developing MetS than natural menopause (Pu et al., 2017). Good health status is important as women age because menopause is shown to be a considerable risk factor for the development of MetS.

The decrease in estrogen seen in menopause is also associated with increased cardiovascular risks, as estrogen has been shown to have a cardioprotective effect. This cardioprotective effect of estrogen helps maintain higher levels of HDL (> 50 mg/dL) and lower levels of LDL (> 100 mg/dL) (U.S. Department of Health and Human Services,

2017) and TAG (< 150 mg/dL) (Pardhe et al., 2017). Levels of total cholesterol (TC), HDL, LDL, and TAG are elevated in postmenopausal women due to the loss of the cardioprotective effect of estrogen, placing women at greater cardiovascular risk after menopause. In addition to a decrease in estrogen levels, LH and FSH are elevated after menopause. Increased risk of CVD is associated with a combination of lower estrogen levels and elevated levels of LH and FSH that affect plasma lipid and lipoprotein metabolism (Pardhe et al., 2017).

The lipid profile of women begins to change leading up to menopause and can be vastly different post menopause. These changes place postmenopausal women at a greater risk for coronary heart disease (CHD) events later in life. Monitoring lipid and lipoprotein levels in women before and during menopause, implementing a healthy diet, and beginning exercise could potentially reduce risk of CHD and related events post menopause (Matthews et al., 2016).

Menopause also increases a woman's risk of osteoporosis due to the "loss of the bone-anabolic and antiresorptive effects of the ovarian hormones" (Seifert-Klauss et al., 2012, p. 433). Osteoporosis affects 10 million Americans, of which 8 million are women (Sanders & Geraci, 2013). About 20% of bone density is lost within 5 to 7 years of menopause (Sanders & Geraci, 2013). The most rapid bone density loss occurs during the menopause transition (Seifert-Klauss et al., 2012). Increased levels of LH and FSH are associated with more significant trabecular bone density loss, while higher levels of estradiol are associated with less average bone density loss (Seifert-Klauss et al., 2012).

Major risk factors, in addition to stage of menopause, include lower initial body weight, BMI below 20 kg/m^2, and a positive family history of osteoporosis (Seifert-Klauss et al., 2012). A structured exercise program that includes strength/resistance and weight training and aerobic activity decrease bone loss and improves strength, flexibility, and mobility of joints in postmenopausal women (Sanders & Geraci, 2013).

Type 2 diabetes mellitus is another complication associated with changes in women around menopause. While MetS, CVD, and osteoporosis are linked to postmenopausal women, the risk of developing type 2 diabetes begins several years prior to menopause. Park et al. identified that the risk of developing type 2 diabetes starts about 7 years prior to the final menstrual period (FMP) (2016). In the years leading up to menopause, levels of estradiol and FSH are associated with increased risk for development of diabetes. Women with a greater rate of increase in FSH levels (5.9 IU/L/year) at least 2 years prior to menopause had a lower risk of developing type 2 diabetes (Park et al., 2016). Higher levels of estradiol (160.4 vs 213.6 pmol/L) in pre-menopause and early perimenopause are also linked to a lower risk for developing type 2 diabetes. Once in the transition of menopause, changes in either hormone level did not show any association with development of type 2 diabetes (Park et al., 2016). Hormone levels affected women independently of weight, though obesity has been linked to lower levels of estradiol and FSH. Weight management is important in middle aged women prior to menopause, as obesity is linked to lower levels of these hormones, and lower levels of these hormones prior to menopause is linked to higher risk of developing type 2 diabetes (Park et al., 2016).

BE FREE™ Program

The BE FREE™ program is a comprehensive approach to creating a healthy lifestyle. The program is currently being developed by Jennifer Neily MS, RDN, LD, FAND through her private practice experience, counseling clients who are typically women in premenopause, perimenopause, and postmenopause. Neily's work inspired her to develop a program that would bring more nutritional and overall wellness to women 40 to 65 years of age. BE FREE™ is an acronym for six components of health/wellness that involve behavior (B), environment (EN), food (F), rest (R), exercise (EX), and emotional health (EH).

The behavior component addresses the behaviors individuals have developed over their lifetime that affect several aspects of personal health and nutrition. Behaviors involving food choice, diet mentality, learning hunger and fullness cues, meal planning, tracking intake with a food log, and mindful eating practice. This component focuses on understanding learned behaviors that influence food choice and intake and finding a way to help individuals to adjust their behaviors to fit a healthier lifestyle and habits. It is important to understand the learned behaviors and reasoning behind them in order to help individuals keep their identity while also learning to adopt healthier practices.

The environment component evaluates the social and personal environments of an individual and how it influences food choice. Environment involves the foods kept in one's home, food temptation in public and/or work settings, navigating the grocery store,

plate/portion sizes, and dining with family and/or friends. The environment a person creates at home has a large impact on the food choices they make for meals and snacks. Learning to stage the environment for success is crucial for adopting healthier food practices. Social environments can cause feelings of anxiety and present temptation for individuals, as do grocery stores and workplace settings. Similar to behavior, environment is learned over time and influences the choices an individual makes regarding diet and/or exercise. There are many ways environment can affect a person's health.

The food component addresses the food choices and portion sizes of individuals. As with behavior and environment, food is also a learned behavior. Individuals are exposed to food at a very young age, beginning the culture of diet and food preference. Understanding how and why individuals choose food is an important foundation to begin teaching effective strategies for healthier food choice. Changing the way an individual visualizes portion sizes and food choices, as well as increasing their knowledge of the nutrients in food is a fundamental step in creating healthier dietary behaviors.

The rest component addresses behaviors and routines individuals practice involving sleep. Sleep disturbances and insomnia are a common problem that women 40 to 65 years of age deal with daily. At this time in life, sleep can be difficult and have a negative impact on their overall health. The rest component of the program aims to educate individuals on better sleep practices to improve quality and duration of sleep. Healthy routines include limiting caffeine in the evening, putting technology devices away before bed, meditation

and/or yoga, and creating a soothing/relaxing environment. The benefits of learning how to obtain a restful night's sleep are immeasurable.

The exercise component addresses the physical activity level and practices of an individual. Exercise is an integral component of overall wellness. Particularly for women in midlife, exercise can be beneficial in weight management, strength, and cardiovascular health. Women of this age group can benefit long-term from developing a manageable exercise program, preventing and/or decreasing bone loss, alleviating symptoms of menopause, and enhancing mental and physical health. It is imperative to help educate women about the benefits of exercise, as well as help them develop an exercise routine that fits their lifestyle. The goal is to create a positive outlook on exercise and develop a plan that is manageable and enjoyable for the long term.

The emotional health component addresses the ways in which people take care of themselves. Self-care practices such as keeping a gratitude journal, meditation, and setting aside personal time can improve an individual's emotional health. Many aspects of health can be negatively impacted when emotional health is suffering. Anxiety, depression, loneliness, and low self-worth are struggles women encounter throughout midlife as they navigate life changes and menopause. Learning to take time to care for themselves is vital to their well-being, both emotionally and physically. A support group of family, friends, and/or faith can improve an individual's emotional health. In addition, the help of a professional can be beneficial in guiding a person to achieve better emotional health by teaching self-care practices and encouraging social support systems.

Purpose

Changes in a woman's body can increase risk of disease beginning several years prior to menopause. These changes continue through the menopause transition and can present a challenge as women try to adapt and maintain good health. Women at this stage of their life are interested in focusing on their own health and have more time and resources to do so. Working to become healthier and achieve overall wellness can slow and/or prevent many of the chronic diseases and challenges presented during midlife.

The purpose of this study, therefore, is to test and validate a questionnaire for the BE FREE™ program (see Appendix A). The development of the questionnaire is the first step in building the BE FREE program™. This study included developing and testing a questionnaire for both validity and reliability to be used for assessment in this program with women 40 to 65 years of age. Once developed and validated, this assessment tool will help to identify areas of wellness for these females to improve to enhance health and quality of their lives.

Hypothesis

The hypothesis of this study is: The BE FREE™ questionnaire will identify components of wellness to be improved to create a healthier lifestyle in premenopausal, perimenopausal, and postmenopausal women. This study will answer how the BE FREE™ questionnaire will assess the wellness needs of premenopausal and postmenopausal women,

as well as women during the transition of menopause. Researchers attempt to answer how the stage of menopause changes the needs identified through the assessment.

Definitions

Bone mineral density (BMD) - the amount of mineral matter, such as calcium, per square centimeter of bones. Bone density is used as an indirect indicator of osteoporosis and fracture risk (www.ncbi.nlm.nih.gov).

Bone resorption – bone loss due to the breakdown of bone by osteoclasts resulting in the release of calcium from the bone into the blood stream (Song, 2017).

C-terminal telopeptide of type 1 collagen (CTX) - Serum bone metabolic marker of bone resorption (Song, 2017).

Menopause – the absence of a menstrual cycle for 12 consecutive months (U.S. Department of Health and Human Services, 2017). Also referred to as "the change of life."

Osteocalcin – serum bone metabolic marker; osteoblast specific hormone (Wen, Huang, Li, Chong, & Ang, 2017).

Peri-menopause - "around menopause," refers to the time during which a woman's body makes the natural transition to menopause, marking the end of the reproductive years. Perimenopause is also called the menopausal transition (Mayo Clinic, 2016).

Post-menopause – the years after menopause; most menopausal symptoms stop at this time

Satiation – the end of desire to eat after a meal; occurring any time after the start of eating. Satiation is controlled by hormones and stretch receptors in the stomach, signaling the brain when the meal is over (Anthony, 2014).

Satiety – the physical feeling of fullness that causes a person to stop eating (Anthony, 2014).

Vasomotor symptoms (VMS) - episodes of profuse heat occurring with sweating and flushing primarily around the head, neck, chest, and upper back. Often referred to as hot flashes and night sweats (Thurston & Joffe, 2011).

Assumptions

Participants were all females between 40-65 years old. All were able to read and write English and had access to a computer. They were competent enough to understand the potential risks of participation in the study. The answers provided by participants on the demographic and health history questionnaire were assumed to be accurate. Responses to the questions in the BE FREE™ questionnaire were assumed to be honest reflections of their feelings and behaviors.

The expert panel participants were experts in the fields of nutrition and/or psychology/behavioral science. All experts had a minimum of a 4-year college degree and were credentialed in their field of practice. Experts were competent and able to understand the purpose of the study, expectations involving feedback, and risks of participation. They had access to a computer and were able to read and write English.

Limitations

Participants of the study were only females between 40-65 years of age. The target population was chosen based on the typical client base of Jennifer Neily MS, RDN, LD, FAND. Individuals excluded from the study were men and anyone under 40 years old or older than 65 years old. Exclusion also included those that could not speak or write English and/or without computer access. Recruitment of the expert panel was limited to professional and/or personal contacts of Jennifer Neily MS, RDN, LD, FAND and Nancy DiMarco PhD, RDN, LD. The target population was mainly recruited through the Texas Woman's University (TWU) email system. A small percentage of the target population was recruited through personal contacts of Jennifer Neily MS, RDN, LD, FAND and Lindsi Gjetley RD.

The early stage of development of the program may have limited the use and full understanding of the questionnaire. Limited rounds of testing were conducted due to time constraints within the semester. The number of the participants on the expert panel was relatively small (n = 22) and their area of expertise was narrow consisting mainly of dietitians. The pilot round of target population testing was very small (n = 25) and could not produce significant data.

CHAPTER II
REVIEW OF THE LITERATURE

The time of midlife for a woman is full of changes in many areas of health including emotional, physical, environmental, and social. During this time of life, a woman can experience changes in home life with children leaving the home and/or taking care of aging parents. These changes can also bring about a shift in a woman's social environment, which can impact her emotional health. In addition to these external environment changes, a woman also experiences a myriad of physical changes during this time.

The transition of menopause occurs at this time of a woman's life, bringing about changes in physical appearance and health. A woman experiences changes in physical appearance, mood, memory, sleep patterns, emotional health, and vasomotor symptoms (VMS). These changes take place over several years and can be stressful, as well as impact a woman's personal and social life (Monteleone, Mascagni, Giannini, Genazzani, & Simoncini, 2018).

VMS, sleep disturbance, anxiety, depression, and changes in cognitive performance are all central nervous system-related symptoms of menopause. VMS are the most common symptom associated with menopause and is reported by 75% of women during menopause (Monteleone et al., 2018). These symptoms include hot flashes and sweating

and can be followed by trembling and a sensation of coldness. VMS can present as early as two years prior to the FMP and last several years after. Approximately 12% of women report VMS continuing up to 12 years after the FMP. Women with earlier onset of VMS will experience these symptoms for a longer period postmenopausal, with 7.4 years being average (Monteleone et al., 2018).

The onset of symptoms is sudden and random, occurring anytime during the day or night. Quality of sleep is greatly affected by VMS experienced at night time due to increased restlessness in bed, less efficient sleep, and feeling fatigued in the morning. Sleep disruption, specifically waking throughout the night, is common in menopause. Approximately 40-60% of women report increased sleep disturbances regardless of the presence of VMS (Monteleone et al., 2018).

Sleep disturbances are mostly observed during menopause or postmenopause, and less in the premenopause stage. Depressive and VMS are the most common reason for sleep disturbances, though the transition of menopause itself can cause changes in sleep quality due to change in arousal levels during REM and non-REM sleep. Women with clinical insomnia are more likely to experience nocturnal hot flashes than women without clinical insomnia. Sleep disturbances have been linked to a higher risk of cognitive decline in menopausal women. Cognitive function is affected specifically in attention span, episodic memory, and self-regulation (Monteleone et al., 2018).

Decline in memory and concentration have been reported by menopausal women. A decline in cognitive performance, particularly learning, is specific to women in menopause rather than pre- or post- menopause. Verbal memory is impaired in early and/or late menopause, while speed processing is affected during late menopause (Monteleone et al., 2018). Speed processing is also diminished in women with depressive symptoms, while women with anxiety exhibit worsened verbal memory. VMS and the associated sleep disturbances contribute significantly to cognitive decline and poor memory function.

Cognitive function is affected more severely in women with surgical menopause compared to those who undergo natural menopause. Surgical menopause is brought on by the surgical removal of the ovaries. In addition to the decline in cognitive function during menopause, women with surgical menopause are also at greater risk of cognitive impairment or dementia in the years after menopause (Monteleone et al., 2018).

Depression and anxiety are symptoms experienced by women throughout the menopausal transition. Depressive symptoms can include sadness, loss of interest, decreased appetite, loss of sleep, diminished concentration, feelings of guilt, fatigue, agitation, and suicidal ideation (Monteleone et al., 2018). These symptoms most often occur during menopause and the early years of postmenopause rather than during premenopause. History of depression increases the likelihood of a woman experiencing depressive symptoms during menopause and up to 2 years postmenopause. Women with a history of anxiety will continue to experience anxiety throughout menopause. However,

women with low anxiety prior to menopause are at risk of experiencing high levels of anxiety during and after the menopausal transition (Monteleone et al., 2018).

Weight gain and change in body fat distribution is another change experienced in menopause. Women have a higher incidence of obesity post menopause, though the increase in weight is related more to the process of aging rather than menopause itself. Body fat redistribution, however, is related to menopause. The redistribution of body fat is characterized by accrual of visceral adiposity around the torso, leading to an increase in waist circumference and change in body shape (Monteleone et al., 2018). This increase in visceral adiposity can affect a woman's self-esteem, in turn affecting her personal and social life. It also further increases risk of cardiovascular disease, MetS, and diabetes.

A woman's personal and social life is greatly affected by the menopausal transition. This can be impacted further depending on cultural or social beliefs. For example, approximately 20% of women internationally perceive menopause as a disease (Monteleone et al., 2018). The symptoms of menopause can be distressing for women and cause problems in aspects of daily living. In addition to the effects on a woman's social and work life, self-image can be negatively affected by the symptoms of menopause. Women have to adjust to the changes taking place inside their bodies as well as the alterations to their physical appearance. Aging, loss of fertility, empty nest syndrome, retirement, becoming the caretaker for aging parents or spouse, and/or loss of parents or spouse are all experienced during this time of midlife. These changes are followed by a

shift in personal and social dynamics and relationships, which can have an effect on mood and perceived quality of life.

Focusing on self-care and improvement of health is important during this time of a woman's life. The BE FREE™ program is targeted at this group to enhance overall wellness and improve quality of life during and after the menopausal transition. The six components of wellness in the BE FREE program address nutrition, physical activity, sleep quality, and emotional health. Behavior, environment, food, rest, exercise, and emotional health all play a significant role in overall wellness.

Food, Behavior, Emotional Health, and Environment: Factors that Impact Food Choices

Nutrition is necessary for growth and survival. Understanding how individuals perceive food, and how those beliefs/practices are developed is essential for meaningful nutrition counseling. Nutrition belief and practice is developed from an early age when people are first exposed to food. Researchers describe "food choice trajectories" as the early life experiences that shape how people form thoughts, feelings, and behaviors related to food choices that will continue throughout their lifetime (Bisogni, Jastran, Seligson, & Thompson, 2012). Adults across several ethnic groups described that early life exposure to fruits and vegetables have heavily influenced their current consumption of these foods (Bisogni et al., 2012). While exposure to foods and eating practices early in life have a large impact on an individual's eating behavior and beliefs, these beliefs and behaviors continue to be shaped by life experiences over time. Knowledge of nutrition, learned

behaviors, food choice and practice, emotional and social support, and the surrounding environment are all intertwined components that impact dietary behavior.

Sensory information and expected satiation and satisfaction from foods influence the types of foods consumed and the portion sizes chosen at meals. Personal experience, age, and illness will impact dietary habits and foods consumed throughout a person's life (Boesveldt et al., 2018; Brunstrom, 2014; Irvine, Brunstrom, Gee, & Rogers, 2013). Palatability is a major determinant of food choice and consumption starting in childhood and continuing through adulthood. Overconsumption of a food is heavily driven by palatability (Boesveldt et al., 2018). Appetite and intake control are dependent on the development of sensory and cognitive cues for pre- and post-ingestion. The sensory and cognitive cues are learned with exposure to individual foods and meals. Individuals create association of expected satiation from the consumption of an individual food item, as well as the amount of food consumed at a meal.

Appetite control is influenced by sensory information such as smell, taste, texture, and expected satiation. All of these components help shape the perception of the foods chosen for consumption and the acceptability for repeated consumption. The aroma of food is detected before it is visually identified and can begin the process of appetite stimulation. Once the food enters the mouth, the retro-nasal aroma continues the effect on bite size and the feeling of fullness, though it may not impact the amount of food consumed (Boesveldt et al., 2018). The sense of taste influences meal size, as palatability is a driver for increased food intake. Meals that have a stronger flavor profile, with a mixture of both

sweet and salty tastes, are perceived as more satisfying and therefore meal size is typically reduced (Boesveldt et al., 2018).

Texture of foods play an important role in food choice and intake. The expected satiation of a food is influenced by the texture of the food. Thicker and chewier foods and beverages are perceived as more filling and satiating than foods without these characteristics (Boesveldt et al., 2018; Brunstrom, 2014). Creamy foods are also perceived as more satiating. Incorporating foods that are chewier and have a thicker consistency reduce meal size by 10-30% compared to equally preferred foods of lesser viscosity and softer texture. Thicker and chewier foods take more time to process, requiring smaller bite size, more chewing, and a longer time spent in the mouth (Boesveldt et al., 2018; Brunstrom, 2014). When comparing food items of equal caloric value, foods that take longer to chew are anticipated to be more satisfying and filling than those that are softer to chew or less viscous (Boesveldt et al., 2018).

Expected satiation and expected satiety play a large role in appetite and portion control. Through associative learning and episodic memory, people develop an expected satiation for individual foods and/or meals (Brunstrom, 2014; Irvine et al., 2013; Labbe, Rytz, Godinot, Ferrage, & Martin, 2017). Familiarity of a food affects the expected satiety. When a person has eaten a food to satiety, an expected satiety from the food is developed for future consumption. Certain foods, such as snack foods, may have a lower expected satiety because they are not usually consumed to satiety. This limits the opportunity for learned satiety to occur for that particular food item (Irvine et al., 2013).

Meal planning is an integral part of dietary control and plays a role in the development of expected satiety for foods. When meals are planned in advance, the portion size and expected satiety of the foods/meal is predetermined before eating takes place. This controls the amount of food consumed, while also establishing a memory for portion size and the satiety that is experienced after consuming the food (Brunstrom, 2014; Irvine et al., 2013). When people plan and self-serve a meal, 92% of the meal is consumed (Labbe et al., 2017). The association formed from meal planning to portion size and expected satiety provides insight into the learned behavior of food choice and intake and could be a useful tool in dietary control and weight loss.

As portion size has steadily increased over the years, it is important to understand the bases of how portion size is learned. Many factors influence chosen portion size of foods including perceived nutritional value, expected satiety and satiation, expected liking, and the food environment (Labbe et al., 2017). Foods that are perceived as "healthy" are generally eaten in larger portions. People believe healthier foods have a lower calorie content and therefore can be consumed in larger quantities versus foods perceived as "unhealthy." Portion size is also determined by expected liking of a food; the more a food is enjoyed, the larger the portion size (Labbe et al., 2017).

Satiety and satiation expectation influence portion size based on prior experiences eating a particular food. Foods with a higher expected satiation are consumed in smaller self-selected portions (Labbe et al., 2017). Studies report that palatability and expected liking is a weaker predictor of selected portion size than expected satiety or satiation.

However, Labbe et al. concluded that expected satiety and satiation were weaker predictors of selected portion size when participants were given different styles of pizza. When consuming pizza, palatability and expected liking were stronger predictors of portion size selection. Perceived healthfulness and expected tastiness were the significant characteristics when participants were asked to choose between pizza toppings. The participants choice of portion size of their selected pizza was influenced by tastiness for 56% of the group, and 44% made their decision based on perceived healthfulness of the toppings (Labbe et al., 2017).

Food environment includes food packaging, social influence and setting, and portion size (Labbe et al., 2017). Eating with distractions, such as computer games and television, can affect appetite at the end of the meal as well as increasing the amount of food consumed at the next meal. This effect is due to the interruption of memory encoding during the ingestion of a meal (Brunstrom, 2014). Memory of a meal affects satiety, as well as influences portion size selection for subsequent meals. Individuals who are distracted at meal times have an interruption in memory coding, leading to an altered satiety from a recently consumed meal. This effect is seen in patients with amnesia. Amnesic patients experience hyperphagia, as they have no memory of the recent meal and experience little change in hunger and satiety shorting after consuming a meal (Ferriday et al., 2015).

When given stimuli from two different sources, television and audio recording, participants consumed more food at a meal compared to meals eaten without a stimulus

(Bellisle, Dalix, & Slama, 2004). The distractions present at meal times divert an individual's attention from their hunger and satiety cues and/or their purposeful intake control, leading to overconsumption. Television is thought to be a more potent distraction, though in a study comparing television and a recorded story, both stimuli were equal in causing the individual to increase food intake. The effect of the environmental distractions was proved not to be a result of more hunger prior to the meal or a more palatable meal, as control meals were the same (Bellisle et al., 2004). The environment in which a meal is consumed has an impact on food intake, regardless of hunger and/or satiety cues or taste preference for the meal.

Eating at a slower pace is shown to reduce portion size while attaining a feeling of fullness and satisfaction from a meal. Meals eaten at a faster pace lead to overconsumption and a lower expected satiation. Attentive eating encourages a slower consumption rate of food, as well as reinforcing episodic memory encoding of the meal (Ferriday et al., 2015). In a study conducted on eating rate, Ferriday et al. observed that participants that consumed a smaller amount of soup at a slower rate, had increased satiation and satiety after the meal, and also at three hours postprandial compared to those who ate a larger portion at a faster rate (2015).

Larger intake amounts are observed when people have more variety in meals. The *variety effect* is a term used to describe the observation of increased food intake seen when individuals are offered a variety of foods with different sensory characteristics (Keenan, Brunstrom, & Ferriday, 2015; Wilkinson, Hinton, Fay, Rogers, & Brunstrom, 2013).

Sensory specific satiety is the basis for the variety effect. The idea that eating a specific food becomes less enjoyable as it is eaten when compared to other foods that may be presented (Brunstrom, 2014; Wilkinson et al., 2013). Larger portions are chosen at a meal that offers more variety between foods, whether it be introducing a different type of food, or increasing sensory distinction between foods (Brunstrom, 2014). When a meal offers a variety of foods with different sensory characteristics, it is estimated that food intake increases by 29% (Keenan et al., 2015).

Variety in a meal shifts expected satiety and satiation from an individual food to the volume of the foods presented. Prior experience from consuming a particular food produces expected satiation and satiety for that food, though when combined in a meal with several foods, the volume of the meal creates the expected satiety and satiation (Keenan et al., 2015). When participants are presented with a two-course meal, larger portions are chosen for the second course when the foods are different. On the other hand, when the food in the first and second course are the same, the portion size of the second course was significantly smaller. The larger the difference in sensory characteristics of the food between courses, the larger the intake amount of the second course (Wilkinson et al., 2013). Another study found that when presented with low variety meals, participants relied on learned expected satiation to determine intake. However, when presented with a high variety meal, participants relied on food volume for expected satiation rather than the learned expected satiation of the individual food item (Keenan et al., 2015).

Physiological and psychological explanations help provide insight into food choice and intake, though external influences are also imperative to acknowledge. Culture and early experiences shape the way individuals perceive food and make up the foundation of their knowledge of nutrition. Culture and family support are influential in an individual's learned behaviors. These aspects are necessary to acknowledge when addressing dietary habits in a practical environment. It is important to understand how people view healthy food and the importance they place on consuming a healthy diet. People describe healthy eating in a variety of ways, including in terms of foods (food groups, type of food, functional food), terms of nutrients, and how food is prepared, processed, or produced. Consequences of not eating healthy, effect on psychosocial well-being, spiritual well-being, and moral beliefs are also considered when describing healthy eating (Bisogni et al., 2012). Psychosocial well-being relates to how food makes a person feel about themselves. Eating a healthy diet is not perceived as a pleasurable experience and is often viewed as boring, not tasty, and not satisfying (Bisogni et al., 2012). This view on healthy eating can alter adherence to a healthy diet if individuals feel healthy food choices deprive them of a pleasurable eating experience and produce feelings of guilt over foods they consume.

Traditions and culture relate to spiritual well-being and can have a connection through food. Some cultures have religious practices that involve beliefs about food/diet. These beliefs/practices have a large influence on the foods that individuals consume, as they feel it connects them to their spirituality and/or culture (Bisogni et al., 2012). For some people, a moral component can have an influence on dietary habits. This moral

component describes food choices as “being good” or doing things “the right way,” which can leave individuals feeling guilty if they do not make the “right” choices (Bisogni et al., 2012). The feeling of restriction and control in following a healthy diet, as perceived by many individuals, can deter them from implementing more balanced eating behaviors.

In addition to cultural belief and practices, socioeconomic status affects the perception of the importance of nutrition. Parents with a higher income place a higher priority on healthy eating and relate it to nutritional and medical importance; while parents of lower income viewed nutritional health by the appearance and functional capacity of their children. Different cultures view a child’s outward appearance and functionality as a sign of nutritional health as well and use their beliefs to guide their nutritional practices (Bisogni et al., 2012). Personal beliefs and experiences rather than expert information are often the basis for the development of an individual’s dietary guidelines and practices.

The availability of types of food can affect dietary choices and habits of individuals. More affluent areas have access to a wide variety of food and tend to be more health conscious. This environment encourages a healthy food intake by offering a plethora of nutritional support and variety of healthy options. Restaurants and specialty grocery stores are more abundant in areas of more wealth. Resources such as these are limited in less affluent and more rural areas, offering limited variety and more convenience. The availability of unhealthy food items and low availability of healthy food offer little choice to people in these locations (Bisogni et al., 2012).

Lower income individuals have access to government programs such as the Supplemental Nutrition Assistance Program (SNAP). Persons receiving SNAP benefits have been reported to consume less healthy diets or diets of lower quality marked by fewer whole grains, more red meat, potatoes, and fruit juice (Sanjeevi, Freeland-Graves, & Hersh, 2018). Several factors, in addition to lower income, have been studied to explain the higher BMI and poor diet quality of women in this population. Emotional and/or mindless eating habits, negative attitudes towards healthy eating, home and community environment, social environment and support, and food insecurity are all factors that contribute to the higher BMI found in these women (Sanjeevi et al., 2018). Women with food insecurity tend to buy foods high in calories, fat, and sugar due to financial constraints. Food insecurity affects people in lower socioeconomic populations and has been shown to adversely affect dietary habits, food intake, and weight status (Sanjeevi et al., 2018).

The home environment has a large impact on the development of dietary habits and influences the intake of individuals throughout their life. Overweight individuals have been shown to have less healthy food options at home when compared to individuals of a normal weight. The neighborhood a person resides in is part of their home and community environment and can impact physical activity. Unsafe neighborhoods limit the opportunities for physical activity, which negatively affects weight status (Sanjeevi et al., 2018). Food insecure families are shown to often reside in neighborhoods considered unsafe, which in turn affects the availability of healthy food items as well as opportunities for physical activity.

Social support can have a constructive influence on food intake and behaviors. Eating with friends and/or family provides a positive setting that can lead to healthier food choices and dietary behavior, leading to a reduction in BMI (Sanjeevi et al., 2018). The social support from friends and/or family is also helpful in promoting physical activity if they are able to create a home or group-based exercise program. When making dietary changes, men find more support in their spouses, while women report finding more support from female family members and/or friends (Bisogni et al., 2012). Relationships with others are proven to have a great impact on one's dietary habits and behaviors, exercise adherence, and emotional health.

As individuals age, life experiences can change eating behaviors/practices. Life events such as marriage, children, gender roles, disease onset, and aging have an impact on nutrition practices. Women, in particular, experience several changes in eating habits throughout their life as pressures and/or expectation as a caregiver alter their behaviors. Traditional gender roles influence a woman's eating behaviors in relation to expectations placed on appearance, childbearing, and providing healthy meals for their family (Bisogni et al., 2012). Women place more importance on providing their spouse and children with healthy meals but may not retain the same diet for themselves. After children leave the home, women feel they are more able to focus care on their own health (Bisogni et al., 2012).

Identity is an important part of who a person is and how they perceive themselves. Culture and social groups are a large part of a person's identity. Implementing certain food

practices may be beneficial for their health but may not coincide with their culture or social group expectations. Adopting healthy diet recommendations could make them feel they are giving up their culture or would no longer fit in to their social group, which can be a deterrent for making these changes (Bisogni et al., 2012).

Exercise

The benefit of exercise can be observed in all areas of health including cardiovascular health, bone health, mental health, weight, disease prevention and management, and longevity. The current recommendations for adults are to get at least 150 minutes per week of moderate intensity aerobic exercise. Another option to achieve the recommended amount of exercise is 30 to 60 minutes of moderate intensity exercise five days per week or 20 to 60 minutes of vigorous intensity exercise three days per week (American College of Sports Medicine (ACSM), 2011).

Participating in the recommended amount of exercise can improve cardiovascular and lung health, reduce risk for type 2 diabetes or help manage existing diabetes, control weight, and reduce risk of MetS. People who exercise also have lower risk of breast and colon cancers. Bone and muscle health are positively impacted by exercise as well. The loss of bone density associated with age can be slowed with regular exercise, and the risk of hip fracture and falls are also decreased. Moderate intensity, low impact aerobic exercise can improve the quality of life and pain management in individuals with arthritis (Division of Nutrition, Physical Activity, and Obesity, National Center for Chronic Disease

Prevention and Health Promotion, 2018; Mayo Foundation for Medical Education and Research, 2016).

In addition, exercise improves cognitive function, sleep, and mental health such as depression. Regular physical activity aides in falling asleep faster and achieving deeper sleep. Daily functions of living, confidence, self-esteem, energy, social connections, and physical intimacy are all areas that can also be improved through participation in exercise (Perez-Lopez, Martinez-Dominguez, Lajusticia, & Chedraui, 2017). People who participate in physical activity at least 7 hours per week have a 40% lower risk of dying early compared to those who exercise for less than 30 minutes per week (Division of Nutrition, Physical Activity, and Obesity, National Center for Chronic Disease Prevention and Health Promotion, 2018).

In postmenopausal women, exercise reduces illnesses that occur in mid-life and forward, as well as reduces severity of menopausal symptoms. Postmenopausal women who participated in a multi-component exercise program that included aerobic cardio-respiratory fitness and muscle resistance experienced positive changes in VMS of menopause and general health status (Godoy-Izquierdo et al., 2017). They also showed improvements in cardio-metabolic health and fitness including weight, BMI, systolic blood pressure, resting heart rate, and flexibility (Godoy-Izquierdo et al., 2017). In only 20 weeks of an exercise program, improvements in functional adaptations (flexibility, blood pressure, resting heart rate, and walking time) can be observed (Godoy-Izquierdo et al., 2017).

The time around menopause presents many changes and challenges for women. Women have twice the risk of depression when compared to men of the same age. Depressive symptoms can occur around mid-life and appear more frequently in women in peri- and post-menopause (Perez-Lopez et al., 2017). Women who experience severe VMS are more likely to experience depression, anxiety, and/or sleep disturbances. Regular exercise can help alleviate menopausal symptoms, depression, anxiety, insomnia, and reduce perceived stress. Improved sleep quality, and glucose and insulin metabolism are also associated with exercise (Perez-Lopez et al., 2017).

Bone loss is a concern for postmenopausal women and may cause them to avoid exercise due to low strength and/or fear of injury or falling. Moderate-to-high intensity, weight bearing endurance exercise activities are recommended to preserve and/or increase bone mass in adults. In postmenopausal women with low bone mass, group-based step aerobics exercise significantly improved functional fitness and bone health (Wen et al., 2017). Improvement in functional fitness lessens the risk of falls and fractures. Components of functional fitness include strength in extremities, agility/dynamic balance, and cardiovascular endurance (Wen et al., 2017).

Bone mineral density (BMD) decreases in postmenopausal women with osteopenia or osteoporosis. Osteocalcin and C-terminal telopeptide of type 1 collagen (CTX) are bone markers associated with BMD and bone resorption. Both bone turnover markers can be used to detect changes in bone in response to weight-bearing exercise such as step aerobics (Wen et al., 2017). After a 10-week group-based step aerobics exercise intervention,

improvements were observed in functional fitness and suppression of bone resorption activity was reported. Bone remodeling takes about 4-6 months to complete the full cycle where changes in BMD can be detected. Due to a shorter intervention period, changes in BMD were not noted in this study. However, multiple studies have shown increases in BMD after a six-month period (Wen et al., 2017).

The 10-week exercise intervention showed decreases in the CTX levels, indicating a suppression of bone resorption. The slowing of bone resorption is beneficial in preventing further bone loss and can improve bone formation. The benefits to bone health can be observed after a short time of participating in regular exercise activity. Improvement in strength and bone formation and/or prevention of further bone loss reduces risk of fracture and falls in postmenopausal women with osteopenia or osteoporosis. Group-based step aerobics exercise programs offers social connection and improves functional fitness, cardiovascular health, sleep quality, physical function, and quality of life in older women (Wen et al., 2017).

Rest

Sleep plays an integral role in mental, physical and emotional health. During sleep, the body works to support brain function, allowing for learning and memory functions to take place, as well as aiding in focus, creativity and problem solving. Deficiency in sleep can negatively affect mood, concentration, behavior, and the ability to cope with change. The risk for depression and other mental illnesses are linked to continued lack of sleep. Sleep is also a critical time for healing and repair in the body. Increased risk of chronic

diseases is associated with ongoing poor sleep such as cardiovascular disease, stroke, diabetes, kidney disease, and high blood pressure. Obesity, hormone imbalance, and poor diet are also attributed to sleep disturbances over a period of time (National Institute of Health Department of Health and Human Services, n.d.).

In the United States, 38% of women 40-55 years of age experience sleep disorders (Zhou, Yang, Li, & Tao, 2017). During this time in a woman's life, menopause is a factor that can affect sleep and overall health. Sleep disorders are associated with menopause and often related to the VMS of menopause. Sleep disturbance in menopause is described as trouble falling asleep, waking up throughout the night, and not being able to fall back asleep once woken up (Sun, Shao, Li, & Tao, 2014). As menopause progresses, sleep disturbances and menopausal symptoms become more severe. The prevalence of sleep disorders in the stages of menopause have been reported as 19.2% in premenopause, 43.6% in perimenopause, 45.7% in early postmenopause, and 50.9% in late postmenopause (Zhou et al., 2017).

Peri-postmenopause marks an increase in sleep disorders and is associated with an increase in arterial stiffness. Arterial stiffness is linked to menopause with or without the presence of a sleep disorder. The incidence of arterial stiffness is independent of cardiovascular risk factors. Women with elevated fasting blood sugar levels are also reported to have increased arterial stiffness (Zhou et al., 2017). The link between sleep disorders and arterial stiffness is attributed to endocrine or metabolic disruption, sympathetic activation, and inflammation and coagulation pathways (Zhou et al., 2017).

The changes that occur from the depletion of estrogen throughout menopause are correlated with the development of sleep disorders. Decline in sleep duration and quality negatively impact endothelial function, and therefore contribute to the increase in arterial stiffness (Zhou et al., 2017). The reduction/absence of estrogen in menopause withdraws the cardioprotective aspect of estrogen, also contributing to endothelial function impairment and affecting arterial stiffness. Both menopause and sleep disorders impact cardiovascular risk and increase arterial stiffness as a woman ages (Zhou et al., 2017).

CHAPTER III
METHODOLOGY

Recruitment

The expert panel participants consisted of professional and/or personal contacts of Jennifer Neily MS, RDN, LD, FAND and Nancy DiMarco PhD, RDN, LD, CSSD. Experts were contacted via email and asked to respond to Lindsi Gjetley, RD if interested in participation. After responding with interest, an email with detailed information about the study and an informed consent form were sent to each participant (see Appendix B). The participants signed and returned the informed consent agreeing to participate in two rounds of testing. All signed consent forms were kept private and confidential and were stored in a file on Lindsi Gjetley's computer. Once the signed consent form was received and filed, another email containing instructions and the link to access the questionnaire in PsychData was provided.

Participants for the target population panel were recruited through the TWU mass email system, social media, or were personal contacts of the investigators (see Appendix C). The pilot round of the target population (n = 25) consisted of personal contacts of the investigators. These participants were contacted through email with information about the study. After agreeing to participate, informed consent forms were emailed to each participant (see Appendix B). Signed informed consent forms were returned to Lindsi

Gjetley, RD and filed in a folder on the computer. Once the signed consent form was received, participants were emailed instructions and the link to access the questionnaire via PsychData. The final round of target population testing used the TWU email system and social media for recruitment. The email and social media post contained the PsychData link to access the questionnaire. Due to the larger participation in this round, informed consent was included at the beginning of the questionnaire.

Participants

Eligibility criteria for participation in this study was females between the ages of 40-65 years of age interested in a comprehensive approach to a healthier lifestyle. Participants were not to be focused on weight specifically, but on overall health improvement. Female participants were required to be able to speak and write in English and have access to a computer. Marital status, education, family, and career did not affect participation in the study.

The eligibility criteria for the expert panel required a 4-year degree or higher in fields of nutrition, sports/exercise, and/or psychology/behavioral science. Experts were credentialed and/or licensed in their field of expertise/practice. Participation for the expert panel was not chosen based on sex/gender, age, years of practice, marital status or family.

Exclusion criteria for the target population group included males, individuals under 40 years of age or older than 65 years of age, individuals without computer access, and inability to speak and write in English. Expert panel participants were excluded if they had

less than a 4-year college degree, lacked credentials and/or licensure in their field of expertise/practice and were unable to speak and write in English.

Expert Panel Testing

The initial round of expert panel testing included 79 questions with a Likert scale (1-5) and an area for feedback. The experts were also provided a drop-down box and asked to choose the BE FREE™ component of wellness they felt the question addressed. The estimated time commitment was 1-2 hours to complete the questionnaire and feedback. Due to the large time commitment, participants were able to register their email in PsychData, allowing them to save and continue at a later time. At the conclusion of the first round of testing, a total of 22 experts completed the questionnaire and provided feedback. Once the questionnaire was closed, investigators reviewed the feedback provided and made adjustments to the questionnaire.

The second round of testing with the expert panel included the same experts. The questionnaire consisted of 41 questions with a Likert scale (1-5) and an area for feedback. Experts were not asked to identify the component of wellness for each question during this round. The estimated time commitment was 30-45 minutes to complete the questionnaire and provide feedback. This round also asked for participants to register their email to save their progress and return to the questionnaire if needed. A total of 20 experts completed the questionnaire and provided feedback in the second round. After the second round was completed, investigators reviewed the feedback and made revisions to the questionnaire.

Target Population Testing

The pilot round of the target population testing consisted of a demographic questionnaire, health history questionnaire, and the 36-question BE FREE™ questionnaire. The demographic questionnaire asked participants for age, level of education, race/ethnicity, and employment. The health history questionnaire consisted of a list of medical conditions and participants were able to check all that applied. The 36 questions consisted of six questions for each BE FREE™ component of wellness, though the component of wellness was not displayed on the questionnaire. Likert scales were presented with each question and ranged from "a great extent like me" (1) to "not at all like me" (5). Each question also provided a text box for optional feedback. Once the questionnaire was closed, investigators reviewed the feedback and made changes to the questionnaire. The pilot round concluded with a total of 25 participants completing the questionnaire and feedback.

The final round of the target population testing included the informed consent, the same demographic and health history questionnaires provided in the pilot round, and the 36 final questions of the BE FREE™ questionnaire. The informed consent was displayed at the beginning of the questionnaire and participants were asked to sign by providing a valid email. The email and the completion of the questionnaire implied acknowledgement of risk and consent to participate. The demographic and health history questionnaires were unchanged from the first round. Participants were given 36 questions with the Likert scale. The area for feedback was removed for this round. The round was closed after 2 weeks

and the data was collected and analyzed. The final round concluded with a total of 122 participants completing the questionnaire.

Statistical Analysis

Statistical analysis was conducted on the data collected from the final round of testing. The pilot test round using the target population was used as an additional feedback round, as it was too small and heterogeneous to run analysis. Analysis was conducted and analyzed using SPSS 25.0 software (IBM Corp. Released 2017. IBM SPSS Statistics for Windows, Version 25.0. Armonk, NY: IBM Corp). Cronbach's alpha scores were used to measure internal consistency reliability of the questionnaire as a whole, as well as each subscale (wellness component). Correlation between items in each subscale was analyzed using Pearson *r* correlation values. The Pearson *r* values were reviewed only if the *p* value for the item was shown to be significantly correlated ($p < 0.05$).

Exploratory factor analysis (EFA) was conducted using principal axis factor (PAF) analysis to identify latent factors that demonstrate correlation between the set of variables. A scree plot and parallel analysis were conducted to identify factors that could be retained. The EFA, scree plot, and parallel analysis all indicated that one factor was much stronger, though the scree plot and parallel analysis indicated a total of five possible factors. Factor one was the only factor retained as the other four had high error of variance and did not show statistical significance. Confirmatory factor analysis (CFA) was conducted but the data could not be analyzed because the factors are unreliable and made up of unexplained

variance. Meaningful analysis cannot be performed until factors are revised and error variance is substantially lower.

CHAPTER IV
RESULTS

Participant Characteristics

Data was analyzed from a group of 122 participants whom completed the BE FREE™ questionnaire. Participants were females ranging in age from 40 to 65 years of age. The age categories included 40-50 years (38.9%), 51-60 years (42.5%), and 61-65 years (18.6%). They identified as Caucasian (75.7%), Hispanic (11.3%), African American (7%), Asian/Pacific Islander (2.6%), Scandinavian (2.6%), Other (2.6%), and American Indian (0.9%). Participants reported their education level as less than a high school diploma (0.9%), high school diploma (2.6%), some college (9.6%), associate degree (17.5%), bachelor's degree (32.5%), and graduate degree or higher (36.8%).

Preliminary Analysis and Missing Data

A total of 122 participants registered their name and email to take part in the questionnaire. Of the 122 participants, 115 completed the questionnaire. Participants were able to access the questionnaire through a link provided via email and therefore did not have to contact the investigators in order to participate. Due to the design of participation, the investigators were unable to assess as to why a participant did not complete the questionnaire. During the initial analysis, 9% of participants had at least one missing data point. Data was 91% complete. After removing the 7 participants who registered but did

not answer any part of the questionnaire, data was 97% complete. Statistical analysis was conducted using the data from the remaining 115 participants. Most of the 115 participants completed the questionnaire in its entirety, with 4 participants having at least one missing data point.

Internal Consistency Reliability and Validity

Cronbach's alpha scores were used to measure internal consistency reliability of the questionnaire as a whole, as well as each subscale (wellness component). Analysis of the questionnaire produced an alpha value of 0.41, indicating poor reliability. The error variance of the questionnaire is 0.83. The values calculated for each subscale also showed poor reliability with high error of variance for each. The alpha values for the subscales tested included behavior (0.58), environment (-0.54), food (-0.39), rest (-0.52), exercise (0.25), and emotional health (0.05) (see Table 1). The error of variance for each subscale include behavior (0.66), environment (0.71), food (0.85), rest (0.73), exercise (0.94), and emotional health (1.0) (see Table 1). The poor reliability and high error variance for the questionnaire and each of its subscales indicate that the questions do not show correlation to one another. The Cronbach alpha values should be close to 1 to show a high correlation and express reliability in the questionnaire (Tavakol & Dennick, 2011).

Table 1:

Subscale Cronbach Alpha Value and Error Variance

	Cronbach alpha value	Error variance
Behavior	0.58	0.66
Environment	-0.54	0.71
Food	-0.39	0.85
Rest	-0.52	0.73
Exercise	0.25	0.94
Emotional Health	0.05	1.0

The Cronbach alpha values range from 0 to 1, with the higher value indicating reliability and inter-relatedness of the items (Tavakol & Dennick, 2011). The negative values shown for three of the subscales indicate that there are inconsistencies in the direction of the relationships between items. When comparing the items in each subscale, the inter-item correlation matrix showed a mixture of positive and negative values for each component. This indicates poor relationship between items within the subscales and inconsistency in direction of the relationships.

Correlation between items in each subscale was analyzed using Pearson *r* correlation values. The Pearson *r* values were reviewed only if the *p* value for the item was shown to be significantly correlated ($p < 0.05$). Few items in each subscale were shown to have a significant relationship when looking at the *p* values. Although the *p* values showed a significant relationship between some items, the Pearson *r* values were low for those items. The Pearson *r* values for items with significant *p* values ranged from 0.19 to 0.80. The interpretation of Pearson *r* correlation values is little/no correlation (<

0.3), low (0.3-0.5), moderate (0.5-0.7), high (0.7-0.9), and very high (0.9-1.0) (Calkins, 2005).

The behavior component showed nine significant relationships ($p < 0.05$), with six indicating little/no correlation and three of low correlation (see Appendix I, Figure 4). The items of this category do not show inter-relatedness. The environment component had eight items with significant relationships, with three indicating little/no correlation, four low correlation, and one moderate correlation (see Appendix I, Figure 5). Food had the highest number of significant relationships, showing 15. Of the 15 significant relationships, one showed little/no correlation, five had low correlation, eight were moderately correlated, and one was highly correlated (see Appendix I, Figure 6). The exercise component produced 13 significant relationships, with two little/no correlation, eight with low correlation, and three with moderate correlation (see Appendix I, Figure 8). The rest showed eight significant relationships, with four of little/no correlation, one with low correlation, and three with moderate correlation (see Appendix I, Figure 7). Finally, emotional health presented with nine significant relationships. Of the nine relationships, four had little/no correlation and five showed low correlation (see Appendix I, Figure 9).

The data produced with the Cronbach alpha scores for internal consistency reliability and the Pearson *r* correlation values indicate that the scale and subscales for the BE FREE™ questionnaire are not reliable or valid. The relationship between the items in the subscales have poor relationships and inconsistency in direction of the relationships. While some items presented with significant relationships based on their *p* value, most

showed low correlation. None of the items in the subscales indicated a high correlation. The scales and subscales need to display highly correlated items with higher Cronbach alpha scores to represent reliability with lower error of variance to be considered reliable and valid.

Factor Analysis

Exploratory factor analysis (EFA) was conducted using principal axis factor (PAF) analysis to identify latent factors that demonstrate correlation between the set of variables. The EFA indicated that one factor solution is the best solution. The Eigenvalue (EV) represents the amount of variance that is explained by each factor (Mvududu & Sink, 2013). Ideally, the factor should explain at least 50% of variance among the variables to be considered a good factor (Mvududu & Sink, 2013). The first factor produced by the EFA explained 24.23% of variance in all the items. This means that 76% of the variance was not explained (error). The second factor explained 6.59% of the variance, meaning that most was error or unexplained variance.

A scree plot was produced to further determine factor retention possibility (see Figure 1). As shown in the PAF analysis, one factor was much more significant than the others. The inflection point (elbow) on the scree plot indicated that there could be a possible five factors for retention.

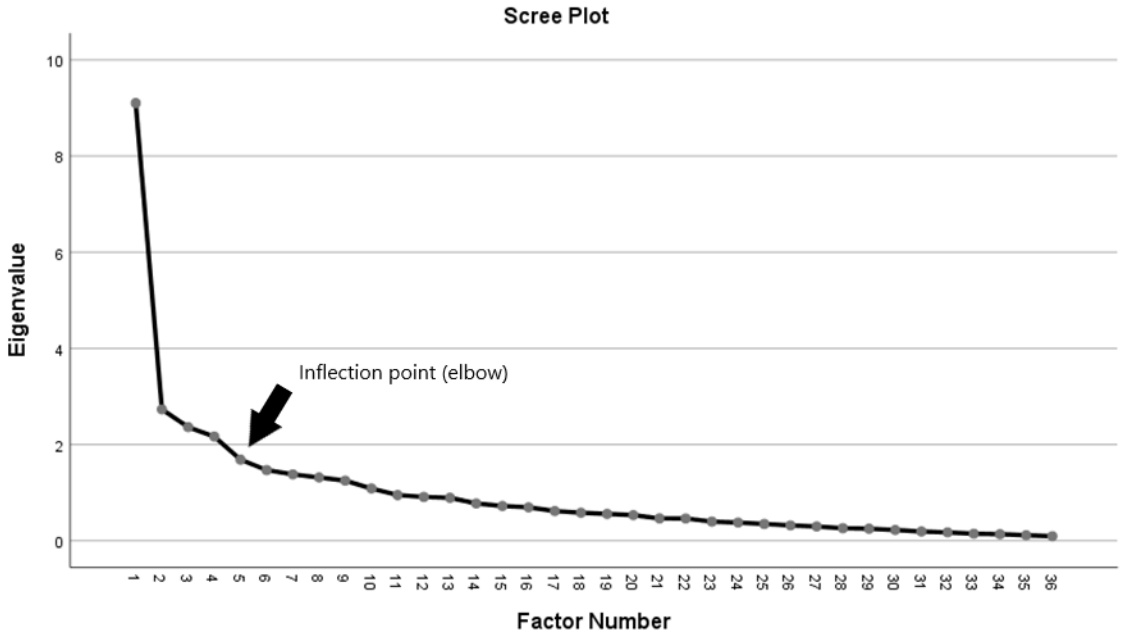

Figure 1: Scree Plot

A parallel analysis was conducted to provide additional analysis prior to factor retention. The parallel analysis generates a random data set to compare to the original data set. Eigenvalues are calculated for the random data set and compared to the EV of the original data. Factors are retained if the EV of the original data set exceed the EV of the random data set (Mvududu & Sink, 2013). The parallel analysis indicated that five factors could be retained, though the first factor was much stronger with a higher variance (see Appendix H, Table 2).

A total of five factors were retained based on results of the scree plot and parallel analysis. Principal axis factor analysis was performed for the five retained factors and direct oblimin rotation was used to show relationships between factors (see Appendix H,

Table 2). The factor loadings indicate the importance of each variable to the factor (Mvududu & Sink, 2013). Factor loadings lower than 0.30 (9% of explained variance) were not displayed. Ideally, factor loadings would be 0.7 to 0.9 to show a strong relationship between factors and variables, and factors below 0.6 are considered poor/weak. For this study, factors of 0.4 and higher were displayed (see Appendix H, Table 2).

Factor one retained 22 items with factor loadings above 0.4. Factor loadings above 0.4 were retained for Factor 2 (3 items), Factor 3 (4 items), Factor 4 (3 items), and Factor 5 (3 items). Several items showed factor loadings above 0.4 for multiple factors, indicating that the items were very similar and not distinct from each other (see Appendix H, Table 2). Due to the low variance of Factors 2 through 5, further analysis was not performed on these factors. Additional analysis was performed on Factor One to determine reliability and correlation between items.

A review of the items that loaded for factor one showed that many of them involved a motivation component. Factor One was renamed to health motivation factor. Based on the factor loading values, it appeared that individuals would score high in the health motivation factor if they lacked motivation for healthy habits. A positive relationship was observed in items such as not understanding nutrition information, lack of physical activity, and preference of eating out rather than cooking at home. A negative relationship was observed with items that involved an individual participating in physical activity, practicing healthy eating habit, and setting aside time for themselves (see Table 1).

The health motivation factor was analyzed for reliability using the Cronbach alpha score. Reliability was poor with a Cronbach alpha value of 0.25 and 0.94 error of variance. Although the items were retained for the health motivation factor after using direct oblimin rotation, the items did not correlate with one another. The inter-item correlation matrix indicated most correlations as poor, with some moderate but none that were strong. The correlation matrix also showed both positive and negative values, indicating inconsistency in the direction of the relationships. Correlation was analyzed using Pearson *r* correlation values. The Pearson *r* values further showed very low to moderate correlation between items. While the health motivation factor one was the strongest factor produced with analysis, the error of variance was too high to consider it a reliable factor.

Confirmatory factor analysis (CFA) was conducted but the data could not be analyzed because the factors are unreliable and made up of unexplained variance. Factors showed high correlation because they were unable to be distinguished from one another. Some latent factors also showed high correlations (> 0.85), indicating that these factors were essentially identical and did not represent unique constructs. The single factor solution of the EFA corroborates these findings. Meaningful analysis cannot be performed until factors are revised and error variance is substantially lower.

The CFA resulted in poor model fit, as shown by the root mean square error of approximation (RMSEA) value (0.08) and normed fit index (NFI) value (0.54). Fit indices, such as the RMSEA and NFI, interpret the usefulness of the model by establishing the ability of the model to represent the relationships in the data set. A good fitting model is

one that is consistent with the data. The RMSEA indicates a value of less than 0.05 as a good fit, 0.08 represents a mediocre fit, and a value greater than 0.10 indicates a poor to unacceptable fit. The RMSEA analysis value for this study was 0.08, indicating a mediocre fit (see Figure 2). The NFI value should be greater than 0.95 to represent a good fit, 0.90-0.95 indicates a marginal fit, and a value less than 0.90 represents a poor fitting model (Kenny, 2015). The NFI value of 0.54 indicates a poor/unacceptable fit for this study (see Figure 3).

Model	RMSEA	LO 90	HI 90	PCLOSE
Default model	0.081	0.072	0.089	0
Independence model	0.142	0.135	0.148	0

Figure 2:RMSEA

Model	NFI Delta1	RFI rho1	IFI Delta2	TLI rho2	CFI
Default model	0.539	0.47	0.733	0.675	0.718
Saturated model	1		1		1
Independence model	0	0	0	0	0

Figure 3: NFI Value

Summary of Analysis

The BE FREE™ questionnaire consists of the six BE FREE™ components of wellness: behavior, environment, food, rest, exercise, and emotional health. Each component of wellness has six questions associated with it for a total of 36 questions (see Appendix E). The statistical analysis of the 36 questions as a whole indicated that the questions were similar to one another, as shown with a Cronbach alpha score of 0.41. Questions need to be related, but conceptually different in order to provide reliable assessment.

Each component was also analyzed individually to show reliability and correlation within the six questions. The behavior component had the least error variance (0.66) among the wellness components, as well as the highest reliability score (0.58). Environment, food, rest, and exercise components had low reliability and high error of variance, indicating that the questions within each component do not relate to one another.

Within these components, there was a mixture of negative and positive values demonstrating an inconsistency in the relationship between questions. This could possibly improve with recoding certain variables or making small adjustments to the wording of the question. The emotional health component showed to be the least reliable (0.05) with the highest error of variance (1.0). This component contained questions about self-care, support systems, and feelings associated with food.

The question stating “I take care of others before I take care of myself” did not show a significant relationship with any of the other five questions in this category. The questions about taking time for one’s self, meditation, and one’s support system showed a relationship with one another, but not with the other three questions. “I use food to cope” and “I feel guilty when I overeat” both showed a relationship with one another but did not relate to the other four questions. While all of the questions in this component could be useful in assessing an aspect of emotional health, they do not appear to assess emotional health as a whole. The category of “emotional health” is a broad term, leaving room for a multitude of questions. A better option for this component would be to ask questions relating more to self-care and support systems or relating emotions to food. Inter-relatedness of questions cannot be shown statistically without focusing on a specific aspect of emotional health.

CHAPTER V
DISCUSSION

This study sought to test validity and reliability of a questionnaire for the BE FREE™ program. The initial questionnaire consisted of 79 questions that addressed the six BE FREE™ components of wellness (see Appendix D): behavior (B), environment (EN), food (F), rest (R), exercise (EX), and emotional health (EH). The first two expert panel rounds of testing were used as feedback rounds to reduce the number of questions to a final 36 (see Appendix E), as well as to revise the phrasing of questions for better readability and understanding for the target population. The pilot target population testing round was initially meant to produce feedback and statistical analysis. However, due to a very small and heterogeneous sample, data was not able to be analyzed. The feedback provided by participants in the pilot round was used to revise phrasing for the questions.

The final round of testing produced data used for statistical analysis that showed reliability and validity of the BE FREE™ questionnaire were not able to be established. High error of variance and low factor loading values demonstrated very little to no correlation within the questions overall and for each subscale. Low Cronbach alpha scores indicated very low reliability for the questionnaire, as well as each subscale. Relationships of the items were inconsistent in direction, showing both positive and negative values. This further supports low reliability, as correlation values should all be positive, or all be

negative to show consistency. Additional evaluation of the items is needed to correct phrasing to produce the desired relationship correlation. Recoding of variables could be explored to yield more consistent variable values.

Several limitations were noticed after the final round of testing was complete. One of the most important limitations was that the BE FREE™ program was not developed to the point of testing. The program is currently being written and the questionnaire was thought to be a starting point in developing the program. After conducting the study, investigators agreed that more understanding of the purpose and content of the program would have been beneficial in creating the questionnaire. More development of the program would have provided direction for the questionnaire and potentially helped create subscales with more correlation in variables. Additionally, time constraints were limiting for the number of testing rounds able to be conducted and data produced. Developing and validating a questionnaire for a new wellness program needs much more time for multiple large rounds of testing and analysis after each round. Although this study was only able to analyze the data from one large round of testing, the results and questionnaire can be used to begin another development process with subsequent testing.

Limitations were also seen regarding the participants in both expert panel and target population. The expert panel was meant to include professionals from various fields of expertise, including nutrition, sports/exercise, and/or psychology/behavioral science. Most, if not all of the participants were registered dietitians. Though they were in different areas of expertise, this did not provide a diverse expert panel. They were all also personal contacts, which could yield potential bias. Ideally, the expert panel should be recruited in

the same manner as the target panel and include experts from various fields of practice. The pilot target population consisted of personal contacts of the investigators, which could also contribute to bias.

The target population was women 40 to 65 years of age to include women in all stages of menopause. The stage of menopause could help differentiate participants and provide another variable for statistical analysis. The questionnaire included demographic and health history information to address variables such as age, ethnicity, and education level (see Appendices F and G). However, the stage of menopause was not addressed in the questionnaire. This did not affect the data produced in the study, so therefore did not impact the reliability or validity of the questionnaire.

Continued testing is needed to establish reliability and validity of the BE FREE™ questionnaire. The current questionnaire can be used for further testing, but the factors/items need to be conceptually different, so they do not relate to one another. The confirmatory analysis was not able to be analyzed due to the lack of distinction between factors. The analysis showed high correlation because the factors were considered to be the same, and therefore could not be used as reliable data. The factors were unreliable and made up of unexplained variance. The problems encountered in analysis were due to the underdeveloped nature of the questionnaire and lack of differentiation between subscales.

Another option for future testing is to use the health motivation factor produced in the factor analysis of the current questionnaire. The factor analysis indicated a possible five factors to be used from the variables. While five were possible, only the first factor

was further explored. The renamed health motivation factor, while not reliable, provided some insight into a possible connection between the variables and participant answers. When the health motivation factor loading score was a positive value, participants did not participate in exercise or healthy eating behavior. When the factor loading score was a negative value, these participants reported regular physical activity and healthy eating habits. This factor could be further developed using high factor loading scores (> 0.5) and variable recoding to express consistency in relationships of variables.

Conclusion

The study indicated that the BE FREE questionnaire is not reliable or valid at this point. The questionnaire developed through this process can be used to continue to develop the program and questionnaire. The hypothesis was not supported after statistical analysis demonstrated that subscales were not conceptually different enough to measure a specific wellness component. Furthermore, researchers were unable to identify a need for women in different stages of menopause, as menopause was not addressed in the questionnaire. Future development of the BE FREE questionnaire should include questions regarding the participant's stage of menopause to evaluate the possible intervention needed in this respect.

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APPENDIX A

IRB APPROVAL LETTER

Institutional Review Board

Office of Research and Sponsored Programs
P.O. Box 425619, Denton, TX
76204-5619 940-898-3378 email:
IRB@twu.edu
http://www.twu.edu/irb.h

DATE: October 16, 2017

TO: Ms. Lindsi Gjetley
Nutrition & Food Sciences

FROM: Institutional Review Board (IRB) - Denton

Re: Approval for The Development and Testing of the Questionnaire for the BE FREE Program (Protocol #: 19670)

The above referenced study has been reviewed and approved by the Denton IRB (operating under FWA00000178) on 10/12/2017 using an expedited review procedure. This approval is valid for one year and expires on 10/12/2018. The IRB will send an email notification 45 days prior to the expiration date with instructions to extend or close the study. It is your responsibility to request an extension for the study if it is not yet complete, to close the protocol file when the study is complete, and to make certain that the study is not conducted beyond the expiration date.

If applicable, agency approval letters must be submitted to the IRB upon receipt prior to any data collection at that agency. A copy of the approved consent form with the IRB approval stamp is enclosed. Please use the consent form with the most recent approval date stamp when obtaining consent from your participants. A copy of the signed consent forms must be submitted with the request to close the study file at the completion of the study.

Any modifications to this study must be submitted for review to the IRB using the Modification Request Form. Additionally, the IRB must be notified immediately of any adverse events or

unanticipated problems. All forms are located on the IRB website. If you have any questions, please contact the TWU IRB.

Institutional Review Board
Office of Research and Sponsored Programs
P.O. Box 425619, Denton, TX
76204-5619 940-898-3378
email: IRB@twu.edu
http://www.twu.edu/irb.html

DATE: December 15, 2017

TO: Ms. Lindsi Gjetley
Nutrition & Food Sciences

FROM: Institutional Review Board - Denton

Re: Notification of Approval for Modification for The Development and Testing of the Questionnaire for the BE FREE Program (Protocol #: 19670)

The following modification(s) have been approved by the IRB:

The study design to develop and validate the BE FREE questionnaire has changed after discussion for statistical analysis. The original study design included two rounds of testing the questionnaire, using an expert panel and a target population (group A & group B). Initially the 60-80 question questionnaire was to be administered to the expert panel and target group A for a first round of testing. After feedback was collected, the questionnaire would be revised to include 36 questions. The final 36 question questionnaire would be administered to a group B of the target population.

After discussion about statistical analysis, the design has been revised.

1. The first round of testing will involve the 60-80 question questionnaire that will be given to the expert panel for feedback. The questionnaire will display the question with a Likert scale (1-5). A drop-down box listing the 6 components of wellness and "other" will be posted with each question. The experts will be asked to choose which category of wellness they feel the question belongs, or to choose "other" and specify how they would classify the question if it doesn't fit into one of the six categories. In addition, a text box will be provided for the experts to type any

feedback about each question. Once the experts submit feedback, the researchers will review and revise the questionnaire.
2.
3. Researchers will create a 36-question questionnaire from the feedback and administer the 36question questionnaire to the expert panel for a second round of testing. This questionnaire will provide the question with a text area for feedback, but will not include the drop-down box. The expert panel will review and provide feedback. Researchers will collect the final feedback from the expert panel and adjust the questionnaire as needed.
4.
5. A final 36-question questionnaire will then be developed and provided to target population group A for a pilot round of testing. This target group will consist of 20-30 individuals. The questions will be given and a text box provided with each question for feedback. In addition to the BE FREE questionnaire, a brief demographic and health history questionnaire will be included. Researchers will collect the data and perform a reliability analysis through SPSS.
6.
7. The final round of testing will administered to target population group B. This round of testing will provide the final 36-question questionnaire with questions only, and no area for feedback. Group B
will also be given the demographic and health history questionnaire.
8.
9. Data will be collected and statistical analysis performed. Statistical analysis will include exploratory factor analysis, confirmatory factor analysis, and reliability analysis. All analysis will be completed using SPSS.

cc. Dr. Nancy DiMarco, Nutrition & Food Sciences

APPENDIX B
STAMPED CONESENT FORM

TEXAS WOMAN'S UNIVERSITY

CONSENT TO PARTICIPATE IN RESEARCH

Title of Study: The Development and Testing of the Questionnaire for the BE FREE Program

Principal Investigator: Lindsi Gjetley, RD
Co-Principal Investigator: Jennifer Neily, MS, RDN, FAND, LD
Faculty Advisor: Nancy M. DiMarco, PhD, RDN, CSSD

Principal Investigator Email Address and Phone Number: ldavenport1@twu.edu 214-680-4823
Co-Principal Investigator Email Address and Phone Number:neily@neilyonnutrition.com 214-395-3114
Faculty Advisor's Email Address and phone number: ndimarco@twu.edu, (940) 898 2785

Explanation and Purpose of the Research

The purpose of this study is to test and validate the questionnaire for the BE FREE program. The BE FREE program is a comprehensive approach to creating a healthy lifestyle. BE FREE is an acronym for six components of health/wellness that involve behavior (B), environment (EN), food (F), rest (R), exercise (EX), and emotional health (EH). This study will include developing, testing, and validating the questionnaire to be used for assessment in this program. This study is being conducted as part of the requirements for completion of the Master's Degree in Nutrition for Lindsi Gjetley.

Study Design

This study will use an online database, Psychdata, to administer the BE FREE questionnaire. You will be asked to complete a demographic and health history questionnaire, as well as one - two questionnaire(s) regarding the BE FREE program and provide feedback.

Research Procedures

Time Involvement and Testing Requirements: Your total time of involvement is the amount of time it takes to complete the questionnaire. This will vary depending on if you are part of the expert panel or the target population group. The testing of the questionnaire will involve two groups: the target population group of women aged 40-65 years and a separate panel of experts in fields related to various aspects of nutrition. You will access the questionnaire through Psychdata. The initial

questionnaire will consist of 60-80 questions and be given to the expert panel for review and feedback.

The format of the questionnaire will involve a question and a text area below each question for you to provide feedback. Once you complete the questionnaire with feedback, the researchers will review the data and revise the questionnaire, which will consist of 36 questions.

The final 36-question questionnaire will be sent again to the same nutrition expert panel for review/feedback. The final questionnaire then will be developed and sent to a small target population group (A). If you are in this group, you will also be recruited and contacted through email and social media. The questionnaire will be accessed through Psychdata, and will include the questions with a text area for feedback. A final round of testing will provide the 36-question questionnaire to a different target population group (B). The
questionnaire will be accessed through Psychdata and consist of only questions. If you are in this group, you will complete the questionnaire and data collected for researchers to analyze.

Initial Questionnaire: 1 hour – 2 hours (questions and provide feedback)
Final Questionnaire: 15-30 minutes
Demographic and Health History Questionnaire: 5 minutes

The expert panel will complete the initial and final questionnaire (maximum time = two hours and 30 min).
The two target groups (A and B) will complete only one questionnaire regarding the BE FREE program (maximum time = 1 – 2 hours (A) and 15-30 min (B), respectively), and a demographic and health history questionnaire (5 minutes).

Potential Risks

Loss of Confidentiality: There exists the possibility of the loss of confidentiality as a potential risk of participation in this study. Confidentiality will be protected to the extent that is allowed by law. To minimize this risk, all data will be anonymous and kept in a locked file cabinet. There is a potential risk of loss of confidentiality in all email,

downloading, and internet transactions. This study is voluntary and you may discontinue at any time.

Coercion: Coercion is a potential risk of participation in this study due to the use of personal and/or professional contacts of both the primary investigator and co-principal investigator. To minimize the risk of coercion, the decision of personal and/or professional contacts will in no way impact their relationship with the investigator they are associated with. Participants are able to withdraw from the study at any time for any reason without penalty.

Fatigue: The possibility of fatigue exists as a potential risk of participation in this study. Questionnaires may ask for detailed feedback about the questions included, which could take up to 2.5 hours to complete. To minimize the risk of fatigue, participants may take breaks as needed while completing the questionnaire. If a participant experiences fatigue, they may withdraw from the study at any time without penalty.

The researchers will try to prevent any problem that could happen because of this research. You should let the researchers know at once if there is a problem and they will help you. However, TWU does not provide medical services or financial assistance for injuries that might happen because you are taking part in this research.

Participation and Benefits

Participation in this study is voluntary and as a participant, you have the right to withdraw from the study at any time without penalty. Should you desire to withdraw from the study at any point, you are entitled to any data collected from you that has been analyzed at any time point.

No identifiable data will be collected during this study.

The BE FREE questionnaire will be used as an online course and/or book. You may benefit from involvement in this study by receiving a 50 percent scholarship deducted from the price of the online course once available as well as receive a finalized copy of the questionnaire once the study is complete.

Questions Regarding the Study

You will be given a copy of this signed and dated consent form to keep. If you have any questions about the research study you should ask the researchers; their contact information is at the top of this form. If you have any questions about your rights as a participant in this research or the way this study has been conducted, you may contact the Texas Woman's

University Office of Research and Sponsored Programs at (940) 898-3378 or via email at IRB@twu.edu.

_____ _____

Signature of Participant Date

APPENDIX C
RECRUITMENT FLYER

VOLUNTEERS WANTED FOR RESEARCH STUDY

The Development and Testing of the Questionnaire for the BE FREE™ Program

To Qualify:

- Must be female between 40-65 years old.
- Must be interested in improving your health with a comprehensive approach to wellness.

Details:

- Receive a 50% scholarship on the complete BE FREE™ program once finalized.
- Help develop the questionnaire to be used for this future wellness program.

Brief Requirements

Complete and evaluate a questionnaire online.

Space is limited! Please contact us ASAP!

If you are eligible and interested, please contact:

Lindsi Gjetley or Jennifer Neily

214-680-4823

ldavenport1@twu.edu or neily@neilyonnutrition.com

The BE FREE™ program is a comprehensive approach to creating a healthy lifestyle. BE FREE is an acronym for six components of health/wellness that involve behavior, environment, food, rest, exercise, and emotional health. This study will include developing, testing, and validating the questionnaire to be used for assessment in this program. This program is being developed and a projected completion date has not been determined at this time.

Confidentiality Statement:

There is a potential risk of loss of confidentiality in all email, downloading, and internet transactions. This study is voluntary and you may discontinue at any time.

APPENDIX D
INITIAL BE FREE™ QUESTIONNAIRE

1. I generally eat only once or twice per day.
2. I've never kept a food journal or kept track of what I eat.
3. I feel I know WHAT to do; I just lack motivation to do it.
4. I eat fast. I'm usually the first one done eating.
5. I never or rarely eat breakfast.
6. When I'm unhappy I tend to reach for food.
7. The number I see on the scale dictates (impacts/affects) how I feel (my mood)
8. I take care of everyone else before I take care of myself.
9. I find it difficult to stop eating when it's something I really enjoy.
10. Sometimes I eat and do not stop when I know I should
11. My food cravings are rarely for fruit/vegetables
12. I am more likely than not to use food to cope or comfort me.
13. At times I feel my eating is out of control
14. Others may attribute my dietary habits and/or behavior to my upbringing
15. I'm embarrassed and/or feel guilty by what and/or how much I eat
16. There are generally convenience foods/snack foods/highly processed foods in my home.
17. I often each too much in social settings
18. I avoid temptation by not keeping convenience/junk/snack foods in the house. If it's readily available, I can't say no.
19. I often avoid the break room at work because foods are always there to tempt me and I can't help myself
20. The food is always the main focus at my family gatherings
21. I very rarely eat homemade meals. I eat out a lot or get take-out.
22. I have started exercise programs but I rarely keep them up.
23. I don't have time to exercise.
24. I prefer sedentary actions (e.g., reading) to being active.
25. I don't like to exercise.
26. I do not consider myself to be very knowledgeable when it comes to nutrition
27. I don't understand the specific properties of food very well (e.g., number of carbs, protein, etc.)
28. I often get less than 6 hours of sleep each night.
29. I tend to go to bed late even though I need to get up early.
30. I toss and turn and sleep very restlessly during the night.
31. I cannot get back to sleep if I wake up during the night.
32. I don't plan my dinner in advance.
33. I do not know how to read or understand a food label.
34. I am not familiar with the Mediterranean style of eating, DASH diet, and/or the Blue Zones.

35. I'm compelled to "clean my plate" even when I feel full.
36. I don't get in bed in time to get at least 7 hours of sleep, 5 nights per week
37. I have trouble falling back to sleep if I wake up in the middle of the night.
38. I rarely feel rested
39. I try to plan my meals for the week
40. I eat most meals sitting at the table focused on eating without distractions.
41. I don't make time to sit and eat my meals. I find myself rushing to eat and/or eating on-the-go.
42. I have tried several FAD/short term diets to lose weight
43. I can follow a diet, but it rarely lasts more than a few weeks/month
44. I limit my intake in social settings and then binge eat when I am home by myself
45. I often eat the same foods my partner does, making it difficult to adhere to my diet.
46. I read food labels when choosing food at the grocery store
47. I am able to read and understand food labels
48. I use food labels to monitor/track my food intake
49. I would be more likely to exercise if I had a partner to exercise with
50. I would be more likely to exercise if I could do 30 minutes or less in my home or office
51. I prefer to work out at home. I am too self-conscious to work out in the gym or take a class.
52. My food cravings are usually for sweet or snack foods (convenience food)
53. I am self-conscious about eating in front of others
54. I am more likely to stick to a diet when I can see quick results
55. Food is the focus when I am around family and/or friends
56. I always make a list for grocery shopping. It keeps me on track while in the store.
57. I often grocery shop while hungry and tend to impulse buy convenience foods.
58. I feel overwhelmed by nutrition and all the information out there
59. I obsess about calorie/nutrient intake.
60. I feel overwhelmed when following a diet or recording my intake. This often leads to me not eating and has a negative impact on my self-esteem/mood.
61. I never weigh myself. Results for me are based on how I feel and what I see in the mirror.
62. I try to keep healthy food readily available at home
63. Nutrition is confusing! I don't know what to believe - there are so many contradictory messages.
64. I know I probably should be reading food labels, but they confuse me. I'm not sure what to look at.
65. I know I don't drink enough water.

66. I wish I could figure a way to drink more water - I know how important it is.
67. I know diets don't work and I am looking for a manageable lifestyle change.
68. I have always struggled with diets and feel that losing the diet mentality would be better for me in moving towards a healthier lifestyle for the long term
69. I typically do not eat much, if anything, early in the day and eat larger meals in the evening
70. I just don't know what to eat to be the healthiest person I can be.
71. I know what to eat, but have difficulty implementing it
72. I have a 'good food/bad food' mentality. I plan for 'cheat meals'
73. I exercise because I really enjoy it, not because I have to.
74. It's important for me to set aside time each day for myself
75. I enjoy meditation and/or quiet time to help center myself.
76. My friends and I plan our time together around activities not involving food.
77. I feel rested in the morning.
78. I try to transition my evenings so I get to bed in time to get the sleep I need.
79. I've been on every diet and am ready for something manageable for the long term.

APPENDIX E
FINAL BE FREE™ QUESTIONNAIRE

1. I eat meals while being distracted (watching TV, using a smartphone/tablet, browsing online, reading, etc.)
2. I know what to do to improve my health, but lack motivation to do it.
3. I make it a priority to set aside time every day for myself.
4. I can fall back asleep if I wake up.
5. I only eat 1-2 meals per day.
6. I am physically active at least 20 minutes a day.
7. I wake up without an alarm clock.
8. I participate in physical activity more when I have a partner.
9. I am more likely to eat out or get take out than to prepare a meal myself.
10. I would be more likely to exercise if I had a workout plan that took 30 minutes or less.
11. I am aware of current health trends.
12. I feel overwhelmed by nutrition information.
13. I enjoy being physically active.
14. My friends and I plan our time together around activities that do not involve food or alcohol.
15. I keep nutritious food on hand and ready to eat at home.
16. I understand Nutrition Facts labels.
17. If I grocery shop while hungry, I tend to impulsively buy more food than I need.
18. I know a lot about nutrition.
19. I am too self-conscious to work out in a gym or take an exercise class.
20. I meditate, pray, and/or set aside quiet time to help center myself.
21. I have a strong support system through my family, friends, and/or faith.
22. I feel guilty when I overeat.
23. I don't know what to eat to be the healthiest person I can be.
24. I have tried to be more physically active but have trouble making it a habit.
25. I feel I must eat everything on my plate even when I am full.
26. I feel tired or not rested during the day.
27. I eat fast. I am usually finished eating a meal within 5 to 10 minutes.
28. I go to bed early enough to get the sleep I need.
29. I take care of others before I take care of myself.
30. I get at least 7 hours of sleep every night.
31. I overeat in social settings.
32. I use food to cope or comfort me.
33. I am unsure about the right amount of carbohydrate, protein, and fat for me to eat to stay healthy.
34. I go to bed late even when I need to get up early.
35. I eat my largest meal at the end of my day.
36. I avoid temptation by not keeping foods I will overeat in the house.

APPENDIX F
DEMOGRAPHIC QUESTIONNAIRE

Demographic Questionnaire

Ethnicity: (Check all that apply)

❑ African American
❑ American Indian
❑ Asian/Pacific Islander
❑ Caucasian (non-Hispanic)
❑ Hispanic
❑ Scandinavian
❑ Other: _____

What is the highest level of education you have attained? (Please mark only one)

❑ Less than a high school diploma
❑ High school graduate
❑ Some college or technical training
❑ Associate's degree or equivalent
❑ Bachelor's degree
❑ Graduate degree

What is your present work situation? (Check all that apply)

❑ Employed full-time
❑ Employed part-time
❑ Semi-retired
❑ Fully-retired
❑ Self-employed
❑ Unemployed
❑ Homemaker
❑ Student
❑ On disability
❑ Other: _____

Are or were you a student at Texas Woman's University?

❑ Yes, I am a current student
❑ No
❑ I am a TWU alumnus

Are you a current employee of Texas Woman's University?

❑ Yes ❑ No

APPENDIX G
HEALTH HISTORY QUESTIONNAIRE

Texas Woman's University Health Questionnaire

Check Yes to any of the following which you have had or have at present. Check No to those that you have not had.

Yes No High Blood Pressure

Yes No Stroke

Yes No Heart Pacemaker

Yes No Heart Failure

Yes No Heart Disease or Attack

Yes No Angina Pectoris

Yes No Fen-phen Redux use

Yes No Artificial Heart Valve

Yes No Congenital Heart Lesions

Yes No Mitral Valve Prolapse

Yes No Heart Surgery

Yes No Lupus

Yes No Rheumatic Fever

Yes No Scarlet Fever

Yes No Heart Murmur

Yes No Artificial Joints

Yes No Kidney Dialysis

Yes No Kidney Disease

Yes No Eating Disorders

Yes No Rheumatoid Arthritis

Yes No Arthritis

Yes No Pain in jaw /TMJ Dysfunction

Yes No Chronic head, neck, or back pain

Yes No Diabetes

Yes No Hypoglycemia

Yes No Thyroid Disease

Yes No Ulcers

Yes No Pulmonary Disease

Yes No Chronic Cough or Bronchitis

Yes No Tuberculosis (TB)
Emphysema

Yes No Emphysema

Yes No Asthma

Yes No Hay Fever

Yes No Allergies or Hives

Yes No Sinus Trouble

Yes No Cancer

Yes No Leukemia or Lymphoma

Yes No Radiation or Chemotherapy

Yes No Anemia

Yes No Bruise Easily

Yes No Bleeding Disorders

Yes No Sickle Cell Disease

Yes No Alcoholism

Yes No Drug Addiction

Yes No Blood Transfusion

Yes No Liver Disease

Yes No Yellow Jaundice

Yes No Hepatitis

Yes No AIDS /HIV Infection

Yes No Cold Sores /Fever Blisters

Yes No Psychiatric Treatment

Yes No Depression /Bipolar

Yes No Nervousness /Anxiety

Yes No Fainting or Dizzy Spells

Yes No Epilepsy or Seizures

Yes No Condition Requiring Cortisone Medicine

Yes No Glaucoma

Yes No Dental Implant

APPENDIX H
FACTOR MATRIX TABLE

Table 2:

Factor Matrix for factors retained through factor analysis. Factor loadings above 0.4 are highlighted. Loadings below 0.6 are considered poor/weak. Ideally, the factor loadings would be 0.7- 0.9.

Factor Matrix[a]

	Factor				
	1	2	3	4	5
B1 1) I eat meals while being distracted (watching TV, using a smartphone/tablet, browsing online, reading, etc.)	0.358		0.401		
B2 2) I know what to do to improve my health, but lack motivation to do it.	0.688				
EH3 3) I make it a priority to set aside time every day for myself.	-0.565				
R4 4) I can fall back asleep if I wake up.					
B5 5) I only eat 1-2 meals per day.	0.372				
EX6 6) I am physically active at least 20 minutes a day.	-0.550		0.317		0.409
R7 7) I wake up without an alarm clock.					
EX8 8) I participate in physical activity more when I have a partner.	0.338				0.524
EN9 9) I am more likely to eat out or get take out than to prepare a meal myself.	0.597				
EX10 10) I would be more likely to exercise if I had a workout plan that took 30 minutes or less.	0.436	0.308			
F11 11) I am aware of current health trends.	-0.410	0.448			
F12 12) I feel overwhelmed by nutrition information.	0.578		0.321		
EX13 13) I enjoy being physically active.	-0.476				0.429
EN14 14) My friends and I plan our time together around activities that do not involve food or alcohol.	-0.384				
EN15 15) I keep nutritious food on hand and ready to eat at home.	-0.829				
F16 16) I understand Nutrition Facts labels.	-0.603	0.516			
EN17 17) If I grocery shop while hungry, I tend to impulsively buy more food than I need.	0.381				
F18 18) I know a lot about nutrition.	-0.655	0.560			
EX19 19) I am too self-conscious to work out in a gym or take an exercise class.	0.445			0.466	

EH20 20) I meditate, pray, and/or set aside quiet time to help center myself.	-0.417				
EH21 21) I have a strong support system through my family, friends, and/or faith.	-0.505				
EH22 22) I feel guilty when I overeat.	0.355			-0.306	
F23 23) I don't know what to eat to be the healthiest person I can be.	0.671				
EX24 24) I have tried to be more physically active but have trouble making it a habit.	0.677	0.307	-0.317		
B25 25) I feel I must eat everything on my plate even when I am full.	0.531				
R26 26) I feel tired or not rested during the day.	0.623				-0.300
B27 27) I eat fast. I am usually finished eating a meal within 5 to 10 minutes.	0.306	0.304		-0.300	
R28 28) I go to bed early enough to get the sleep I need.	-0.395		0.541	0.525	
EH29 29) I take care of others before I take care of myself.					
R30 30) I get at least 7 hours of sleep every night.	-0.331		0.467	0.496	
EN31 31) I overeat in social settings.	0.413		0.338		
EH32 32) I use food to cope or comfort me.	0.560	0.391			
F33 33) I am unsure about the right amount of carbohydrate, protein, and fat for me to eat to stay healthy.	0.654	-0.316			
R34 34) I go to bed late even when I need to get up early.	0.406	-0.349	-0.431		
B35 35) I eat my largest meal at the end of my day.	0.332				
EN36 36) I avoid temptation by not keeping foods I will overeat in the house.	-0.375				

Extraction Method: Principal Axis Factoring.

a. 10 factors extracted. 19 iterations required.

APPENDIX I
SUBSCALE PEARSON R CORRELATION TABLES

		1) I eat meals while being distracted (watching TV, using a smartphone/tablet, browsing online, reading, etc.)	2) I know what to do to improve my health, but lack motivation to do it.	5) I only eat 1-2 meals per day.	25) I feel I must eat everything on my plate even when I am full.	27) I eat fast. I am usually finished eating a meal within 5 to 10 minutes.	35) I eat my largest meal at the end of my day.
1) I eat meals while being distracted (watching TV, using a smartphone/tablet, browsing online, reading, etc.)	Pearson Correlation	1	.334**	-0.025	.190*	0.177	.207*
	Sig. (2-tailed)		0.000	0.794	0.046	0.063	0.029
	N	115	114	114	111	111	111
2) I know what to do to improve my health, but lack motivation to do it.	Pearson Correlation	.334**	1	.210*	.392**	.219*	.282**
	Sig. (2-tailed)	0.000		0.025	0.000	0.021	0.003
	N	114	114	114	111	111	111
5) I only eat 1-2 meals per day.	Pearson Correlation	-0.025	.210*	1	0.086	0.000	-0.011
	Sig. (2-tailed)	0.794	0.025		0.367	0.997	0.909
	N	114	114	114	111	111	111
25) I feel I must eat everything on my plate even when I am full.	Pearson Correlation	.190*	.392**	0.086	1	.392**	.240*
	Sig. (2-tailed)	0.046	0.000	0.367		0.000	0.011
	N	111	111	111	111	111	111
27) I eat fast. I am usually finished eating a meal within 5 to 10 minutes.	Pearson Correlation	0.177	.219*	0.000	.392**	1	0.170
	Sig. (2-tailed)	0.063	0.021	0.997	0.000		0.075
	N	111	111	111	111	111	111
35) I eat my largest meal at the end of my day.	Pearson Correlation	.207*	.282**	-0.011	.240*	0.170	1
	Sig. (2-tailed)	0.029	0.003	0.909	0.011	0.075	
	N	111	111	111	111	111	111

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Figure 4: Behavior Component Pearson r Correlation Values. Pearson correlation value highlighted if p value is significant (p < 0.05)

		9) I am more likely to eat out or get take out than to prepare a meal myself.	14) My friends and I plan our time together around activities that do not involve food or alcohol.	15) I keep nutritious food on hand and ready to eat at home.	17) If I grocery shop while hungry, I tend to impulsively buy more food than I need.	31) I overeat in social settings.	36) I avoid temptation by not keeping foods I will overeat in the house.
9) I am more likely to eat out or get take out than to prepare a meal myself.	Pearson Correlation	1	-.271**	-.594**	.309**	0.183	-0.164
	Sig. (2-tailed)		0.004	0.000	0.001	0.055	0.085
	N	113	112	112	112	111	111
14) My friends and I plan our time together around activities that do not involve food or alcohol.	Pearson Correlation	-.271**	1	.333**	-0.128	-.266**	0.180
	Sig. (2-tailed)	0.004		0.000	0.180	0.005	0.058
	N	112	112	112	112	111	111
15) I keep nutritious food on hand and ready to eat at home.	Pearson Correlation	-.594**	.333**	1	-.307**	-.328**	.285**
	Sig. (2-tailed)	0.000	0.000		0.001	0.000	0.002
	N	112	112	112	112	111	111
17) If I grocery shop while hungry, I tend to impulsively buy more food than I need.	Pearson Correlation	.309**	-0.128	-.307**	1	0.147	-0.173
	Sig. (2-tailed)	0.001	0.180	0.001		0.124	0.070
	N	112	112	112	112	111	111
31) I overeat in social settings.	Pearson Correlation	0.183	-.266**	-.328**	0.147	1	-0.134
	Sig. (2-tailed)	0.055	0.005	0.000	0.124		0.162
	N	111	111	111	111	111	111
36) I avoid temptation by not keeping foods I will overeat in the house.	Pearson Correlation	-0.164	0.180	.285**	-0.173	-0.134	1
	Sig. (2-tailed)	0.085	0.058	0.002	0.070	0.162	
	N	111	111	111	111	111	111

Figure 5:Environment Component Pearson r Correlation Values. Pearson correlation value highlighted if p value is significant (p < 0.05)

		11) I am aware of current health trends.	12) I feel overwhelmed by nutrition information.	16) I understand Nutrition Facts labels.	18) I know a lot about nutrition.	23) I don't know what to eat to be the healthiest person I can be.	33) I am unsure about the right amount of carbohydrate, protein, and fat for me to eat to stay healthy.
11) I am aware of current health trends.	Pearson Correlation	1	-.214*	.620**	.555**	-.458**	-.402**
	Sig. (2-tailed)		0.023	0.000	0.000	0.000	0.000
	N	112	112	112	112	111	111
12) I feel overwhelmed by nutrition information.	Pearson Correlation	-.214*	1	-.470**	-.471**	.574**	.473**
	Sig. (2-tailed)	0.023		0.000	0.000	0.000	0.000
	N	112	112	112	112	111	111
16) I understand Nutrition Facts labels.	Pearson Correlation	.620**	-.470**	1	.802**	-.545**	-.538**
	Sig. (2-tailed)	0.000	0.000		0.000	0.000	0.000
	N	112	112	112	112	111	111
18) I know a lot about nutrition.	Pearson Correlation	.555**	-.471**	.802**	1	-.624**	-.654**
	Sig. (2-tailed)	0.000	0.000	0.000		0.000	0.000
	N	112	112	112	112	111	111
23) I don't know what to eat to be the healthiest person I can be.	Pearson Correlation	-.458**	.574**	-.545**	-.624**	1	.640**
	Sig. (2-tailed)	0.000	0.000	0.000	0.000		0.000
	N	111	111	111	111	111	111
33) I am unsure about the right amount of carbohydrate, protein, and fat for me to eat to stay healthy.	Pearson Correlation	-.402**	.473**	-.538**	-.654**	.640**	1
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	
	N	111	111	111	111	111	111

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Figure 6: Food Component Pearson r Correlation Values. Pearson correlation value highlighted if p value is significant (p < 0.05)

		4) I can fall back asleep if I wake up.	7) I wake up without an alarm clock.	26) I feel tired or not rested during the day.	28) I go to bed early enough to get the sleep I need.	30) I get at least 7 hours of sleep every night.	34) I go to bed late even when I need to get up early.
4) I can fall back asleep if I wake up.	Pearson Correlation	1	-0.016	-.438**	0.144	0.144	-0.047
	Sig. (2-tailed)		0.863	0.000	0.133	0.130	0.624
	N	114	114	111	111	111	111
7) I wake up without an alarm clock.	Pearson Correlation	-0.016	1	-0.168	.217*	0.146	-0.138
	Sig. (2-tailed)	0.863		0.077	0.022	0.125	0.149
	N	114	114	111	111	111	111
26) I feel tired or not rested during the day.	Pearson Correlation	-.438**	-0.168	1	-.294**	-.224*	.261**
	Sig. (2-tailed)	0.000	0.077		0.002	0.018	0.006
	N	111	111	111	111	111	111
28) I go to bed early enough to get the sleep I need.	Pearson Correlation	0.144	.217*	-.294**	1	.717**	-.674**
	Sig. (2-tailed)	0.133	0.022	0.002		0.000	0.000
	N	111	111	111	111	111	111
30) I get at least 7 hours of sleep every night.	Pearson Correlation	0.144	0.146	-.224*	.717**	1	-.582**
	Sig. (2-tailed)	0.130	0.125	0.018	0.000		0.000
	N	111	111	111	111	111	111
34) I go to bed late even when I need to get up early.	Pearson Correlation	-0.047	-0.138	.261**	-.674**	-.582**	1
	Sig. (2-tailed)	0.624	0.149	0.006	0.000	0.000	
	N	111	111	111	111	111	111

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Figure 7:Rest component Pearson r Correlation Values. Pearson correlation value highlighted if p value is significant (p < 0.05)

		6) I am physically active at least 20 minutes a day.	8) I participate in physical activity more when I have a partner.	10) I would be more likely to exercise if I had a workout plan that took 30 minutes or less.	13) I enjoy being physically active.	19) I am too self-conscious to work out in a gym or take an exercise class.	24) I have tried to be more physically active but have trouble making it a habit.
6) I am physically active at least 20 minutes a day.	Pearson Correlation	1	-0.170	-.303**	.627**	-.323**	-.625**
	Sig. (2-tailed)		0.071	0.001	0.000	0.001	0.000
	N	114	114	113	112	112	111
8) I participate in physical activity more when I have a partner.	Pearson Correlation	-0.170	1	.386**	0.017	.239*	.376**
	Sig. (2-tailed)	0.071		0.000	0.861	0.011	0.000
	N	114	114	113	112	112	111
10) I would be more likely to exercise if I had a workout plan that took 30 minutes or less.	Pearson Correlation	-.303**	.386**	1	-.261**	.397**	.614**
	Sig. (2-tailed)	0.001	0.000		0.005	0.000	0.000
	N	113	113	113	112	112	111
13) I enjoy being physically active.	Pearson Correlation	.627**	0.017	-.261**	1	-.316**	-.420**
	Sig. (2-tailed)	0.000	0.861	0.005		0.001	0.000
	N	112	112	112	112	112	111
19) I am too self-conscious to work out in a gym or take an exercise class.	Pearson Correlation	-.323**	.239*	.397**	-.316**	1	.420**
	Sig. (2-tailed)	0.001	0.011	0.000	0.001		0.000
	N	112	112	112	112	112	111
24) I have tried to be more physically active but have trouble making it a habit.	Pearson Correlation	-.625**	.376**	.614**	-.420**	.420**	1
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	0.000	
	N	111	111	111	111	111	111

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Figure 8: Exercise Component Pearson r Correlation Values. Pearson correlation value highlighted if p value is significant (p < 0.05)

		3) I make it a priority to set aside time every day for myself.	20) I meditate, pray, and/or set aside quiet time to help center myself.	21) I have a strong support system through my family, friends, and/or faith.	22) I feel guilty when I overeat.	29) I take care of others before I take care of myself.	32) I use food to cope or comfort me.
3) I make it a priority to set aside time every day for myself.	Pearson Correlation	1	.416**	.251**	-0.133	-.255**	-.352**
	Sig. (2-tailed)		0.000	0.007	0.163	0.007	0.000
	N	114	112	112	112	111	111
20) I meditate, pray, and/or set aside quiet time to help center myself.	Pearson Correlation	.416**	1	.314**	-0.090	-0.180	-0.116
	Sig. (2-tailed)	0.000		0.001	0.348	0.058	0.225
	N	112	112	112	112	111	111
21) I have a strong support system through my family, friends, and/or faith.	Pearson Correlation	.251**	.314**	1	-.198*	-0.033	-.302**
	Sig. (2-tailed)	0.007	0.001		0.036	0.731	0.001
	N	112	112	112	112	111	111
22) I feel guilty when I overeat.	Pearson Correlation	-0.133	-0.090	-.198*	1	0.089	.458**
	Sig. (2-tailed)	0.163	0.348	0.036		0.355	0.000
	N	112	112	112	112	111	111
29) I take care of others before I take care of myself.	Pearson Correlation	-.255**	-0.180	-0.033	0.089	1	.227*
	Sig. (2-tailed)	0.007	0.058	0.731	0.355		0.016
	N	111	111	111	111	111	111
32) I use food to cope or comfort me.	Pearson Correlation	-.352**	-0.116	-.302**	.458**	.227*	1
	Sig. (2-tailed)	0.000	0.225	0.001	0.000	0.016	
	N	111	111	111	111	111	111

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Figure 9: Emotional Health Component Pearson r Correlation Values. Pearson correlation value highlighted if p value is significant (p < 0.05)