STUDENTS’ EXPERIENCES WITH HEALTHY LIVING
PUBLIC SERVICE ANNOUNCEMENTS DISSEMINATED
THROUGH A SOCIAL NETWORKING SITE

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Public Service Announcements (PSAs) have had roots in American culture since WWII and are still used today to inform the public about current health, social, and environmental issues facing the population. In the past 70 years, traditional media outlets were used to spread PSAs, including print, television, and radio. However, newer technologies are starting to take shape as an alternative way to reach the masses, including social networking sites (SNSs) such as Facebook, Twitter, and YouTube. Along with changes in the delivery of information, there have also been some changes with many Americans’ bodies, specifically related to weight gain. The increase in the weight of many Americans is largely attributed to oversized meal portions and a sedentary lifestyle. This study gathered information from young adults ($N=249$) at a large Ohio public university to add to the current literature about PSAs disseminated through the social networking site Facebook, and email, to determine their effectiveness on changing people’s awareness, attitudes and behaviors about daily food and exercise choices. The quantitative results provided evidence that a four-week intervention helped to create modest changes in both Facebook and email groups regarding awareness, behaviors, and attitude changes about healthy living. Contrary to the popularity of social media, the Facebook group did not perform better than the email group. In fact, the email group demonstrated statistical significance on two issues
that the Facebook group did not. The qualitative results provided by the Facebook group demonstrated that SNSs can benefit people who read posted messages and comments and participate in discussion. In this study, 95% of the Facebook participants self-reported that they benefitted from discussions.
ACKNOWLEDGEMENTS

I would like to express my sincere appreciation to my dissertation chair Dr. Drew Tiene. Throughout the past few years he has provided me with the encouragement and continual guidance during this process, and he has pushed me further than I thought I could go with my exploration of this study. The challenges he set forth for me has made me a better student and researcher.

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And lastly, I would like to thank my family and friends, especially my mom and dad, husband, daughter, and Julee Henry. Thank you all for your encouragement.
DEDICATION

I would like to dedicate this dissertation to my daughter, Claire Thomas, who at this time of this writing is six years old. We both will graduate from Kent State University in 2016 – she from kindergarten at the Child Development Center, and I with my doctorate degree. She may not understand what a dissertation is at this point in her life, but she understands that women can do great things. And, in fact, she has stated that she wants to be a “doctor of kids, a soccer ball player, and a teacher at Kent State.”

“A woman is the full circle. Within her is the power to create, nurture and transform.”

~ Diane Mariechild
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CHAPTER I
INTRODUCTION
Problem Statement

Public Service Announcements (PSAs) have had roots in American culture since WWII and are still used today to inform the public about current health, social, and environmental issues facing the population. In the last seven years, Americans were informed by the government and other participating organizations on ways to help prevent the spread of the H1N1 flu virus. The announcement was spread through various channels, including print, television, and radio. Although these channels have been the most popular ways to reach the American people in the past 75 years, newer technologies are starting to take shape as an alternative way to reach the masses. These newer technologies include Web sites, blogs, wikis, forums, social networking sites, such as Facebook, and streaming video sites, such as YouTube, and could be the future of effectively delivering public messages.

Along with changes in the delivery of information, there have also been some changes with many Americans’ bodies, specifically related to weight gain. The increase in the weight of many Americans is largely attributed to oversized meal portions and a sedentary lifestyle. This major health problem affects many Americans including children. Childhood obesity has more than tripled in the past 30 years. The prevalence of obesity among children aged 6 to 11 years increased from 6.5% in 1980 to 19.6% in 2008. The prevalence of obesity among adolescents aged 12 to 19 years increased from 5% to 18.1% (“Childhood obesity facts,” 2011).

Because of this problem, there are many PSAs shown on TV and the Internet that aim to curb childhood obesity and instill a belief in the importance of healthy living. The PSAs
encourage children to make healthy food choices, such as green leafy vegetables, and to ‘get off the couch’ and play outside or join a sport. Some current PSAs examples include First Lady Michelle Obama’s “Let’s Move,” the National Football League’s “Play60,” and the State of Georgia’s “Strong 4 Life” campaigns.

For example, the PSAs for “Let’s Move” can be found on the Let’s Move YouTube channel and includes 30-second commercials featuring Michelle Kwan, Olympic figure skater champion, and Seth Wescott, Olympic snowboard cross champion, talking about the importance of healthy eating and daily exercise. In addition to celebrity testimonials, there are other PSAs that inform children about choosing a different sport or activity each day of the week, and even one in Spanish that is geared toward Hispanic families to encourage them to find out their child’s body mass index (BMI). In addition to YouTube, a social networking user can ‘like’ the “Let’s Move” Facebook page, and receive numerous healthy eating and exercise tips throughout the week.

Based on the current research about PSAs and the current obesity epidemic affecting America, more research needs to be conducted on this topic to determine if the current ‘healthy living’ campaigns that are disseminated through newer technologies, specifically social networking sites, such as Facebook, are changing our youth’s awareness, behaviors, and attitudes about the importance of maintaining a healthy living lifestyle in regards to the foods they choose and the amount of exercise they engage in on a daily basis. In addition, it is important to understand if creating a social networking group of peers can enhance young adults’ ability to make healthy living choices regarding diet and exercise.
Purpose Statement

When creating a health communication campaign, one must consider the effectiveness of the campaign or the greater likelihood that change will occur in health behaviors. Media campaigns, which use media such as posters, brochures, television, radio, billboards, Internet, etc., are organized communication activities directed at a target group for a specified period of time to achieve a goal (Snyder & LaCroix, 2013). There are three types of campaigns for which there is positive evidence of influence on behavior: when the focus behavior is high reward and low cost to implement; when the campaign can complement substantial changes in the material environment affecting adoption of the behavior; and when the campaign can be long-lived and operate through various channels (Hornik, 2013). One particular effective high-reward and low-cost health communication campaign was the effort to encourage parents to put their newborns on their backs to sleep. Evidence collected showed that Sudden Infant Death Syndrome (SIDS) may be reduced if infants slept on their backs rather than on their stomachs. Because the promised reward associated with this behavior was highly valued by reducing the number of infant deaths, the behavior was simple and easy to adopt, and the cost was low (some possible fussiness with the baby). This behavior was widely adopted by parents in Australia, Britain, New Zealand, the Netherlands, Norway, Sweden, and the United States, and SIDS declined dramatically by 50% in those countries (Willinger, Hoffman, & Hartford, 1994). An example of when the campaign can complement substantial changes in the material environment affecting adoption of the behavior is immunization promotion in The Philippines. In the urban areas of The Philippines, on-time immunization rates were lower than anticipated. The Ministry of Health improved its policies around delivering health services by creating a vaccination day, and
allowing health workers to open vials of serum even just for a single child. While the change was happening onsite, the communication and advertising to parents was about where and when vaccines were available. If the health clinics had not been prepared to serve the increase in demand, then the communication efforts would not have been worthwhile; at the same time, the policy changes alone were not able to increase the rates. Because of the material change and communication, the vaccination rate jumped in one year from 32% to 56% (Zimicki et al., 1994).

The third type of communication program is long-lived, high-exposure, multiple channel programs that work to affect individual preferences, as well as social support and institutional policies that support such preferences (Hornik, 2013). A popular example of this program is the antismoking movement in the United States, which takes place over a 50-year period. The proportion of U.S. adults who smoked in 2011 was less than half the proportion of people that smoked in 1958. This rate change does not reflect just one single effort, but rather uncoordinated efforts of a movement that produced slow, but over-the-long-term, large change. This movement involved mass media campaigns, which sometimes involved public relations efforts by antismoking groups to affect policy decisions. It also involved community groups pressing their cases on policy makers (Warner, 1989). All of these activities reflected a massive shift in social norms around the dangers of smoking, even as tobacco companies fought those changes (Hornik, 2013).

Reviews and meta-analyses of health communication campaigns suggested that public service campaigns have been most successful at influencing health knowledge and attitudes (Abroms & Maibach, 2008; Derzon & Lipsey, 2002). These studies also suggested that targeted campaigns can impact health-related behaviors (S.M. Noar, 2006). Therefore, it is important to
determine if these ‘newer’ healthy living campaigns that are primarily disseminated through social networking sites are effective at influencing our youths’ daily food and exercise choices.

The purpose of this study is to seek information from young adults, specifically those who are 18-24 years old (Millennial Generation or Generation Y), to add to the current literature about PSAs and its effectiveness on shaping our youths’ knowledge, attitudes, and ideas about daily food and exercise choices. It is important to study young adults about this topic, since many of them make food and exercise choices independently, meaning without the influence of their parents or other adults in their life, and also because they use social networking sites to receive information. In addition, this study will help to determine what type of content makes good social media messages, and what characteristics of a social media message help to change awareness, behaviors, and attitudes.

**Research Questions**

The research questions that will be addressed in this study include:

1. Do participants’ awareness, behaviors, and attitudes about proper nutrition and exercise change with the use of ‘healthy living’ public service announcement campaigns, that are delivered via a social networking site?

2. Currently, how do participants receive information about nutritional health and exercise to control weight and overall well-being?

3. What aspects of the social networking experience contributed to changes in the participants’ awareness, behaviors, and attitudes about proper nutrition and exercise?
   - Did the two-way communication affect the experience?
What types of resources (instructional videos, text postings, shared resources, peer communication/support) within the social networking group did participants find most beneficial?

**Significance**

The results from this research will help to add to the current literature on PSA campaigns and its effectiveness, but with specific regard to the information being disseminated through social networking sites. Since the emergence of ‘healthy living’ campaigns and social networking sites in the last several years, there is a gap in the literature, and therefore the results can help close that gap. Also, conducting the study with young adults will help to add more information to the effectiveness of these campaigns on populations that are not heavily researched, since an abundance of the current literature focuses on children ages 17 and under.

**Definition of Terms**

*Alcohol Consumption:* Moderate alcohol consumption is defined as having up to one drink per day for women and up to two drinks per day for men. This definition is referring to the amount consumed on any single day and is not intended as an average over several days (“Alcohol and Public Health,” 2014).

*Body Mass Index (BMI):* A number calculated from a person's weight and height. BMI provides a reliable indicator of body fatness for most people and is used to screen for weight categories that may lead to health problems (“Healthy weight - it’s not a diet, it's a lifestyle,” 2014).

*Healthy Living:* At a population level, healthy living refers to the practices of population groups that are consistent with supporting, improving, maintaining, and/or enhancing health. As it
applies to individuals, healthy living is the practice of health-enhancing behaviors, or put simply, living in healthy ways (“What is healthy living?” 2013). Healthy behaviors include self-directed health behaviors (diet, exercise, smoking, alcohol consumption). In this study, healthy behaviors do not include medical service usage (physician visits, vaccinations, and screenings) (Conner, 2002).

*Obesity:* A body mass index (BMI) that is greater than or equal to 30 is obesity (“World Health Organization,” 2011).

*Public Service Announcements (PSA):* An advertisement broadcast on radio, television, or the World Wide Web, for the public interest. It is intended to modify public attitudes by raising awareness about specific issues in the categories of health and safety, community and education. It is reserved strictly for nonprofit organizations – those that qualify as a not-for-profit under federal tax laws. Such organizations may air their PSA for free (Bivins, 2011).

*Smoking:* The inhalation of tobacco products that are made entirely of partly or leaf tobacco as a raw material, which contains the highly addictive psychoactive ingredient, nicotine (“World Health Organization,” 2014).

*Social Network Sites:* Web-based services that allow individuals to construct a public or semi-public profile within a bounded system, articulate a list of other users with whom they share a connection, and view their list of connections and those made by others within the system (Boyd & Ellison, 2007).
Vigorous exercise: Exercise intense enough to cause sweating and/or heavy breathing, and/or increase of heart rate to near maximum. Vigorous exercise includes brisk walking (4-5 mph), lap swimming, running (6-7 mph), shoveling snow and singles tennis, to name a few ("Vigorous Exercise," 2012).
CHAPTER II

LITERATURE REVIEW

Introduction

The literature review for this study will cover the following topics: weight and obesity, past health communication public service announcements (PSAs), current healthy living PSAs that use social networking sites (SNSs), guidelines for effective message design, social media message design, influence of health promotion messages, how medium affects the impact of a message, and SNSs and its benefits. All of these topics are important to review to help to understand and create a healthy living social networking campaign that is engaging and effective, and able to change college-aged students’ awareness, behaviors, attitudes about proper nutrition and exercise.

Weight & Obesity

Human weight gain is usually a very slow process, unnoticeable by ordinary daily self-observation. However, this slow imbalance in energy is responsible for the increase in the rate of overweight and obese adults in the United States. Many prominent researchers and public health officials have identified the increase as an epidemic (Wadden, Brownell, & Foster, 2002; Levitsky & Youn, 2004). One possible model of the increase in body weight is believed to occur in freshmen during their first year at college, and is often referred to as the ‘Freshman Fifteen’ by the public (Levitsky, Halbmaier, & Mrdjenovic, 2004). Currently, between 31-35% of college students are overweight or obese (American College Health Association, 2009). The issue of obesity has been recognized for centuries, possibly starting with writings attributed to Hippocrates. In later decades of the 20th century through the present, there have been many
epidemiological studies identifying the relationship between excess weight and the mortality rate (Bray, 1992). Worldwide obesity has more than doubled since 1980 with 1.5 billion adults, 20 and older, being overweight in 2008. Ironically, 65% of the world's population lives in countries where being overweight and obesity kills more people than being underweight. Overweight and obesity are the fifth leading risk for global deaths. At least 2.8 million adults die each year as a result of being overweight or obese (“World Health Organization,” 2011). Obesity is associated with numerous diseases such as cardiovascular disease (CVD), type 2 diabetes, hypertension, certain cancers, and sleep apnea. In fact, obesity is an independent risk factor for CVD (Poirier et al., 2006). The World Health Organization (2011) reports that 44% of the diabetes burden, 23% of the ischaemic heart disease burden and between 7% and 41% of certain cancer burdens are attributable to overweight and obesity.

The World Health Organization (WHO) defines obesity as:

- a BMI greater than or equal to 25 is overweight
- a BMI greater than or equal to 30 is obesity (“World Health Organization,” 2011).
- an increased intake of energy-dense foods that are high in fat, salt and sugars but low in vitamins, minerals and other micronutrients; and
- a decrease in physical activity due to the increasingly sedentary nature of many forms of work, changing modes of transportation, and increasing urbanization.

According to the Centers for Disease Control and Prevention (CDC) website, in 2009-10, more than 78 million U.S. adults and about 12.5 million U.S. children and adolescents were considered obese. Obesity is measured by calculating a person’s weight in kilograms divided by
height in meters squared to find a body mass index (BMI) (National Heart Lung and Blood Institute & National Institutes of Health (NIH) National Heart, Lung, and Blood Institute, 1998). Children that have a BMI at or above the 95th percentile for children of the same age and sex are considered obese, and are more likely to become obese adults. Obesity in adults is defined as BMI greater than or equal to 30 (Ogden, Carroll, Kit, & Flegal, 2012). Table 1 shows the obesity cut points for adults 5’4” and 5’9” in height.

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<th>Height</th>
<th>Obesity weight range</th>
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<td>5’4”/1.63 meters</td>
<td>174 pounds or more/79 kilograms or more</td>
</tr>
<tr>
<td>5’9”/1.75 meters</td>
<td>203 pounds or more/92 kilograms or more</td>
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Table 1

*Obesity Cut Points in Adults*

Data from the 2007-08 National Health and Nutrition Examination Survey (NHANES) indicated that an estimated 16.9% of children and adolescents aged 2-19 years were obese. Table 2 shows the prevalence in percentages of obesity among U.S. children and adolescents aged 2-19, for selected years 1976-1980 through 2007-2008.
Table 2

Percentage of Obese Children and Adolescents in U.S.

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<tr>
<td>Total in %</td>
<td>5.5</td>
<td>10.0</td>
<td>13.9</td>
<td>15.4</td>
<td>17.1</td>
<td>15.5</td>
<td>16.9</td>
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In adults, obesity increases the rise of a number of health conditions, including hypertension, adverse lipid concentrations, and type 2 diabetes. The prevalence of obesity in the United States increased during the last decades of the 20th century in adults. Figure 1 illustrates that in 2009-2010, an average of 35.7% of U.S. adults were obese with 32.6% of adults ages 20-39, 36.6% of adults ages 40-59, and 39.7% of adults ages 60 and over being considered obese.
In a pilot study conducted in fall 2014, 62 participants at a large university were surveyed and asked if they are “trying to gain, lose, or maintain their weight?” The results indicated:

- 2% want to gain weight,
- 25% want to maintain weight,
- 69% want to lose weight, and
- 5% don’t care about weight.

In addition, students were asked to self-report their height and weight. Based on BMI calculations:

- 1.6% are considered underweight,
- 42.6% are considered normal weight,
- 19.7% are overweight, and
- 36.1% are obese.

The pilot study results regarding obesity are similar to the “Prevalence of Obesity in the United States, 2009-2010” results, with 36.1% (pilot) versus 35.7% obese Americans with a BMI of 30.0 and above (Ogden et al., 2012).
Davidson and Birch (2001) reported that the problem of childhood obesity is multi-causal in nature, with genetic, individual, family, organizational, and societal levels identified as contributing to the epidemic. Contributing to the increasing rate of obesity are multiple factors, including the increased availability of high-calorie, nutrient-deficient foods (Nielsen, Siega-Riz, & Popkin, 2002); more advertising efforts to market unhealthy foods (Caroli, Argentieri, Cardone, & Masi, 2004); limited walkways and green space in communities that encourage driving and discourage walking, biking, or other types of physical activity (Frank, Andresen, & Schmid, 2004); increased sedentary recreational activities such as television viewing and playing video games (Dietz & Gortmaker, 1985; Wake, Hesketh, & Waters, 2003) decreased levels of physical activity among children (Trost, Kerr, Ward, & Pate, 2001); and the increased number of meals eaten by families outside of the home (Kant & Graubard, 2004). Since Ogden and Flegal (2012) reported that obese children most likely become obese adults, more emphasis also needs to be directed toward adults to encourage a more healthful lifestyle.

Public Communication Campaigns

When attempting to influence population thinking and social norms, one strategy requires interventions that can reach large numbers of people at a low cost. This method has led public health agencies to consider using public communication campaigns to influence community understanding and beliefs (Cavill & Bauman, 2004). In the last 30 years, public communication campaigns have changed the social climate related to tobacco use, in particular second-hand smoking near children or in public places, and have influenced community beliefs and attitudes toward vaccinations as well as the use of seat belts to help prevent injury and death during car
accidents (Smith, 2002). One of the most important tasks for communicators is to know the audience being targeted (Cavill & Bauman, 2004).

In the past, when disseminating messages, message designers would rely on traditional broadcast and print channels that carry public service announcements, entertainment-education placements, and news coverage. There are many options to choose from to channel campaign messages (Rice & Atkin, 2013). Salmon and Atkin (2003) discussed channel differences in terms of reach (proportion of population subjected to the message), specializability (narrowcasting to specific groups or individuals), interactivity (receiver participation and stimulus adaptation during processing), meaning modalities (array of senses employed in conveying detailed and complex content), personalization (human relational nature of source-receiver interaction), decoding ability (mental effort required for processing stimulus), depth (channel capacity for conveying detailed and complex content), credibility (believability of material conveyed), agenda setting (strength of channel for raising salience priority of issues), accessibility (ease of placing messages in channel), and economy (cost of producing and disseminating stimuli). Rice and Atkin (2013) claimed that channel selection is often determined by the usage patterns of target audiences, the message, and the topic within the constraints of available resources. Public communication campaigners often find it more practical to stage an event that will generate news coverage than it is to raise funds to purchase time or space in a media vehicle.

Rice (2006) stated that the Internet has become a major source for information, discussion, therapy, and access to physicians. Online health-related support groups can increase social support, quality of life, and self-efficacy in managing one’s health condition/s, and allow
for anonymity for sensitive topics, such as STD/HIV prevention and testing. A meta-analysis of 85 studies found that using the Internet for health behavior change reported an overall small, but significant positive effect. The effectiveness of Internet-based interventions was enhanced by the use of additional methods of communicating with participants, especially with the use of text messaging (Webb, Jospeh, Yardley, & Michie, 2010). Ajzen and Fishbein (1980) stated that the theory of reasoned action and planned behavior (TPB) is a combination of personal attitudes, perceived norms of influential others, and motivation to comply as predictors of intended behavior. Cole-Lewis and Kershaw’s (2010) review found consistent evidence of the positive effects of text messaging on behavioral changes across demographic and national differences.

**Effective Past Health Communication PSAs**

Communication campaigns have promoted a wide variety of health behaviors, including seat belt use, dietary change, medication use, exercise, dental care, social support, substance use prevention and cessation, family planning, use of health services, and testing and screening for diseases. Health communication campaigns have been used to address many of the most common causes of death in the United States, which include poor diet, physical inactivity, tobacco use, alcohol consumption, microbial agents, and toxic agents (Remington & Brownson, 2011). In the United States, health communication campaigns that include the use of the mass media and avoid coercion have an average effect size of about 5 percentage points (r = .05). Thus, if 60% of people were doing the target behavior before the campaign, about 65% can be predicted to do the health behavior after the campaign. The level of effectiveness of health campaigns that include some form of the media depends in part on the specific behavior that is
promoted. For example, seat belt campaigns (r = .15), dental care (r = .13), and adult alcohol reduction (r = .11) have had the greatest success rates, whereas youth drug and marijuana campaigns have had the least success (r = .01-.02) (Snyder, 2007).

Some anti-tobacco media campaigns using PSAs have shown promise in reducing smoke initiation and increasing intentions to quit. In an effort to counter the tobacco industry’s influences on smoking behavior, several mass-media campaigns have been developed and evaluated with some promising effects. For example, the California Tobacco Control Program, which included a comprehensive mass media component, led to a substantial decline in smoking (Pierce, Emery, & Gilpin, 2002) and smoking-related heart disease (Fichtenberg & Glantz, 2000) in California in its first three years. Arizona and Oregon also reported decreases in smoking when an increased cigarette tax and anti-tobacco campaigns were introduced concurrently (Siegel, 2002).

The Truth campaign, funded by the American Legacy Foundation, was successful in positively changing youths’ attitudes toward tobacco use (Farrelly et al., 2002). The Truth campaign used a strategy to communicate directly with the target population in order to change their behavior. Direct communication assumes that people have the capacity to change their own behavior (Snyder, 2007). The marketers behind the campaign used an extensive televised PSA component, and used rebellious-appearing actors who reject smoking and promote the idea that tobacco companies engage in false advertising practices to hook young people. In a nationally represented sample of 12- to 17-year-olds, awareness of the Truth campaign increased from 9.5% to 47.6% after nearly a year of the campaign. And, the number of youth who agreed that "taking a stand against tobacco is important to me" increased from 72% to 83%, while the
percentage who agreed that they want to be involved in efforts to get rid of smoking went from 65% to 82% (Noar, Palmgreen, Zimmerman, Lustria, & Lu, 2010). Television was, by far, the most commonly reported source of the anti-smoking message (91%) and increased exposure to the campaign have been associated with less favorable smoking attitudes and intentions in adolescents (Farrelly et al., 2002). Monahan, Rhodes, and Roskos-Ewoldsen (2009) highlighted some of the “Truth” anti-tobacco scripts:

- **Singing Cowboy:** This is a Truth advertisement that shows a white cowboy singing with a guitar in the middle of Times Square in New York. The man is singing about the dangers of smoking through a voice box because he no longer has his own vocal cords from smoking.

- **Cinema:** This advertisement is set up to seem like a movie trailer with the tobacco industry people being the producers. It describes the harm brought by tobacco: “heart-stopping, positively addictive, 3 million deaths a year.”

- **Poison:** This advertisement shows various white people (male, female, and a baby) drinking different poisonous chemicals (e.g., cyanide) from chemistry jars. At the end, the advertisement states that all of those chemicals are in cigarettes.

Anti-smoking PSAs that emphasized long-term smoking effects, such as the ones described above, were the most strongly associated with increased smoking resistance self-efficacy (Noar et al., 2010).
**Current Healthy Living PSAs**

Recently, health educators have begun to explore innovative uses of social media sites to infuse education (Korda & Itani, 2013), such as Facebook users “liking” a health website to introduce health information into their social networks (Vance, Howe, & Dellavalle, 2009). Online nutrition education has been shown to be as or more effective than traditional programs for participants in the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) (Bensley, Anderson, Brusk, Mercer, & Rivas, 2011). And recruitment using social network sites relies on the fact that Internet use is not limited by income, education, or geography. Internet usage in August 2012 was reported by 75% of those earning less than $30,000 per year, 80% of those with only a high school education, and 61% of those with less than a high school diploma (“Trend data (adults): Demographics of internet users,” 2013). These 2012 statistics support an earlier finding that 80% of a low-income sample in Pennsylvania had internet access and considered the internet the most convenient method to access health information (Stotts Krall & Lohse, 2009). Approximately 80% of all internet users 18-46 years of age go online for health information (“Trend data (adults): Demographics of internet users,” 2013). Women are more likely than men to pursue health topics online (86% versus 73% of online users). Thus, use of online strategies to recruit subjects for nutrition education research targeting low-income audiences, especially women, appears congruent with social norms (Fox, 2011).

Currently, some of the more prominent healthy living PSAs include Let’s Move and We Can campaigns. First Lady Michelle Obama has made it her mission to educate the public on the obesity epidemic plaguing American families. Her goal is to solve the problem of childhood
obesity within a generation. Leading the Let’s Move campaign, her plan is to give parents the support they need, provide healthier food in schools, help our children to be more physically active, and make healthy, affordable food available in every part of our country. She has begun to do this through the website, www.letsmove.gov, which houses newer technologies, such as an informative blog, video PSAs posted on YouTube, and a Facebook page that people can join to receive daily nutrition and exercise information. The Childhood Obesity Prevention work, created by the U.S. Department of Health and Human Services (HHS), National Institutes of Health’s We Can! Program and the Ad Council also have created PSAs to focus on assisting parents to help children maintain a healthy weight. The “I Can, You Can, We Can” set of PSAs encourages parents to find interesting ways to challenge and engage their children to make healthy choices with its motto being: Eat Right. Get Active. Reduce Screen Time.

The Let’s Move campaign’s goal is to raise public awareness, reaching out to constituencies, and motivating leaders from across the country to make meaningful commitments to tackle childhood obesity. These include several private-sector commitments. The food and beverage industry have started to answer the call to provide parents with better nutritional information and healthier food products. Beverage companies are putting calorie information on the front of their packages. Also, 16 of the national’s largest food companies have pledged to cut a total of 1.5 trillion calories from their products by 2015. And, the nation’s largest corporation has announced a nutrition charter that pledges to reformulate food products, eliminate price premiums for healthier options, and develop a simple front-of-package seal so shoppers can quickly identify healthy choices. In addition, the First Lady is focusing on increasing children’s opportunities for physical activity. As part of the campaign, various social media components,
including email updates, twitter page, Facebook page and YouTube channel, are available for Americans to view or subscribe to, to learn more about healthy living ("Let’s Move," 2012).

The Academy of Nutrition and Dietetics is the world’s largest organization of food and nutrition professionals. Many of its members are registered dietitians and the organization strives to improve the nation’s health and advance the profession of dietetics through research, education, and advocacy. Its website, eatright.org, contains nutritional information for consumers and the media, featuring content ranging from articles, tips, videos, recipes and online games to app reviews. As part of the Eat Right campaign, people can view or subscribe to nutritional information disseminated through its Facebook, Google + and Twitter pages, and its YouTube channel ("Eat Right: Academy of Nutrition and Dietetics,” 2012).

The We Can! campaign is a partnership of the U.S. Department of Health and Human Services, the National Institutes of Health, and the Ad Council, and is focused on helping parents and caregivers help children maintain a healthy weight. The “I Can, You Can, We Can” set of PSAs encourages parents to challenge their kids to make healthy choices and get active. The Ad Council’s We Can site houses television, radio, images, Flash videos and downloadable print materials all focused preventing childhood obesity. In addition, the website offers social media options for viewers, including Facebook and twitter pages, and a YouTube channel ("Ad Council,” 2012).

**Guidelines for Effective Message Design**

In order to fully understand effective social media campaigns, the theories and principles behind traditional public communication campaigns and messaging should be addressed. When attempting to influence the population on thinking and social norms around health, it requires
interventions that can reach large numbers of people at a relatively low cost, and are likely to influence community beliefs (Cavill & Bauman, 2004). To influence health-related social norms, it involves the use of persuasive communications, targeting whole populations, through the use of organized mass media (Flora, 2000).

Communicators face a challenge to create an effective campaign; they need to design messages that attract attention, make sense, and help to encourage change in what are often entrenched attitudes and behaviors in the target audience. One of the most important tasks for communicators is to know the audience. Expensive television spots would be a waste of money if they fail to attract attention or if they are misinterpreted. Different people are influenced by messages in different ways, therefore messages that are designed with a particular audience in mind will be the most effective (Wilson, 2006). Audience analysis should be conducted so as to carefully segment people into targeted groups. A variety of investigative strategies can be used to better understand the target audience. These strategies can include consulting previous research, conducting audience surveys, carrying out focus groups, and doing in-depth interviews (Slater, 1995).

Persuasion theories can help a communicator understand and possibly predict how different consumers might respond to messages. One theory that has received empirical support is the Elaboration Likelihood Model (ELM), which was developed by Richard Petty and John Cacioppo. The ELM states that variations in persuasive effect are a function of how people process information and the degree to which they engage in elaboration or issue-relevant thinking. According to ELM two routes to persuasion exist. The “central” route involves a high degree of elaboration on the part of the receiver – close attention to the information in the
message, careful scrutiny of the message’s arguments, and consideration of other issue-relevant material stored in memory. When people are motivated and able to follow the central route, they carefully appraise the extent to which a message provides information that is fundamental or central to the true merits of the person, object, or issue under consideration. It is important to note that the particular type of information that is perceived as central to the merits of any particular issue may vary from person to person and from situation to situation (Katz, 1960). Research has shown that when some people think about topics such as capital punishment, religion, and arguments that are persuasive, whereas when other people think about that topic, legal arguments carry the most weight (Cacioppo, Petty, & Sidera, 1982). When evaluating consumer products, some people are particularly concerned about how using the product will affect the images they project, whereas this aspect is unimportant for others (Snyder & DeBono, 1985). Some people are most concerned about the immediate consequences of their actions, whereas others are most concerned about the future; thus, this element of judgment can vary widely in its significance among people (Strathman, Gleicher, Boninger, & Edwards, 1994). The alternative route is the “peripheral” route. The elaboration is relatively low, whereas the receiver employs some type of cognitive shortly to evaluate the message. For example, a person may focus on whether the source of the message is attractive or likable (Wilson, 2006). The peripheral route recognizes that it is just not very practical, or even possible, for people to exercise considerable mental effort in thinking about all of the persuasive communications to which they are exposed (Miller, Maruyama, Beaber, & Valone, 1976). According to the ELM, attitudes formed or changed by way of the peripheral route are less accessible, persistent,
resistant, and predictive of behavior than are attitudes formed or changed by way of the central route (Petty, Cacioppo, Strathman, & Priester, 2005).

Figure 2 represents the ELM, depicting two modes of processing. The central and peripheral routes are often illustrated as divided into two parts and mutually exclusive for simplification purposes (Petty, Cacioppo, Strathman, & Priester, 2005). However, persuasive situations often involved a mix of both routes to reflect endpoints on a continuum of receiver elaboration (Petty, Kasmer, Haugtvedt, & Cacioppo, 1987). Therefore, the figure depicts idealized cases of information processing that help to highlight important distinctions between the two paths. The figure also illustrates that two main factors influence the degree to which audience elaboration is likely to occur; whether people are motivated to critically process the information, and whether people are capable of such processing (Petty, Priester, & Brinol, 2002a).
In order for a communicator to change a receiver’s attitude for the long term, he or she should focus their message on the central route rather than the peripheral route. Petty, Cacioppo, and Schumann (1983) conducted a study to exam source effects in advertising. The product being advertised was a disposable razor called Edge. In their study, 160 male and female undergraduates at the University of Missouri-Columbia participated. Two groups were formed:
one group had high involvement with the product and were told that the disposable razor would be test marketed soon in the local area and at the end of the experiment they would have the opportunity to receive their own razor. The researchers made the other group have low involvement with the product by telling them that the product would only be tested on the East Coast and that at the end he or she would receive toothpaste as their gift. In addition, weak and strong arguments were presented in the advertisements and shown to each group. The strong argument advertisement highlighted the following statements about the new razor.

- The new advanced honing method creates unsurpassed sharpness.
- Special chemically formulated coating eliminates nicks and cuts and prevents rusting.
- The handle is tapered and ribbed to prevent slipping.
- In direct comparison tests, the Edge blade gave twice as many close shaves as its nearest competitor.
- Unique angle placement of the blade provides the smoothest shave possible.

The weak argument advertisement highlighted the following statements about the new razor.

- Floats in water with a minimum of rust.
- Comes in various sizes, shapes, and colors.
- Designed with the bathroom in mind.
In direct comparison tests, the Edge blade gave no more nicks or cuts than its competition.

Can only be used once but will be memorable.

In addition, professional athletes were used to endorse the advertisements in the high-involvement group. In the low involvement group, average-looking people who they did not know were pictured in advertisements. The results from this study indicated that the 92.5% of the participants with high involvement correctly recalled that they were to select a brand of disposable razor, while only 78% of participants with low involvement correctly recalled they were to select a brand of toothpaste. To assess the effectiveness of the endorser manipulation, two questions were asked. First, subjects were asked if they recognized the people in the ad for the disposable razor. Ninety-four percent of the participants indicated “yes” they recognized the athletes, and 96% indicated “no” they did not recognize the average citizen. Secondly, when asked if they “liked” the people depicted in the advertisement, the famous endorsers ($M = 6.06$) were liked more than the average citizens ($M = 3.64$). However, the researchers found the product endorser had a significant impact on product attitudes only under low involvement, but not under high involvement. To assess the argument-persuasiveness manipulation, participants were asked to rate (unpersuasive and persuasive) the reasons as described in the advertisement for using the razor. Participants exposed to the strong arguments rated them as significantly more persuasive ($M = 5.46$) than the participants exposed to the weak arguments ($M = 4.03$). Two significant effects emerged from the question asking participants to rate their likelihood of purchasing the new razors the next time they needed one. They said that they would be more
likely to buy the razor when the arguments presented were strong ($M=2.23$) rather than weak ($M=1.68$). The argument quality manipulation affected behavioral intentions while the endorser manipulation did not (although it did affect attitudes). The study showed that attitudes were better predictors of behavioral intentions under high rather than low involvement, and provides some support for the ELM view that attitudes formed via the central route will be more predictive of behavior than attitudes formed via the peripheral route (Petty, Cacioppo, & Schumann, 1983).

Petty, Cacioppo, and Schumann’s analysis of results from the razor experiment can be taken away and applied to future studies, such as the study I have proposed. When designing messages for a health campaign it is very important to create strong statements or arguments, and create a high involvement environment to persuade participants to change behaviors and adopt healthier eating habits and increase exercise. When designing messages in the proposed study, first a fact was given about nutrition or exercise and then followed up with a question to help spark engagement and interaction from participants. In addition to information posted, a link, picture and/or video accompanied it to draw in the participant. Examples of strong messages include:

- “The average American eats way less than the daily recommended amount of fiber. Women should aim for 25 grams per day, and men should try for 38. Some of the best fiber sources in food are fruit and vegetable peels and skin, beans, lentils, whole grains, nuts, and seeds. According to health experts, men and women should shoot for 2.5 cups of veggies each day. As a good rule of thumb, the more processed or refined something
is, the less fiber content it will likely have. Check out this link for more high-fiber food sources (http://www.eatright.org/). What are some of your favorite fiber-rich foods?”

• “Have you heard about TRX? TRX stands for Total Body Resistance Exercise. It was invented by a Navy Seal. He needed a way to keep himself and his fellow Seals in top shape no matter where they were in the world, whether conducting a mission or standing by. Did you know that Kent State offers TRX classes on Fridays at the Recreation Center? What are some of your favorite exercise classes and why?” (Post is accompanied by a video displaying the TRX workout.)

In addition, a communicator must consider their audience and whether they can understand it. This issue is important when the target audience is composed of children or young adults. Even for adults, a lack of prior knowledge about a topic may impede central processing. The ability to comprehend certain terminology and the ability to draw inferences from a communicated message may make it difficult to comprehend the message (Ackerman, 1988). Studies show that as receivers’ prior knowledge increases, more elaborated thinking occurs, and superficial cues in a message are less influential (Laczniak, Muehling, & Carlson, 1991). Also, distraction in the environment, and even in the message itself can impede critical thinking (Petty & Cacioppo, 1986). For example, a brochure that contains too much text might actually distract from the informational content (Petty et al., 2002). People are better able to comprehend a complex message when it is presented in a medium that allows for reflection and self-pacing, such as the Internet, than a medium like television that provides little audience control (Chaiken & Eagly, 1983). Ideally, a researcher should strive for central processing to occur if the goal is
to achieve sustained attitude and behavior change; motivating the target groups about the topic and ensuring they are capable of understanding the message are critical to that endeavor (Wilson, 2006). In the proposed study, social media was used to disseminate the nutrition and exercise information. Therefore, participants had time to view the information at their leisure, reflect on the message, and respond with a question or comment to engage others.

The extent to which personal connections are made to a message can be traced as far back in the literature as Herbert Krugman's (1965) work on personal participation in advertising. From this perspective, messages move us to act when we can relate to them and we feel that they speak to us personally. Krugman’s work suggests that if we do not make any type of personal connection to a message, that persuasion is unlikely. This is also consistent with the ELM’s proposal that increased personal relevance of a message is more likely to encourage one to attend to that message, to process it centrally, and in the end be persuaded by it (Petty & Cacioppo, 1986). This aspect of messages might be more formally examined in future studies for the effectiveness of PSAs disseminated through social networking in order to better understand what leads individuals to feel personally connected to a message.

Consistent with ELM, the need for a credible source depends on the target audience. And, according to a meta-analysis of various source factors, a communicator’s credibility has a stronger effect when the topic is less personally pertinent to the audience (Wilson & Sherrell, 1993). When the topic is perceived as insignificant, audiences will be less engaged and less observant, so they are less likely to critically process the arguments and more likely to focus on superficial cues, such as the nature of the source. A source with high credibility is more influential when receivers are engaging in peripheral processing (Wilson, 2006). Besides
credibility, the source of the message is also important. For example, The National Institute of Child Health and Human Development (NICHD) created brochures, posters and other print PSAs for its Milk Matters campaign targeted at adolescents. The materials present information about the importance of calcium along with colorful images of milk products and of preteens and teens drinking milk. The fact that NICHD is the source is only revealed only in small print at the bottom of the print materials (“Milk Matters,” 2005). In this situation, it is less critical to have a high credible source in changing behavior (O’Keefe, 1987). It is presumed that this audience is more likely to focus on the message when the source is unknown or not revealed until later (O’Keefe, 2002). Gaining attention to an issue through the peripheral route may be an important first step in a communication strategy, but achieving long-term, ongoing sustainability objectives requires a more comprehensive approach (Rice & Robinson, 2013).

The last theory covered in this section is the Social Cognitive Theory (SCT). SCT is one of the commonly used theories in nutrition education interventions (Anderson, Winett, Wojcik, Winett, & Bowden, 2001), and is outlined by personal environments and behavioral interactions to explain behavior (Poddar, Hosig, Anderson-Bill, Nickols-Richardson, & Duncan, 2012). SCT was developed by behaviorist Albert Bandura and can help to explain that a person’s surroundings and environment influence their behavior. Bandura, a professor emeritus of psychology at Stanford University, is most known for his Bobo doll studies in the 1960s, which helped to develop his Social Cognitive Theory. In this groundbreaking study, Bandura had a doll in a room where a woman entered the room hitting and screaming at the doll. He then had children watch the person doing this to the doll. The children were allowed into the room with the doll where they imitated exactly what they had seen the woman doing to the doll earlier.
Bandura called this observational learning or modeling. The assumption of this theory is that children learn behavior in two ways: through direct experience and by observing the behavior of others (Bandura, Ross, & Ross, 1963). Social cognitive variables included social support, self-efficacy, outcome expectations, and self-regulation (Poddar et al., 2012).

The SCT emphasizes that individuals in environments supportive of behavior change are more likely to have higher self-efficacy for behavior change; to expect to benefit from new behaviors; and, in turn to employ the self-regulatory skills necessary to achieve these behaviors. Research demonstrates that university students may lack self-regulatory skills, and that self-efficacy, outcome expectations, and social support for maintaining healthful patterns strongly influence health behaviors during their college career (Strong, Parks, Anderson, Winett, & Davy, 2008). According to the SCT, self-efficacy is one of the most important determinants of whether behavioral change takes place, because unless people believe that they can produce desired effects by their actions, they have little incentive to act for behavioral change. Self-efficacy also affects whether people summon the motivation and perseverance needed to reach their goal, their ability to recover from failures and relapses, and how well they maintain the habit changes they have achieved (Bandura, 2004). SCT suggests nutrition goal setting and self-regulation would directly improve participants’ nutrition-related behavior. In addition to the direct effect of these intervention strategies, SCT suggests such interventions would increase nutrition-related self-efficacy and outcome expectations – processes that would also directly improve nutrition behavior (Anderson et al., 2001).

In a pilot study, open-ended, posttest questions were asked to some of the students (n=29) to see if their awareness, behaviors, and attitudes changed over a four-week period after
receiving nutrition information via a SNS. When asked if their social awareness changed, some students answered:

- “I’m much more understanding of the little changes I can make to make my life more healthy in general.”

- “I was more motivated to treat my body how I know I should. I also learned a lot of useful tips and tricks on food and exercise, which really helped.”

- “I learned that many other people have the same type of problems and issues.”

Additionally, students were asked if their ‘Facebook friends’ in the nutrition group helped change their own healthy living behaviors after receiving the information. Some students responded with the following:

- “Seeing what (others) had to say about different, unique foods was interesting because it made we want to try it. People had questions about what certain foods tasted like, and I think that describing something like taste online does not do a food justice. I want to actually taste it.”

- “They gave me input on my problems and gave ideas on how to incorporate healthy items into my diet, and also offered some recipes.”

- “I made a lifestyle change (health-wise) over the last year. I lost about 50 pounds, so it was nice to see posts and how I could incorporate them into what I was already doing. Changing my lifestyle was one of the best things I could have done for myself.”
In the pilot study, the group was created in the social networking site Facebook so that participants could receive factual information about health and exercise in a small, private environment. As stated with the SCT, participants in the Facebook group were encouraged to support one another, and share beneficial information. And in turn, this supportive atmosphere may be more likely to show a higher self-efficacy for behavior change in participants.

**Social Media Message Design**

Social media, or SNSs, are relatively new, and there are very few studies that show the relationship between ELM and social media. SNSs is defined as web-based services that allow individuals to (1) construct a public or semi-public profile within a system, (2) articulate a list of other users with whom they share a connection, and (3) view and traverse their list of connections and those made by others within the system (Boyd & Ellison, 2007). SNSs such as Facebook, Twitter, LinkedIn and Google+ allow individuals to present themselves, articulate their social networks, and establish or maintain connections with others. These sites can be oriented toward work-related contexts, shared interests such as music, books, crafts or politics, or just a general group of friends and acquaintances. Participants may use the sites to interact with people they already know offline or to meet new people (Ellison, Steinfield, & Lampe, 2007a). SNSs support both the maintenance of existing social ties and the formation of new connections. Much of the early research with online communities assumed that individuals using these systems would be connecting with others outside their pre-existing social group or location, energizing them to form communities around shared interests, as opposed to shared location (Wellman et al., 1996).
SNSs are part of Web 2.0 applications, which are a variety of online tools and services that are web-based and dynamic in nature. They encourage interaction, collaboration, and democracy. Examples of Web 2.0 technologies used in education include blogs, wikis, and social bookmarking. Individuals, businesses, and educational institutions are taking advantage of this technology evolution, which offers new tools that are free (at some level), open, and accessible. Compared to traditional institutional applications, Web 2.0 tools have increased functionality and have a wider reach to accomplish tasks. The user-generated contact in social media can mean digital text, images, audio, and video that are create and shared (Joosten, 2012).

One of the most popular social networking services used today is Facebook, which has more than 845 million active users worldwide, and is available to users in more than 70 languages ("Facebook Newsroom," 2012). Young adults, and in this study the Millennial Generation, are more likely than any other age group to use social media, and women are more likely than men to use social media. Seventy-two percent of women ages 18-29 use Facebook, and 62% of men of the same age group use Facebook (Brenner, 2013). Facebook enables its users to present themselves in an online profile, accumulate ‘friends’ who can post comments on each other’s pages, and view each other’s profiles. Its members can also join virtual groups based on common interests, share photo albums, and learn about each other’s hobbies, interests, musical tastes, and romantic relationship status through the profiles (Ellison et al., 2007).

Ellison's et. al (2007) study examined the relationship between the use of Facebook and the formation and maintenance of social capital. It addressed bonding and bridging social capital and observed one's ability to stay connected with members of an inhabited community. The definition of social capital refers to the resources accumulated through the relationships among
people (Coleman, 1988). Bourdieu and Wacquant (1992) defines social capital as “the sum of the resources, actual or virtual, that accrue to an individual or a group by virtue of possessing a durable network of more or less institutionalized relationships of mutual acquaintance and recognition” (p. 119). Adler and Kwon (2002) suggests that social capital has been linked to numerous positive social outcomes, such as better education, public health, lower crime rates, and more efficient financial markets.

Joosten (2012) states that Facebook is the most popular social networking tool in society and with students. More than 70 % of adults, young adults, and teens who are online use Facebook (Lenhart, Purcell, Smith, & Zickuhr, 2010). Smith and Caruso (2010) report that 96 % of undergraduate students use Facebook. With such a dominant use among students, it’s important for communicators and educators to look at the possibilities of Facebook and other SNSs, and how they can play a role in educating the public.

Ni, Xue, Ling, Yu, and Yang (2007) investigated the use of social media to enable public opinion convergence in activities with wide-scale interaction. Using ELM as their theoretical foundation, the researchers analyzed Twitter data of Singapore General Election 2011, concentrating on the retrieval of tweets that mentioned all political parties and its candidates. Twitter is a micro-blogging service that allows its users to share short messages with each other. These short messages are referred to as “tweets” that can be sent and retrieved across a wide variety of media including email, text messaging, instant messaging, Internet, and other third-party applications. The researchers suggested that social media often includes messages that can be classified as informative or affective. Informative refers to comments related to specific issues or topics, and affective refers to comments related to personal feelings, thoughts or
emotions. The analyses showed that informative tweets were more effective than affective
tweets in regards to opinion convergences, and their interactive effect on social impact was
significant. ELM suggests that informative online data can be viewed as central routes of
influence on attitude change, whereas affective online data can be viewed as peripheral routes of

One health campaign that is using social media to persuade behavioral change is the
GYT: Get Yourself Tested campaign, which was launched in 2009 and is produced through a
partnership between MTV, the Kaiser Family Foundation, and Planned Parenthood Federation of
America. The campaign goal is to reduce the stigma of sexually transmitted diseases (STDs),
and promote STD communication and testing among youth. Across 2009 to 2010, GYT’s
Facebook page gained 4,477 fans and its Twitter feed gained 1,994 followers. In addition to
social media efforts, on-the-ground events were conducted. From April 2008 to 2010, there was
a 71% increase in STD testing and a 41 percent increase in chlamydia testing at reporting
Planned Parenthood affiliates, representing 118 health centers. The researchers found that online
engagement increased on GYT’s social media platforms, without any paid advertising. For
example, one of GYT’s prelaunch celebrity videos on YouTube attracted more than a quarter
million views and generated thousands of comments (Friedman et al., 2014). Social media
engagement is difficult to assess and determine if it translates into a meaningful change in
behavior. However, there is some evidence from other campaigns linking consumer exposure to
behavior change. Programs or campaigns that have achieved high exposure also achieved
behavioral outcomes as well (Hornik, 2002). There are at least five mechanisms that suggest an
important role for exposure.
1. Simple learning – the more times a message is made available, the more times a person will be exposed to it, and he/she is more likely to learn it (R. C. Hornik, 2002).

2. Priming – this occurs when repeated exposure to a message affects the weight given to the message in deciding to engage in a behavior (Cappella, Fishbein, Hornik, Ahern, & Sayseed, 2001).

3. Channels – high levels of exposure coming from a variety of channels may communicate an implicit social expectation about a behavior. Also, if a person is vulnerable to social norm pressure, repeated exposure may communicate a new social norm.

4. Discussion – messages coming from many sources and ones that are heard often are more likely to become the subject of discussion. Thus, discussions pass the message on, reinforce the message, or lead to social network rejection of the message.

5. Policymakers – if a message gets high levels of exposure, it is more likely heard by policymakers because it has captured the attention of the public. Issues of public concern are the subjects of legislation, regulation, and funding for interventions and research. And, this in turn, may affect the audiences’ behavior.

These five items all support that whatever the path of the effect, exposure through multiple channels and messages repeated over a period of time are the most important in changing behaviors (Hornik, 2002).

In today’s age, consumers are no longer passive recipients in the marketing exchange process. They are an increasingly active role in promotional messages (Berthon, Pitt, McCarthy,
Social media has a number of important capabilities that support their potential utilization in health care-related communication. This potential to add capabilities to health communication practices arises as there are certain technical capabilities and novel usage and behavioral characteristics implied by their usage. Their potential to benefit public health and aid in prevention, is promising, but substantial research is still required (Steele, 2011). Some relevant characteristics of social media include:

- **One-to-many communication**: Unlike email, instant messaging, and others, social media is not focused on a one-to-one model. This means that communications take on a more informative, group reception-focused nature. While research to this is still in the early stages, an impact on the nature and content of the communication occurring has been shown (Boyd & Ellison, 2007; Java, Song, Finin, & Tseng, 2007).

- **Social nature**: Communication is between those with social and/or professional relationships, and the communication has a highly social and engaging aspect to it (Yu, Faloutsos, & Han, 2010).

- **Low barrier to communication**: While traditional forms of communication, such as a mailed letter, required operationally and socially greater barriers before the communication would take place, electronic communications, including social media, are leading toward a lower barrier to communication (Skeels & Grudin, 2009). This is seen with the increased use of mobile devices, such as smart phones (Perreault & Ruths, 2011). It also has led to an increase in the frequency of communication with the use of microblogging communications, such as those via Twitter originating from mobile devices (Parr, 2011).
Geographically correlated: Social media supports a global forum of communication, which can include connections that are typical between people that are known to the user individually. This typically involves a higher proportion of contacts from their own community or region (Onnela, Arbesman, Gonzalex, Barabasi, & Christakis, 2011).

Steele (2011) identified two areas - chronic disease and personalized health care - in which social media and social networks have a potential impact on people’s health. Chronic disease accounts for more than 70% of health cost and 80% of deaths in the U.S. (Bringewatt, 1998). Chronic disease is best combated through lifestyle change and this must occur within an individual’s daily living and work environments. Therefore, social networks, as they reach directly to individuals on a daily or weekly basis, have the potential to affect behavior in relation to chronic conditions. At the same time, it is yet to be determined if, how and how effectively social media might be able to affect such lifestyle behavior. Chronic conditions often do not require just clinical interventions, but require a long-term discussion between health professionals and patients. Long-term lifestyle changes are often the best treatment (Roundtree, Dorsten, & Reif, 2011). Social networks provide for individualized and personalized communication, and analysis would suggest there is potential for more personalized and targeted health care. Examples of using Internet resources include taking a face-to-face lifestyle intervention and turning it into an Internet-based intervention (McTigue et al., 2009). SNSs among patient to patient allows for competition in maintaining good health. For example, the SNS PatientsLikeMe allows individuals to display graphs of the health data and other information that is not considered overly private, such as weight. The competition aspect can
benefit an individual’s health progress over a long period of time, but to date still remains an area of potential future research (Steele, 2011).

In addition, it is important to consider intercultural and cross-cultural communication when creating a campaign. It has been found that when examining the potential role of television in promoting the adoption of prosocial attitudes, researchers have studied factors associated with both advertisement and message recipient (Assael, 1987). However, neither the characteristics of the message recipient, nor the collaboration of advertisement components with the characteristics of the message recipient are well known by researchers. This is because researchers have had to assume meaning from externally guided frameworks of what is thought a person “brings to the message.” Therefore, researchers have focused on “internals,” such as thoughts, emotion, lifestyle and demographic characteristics, and “externals,” such as social class, face-to-face groups, relevant communication situations, and values built into society (Lynne & Walters, 1997). Gundykunst (1994) believes that intercultural and cross-cultural communication plays a pivotal role in exchanging information because life experiences influence how a person transmits messages as an individual’s unique experiences and as a shared ethnic and cultural experience. For example, Kern-Foxworth (1994) noted that African Americans react more favorably toward advertisements featuring African Americans than they do toward advertisements that do not feature African Americans. And, Pitts, Whalen, O’Keefe, and Murray (1989) concluded that black respondents displayed a more positive attitude toward a commercial message that featured black actors.
Influence of Health Promotion Messages

In seeking to influence behavior, campaigners may decide to promote positive behaviors, such as eating fruit, recycling, and buckling your seat belt, to prevent problematic behaviors, such as obesity, pollution, and car accident deaths. In many campaign situations, informational messages that seek to create awareness or provide instruction play an important role. Awareness messages present simple content that informs people what to do, specifies who should do it, or provides cues about when and where it should be done. The more complex instruction messages present how-to-do-it information in campaigns that need to produce knowledge gain or skills acquisition, including enhancing personal efficacy in boosting peer resistance and acquiring media literacy skills. However, the central type of content in campaigns features persuasive messages. Most campaigns present persuasion appeals highlighting reasons why the audience should adopt the advocated action or avoid the proscribed behavior. For audiences that are favorably included, the campaign has the easier persuasive task of reinforcing current predispositions: strengthening a positive attitude, promoting post-behavior consolidation, and motivating behavioral maintenance over time. Because a long-lasting campaign spreads a broad array of persuasive messages, strategists often develop a variety of appeals built around motivational incentives designed to influence attitudes and behaviors (Ronald E. Rice & Atkin, 2013).

A recent Google search revealed more than 155,000,000 websites related to the terms “nutrition advice.” The Internet has surged in popularity with 40% of people receiving nutrition information through Internet resources, such as websites and social media. In fact, the Internet as a nutrition information resource increased 16% from 2008 to 2011. However, television still
remains the number one source for Americans to receive nutrition information at 67 percent, and magazines at number two with 41 percent. Although, there are many media sources for Americans to receive healthy living information, including television, Internet, magazines, doctors, newspapers, package labels, and nutritionists, only 42% of consumers feel maintaining a healthy diet and regular exercise are very important, and they are doing all they can to eat a healthy diet. The 42% of Americans that are “Already Doing It” skews toward females, and are most apt to have someone in the household on a diet for medical reasons. They also are more apt to use magazines for nutrition information. Only 38% of consumers who feel maintaining a healthy diet and regular exercise are very important, but do not do all they can to eat a healthy diet. The “I Know I Should” consumers lean toward ages 35-54 and have more than four people in a household. This group is most apt to use Internet and magazines for nutritional information. Lastly, 20% of consumers do not feel diet and exercise are very important. This “Don’t Bother Me” group skews toward males ages 18-24 with less than a college education. Also, these consumers are least likely to be married or living with a partner. In addition to only 42% of consumers “Already Doing It,” Table 3 represents the little change in Americans behaviors toward diet and exercise from 2008 to 2011 (*Nutrition and You: Trends 2011*).

Table 3

*Americans Behaviors Toward Diet and Exercise, 2008-11*

<table>
<thead>
<tr>
<th>Group</th>
<th>2008</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>“I’m Already Doing It”</td>
<td>45%</td>
<td>42%</td>
</tr>
<tr>
<td>“I Know I Should”</td>
<td>37%</td>
<td>38%</td>
</tr>
<tr>
<td>“Don’t Bother Me”</td>
<td>18%</td>
<td>20%</td>
</tr>
</tbody>
</table>

*Note: Adapted from Nutrition and You: Trends 2011*
Since Americans behaviors toward diet and exercise have not changed more than a few percentage points, both negative and positive, in the last few years, it is important to design effective media messages about health and nutrition. One way to change the dietary behaviors of a large number of people is to conduct a communication campaign. Communication campaigns are an organized communication activity, directed at a particular audience for a specific period of time, to achieve a goal (Snyder, 2002). Snyder (2007) reviewed the overall effectiveness of campaigns in a meta-analysis research journal, and found that the lessons are organized around three critical elements of campaign planning: goals, strategy, and research. The 441 health campaigns Snyder analyzed in the meta-analysis research focused on topics such as:

- nutrition interventions among adults for fruit and vegetable and dietary fat intake;
- HIV prevention;
- youth substance abuse media campaigns;
- myocardial infarction admissions, immunizations, and cancer screenings;
- in-school nutritional campaigns related to heart health aimed at fourth and fifth graders;
  and
- family planning and reproductive health campaigns.

Campaign goals specify what the campaign is designed to accomplish with a specific target audience and within a set period of time. The goals state the desired outcomes, such as the specific behavior that the campaign is promoting. Campaign objectives, which are more detailed
versions of goals, should also specify the target level of change, such as: After six months, men ages 18-23 will have increased their daily vegetable consumption by eight percentage points. The objectives should be measurable and able to be used as criteria for campaign success during evaluation (Snyder, 2007). Campaigns should explicitly state that behavior change is a goal because it will guide the development of appropriate messages and campaign strategies (Andreasen, 1995).

Across health issues, campaigns promoting the adoption of a behavior that is new to the individual or replacement of an old behavior with a new one have a greater success rate than campaigns aiming to cease an unhealthy behavior people are already doing or prevent commencement of a risky behavior (Snyder et al., 2004). An example of a nutrition campaign promoting the replacement of an old behavior is one at Virginia Polytechnic Institute and State University that encouraged 211 college students to switch in consumption from whole or 2% milk to 1% milk (Poddar et al., 2012). Researchers studied this population partly because the campus environment may contribute to poor food choices and subsequent development of poor dietary habits. Examples of this environment include all-you-can-eat dining halls; soda machines; and energy-dense, nutrition-poor foods (Levitsky et al., 2004). Participants in the intervention group \((n=107)\) were encouraged to improve their total dairy intake, with an emphasis on low-fat dairy options, while the comparison group \((n=104)\) received a stress management intervention, via email over an eight-week period. Data collection from the intervention group included dairy intake from seven-day food records and social cognitive theory variables from questionnaires administered during January 2008 and April 2008. Focus groups and semi-structured interviews were conducted with college students to determine motivators
and barriers with consuming dairy. The major barriers include the expense of dairy products, taste, and storage issues. Motivators included seeing others drink milk, awareness of its benefits, and accessibility. The intervention group received a variety of dairy-related components whereas the comparison group received only stress-related components. Table 4 presents the intervention components administered over the eight-week study via online modules from Poddar et al., (2012).

Table 4

*Intervention Components Administered Over Eight-Week Study*

<table>
<thead>
<tr>
<th>Week</th>
<th>Intervention group</th>
</tr>
</thead>
</table>
| 1    | Attaining peak bone mass  
Preventing osteoporosis  
Number of servings per day of dairy recommended by the Dietary Guidelines for Americans, 2005  
Reason for recommendation  
Behavior checklist and online quiz on tracking dairy intake |
| 2    | Potential role of dairy in regulating weight  
How much dairy is sufficient?  
Nutrient information of different beverages (sports drinks and flavored-dairy drinks); choosing beverages  
Behavior checklist and online quiz on monitoring dairy intake  
Social events for participation and their friends where information on dairy foods was provided by campus registered dietitian |
| 3    | Information on nine different nutrients present in dairy foods  
Information on other health benefits  
Behavior checklists and quizzes on strategies to improve dairy intake |
| 4    | Importance of reading food labels  
How to read food labels  
Different types of labels and health claims |
| 5    | Information on dairy foods sent to parents |
Parents asked to encourage participants to incorporate three servings of dairy daily. Methods for incorporating dairy in breakfast, lunch, and dinner, with recipes. Understanding diet quality.

6
Summary of all information provided
Summary of health at a glance

7
How to set goals, plan, monitor, track, and achieve goals
Information on how to develop strategies
Methods for achieving goals

8
Reinforce development of strategy to achieve goals
Behavior checklists and quizzes on strategies to improve dairy intake

This study used SCT and the variables were defined as:

- social support is modeling and normative beliefs of family and friends,
- self-efficacy is self-confidence in the ability to perform the targeted behavior,
- outcome expectations are positive or negative consequences as a result of the behavior, and
- self-regulation is the ability to control and regulate action related to the behavior (Bandura, 2004).

Table 5 presents the intervention components administered to address specific constructs from the SCT model in the Poddar et al. (2012) study.
### Table 5

*Intervention Components Administered to Address Specific Constructs from the SCT Model*

<table>
<thead>
<tr>
<th>Construct</th>
<th>Intervention component</th>
<th>Method of delivery</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social support</td>
<td>Similar information on dairy foods provided to family members and friends</td>
<td>Email messages</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Informative flyers from National Dairy Council</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Friends invited to presentations by campus registered dietitian during socials</td>
</tr>
<tr>
<td>Self-efficacy</td>
<td>Way to incorporate dairy into the diet while studying in the library or on the go</td>
<td>Email messages</td>
</tr>
<tr>
<td></td>
<td>Dairy recipes provided</td>
<td>Informative flyers from National Dairy Council</td>
</tr>
<tr>
<td></td>
<td>Different ways to incorporate dairy into all meals</td>
<td>Presentations by campus registered dietitian during socials</td>
</tr>
<tr>
<td></td>
<td>Kinds of beverages to drink</td>
<td>Free dairy products distributed during socials for tasting</td>
</tr>
<tr>
<td></td>
<td>How many servings to consume</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Amount that constitutes one serving</td>
<td></td>
</tr>
<tr>
<td>Outcome expectations</td>
<td>Benefits of dairy in health</td>
<td>Email messages</td>
</tr>
<tr>
<td></td>
<td>Nutrients present in dairy</td>
<td>Informative flyers from National Dairy Council</td>
</tr>
<tr>
<td></td>
<td>Quantity recommended</td>
<td>Presentations by campus registered dietitian during socials</td>
</tr>
<tr>
<td></td>
<td>Type of dairy recommended (low-fat vs. regular fat)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Places on campus to find dairy</td>
<td></td>
</tr>
</tbody>
</table>
Overall, the authors of the dairy intake study found the total dairy servings per day to be significant \((p = 0.01)\). The total dairy intake increased by 0.17 servings per day with the intervention group, and is equivalent to only 1.3 ounces or two tablespoons of milk. Although this increase is not clinically significant, it does suggest that behavior intervention has the potential to improve dairy intake (Poddar et al., 2012). It is important to note that published data show that dairy intake declines into young adulthood (Demory-Luce et al., 2004; Storey, Forshee, & Anderson, 2006). Although no significant changes were seen in self-efficacy, outcome expectations, and social support, results showed positive and encouraging effects of the intervention on self-regulation. Participants reported that they were more likely to use self-regulation strategies for consuming at least three servings of total dairy and low-fat dairy at the end of the study compared to the participants in the comparison group. Had the intervention been longer than eight weeks, participants’ consistent self-regulation of dairy intake may have had a positive influence on self-efficacy (Poddar et al., 2012). College students have high perceived barriers to healthy eating and low perceived susceptibility to health problems related to dairy intake (Chang, 2006; Schmiege, Aiken, Sander, & Gerend, 2007). Previous studies, similar to this one, have reported that web-based interventions have the potential to improve knowledge
and self-regulation skills related to behavior in college students (Poddar, Hosig, Anderson, Nickols-Richardson, & Duncan, 2010; Suminski & Petosa, 2006). In conclusion, a supportive social environment, including friends and family, is crucial for development and maintenance of positive health behaviors in college students (Sallis, Calfas, Alcaraz, Gehrman, & Johnson, 1999).

**Does the Medium Affect the Impact of a Message?**

Richard Clark stated that media are “mere vehicles that deliver instruction, but do not influence student achievement any more than the truck that delivers our groceries causes changes in our nutrition” (1983, p. 445). He further stated that there is no single media attribute that serves as a unique cognitive effort for a learning task, and posed the question that if different media yield similar learning gains, it makes sense to always choose the less expensive way to achieve a learning goal. In addition, Clark accepted the point that “when learning occurs, some medium or mix of media must be present to deliver the instruction. However, if learning occurs as a result of exposure to any media, the learning is caused by the instructional method embedded into the media presentation” (Clark, 1994, p. 26). Gabriel Salomon (1979) also agreed that it was not the medium which influenced learning, however, it was certain attributes of media that can be modeled by learners to help shape the development of cognitive processes. Students often need an example to connect new information with prior experience. If students cannot give themselves an example, an instructional presentation must be provided for them. Examples of media attributes that can facilitate learning include the capacity of television and movies to zoom in to provide detail or to “unwrap” three-dimensional objects into two dimensions. However, one problem with focusing solely on media attributes is that many
different media attributes may accomplish the same learning goal. Ideally, if many different types of examples were presented by many different media, it would serve similar cognitive functions for any given student (Clark, 1994).

Ten years after Clark's claim that media does not influence learning Robert Kozma (1994) revisited the statement and reframed the question. He asked not do, but will media influence learning? In his article Will Media Influence Learning? Reframing the Debate, he asserted that if there is no relationship between media and learning, it is because a relationship has not yet been made. Kozma's article is more than 20 years old, but he did foresee a change in media with the merging of telephone, cable television, and digital computer technologies. He asserted that the source of failure between media and learning is that theories, research, and designs have been constrained by remnants of the behaviorist theory (Richey, 1992; Winn, 1990) and embedding in comparative media studies that are primal stimuli and response of the behavioral paradigm. Learning is not a receptive response to instruction's delivery, but rather it is an active, constructive, cognitive, and social process by which the learner manages cognitive, physical, and social resources to create new knowledge by interacting with information already stored in memory (Shuell, 1988). The role of the media can be analyzed in terms of cognitively relevant attributes (Salomon, 1979). These attributes include a medium's technology, symbol systems, and processing capabilities (Kozma, 1994). Technology is the physical, mechanical, or electronic capabilities of a medium that determine its function and possibly how other features are shaped. And, it should be noted that with the advancement of speed and capacity of computers it is possible to employ pictures and other dynamic symbol systems with computers in a way that was not possible before the 1970s. Therefore, the definition of computers has
changed to include these symbol systems. Early studies of computer-based instruction, including those studied by Clark in the 1980s, were actually studying a different, less capable medium than those of the 1990s (Kozma, 1994). Symbol systems are sets of symbolic expressions by which information is communicated about a field of reference (Goodman, 1976). Some examples may include spoken language, printed text, pictures, performed music, maps, graphs, and so on. Processing capabilities are the ability of a medium to operate on available symbol systems in specified ways. Information can be displayed, received, stored, retrieved, organized, translated, transformed, and evaluated among other processes (Kozma, 1994).

Richard Mayer and Valerie Sims (1994) said that in order to fully capture students’ attention and have students retain information, multimedia learning needs to occur. Multimedia learning occurs when students use the information presented in two or more formats – such as visual and verbal– to help them construct knowledge. When two or more formats are used simultaneously it is referred to as the dual-coding theory of multimedia learning. This theory was adapted and modified from Paivio’s theory (Paivio, 1971, 1986), and offers a three-process account of how visually and verbally presented material might be integrated into the learner’s working memory during learning (Mayer & Sims, 1994).

Figure 3 represents the dual-coding model of multimedia learning. (1) A verbal explanation, such as an oral lecture, is presented to a learner. (2) A visual explanation is presented to the learner, such as animation. (3) Within working memory, the learner constructs a mental representation of the system described in the verbal explanation. The cognitive process of going from an external to an internal representation of the verbal material is called building a verbal representation connection. The same holds true for the visually presented information.
The cognitive process of going from an external to an internal representation of visual information is called building a visual representational connection. The construction of referential connections between the two mental representations is the mapping of structural relations between the two representations of the system. (4) The learner builds referential connections between visual and verbal representations of essential parts, actions, relations, and principles in the system. Performance includes the learner’s response to tests of retention and transfer. Therefore, when a student is asked to solve transfer problems, performance depends on all three connections being formed – visual representational connections, verbal connections, and referential connections (Mayer & Sims, 1994).

Figure 3. Dual-coding Model of Multimedia Learning
The dual-coding theory can be applied to SNSs since the sites allow for images, video, and text to appear in posts. Users can watch a video presented to them through Facebook, which allows for verbal and visual explanation together. This ultimately allows for a more effective way of learning information than just text alone.

**Social Networking Sites and Its Benefits**

Social networking sites is a relatively new term, however, the study of information from and the influence of social networks has been active for many years in the fields of sociology, communication, marketing, political science, and physics. Earlier research focused on the presence of key influential people in a social network, defined as those who are responsible for the overall information dissemination in the network. The social networking theory states that there is a powerful tendency that individuals have to network along the same lines and it is driven by shared beliefs, interests, and social status. Social networking theory suggests that informal webs of relationships are usually the determinants of how well and quickly change efforts take hold, diffuse, and sustain (Daly, 2010). More recently, Agarwal, Liu, Tang and Yu (2008) have examined social influence and the blogosphere. Blogging has become a popular means for mass web users to express, communicate, share, collaborate, debate, and reflect. The blogosphere is the virtual universe that contains all blogs. The blogosphere provides a platform to build virtual communities of special interests. It inspires viral marketing (Domingos & Richardson, 2001), provides trend analysis and sales prediction (Gruhl, Guha, Liben-Nowell, & Tomkins, 2004), and acts as grassroots information sources (Thelwall, 2006). Keller and Berry (2003) stated that 83% of people prefer consulting family, friends, or an expert over traditional
advertising before trying a new restaurant, 71% of people do the same before buying a prescription drug or visiting a specific location, and 61% of people talk to family, friends, or an expert before watching a movie. These numbers show that before people buy or make decisions, they talk, and they listen to others’ experiences, opinions, and suggestions.

Technology and education have evolved to allow people to communicate in ways that span temporal and spatial boundaries. Face-to-face meetings are not the only way to conduct class. We can communicate synchronously and asynchronously, and be separated geographically (Joosten, 2012). Mobile devices, such as the smart phone and iPad, play a large role in facilitating the use of SNSs for teaching and learning. Most SNSs have functions that allow students to receive and send text messages or updates through mobile applications (apps). Researchers report that 90% of 18-29-year-olds use their mobile phones to send and receive text messages (Smith & Caruso, 2010). Joosten (2012) reported high use of text messaging with mobile devices at 88.4%, and 70.5% said they desire to receive text messaging updates of course information. Much of this research is guiding the exploration of the effectiveness of online learning, online pedagogy, and course design (Joosten, 2012).

Shirky (2008) suggested that there are four stages to mastering the connected world: sharing, cooperating, collaboration, and collective action. Sharing is the key to connecting online and it is a fundamental skill of network literacy. People share because they want to connect with others around their passions, not simply to communicate. Sharing leads to connecting, which is the starting place for network building and cooperation. Cooperating in networks is done through the sharing of ideas and resources, but without much accountability, action, or follow-through on the ideas. As one shares and connects with other educational
leaders, you begin to build a collective identity and efficacy. Collaboration requires the best efforts of those involved to build something together. Collaboration within a community can lead to outcomes that affect society for the greater good and result in projects or efforts that display the wisdom of crowds at their best. Collaboration within a school allows educators to approach goals as connected learners who are reliant on the skills and knowledge of each other as a means for meeting the needs of today's students. And lastly, collective action in a community may result in positive global change. SNSs offer educators the tools to connect in ways that can change society for the better. For instance, students and teachers become co-learners in the creation of projects that align with curricular goals, and can create an awareness of social justice issues and how to solve these problems in our society (Nussbaum-Beach, 2012).

While some standardized scales have been developed to examine attitude and behavior interactions in the area of SNSs and psychology, such as The Facebook Intensity Scale (Ellison, Steinfield, & Lampe, 2007b), they are not consistently applied in all studies of this nature. The Facebook Intensity Scale was created to obtain a better measure of Facebook usage than frequency or duration. This measurement includes two self-reported assessments of Facebook behavior, designed to measure the extent to which the participant was actively engaged in Facebook activities; the number of Facebook “friends’ and the amount of time spent on Facebook on a typical day. This measurement also included a series of Likert-scale attitudinal questions designed to uncover the extent to which the participant was emotionally connected to Facebook and the extent to which Facebook was integrated into his/her daily activities. Some of the items used in the Facebook Intensity Scale include:

- About how many total Facebook friends do you have at your school or elsewhere?
In the past week, on average, approximately how many minutes per day have you spent on Facebook?

Facebook is part of my everyday activity.

I feel out of touch when I haven’t logged onto Facebook for a while.


Anderson et. al (2012) reviewed 100 publications dealing with the subject psychological themes concerning Facebook use. They grouped the themes into the following categories:

- antecedents of Facebook use,
- how individuals and corporations use Facebook, and
- the psychological outcomes or effects of Facebook use.

The authors’ suggest that because Facebook users are motivated by a desire to manage new and existing relationships, it is important to consider the impact of making a Facebook friend. Interpersonal interaction is informed not only by how a person presents him- or herself (Goffman, 1959), but also by the ability of perceivers to accurately infer characteristics from that self-presentation (Funder, 1995). Packaging information in a way that facilitates easy access to, and digestion of, has never been more important. Internet users have identified “zero tolerance for delay.” They want to access the data they want, instantaneously – a demand that is both driven and reinforced by the capabilities of new media (Rowlands et al., 2008). Facebook is part of this movement and its platform allows members to use the small amounts of information posted on a profile to make quick and reasonably accurate assessments of large numbers of potential friends (Anderson et al., 2012). As in real life, Facebook suggests that in any large group of friends, only a few will be close friends, which may be explained in part that we have
only limited cognitive capacity to maintain social relationships (Hill & Dunbar, 2003). In sociological and psychological theory, the interpersonal tie describes the bond between individuals through which information can be channeled. These ties can be weak or strong depending on the amount of time invested, the emotional intensity, the mutual confiding, and the reciprocal services which characterize the tie (Granovetter, 1973). This also applies to Facebook, as we can see that friends made online can be weak or strong interpersonal ties. This means that online friends can create and sustain information-facilitating connections with existing, close friends, as well as acquaintances (Ellison et al., 2007b).

**Summary**

For the past 75 years, PSAs and other media messages have been deep-rooted in American culture, and have been delivered to audiences via traditional channels, such as television, radio, and newspapers. However, with the shift in technology to a more social and dynamic platform in the last 10 years, the demand among consumers for more and better ways to connect, communicate, and conduct business is upon us now. Therefore, it is important to continuing research into the psychology of SNSs, including Facebook (Anderson et al., 2012). There are still gaps in the research to date that may be worth studying in more detail. Although researchers have spent an effort in understanding how people use Facebook features, such as how they create and perceive profile content and befriend other users or brands, there is still only a limited amount of knowledge known about awareness, attitude, and behavior changes from a PSA campaign conducted through a SNS.
CHAPTER III

METHODOLOGY

Introduction

This chapter details the methods used in this study to measure the change in participants’ awareness, behaviors and attitudes about proper nutrition and exercise with the use of healthy living public service announcements over a four-week period. The disseminated announcements will focus on encouraging participants to increase fruit and vegetable consumption, and also to increase daily physical activity. Secondary goals of this study are to establish how people receive information about nutritional health and exercise to control weight and overall well-being, and to define what aspects of the social networking experience contributed to changes in the participants’ awareness, behaviors, and attitudes about proper nutrition and exercise. Within one of the groups, the following two questions will be addressed. Did the two-way communication affect the experience, and what types of resources (instructional videos, text postings, shared resources, peer communication/support) within the social networking group did participants find most beneficial?

Participants

A four-week study was conducted using about 250 undergraduate students from Kent State University, a large public university in Northeast Ohio. Students were randomly placed in one of two groups; the first group of students was the experimental group (Facebook), and the second group of students was the control group (email). They completed a pretest survey deployed through Qualtrics, a secure online survey system supported by Kent State that allows
researchers to collect and analyze data. The participants in the experimental group were asked to join the closed Facebook group “Kent State Healthy Living.” In the closed group, administrators approved members and only group members were able to see posted content. The experimental group received 14 healthy living information posts (3-4 per week) over a four-week period from the facilitator (Elizabeth Thomas) through the social media platform Facebook. The facilitator played an active role in encouraging students in the experimental group to communicate and interact with one another about the posts in the Facebook group page. The facilitator did this by asking open-ended questions/prompts to the group.

The control group received the same 14 healthy living information posts (3-4 per week) over a four-week period as the experimental group, and they were received on the same day and time as the experimental group. However, instead of using a Facebook group page, the control group only received communication through email. The email participants were not able to see who was receiving the emails, as participants were blind copied in the emails. Therefore, they did not have the ability to communicate with others in the group. Also, they did not receive any additional questions/prompts from the facilitator. All participants were offered extra credit upon completion of the posttest survey. Participants had the option to opt out the study and complete an alternative assignment for extra credit. However, no participants chose this option. Participants were presented with one of two consent forms: a Facebook consent form (Appendix A) or an email consent form (Appendix B), as approved by the Kent State Institutional Review Board (IRB). The consent form and pretest and posttest surveys were delivered to the participating students via Qualtrics.
Pilot Studies

A pilot study has several functions, principally to increase the reliability, validity, and practicability of the survey (Oppenheim, 1992). To test these functions, two pilot studies were conducted in fall 2014 with undergraduate students. The goal of the pilot study was to increase the likelihood of a successful main study. As part of the strategy, the following factors were examined during the pilot phase:

- Check that instructions are clear and understandable.
- Check that investigator is skilled in the procedure.
- Check the wording of a survey.
- Check the reliability and validity of the results.
- Check the statistical processes (Simon, 2011).

In the first pilot, a small number of participants \( n = 58 \) that were college students took part in the study: completed a pretest survey, received posts via Facebook or email over a four-week period, and completed a posttest survey. While the pilot study did not indicate significance between the two groups: Facebook \( n = 29 \) and email \( n = 29 \), there were also no major issues with the surveys or intervention. Only small changes were made regarding wording in some of the questions. For example, in the pilot study’s pretest survey “vigorous” was not defined, and therefore participants did not have a baseline understanding of what exercise is considered vigorous. In the main study, the wording was changed to give examples of “vigorous exercise.” In question 23 of the pretest survey it stated, “According to health experts, for my age group, I should be getting the following amount of vigorous exercise each day. Examples of vigorous
activities include running, competitive sports such as volleyball, football, and basketball, fast swimming, or climbing briskly up a hill. Check only one.”

In the second pilot study, a focus group with three college students was conducted to test the information added after the first pilot study. Focus groups are a form of group interview where participants interact with each other rather than with the interviewer, such that the view of the participants can emerge (Cohen, Manion, & Morrison, 2011). The suggestions from the focus group are as follows:

- Pretest question: “In the past year how often have you been exposed to a public service campaign through Facebook and/or another social networking site? A public service campaign informs the public about current health, social, and environmental issues facing the population. Some of the examples include AIDS prevention, recycling, and autism awareness.” Instead, the students mentioned that more current PSAs, such as ALS bucket challenge and gay rights, might be more appropriate and impactful for my target audience.

- Pretest question: “Do you feel that there are daily obstacles that don’t allow for you to eat healthy and exercise? If yes, check all that apply.

  o Not enough time to exercise
  o Not enough time to create healthy meals and snacks
  o Financial barriers
  o Unmotivated to eat healthy and exercise
  o Health issues don’t allow for exercise
  o I don’t like to eat healthy foods
- I don’t like to exercise
- Other, please explain. ________________________________________________

Instead, the focus group students suggested that this question be split into two different questions: one about daily obstacles for eating healthy, and one question about daily obstacles for exercising for easier reading. Also, they suggested adding “I don’t know if I am eating healthy,” and “I don’t have access to a kitchen to make healthy meals” as options to choose since some college-aged students are not knowledgeable on the subject and may live in places without adequate kitchen appliances.

**Research Design**

A convenience sample of students was used in this experimental research design. The pretest survey (Appendix C) was deployed through Qualtrics and started with asking demographic questions, including first and last name identifiers. Identifiers were necessary because participants were being tracked in the Facebook group, and also in the posttest survey. They were also asked about their age, gender, and weight. In addition, they were asked if they were trying to gain, lose, or maintain their weight. This was done to collect descriptive statistics from the participants. This study is not only concerned with weight changes, but also to investigate if there is an increase in fruit and vegetable intake, and an increase in exercise minutes. The second part of the survey asked about technology use. Participants were asked questions about how they receive information about nutritional health and exercise, how many hours they spend actively using the Internet each day, and if and how they use Facebook. In the last part of the survey, participants were asked about healthy living, including their interest in maintaining a healthy lifestyle, how many fruit and vegetables they eat, and what types of
cardiovascular and muscle strengthening activities they actively engage in on a weekly basis. Dichotomous questions, such as yes or no, and gender selection, were included in the survey. Dichotomous questions are useful because it compels survey takers to take a stance. It is also useful as a funneling device for subsequent questions. For example, “if you answered ‘yes’ to question X, please go to the question Y” (Cohen et al., 2011). In addition, questions based on the level of measurement, such as Likert scales, were included, as well as open-ended questions. Likert scales named after its deviser, Rensis Likert, provide the survey taker with a range of responses to a given question or statement, such as “1 – strongly disagree, 2 – disagree, 3 – neither agree nor disagree, 4 – agree, and 5 – strongly agree.” Open-ended questions allow the survey taker to provide an honest, personal comment, and may contain the ‘gems’ of information that otherwise might not be caught in the questionnaire (Cohen et al., 2011). Students were given one week to complete the pretest survey, and when it closed 333 participants completed it in its entirety. Participants were randomly placed in the email group ($n=167$) or the Facebook group ($n=166$). The Facebook group participants were asked to join the closed Facebook group “Kent State Healthy Living.” Because not all of the Facebook participants accepted the invite to join the closed group, this resulted in 139 Facebook participants, including the facilitator. Figure 4 illustrates the “Kent State Healthy Living” closed Facebook group that 139 participants/members joined.
Once the groups were formed, the intervention phase began and spanned over the course of four weeks. Participants received the following number of posts/emails each week: week one = 3, week two = 4, week three = 4, week four = 3. These PSAs (Appendix D) were compiled from various credible sources, such as eatright.org, wholeliving.com, usda.gov, and kent.edu. Each Facebook post contained text and a hyperlink and image, or a video. The email group did not receive any images, but rather a clickable link to the web page or video. Figure 5 illustrates one of the Facebook posts and a prompt from the facilitator. Seventy-one Facebook group members viewed the post in their newsfeed.
Figure 5. Screenshot of Facebook Post Example 1

Figure 6 illustrates another one of the Facebook posts and prompts from the facilitator, along with members’ communicating with the facilitator and one another through commenting. It should be noted that although not everyone commented on this post, 102 members viewed the post in their Facebook newsfeed.
Figure 6. Screenshot of Facebook Post Example 2
Figure 7 represents the same information posted in the Facebook message, however, it was sent via email and there are no visual elements or ways to communicate with others. Email participants are blind copied, and therefore only saw the facilitator’s name and email in both the “to” and “from” fields. In addition, the recipient must click on the URL to view the video outside of his/her email client.

![Email Message Example]

**Figure 7: Screenshot of Email Message Example**

The emails and Facebook posts were disseminated on the same day within minutes of each other, Monday through Thursday, during the morning hours. Each week, at least one fruit, one vegetable, and one exercise PSA message was sent to the participants. In addition, each Facebook participant was also given a facilitator prompt under the post. For example, in a post about exercising with music, the facilitator asked the question, “What are some of your favorite tunes to listen to when working out?” This prompt allowed for more open-ended discussion to elicit information regarding participants’ exercise habits in the Facebook group. Also, it puts responsibility for and ownership of the data much more firmly into participants’ hands (Cohen et
Additionally, quantitative information was gathered, such as how many Facebook members “liked” a post or “saw” a post. Figure 8 represents a Facebook post with the facilitator’s prompt/question to members to encourage a response after reading the message.

*Figure 8. Screenshot of Prompt/Question in Facebook Group*
Table 6 details the types of information – text, web links, images, videos, instructor prompts/questions, and peer-to-peer communication – received by each of the groups during the intervention.

Table 6

Summary of Information Received by Both Groups During Intervention Phase

<table>
<thead>
<tr>
<th>Type of Information</th>
<th>Control (Email) Group</th>
<th>Experimental (Facebook) Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Text</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Web links</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Images</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Videos</td>
<td>Yes (link to outside page)</td>
<td>Yes (embedded in post)</td>
</tr>
<tr>
<td>Instructor Prompts</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Peer-to-Peer Communication</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

At the end of the four-week period, the participants were given one of two posttest surveys depending on their group. The Facebook group received a survey (Appendix E) deployed through Qualtrics including dichotomous, levels of measurement, and open-ended questions. The email group received a survey (Appendix F) deployed through Qualtrics including dichotomous, and levels of measurement questions. No open-ended questions were asked to the email group. The posttest respondents were $n=129$ email participants, and $n=139$ Facebook participants that fully completed the study. However, the analyses were only run on a total of 249 participants because not all of the participants who took a pretest survey took a
posttest survey; some participants didn’t provide their name on both surveys, and therefore couldn’t be matched; some students did not consent to participate in the study, and did not complete the surveys; and some participants responded to the surveys more than once, and the invalid responses were removed.

**Data Analysis**

In this study, two hypotheses were tested. The hypothesis guides the researcher on the selection of some observations rather than others and will suggest experiments (Medawar, 1981). The hypothesis is a statement of the relations between two or more variables or ‘an educated guess,’ however unlike an educated guess, it is often the result of extensive study, reflective thinking, and observation (Kerlinger, 1970). The hypotheses in this study are:

- Participants’ awareness, behaviors, and attitudes about proper nutrition and exercise will change over a four-week period with the use of a ‘healthy living’ PSA campaign.

- Participants’ awareness, behaviors, and attitudes about proper nutrition and exercise will change depending on the group with the use of a ‘healthy living’ PSA campaign disseminated through social media compared to through email.

In order to measure the change of awareness, behaviors, and attitudes from pretest to posttest, specific questions were asked of all participants. Table 7 displays example questions and statements geared toward measuring these changes.
Table 7

*Measurement of Change*

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Key Words</th>
<th>Example Question/Statement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Awareness</td>
<td>“I should”</td>
<td>According to health experts, for my age group, I should be eating the following amount of</td>
</tr>
<tr>
<td></td>
<td>“I know I should”</td>
<td>vegetables each day.</td>
</tr>
<tr>
<td>Behaviors</td>
<td>“Times per week”</td>
<td>During the past week, other than your regular job, how many times did you participate</td>
</tr>
<tr>
<td></td>
<td>“Servings per week”</td>
<td>in any vigorous physical activities or sports for exercise?</td>
</tr>
<tr>
<td></td>
<td>“Current weight”</td>
<td></td>
</tr>
<tr>
<td>Attitudes</td>
<td>“I make an effort”</td>
<td>I make an effort to eat a variety of fruits and vegetables in my daily diet.</td>
</tr>
<tr>
<td></td>
<td>“I feel”</td>
<td></td>
</tr>
</tbody>
</table>

In addition, other research questions were addressed to help understand the topic more, and to help with further discussion about PSAs delivered through various channels. A series of repeated measure analysis of variance (ANOVA) tests were conducted to compare differences in participants’ awareness, behaviors, and attitudes between the two groups across two testing periods (i.e. pretest and posttest). The significance level for these tests was 0.05. Repeated measure designs are designs in which the same subject (i.e. Facebook group and email group) is measured more than once on the dependent variable (Wiersma & Jurs, 2005). In addition, descriptive statistics was collected to help support the quantitative data. Descriptive statistics deals with describing distributions of data and relationships between variables (Wiersma & Jurs, 2005).
In experimental research, the goal is to control an independent variable, and then observe the effect that this change has on a dependent variable (“Laerd Statistics,” 2013). In this study, there were two experimental objectives. The first objective was to investigate participants’ awareness, behaviors, and attitudes about proper nutrition and exercise to determine if it will change over a four-week period with the use of a ‘healthy living’ PSA campaign. The second objective was to determine if participants’ awareness, behaviors, and attitudes about proper nutrition and exercise will change depending on their group assignment of either using social media or email on how they receive their ‘healthy living’ PSA campaign. The analysis was conducted using the Statistical Package for the Social Sciences (SPSS), version 21. The two groups of participants were compared using a repeated measures ANOVA, and a McNemar’s test because the study investigated a change in scores with measurements taken at the beginning of week one and at the end of week four. ANOVA tests the null hypothesis that two or more population means are the same. A ratio of two variance estimates is calculated, and this ratio has as its sampling distribution the $F$-distribution, determined by two degrees-of-freedom values (Wiersma & Jurs, 2005). McNemar’s test was used on three awareness statements because the dependent variable is dichotomous, which means the respondent either got the question right or wrong (“Laerd Statistics,” 2013). The awareness statements were:

- According to healthy experts, for my age group, I should be eating the following amount of vegetables each day. Please note that one cup is about the size of your fist. Choose only one answer.
According to health experts, for my age group, I should be eating the following amount of fruit each day. Please note that a piece of fruit (i.e. apple, banana, or pear) is considered one cup. Choose only one answer.

According to health experts, for my age, I should be getting the following amount of vigorous exercise each day. Examples of vigorous activities include running, competitive sports such as volleyball, football, and basketball, fast swimming, or climbing briskly up a hill. Choose only one answer.

The independent variables were the two groups of participants (Facebook and email) and time (pretest and posttest). The dependent variables were weight, fruit intake, dark green vegetable intake, other vegetable intake, vigorous physical exercise, strengthening of muscles, and knowledge of healthy living. Data analysis for each of the research questions is outlined in Table 8.

### Table 8

<table>
<thead>
<tr>
<th>Research Question</th>
<th>Independent Variables</th>
<th>Dependent Variables</th>
<th>Data Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do participants’ awareness, behaviors, and attitudes about proper nutrition and exercise change with the use of ‘healthy living’ public service announcement campaigns, that are Facebook and email groups, Time</td>
<td>Weight</td>
<td>Repeated Measures Analysis of Variance (ANOVA), and a McNemar’s test *</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Fruit intake</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dark green vegetable intake</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Other vegetable intake</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Question</td>
<td>Method</td>
<td>Analysis</td>
<td></td>
</tr>
<tr>
<td>--------------------------------------------------------------------------</td>
<td>-------------------------------</td>
<td>-------------------</td>
<td></td>
</tr>
<tr>
<td>delivered via a social networking site?</td>
<td></td>
<td>Vigorous physical exercise</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Strengthening of muscles</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Knowledge of healthy living</td>
<td></td>
</tr>
<tr>
<td>Currently, how do participants receive information about nutritional health and exercise to control weight and overall well-being?</td>
<td>Facebook and email groups</td>
<td>Descriptive statistics</td>
<td></td>
</tr>
<tr>
<td>What aspects of the social networking experience contributed to changes in the participants’ awareness, behaviors, and attitudes about proper nutrition and exercise?</td>
<td>Facebook group</td>
<td>Descriptive statistics</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Time</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Did the two-way communication affect the experience?</td>
<td>Facebook group</td>
<td>Descriptive statistics</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>What types of resources (instructional videos, text postings, shared resources, peer communication/support) within the social networking group did participants find most beneficial?</td>
<td>Facebook group</td>
<td>Descriptive statistics</td>
<td></td>
</tr>
</tbody>
</table>

* A Repeated Measures ANOVA was used on the behaviors’ and attitudes’ questions. McNemar’s test was used on three awareness statements, in which the respondent either got the statement correct or incorrect.
Summary

In this chapter, the methodology used to answer the research questions was detailed. The pretest and posttest surveys, and intervention materials have been piloted and refined. The final data study collected in fall 2015 was analyzed using a basic between subjects and within subjects research design. In this study, using social media (i.e. Facebook) as an educational approach was expected to result in statistical significance.
CHAPTER IV
RESULTS

Introduction

The results of this statistical analysis are presented in this chapter. It begins with a summary of the participants’ demographics and is then organized by the research questions presented in chapter one. There are three primary research questions, and two secondary questions addressed in this experimental research study. Table 9 displays participants’ gender, age, weight, year of study, living situation, and whether they are trying to gain, lose, or maintain their current weight. This demographical information was self-reported and collected during the pretest survey.

Table 9

Demographics of Participants in the Study (n=249)

<table>
<thead>
<tr>
<th>Measures</th>
<th>Male (70)</th>
<th>Female (177)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>28%</td>
<td>72%</td>
</tr>
<tr>
<td>Age</td>
<td>Mean=22.62 years</td>
<td></td>
</tr>
<tr>
<td>Female Weight</td>
<td>Mean=150.96 pounds</td>
<td></td>
</tr>
<tr>
<td>Male Weight</td>
<td>Mean=180.04 pounds</td>
<td></td>
</tr>
<tr>
<td>Academic Year</td>
<td>Freshman 23 (9%)</td>
<td>Sophomore 105 (42%)</td>
</tr>
</tbody>
</table>
## Living Situation

<table>
<thead>
<tr>
<th>Living Situation</th>
<th>On-Campus Hall</th>
<th>Fraternity/Sorority House</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fraternity/Sorority House</td>
<td>2 (1%)</td>
<td></td>
</tr>
<tr>
<td>Parent’s/Guardian’s House</td>
<td>42 (17%)</td>
<td></td>
</tr>
<tr>
<td>Other College Housing</td>
<td>11 (4%)</td>
<td></td>
</tr>
<tr>
<td>Other Off-Campus Housing</td>
<td>115 (46%)</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>26 (10%)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Try to gain, lose, or maintain weight</th>
<th>Gain (10%)</th>
<th>Lose (53%)</th>
<th>Maintain (28%)</th>
<th>Don’t Care (8%)</th>
</tr>
</thead>
</table>

## Background Information

Participants completed a few questions about background information during the pretest survey and were asked about their Facebook usage, exposure to PSAs, their interest in maintaining a healthy lifestyle, and obstacles that they may face if trying to eat healthily and exercising. This information was gathered to better understand the participants’ behaviors and attitudes toward healthy living. Participants were asked, “In the past week, on average, approximately how many minutes per day have you spent on Facebook?” Eighty percent of participants indicated that they spent 10 minutes or more on Facebook each day. Results are presented in Table 10.
Participants were asked, “In the past year, how often have you been exposed to a public service campaign through Facebook and/or another SNS? A public service campaign informs the public about current health, social, and environmental issues facing the population. Some examples include ALS/Lou Gehrig's Disease, LGBT rights, and autism awareness.” The answers were mixed, but a majority of the participants indicated that they had been exposed to PSAs, and many of them on numerous occasions. Test results are presented in Table 11.

Table 11

Frequencies of Being Exposed to a PSA Campaign Through Social Networking

<table>
<thead>
<tr>
<th>Frequencies</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never</td>
<td>17.8</td>
</tr>
<tr>
<td>1-3 times</td>
<td>36.0</td>
</tr>
<tr>
<td>4-6 times</td>
<td>17.3</td>
</tr>
<tr>
<td>7 or more times</td>
<td>28.9</td>
</tr>
</tbody>
</table>

Participants were asked, “What level of interest do you have with maintaining a healthy lifestyle? (i.e. eating nutritious foods and exercising)?” More than 53% of respondents had “great interest” in maintaining a healthy lifestyle, while only 2.8% had “no interest at all” in maintaining a healthy lifestyle. Results are presented in Table 12.
Table 12

*Interested in Maintaining a Healthy Lifestyle*

<table>
<thead>
<tr>
<th>Interest Level</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>No interest at all</td>
<td>2.8</td>
</tr>
<tr>
<td>Some interest</td>
<td>43.9</td>
</tr>
<tr>
<td>Great interest</td>
<td>53.3</td>
</tr>
</tbody>
</table>

Participants were asked, “Do you feel that there are daily obstacles that don't allow for you to eat healthy?” More than 63% of respondents said “They don’t have enough time to create healthy meals,” and more than 47% of respondents said, “I have financial barriers associated with buying fresh produce, whole grains, and meats.” Only 8.8% of respondents said, “I don’t like to eat healthy foods.” Results are presented as percentages in Table 13.

Table 13

*Daily Obstacles that Don’t Allow for Healthy Eating*

<table>
<thead>
<tr>
<th>Healthy Eating Obstacles</th>
<th>Yes (%)</th>
<th>No (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I don’t have enough time to create healthy meals.</td>
<td>63.9</td>
<td>36.1</td>
</tr>
<tr>
<td>I don’t have access to a kitchen to make healthy meals.</td>
<td>19.7</td>
<td>80.3</td>
</tr>
<tr>
<td>I have financial barriers (costs associated with buying fresh produce, whole grains, and meats).</td>
<td>47.8</td>
<td>52.2</td>
</tr>
<tr>
<td>I am unmotivated to eat healthy.</td>
<td>21.3</td>
<td>78.7</td>
</tr>
<tr>
<td>I don’t like to eat healthy foods.</td>
<td>8.8</td>
<td>91.2</td>
</tr>
<tr>
<td>I don’t know if I am eating healthy foods.</td>
<td>16.5</td>
<td>83.5</td>
</tr>
</tbody>
</table>
Some of the respondents’ other comments were:

- When I am under stress, I make unhealthy food choices.
- I am a picky eater.
- The campus food options are fattening.
- It is difficult to find healthy recipes that taste good.
- I give into my cravings.
- It is more convenient to eat fast food.
- I don’t have any obstacles. I love eating healthy foods.

Participants were asked, “Do you feel that there are daily obstacles that don’t allow for you to exercise? If yes, check all that apply.” More than 63% of respondents said “There is not enough time to exercise,” and more than 35% of respondents said, “I am unmotivated to exercise.” Only 5.6% of respondents said, “Health issues don’t allow for exercise.” Results are presented as percentages in Table 14.

Table 14

*Daily Obstacles that Don’t Allow for Exercise*

<table>
<thead>
<tr>
<th>Exercise Obstacles</th>
<th>Yes (%)</th>
<th>No (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>There is not enough time to</td>
<td>63.5</td>
<td>36.5</td>
</tr>
<tr>
<td>exercise.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I have financial barriers (cost to</td>
<td>10.4</td>
<td>89.6</td>
</tr>
<tr>
<td>join gym).</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
I am unmotivated to exercise.   35.3   64.7

Health issues don’t allow for exercise.   5.6   94.4

I don’t like to exercise.   14.1   85.9

Other, please explain.   7.6   92.4

Some of the respondents’ other comments were:

- I feel awkward and/or anxious at the gym.
- I am lazy.
- I don’t have energy.
- I don’t have obstacles. I am a student athlete.

Lastly, participants were asked, “How would you describe your daily diet?” More than 77% of respondents said “I eat a variety of foods, including meats such as fish, pork, chicken and beef” while just under 5% of respondents said they eat a vegetarian or vegan diet. Results are presented in Table 15.

Table 15

*Daily Diet Description*

<table>
<thead>
<tr>
<th>Diet Description</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>I eat a variety of foods, including meats such as fish, pork, chicken, and beef.</td>
<td>77.6</td>
</tr>
<tr>
<td>I eat a mostly vegetarian diet, but occasionally eat meats such as fish or chicken.</td>
<td>13.0</td>
</tr>
</tbody>
</table>
I eat a 100% vegetarian diet, including eggs and dairy, but no meat products. 4.1
I eat a 100% vegan diet, and I do not eat eggs, dairy, honey or other animal products. 0.8
Other, please explain. 4.5

Some of the respondents’ other comments were:

- I eat mostly unhealthy foods because I am a picky eater.
- I eat the caveman diet (mostly meats, produce, seeds, and nuts).
- I only eat Halal food, and do not eat pork.
- I eat only unprocessed foods (no sugar, grains, or dairy).

**Research Question One**

Do participants’ awareness, behaviors, and attitudes about proper nutrition and exercise change with the use of ‘healthy living’ public service announcement campaigns, that are delivered via a social networking site?

There are many different statistics analyzed to answer this question. As stated in chapter 3’s data analysis section, there were keywords used in the survey questions to measure awareness, behavior and attitudinal change between subjects (Facebook or email) and within subjects (pretest survey to posttest survey). For example, to measure participants’ awareness change, “I should” and “I know I should” statements and dichotomous questions were asked; to measure participants’ behavioral change, “times per week,” “serving per week,” and “weight in
pounds” statements were asked; and to measure participants’ attitudinal change, “I make an effort,” and “I feel” statements were asked in pretest and posttest surveys.

To measure participants’ awareness of healthy living, five “I should” statements were presented to the participants. Two of the statements used a Likert scale with a range of responses to a given statement, such as “1 – strongly disagree, 2 – disagree, 3 – neither agree nor disagree, 4 – agree, and 5 – strongly agree. In the first statement, “I know I should eat a variety of fruits and vegetables in my daily diet,” there was no statistical significance found from the pretest ($M=4.62$) to the posttest ($M=4.57$) surveys. Descriptive statistics are displayed in Table 16.

Table 16

*Descriptive Statistics for “I know I should eat a variety of fruits and vegetables”*

<table>
<thead>
<tr>
<th></th>
<th>Group</th>
<th>Mean</th>
<th>SD</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest</td>
<td>Facebook</td>
<td>4.59</td>
<td>.657</td>
<td>129</td>
</tr>
<tr>
<td></td>
<td>Email</td>
<td>4.66</td>
<td>.682</td>
<td>118</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>4.62</td>
<td>.669</td>
<td>247</td>
</tr>
<tr>
<td>Posttest</td>
<td>Facebook</td>
<td>4.53</td>
<td>.849</td>
<td>129</td>
</tr>
<tr>
<td></td>
<td>Email</td>
<td>4.61</td>
<td>.906</td>
<td>118</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>4.57</td>
<td>.876</td>
<td>247</td>
</tr>
</tbody>
</table>

There was no main effect for time, no main effect for group, and there was no interaction effect for “I know I should eat a variety of fruits of vegetables in my daily diet.” A repeated measures ANOVA indicated that the there was no statistical significance found between subjects or within subjects. Results are presented in Table 17.
Table 17

*Repeated Measures ANOVA for “I know I should eat a variety of fruits and vegetables”*

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between-subjects</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group</td>
<td>1</td>
<td>.739</td>
<td>.972</td>
<td>.325</td>
</tr>
<tr>
<td>Error</td>
<td>245</td>
<td>.760</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Within-subjects</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>1</td>
<td>.393</td>
<td>.862</td>
<td>.354</td>
</tr>
<tr>
<td>Group x Time</td>
<td>1</td>
<td>.004</td>
<td>.008</td>
<td>.927</td>
</tr>
<tr>
<td>Error</td>
<td>245</td>
<td>.456</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In the second statement, “I know I should get physical activity on a daily basis,” there was no statistical significance found from the pretest ($M=4.59$) to the posttest ($M=4.56$) surveys. Descriptive statistics are displayed in Table 18.

Table 18

*Descriptive Statistics for “I know I should get physical activity”*

<table>
<thead>
<tr>
<th>Group</th>
<th>Mean</th>
<th>SD</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Facebook</td>
<td>4.56</td>
<td>.661</td>
<td>128</td>
</tr>
<tr>
<td>Email</td>
<td>4.62</td>
<td>.678</td>
<td>118</td>
</tr>
<tr>
<td>Total</td>
<td>4.59</td>
<td>.669</td>
<td>246</td>
</tr>
<tr>
<td>Posttest</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Facebook</td>
<td>4.52</td>
<td>.813</td>
<td>128</td>
</tr>
<tr>
<td>Email</td>
<td>4.60</td>
<td>.828</td>
<td>118</td>
</tr>
<tr>
<td>Total</td>
<td>4.56</td>
<td>.820</td>
<td>246</td>
</tr>
</tbody>
</table>

There was no main effect for time, no main effect for group, and there was no interaction effect for “I know I should get physical activity on a daily basis.” A repeated measures ANOVA indicated that there was no statistical significance found between subjects or within subjects. Results are presented in Table 19.
Table 19

Repeated Measures ANOVA for “I know I should get physical activity”

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between-subjects</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group</td>
<td>1</td>
<td>.555</td>
<td>.829</td>
<td>.363</td>
</tr>
<tr>
<td>Error</td>
<td>244</td>
<td>.669</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Within-subjects</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>1</td>
<td>.096</td>
<td>.213</td>
<td>.645</td>
</tr>
<tr>
<td>Group x Time</td>
<td>1</td>
<td>.015</td>
<td>.033</td>
<td>.856</td>
</tr>
<tr>
<td>Error</td>
<td>244</td>
<td>.452</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The last three awareness statements were dichotomous, and therefore the answers were either correct or incorrect based on the participants’ age and gender. Participants were asked “According to healthy experts, for my age group, I should be eating the following amount of vegetables each day. Please note that one cup is about the size of your fist. Choose only one answer.” The correct answer is that women and men should aim to get at least 2.5 cups of vegetables on a daily basis (“Eat Right: Academy of Nutrition and Dietetics,” 2012). The answers that participants chose from were: 1 cup, 2 cups, 3 cups, 4 cups or 5 cups. If the participants chose 2 cups or 3 cups, the statement was marked correct. If they chose any of the other answers, it was marked incorrect. Overall, the participants (n=245) increased their awareness from the pretest (62.4%) to posttest (71.4%) survey for this statement. A McNemar’s test found significance (p=.028, p<.05) at the sample level. Descriptive statistics for the results with correct answers are presented in Table 20.
Table 20

*McNemar’s Test for “I should be eating the following amount of vegetables each day”*

<table>
<thead>
<tr>
<th></th>
<th>Pretest (%)</th>
<th>Posttest (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facebook</td>
<td>61.4</td>
<td>72.4</td>
</tr>
<tr>
<td>Email</td>
<td>63.6</td>
<td>70.3</td>
</tr>
</tbody>
</table>

A Chi-Square test indicated significance, and results are presented in Table 21

Table 21

*Chi-Square Test for “I should be eating the following amount of vegetables each day”*

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>Exact Sig. (2-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>McNemar’s test</td>
<td>245</td>
<td>.028*</td>
</tr>
</tbody>
</table>

*p < 0.05

Next, the participants were asked “According to health experts, for my age group, I should be eating the following amount of fruit each day. Please note that a piece of fruit (i.e. apple, banana, or pear) is considered one cup. Choose only one answer.” The correct answers for fruit intake are dependent on age and gender. Experts say that women ages 19-30 should eat 2 cups of fruit and women ages 31 and up should eat 1.5 cups of fruit every day. Men ages 19-50 should eat 2 cups of fruit on a daily basis (“Eat Right: Academy of Nutrition and Dietetics,” 2012). Because one of the answers is 1.5 cups, 1 cup, and 2 cups were marked correct when analyzing data. Overall, the participants (n=245) increased their awareness from the pretest (38.5%) to posttest (45.9%) survey for this statement. However, a McNemar’s test indicated that these results are not significant. Descriptive statistics for the results with correct answers are presented in Table 22.
Table 22

McNemar’s Test for “I should be eating the following amount of fruit each day”

<table>
<thead>
<tr>
<th></th>
<th>Pretest (%)</th>
<th>Posttest (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facebook</td>
<td>38.6</td>
<td>46.5</td>
</tr>
<tr>
<td>Email</td>
<td>38.5</td>
<td>45.3</td>
</tr>
</tbody>
</table>

A Chi-Square test indicated no significance, and results are presented in Table 23.

Table 23

Chi-Square Test for “I should be eating the following amount of fruit each day”

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>Exact Sig. (2-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>McNemar’s test</td>
<td>244</td>
<td>.073</td>
</tr>
</tbody>
</table>

Lastly, the participants were asked “According to health experts, for my age, I should be
getting the following amount of vigorous exercise each day. Examples of vigorous activities
include running, competitive sports such as volleyball, football, and basketball, fast swimming,
or climbing briskly up a hill. Check only one.”  Choose only one answer.”  The correct answer is
15 minutes for everyone (“United States Department of Agriculture,” 2016). Overall, the
participants (n=246) increased their awareness from the pretest (8.9%) to posttest (20.7%) survey
for this statement. A McNemar’s test indicated these results to be significant (p=.000, p<.01). A
subsequent McNemar’s test was conducted and found a significant effect for time for the email
group (p=.002, p<.01), but not for the Facebook group. Descriptive statistics for the results with
correct answers are presented in Table 24.
Table 24

*McNemar’s Test for “I should be getting the following amount of physical activity each day”*

<table>
<thead>
<tr>
<th></th>
<th>Pretest (%)</th>
<th>Posttest (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facebook</td>
<td>9.4</td>
<td>17.2</td>
</tr>
<tr>
<td>Email</td>
<td>8.5</td>
<td>24.6</td>
</tr>
</tbody>
</table>

A Chi-Square test indicated significance, and results are presented in Table 25.

Table 25

*Chi-Square Test for “I should be eating the following amount of physical activity each day”*

<table>
<thead>
<tr>
<th>Test</th>
<th>Value</th>
<th>Exact Sig. (2-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>McNemar’s test</td>
<td>246</td>
<td>.000*</td>
</tr>
</tbody>
</table>

*p<.01

A subsequent Chi-Square test indicated significance for the email group, and results are presented in Table 26.

Table 26

*Chi-Square Test for Each Group for “I should be eating the following amount of physical activity each day”*

<table>
<thead>
<tr>
<th>Group</th>
<th>Value</th>
<th>Exact Sign (2-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facebook McNemar’s test</td>
<td>128</td>
<td>.064</td>
</tr>
<tr>
<td>Email McNemar’s test</td>
<td>118</td>
<td>.002*</td>
</tr>
</tbody>
</table>

*p<.01

To measure participants’ behaviors there were six dependent variables analyzed to help determine the change in behavior. The dependent variables are weight, fruit intake, dark green vegetable intake, other vegetable intake, vigorous physical exercise, and strengthening of muscles. All of the data was self-reported, and each dependent variable was analyzed using SPSS to determine statistical significance.
Weight

Participants were asked to self-report their weight during the pretest and posttest surveys. Therefore, weight may not be accurate since some respondents may have estimated their weight when reporting this information rather than actually weighing themselves. A repeated measures ANOVA indicated that there was no statistical significance found between subjects or within subjects regarding weight change. The Facebook group \((n=130)\) had no statistical significance in weight from pretest, \(M=163.60\) pounds, to posttest, \(M=160.89\) pounds, and the email group \((n=119)\) also had no statistical significance from pretest, \(M=155.74\) pounds, to posttest, \(M=156.14\) pounds. Results are displayed in Table 27.

Table 27

*Descriptive Statistics for Weight*

<table>
<thead>
<tr>
<th>Group</th>
<th>Mean</th>
<th>SD</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Facebook</td>
<td>163.60</td>
<td>46.887</td>
<td>130</td>
</tr>
<tr>
<td>Email</td>
<td>155.74</td>
<td>48.516</td>
<td>119</td>
</tr>
<tr>
<td>Total</td>
<td>159.84</td>
<td>47.738</td>
<td>249</td>
</tr>
<tr>
<td>Posttest</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Facebook</td>
<td>160.89</td>
<td>47.26197</td>
<td>130</td>
</tr>
<tr>
<td>Email</td>
<td>156.14</td>
<td>47.00545</td>
<td>119</td>
</tr>
<tr>
<td>Total</td>
<td>158.62</td>
<td>47.10450</td>
<td>249</td>
</tr>
</tbody>
</table>

There was no main effect for time, no main effect for group, and there was no interaction effect for weight. Results are presented in Table 28.
Table 28

Repeatead Measures ANOVA for Weight

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between-subjects</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group</td>
<td>1</td>
<td>4940.216</td>
<td>1.147</td>
<td>.285</td>
</tr>
<tr>
<td>Error</td>
<td>247</td>
<td>1063589.916</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Within-subjects</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>1</td>
<td>165.07</td>
<td>.875</td>
<td>.351</td>
</tr>
<tr>
<td>Group x Time</td>
<td>1</td>
<td>300.498</td>
<td>1.592</td>
<td>.208</td>
</tr>
<tr>
<td>Error</td>
<td>247</td>
<td>188.733</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Fruit Intake

A repeated measures ANOVA indicated that there was no statistical significance found between subjects or within subjects regarding fruit intake. Participants were asked in the pretest and posttest surveys: “During the past week, not counting juice, how many servings of fruit did you eat? A serving of fruit is equal to a piece of fruit or a cup of fruit salad.” A Likert interval scale was used for participants to choose from a range of fruit servings per week. The serving ranges were recoded in the data file as the average of each range. Therefore, it should be noted that if a participant ate one serving of fruit, their self-reported response in the survey would have been the option with the range 1-4 servings, and the data value would be recorded as 2.5. Similarly, if a participant ate 16 servings of fruit, their response in the survey would have been the option with the range 13-16 servings, and the data value would be recorded as 14.5. Table 29 illustrates the serving ranges and recoding for analysis.
Table 29

Fruit Serving Ranges and Recoding

<table>
<thead>
<tr>
<th>Serving ranges</th>
<th>Recoding</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1-4</td>
<td>2.5</td>
</tr>
<tr>
<td>5-8</td>
<td>6.5</td>
</tr>
<tr>
<td>9-12</td>
<td>10.5</td>
</tr>
<tr>
<td>13-16</td>
<td>14.5</td>
</tr>
<tr>
<td>17+</td>
<td>17</td>
</tr>
</tbody>
</table>

The descriptive statistics presented in Table 30 indicates no statistical significance was found in total fruit intake from pretest ($M=5.99$) to posttest ($M=5.84$).

Table 30

Descriptive Statistics for Servings of Fruit Per Week

<table>
<thead>
<tr>
<th>Group</th>
<th>Mean</th>
<th>SD</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest</td>
<td>Facebook</td>
<td>5.61</td>
<td>4.367</td>
</tr>
<tr>
<td></td>
<td>Email</td>
<td>6.40</td>
<td>4.257</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>5.99</td>
<td>4.324</td>
</tr>
<tr>
<td>Posttest</td>
<td>Facebook</td>
<td>5.53</td>
<td>3.933</td>
</tr>
<tr>
<td></td>
<td>Email</td>
<td>6.17</td>
<td>3.773</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>5.84</td>
<td>3.863</td>
</tr>
</tbody>
</table>

There was no main effect for time, no main effect for group, and there was no interaction effect for fruit intake. Results are presented in Table 31.

Table 31

Repeated Measures ANOVA for Fruit Intake

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between-subjects</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group</td>
<td>1</td>
<td>62.146</td>
<td>2.345</td>
<td>.127</td>
</tr>
<tr>
<td>Error</td>
<td>245</td>
<td>26.497</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Dark Green Vegetable Intake

A repeated measures ANOVA indicated that there was no statistical significance found between subjects or within subjects regarding dark green vegetable intake. Participants were asked in the pretest and posttest surveys: “During the past week, how many servings of dark green vegetables did you eat? A serving of vegetables is equal to one cup (size of your fist). Dark green vegetables include broccoli, romaine, chard, kale or spinach.” The same Likert interval scale and recoding procedure that was used for fruit were also used for this question.

The descriptive statistics presented in Table 32 indicate no statistical significance were found in total dark green vegetable intake from pretest \(M=2.80\) to posttest \(M=2.83\).

Table 32

<table>
<thead>
<tr>
<th></th>
<th>Group</th>
<th>Mean</th>
<th>SD</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pretest</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Facebook</td>
<td></td>
<td>2.73</td>
<td>1.184</td>
<td>129</td>
</tr>
<tr>
<td>Email</td>
<td></td>
<td>2.88</td>
<td>1.262</td>
<td>118</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>2.80</td>
<td>1.222</td>
<td>247</td>
</tr>
<tr>
<td><strong>Posttest</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Facebook</td>
<td></td>
<td>2.86</td>
<td>1.116</td>
<td>129</td>
</tr>
<tr>
<td>Email</td>
<td></td>
<td>2.81</td>
<td>1.1015</td>
<td>118</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>2.83</td>
<td>1.067</td>
<td>247</td>
</tr>
</tbody>
</table>

There was no main effect for time, no main effect for group, and there was no interaction effect for dark green vegetable intake. Results are presented in Table 33.
Table 33

Repeated Measures ANOVA for Dark Green Vegetable Intake

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between-subjects</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group</td>
<td>1</td>
<td>.292</td>
<td>.143</td>
<td>.706</td>
</tr>
<tr>
<td>Error</td>
<td>245</td>
<td>2.042</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Within-subjects</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>1</td>
<td>.095</td>
<td>.160</td>
<td>.690</td>
</tr>
<tr>
<td>Group x Time</td>
<td>1</td>
<td>1.334</td>
<td>2.245</td>
<td>.135</td>
</tr>
<tr>
<td>Error</td>
<td>245</td>
<td>.594</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Other Vegetable Intake

A repeated measures ANOVA indicated that there was statistical significance found regarding other vegetable intake. There was a main effect for time, but no main effect for group, and no interaction effect for other green vegetable intake. Participants were asked in the pretest and posttest surveys: “During the past week, how many servings of other vegetables did you eat? A serving of vegetables is equal to one cup (size of your fist). Other vegetables include tomatoes, tomato juice, corn, eggplants, peas, lettuce, cabbage, and white potatoes that are not fried.” The same Likert interval scale and recoding procedure that was used for fruit were also used for this question. The descriptive statistics presented in Table 34 indicate the increase in total other vegetable intake from pretest ($M=2.81$) to posttest ($M=3.04$) as self-reported by participants.
Table 34

Descriptive Statistics for Servings of Other Vegetables Per Week

<table>
<thead>
<tr>
<th></th>
<th>Group</th>
<th>Mean</th>
<th>SD</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest</td>
<td>Facebook</td>
<td>2.77</td>
<td>1.086</td>
<td>129</td>
</tr>
<tr>
<td></td>
<td>Email</td>
<td>2.86</td>
<td>1.012</td>
<td>118</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>2.81</td>
<td>1.050</td>
<td>247</td>
</tr>
<tr>
<td>Posttest</td>
<td>Facebook</td>
<td>3.03</td>
<td>1.138</td>
<td>129</td>
</tr>
<tr>
<td></td>
<td>Email</td>
<td>3.05</td>
<td>1.028</td>
<td>118</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>3.04</td>
<td>1.085</td>
<td>247</td>
</tr>
</tbody>
</table>

The Repeated Measures ANOVA results are presented in Table 35 and indicate a significance regarding time ($p=.002$).

Table 35

Repeated Measures ANOVA for Other Vegetable Intake

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>MS</th>
<th>$F$</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between-subjects</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group</td>
<td>1</td>
<td>.420</td>
<td>.255</td>
<td>.614</td>
</tr>
<tr>
<td>Error</td>
<td>245</td>
<td>1.649</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Within-subjects</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>1</td>
<td>6.240</td>
<td>9.771</td>
<td>.002**</td>
</tr>
<tr>
<td>Group x Time</td>
<td>1</td>
<td>.183</td>
<td>.287</td>
<td>.593</td>
</tr>
<tr>
<td>Error</td>
<td>245</td>
<td>.639</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**$p < 0.01$**

Vigorous Physical Activity

Participants were asked the same four questions regarding physical activity and exercise during the pretest and posttest surveys. In the first question, participants were asked: “During the past week, other than your regular job, how many times did you participate in any vigorous physical activities or sports for exercise?” A repeated measures ANOVA indicated that there
was statistical significance found regarding vigorous physical activities. There was significance (p=0.006) with an increase in the amount of times respondents participated in vigorous activities from pretest to posttest. However, there was no statistical significance found in groups or interaction. A Likert interval scale was used for participants to choose from a range of times per week. The time ranges were recoded in the data file as the average of each range. Therefore, it should be noted that if a participant exercised 1 time, their response in the survey would have been the option with the range 1-2 times, and the data value would be recorded as 1.5. Similarly, if a participant exercised 6 times, their response in the survey would have been the option with the range 5-6, and the data value would be recorded as 5.5. Table 36 illustrates the serving ranges and recoding procedure for analysis.

Table 36

_Vigorous Physical Activity Time Ranges and Recoding_

<table>
<thead>
<tr>
<th>Time ranges</th>
<th>Recoding</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1-2</td>
<td>1.5</td>
</tr>
<tr>
<td>3-4</td>
<td>3.5</td>
</tr>
<tr>
<td>5-6</td>
<td>5.5</td>
</tr>
<tr>
<td>7+</td>
<td>7</td>
</tr>
</tbody>
</table>

The descriptive statistics presented in Table 37 indicate the increase in total times exercising from pretest (M=2.37) to posttest (M=2.67) as self-reported by participants.

Table 37

_Descriptive Statistics for Vigorous Physical Activity Times Per Week_

<table>
<thead>
<tr>
<th></th>
<th>Group</th>
<th>Mean</th>
<th>SD</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest</td>
<td>Facebook</td>
<td>2.62</td>
<td>2.070</td>
<td>129</td>
</tr>
</tbody>
</table>
There was a main effect for time ($p=.006$), no main effect for group, and no interaction effect for vigorous physical activity times. Results are presented in Table 38.

Table 38

*Repeated Measures ANOVA for Vigorous Physical Activities*

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>MS</th>
<th>$F$</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between-subjects</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group</td>
<td>1</td>
<td>18.605</td>
<td>3.173</td>
<td>.076</td>
</tr>
<tr>
<td>Error</td>
<td>244</td>
<td>5.864</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Within-subjects</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>1</td>
<td>11.326</td>
<td>7.816</td>
<td>.006**</td>
</tr>
<tr>
<td>Group x Time</td>
<td>1</td>
<td>2.576</td>
<td>1.778</td>
<td>.184</td>
</tr>
<tr>
<td>Error</td>
<td>244</td>
<td>1.449</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**$p < 0.01$**

In the second physical activity question, participants were asked the open-ended question: “What type of physical activity or exercise did you spend the most time during the past week?”

Participants ($n=219$) responded with a variety of answers with the top three answers of walking ($n=81$), running/jogging ($n=51$), lifting ($n=22$). Other ($n=65$) answers also were listed, including ballroom dance, basketball, elliptical, racquetball, soccer, swimming, yoga, etc. Self-reported results are presented in Figure 9.
Figure 9. Vigorous Physical Activity Specified

In the third physical activity question, participants were asked: “How many times per week did you take part in this activity during the past month?” A Likert interval scale was used for participants to choose from a range of times per week that they participated in their specified activity. The time ranges were recoded in the data file as the average of each range. Therefore, it should be noted that if a participant took part in the activity 1 time, their response in the survey would have been the option with the range 1-2 times, and the data value would be recorded as 1.5. Similarly, if a participant took part in the activity 6 times, their response in the survey would have been the option with the range 5-6, and the data value would be recorded as 5.5. Table 39 illustrates the time ranges and recoding for analysis.
Table 39

*Physical Activity Times with Specified Activity and Recoding*

<table>
<thead>
<tr>
<th>Time ranges</th>
<th>Recoding</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1-2</td>
<td>1.5</td>
</tr>
<tr>
<td>3-4</td>
<td>3.5</td>
</tr>
<tr>
<td>5-6</td>
<td>5.5</td>
</tr>
<tr>
<td>7+</td>
<td>7</td>
</tr>
</tbody>
</table>

The descriptive statistics presented in Table 40 indicate no statistical significance in the email group from pretest ($M=3.8$) to posttest ($M=4.21$), and no statistical significance in the Facebook group from pretest ($M=4.52$) to posttest ($M=4.54$) as self-reported by participants.

Table 40

*Descriptive Statistics for Physical Activity Times with Specified Activity*

<table>
<thead>
<tr>
<th>Group</th>
<th>Mean</th>
<th>SD</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Facebook</td>
<td>4.52</td>
<td>2.149</td>
<td>128</td>
</tr>
<tr>
<td>Email</td>
<td>3.80</td>
<td>2.200</td>
<td>117</td>
</tr>
<tr>
<td>Total</td>
<td>4.17</td>
<td>2.199</td>
<td>245</td>
</tr>
<tr>
<td>Posttest</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Facebook</td>
<td>4.54</td>
<td>2.117</td>
<td>128</td>
</tr>
<tr>
<td>Email</td>
<td>4.21</td>
<td>2.171</td>
<td>117</td>
</tr>
<tr>
<td>Total</td>
<td>4.38</td>
<td>2.145</td>
<td>245</td>
</tr>
</tbody>
</table>

There was a main effect for group ($p=.018$), but no main effect for time, and no interaction effect for physical activity times with a specified activity. Therefore, the Facebook group on average self-reported taking part in physical activity more times per week in the past month ($M=4.53$) than the email group ($M=4.00$). Results for the main effect for group are presented in Table 41.
### Table 41

*Estimates for Physical Activity Times with Specified Activity Group*

<table>
<thead>
<tr>
<th>Group</th>
<th>Mean</th>
<th>Std. Error</th>
<th>95% Confidence Interval</th>
<th>Lower Bound</th>
<th>Upper Bound</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facebook</td>
<td>4.525</td>
<td>.152</td>
<td>4.227</td>
<td>4.824</td>
<td></td>
</tr>
<tr>
<td>Email</td>
<td>4.002</td>
<td>.159</td>
<td>3.690</td>
<td>4.315</td>
<td></td>
</tr>
</tbody>
</table>

Repeated Measures ANOVA results for vigorous physical activities times with specified activity are presented in Table 42.

### Table 42

*Repeated Measures ANOVA for Vigorous Physical Activities Times with Specified Activity*

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between-subjects</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group</td>
<td>1</td>
<td>33.472</td>
<td>5.682</td>
<td>.018*</td>
</tr>
<tr>
<td>Error</td>
<td>243</td>
<td>5.891</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Within-subjects</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>1</td>
<td>5.534</td>
<td>1.616</td>
<td>.205</td>
</tr>
<tr>
<td>Group x Time</td>
<td>1</td>
<td>4.564</td>
<td>1.333</td>
<td>.249</td>
</tr>
<tr>
<td>Error</td>
<td>243</td>
<td>3.424</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*<p < 0.05

In the fourth physical activity question, participants were asked: “And, when you took part in this activity, for how many minutes did you usually keep at it?” Again, a Likert interval scale was used for participants to choose from a range of minutes each time they participated in their specified activity. The time ranges were recoded in the data file. Therefore, it should be noted that if a participant took part in the activity for 15 minutes each time, their response in the survey would have been the option with the range 10-30 minutes, and the data value would be recorded as 20. If a participant took part in the activity 2 hours each time, their response in the
survey would have been the option with the range 1-2 hours, and the data value would be recorded as 90. Table 43 illustrates the time ranges and recoding for analysis.

Table 43

*Physical Activity Minutes/Hours with Specified Activity and Recoding*

<table>
<thead>
<tr>
<th>Minute/Hour Ranges</th>
<th>Recoding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 10 minutes</td>
<td>5</td>
</tr>
<tr>
<td>10-30 minutes</td>
<td>20</td>
</tr>
<tr>
<td>31-60 minutes</td>
<td>45.5</td>
</tr>
<tr>
<td>1-2 hours</td>
<td>90</td>
</tr>
<tr>
<td>More than 2 hours</td>
<td>120</td>
</tr>
</tbody>
</table>

The statistics presented in Table 44 indicates an increase in total the total physical activity minutes/hours with specified activity from pretest ($M=2.80$) to posttest ($M=2.90$).

Table 44

*Descriptive Statistics for Physical Activity Minutes/Hours with Specified Activity*

<table>
<thead>
<tr>
<th></th>
<th>Group</th>
<th>Mean</th>
<th>SD</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest</td>
<td>Facebook</td>
<td>47.66</td>
<td>32.9817</td>
<td>126</td>
</tr>
<tr>
<td></td>
<td>Email</td>
<td>45.12</td>
<td>33.5584</td>
<td>115</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>46.45</td>
<td>33.2129</td>
<td>241</td>
</tr>
<tr>
<td>Posttest</td>
<td>Facebook</td>
<td>48.60</td>
<td>30.1667</td>
<td>126</td>
</tr>
<tr>
<td></td>
<td>Email</td>
<td>46.74</td>
<td>31.2163</td>
<td>115</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>47.72</td>
<td>30.6220</td>
<td>241</td>
</tr>
</tbody>
</table>

There was no main effect for time, no main effect for group, and there was no interaction effect for physical activity minutes/hours with specified activity. Results are presented in Table 45.
Table 45

Repeated Measures ANOVA for Physical Activity Minutes/Hours with Specified Activity

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between-subjects</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group</td>
<td>1</td>
<td>580.080</td>
<td>.377</td>
<td>.540</td>
</tr>
<tr>
<td>Error</td>
<td>239</td>
<td>1539.282</td>
<td>.391</td>
<td>.532</td>
</tr>
<tr>
<td>Within-subjects</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>1</td>
<td>198.582</td>
<td>.391</td>
<td>.532</td>
</tr>
<tr>
<td>Group x Time</td>
<td>1</td>
<td>13.629</td>
<td>.027</td>
<td>.870</td>
</tr>
<tr>
<td>Error</td>
<td>239</td>
<td>507.575</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Strengthening of Muscles

In addition to the four physical activity questions above, participants also were asked:

“During the past week, did you do physical activities or exercise to strengthen your muscles? Do not count aerobic activities like walking, running, or bicycling. Count activities that use your own body weight like yoga, sit-ups or push-ups, and those that use weight machines, free weights or elastic bands.” A Likert interval scale was used for participants to choose from a range of times they participated in strengthening their muscles. The time ranges were recoded in the data file. Therefore, it should be noted that if a participant strengthened their muscles 1 time, their response in the survey would have been the option with the range 1-2 times, and the data value would be recorded as 1.5. If a participant strengthened their muscles 6 times, their response in the survey would have been the option with the range 5-6 times, and the data value would be recorded as 5.5. Table 46 illustrates the time ranges and recoding for analysis.
Table 46

*Muscle Strengthening Times and Recoding*

<table>
<thead>
<tr>
<th>Time Ranges</th>
<th>Recoding</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1-2</td>
<td>1.5</td>
</tr>
<tr>
<td>3-4</td>
<td>3.5</td>
</tr>
<tr>
<td>5-6</td>
<td>5.5</td>
</tr>
<tr>
<td>7+</td>
<td>7</td>
</tr>
</tbody>
</table>

The descriptive statistics presented in Table 47 indicate an increase in the Facebook group pretest ($M=1.71$) to posttest ($M=2.07$), and a decrease in the email group pretest ($M=1.76$) to posttest ($M=1.64$) regarding physical activities to strengthen muscles.

Table 47

*Descriptive Statistics for Strengthening Muscles*

<table>
<thead>
<tr>
<th></th>
<th>Group</th>
<th>Mean</th>
<th>SD</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest</td>
<td>Facebook</td>
<td>1.71</td>
<td>2.0764</td>
<td>129</td>
</tr>
<tr>
<td></td>
<td>Email</td>
<td>1.76</td>
<td>1.9698</td>
<td>116</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>1.74</td>
<td>2.0227</td>
<td>245</td>
</tr>
<tr>
<td>Posttest</td>
<td>Facebook</td>
<td>2.07</td>
<td>2.0033</td>
<td>129</td>
</tr>
<tr>
<td></td>
<td>Email</td>
<td>1.64</td>
<td>1.7340</td>
<td>116</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>1.86</td>
<td>1.8890</td>
<td>245</td>
</tr>
</tbody>
</table>

There was no main effect for time, no main effect for group, and there was no interaction effect for physical activity minutes/hours with specified activity. Results are presented in Table 48.
Table 48

Repeated Measures ANOVA for Strengthening Muscles

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between-subjects</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group</td>
<td>1</td>
<td>4.368</td>
<td>.763</td>
<td>.383</td>
</tr>
<tr>
<td>Error</td>
<td>243</td>
<td>5.727</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Within-subjects</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>1</td>
<td>1.584</td>
<td>.826</td>
<td>.364</td>
</tr>
<tr>
<td>Group x Time</td>
<td>1</td>
<td>6.969</td>
<td>3.636</td>
<td>.058</td>
</tr>
<tr>
<td>Error</td>
<td>243</td>
<td>1.917</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

To measure participants’ attitudes regarding healthy living, three “I make an effort” and “I feel” statements were asked of participants during the pretest and posttest surveys. Likert scales were provided with a range of responses to each of the three statements, such as “1 – strongly disagree, 2 – disagree, 3 – neither agree nor disagree, 4 – agree, and 5 – strongly agree.” In the first attitudinal statement, participants were asked: “I make an effort to eat a variety of fruits and vegetables in my daily diet.” The descriptive statistics presented in Table 49 indicate an increase in making an effort to eat healthy from pretest (M=3.68) to posttest (M=3.89).

Table 49

Descriptive Statistics for “I make an effort to eat healthy”

<table>
<thead>
<tr>
<th>Group</th>
<th>Mean</th>
<th>SD</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Facebook</td>
<td>3.63</td>
<td>.977</td>
<td>129</td>
</tr>
<tr>
<td>Email</td>
<td>3.73</td>
<td>.903</td>
<td>118</td>
</tr>
<tr>
<td>Total</td>
<td>3.68</td>
<td>.942</td>
<td>247</td>
</tr>
<tr>
<td>Posttest</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Facebook</td>
<td>3.81</td>
<td>1.046</td>
<td>129</td>
</tr>
<tr>
<td>Email</td>
<td>3.99</td>
<td>.872</td>
<td>118</td>
</tr>
<tr>
<td>Total</td>
<td>3.89</td>
<td>.970</td>
<td>247</td>
</tr>
</tbody>
</table>
A repeated measures ANOVA indicated that there was statistical significance found regarding this statement. There was significance (\(p=.001\)) with an increase in the amount of times respondents self-reported making an effort to eat healthy from pretest to posttest. However, there was no statistical significance found in groups or interaction. Therefore, there was a main effect for time, no main effect for group, and no interaction effect for “I make an effort to eat healthy.” Results are presented in Table 50.

Table 50

Repeate Measures ANOVA for “I make an effort to eat healthy”

<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between-subjects</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group</td>
<td>1</td>
<td>2.525</td>
<td>1.905</td>
<td>.169</td>
</tr>
<tr>
<td>Error</td>
<td>245</td>
<td>1.325</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Within-subjects</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>1</td>
<td>5.993</td>
<td>12.047</td>
<td>.001**</td>
</tr>
<tr>
<td>Group x Time</td>
<td>1</td>
<td>.220</td>
<td>.441</td>
<td>.507</td>
</tr>
<tr>
<td>Error</td>
<td>245</td>
<td>.497</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**\(p < 0.01\)**

In the second attitudinal statement, participants were asked: “I make an effort to get physical activity on a daily basis.” Table 51 presents the descriptive statistics for “I make an effort to get more physical activity.”
Table 51

Descriptive Statistics for “I make an effort to get physical activity”

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>SD</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Facebook</td>
<td>3.65</td>
<td>1.080</td>
<td>129</td>
</tr>
<tr>
<td>Email</td>
<td>3.42</td>
<td>1.172</td>
<td>118</td>
</tr>
<tr>
<td>Total</td>
<td>3.54</td>
<td>1.129</td>
<td>247</td>
</tr>
<tr>
<td>Posttest</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Facebook</td>
<td>3.79</td>
<td>1.095</td>
<td>129</td>
</tr>
<tr>
<td>Email</td>
<td>3.85</td>
<td>1.001</td>
<td>118</td>
</tr>
<tr>
<td>Total</td>
<td>3.82</td>
<td>1.049</td>
<td>247</td>
</tr>
</tbody>
</table>

A repeated measures ANOVA test indicated that there was statistical significance found regarding this question. There was no statistical significance found in groups.

However, the ANOVA indicated that there was a statistically significant interaction effect ($p=.04$), as well as a significant main effect for time ($p=.000$) from pretest to posttest. The response to this item from participants in the email group at pretest was $M=3.42$, and $M=3.85$ at posttest, while the response from participants in the Facebook group at pretest was $M=3.65$ and $M=3.79$ at posttest. Therefore, both groups changed, but the email group increased more than the Facebook group. Results are presented in Table 52.

Table 52

Repeated Measures ANOVA for “I make an effort to get physical activity”

<table>
<thead>
<tr>
<th>Source</th>
<th>$df$</th>
<th>$MS$</th>
<th>$F$</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between-subjects</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group</td>
<td>1</td>
<td>.989</td>
<td>.564</td>
<td>.453</td>
</tr>
<tr>
<td>Error</td>
<td>245</td>
<td>1.752</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Within-subjects</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>1</td>
<td>10.073</td>
<td>16.319</td>
<td>.000**</td>
</tr>
<tr>
<td>Group x Time</td>
<td>1</td>
<td>2.639</td>
<td>4.276</td>
<td>.04*</td>
</tr>
<tr>
<td>Error</td>
<td>245</td>
<td>.617</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
*p < 0.05   **p < 0.01

In the third attitudinal statement, participants were asked: “I feel that eating a diet rich in vegetables and fruits, and getting daily exercise will help increase my energy level, and decrease stress and susceptibility to illness.” The descriptive statistics presented in Table 53 indicate no statistical significance in “I feel that eating healthy and exercising will help increase energy level and decrease illness” from pretest (M=4.45) to posttest (M=4.49).

Table 53

Descriptive Statistics for “I feel that eating healthy and exercising will help increase energy level and decrease illness”

<table>
<thead>
<tr>
<th>Group</th>
<th>Mean</th>
<th>SD</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Facebook</td>
<td>4.33</td>
<td>.784</td>
<td>129</td>
</tr>
<tr>
<td>Email</td>
<td>4.57</td>
<td>.685</td>
<td>118</td>
</tr>
<tr>
<td>Total</td>
<td>4.45</td>
<td>.746</td>
<td>247</td>
</tr>
<tr>
<td>Posttest</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Facebook</td>
<td>4.47</td>
<td>.858</td>
<td>129</td>
</tr>
<tr>
<td>Email</td>
<td>4.51</td>
<td>.875</td>
<td>118</td>
</tr>
<tr>
<td>Total</td>
<td>4.49</td>
<td>.864</td>
<td>247</td>
</tr>
</tbody>
</table>

A repeated measures ANOVA indicated that there was no statistical significance found regarding this question. There was no main effect for time, no main effect for group, and there was no interaction effect for “I feel that eating healthy and exercising will help increase energy level and decrease illness.” Results are presented in Table 54.

Table 54

Repeated Measures ANOVA for “I feel that eating healthy and exercising will help increase energy level and decrease illness”
<table>
<thead>
<tr>
<th>Source</th>
<th>df</th>
<th>MS</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between-subjects</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group</td>
<td>1</td>
<td>2.247</td>
<td>2.619</td>
<td>.107</td>
</tr>
<tr>
<td>Error</td>
<td>245</td>
<td>.858</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Within-subjects</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>1</td>
<td>.198</td>
<td>.454</td>
<td>.501</td>
</tr>
<tr>
<td>Group x Time</td>
<td>1</td>
<td>1.219</td>
<td>2.789</td>
<td>.096</td>
</tr>
<tr>
<td>Error</td>
<td>245</td>
<td>.437</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Research Question Two**

Currently, how do participants receive information about nutritional health and exercise to control weight and overall well-being?

To answer this research question, one specific question was asked to all participants during the pretest survey (Appendix C): In the last year how often have you received information about nutritional health and exercise to control weight and overall well-being? Participants were to choose one of the following frequencies: never, seldom, sometimes, or often for each option. The options of how participants received information about health and exercise in the last year were:

- reading magazines, newspapers, and other print materials
- watching television advertisements
- watching television news programs
- communicating with other people via social media, such as Facebook and Twitter.
- receiving information from my social media news feed
- looking up information on reputable websites
- talking face-to-face or over the phone with friends, family, and acquaintances
- talking with health care workers, such as nurses, doctors, and nutritionists
• other, please explain.

The results are presented in Figure 10 with the “often” column represented from highest to lowest percentages.

**Figure 10.** How Participants Received Information about Health & Exercise
The top three most “often” avenues to receive information about nutritional health and exercise are:

1. Communicating with others via social media (30%)
2. Information from social media news feed (30%)
3. (TIE) Reputable websites (26%) & Talking with friends, family, and acquaintances (26%)

The respondents that provided a description of “other” on how they received information about health and exercise wrote the following answers:

- Class (nutrition major)
- Addicted to counting macro and micro nutrients
- Radio
- Girlfriend
- I’m very into fitness and nutrition so I do research on my own, and based upon my experience in the subject.
- Kent State University
- Observation from my body
- Talking to a trainer
- Watching a YouTube program

**Research Question Three**

What aspects of the social networking experience contributed to changes in the participants’ awareness, behaviors, and attitudes about proper nutrition and exercise?

- Did the two-way communication affect the experience?
What types of resources (instructional videos, text postings, shared resources, peer communication/support) within the social networking group did participants find most beneficial?

To answer these research questions, only Facebook participants were surveyed in the posttest survey, since the email group didn’t use any social media in the experiment.

During the four-week experiment, the facilitator and its group member were able to view how many people saw (“seen by”) the post in their newsfeed and how many people “liked” the post. It should be noted that even though it was “seen by” or the person clicked “liked,” it doesn’t always mean that the person read it carefully (“Facebook Help Center,” 2016). An example is presented in Figure 11.

![Screenshot “Seen by” and “Liked” Facebook Post Example](image)

**Figure 11.** Screenshot “Seen by” and “Liked” Facebook Post Example

There was a total of 14 posts over the four-week period, and the level of engagement dropped steadily each week. At the beginning of Week 1 (Post 1), 123 people “saw” the post and 18 people “liked” it. In the middle of the experiment (Post 8) 95 people “saw” the post and 18
people “liked” it. And, at the end of Week 4 (Post 14), 65 people “saw” the post and 10 people “liked” it. The “seen by” and “liked” results for each post are presented in Table 55.

Table 55

“Seen by” and “Liked” Facebook Results

<table>
<thead>
<tr>
<th>Week 1</th>
<th>Post 1</th>
<th>Post 2</th>
<th>Post 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>“Seen by” (people)</td>
<td>“Liked” (people)</td>
<td></td>
</tr>
<tr>
<td>Post 1</td>
<td>123</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td>Post 2</td>
<td>115</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>Post 3</td>
<td>114</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>Week 2</td>
<td>Post 1</td>
<td>102</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>Post 2</td>
<td>110</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>Post 3</td>
<td>102</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>Post 4</td>
<td>93</td>
<td>12</td>
</tr>
<tr>
<td>Week 3</td>
<td>Post 1</td>
<td>95</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>Post 2</td>
<td>88</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>Post 3</td>
<td>82</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Post 4</td>
<td>85</td>
<td>20</td>
</tr>
<tr>
<td>Week 4</td>
<td>Post 1</td>
<td>79</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Post 2</td>
<td>74</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Post 3</td>
<td>65</td>
<td>10</td>
</tr>
</tbody>
</table>

One message post that displayed lots of activity and comments from the group was focused on increasing fruit intake by drinking healthy, homemade smoothies. Figure 12 illustrates the comments that were posted to the Kent State Healthy Living group.
Figure 12. Screenshot of Smoothie Article Comments
During the posttest survey, participants were asked a variety of questions, including dichotomous, Likert scale, and open-ended questions. When participants were asked, “To what extent did your social awareness about healthy living change over the four-week period?” 102 out of 113 participants responded with positive comments, such as “a little” to “a lot.” Some of the detailed positive comments were:

- “I enjoyed the information and my awareness from healthy living was expanded by everyone chatting. I heard many different spins on recipes and ideas of how to prepare foods in new ways. It was interesting.”
- “I tried to incorporate more fruit and vegetables, drink less pop, and increase water. Also, I let my fiancé know about what I learned, as well.”
- “I learned a ton through the articles. Even being a nutrition major, there were a couple of new things that I learned this past month.”

Of the participants (n=11) that responded either neutrally or negatively to the question, some stated that they were familiar with this information already or they admitted that they didn’t read any of the social media posts. One participant did respond with this answer, “Honestly, it didn’t change much. I already knew everything. It just comes down to the fact that I’m lazy and when I get a free moment, I would rather lay down than go work out.” However, another student stated, “I’m not sure it changed significantly, but rather reinforced what I already knew. It was interesting to see other people’s comments.”

Next, participants were asked, “Please explain in detail how your Facebook ‘friends’ in the group helped you to change your own healthy living behaviors,” and n=84 answered with
positive comments, and \( n=13 \) answered with negative comments. Some of the positive comments from the participants include:

- “Being someone who is continually researching nutrition and fitness topics, I did not think I would gain anything from this page that I did not already know, but I did enjoy reading many of the articles that were posted. I enjoy reading up on articles written by credible sources and that was done through this page. I also enjoyed the healthy recipes that were shared.”
- “They helped me make healthy food choices and start doing better at exercising.”
- “I’ve been eating a lot more fruit than I normally do, with a little more veggies in my life.”

Some of the negative comments from the participants include:

- “I actually knew some of the people in the Facebook group, so it made me more conscious of what was being posted.”
- “I don’t know that they have impacted my behaviors yet, but they did give me new ideas for recipes which I genuinely [plan] to try.”
- “I mean it was interesting to learn what other people had to say and their opinions. But ultimately it comes back to [me] to get myself eating healthy and exercising.”

Participants were asked, “Please explain why you did or did not benefit from the communication and discussions in the Facebook group page over the last four weeks,” and \( n=91 \) answered with positive answers, and \( n=20 \) answered with negative answers. Some of the positive comments from the participants include:
• “I believe I benefitted from the Facebook page because it quickly educated me on ideas I was not worried about currently. I learned new ideas for quick snacks and lunch on the go. I even made new recipes as well, which was very helpful. Overall, the page made me more aware of what I am eating and how much I am exercising than I was before. I got a few tips from some of the comments on the posts, which reminded me that everyone is not the same and other people struggle with some of the same things I do.”

• “I benefitted from the discussions in the Facebook group because I was able to communicate with other students my age and see what types of diets and workouts they have tried and that have worked for them. I am willing to try some of those suggestions. The communication was clear every time there was a new article posted to the group and I was notified. The instructions at the beginning of the research and at the end of the research project had clear instructions of what was expected of the students and what the students expected to see during the research project. Overall, the communication was excellent.”

• “The exercise posts did inspire me to start working out again. Seeing other participants’ comments and (I) liked their ideas and felt a small bit of relief that other struggle with healthy eating on the go. I have a very bad habit of grabbing fast food on my way to school from work. I did stop at Subway instead of Burger King this week and got a turkey sandwich, instead of the chicken bacon ranch melt.”

• “The more I saw, the more I wanted to take action.”

Some of the negative comments (did not benefit) from the participants include:
• “I didn’t get involved much with the discussions. I am a very busy student and mom of two young children.”

• “I’m just here for the bonus points.”

• Everything in the posts was information I already knew. I did save one recipe, but the rest just seemed like typical healthy eating propaganda. I know I need to change my habits, but I am not sure this helped.”

When Facebook participants were asked if they participated in discussion with other participants (two-way communication) through the Facebook group page, 44% responded “yes” and 56% responded “no.” Of the participants (n=53) that participated in group discussion, 74% on average posted 1-2 times per week, 22% on average posted 3-5 times per week, and 4% on average posted 6-9 times per week. The times per week that participants posted in the discussion are presented in Table 56.

Table 56

<table>
<thead>
<tr>
<th>Times Per Week</th>
<th>Percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-2</td>
<td>74</td>
</tr>
<tr>
<td>3-5</td>
<td>22</td>
</tr>
<tr>
<td>6-9</td>
<td>4</td>
</tr>
<tr>
<td>10+</td>
<td>0</td>
</tr>
</tbody>
</table>

When all of the Facebook participants were asked: “Did the opinion/s of your Facebook ‘friends’ in the group help to change your own healthy living behaviors?” Forty-eight percent experienced moderate or dramatic change, while 52% experienced little or no change. The
results for how much the Facebook ‘friends’ helped to change a person’s healthy living behaviors are presented in Table 57.

Table 57

**Percentage of How Much “Friends” Helped to Change Behavior**

<table>
<thead>
<tr>
<th></th>
<th>Percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not at all</td>
<td>16</td>
</tr>
<tr>
<td>Very little</td>
<td>36</td>
</tr>
<tr>
<td>Moderately</td>
<td>45</td>
</tr>
<tr>
<td>Dramatically</td>
<td>3</td>
</tr>
</tbody>
</table>

Additionally, when the group was asked, “Do you feel that you benefited from the discussions in the Facebook group page?” Sixty-three percent did benefit moderately or dramatically, while 37% did not benefit or very little. The results for how much the participants’ benefited from the discussions are presented in Table 58.

Table 58

**Percentage of How Much Participants Benefited from Discussions**

<table>
<thead>
<tr>
<th></th>
<th>Percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not at all</td>
<td>5</td>
</tr>
<tr>
<td>Very little</td>
<td>32</td>
</tr>
<tr>
<td>Moderately</td>
<td>56</td>
</tr>
<tr>
<td>Dramatically</td>
<td>7</td>
</tr>
</tbody>
</table>

Some participants (n = 97) provided detailed comments, both positive and negative, about their experience interacting with others in the group:

- “Everyone was sharing what kind of issues they had and it was nice to see what people were asking because it’s similar to what I wanted to know.”
- “I actually knew some of the people in the Facebook group, so it made me more conscious of what was being posted.”
• “I loved the recipes. I would ask for help with certain recipes and I would get four or more recipes.”

• “It was nice to see new recipes and new ideas on how to eat healthy. I’ve started cooking more for (my boyfriend and me), and going to the gym a lot more regularly. However, I am a recovering anorexic and I’m starting to think this experiment was a bit of a mistake. I feel very fat and incredibly triggered. I have not slipped back into my old habits again and have been doing it ‘the right way,’ but my weight has been bothering me with an increasing amount, and that’s very scary. I think this was a great thing for normal people and I’ve benefitted from it.”

• “They recommended many things I have never heard of and gave incredible feedback.”

When Facebook participants were asked, “Which of the following types of media did you benefit from most when receiving healthy living posts through Facebook each week?” Forty-nine percent answered “often” for posts with text and images, and 46% answered “often” for posts with website links. Only 31% of participants answered “often” for posts with videos. The results are presented in Figure 13 with the “often” column represented from highest to lowest percentages.
When Facebook participants were asked if they prefer a specific media over others, 60% responded “yes” and 40% responded “no.” Seventy of the 121 respondents provided open-ended feedback as to why they prefer some media over others. Some of the more detailed open-ended comments are below.

Posts with text and images

- “I preferred the written posts because I could read them on my way to class or while I was around others. The videos and website links required a certain setting and amount of time to watch and read and I wasn’t always able to put that time into viewing those posts.”
Posts with website links

- “I like the websites. I enjoy reading about things that are deemed “healthier” and for me it is easier to open a link and read then it is to sit through a video. Do not get me wrong, videos can be very useful, it is just the video has to done really well. If the video is mundane and boring, it really loses me, making it hard for me to pick up on anything.”

- “I prefer to read articles and websites because I feel you learn the most information from those types of sources.”

Posts with videos

- “I typically prefer videos to pure text media. Many other informational intakes I am exposed to, like the nightly news, contain a visual-audio component. I have grown accustomed to this and expect it in media I am subjected to. If executed well. I associate the information disseminated with parts of the video, increasing my likelihood of remembering the information.”

- “I think it just depends on what the link/image/video is for. If I want to look up a healthy recipe and it’s something I’m not sure of, I prefer to watch a video so I can see the steps clearly.”

- “I’m more of a visual learner, so watching videos helps me comprehend information better.”
• “I did not like the videos because I usually looked at the posts on my phone and my phone is old and the videos would not load.”

It should be noted that two months after the experiment ended, one of the Facebook participants posted information about Kent CHAARG, a women’s fitness organization on campus. The person felt that this article would benefit the group since some of the people in the group are interested in healthy living. Figure 14 illustrates the “Kent CHAARG article” that was posted by a participant to the Kent State Healthy Living group.

![Figure 14: Screenshot of Kent CHAARG Article](image-url)
CHAPTER V

DISCUSSION

Introduction

The purpose of the study was to seek information from young adults to add to the current literature about PSAs and its effectiveness on shaping youth’s knowledge, attitudes, and ideas about daily food and exercise choices with the use of social networking. It is important to examine this topic with young adults, also called Millennial Generation or Generation Y, because the study found that 83% of the participants are living outside of their parents’ home, and are making independent food and exercise choices. Also, this population uses the Internet frequently, with 94% of the participants spending one or more hours per day on the Internet. Additionally, the study found that 80% of participants spent an average of 10 or more minutes per day using Facebook. With 81% of the participants trying to lose or maintain their current weight, using Facebook was a practical medium to reach this audience with communication to help promote healthy behaviors. This study sought to understand how people receive information about nutritional health and exercise to control weight and overall well-being, and what aspects of social networking help to contribute to changes in peoples’ awareness, behaviors, and attitudes about proper nutrition and exercise. To date, there is a lack of research to answer these questions about the use of Social Networking Sites (SNSs) as a tool to disseminate information about healthy living. The implications of the study findings are presented, along with the limitations of the study.
Research Findings

The research objectives of this study were to determine if participants’ awareness, behaviors, and attitudes about proper nutrition and exercise would change over a four-week period with the use of a healthy living PSA campaign. Also, it was to determine if participants’ awareness, behaviors, and attitudes about proper nutrition and exercise would change depending on how the campaign was delivered, that is comparing those who received the information through Facebook to those who received the information through email. The quantitative results provided evidence that the four-week intervention helped to create modest changes in both Facebook and email groups regarding awareness, behaviors, and attitude changes about healthy living. There were some increases in all three areas over time for both groups. However, the Facebook group did not perform better than the email group. In fact, the email group demonstrated statistically significant changes on two issues that the Facebook group did not. Overall, these findings of modest changes are consistent with other studies using SNS environments for health-related topics. The combined findings state that there is limited evidence that SNSs may be effective. However, this field of research is in its infancy, and therefore more interventions are needed to determine how to maximize engagement, and establish if awareness, behavior, and attitude change can be sustained in the longer term (Maher et al., 2014a). The qualitative results provided by the Facebook group demonstrate that SNSs can benefit people who read posted messages and comments and participate in the discussion. In this study 95% of the Facebook participants self-reported that they benefitted from discussions, and one participant’s response supports this finding and summarizes some young adults’ ideas about social media in their daily lives: “Millennials are always checking social media platforms –
they are bound to click on articles they see, especially since eating and exercise are crucial to a young person’s health. I think communicating over social media is a great idea.”

**Research Question One**

Do participants’ awareness, behaviors, and attitudes about proper nutrition and exercise change with the use of healthy living public service announcement campaigns that are delivered via a social networking site?

**Awareness Change**

In this study five awareness statements – two “I know” and three “I should” – were asked of both groups during the pretest and posttest surveys. For a comprehensive list of awareness results, refer to chapter 4, (pgs. 91-99). The awareness statements are as follows:

- I know I should eat a variety of fruits and vegetables.
- I know I should get physical activity.
- I should be eating the following amount of vegetables each day.
- I should be eating the following amount of fruit each day.
- I should be getting the following amount of physical activity each day.

A McNemar’s test found significant effects on the improvement of scores from the pretest to posttest for all participants for the importance of eating a specific amount of vegetables ($p = .028, p<.05$) and getting a specific amount of physical activity ($p = .000, p<.01$). The “fruit”, as well as the “I know I should” statements, did not produce any significant changes. The
statements and corresponding messages that participants were exposed to and produced significance are illustrated in Table 59.

Table 59

*Significant Awareness Statements and Messages*

<table>
<thead>
<tr>
<th>Pretest and Posttest Survey Statement</th>
<th>Facebook or Email Message</th>
</tr>
</thead>
<tbody>
<tr>
<td>According to health experts, for my age group, I should be eating the following amount of vegetables each day. Please note that one cup is about the size of your fist.</td>
<td>Experts say that women and men should aim to get at least 2.5 cups of vegetables on a daily basis. Evidence indicates that increasing vegetable intake may reduce the risk of cardiovascular disease, including heart attacks and strokes.</td>
</tr>
<tr>
<td>● 1 cup of vegetables</td>
<td>View some of these recipes that are geared toward increasing your daily vegetable intake.</td>
</tr>
<tr>
<td>● 2 cup of vegetables*</td>
<td></td>
</tr>
<tr>
<td>● 3 cup of vegetables*</td>
<td></td>
</tr>
<tr>
<td>● 4 cup of vegetables</td>
<td></td>
</tr>
<tr>
<td>● 5 cup of vegetables</td>
<td></td>
</tr>
</tbody>
</table>

According to health experts, for my age group, I should be getting the following amount of vigorous exercise each day.

<table>
<thead>
<tr>
<th>Pretest and Posttest Survey Statement</th>
<th>Facebook or Email Message</th>
</tr>
</thead>
<tbody>
<tr>
<td>According to health experts, for my age group, I should be getting the following amount of vigorous exercise each day.</td>
<td>According to the USDA, everyone should get 15 minutes of vigorous activity at least five days a week. Examples of “vigorous” activities include running, competitive sports such as volleyball, football, and basketball, fast swimming, or aerobics.</td>
</tr>
<tr>
<td>● 5 minutes</td>
<td>Did you know that the Kent State Recreation Center offers more than 60 exercise classes throughout the week? From Spinning to Total Body Boot Camp to Zumba, it has something for everyone at all levels of fitness.</td>
</tr>
<tr>
<td>● 15 minutes**</td>
<td></td>
</tr>
<tr>
<td>● 30 minutes</td>
<td></td>
</tr>
<tr>
<td>● 60 minutes</td>
<td></td>
</tr>
</tbody>
</table>

*2 cups and 3 cups were marked correct during analysis

** 15 minutes were marked correct during analysis
An important consideration is that two of the three “I should” statements were the only awareness statements to produce significant results. Unlike the “I know I should eat a variety of fruits and vegetables in my daily diet” and “I know I should get physical activity on a daily basis” awareness statements, the “I should be eating this amount of vegetables” and “I should be getting this amount of physical activity” statements were very specific (e.g. 2.5 cups of vegetables per day, and 15 minutes of vigorous activity, respectively), and were marked either correct or incorrect. However, the “I should be eating this amount of fruit” did not produce any changes. Because two of the three specific amount “I should” statements did produce positive changes, the results may indicate that young adults have higher awareness and can recall messages that provide specific recommendations about their health, such as exact number cups of vegetables to eat or the exact amount of minutes to exercise on a daily basis. These findings are supported by the literature in chapter 2 and researchers, such as Rice and Atkin (2013), that affirms awareness messages should present simple content that informs people what to do, and provides cues about when and where it should be done. Additionally, the significant awareness messages contained phrases, such as “according to the USDA” and “reduce the risk of cardiovascular disease.” These types of statements may be perceived with high credibility because it comes from a respected source (i.e. USDA), and therefore is more influential to the receivers (Wilson, 2006). Additionally, the fear of getting cardiovascular disease, which can lead to heart attack or stroke, may have been a motivational incentive for reasons why some participants would take note and abide by the awareness message to eat the prescribed amount of vegetables each day. Fear inducing messages describe unfavorable consequences that are a result of failure to adopt and adhere to the communicator’s message (Hovland, Janis, & Kelly,
The “I know I should a variety of fruits and vegetables” and “I know I should get physical activity” statements had little change over the four-week period possibly because most participants had a high awareness of healthy living at the beginning of the experiment, and already knew that they should eat fruits and vegetables and get physical activity on a daily basis. A study conducted with more than 450 college students in Arkansas and Florida supports this statement, and found that more than 85% of students self-reported having average to excellent nutrition knowledge and healthy behavior knowledge (Schroeter, House, & Lorence, 2007).

Overall, significant findings did occur with two of the five awareness statements. The email group at 16.1% experienced more than twice the change compared to the Facebook group, which only increased 7.8% from the pretest to the posttest surveys on the “I should be getting the following amount of physical activity each day” statement. With that being said, the qualitative data collected from the Facebook group does yield some interesting results. More than 90% of the Facebook participants responded with positive comments about changing their awareness about healthy living over the four-week period. One student said, “It made me want to eat healthier and go to the gym, which I did over the four-week period” when asked, “To what extent did your awareness about healthy living change over the four weeks?” This statement supports that his/her exposure to the healthy living campaign translated into positive behavior change. Additionally, some students commented that the Facebook group helped to reinforce information they already knew, such as to incorporate more fruits and vegetables into their daily eating, and to get physical activity on most days.
Behavior Change

Similar to the findings in the awareness statements, vegetables, and physical activity statements produced significant effects over a four-week period for all participants’ behavior change. Behavior variables that were measured during the pretest and posttest surveys were participants’ weight; the amount of fruit, dark green vegetables, and other vegetables they ate each week; and how much physical activity and strengthening of muscles they completed on a weekly basis. For a comprehensive list of behavior results, refer to chapter 4, (pgs.99-118). Of the eight items to measure behavior change, two items were found to be statistically significant in the improvement of scores from the pretest to posttest. The amount of “other vegetables” intake ($p=0.002, p<0.01$) and “physical activity” ($p=0.016, p<0.01$) were significant, while weight, fruit, dark green vegetables, and strengthening muscles variables did not produce any significant changes. It should be noted that the Facebook group ($M=4.53$) on average took part in physical activity more times per week in the past month than the email group ($M=4.00$). However, this variable was not found to be statistically significant over time for either group. The results of two of the eight items producing significance over time are not surprising given that other research on behavior (Dervin & Foreman-Wernet, 2013) says that achieving behavioral change outcomes is difficult and costly, and rarely results from communication efforts alone. With that being said, it is still important to note that there was some modest overall behavior change over the four weeks, and interestingly it did occur with the same items that demonstrated significant awareness results, which were vegetables and physical activity. This behavior change may be attributed to the specific message recommendations, as mentioned in the awareness section, about eating 2.5 cups of vegetables and getting 15 minutes of vigorous physical activity. These
messages were delivered to participants during weeks 2 and 4 of the study, but did not produce more “likes,” “views,” or “comments” than the other messages in the Facebook group. However, what set these messages apart from some of the others were that they noted credible sources, and used phrases such as “experts say that women and men should aim to get 2.5 cups of vegetables …” and “according to the USDA, everyone should get 15 minutes of vigorous activity…” Also, after each statement was made on how much vegetables one should eat and how much activity one should get on a daily basis, it was followed up with information on how you can incorporate more vegetables in your diet (i.e. link to simple vegetable side dish recipes), and how you can get more exercise (i.e. link to university’s exercise group classes, which are low cost to all students). These messages may be successful in part because they provided targeted health information based on gender from credible sources, and also encouraged participants to take action by viewing new recipes and exercise classes in the hopes that behavior change would occur with the participant making a healthy dish and/or taking a group exercise class. The positive relationship between the awareness and behavior items leads us to believe that the Facebook and email groups were interested and able to process the persuasive messages about vegetables and physical activity, and therefore central processing occurred, as stated in the Elaboration Likelihood Model (Petty & Cacioppo, 1986). The “central” processing route involves a high degree of elaboration on the part of the receiver – paying close attention to the information in the message, carefully scrutinizing of the message’s arguments, and considering other issue-relevant material stored in memory (Katz, 1960).

The Social Cognitive Theory (SCT), as stated in chapter 2, emphasizes that individuals in environments supportive of behavior change are more likely to have higher self-efficacy for
behavior change; to expect to benefit from new behaviors; and, in turn, to employ the self-regulatory skills necessary to achieve these behaviors. However, research demonstrates that university students may lack self-regulatory skills, self-efficacy, outcome expectations, and social support for maintaining healthful patterns strongly influence health behaviors during their college career (Strong et al., 2008). This may support why behavior change only occurred in a few of the variables, and not more of them. Most of the participants noted in the pretest survey that they did have some or great interest (97%) on the subject of healthy living, but their motivation to change their eating and exercise behaviors may have been low. Their lack of motivation and behavior change may be attributed to obstacles that many busy college students’ face on a daily basis. As mentioned in chapter 2, predictors of intended behaviors are a combination of personal attitudes, perceived norms of influential others, and motivation as stated in the Theory of Reasoned Action and Planned Behavior (TPB) (Ajzen & Fishbein, 1980). This study found that 64% of participants don’t have enough time to create healthy meals; 48% have financial barriers, such as costs associated with buying fresh produce, meats, and whole grains; while 20% don’t have access to a kitchen to make healthy meals. Additionally, 64% of participants don’t have enough time to exercise, 36% are unmotivated to exercise, and 14% don’t like to exercise. These findings support previous research (Bandura, 1997; Strong et al., 2008) that college students are in a transitional period of their lives, and may lack self-efficacy and self-regulatory skills during their college career. Additionally, SCT also suggests that nutrition goal setting would directly improve participants’ nutrition-related behavior (Anderson et al., 2001). However, in this study students were not asked to employ this strategy. Future similar
studies may want to look at incorporating a goal-setting component into a healthy living campaign.

Since there was only modest behavior change, it should be mentioned that in public communication campaigns, it is commonly accepted that it is easier to achieve awareness, but much harder to achieve compliance, with studies often showing low compliance outcomes (Snyder & LaCroix, 2013). If a campaign is supported by a widespread public belief, this predicts higher campaign success, although at a high cost and with great repetition. Despite these findings, a public communications campaign is deemed worthwhile even if successes are measured by small changes over time. Additionally, campaigns still drive public policy with research, journals, and increases in public funding to find better and more efficient ways to achieve prescribed campaign outcomes (Dervin & Foreman-Wernet, 2013).

**Attitudinal Change**

Similar to the findings in the awareness and behavior statements, the “eating healthy” and “getting physical activity” statements produced significant effects over a four-week period for all participants’ attitudinal change. For a comprehensive list of attitudinal results, refer to chapter 4, (pgs. 118-124). Three attitudinal statements were asked of both groups during the pretest and posttest surveys, and are as follows:

- I make an effort to eat healthy.
- I make an effort to get physical activity.
- I feel that eating a diet rich in vegetables and fruits, and getting daily exercise will help my energy level, and decrease stress and susceptibility to illness.
In the attitudinal statements, significant effects were found regarding time for all participants for “I make an effort to eat healthy” ($p=.001, p<.01$) and “I make an effort to get physical activity” ($p=.00, p<.01$). Additionally, an interaction effect for the email group was found to be significant ($p=.04, p<.05$), as the email group increased more than the Facebook group over the four weeks. This finding demonstrates that email, or one-way communication, was more effective than SNSs to change people’s attitudes about physical activity. This finding is interesting considering that since 2006 there has been a decline in students’ email usage, and an increase in students’ social media usage on a daily basis (Judd, 2010).

The two attitudinal statements that produced significant results support that the participants may have processed the messages through the Elaboration Likelihood Model’s central route, as mentioned earlier in this chapter and in chapter 2. In order to change a receiver’s attitude for the long term, and via the central route, the focus should be on strong messages with high involvement (Petty et al., 1983). With 81% of participants wanting to lose weight or maintain their current weight, and more than 97% of participants interested in maintaining a healthy lifestyle, there appeared to be sufficient motivation from the receivers to change their attitude about healthy living. Additionally, the message cites an expert (i.e. USDA) to show credibility, and gives a specific number of minutes to exercise (i.e. 15 minutes) to help participants recall this information when answering the awareness statements. Interestingly, there was a fruit post that both groups received and it used the same message approach (i.e. experts and a specific number of cups to eat), but did not produce any significant changes over time. Future research may want to look into the possibility of why people are more aware and interested in increasing their vegetable intake versus their fruit intake.
The connection between awareness, behaviors, and attitudes is not surprising, and helps to affirm the validity of this study. The messages sent to both groups helped to first create some awareness about the importance of eating more vegetables and getting at least 15 minutes of physical activity each day, which then helped to create attitude shifts about healthy living, and ultimately create behavior change in some areas of healthy living. The association between the three areas regarding eating more vegetables and getting more physical activity supports the ELM view that attitudes formed via the central route, which is more enduring and resistant to change than the peripheral route, as suggested by Petty, Cacioppo, and Schumann (1983), will help to create sustained attitude and behavior change, which was a goal of this healthy living campaign.

**Discussion of Research Question One**

Do participants’ awareness, behaviors, and attitudes about proper nutrition and exercise change with the use of healthy living public service announcement campaigns that are delivered via a social networking site?

This study produced modest changes over time with both the Facebook and email participants regarding healthy living. However, the change was not as dramatic for the Facebook group as anticipated at the beginning of the study, given the important role that social media plays in the daily lives of college students. As mentioned in chapter 2 by Cavill and Bauman (2004), one of the most important tasks for communicators is to know the audience. And, while messages in this study were targeted toward busy, young adults through mediums that they utilize often (i.e. Facebook and email), many of the participants’ readiness to change behavior and/or motivation may have been lacking in this study even though there was strong interest in
the topic and more than 81% of participants wanted to maintain or lose weight. The lack of motivation over time was evident in the low participation rates among Facebook members on providing comments and interacting with peers, as only 44% participated in Facebook commenting, as well as weekly viewing of posts declined steadily each week over the four-week period (see chapter 4, Table 57). Low motivation was a factor in other similar studies, as people using standalone health-focused SNSs saw poor retention as an issue with roughly 50% or more of users who signed up failed to stay in the intervention during for its duration, and those that did stay had low engagement (Maher et al., 2014b). One study that did see high engagement in a health-related SNS intervention, and was different than other similar studies, was that it recruited participants who already knew each other and created a friendly, competitive environment (Foster, Linehan, Kirman, Lawson, & James, 2010). With that being said, there still was some motivation in this study because changes did occur with some of the awareness, behavior, and attitude statements over time. Some participants may be motivated to change their behaviors about healthy living immediately; whereas other participants are not motivated to change their behaviors immediately possibly because they are young, and are not highly concerned with health issues that tend to affect older adults, such as high cholesterol or heart disease. This is supported by research mentioned in chapter 2, which suggests that some people are more concerned about the immediate consequences of their actions, whereas others are more concerned about the future; thus, this element of judgment can vary widely in its significance among people (Strathman et al., 1994).

Researcher Richard Clark’s idea in 1983 that media are “mere vehicles that deliver instruction, but do not influence student achievement any more than the truck that delivers our
groceries causes changes in our nutrition” as mentioned in chapter 2, does not hold true based on the results of this study. There are two findings in this study with the email group that disproves Clark’s belief that the “medium doesn’t matter.” In the awareness statement “I should be getting the following amount of physical activity each day” the email group increased from 8.5% to 24.6% with correct answers from the pretest to posttest, while the Facebook group only increased from 9.4% to 17.2% with correct answers from the pretest to posttest. Also, in the attitudinal statement “I make an effort to get physical activity on a daily basis” the email group ($M=3.42$, $M=3.85$) increased more over time than the Facebook group ($M=3.65$, $M=3.79$). Although SNSs are very popular with college students, the Facebook group did not increase more than the email group as anticipated at the beginning of this study. A limitation as to why Facebook did not produce more change may be due to the fact that many of the participants did not have close friendships with others in the group, and did not develop strong personal ties during the intervention period. As stated in chapter 2 (p. 65), interpersonal ties can be weak or strong depending on the amount of time invested, the emotional intensity, the mutual confiding, and the reciprocal services which characterize the tie (Granovetter, 1973). As in real life, Facebook suggests that in any large group of friends, only a few will be close friends (Hill & Dunbar, 2003). Creating a SNS space with existing friends may have resulted in different outcomes, as three recent studies (Foster et al., 2010; Kernot, Olds, Lewis, & Maher, 2014; Maher et al., 2015) each reported that Facebook helped to increase physical activity. In these three studies participants using a pedometer, created friendly rivalries within existing friendship networks, and the findings produced short-term physical activity changes. Additionally, email may have been the superior method of disseminating health information in this study because social media
limitations can include quality concerns and the lack of reliability of health information, as Moorhead et al. (2013) found in a systematic review of uses, benefits, and limitations of social media for health communication. The disadvantages of social media for health communication with the general public also can include lack of confidentiality and privacy, disclosing personal information online, information overload, and communicating harmful or incorrect advice (Moorhead, Hazlett, & Harrison, 2013). Information overload is when a person finds it difficult to keep up with the information they have chosen to read and/or fail to find time to attend to the quantity of information they feel they should read (Bontcheva, Gorrell, & Wessels, 2013).

Rodriguez, Gummadi, and Schoelkopf (2014) observed that when users are not overloaded with information through social media, they process and forward information faster as the rate at which they receive information increases. However, when users are overloaded with information the longer the time they will take to process and forward a piece of information. Additionally, when users were overloaded, they prioritized the information from a selected subset of sources. Information overload was apparent with some people in this study because a few of the Facebook participants mentioned in the comments that they didn’t have enough time to read through all of the posts each week. Besides information overload, distraction may be another disadvantage for the Facebook group, as students are using social media to do a variety of tasks, such as catch up with friends, watch videos, read news, etc. Also, one may have to scroll through an entire newsfeed to find and read a specific message, unlike the email group that receives a list of unread messages in his/her inbox. Foerde, Knowlton and Poldrack (2006) found that people had a harder time learning new things when their brains were distracted by another activity. A 2015 study found that continual checkers of social media was mostly lower
classmen, whereas infrequent checkers were predominantly upper classmen. The study revealed a lack of control of social media use with lower classmen and the students agreed that social media distracts them, and they were falling behind in school work (Wang, Niiya, Mark, Reich, & Warschauer, 2015). Another reason as to why email outperformed social media in two areas of questioning is that students may feel that email is a more appropriate avenue to communicate with campus administration, or as in this study the facilitator. In a study by Chu and Meulemans (2008) college students reported some ambivalence on using Facebook or other SNSs to connect with campus libraries. However, Chu’s and Meulemans’ research is more than eight years old, and social media is more popular than ever among college students. Therefore, more research is needed to determine why email outperformed social media since most current literature points to the popularity of college students utilizing social media often (Brenner, 2013; Joosten, 2012; Lenhart et al., 2010; Smith & Caruso, 2010). Incorporating open-ended questioning during the post-test survey with the email group may have provided some answers to this concern. With that being said, since both groups did illustrate change over time in six of the 16 areas of questioning, it may not matter how the students received the messages, as long as the design of messages were good, and spoke to the targeted audience. Additionally, some researchers have found that using tailored messaging, repurposing and applying it to multiple complimentary delivery modes, such as text messaging, email, social media and even face-to-face contact, may be the most successful way to reinforce messages and create behavior change (Cavill & Bauman, 2004; Korda & Itani, 2013). Anderson and Gomez (2009) suggest that engagement is the key to a successful social media outreach campaign. For example, if people using social media create user-generated content by posting photos of them wearing a special ribbon to help support a
health initiative, it can help to increase engagement in health promotion campaigns. This strategy may have been helpful to create more engagement among peers in the Facebook group, such as posting photos of themselves exercising or eating healthy.

The modest changes over time in this study are similar to the levels found by other researchers on this topic. For example, Derzon and Lipsey (2002) found that on average 4-8% of people exposed to health campaigns will change their health-related behaviors. Additionally, in a systematic review of 85 studies on behavior change techniques conducted by Webb, Joseph, Yardley and Michie (2010) they found that the average effect on behavior change using Internet-based interventions were statistically small. However, using additional methods of communicating with participants, especially the use of text messages, helped to enhance the effectiveness of the behavior change. And, while this study’s modest change findings are comparable to other similar studies, and may not seem like a large proportion, when distributed across a wider audience, they have the possibility to make a sizable impact. When sampled with a larger audience, across different geographic regions, using multiple delivery methods, and over a longer period of time, researchers may find sizeable changes in people’s awareness, behaviors, and attitudes about healthy living.

**Discussion of Research Question Two**

The second research question in this study was how do participants receive information about nutritional health and exercise to control weight and overall well-being? The top three channels that participants often or sometimes receive information about nutritional health and exercise is communicating with others via social media (66%), information from social media news feeds (66%), and reputable websites (59%). This information demonstrates the shift from
traditional channels, such as radio, television, and magazine advertisements, to SNSs and websites to help reach the masses to create awareness, and change in behaviors and attitudes on health topics. These results are not surprising given the popularity of Facebook and other SNSs, and their increase in daily engagement among all ages. In a 2014 Pew Research Center study, 70% of Facebook users engage with the site daily, and 45% do so several times a day, compared with only 63% of users engaging on a daily basis the year before (Duggan, Ellison, Lampe, Lenhart, & Madden, 2015). Additionally, 18-25-year-olds spend more time with media and technology daily than any other activity (Coyne, Padilla-Walker, & Howard, 2013). These findings are consistent with previous research, that social media serves as a platform to share and receive information about food and exercise, and also influence their choices (Vaterlaus, Patten, Roche, & Young, 2015; Zilberman & Kaplan, 2014). In this study, 80% of participants used Facebook at least 10 minutes or more each day, and those in the Facebook group provided positive feedback about the group and discussions that took place over the four weeks. However, they did not produce more change than the email group. Therefore, similar future studies may need to ask open-ended questions for the email group in the posttest survey regarding the role email plays in people’s daily lives. Some questions and statements to ask the email group during the posttest survey may be:

- How often do you check and read your personal email accounts?
- Do you prefer social media or email to receive information about healthy living?
- What do you see are the strengths of using email to receive healthy living information?
• What do you see are the weaknesses or limitations of using email to receive healthy living information?

• Do you think that email would be just as effective as social media to receive information about healthy living information?

Facebook and other SNSs are still in their infancy stages, and there is still a lot to learn from people about how they interpret and remember information disseminated to them through social media. Additionally, more research about SNSs needs to be conducted because unlike older, costly channels like TV, radio, and newspapers, SNSs provide inexpensive or free ways to reach audiences, increase user interaction, provide peer-to-peer support, and widen access to health interventions (Moorhead et al., 2013).

**Discussion of Research Question Three**

The third research question investigated was what aspects of the social networking experience contributed to changes in the participants’ awareness, behaviors, and attitudes about proper nutrition and exercise?

a. Did the two-way communication affect the experience?

b. What types of resources (instructional videos, text postings, shared resources, peer communication/support) within the social networking group did participants find most beneficial?

Unlike the email group, the Facebook group produced no statistically significant findings. However, the descriptive data from the Facebook group provided a more positive perspective, describing the SNS experience to be an overall effective way to reach, engage and benefit this
population. Of the 113 Facebook participants, 102 people (90%) provided open-ended positive feedback with comments such as “a lot” or “they learned something new” about using Facebook to change their social awareness about healthy living when asked “To what extent did your social awareness about healthy living change over the four-week period?”

Facebook was the best SNS platform to use in a study like this because of its global popularity. Facebook reached a milestone of 1.1 billion users in 2016. It is the number one most popular SNS in the world (“Top 15 most popular social networking sites,” 2016), and is overall the number one visited website with the highest number of minutes spent per day by visitors (Boulton, 2011). Therefore, this free platform allows communicators to easily reach the masses, and sends a notification reminder to the subscribed participant when an article or comment is posted. One participant said, “Everybody uses social media.... It is such a great platform to reach a lot of people. The only downfall is you really have to make what you are posting catch someone’s eye. I know on Facebook, I tend to glare over a lot of stuff. That is why the group was so helpful, because I would get notifications every time someone posted something.” Some people enjoyed the intimate space to share questions and ideas with their peers. One participant said “I feel that when you are on Facebook you can ask what you want and not feel stupid. There is always someone who is wondering the same thing.” This comment supports the literature that people have the ability to use social media as an intimate, interactive and engaging tool to communicate (Steele, Lo, Secombe, & Wong, 2009), and that it can provide a valuable and useful source of peer, social, and emotional support to individuals (Moorhead et al., 2013) (Williams, Hamm, Shulhan, Vandermeer, & Hartling, 2014). Peer support is a method of giving and receiving help based on respect, shared responsibility, and mutual agreement of what is
helpful. When people find affiliations with others they feel are similar to them, they feel a connection (Mead, Hilton, & Curtis, 2001). In this study, peer connections is evident in the majority of positive descriptive data collected, and is supported by the quantitative results that 84% of participants said that the group helped at least a little to change their behavior, as mentioned in chapter 4.

Did the two-way communication affect the experience?
The two-way communication did affect the experience, and in a mostly positive way. However, there were some negative comments mentioned as well. Some of the participants did engage in posting comments to the administrator’s prompt. For example, in the “smoothie” article post mentioned in chapter 4, 14 participants replied with some of their favorite smoothie recipes, and not only responded to the prompt, but interacted with each other. In fact, one participant stated a problem in the comments section: “I love smoothies, but when I make them it always seems like there’s something missing. They never taste good. What am I doing wrong?” Within five minutes of the posting, another participant replied: “Maybe try adding honey, dates, and bananas. Those are natural sweeteners for smoothies. You can also use juice instead of milk, [as it will] give it a fruitier tastier flavor.” This two-way communication, which also is referred to as interpersonal communication, (Valente, Poppe, Alva, DeBriceno, & Cases, 1994) has been found to create behavior change in face-to-face experiences as Snyder (2007) found in a meta-analysis of health communication campaigns. Additionally, brief interpersonal communication, such as face-to-face, one-on-one or small group counseling, provides the opportunity for the communicator to tailor messages to the person and answer questions immediately, as long as the person is knowledgeable in the content area and skilled in communication (Weinreich, 1999).
While there are numerous research studies about interpersonal communication in face-to-face settings leading to positive behavior change, as mentioned by Snyder (2007), there is little research about interpersonal communication within social media and the degree to which behavior changes from a health campaign. This positive descriptive data from this study will help add to the literature on the topic, and future studies should include these variables to determine if interpersonal communication within a SNS can be more effective than face-to-face interpersonal communication to change health behaviors.

However, in this study, less than half (44%) of the Facebook group participated in the discussion. And, of the people that did partake in the discussion, most people (74%) only posted 1-2 messages each week. As mentioned earlier in this chapter, the lack of engagement in this study and other similar studies may be due to the fact that the participants did not know each other, and therefore may not have felt comfortable or as interested in participating in commenting (Maher et al., 2014b). Lao (2011) found that social media did not yield a significant change in a health behavior goals among adolescents because the lack of engagement and attrition. However, unlike this study, Lao did not provide incentives to participants, such as extra credit. The Foster study mentioned earlier in this chapter was one of the few studies that Maher (2014) found high engagement results in a health-related SNS intervention. It was different than other similar studies, because a small number of participants who already knew each other were recruited to join a Facebook group, and a friendly, competitive environment was created to encourage people to walk more each day.
Contrary to the amount of low discussion posts by members of the group, there still was a high percentage (84%) of people that said that the ‘friends’ in the group helped to change their behavior. Additionally, a high percentage (95%) of people that said they benefited from the Facebook discussions. This may be due higher rates of people reading posts and discussions, but not actively participating in discussions by posting their own thoughts. Also, the two-way experience did have some negative aspects to it. One participant made a valid point that you cannot believe everything that is written, as this information could have been passed around from one person to another and in turn could result in misinformation. And, although the Facebook group was closed off from the public, some participants did mention that they were self-conscious about participating because they knew others in the group from classes, work, or other involvements on or off campus. If an individual shares personal information with other others, those others may disapprove or betray that person’s confidences (Forest & Wood, 2012). Also, it is important to have a moderator/facilitator to review comments to ensure that correct information is posted about healthy living from group members. During the 2009 H1N1 event, the Centers for Disease Control and Prevention used its Facebook page to educate the public about the disease and the importance of vaccination. This allowed the CDC the opportunity to engage with the public through dialogue, spread correct health messaging, and quickly correct any misinformation posted by outside commenters (Kass-Hout & Alhinnawi, 2013). Additionally, as noted in chapter 4, many Facebook group members did view and “liked” the posts, albeit the views and likes did decrease steadily each week. At the beginning of Week 1 (Post 1) 123 people “saw” the post and 18 liked it, and at the end of Week 4 (Post 14), only 65 people “saw” the post and 10 people “liked” it. Therefore, the length of a SNS campaign should
be selected carefully to inform and educate the target audience, but at the same time not lose their attention. The “novelty effect” of the Facebook group, or any new media, tends to disappear over time. This effect diminishes as participants become more familiar with a new medium (Clark, 1983). With that being said, the experiment was only four weeks long, and further research needs to be conducted to determine how long it takes to create trust among ‘friends’ in a group similar to this one, since many of the people did not know each other before joining the closed group.

What types of resources (instructional videos, text postings, shared resources, peer communication/support) within the social networking group did participants find most beneficial?

In this study, both groups received some dual-coding messages with visual and verbal formats (i.e. videos), which has shown to help capture students’ attention and construct knowledge, as mentioned in chapter 2 as the dual-coding Theory of Multimedia Learning by Richard Mayer and Valerie Sims (1994). The multimedia aspect of social media is important because it ultimately allows for a more effective way of learning information, such as prosocial messages, than just text alone. The types of resources that the Facebook participants found most beneficial, in the following order of popularity, were posts with text and images, posts with website links, and posts with videos. Of the participants (n=121) that answered what resources/media they prefer, 87% said that they “often” or “sometimes” like posts with text and images, 78% said that they “often” or “sometimes” like posts with website links, and 68% said that they “often” or “sometimes” like posts with videos. These results are interesting given the popularity of watching online videos on sites, such as Youtube.com. More than 1.3 billion
people use YouTube, and 4.9 billion videos are viewed on YouTube.com every day, (“YouTube Statistics,” 2015). The most common reason given as to why participants preferred text and images over other resources was time constraints. One participant said “I preferred the written posts because I could read them on my way to class or while I was around others. The videos and website links required a certain setting and amount of time to watch and read and I wasn’t always able to put that time into viewing those posts.” Another resource that students particular enjoyed and benefitted from was the Facebook communication and discussions. While only 44% of the participants participated in the Facebook discussion, 82% of the participants answered that they benefited from it. One participant said, “I benefitted from [the group] because the posts were informational and I’m trying to lose weight. It was easy to become inspired from the posts.” The most common reason the 18% of participants answered with negative or neutral comments about not benefitting from the communication and discussions was again due to time constraints, and not having enough time to read the posts or comments. These findings suggest that students may not have performed as well as they could have on the awareness statements because they didn’t watch some or all of the videos presented to them over the four-week period.

In this study, there were five video posts that ranged in length from 45 seconds to 4 minutes 28 seconds. Since research demonstrates that dual-coding messages can help to construct knowledge, future studies may include shorter videos to determine the video’s appropriate length to encourage more viewing. Research suggests that it takes 10 seconds to grab a viewer’s attention (Pedersen, 2015), and the optimal length for video content should be 2 minutes 54 seconds or less (Jarboe, 2012). Also, video accompanied by transcriptions or captions bring the human element back into an over-technologized world. Besides complying with the Americans
with Disabilities Act, video transcripts can also help to increase completion rates of videos by 40-80%. More than 94% of student that responded to a 2012 Massachusetts Institute of Technology study said that interactive video transcripts were useful because it enabled them to stay focused, and learn at their own pace in a multi-sensory mode (Dean, 2015).

**Limitations**

Experimental validity is not an all-or-nothing outcome. Possible limits to validity should be acknowledged and countered through the design and the way the experiment is conducted (Wiersma & Jurs, 2005). The threats to experimental validity include eight threats to internal validity – history, maturation, testing, instrumentation, statistical regression, selection, mortality, and selection-maturation interaction – and four threats to external validity – interaction effect of testing, interaction effects of selection biases and the experimental treatment, reactive effects of experimental arrangements, and multiple-treatment interference (Campbell & Stanley, 1963). Statistical regression, selection, and selection-maturation interaction threats were managed by randomly assigning participants to the Facebook or email groups. Randomization is important because it spreads the effects of other variables evenly across the groups of the study. During the four-week experiment, there were no known internal validity threats to history, or unanticipated events that affected the dependent variable addressed by the participants. However, participants could have been taking a health class or received healthy living information from a similar campaign during this short time period to educate themselves about this topic, and thus affecting the dependent variable. Maturation, which processes operating within the subject as a function of time (Wiersma & Jurs, 2005), was minimized by presenting short and concise pretest and posttest surveys to complete, and a small time commitment to spend a few minutes a couple of
times a week to read healthy living information, and in the case of the Facebook group possibly commenting on some posts.

When reviewing the informed consent forms (Appendix A, Appendix B), participants were alerted to the fact that there would be two surveys, one at the beginning and one at the end of the experiment; therefore they were cued about testing, and an interaction effect of testing could have been a threat (Wiersma & Jurs, 2005). Also, another limitation of testing includes the use of self-reported weight, daily fruit and vegetable intake, and the number of minutes of physical activity. Participants may have adjusted answers from pretest to posttest to produce higher scores on the posttest survey, which may have led to some partiality due to inaccurate recall and/or social desirability bias (Sallis & Saelens, 2000). Researchers Hebert, Clemow, Pbert, Ockene, and Ockene (1995) have shown that some personality traits, such as social desirability and social approval, can influence participants’ reports of diet. Social desirability is the defensive tendency of people to portray themselves in keeping with perceived cultural norms, and social approval is the need to obtain a positive answer in a testing setting. Additionally, it has been found that individuals, especially females, who score higher on the social desirability scale are more likely to underreport their fat and total caloric intake (Hebert et al., 1997). In this study, participants were asked their weight at the pretest and posttest periods. Their responses may have been estimated and possibly inaccurate since a scale was not provided to the participants, nor did the facilitator measure the students individually for an accurate reading. Additionally, some participants may have skewed their weight answers due to self-conscious emotions toward being underweight or overweight for their age and height, and wanting to portray themselves with the perceived cultural norms of the ideal weight. Despite self-
reporting’s limitations, there are a number of reasons as to why it is widely used in studies. Self-reporting is popular because it represents an inexpensive way (both time and money) for obtaining data, it can be easily implemented with large populations, and it can help measure constructs that would be difficult to obtain with behavioral or physiological measures (for example personality traits such as extroversion) (Hostkin, 2012).

Additionally, the observer effect, also called the “Hawthorne effect,” may have affected the population. The “Hawthorne effect” is where participants show a change in behavior as a result of their awareness of being studied, and was coined by Henry Landsberger when he analyzed experiments in the 1920s and 1930s at the Hawthorne Works factory near Chicago. The Hawthorne Works factory commissioned a study to see if their workers would become more productive in higher or lower levels of light. The workers’ productivity seemed to improve when changes were made, and slumped when the study ended (Landsberger, 1958). Landsberger concluded that he found a marked increase in production related only to special social positions and social treatments (Hair, Bush, & Orinau, 2009). As a participant in this study, it may have created an environment that makes some of the participants think they are “special” and act accordingly during the four-week intervention phase. Without further investigation, it is hard to determine if the participants continued to work toward increasing their daily fruit and vegetable intake and minutes spent exercising after the study ended.

The ceiling effect may have occurred in this study as well, as the participants may have already known the information, and therefore the independent variables (i.e. Facebook, email, and time) did not have an effect on the dependent variables, such as awareness of increasing fruit
and vegetable intake (Cramer & Howitt, 2004). A review of nutrition education interventions on the dietary habits of college students by Lin and Dali (2012) reported that females exceed their male counterparts in terms of positive attitudes toward healthy eating and greater health-consciousness than males did. In this study, there were significantly more female participants (72%) than male participants (28%), which may have had an effect on healthy living knowledge prior to participating in the study. Additionally, a study by Georgiou et al. (1997) reported that college students ate more grain foods high in dietary fiber, more fruits and dark green vegetables, and more lower-fat milk and meats than nonstudents. This research may suggest that a large number of the participants in this study already had high awareness of healthy eating and exercise because of their female, college student status, and therefore the intervention did not have a further effect of participants’ knowledge from the pretest to the posttest survey.

There was a careful review of the instrumentation to minimize this threat through the pilot study conducted in fall 2014. However, one small flaw was found after collecting all of the data. It should be noted that during the pretest survey the word “servings” was used when asking participants about fruit and vegetable intake. However, during the posttest survey, the same question was asked, but the word “times” was used. This could have possibly skewed some of the statistics regarding fruit and vegetable servings. Mortality, an effect due to subjects dropping out of the experiment (Wiersma & Jurs, 2005), was low in both groups. The participation rate was 81% for the Facebook group, and 72% for the email group. Mortality was minimized partly due to motivation because participants received extra credit in their class if they completed both the pretest and posttest surveys. During the entire experiment, there were no known external validity threats to interaction effects of selection biases and the experimental treatment because
the groups were formed randomly. Just like threats to internal validity, the interaction effect of testing, reactive effects of experimental arrangements and multiple-treatment interference could be external threats. The reactive effects of experimental arrangements and multiple-treatment interference could be threats because of the lack of generalizability with this convenience sample (i.e. undergraduate students at a large Ohio public university). This group of students may have particular characteristics that are not prevalent at other universities or with populations this age that currently are not enrolled in college. Additionally, the Facebook group was encouraged, but not required to participate in discussion. Only 44% of people participated in the discussions, possibly affecting the results. Also, qualitative data from the email group was not gathered, and therefore their perceptions of the platform were not recorded to determine if they would rate email positively in regards to learning about healthy living information. Lastly, participants may have been motivated with extra credit, and therefore may have been more interested in their academic performance compared to students who choose not to participate in this study.

Experimental designs in educational research are usually never perfect. Researchers must attempt an adequate balance by attaining control to make the results interpretable, while maintaining enough realism so that the results will generalize adequately to the situation (Wiersma & Jurs, 2005).

Recommendations for Future Research

It is beneficial to study SNSs as a tool to change people’s awareness, behaviors, and attitudes because the descriptive data in this study and the data in other studies (Brenner, 2013; A. Smith, 2011; Vaterlaus et al., 2015) supports that young people are using social media daily, and often. Because the findings in the research literature are not particularly robust, there are
reasons to conduct further research. Longitudinal studies are needed and should include not only a larger sample of college students in different geographic regions, but also non-students from diverse socioeconomic groups to add to the literature on this topic. Since lack of motivation with college-aged students in this study was identified as a factor, future studies should include a posttest survey question about participants’ motivation to eat healthy and exercise to determine if there was change over time. In this study, it was a challenge to motivate and engage participants because some of the students only participated in the intervention because they received extra credit in one of their classes. Since the Foster study found that people who knew each other and participated in a SNS health intervention were the only ones to produce high motivation and engagement, it may be beneficial to see if these results could be replicated and expanded. A future study may look at different groups using a SNS health intervention to determine how much motivation and engagement play into changing young adults’ awareness, behaviors, and attitudes about healthy living. The following four groups would include:

- G1 – high motivation to change health, knows other participants
- G2 – high motivation to change health, does not know other participants
- G3 – low motivation to change health, knows other participants
- G4 – low motivation to change health, does not know other participants

More demographic information may be asked to determine if there are associations between participants who commute versus live on or near campus and their changes in healthy living over time. Additional demographics may look at relationships between gender and weight goals (lose, maintain, gain) to determine if there are more significant changes with awareness, behaviors, and attitudes for people wanting to lose weight.
This study also leaves open the questions of how important is the role of the facilitator, and how long should a SNS campaign be in length? An open-ended question can be asked of the SNS group in a posttest survey to determine if the facilitator played a significant role to help change their awareness, behaviors, and attitudes about healthy living. And, further investigation is needed to determine an appropriate length of time for a SNS campaign with the given target audience. Were four weeks too long or too short of a time to produce change about healthy living? A longer time may be needed since a few participants mentioned that they didn’t know the other “friends” of the closed group, and needed more time to build trust and friendships. Over time, more people may feel apt to share information on the discussion board. As stated earlier, previous literature (Hornik, 2002, 2013) supports that change in behavior occurs when the behavior is high reward and low cost to implement; when the campaign can complement substantial changes in the material environment affecting adoption of the behavior; and when the campaign can be long-lived and operate through various channels, such as special events; print, radio and television advertising; and other social media tools. Therefore, an experiment that is longer in length, and is supplemented with high levels of exposure coming from a variety of channels, may produce stronger results.

Conclusion

This study added to the literature about SNSs, and demonstrated the need for more research to examine the use of SNSs to disseminate health-oriented information to the public. Additionally, it helped to validate the popularity of social media as a medium to reach college-age students. However, as a standalone medium, SNSs only produced modest changes in transforming young adults’ awareness, behaviors and attitudes toward healthy living. This study
also agrees with other similar studies (Derzon & Lipsey, 2002; Webb, Joseph, Yardley & Michie, 2010), which found that the average effect on behavior change using Internet-based interventions was statistically small. Therefore, this study, along with other studies (Webber, Tate, Ward, & Bowling, 2010; Williams et al., 2014) implies that researchers should not assume that the target audience will be engaged with a topic solely based on the premise that social media is popular and widespread. And, while research from Judd (2010) states that college students’ usage with email has been on the decline, but on the rise with social media usage since 2006, it may be worthwhile to investigate if email is seen as a more credible communication tool than social media, with students paying more attention to the messages being sent to their inbox versus their social media feed. Although participants enjoyed taking part in the Facebook group, the qualitative data collected from this group did not translate into significant results produced in all or most of the variables collected from the quantitative data. The goal of the Facebook group was to create enthusiasm and participation where members could share health information with one another. However, in this study, engagement among Facebook participants was found to be low. As stated in chapter 2, Ellison’s et. al (2007) and Adler and Kwon (2002) said that creating a bond or relationship and staying connected with members of a community, or high social capital, can have positive outcomes. In this study, the social capital may have been low, and therefore the results did not produce significant changes among the Facebook group. In order for social media campaigns to make a difference, engagement or high social capital, may help to create positive change in people’s behaviors. Researchers Freeman, Potente, Rock, & Mciver (2015) found common themes in nine social media case studies to help provide a summary of successful factors to help cut through the online clutter, and identify key lessons learned. The
themes include using social media campaigns in conjunction with traditional media campaigns, using simple and familiar tools to encourage participation, building online communities by tapping into existing networks, developing engaging content with a clear call to action, enhancing appeal to participate with personal benefits, actively driving traffic through continuous promotion, and being diligent and timely moderation and monitoring of pages. In this study, one way that may have helped to increase Facebook engagement would have been to enhance the appeal of participation by offering a health-related reward to students, such as a Fitbit watch to track daily steps and calories, in addition to the extra credit points awarded. Additionally, including video captioning may have helped to increase video viewing in both groups.

Moving forward policymakers and other opinion leaders can play a big role in affecting people’s behaviors. Policymakers have already started to make changes in deterring people from buying sugary drinks. For example, in 2014 Berkeley, California became the first U.S. city to pass a law taxing sugary drinks, including sodas (Mandaro, n.d.). Additionally, many U.S. employers have started to encourage their employees to stop smoking, exercise more, and choose to eat healthier meals and snacks with workplace incentive programs, such as cash rewards and low-cost gym memberships (Heinen & Darling, 2009). With support from influential leaders, changes in laws, and additional research, a SNS campaign that uses high levels of exposure and engagement, and comes from a variety of channels may result in more changes in the way people approach healthy living. Hornik (2002) described that if a health campaign can achieve high exposure through various channels, it can also achieve behavioral outcomes as well. In addition to utilizing traditional channels, such as print and television advertisements, a health campaign
should utilize a variety of social media channels, such as YouTube, Twitter, Facebook and Instagram to increase participant involvement, and reach a wider audience. Additionally, users should be encouraged to generate and share content, as engagement is key to successful social media outreach. With these best practices taken into consideration for future health intervention campaigns, it may help to make significant differences in many people’s lives and society as a whole.
APPENDICES
APPENDIX A

FACEBOOK INFORMED CONSENT FORM
Appendix A

Informed Consent to Participate in a Research Study

Study Title: Students’ Experiences with Healthy Living Public Service Announcements Disseminated through Social Networking Sites

Principal Investigator: PI – Drew Tiene; Co-Investigator – Elizabeth Thomas; Researcher – Edward Bolden

You are being invited to participate in a research study. This consent form will provide you with information on the research project, what you will need to do, and the associated risks and benefits of the research. Your participation is voluntary. Please read this form carefully. It is important that you ask questions and fully understand the research in order to make an informed decision. You will receive a copy of this document to take with you.

Purpose
The purpose of this study is to seek information from young adults, specifically those who are 18 years and older, to add to the current literature about Public Service Announcements and social media, and their effectiveness on shaping people’s knowledge, attitudes, and ideas about daily food and exercise choices. It is important to study young adults about this topic, since many of them make food and exercise choices independently, meaning without the influence of their parents or other adults in their life, and also because they use social networking sites to receive information. In addition, this study will help to determine what type of content makes good social media messages, and what characteristics of a social media message help to change awareness, behaviors, and attitudes.

Procedures
You will be assigned to one of two groups for this study. In your group you will be asked to complete two online surveys, which will take approximately 10 minutes each to complete. The surveys will ask you questions about your attitudes, behaviors, and feelings about health, exercise and social media, as well as some demographic questions. After the first survey is completed, you will be asked to participate in a four-week long study that will be administered through the social media application Facebook. You will be encouraged to participate and post your thoughts and ideas about various health topics in the Facebook discussion. This will take
less than 15 minutes of your time each week. At the end of the four weeks, you will be asked to complete the second online survey, which will take approximately 10 minutes.

**Audio and Video Recording and Photography**

This study will use a closed Facebook group page to share ideas and thoughts about health and exercise. Therefore, only the people invited to this group by the facilitator will be able to view posted information, videos, and images.

**Benefits**

Participation in this study does not guarantee any beneficial results to you. However, participants will learn about choosing healthier food options and exercise tips. As a result of participating you may better understand your own use of communication and healthy living.

**Risks and Discomforts**

Some of the questions that you will be asked in the online survey are of a personal nature, such as “How much do you weigh?” You may ask to see the questions before deciding whether or not to participate in the study. Your name along with the answers to these types of questions will not be seen by classmates or the public. If you feel uncomfortable answering a question, you may skip it and go on to the next question. There is also a small chance that these questions may raise issues that you may want to further discuss with a healthcare professional. There are resources on campus that can help, such as Kent State University Health Services - http://www.kent.edu/uhs.

**Privacy and Confidentiality**

Your study’s related information will be kept confidential within the limits of the law. Completed survey information will be kept electronically and password protected. Any identifying information from the survey will be kept in a secure location and only the researchers will have access to the data. Research participants will not be identified by name in any publication or presentation of research results.

During the four-week period, participants in the Facebook group will be able to see who is posting information in the discussion. However, this is an invite-only group, and the public cannot view what is being posted by the members. Your research information may, in certain
circumstances, be disclosed to the Institutional Review Board (IRB), which oversees research at Kent State University, or to certain federal agencies. Confidentiality may not be maintained if you indicate that you may do harm to yourself or others.

**Compensation**

Students that choose to participate in this study will receive bonus points in a Kent State course. Students also have the option for an alternative assignment to receive bonus points. Alternatively they can write a three-page research paper about healthy living in college-aged student population. Participation in the study includes completing two online surveys, and accepting an invitation to the closed Facebook group by the facilitator (Elizabeth Thomas).

**Voluntary Participation**

Taking part in this research study is entirely up to you. You may choose not to participate or you may discontinue your participation at any time without penalty or loss of benefits to which you are otherwise entitled. You will be informed of any new, relevant information that may affect your health, welfare, or willingness to continue your study participation.

**Contact Information**

If you have any questions or concerns about this research, you may contact Drew Tiene at 330-672-0607. This project has been approved by the Kent State University Institutional Review Board. If you have any questions about your rights as a research participant or complaints about the research, you may call the IRB at 330.672.2704.

**Consent Statement and Signature**

I have read this consent form and have had the opportunity to have my questions answered to my satisfaction. I voluntarily agree to participate in this study. I understand that a copy of this consent will be provided to me for future reference.

________________________________________  ________________
Participant Signature                        Date
(If a waiver of documented informed consent has been approved and/or you are using a web-based consent, you may modify the above to include a statement such as, “My completion and return of this (survey, questionnaire, or instrument) will be indicative of my consent to participate in this research study. I have been given a copy of this consent form” or “I may print a copy of this consent statement for future reference.”)
APPENDIX B

EMAIL INFORMED CONSENT FORM
Appendix B

Informed Consent to Participate in a Research Study

**Study Title:** Students’ Experiences with Healthy Living Public Service Announcements Disseminated through Social Networking Sites

**Principal Investigator:** PI – Drew Tiene; Co-Investigator – Elizabeth Thomas; Researcher – Edward Bolden

You are being invited to participate in a research study. This consent form will provide you with information on the research project, what you will need to do, and the associated risks and benefits of the research. Your participation is voluntary. Please read this form carefully. It is important that you ask questions and fully understand the research in order to make an informed decision. You will receive a copy of this document to take with you.

**Purpose**
The purpose of this study is to seek information from young adults, specifically those who are 18 years and older, to add to the current literature about Public Service Announcements and social media, and their effectiveness on shaping people’s knowledge, attitudes, and ideas about daily food and exercise choices. It is important to study young adults about this topic, since many of them make food and exercise choices independently, meaning without the influence of their parents or other adults in their life, and also because they use social networking sites to receive information. In addition, this study will help to determine what type of content makes good social media messages, and what characteristics of a social media message help to change awareness, behaviors, and attitudes.

**Procedures**
You will be assigned to one of two groups for this study. In your group you will be asked to complete two online surveys, which will take approximately 10 minutes each to complete. The surveys will ask you questions about your attitudes, behaviors, and feelings about health, exercise and social media, as well as some demographic questions. After the first survey is completed, you will be asked to participate in a four-week long study that will be administered through email. You are encouraged to read the emails sent by the facilitator (Elizabeth Thomas) but are not required to respond to the email. This will take less than 15 minutes of your time.
each week. At the end of the four weeks, you will be asked to complete the second online survey, which will take approximately 10 minutes.

**Benefits**

Participation in this study does not guarantee any beneficial results to you. However, participants will learn about choosing healthier food options and exercise tips.

**Risks and Discomforts**

Some of the questions that you will be asked in the online survey are of a personal nature, such as “How much do you weigh?” You may ask to see the questions before deciding whether or not to participate in the study. Your name along with the answers to these types of questions will not be seen by classmates or the public. If you feel uncomfortable answering a question, you may skip it and go on to the next question. There is also a small chance that these questions may raise issues that you may want to further discuss with a healthcare professional. There are resources on campus that can help, such as Kent State University Health Services - http://www.kent.edu/uhs.

**Privacy and Confidentiality**

Your study’s related information will be kept confidential within the limits of the law. Completed survey information will be kept electronically and password protected. Any identifying information from the survey will be kept in a secure location and only the researchers will have access to the data. Research participants will not be identified by name in any publication or presentation of research results. Your research information may, in certain circumstances, be disclosed to the Institutional Review Board (IRB), which oversees research at Kent State University, or to certain federal agencies. Confidentiality may not be maintained if you indicate that you may do harm to yourself or others.

**Compensation**

Students that choose to participate in this study will receive bonus points in a Kent State course. Students also have the option for an alternative assignment to receive bonus points. Alternatively they can write a three-page research paper about healthy living in college-aged student population. Participation includes completing two online surveys, and reading email messages sent by the facilitator (Elizabeth Thomas).
Voluntary Participation

Taking part in this research study is entirely up to you. You may choose not to participate or you may discontinue your participation at any time without penalty or loss of benefits to which you are otherwise entitled. You will be informed of any new, relevant information that may affect your health, welfare, or willingness to continue your study participation.

Contact Information

If you have any questions or concerns about this research, you may contact Drew Tiene at 330-672-0607. This project has been approved by the Kent State University Institutional Review Board. If you have any questions about your rights as a research participant or complaints about the research, you may call the IRB at 330.672.2704.

Consent Statement and Signature

I have read this consent form and have had the opportunity to have my questions answered to my satisfaction. I voluntarily agree to participate in this study. I understand that a copy of this consent will be provided to me for future reference.

__________________________________________________________
Participant Signature                                      Date

(If a waiver of documented informed consent has been approved and/or you are using a web-based consent, you may modify the above to include a statement such as, “My completion and return of this (survey, questionnaire, or instrument) will be indicative of my consent to participate in this research study. I have been given a copy of this consent form” or “I may print a copy of this consent statement for future reference.”)
APPENDIX C

PRETEST SURVEY QUESTIONS
Appendix C

DEMOGRAPHICS

1. First Name ______________

2. Last Name ______________

3. Email ______________

4. Your Gender:
   • Male
   • Female

5. Your Age:
   • ___ Years

6. How tall are you?
   • Ft:_____ In _____

7. How much do you weigh?
   • _____ Pounds

8. Currently, are you trying to gain, lose, or maintain your weight?
   • Gain
   • Lose
   • Maintain
   • Don’t care
   • I’m not concerned now, but I plan to gain or lose weight in the future.
     o When and why do you plan to wait to make a change?

9. Year in School:
   • Freshman
• Sophomore
• Junior
• Senior
• Graduate Student

10. Where do you currently live?

• Campus residence hall
• Fraternity or sorority house
• Other college/university housing
• Parent/guardian’s housing
• Other off-campus housing
• Other

TECHNOLOGY QUESTIONS

11. In the last year how often have you received information about nutritional health and exercise to control weight and overall well-being?

• Reading magazines, newspapers and other print materials.
  o Never
  o Seldom
  o Sometimes
  o Often
• Watching television advertisements.
  o Never
  o Seldom
  o Sometimes
  o Often
• Watching television news programs.
  o Never
  o Seldom
  o Sometimes
  o Often
• Communicating with other people via social media, such as Facebook and Twitter.
  o Never
  o Seldom
  o Sometimes
  o Often
• Receiving information from my social media news feed.
  o Never
  o Seldom
  o Sometimes
  o Often
• Looking up information on reputable websites.
  o Never
  o Seldom
  o Sometimes
  o Often
• Talking face-to-face or over the phone with friends, family and acquaintances.
  o Never
  o Seldom
  o Sometimes
  o Often
• Talking with health care workers, such as nurses, doctors, and nutritionists.
  o Never
  o Seldom
  o Sometimes
  o Often
• Other, please explain. ___________________________________________________________
  o Never
  o Seldom
  o Sometimes
  o Often

12. How many hours do you typically spend actively using the Internet EACH DAY?
• Less than 1 hour
• 1-3 hours
• 3-5 hours
• more than 5 hours

13. Are you a member of Facebook?
• Yes
14. About how many total Facebook friends do you have?
   - 10 or less
   - 11-100
   - 101-200
   - 201-300
   - 301-400
   - More than 400

15. In the past week, on average, approximately how many minutes per day have you spent on Facebook?
   - Less than 10 min
   - 10-30 min
   - 31-60 min
   - 1-2 hours
   - 2-3 hours
   - More than 3 hours

16. In the past year how often have you been exposed to a public service campaign through Facebook and/or another social networking site? A public service campaign informs the public about current health, social, and environmental issues facing the population. Some examples include ALS/Lou Gehrig’s Disease, LGBT rights, and autism awareness.
   - 0 times
   - 1-3 times
   - 4-6 times
   - 7 times or more

Please indicate the extent to which you agree with each of the following statements.

17. Facebook is part of my everyday activity.
   - Strongly Disagree
   - Disagree
   - Neither Agree nor Disagree
   - Agree
   - Strongly Agree

18. Facebook is primarily a source of entertainment.
   - Strongly Disagree
19. Facebook is a source of facts and news information.
   - Strongly Disagree
   - Disagree
   - Neither Agree nor Disagree
   - Agree
   - Strongly Agree

Please answer the following questions about yourself. (Asked at pre- and post-surveys)

20. What level of interest do you have with maintaining a healthy lifestyle? (i.e. eating nutritious foods and exercising)
   - No interest at all
   - Some interest
   - Great interest

21. Do you feel that there are daily obstacles that don’t allow for you to eat healthy? If yes, check all that apply.
   - I don’t have enough time to create healthy meals and snacks.
   - I don’t have access to a kitchen to make healthy meals.
   - I have financial barriers (costs associated with buying fresh produce, whole grains, and meats).
   - I am unmotivated to eat healthy.
   - I don’t like to eat healthy foods.
   - I don’t know if I am eating healthy foods.
   - Other, please explain. __________________________

22. Do you feel that there are daily obstacles that don’t allow for you to exercise? If yes, check all that apply.
   - There is not enough time to exercise.
   - I have financial barriers (cost to join gym).
   - I am unmotivated to exercise.
   - Health issues don’t allow for exercise.
   - I don’t like to exercise.
• Other, please explain. ______________________

23. How would you describe your daily diet? (Check only one statement.)
___ I eat a variety of foods, including meats such as fish, pork, chicken, and beef.
___ I eat a mostly a vegetarian diet, but occasionally eat meats such as fish or chicken.
___ I eat 100% vegetarian diet, including eggs and dairy, but no meat products.
___ I eat 100% vegan diet, and do not eat eggs, dairy, honey or other animal products.
___ Other, please explain. ______________________________________________________

24. According to health experts, for my age group, I should be eating the following amount of
evectors each day. Please note that one cup is about the size of your fist. (Check only one.):
___ 1 cup of vegetables
___ 2 cups of vegetables
___ 3 cups of vegetables
___ 4 cups of vegetables
___ 5 cups of vegetables

25. According to health experts, for my age group, I should be eating the following amount of
fruit each day. Please note that a piece of fruit (i.e. apple, banana, pear) is considered one
cup. (Check only one.):
___ 1 cup of fruit
___ 2 cups of fruit
___ 3 cups of fruit
___ 4 cups of fruit
___ 5 cups of fruit

26. According to health experts, for my age group, I should be getting the following amount of
vigorous exercise each day (examples of “vigorous” activities include running, competitive
sports such as volleyball, football, and basketball, fast swimming, or climbing briskly up a
hill). (Check only one.):
___ 5 minutes
___ 15 minutes
___ 30 minutes
___ 60 minutes

27. I know I should eat a variety of fruits and vegetables in my daily diet.
• Strongly Disagree
• Disagree
• Neither Agree nor Disagree
28. I make an effort to eat a variety of fruits and vegetables in my daily diet.
   - Strongly Disagree
   - Disagree
   - Neither Agree nor Disagree
   - Agree
   - Strongly Agree

29. I know I should get physical activity on a daily basis.
   - Strongly Disagree
   - Disagree
   - Neither Agree nor Disagree
   - Agree
   - Strongly Agree

30. I make an effort to get physical activity on a daily basis.
   - Strongly Disagree
   - Disagree
   - Neither Agree nor Disagree
   - Agree
   - Strongly Agree

31. I feel that eating a diet rich in vegetables and fruits, and getting daily exercise will help increase my energy level.
   - Strongly Disagree
   - Disagree
   - Neither Agree nor Disagree
   - Agree
   - Strongly Agree

32. I feel favorably toward eating the recommended number of vegetables for my age and gender.
   - Strongly Disagree
   - Disagree
   - Neither Agree nor Disagree
   - Agree
   - Strongly Agree
33. I feel favorably toward eating the recommended number of fruits for my age and gender.
   - Strongly Disagree
   - Disagree
   - Neither Agree nor Disagree
   - Agree
   - Strongly Agree

34. I feel favorably toward exercising vigorously for at least 15 minutes a day at least five days a week (examples of “vigorous” activities include running, competitive sports such as volleyball, football, and basketball, fast swimming, or climbing briskly up a hill).
   - Strongly Disagree
   - Disagree
   - Neither Agree nor Disagree
   - Agree
   - Strongly Agree

35. I am able to eat the recommended number of vegetables for my age and gender.
   - Strongly Disagree
   - Disagree
   - Neither Agree nor Disagree
   - Agree
   - Strongly Agree

36. I am able to eat the recommended number of fruits for my age and gender.
   - Strongly Disagree
   - Disagree
   - Neither Agree nor Disagree
   - Agree
   - Strongly Agree

37. I am able to exercise vigorously for at least 15 minutes a day at least five days a week (examples of “vigorous” activities include running, competitive sports such as volleyball, football, and basketball, fast swimming, or climbing briskly up a hill).
   - Strongly Disagree
   - Disagree
   - Neither Agree nor Disagree
   - Agree
   - Strongly Agree
The next questions are about the fruits and vegetables you ate during the past seven days. Please think about all forms of fruits and vegetables including cooked or raw, fresh, frozen or canned. Please think about all meals, snacks, and food consumed at home and away from the home.

38. During the past week, not counting juice, **how many servings of fruit** did you eat? A serving of fruit is equal to a piece of fruit or a cup of fruit salad. Please provide your best estimate:
   - 0
   - 1-4
   - 5-8
   - 9-12
   - 13-16
   - 17+

39. During the past week, **how many servings of dark green vegetables** did you eat? A serving of vegetables is equal to one cup (size of your fist). Dark green vegetables include broccoli, romaine, chard, kale or spinach. Please provide your best estimate:
   - 0
   - 1-4
   - 5-8
   - 9-12
   - 13-16
   - 17+

40. During the past week, **how many servings of OTHER vegetables** did you eat? A serving of vegetables is equal to one cup (size of your fist). Other vegetables include tomatoes, tomato juice, corn, eggplant, peas, lettuce, cabbage, and white potatoes that are not fried. Please provide your best estimate:
41. During the past week, other than your regular job, how many times did you participate in any vigorous physical activities or sports for exercise? Examples of “vigorous” activities include running, competitive sports such as volleyball, football, and basketball, fast swimming, or climbing briskly up a hill.

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

42. What type of physical activity or exercise did you spend the most time during the past week?

__________________________________________________ (please specify)

43. How many times per week did you take part in this activity during the past month?

- 0
- 1-2
- 3-4
- 5-6
44. And, when you took part in this activity, for how many minutes did you usually keep at it?

- Less than 10 min.
- 10-30 min.
- 31-60 min.
- 1-2 hours
- More than 2 hours

45. During the past week, did you do physical activities or exercises to STRENGTHEN your muscles? Do NOT count aerobic activities like walking, running or bicycling. Count activities using your own body weight like yoga, sit-ups or push-ups and those using weight machines, free weights or elastic bands.

- 0
- 1-2
- 3-4
- 5-6
- 7+
APPENDIX D

POSTS DISSEMINATED TO BOTH GROUPS OVER FOUR-WEEK PERIOD
## Appendix D

<table>
<thead>
<tr>
<th>WEEK #1</th>
<th>Text</th>
<th>Web link</th>
<th>Image</th>
<th>Video</th>
<th>Instructor Prompt (Only provided to FB group.)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Post 1:</strong>&lt;br&gt;Monday&lt;br&gt;Oct. 12, 2015, 10:59 a.m.&lt;br&gt;Seen by 123, 18 likes</td>
<td><strong>Avocados are a wonderful source of healthy fat called monounsaturated fatty acids. They're full of vitamins and minerals and have more protein than the average fruit or vegetable. Their only flaw is how quickly they turn brown, but that can be prevented by using this handy tip involving a Tupperware and some chopped onion - check it out! (Fruit)</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>Is avocado a fruit or vegetable?</strong>&lt;br&gt;Besides making guacamole, what other dishes do you use avocado in?</td>
</tr>
<tr>
<td><strong>Post 2:</strong>&lt;br&gt;Tuesday&lt;br&gt;Oct. 13, 2015 10:10 a.m.&lt;br&gt;Seen by 115, 16 likes</td>
<td><strong>If exercise feels like work, mindless snacking may follow. (Activity)</strong></td>
<td><strong><a href="http://www.npr.org/blogs/thesalt/2014/07/11/330690041/if-exercise-is-work-mindless-snacking-may-follow">http://www.npr.org/blogs/thesalt/2014/07/11/330690041/if-exercise-is-work-mindless-snacking-may-follow</a></strong></td>
<td></td>
<td><strong>Bowl of M&amp;M candies</strong></td>
<td><strong>Don’t sabotage your diet! What are some of your favorite activities to participate in?</strong></td>
</tr>
<tr>
<td>Post 3:</td>
<td>On the go, please know that not all fast-food subs are the same. A 6-inch Subway Meatball Marinara with cheese and no veggies is 520 calories and 18 grams of fat, while a 6-inch Turkey Breast &amp; Black Forest Ham with cheese and all of the veggies is only 340 calories and 8 grams of fast. That’s a 180 calorie difference. (Veg)</td>
<td><a href="http://www.subway.com/menu/MenuCategoryItems.aspx?CC=USA&amp;LC=ENG&amp;MenuTypeId=1&amp;MenuId=35">http://www.subway.com/menu/MenuCategoryItems.aspx?CC=USA&amp;LC=ENG&amp;MenuTypeId=1&amp;MenuId=35</a></td>
<td>Grilled chicken sub sandwich</td>
<td>Check to see how many calories you are eating there? Were you surprised at all? If so, explain how you might change the sub to make it healthier next time.</td>
<td></td>
</tr>
<tr>
<td><strong>WEEK #2</strong></td>
<td><strong>Text</strong></td>
<td><strong>Web link</strong></td>
<td><strong>Image</strong></td>
<td><strong>Video</strong></td>
<td><strong>Instructor Prompt</strong></td>
</tr>
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<td>---</td>
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</tr>
</tbody>
</table>
| **Post 1:**  
Monday, Oct. 19, 2015  
10:25 a.m.  
Seen by 102  
17 likes | The best menu for boosting memory and brain function encourages good blood flow to the brain. A recent study found that the Mediterranean Diet helps in keeping aging brains sharp, and foods like those in the Mediterranean Diet with better cognitive function, memory, and alertness. To increase brain function: get adequate vegetables, especially cruciferous ones like broccoli, cabbage and dark leafy greens; enjoy berries, especially dark ones like blackberries, |  |  | [http://www.youtube.com/watch?v=ESGGKhPOsrU](http://www.youtube.com/watch?v=ESGGKhPOsrU) | What are your thoughts about the Mediterranean diet?  
Oct. 19 note: Instructor prompt not needed since many people started discussing before prompt. Instead, I included more information about Omega 3s since there was interest: [http://www.webmd.com/healthy-aging/omega-3-fatty-acids-fact-sheet](http://www.webmd.com/healthy-aging/omega-3-fatty-acids-fact-sheet) |
<table>
<thead>
<tr>
<th>Post 2</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tuesday Oct. 20, 2015 10:37 a.m.</strong></td>
</tr>
<tr>
<td>Seen by 110 9 likes</td>
</tr>
<tr>
<td>Running with music is a great way to get in a groove (just make sure it's not blasting too loudly, or you won't hear those cars!). To pick the ultimate iPod playlist, think about what gets you going. &quot;I know several elite athletes that listen to what we'd consider 'relaxing' music, such as symphony music, while they do a hard workout,&quot; says Andrew Kastor, former competitive runner and coach. So don't feel like you have to download Lady</td>
</tr>
</tbody>
</table>

blueberries, and cherries; get adequate omega-3 fatty acids, such as salmon, tuna, sardines and herring; and eat walnuts. *(Veg & Fruit)*
<table>
<thead>
<tr>
<th>Post 3</th>
<th>Thursday, Oct. 22, 2015 10:41 a.m.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seen by 102 13 likes</td>
<td></td>
</tr>
</tbody>
</table>

Fall is in full swing. Try this quick and healthy fall recipe. Apple, walnut, and endive salad. Sweet, nutty, tart, and fresh. Apples help fill you up. (Fruit & Veg)


Salad with apples and a side of dressing

The fall harvest lends itself to squash, pumpkins and apples. What are some of your favorite, healthy dishes to make during the fall season?

<table>
<thead>
<tr>
<th>Post 4</th>
<th>Friday, Oct. 23, 2015 11:55 a.m.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seen by 93 12 likes</td>
<td></td>
</tr>
</tbody>
</table>

According to the USDA, everyone should get 15 minutes of vigorous activity at least five days a week. Examples of “vigorous” activities include running, competitive sports such as volleyball, football, and basketball, fast swimming, or aerobics. Did

https://www.kent.edu/recservices/fall-group-x-schedule

Have you tried any of the fitness classes offered at the Rec? And if so, what are some of your favorites and why?
you know that the Kent State Recreation Center offers more than 60 exercise classes throughout the week? From Spinning to Total Body Boot Camp to Zumba it has something for everyone at all levels of fitness. (Activity)
<table>
<thead>
<tr>
<th>WEEK #3</th>
<th>Text</th>
<th>Web link</th>
<th>Image</th>
<th>Video</th>
<th>Instructor Prompt</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post 1</td>
<td>Experts say that women ages 19-30 should get 2 cups of fruit and women ages 31 and up should get 1.5 cups of fruit every day. Men ages 19-50 should get 2 cups of fruit on a daily basis. With that being said, you may wonder &quot;how will I get my recommended amount each day!?&quot; Make a smoothie! Try your favorite fruit smoothie and add a little spinach or cauliflower; you'll never know it's in your drink. Smoothies hide flavors! (Fruit &amp; Veg)</td>
<td><a href="http://simplegreensmoothies.com/green-smoothie-recipes/pineapple-upside-cake">http://simplegreensmoothies.com/green-smoothie-recipes/pineapple-upside-cake</a></td>
<td>Spinach, pineapple and green smoothie</td>
<td>Share some of your favorite smoothie recipes with everyone.</td>
<td></td>
</tr>
<tr>
<td>Post 2</td>
<td>Snacks can boost energy between meals and supply essential vitamins and minerals. Enjoy some of these</td>
<td><a href="http://www.feedyourawesomemachine.com/baked-potato-avocado-red-pepper-and-lime-salsa/">http://www.feedyourawesomemachine.com/baked-potato-avocado-red-pepper-and-lime-salsa/</a></td>
<td>Three photos: popcorn, baked potato with salsa, and apples and peanut butter.</td>
<td>Sometimes you are in back-to-back classes and then have to head off to work. What are some of your favorite</td>
<td></td>
</tr>
<tr>
<td>Post 3</td>
<td>Have you heard about TRX? TRX stands for Total Body Resistance Exercise. It was invented by a Navy Seal. He needed a way to keep himself and his fellow Seals in top shape no matter where they were in the world, whether conducting a mission or standing by. (Activity)</td>
<td>Woman in plank position.</td>
<td><a href="http://www.youtube.com/watch?v=mQ4dQzbIEHQ">http://www.youtube.com/watch?v=mQ4dQzbIEHQ</a></td>
<td>What types of workouts do you do or would like to do to keep your muscles toned?</td>
<td></td>
</tr>
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<td></td>
</tr>
<tr>
<td><strong>Post 4</strong></td>
<td>Cooking oatmeal in the microwave is a great go-to for college</td>
<td><a href="http://www.fannetasticfood.com/recipes/perfect-Oatmeal-with-berries">http://www.fannetasticfood.com/recipes/perfect-Oatmeal-with-berries</a></td>
<td>Do you eat breakfast? If you don’t, why not?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
9:55 a.m.

Seen by 85
20 likes

<p>| students who are looking to make a fast and healthy breakfast. Here's an easy recipe for microwave banana oatmeal. The website includes tons of other fun topping ideas. (Fruit) | microwave-banana-oatmeal/ | | What’s your go-to healthy breakfast item? |</p>
<table>
<thead>
<tr>
<th>WEEK #4</th>
<th>Text</th>
<th>Web link</th>
<th>Image</th>
<th>Video</th>
<th>Instructor Prompt</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Post 1</strong>&lt;br&gt;Monday, Nov. 2, 2015 11:04 a.m.&lt;br&gt;Seen by 79 14 likes</td>
<td>Experts say that women and men should aim to get at least 2.5 cups of vegetables on a daily basis. Moderate evidence indicates that increasing vegetable intake may reduce the risk of cardiovascular disease, including heart attacks and strokes. View some of these recipes that are geared toward increasing your daily vegetable intake. (Veg.)</td>
<td><a href="http://allrecipes.com/recipes/225/side-dish/vegetables/">http://allrecipes.com/recipes/225/side-dish/vegetables/</a></td>
<td>Pasta with vegetables</td>
<td></td>
<td>What are your favorite veggies and/or veggie recipes?</td>
</tr>
<tr>
<td><strong>Post 2</strong>&lt;br&gt;Tuesday, Nov. 3, 2015 9:53 a.m.&lt;br&gt;Seen by 74 14 likes</td>
<td>Have you ever tried starfruit? Carambola, also known as starfruit, is the fruit native to the Philippines, Indonesia, Malaysia, India, and Sri Lanka. The entire fruit is edible and is</td>
<td><a href="https://www.youtube.com/watch?v=jTNSTk48BSA">https://www.youtube.com/watch?v=jTNSTk48BSA</a></td>
<td>Starfruit on cutting board</td>
<td></td>
<td>Have you tried starfruit or another tropical fruit? What was your reaction?</td>
</tr>
</tbody>
</table>
usually eaten out of the hand. It is also used in cooking and can be made into relishes, preserves, and juice drinks. (Fruit)

| **Post 3** | Remember these five easy tips from registered dietitian Lisa Hark to help you stay healthy. (Fruit, Veg., & Activity) | https://www.youtube.com/watch?v=qFPgUTa988M | What is your favorite nutrition or exercise tip that you try to follow on a daily or weekly basis? |
APPENDIX E

POSTTEST SURVEY QUESTIONS FOR FACEBOOK GROUP
Appendix E

1. First Name ________________

2. Last Name ________________

3. How much do you weigh?
   _____ Pounds

4. According to health experts, for my age group, I should be eating the following amount of vegetables each day. Please note that one cup is about the size of your fist. (Check only one.):
   ___ 1 cup of vegetables
   ___ 2 cups of vegetables
   ___ 3 cups of vegetables
   ___ 4 cups of vegetables
   ___ 5 cups of vegetables

5. According to health experts, for my age group, I should be eating the following amount of fruit each day. Please note that a piece of fruit (i.e. apple, banana, pear) is considered one cup. (Check only one.):
   ___ 1 cup of fruit
   ___ 2 cups of fruit
   ___ 3 cups of fruit
   ___ 4 cups of fruit
   ___ 5 cups of fruit

6. According to health experts, for my age group, I should be getting the following amount of vigorous exercise each day (examples of “vigorous” activities include running, competitive sports such as volleyball, football, and basketball, fast swimming, or climbing briskly up a hill). (Check only one.):
   ___ 5 minutes
   ___ 15 minutes
   ___ 30 minutes
   ___ 60 minutes

7. I know I should eat a variety of fruits and vegetables in my daily diet.
   • Strongly Disagree
   • Disagree
8. I make an effort to eat a variety of fruits and vegetables in my daily diet.
   • Strongly Disagree
   • Disagree
   • Neither Agree nor Disagree
   • Agree
   • Strongly Agree

9. I know I should get physical activity on a daily basis.
   • Strongly Disagree
   • Disagree
   • Neither Agree nor Disagree
   • Agree
   • Strongly Agree

10. I make an effort to get physical activity on a daily basis.
    • Strongly Disagree
    • Disagree
    • Neither Agree nor Disagree
    • Agree
    • Strongly Agree

11. I feel that eating a diet rich in vegetables and fruits, and getting daily exercise will help increase my energy level.
    • Strongly Disagree
    • Disagree
    • Neither Agree nor Disagree
    • Agree
    • Strongly Agree

The next questions are about the fruits and vegetables you ate during the past seven days. Please think about all forms of fruits and vegetables including cooked or raw, fresh, frozen or canned. Please think about all meals, snacks, and food consumed at home and away from the home.

12. During the past week, not counting juice, **how many servings of fruit** did you eat? A serving of fruit is equal to a piece of fruit or a cup of fruit salad. Please provide your best estimate:
13. During the past week, **how many servings of dark green vegetables** did you eat? A serving of vegetables is equal to one cup (size of your fist). Dark green vegetables include broccoli, romaine, chard, kale or spinach. Please provide your best estimate:

- 0
- 1-4
- 5-8
- 9-12
- 13-16
- 17+

14. During the past week, **how many servings of OTHER vegetables** did you eat? A serving of vegetables is equal to one cup (size of your fist). Other vegetables include tomatoes, tomato juice, corn, eggplant, peas, lettuce, cabbage, and white potatoes that are not fried. Please provide your best estimate:

- 0
- 1-4
- 5-8
- 9-12
15. During the past week, other than your regular job, how many times did you participate in any vigorous physical activities or sports for exercise? Examples of “vigorous” activities include running, competitive sports such as volleyball, football, and basketball, fast swimming, or climbing briskly up a hill.

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

16. What type of physical activity or exercise did you spend the most time during the past week?

__________________________________________________ (please specify)

17. How many times per week did you take part in this activity during the past month?

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

18. And, when you took part in this activity, for how many minutes did you usually keep at it?

- Less than 10 min.
19. During the past week, did you do physical activities or exercises to STRENGTHEN your muscles? Do NOT count aerobic activities like walking, running or bicycling. Count activities using your own body weight like yoga, sit-ups or push-ups and those using weight machines, free weights or elastic bands.

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

Did you join the closed Facebook group “Kent State Healthy Living” in which you were invited to participate

- Yes
- No

Which of the following types of media did you benefit from most when receiving healthy living posts through Facebook each week?

- Only text posts
  - Never
  - Seldom
  - Sometimes
  - Often

- Posts with link to other resources (such as a website)
  - Never
  - Seldom
  - Sometimes
20. Do you prefer a specific media over others?
___ Yes
___ No

21. If yes, why do you prefer that specific media over others?
_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________

22. To what extent did your social awareness about healthy living change over the four-week period?
23. What do you see are the strengths of using social media to disseminate information?
_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________

24. What do you see are the weaknesses and/or limitations of using social media to disseminate information?
_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________

25. Did you participate in discussion with other participants through the Facebook group page?
   ___ Yes
   ___ No

26. If yes, on average, how many discussion posts did you make each week?
   • 1-2
   • 3-5
• 6-9
• 10 or more

27. Did the support of your peers (Facebook “friends”) in the group help to change your own healthy living behaviors?

• None
• Very Little
• Moderately
• Dramatically

28. Did the support of the facilitator in the Facebook group help to change your own healthy living behaviors?

• None
• Very Little
• Moderately
• Dramatically

29. Please explain in detail how your Facebook “friends” in the group helped you to change your own healthy living behaviors.

_____________________________________________________________________
_____________________________________________________________________
_____________________________________________________________________

30. Do you feel that you benefited from the discussions in the Facebook group page?

• Not At All
• Very Little
• Moderately
31. Please explain in detail why you did or did not benefit from the communication and discussions in the Facebook group page over the last four weeks.
APPENDIX F

POSTTEST SURVEY QUESTIONS FOR EMAIL GROUP
Appendix F

POST-SURVEY QUESTIONS FOR EMAIL/CONTROL GROUP

1. First Name ______________

2. Last Name ______________

3. How much do you weigh?
   _____ Pounds

4. According to health experts, for my age group, I should be eating the following amount of vegetables each day. Please note that one cup is about the size of your fist. (Check only one.):
   ___ 1 cup of vegetables
   ___ 2 cups of vegetables
   ___ 3 cups of vegetables
   ___ 4 cups of vegetables
   ___ 5 cups of vegetables

5. According to health experts, for my age group, I should be eating the following amount of fruit each day. Please note that a piece of fruit (i.e. apple, banana, pear) is considered one cup. (Check only one.):
   ___ 1 cup of fruit
   ___ 2 cups of fruit
   ___ 3 cups of fruit
   ___ 4 cups of fruit
   ___ 5 cups of fruit

6. According to health experts, for my age group, I should be getting the following amount of vigorous exercise each day (examples of “vigorous” activities include running, competitive sports such as volleyball, football, and basketball, fast swimming, or climbing briskly up a hill). (Check only one.):
   ___ 5 minutes
   ___ 15 minutes
   ___ 30 minutes
   ___ 60 minutes

7. I know I should eat a variety of fruits and vegetables in my daily diet.
8. I make an effort to eat a variety of fruits and vegetables in my daily diet.
   • Strongly Disagree
   • Disagree
   • Neither Agree nor Disagree
   • Agree
   • Strongly Agree

9. I know I should get physical activity on a daily basis.
   • Strongly Disagree
   • Disagree
   • Neither Agree nor Disagree
   • Agree
   • Strongly Agree

10. I make an effort to get physical activity on a daily basis.
    • Strongly Disagree
    • Disagree
    • Neither Agree nor Disagree
    • Agree
    • Strongly Agree

11. I feel that eating a diet rich in vegetables and fruits, and getting daily exercise will help increase my energy level.
    • Strongly Disagree
    • Disagree
    • Neither Agree nor Disagree
    • Agree
    • Strongly Agree

The next questions are about the fruits and vegetables you ate during the past seven days. Please think about all forms of fruits and vegetables including cooked or raw, fresh, frozen or canned. Please think about all meals, snacks, and food consumed at home and away from the home.
12. During the past week, not counting juice, **how many servings of fruit** did you eat? A serving of fruit is equal to a piece of fruit or a cup of fruit salad. Please provide your best estimate:

- 0
- 1-4
- 5-8
- 9-12
- 13-16
- 17+

13. During the past week, **how many servings of dark green vegetables** did you eat? A serving of vegetables is equal to one cup (size of your fist). Dark green vegetables include broccoli, romaine, chard, kale or spinach. Please provide your best estimate:

- 0
- 1-4
- 5-8
- 9-12
- 13-16
- 17+

14. During the past week, **how many servings of OTHER vegetables** did you eat? A serving of vegetables is equal to one cup (size of your fist). Other vegetables include tomatoes, tomato juice, corn, eggplant, peas, lettuce, cabbage, and white potatoes that are not fried. Please provide your best estimate:

- 0
- 1-4
- 5-8
15. During the past week, other than your regular job, how many times did you participate in any vigorous physical activities or sports for exercise? Examples of “vigorous” activities include running, competitive sports such as volleyball, football, and basketball, fast swimming, or climbing briskly up a hill.

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

16. What type of physical activity or exercise did you spend the most time during the past week?

__________________________________________________ (please specify)

17. How many times per week did you take part in this activity during the past month?

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

18. And, when you took part in this activity, for how many minutes did you usually keep at it?
Less than 10 min.
10-30 min.
31-60 min.
1-2 hours
More than 2 hours

19. During the past week, did you do physical activities or exercises to STRENGTHEN your muscles? Do NOT count aerobic activities like walking, running or bicycling. Count activities using your own body weight like yoga, sit-ups or push-ups and those using weight machines, free weights or elastic bands.

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