EFFECTS OF MINDFUL EATING ON FOOD INTAKE AND SELECTION IN COLLEGE STUDENTS

A thesis submitted to the Kent State University College of Education, Health, and Human Services in partial fulfillment of the requirements for the degree of Masters of Science

By

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The purpose of this study is to determine whether a 15 minute mindful eating group intervention for college students has an impact on the nutrient intake and amount consumed of snack foods during a movie. The study was a non-experimental, post-test only, quantitative, comparative study. Students (n=28) were recruited through Flashline on Kent State University’s website and through flyers on campus. Participants were placed into either a control or treatment group. The treatment group received a brief overview of mindful eating principles prior to data collection; the control group was not exposed to mindful eating principles. Deception was used with both groups. Participants were told the purpose of the study was to evaluate movie theater food items. The terms mindful eating, nutrition, and health were not mentioned. Following the intervention, both groups watched a movie and were offered snack foods and beverages. Participants self-selected portions. Data was analyzed using Food Processor SQL and SPSS software. Food selection, serving sizes, and plate waste were measured using a digital photography method. An independent t-test was used to compare each variable. The control group consumed significantly more kilocalories, protein, carbohydrates, total fat, and saturated fat. The control group consumed significantly more (p ≤ 0.05) high fat dips, sugar
sweetened beverages, and chips and pretzels. The results confirm mindful eating nutrition interventions aimed at college students can immediately impact portion control and decrease consumption of high fat and energy dense food items.
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CHAPTER I
INTRODUCTION

A variety of techniques are currently used in nutrition counseling in attempt to create the most effective style of intervention. These interventions help improve eating behaviors and are oriented around different learning theories such as the Cognitive Behavioral Theory, the Social Cognitive Theory, the Transtheoretical Theory, and the Health Belief Model (Academy of Nutrition and Dietetics, 2013). Nutrition interventions are delivered using a variety of methods such as individual counseling, group counseling, coaching, and education (Boyle & Holben, 2013). Education is a key component of changing nutrition related behavior; however, nutrition knowledge is just one of the many areas that determine the population’s behaviors and habits with food (Brown, 2013). Therefore, education is often combined with learning theories in order to successfully create change (Onema, Brug, & Lechner, 2001).

The Cognitive Behavioral Theory is the most commonly used behavior change theory in nutrition programs according to the Academy of Nutrition and Dietetics Evidence Analysis Library (2013); the Academy found that 23 randomized controlled trials using the Cognitive Behavioral Theory in nutrition counseling yielded positive results. Studies have also shown a benefit to delivering counseling and education as a group because it promotes change and covers large populations in a short period of time (Gucciardi, DeMelo, Lee, & Grace, 2007; Kalavainen, Korppi, & Nuutinen, 2007; Renjilian et al., 2001; Rigsby, Gropper, & Gropper, 2009).
Nutrition counseling and education help to create behavior changes to improve the poor eating habits that are prevalent in the U.S. population. The Center for Disease Control and Prevention (2013) promotes adherence to the United States Department of Agriculture (USDA) 2010 dietary guidelines to help prevent the incidence of chronic disease. Despite this advice, the average American consumes a diet that is not consistent with these guidelines (NHANES, 2003-2006). Specifically, there continues to be issues with overconsumption and portion control (American Dietetic Association, 2009; Bryant & Dundes, 2005; Byrd-Bredbenner & Schwartz, 2004). According to the American Dietetic Association (2009), “portion control should be included as part of a comprehensive weight management program.”

Mindfulness is a counseling technique that recent research has started to focus on in the clinical setting (Baer, 2003; Davidson et al., 2003; Rosenzweig et al., 2007; von Son, Nyklicek, Pop, & Power, 2011). Albers (2012) mentions how mindfulness is very similar to the cognitive behavioral theory and that they differ in that mindfulness focuses on the acceptance of one’s thoughts. “Mindful eating” is a counseling technique that is practiced by slowing down while eating, paying attention to the bodies hunger cues, acknowledging the difference between emotional and physical hunger, eliminating outside distractions, and utilizing all of the senses; the aim of this method is to reduce portion sizes and eliminate the sense of guilt that can be tied to eating (Albers, 2012; Mathieu, 2009). Recent studies have shown success in the use of mindful eating (Dalen et al., 2012; Timmerman & Brown, 2012; Vettese, Toneatto, Stea, Nguyen, & Wang,
2009). However, many studies lack quantitative measures and the methodology
development is continuing to undergo changes as studies evolve (Vettese, Toneatto, Stea,
Nguyen, & Wang, 2009).

**Problem Statement**

According to the Centers for Disease Control and Prevention (2013), unhealthy
eating behaviors increase the risk of chronic illnesses such as type 2 diabetes,
hypertension, cardiovascular disease, stroke, certain cancers, osteoporosis and obesity. A
major contributor of poor diet quality is overconsumption and portion control which
results in excessive caloric intake (American Dietetic Association, 2009). This issue is
linked to factors such as the environment, outside distractions while eating, emotions,
boredom and an increase in caloric intake from snacking (Gore, Foster, DiLillo, Kirk, &
Smith, 2003; Nelson, Kocos, Lytle, & Perry, 2009; Piernas & Popkin, 2010; Sebastian,
Enns, & Goldman, 2011; Thomson Spence, Paine, & Lange, 2008). Group counseling
delivered to community members can help to promote large scale changes related to these
factors (Gucciardi, DeMelo, Lee, & Grace, 2007; Kalavainen, Korppi, & Nuutinen, 2007;
Renjilian et al., 2001; Rigsby, Gropper, & Gropper, 2009).

College years are a critical period in establishing health behaviors and habits
because most college students are leaving home and becoming more independent at this
time (Kelly, Mazzeo, & Bean, 2013; Vankim & Nelson, 2013). Studies have shown that
young adults have portion distortion and tend to consume too large of quantities of food
at one sitting (Bryant & Dundes, 2005; Marchiori, Waroquier, & Klein, 2011; Schwartz
& Byrd-Bredbenner, 2006). They also appear to develop unhealthy eating behaviors such as skipping meals and snacking on energy dense foods (Spanos & Hankey, 2010). Overall, this population has a tendency to over consume foods high in fat, saturated fat, and kilocalories (Huang et al., 2003). In the Surgeon General’s National Prevention Strategy on Healthy Eating (2010), colleges and universities are mentioned as one of the settings that can promote nutrition changes for the population; one specific recommendation that is made is to “help people recognize and make healthy food and beverage choices”. One intervention that may help to make this change is mindful eating which has been shown to be effective in reducing portion size (Cadewell, Baime, & Wolever, 2012; Timmerman & Brown, 2012; Wansink, 2010).

Mindful eating is an emerging area in research and more studies are needed to determine its effectiveness in modifying eating behaviors (Vettese, Toneatto, Stea, Nguyen, & Wang, 2009). Research has shown that the use of mindful eating in counseling is widely accepted by participants and is often delivered through group interventions (Cadewell, Baime, and Wolever, 2012; Dalen, et al., 2010; Timmerman & Brown, 2012). There is yet to be research on the immediate effects of mindful eating and very little research looks at the use of mindful eating in the general college student population. An online weight prevention program for first year university students used a mindful eating activity as part of their study, however mindful eating’s direct impact on the results was not measured (Gow, Trace, & Mazzeo, 2010). Mindful eating is a
flexible intervention strategy and may be successful in achieving short term outcomes in reduced portion sizes as well as healthier food choices.

**Purpose Statement**

The purpose of this study is to determine whether a 15 minute mindful eating group intervention for college students has an impact on the nutrient intake and amount consumed of snack foods during a movie.

**Hypothesis**

1. College students who participate in the mindful eating group intervention will consume different serving amounts of snack groupings from the snack foods provided compared to those in the control group.

2. College students who participate in the mindful eating group intervention will consume a different amount of macronutrients, kilocalories, and sodium from the snack foods provided compared to those in the control group.

**Operational Definitions**

- Snack foods: Preselected snack foods for all groups are chocolate covered raisin, candy coated chocolate pieces, chewy fruit flavored candy pieces, gummy bears, pretzel sticks, potato chips, cheese flavored popcorn, butter flavored popcorn, hummus, salsa, cheese sauce, French onion dip, baby-cut carrots, celery sticks, apple slices, green grapes, regular cola, orange flavored soda, diet lemon lime soda, sweetened iced tea, and water.
• Food grouping: Food groupings are determined in relation to snack items energy density and nutrient composition. These groupings include candy, high fat dip, low fat dip, fruits, vegetables, popcorn, chips and pretzels, sugar sweetened beverages, artificially sweetened beverages, and water.

• Mindful eating: A specific nutrition counseling technique that focuses on the enjoyment of food and portion control through utilizing all of the senses when eating.

• College students: Students that attend Kent State University and are either in the graduate or undergraduate programs
CHAPTER II
REVIEW OF LITERATURE

Nutrition Counseling Techniques for Behavior Change

Definitions

There are a variety of approaches to nutrition counseling and interventions. There has been a recent shift in counseling from the traditional method to client-centered counseling (Deehy et al., 2010; Isbell, Seth, Atwood, & Ray, 2014). One specific form of this, motivational interviewing, is starting to emerge in current research (Boyle & Holben, 2013). Due to the variety of approaches and recent shift, the specific types of techniques that will be focused on in relation to mindful eating will be defined.

**Nutrition counseling.** “A collaborative activity during which a counselor and client jointly set priorities, establish goals, and create an action plan; the counselor provides coaching to foster responsibility for self-care to promote health or treat a health condition.” (Boyle & Holben, 2010)

**Individual counseling.** “A non-directive approach to counseling in which the client determines the general direction of therapy, while the counselor seeks to increase the client’s insight and self-understanding through informal clarifying questions.” (Boyle & Holben, 2010)

**Group counseling.** Nutrition counseling with more than one person that combines education, social support, and guidance for the group members (Boyle & Holben, 2013).
Coaching. “Facilitating the discussion, eliciting from the client, and guiding the clients to set realistic behavior change goals.” (Boyle & Holben, 2013)

Talking. The counselor has the “responsibility for identifying solutions” and “the drive to provide information” in this style of counseling (Boyle & Holben, 2013).

Nutrition education. “A formal process to impart knowledge to a group or individual to facilitate voluntary adaptation of eating and other nutrition-related behaviors to improve or maintain health.” (Boyle & Holben, 2013)

Theoretical models. “Theories and theoretical models consist of principles, constructs, and variables, which offer systemic explanations of the human behavior change process.” (American Dietetic Association, 2011)

Individual vs. Group

Ash et al. (2006) compared three weight management groups, one that received group counseling, another that received individual counseling, and a third that just received education. Both individual and group counseling were more successful than education alone in reducing weight and were shown to improve self efficacy. However, there were no statistical differences between the outcomes of the individual and group counseling. Waleekhachonloet, Limwattananon, Limwattananon, and Gross (2007) also found no significant difference in results between individual and group counseling for weight loss and found both to be successful in decreasing weight among participants. However, one of the major benefits to group based counseling is the ability to impact a greater number of people with lesser cost (Ash et al., 2006)
Spahn et al. (2010) looked at three studies that used individual and group counseling to see which was more effective in diabetes and weight management; they found that group counseling was significantly more effective. The Academy of Nutrition and Dietetics Evidence Analysis Library (2014) also supports the use of group counseling over individual counseling. Other studies have also shown group counseling more effective in creating significantly different results in nutrition programs (Gucciardi, DeMelo, Lee, & Grace, 2007; Kalavainen, Korppi, & Nuutinen, 2007; Renjilian et al., 2001; Rigsby, Gropper, & Gropper, 2009). Befort, Donnelly, Sullican, Ellerbeck, & Perri (2010) conducted a study in which they compared group phone counseling to individual phone counseling; there results showed that group counseling was more cost effective, sustained significant weight loss for a longer period of time, and resulted in a stronger relationship with their counselor. One possible reasoning for this is that the group offers peer support to each other (Gropper & Gropper, 2009). Abusabha, Peacock, and Achterberg (1999) found that group counseling is most effective when participants are included in the discussion and able to talk openly as opposed to lecturing to the group. These studies support the use of group counseling to create long term results in behavior changes.

**Coaching vs. Talking**

Currently research is focusing on moving away from traditional counseling and focusing more on client-centered counseling. Counseling is no longer looked at as “talking” to the client but rather as “coaching” (Boyle & Holben, 2010).
form of counseling has been successfully implemented into nutritional counseling and education at some WIC sites; results showed that it was successful in promoting behavioral changes (Deehy et al., 2010; Isbell, Seth, Atwood, & Ray, 2014). Deehy et al. (2010) found that in order to effectively provide participant centered counseling, it is important to have the following points: cultural competency, training of dietitians providing counseling, implementation of motivational interviewing techniques, educational materials that enhance this method of counseling, and a supportive environment.

Motivational interviewing, a client-centered counseling technique, involves using a “selective response to client speech in a way that helps the client resolve ambivalence and move towards change” (American Dietetic Association, 2011). The main role of the counselor is to listen and guide the client to resolve the issues themselves, only providing information when necessary and asked for by the client (Boyle & Holben, 2013). In this form of counseling, the client and dietitian work together in a partnership to help create goals, empower the client, and overcome resistance (American Dietetic Association, 2011). Studies have shown that when motivational interviewing is combined with traditional behavioral weight loss treatment overall results are more positive than behavioral weight loss treatment alone (Bowen et al., 2002; DiMarco, Klein, Clark, & Wilson, 2009; Smith, Heckemeyer, Kratt, & Mason, 1997; West DiLillo, Bursac, Gore, & Green, 2007). Even though motivational interviewing did not always lead to a more significant weight loss in these studies, the general theme that appeared was that
participants were better able to achieve dietary goals of the program (Bowen et al., 2002; Smith, Heckemeyer, Kratt, & Mason, 1997; West DiLillo, Bursac, Gore, & Green, 2007).

**Education**

Nutrition education, part of the intervention strategies used in the Nutrition Care Process, provides the client with nutrition related knowledge (American Dietetic Association, 2011). It includes informing clients on why a nutrition intervention is needed, how it will help to improve their situation, how they need to modify their diet, and any additional information they may need to know regarding nutrition related topics and their condition (American Dietetic Association, 2011). Education can be delivered individually or as a group (Boyle & Holben, 2010). In order for education to be most effective, it is important for it to be tailored to the individual and included with counseling (Onema, Brug, & Lechner, 2001). Abusabha, Peacock, and Achterberg (1999) found that education that is facilitated through group discussion and participation helps to empower participants much more than the traditional lecture form of education.

Some studies have suggested that nutritional knowledge alone does not influence weight (Allison et al., 1995; Burns, Richman, & Caterson, 1986). This may be due to the fact that it does not address behavioral issues, socioeconomic issues, or provide full social support for a lifestyle change (Glanz, 1985). Nutritional education is found to be most effective when it is combined with learning theories and specific to the individual’s current needs (Campbell et al., 1994). One study found education to be an important factor in the initial start of weight loss programs because it resulted in greater weight loss
(Klohe-Lehman et al., 2005). Overall, nutrition education is an important component to successful nutritional interventions (Abusabha, Peacock, & Achterberg 1999; Boyle & Holben, 2010; Onema, Brug, & Lechner, 2001).

**Theoretical Models**

**Cognitive behavior theory.** The Academy of Nutrition and Dietetics (2013) states that Cognitive Behavioral Therapy (CBT) is based on the principle that both external and internal factors influence learned behaviors. Studies have shown that intervention programs that use the cognitive behavioral theory in weight control are successful in producing significant long term results in weight management (Dornelas, Wylie-Rosett, Swencionis, 1998; Kajaste, Brander, Telakivi, Partinen, Mustajoki, 2004). However, Kalodner and DeLucia (1991) found that weight loss was not significantly different between those that received CBT and those that only received behavioral therapy. Both groups were successful in losing weight. They did find that the CBT group had higher levels of motivation compared to the group that only received behavioral therapy.

According to the Academy of Nutrition and Dietetics’ Counseling Evidence Analysis Project (2013), CBT has been shown to be successful in creating behavioral change of dietary habits in those with diabetes and cardiovascular disease. Through the Academy’s review of literature, they found that 23 randomized controlled trails supported the use of CBT in counseling. The Academy’s Position Paper on Weight Management (2009), recognizes the important role cognitive behavioral therapy has in helping clients
change behaviors related to dietary intake. Spahn et al. (2010) summarized the findings of the ADA’s Evidence Analysis Library Nutrition Counseling Workgroup and associated nutrition counseling strategies and concluded that CBT can be applied in nutrition counseling through self-monitoring, problem solving, goal setting, rewards, social support, stress management, stimulus control and relapse prevention.

**Social cognitive theory.** Bandura’s Social Cognitive Theory (SCT) depicts behavior change and maintenance as being influenced by four conditions: attention, retention, motor reproduction, and motivation. The SCT focuses on the belief that behavior is developed and maintained through outside social influences (Bandura, 1986). The Academy of Nutrition and Dietetics (2013) states that the SCT, “provides a framework for understanding, predicting, and changing behavior.” Goals, outcomes, and self-efficacy all play a role in changing, reinforcing and continuing behaviors. Many studies conducted using the SCT in health behavior change focus on the ideas of self-efficacy and self-regulation (Annesi, 2011; Dennis, Potter, Estabrooks, Davy, 2012; Poddar, Hosig, Anderson, Nickols-Richardson, Duncan, 2010; Teixeira, Patrick, Mata, 2011). Poddar et al. (2010), found a significant increase in self-efficacy and self-regulation with an experimental program designed to change diary intake. But, other constructs of the SCT such as outcome expectations did not alter. The end result was that the program did not change dietary behavior. Dennis et al. (2012) was also unsuccessful in promoting dietary behavioral changes using self-regulation training. However, one study found that their program increased self-efficacy as well as increased fruit and
vegetable consumption (Annesi, 2011). In a review, Bandura (2005) acknowledges the need to promote self regulation in preventative health programs in order to effectively change behavior.

Cerin, Barnett, and Baranowski (2009) reviewed past studies based on changing youth dietary behaviors that were based on different theoretical models. They expressed difficulty in conducting the study due to little research available specific to SCT being applied in nutrition related programs. However, they did find that self-efficacy was related to dietary behavioral changes, although the change was not statistically significant. According to the Academy of Nutrition and Dietetics (2013), due to lack of evidence showing the clear outcome of the application of the SCT in counseling, more studies need to be conducted before suggesting using this theory when developing a nutrition therapy program. Spahn et al. (2010) summarized the findings of the ADA’s Evidence Analysis Library Nutrition Counseling Workgroup and associated nutrition counseling strategies and found that nutrition counseling strategies that fit into the SCT framework are demonstration and modeling, skill development and coaching, social support, reinforcement, goal setting, stimulus control, and motivational interviewing.

**Transtheoretical theory.** The Transtheoretical model consists of a sequence of five stages in behavior change: precontemplation, contemplation, preparation, action, and maintenance (American Dietetic Association, 2011). This model is based off of the theory that behavior can change if interventions are developed around whichever stage of change the participant is currently categorized in (Boyle & Holben, 2010). The first
stage, precontemplation, is when the individual is “unaware or not interested in making a change (Boyle & Holben, 2010).” The second stage, contemplation, is when the individual considers making a change in their behavior (Boyle & Holben, 2010). The third stage, preparation, is when the individual starts to plan on how they will create a behavior change (Boyle & Holben, 2010). The fourth stage, action, is when the individual follows through with those plans and starts to change their behavior (Boyle & Holben, 2010). And the final step is maintenance, which is when the individual has established that habit into their lifestyle for six or more months (Boyle & Holben, 2010).

When applying this theory to nutrition counseling, early intervention stages focus on techniques similar to motivational interviewing, and the later stages focus on behavioral strategies such as goal setting (American Dietetic Association, 2011). According to the Academy of Nutrition and Dietetics’ Counseling Evidence Based Analysis Project (2013), only one study has shown this method to help create a dietary behavior change; this is due to the fact that most studies that have been conducted are to create measurement tools to assess which stage of change participants are in. This study found that using the Transtheoretical Model of Change along with regular diabetes treatment resulted in helping to create behavioral change even in those who are at a stage that is reluctant to change and was able to be applied in a large group setting (Jones et al, 2003). Much of the research done is qualitative research that assesses which stage of change participants are in and does not measure the effectiveness of applying specific
counseling strategies to those stages (Kasila, Poskiparta, Karhila, & Kettunen, 2003; Lin & Wang, 2013).

**Health belief model.** The Health belief model, according to the American Dietetic Association (2011), “focuses on an individual’s attitudes and beliefs to attempt to explain and predict health behaviors.” There are three constructs that explain what health behavior changes. The first is that the person is aware of the negative effects of certain diseases and feels steps can be taken to prevent it from happening (American Dietetic Association, 2011; Boyle & Holben, 2010). The second is that the person is able to see the positive effects that taking action will create (American Dietetic Association, 2011; Boyle & Holben, 2010). And the third is self-efficacy and the belief that change can be made (American Dietetic Association; Boyle & Holben, 2010). Different methods of counseling are used depending on which stage the client is in and ranges from education to counseling (American Dietetic Association, 2011). The Health Belief Model can be difficult to apply to all areas of nutrition prevention, but can target certain populations that see some negative effects of their diet that need controlled before the symptoms worsen (Boyle & Holben, 2010). Populations that this model can be applied to include those recently diagnosed with type 2 diabetes, those with high cholesterol, and those at risk of developing osteoporosis (Boyle & Holben, 2010).
Areas of Nutritional Concern for American’s

Use of Dietary Intake for the Prevention and Treatment of Chronic Disease

The USDA’s 2010 Dietary Guidelines encourage Americans to maintain caloric balance and consume foods that are nutrient dense. The USDA’s 2010 dietary guidelines suggest that limiting foods high in fat, sodium, and added sugars and increasing foods such as fruits, vegetables, and whole grains can help to decrease the chance of chronic disease. They also state, “improved nutrition, appropriate eating behaviors, and increased physical activities have tremendous potential to decrease the prevalence of overweight and obesity, enhance the public’s health, reduce morbidity and premature mortality, and reduce health care costs” (USDA 2010). The Center for Disease Control and Prevention (CDC) (2013) position is that following the USDA’s 2010 Dietary guidelines can help to prevent type 2 diabetes, hypertension, cardiovascular disease, stroke, certain cancers, osteoporosis, and obesity in young people. Due to the average American not meeting these suggestions, the Surgeon General has created a National Prevention Strategy (2010) with one of the focuses being on healthy eating; the goal of this is to create large scale changes in the community by promoting healthy choices through the environment, clinical and community preventative services, and increasing the knowledge of the public.

The Academy of Nutrition and Dietetics Evidence Analysis Library (2013) provides research articles that support the need of a balanced diet in order to help treat and control chronic disease. Diseases which can be treated or controlled through proper
diet include chronic kidney disease, coronary artery disease, diabetes, obesity, malnutrition, chronic obstructive pulmonary disease, hypertension, and heart disease. In the American Dietetic Association’s position paper on weight management (2009), they support the use of a diet that is low in total fat, saturated fat, and kilocalories to promote healthy weight loss and treat obesity.

The nutrition objective of the Office of Disease Prevention and Health Promotion’s Healthy People 2020 (2014) is to “promote health and reduce chronic disease risk through the consumption of healthful diets and achievement and maintenance of healthy body weights”. This promotes doing so through an increased consumption of whole grains, vegetables, low-fat or fat-free milk or milk products, fruits, and lean meats or other protein sources. Also, this states that it is important to limit saturated fats, trans fats, cholesterol, added sugars, and sodium. Individuals caloric intake should meet but not exceed their energy needs.

**Current Dietary Intake and Rationale for American’s**

Salty snack foods, processed foods, and lack of fruits and vegetables all contribute diets that are high in sodium, kilocalories, and fat. These diets also tend to be low in fiber. The average adult male consumes about 2638 kilocalories per day and the average adult female consumes about 1785 kilocalories per day (USDA, 2008). The recommendation however states that the average adult male should be consuming 2200 kilocalories and the average female 1800 kilocalories (USDA, 2010) The recommended dietary intake of fiber for adult males is 38 grams and for females it is 25 grams (USDA,
Despite this recommendation, the average adult male consumes only about 18 grams of fiber per day and the average adult female consumes only about 14 grams of fiber per day (NHANES, 2003-2006). The NHANES survey also estimated that the average adult consumes about 3.4 grams of sodium daily (NHANES, 2003-2006), which is above the American Heart Association’s (2010) recommendation of 1.5 grams per day. The 2005-2006 NHANES survey found that estimated daily protein has increased to about 70 grams per day for females and 102 grams per day for males, which exceeds the recommended intake of 56 grams for males and 46 grams for females (USDA, 2010).

The 2005-2006 NHANES survey found that Americans were consuming about 33% of their daily kilocalories from fat and about 11% from saturated fat (USDA, 2008). This is well over the recommendation from the American Heart Association (2010) that saturated fat should contribute to less than seven percent of daily caloric intake. The American Heart Association (2010) recommends keeping percent kilocalories from fat to around 25–35 percent, therefore, American’s are generally within the higher half of this range.

**Dietary habits.** Snacking has increased in adults over the last 30 years and results in higher daily caloric consumption (Piernas & Popkin, 2010; Sebastian, Enns, & Goldman, 2011). However, the frequency of daily snacking does not relate to weight status (Sebastian, Enns, & Goldman, 2011). Top foods snacked on include: alcoholic beverages, sugar-sweetened beverages, savory snacks (chips, pretzels, crackers, etc.), candies, cakes, pastries, pies, fruits, fruit juice, dairy desserts, nuts, seeds, cookies, and
milk (Sebastian, Enns, & Goldman, 2011). Pierna’s and Popkins (2010) found that the top five foods that contributed to the most kilocalories were desserts, salty snacks, other snacks, sweetened beverages and juice. However, in a study conducted by Zizza & Beibei (2012) it was found that snacking was associated with a more nutrient dense diet.

Other daily dietary habits are associated with weight status. In a study done by Gore, Foster, DiLillo, Kirk, and Smith (2003), they found that participants consumed on average 9.1 meals in front of the TV per week. Studies have linked watching TV while eating has results in overconsumption and a larger quantity of food is consumed compared to those who do not snack in front of the TV (Gore, Foster, DiLillo, Kirk, & Smith, 2003; Thomson, Spence, Raine, & Laing, 2008). Mattes (2002), found that those who spent more time preparing meals are able to better control the nutrient content of their meals, resulting in a healthier weight compared to those who spend less time and consume mainly already prepared meals.

**Overconsumption and portion control.** Lack of portion control can lead to overconsumption of food. Many studies suggest that young adults have trouble in estimating portion size and tend to overestimate the size of portions (American Dietetic Association, 2009; Bryant & Dundes, 2005; Byrd-Bredbenner & Schwartz, 2004; Schwartz & Byrd-Bredbenner, 2006). One possible factor as to why overconsumption seems to be on the rise is that the sizes of food items are increasing (American Dietetic Association, 2009; Young & Nestle, 2003). Environmental factors such as plate size, packaging size, and convenience of foods also influence portion sizes (Wansink, 2010).
This in turn could make college students a more vulnerable population because of the high availability of convenience foods offered on campus. As portion size increases kilocalorie consumption increases as well (Diliberti, Bordi, Conklin, Roe, & Rolls, 2004; Rolls, Roe, & Meengs, 2007). As a result of this issue with portion control, the USDA switched from the food pyramid to “MyPlate” which helps consumers visualize portion sizes of foods (USDA, 2011).

A strategy used in obesity intervention programs focuses on decreasing portion size in order to consume fewer kilocalories (American Dietetic Association, 2009). One study found that decreasing the size of candy being served to young adults resulted in a lower caloric intake (Marchiori, Waroquier, & Klein, 2011). Teaching consumers on typical serving sizes can also help in decreasing the chance of portion distortion (American Dietetic Association, 2009; Byrd-Bredbenner & Schwartz, 2004). The American Dietetic Association (2009) states in their Evidence Analysis Library that, “Portion control should be included as part of a comprehensive weight management program. Portion control at meals and snacks results in reduced energy intake and weight loss”

**Influences on dietary intake.** The eating environment influences dietary intake at both a macro-level and micro-level (Wansink & Sobal, 2007). The micro-level is what is in control of the consumer. The Academy of Nutrition and Dietetics position paper on Total Diet Approach to Healthy Eating (2013) states that the environment includes “distractions that can reduce a person’s tendency to self monitor or stop eating”. In
today’s society distractions are increased from electronics and the shift to a multitasking society. Studies have shown that watching TV while snacking has resulted in an increase in total kilocalories, increase in fat consumption, and an increase in snack frequency compared to those who do not snack in front of the TV (Gore, Foster, DiLillo, Kirk, & Smith, 2003; Thomson, Spence, Raine, & Laing, 2008).

The macro-level is not as easily controlled by the consumer and consists of marketing of food and governmental regulations (Wansink & Sobal, 2007). The American Dietetic Association’s Position Paper on weight management (2009) mentions that packaging, dinnerware, and serving utensils have all increased in size over the years which influence an increase in dietary intake. Serving sizes of restaurant foods and “marketplace portions” are often much larger than that recommended by the USDA and result in consumers having trouble in determining proper portion sizes, leading to overconsumption (Shwartz & Byrd-Bredbenner, 2006; Young & Nestle, 2003). The Office of Disease Prevention and Health Promotion’s Healthy People 2020 (2014) is an initiative that includes a focus on helping to improve nutrition policies and these environmental factors to promote healthier dietary choices.

Emotions and boredom also influence dietary intake. The Academy of Nutrition and Dietetics’ position paper on the Total Diet Approach to Healthy Eating (2014) states eliminating the sense of guilt and anxiety that is often tied to high calorie foods can help to decrease overconsumption of those foods; these feelings can trigger a loss of control in people often resulting in binge eating. One study found that college students reported
eating as a result of boredom and stress as one of the main barriers to them following a healthful diet (Nelson, Kocos, Lytle, & Perry, 2009).

**MyPlate Recommendations.** MyPlate was released in 2011 to help the general population better understand the USDA’s 2010 Dietary Guidelines for Americans (USDA, 2014). MyPlate is an icon that shows how a typical meal can incorporate a balance of food groups with healthy serving sizes for each group. MyPlate differs from the USDA’s original food guide pyramid in that it helps consumer visualize appropriate portion sizes of food groups. The icon emphasizes half of the plate as fruits and vegetables, about a quarter of the plate as grains, about a quarter of the plate as protein, and the addition of dairy to the meal as well (USDA, 2014). It was created to help promote healthy eating habits to combat the rise in chronic disease and obesity in Americans (USDA, 2014).

**College Students Eating Habits.** Many college students are leaving home and becoming more independent at this time; therefore, college years are a critical period in establishing health behaviors and habits (Kelly, Mazzeo, & Bean, 2013; Vankim & Nelson, 2013). Kelly, Mazzeo, & Bean (2013) had found that overall college students have poor nutrition. This poor nutrition is linked the majority developing unhealthy eating behaviors such as skipping meals and snacking on energy dense foods (Choi & Lee, 2012; Spanos & Hankey, 2010). Driskell, Kim, and Goebel (2005) found that a majority of college students snack on chips or sweets. Huang et al. (2003) found regular soda as the most consumed beverage in this population; however, a more recent study has
shown the percent of students consuming regular soda appears to be slightly declining (Driskell, Kim, and Goebel, 2005). Another study found that about half of the college students sampled tended to consume the entire meal they order when eating at fast food restaurants and did not take portion sizes into consideration (Driskell, Meckna, & Scales, 2006). Overall, this population has a tendency to over consume foods high in fat, saturated fat, and kilocalories (Huang et al., 2003).

**Specific Nutrition Counseling Techniques: Mindful eating**

**Definition of Mindful Eating**

Mindful eating is “eating more consciously so you can just eat enough to be satisfied—without eating too much or too little” (Albers, 2012).

**History of Mindfulness in the Healthcare Setting**

Dr. Jon Kabat-Zinn was one of original people that brought mindfulness practice into medical care and clinical research with the publication of his book “Full Catastrophe Living: Using the Wisdom of Your Body and Mind to Face Stress, Pain, and Illness” in 1990 (Albers, 2012). Albers (2012), states that mindfulness differs from cognitive behavioral therapy because “With mindfulness you do not replace the thought or try to get rid of it. Instead, you become aware of this thought and accept the thought as it is.” Baer (2003) conducted a conceptual and empirical review on mindfulness on clinical intervention and found that it may help to improve mental health issues. Baer found mindfulness to be used in stress reduction, the treatment of borderline personality disorder, relapse prevention, treatment of chronic pain, and treatment of anxiety.
Davidson et al. (2003), found that a short program in mindfulness meditation improved immune function. Mindfulness has also been found successful in quality of treatment in those with type 2 diabetes mellitus because of its ability to decrease depression, anxiety, and physiological distress (Rosenzweig et al., 2007; von Son, Nyklicek, Pop, & Pouwer, 2011). Rosenzweig et al. (2007) also noted a significant decrease in hemoglobin A1c levels in the mindful group. Mindfulness practice in the clinical setting is a relatively new area that is starting to grow in research.

**Principles**

The term “mindful eating” describes a behavior of eating that accompanies many different principles. Mathieu (2009), describes the principles of mindful eating that registered dietitians should be aware of if incorporating this technique into their counseling sessions. According to Mathieu (2009), these principles are: slowing down, paying attention to the body’s hunger cues, acknowledging the difference between emotional and physical hunger, eliminating distractions from the eating environment, reflecting on how food helps to nourish the body and utilizing all of the senses. Albers (2012) describes very similar principles in her book *Eating Mindfully*. Some unique principles that Albers addresses include: savoring the food, discovering any emotional triggers related to food, being aware of what your body is doing at all times when eating, not restricting food, and not categorizing food as “good” or “bad”.

The purpose of mindful eating is to make the body more aware of hunger cues (Mathieu, 2009). By being aware, one is able to focus a variety of issues involved with
over eating. One of these is being able to distinguish if eating is done out of boredom, stress, or emotions versus real hunger (Mathieu, 2009). Another is being able better control portion size and not continue to consume food after the body signals that it is full (Wansink, 2010). This can result in an efficient way to reduce caloric intake and help in both weight loss and management. It does not eliminate foods, but does create awareness of what the purpose of eating is for, nourishing the body (Albers, 2012). This can help to eliminate some of the emotions strongly tied to consuming unhealthy foods (Albers, 2012; Mathieu, 2009). In the Academy of Nutrition and Dietetics position paper on Total Diet Approach to Healthy Eating (2013), they emphasize the need of to educate that food cannot be classified as “good” or “bad” but rather to look at its overall role in a more abstract way; this is consistent to mindful eating principles.

**Success of Mindful Eating in Counseling**

Nutrition counseling that utilizes the mindful eating technique has been shown to be successful in behavioral change for a variety of populations. In one qualitative study by Cadwell, Baime, and Woleverm (2012), mindful eating in a weight loss and weight management program was widely accepted by participants and viewed as a positive way for them to create internal goals and motivation to improve for their own health. A pilot study, that was similar in that it used mindfulness for weight loss in obese individuals, found that the program resulted in significant weight loss among all participants (Dalen et al., 2010). Studies with programs that targeted obese participants with Binge Eating Disorder were successful in reducing the number of binges, however there was no
significant changes in weight (Kristeller & Hallett, 1999; Smith, Shelly, Leahigh, & Vanleit, 2006). Another study focusing on weight loss and management in women was successful in significantly reducing weight, caloric intake, and fat intake (Timmerman & Brown, 2012).

Positive findings outside of weight loss are also associated with mindful eating practices. One study also found that the mindful eating program was successful in decreasing C-reactive proteins, an inflammation marker associated with cardiovascular disease (Dalen, et al. 2010). Mindfulness programs that focus on the constructs of the Social Cognitive theory were successful in improving self-efficacy and promoting weight change (Cadwell, Baime, & Woleverm, 2012; Rott, Seaborn, Schidt, Tafalla, Pejsa, & Evers, 2008; Timmerman & Brown, 2012). Mindfulness interventions related to binge eating help to decrease depression and anxiety, while increasing self-acceptance (Smith, Shelly, Leahigh, & Vanleit, 2006). Another program was successful in reducing caloric and fat intake in those who frequently consume meals from restaurants (Timmerman & Brown, 2012).

**Challenges of Mindful Eating in Counseling**

Due to the fact that mindful eating research has started to grow within the last couple of decades, there are some challenges that still have to be addressed in order to improve research quality. One empirical study looked at mindfulness interventions to determine how many of those measured clinical outcomes. Of the 94 studies that they reviewed 24 of the studies measured clinical outcomes (Vettese, Toneatto, Stea, Nguyen,
This empirical study noted that challenges to mindful eating included: incomplete data in daily diaries, lack of practice compliance data, and few studies came up with a way to quantitatively measure mindfulness. Cadwell, Baime, and Woleverm (2012) found that there were a large variety of techniques used to practice mindful eating and that each participant had varying preferences as to which ones worked best for them. According to Vettese, Toneatto, Stea, Nguyen, and Wang (2009), mindfulness is “a relatively young intervention and, correspondingly, in an early stage of development methodologically.”
CHAPTER III

METHODOLOGY

Design

The purpose of this study is to determine whether a 15 minute mindful eating group intervention for college students has an impact on the nutrient intake and amount consumed of snack foods during a movie. The study was a non-experimental, post-test, comparative design. Quantitative data was gathered. The independent variable was exposure to a 15 minute mindful eating intervention. The dependent variables were the macronutrients, sodium, fat and amounts of food consumed. The control group was not exposed to any mindful eating principles prior to data collection. The treatment group received a brief overview of mindful eating principles prior to data collection. Students self selected the date they wanted to participate in the study. They were unaware this determined if they would be in the treatment or control group. Each group alternated between treatment and control. This study was approved by the Institutional Review Board at Kent State University. Deception was used and will be later described in the methodology section.

Sample

Participants in the study were Kent State University students. An advertisement was place on Kent State University’s Flashline announcement page, placed around campus, and handed out in freshman FYE classes. The only inclusion criterion was that participants must be students at Kent State University. The only exclusion criterion was
that the participants cannot have any self-reported food allergies. In recruitment for the sample, it was stated that those with allergies would not be able to participate in the study.

**Instruments of Measure**

**Survey**

A survey was distributed during the intervention to collect data on gender, ethnicity, age, degree major, class standing, weight, height, and which group they are participating in (Appendix A). Each survey was assigned a number specific to that person to allow for anonymity. Attached to the surveys were four tickets with same participant number on it in addition to a tray number. This number combination was used to mark each tray so that it could be linked back to the participant’s information. The participants were told that additional tickets would be given if they wanted additional trays after the fourth.

Attached to each survey was also an additional questionnaire that related to the group activity. Data was not collected from any of these. The treatment group’s questionnaire served the purpose of reinforcing mindful eating principles and encouraging them to think about the senses and how they relate to the food item (Appendix B). The control group’s questionnaire focused on items not related to mindful eating; this allowed the control group to participate in a brief 15 minute activity before data collection (Appendix C).
Photography

Food selection, serving sizes and plate waste was measured using a digital photography method. This digital photography method is considered to be accurate in measuring food amounts in comparison to weighing foods on a scale and allowed for the line to move more quickly (Wiliamson et al., 2007). A camera was placed at a fixed angle and distance that was consistent for all data collection days (Figure 1). Trays were placed in the same marked location on the table to allow for a standardized comparison. Plates were photographed immediately after food was selected and placed on the tray. The trays were photographed again before disposal. The trays were marked with the designated ticket that was distributed with the survey (Figure 2). If the participant chose to take more food, the previous tray was photographed and discarded and a new tray was taken. The new tray displayed a new ticket so that the tray could be distinguished and the process repeated.

*Figure 1. Digital Photography Method Set-Up*
Snacks were provided based on Pierna’s and Popkins (2010) finding that the top five foods that contributed to the most kilocalories were desserts, salty snacks, other snacks, sweetened beverages, and juice. Healthier options were available as well to see if mindful eating would affect the snack foods chosen for the movie. Foods groupings available were fruits, vegetables, high fat dips, low fat dips, candy, chips and pretzels, popcorn, sugar sweetened beverages, artificially sweetened beverages, and water. Foods were labeled with their name and set out so that portions were self-selected by the participants (Figures 3 and 4). There were no single serve items. Large containers and serving utensils were used so that they did not feel limited to taking a certain amount. These container sizes were similar in size for all of the like items. Foods and beverages offered were the same for all groups and were filled at that start of each study. Extra were available in case refills were needed. Chilled beverages were served in two liter bottles so that the participants poured their selected amounts into their 20 ounce glasses (Figure 3). No ice was used to avoid measurement errors. All plates, cups, bowls,
serving utensils and eating utensils were consistent between the groups to avoid influencing portion sizes.

*Figure 3. Display of Foods and Beverages*

*Figure 4. Foods Clearly Labeled and Served in Similar Style*

The movie chosen was a popular newer release. The theme was not food oriented. The genre was comedy to avoid any negative emotions that may influence eating. The same movie was played for all groups.
Deception

Deception was used and the participants were told that the main focus of the intervention was to evaluate movie theater food items. The terms mindful eating, nutrition, and health were not mentioned to either group. The purpose of the deception was to avoid mentioning nutrition counseling to the participants. This helped to eliminate the possibility of them choosing healthier or less foods than they normally would due to the food being measured in relation to nutrition. They were asked to fill out mock surveys; the data from the surveys were not collected. The treatment group’s mock survey reinforced mindful eating principles. The control group’s survey served as a brief activity.

After the movie was over, participants were asked to place their trays on a designated table and not to throw away any items so that end data could be collected. They then returned to their seats and were debriefed about the deception that was used in the study. They were informed that the true main purpose of the study was to assess the effectiveness of mindful eating immediately following the intervention. Any questions were answered and further information on the topic of mindful eating used in nutrition counseling was given. They were notified that they could withdraw from the study if they wished, but by leaving the room they were providing their consent for the data gathered to be used and evaluated. No identifying information was provided on any of the questionnaires or photographs.
Procedures

The procedures for the control and treatment group were the same, with the exception of the intervention material. The sample of 28 students was broken up into four smaller groups of students that participated on four different dates. This group size allowed plenty of space to easily leave one’s seat; this was important so that participants could easily access the food provided. The study took place in room 104 Nixson Hall on Kent State University’s campus on a Sunday afternoon for all groups.

All groups were asked to fill out a survey with basic background information at the start of the study. After the surveys were completed, both groups participated in a 15 minute activity titled “Marketing of Foods”. The content of the activity differed between the treatment and control group. Once the activity was completed, participants were given the option to self-select foods that were provided for them and to stay for a movie. The movie allowed for there to be a time period after the intervention that food intake could be measured and estimated. Snack foods were selected based off of popular items that range in nutrient composition. Participants were informed that they could take as much food as they wanted and there was no limit to the number of trays allowed.

The control group’s activity focused on the packaging and pricing of ice cream. A picture of ice cream was shown on the screen and no principles associated with mindful eating were discussed (Appendix D). During this time, participants were asked to fill out a brief questionnaire relating to this product. The data collected from this
questionnaire was not used. The purpose of this questionnaire was so that both groups participated in a 15 minute activity before data collection.

The treatment group’s presentation focused on the basic principles of mindful eating. They were given dark chocolate to sample and were walked through a brief exercise related to using all of the senses while eating (Appendix E). During this intervention, the mindful eating principle of often being distracted by a movie and not focusing on the food that is being eaten while watching a movie was discussed. Following this participants were asked to fill out a questionnaire related to mindful eating and the senses. This data was not used, but its purpose was to reinforce the mindful principles that were reviewed.

**Data Analysis**

Plate consumption was measured using a digital photography method (Williamson et al., 2007). Two people analyzed the amounts of food on 20 randomly chosen photographs to determine estimated amounts and compare for accuracy. Accuracy in estimates of food amounts was measured using Cronbach’s SPSS. The remaining photographs were analyzed by one of the two people. The consumption amount for each item was determined by subtracting the unconsumed amount on plate from the initial amount taken. Then, a nutrient analysis was conducted to calculate total fat, saturated fat, trans fat, kilocalories, percent kilocalories from fat, percent kilocalories from saturated fat, protein, carbohydrates, fiber and sodium consumed using Food Processor SQL. The amounts consumed for each grouping of food were estimated as
well to determine the servings consumed. Groupings were fruit, vegetables, high fat dip, low fat dip, chips and pretzels, popcorn, candy, sugar sweetened beverages, artificially sweetened beverages, and water.

Data were analyzed using SPSS software. An independent t-test was used to compare each variable for significance. Significant data were required to have a \( p \) value of \( \leq 0.05 \). Variables included amounts in determined categories of food and each specific nutrient selected.
CHAPTER IV
JOURNAL ARTICLE

Introduction

According to the Center for Disease Control and Prevention (2013), unhealthy eating behaviors increase the risk of chronic illnesses such as type 2 diabetes, hypertension, cardiovascular disease, stroke, certain cancers, osteoporosis and obesity. A major contributor of poor diet quality is overconsumption and portion control which results in excessive caloric intake (American Dietetic Association, 2009). This issue is linked to factors such as the environment, outside distractions while eating, emotions, boredom and an increase in caloric intake from snacking (Gore, Foster, DiLillo, Kirk, & Smith, 2003; Nelson, Kocos, Lytle, & Perry, 2009; Piernas & Popkin, 2010; Sebastian, Enns, & Goldman, 2011; Thomson Spence, Paine, & Lange, 2008). Group counseling delivered to community members can help to promote large scale changes related to these factors (Gucciardi, DeMelo, Lee, & Grace, 2007; Kalavainen, Korppi, & Nuutinen, 2007; Renjilian et al., 2001; Rigsby, Gropper, & Gropper, 2009).

College years are a critical period in establishing health behaviors and habits because most college students are leaving home and becoming more independent at this time (Kelly, Mazzeo, & Bean, 2013; Vankim & Nelson, 2013). Studies have shown that young adults have portion distortion and tend to consume too large of quantities of food at one sitting (Bryant & Dundes, 2005; Marchiori, Waroquier, & Klein, 2011; Schwartz & Byrd-Bredbenner, 2006). They also appear to develop unhealthy eating behaviors such
as skipping meals and snacking on energy dense foods (Spanos & Hankey, 2010). Overall, this population has a tendency to over consume foods high in fat, saturated fat, and kilocalories (Huang et al., 2003). In the Surgeon General’s National Prevention Strategy on Healthy Eating (2010), colleges and universities are mentioned as one of the settings that can promote nutrition changes for the population; one specific recommendation that is made is to “help people recognize and make healthy food and beverage choices”. One intervention that may help to make this change is mindful eating which has been shown to be effective in reducing portion size (Cadewell, Baime, & Wolever, 2012; Timmerman & Brown, 2012; Wansink, 2010). This intervention strategy focuses on the body’s internal hunger cues, helping one to manage outside environmental influences on portion control (Albers, 2012).

Mindfulness is a counseling technique that recent research has started to focus on in the clinical setting (Baer, 2003; Davidson et al., 2003; Rosenzweig et al., 2007; von Son, Nyklicek, Pop, & Power, 2011). Albers (2012), mentions how mindfulness is very similar to the cognitive behavioral theory and that they differ in that mindfulness focuses on the acceptance of one’s thoughts. The cognitive behavioral theory is a commonly used behavior change theory in nutrition programs and has been associated with positive outcomes according to the Academy of Nutrition and Dietetics Evidence Analysis Library (2013).

“Mindful eating” is a counseling technique that is practiced by slowing down while eating, paying attention to the bodies hunger cues, acknowledging the difference
between emotional and physical hunger, eliminating outside distractions, and utilizing all of the senses; the aim of this method is to reduce portion sizes and eliminate the sense of guilt that can be tied to eating (Albers, 2012; Mathieu, 2009). Recent studies have shown success in the use of mindful eating (Dalen et al., 2012; Timmerman & Brown, 2012; Vettese, Toneatto, Stea, Nguyen, & Wang, 2009). However, many studies lack quantitative measures and the methodology development is continuing to undergo changes as studies evolve (Vettese, Toneatto, Stea, Nguyen, & Wang, 2009).

Mindful eating is an emerging area in research and more studies are needed to determine its effectiveness in modifying eating behaviors (Vettese, Toneatto, Stea, Nguyen, & Wang, 2009). Research has shown that the use of mindful eating in counseling is widely accepted by participants and is often delivered through group interventions (Cadewell, Baime, and Wolverman, 2012; Dalen, et al., 2010; Timmerman & Brown, 2012). There is yet to be research on the immediate effects of mindful eating and very little research looks at the use of mindful eating with the general college student population. An online weight prevention program for first year university students used a mindful eating activity as part of their study, however mindful eating’s direct impact on the results was not measured (Gow, Trace, & Mazzeo, 2010). The purpose of this study is to determine whether a 15 minute mindful eating group intervention for college students has an impact on the nutrient intake and amount consumed of snack foods during a movie. It is hypothesized that college students who participate in the mindful eating group intervention will consume different serving amounts of snack groupings from the
snack foods provided compared to those in the control group. It is also hypothesized that college students who participate in the mindful eating group intervention will consume a different amount of macronutrients, kilocalories, and sodium from the snack foods provided compared to those in the control group.

**Methodology**

The study was a non-experimental, post-test only, quantitative, comparative design and was approved by the Institutional Review Board at Kent State University. Deception was used and the participants were told that the main focus of the intervention was to evaluate movie theater food items. The terms mindful eating, nutrition, and health were not mentioned. The purpose of the deception was to avoid any biased food choices related to the topic. Participants were grouped in either the control or treatment group. The control group was not exposed to any mindful eating principles prior to data collection. The treatment group received a brief overview of mindful eating principles prior to data collection.

**Participants**

Participants in the study were Kent State University students. An advertisement was placed on Kent State University’s Flashline announcement page, placed around campus, and handed out in freshman FYE classes. The only inclusion criterion was that participants must be students at Kent State University. The only exclusion criterion was that the participants cannot have any food self-reported allergies. In recruitment for the sample, it was stated that those with allergies would not be able to participate in the
study. The participants were split into four smaller sections. The sections were not randomly selected because of the need to balance the trials. The sections alternated between the control and treatment group.

**Intervention**

The procedures for the control and treatment group were the same, with the exception of the intervention material. The sample of 28 students was broken up into four smaller groups of students that participated on four different dates. This group size allowed plenty of space to easily leave one’s seat; this was important so that participants could easily access the food provided. The study took place in room 104 Nixson Hall on Kent State University’s campus on a Sunday afternoon for all groups.

All groups were asked to fill out a survey with basic background information at the start of the study (Appendix A). After the surveys were completed, both groups participated in a 15 minute activity titled “Marketing of Foods”. The content of the activity differed between the treatment and control group. Once the activity was completed, participants were given the option to self-select foods that were provided for them and to stay for a movie. The movie allowed for there to be a time period after the intervention that food intake could be measured and estimated. Snack foods were selected based off of popular items that range in nutrient composition. Participants were informed that they could take as much food as they wanted and there was no limit to the number of trays allowed.
The control group’s activity focused on the packaging and pricing of ice cream. A picture of ice cream was shown on the screen and no principles associated with mindful eating were discussed (Appendix D). During this time, participants were asked to fill out a brief questionnaire relating to this product (Appendix B). The data collected from this questionnaire was not used. The purpose of this questionnaire was so that both groups participated in a 15 minute activity before data collection.

The treatment group’s presentation focused on the basic principles of mindful eating. They were given dark chocolate to sample and were walked through a brief exercise related to using all of the senses while eating (Appendix E). During this intervention, the mindful eating principle of often being distracted by a movie and not focusing on the food that is being eaten while watching a movie was discussed. Following this participants were asked to fill out a questionnaire related to mindful eating and the senses (Appendix C). This data was not used, but its purpose was to reinforce the mindful principles that were reviewed.

**Instruments of Measure**

**Survey.** A survey was distributed during the intervention to collect data on gender, ethnicity, age, degree major, class standing, weight, height, and which group they are participating in (Appendix A). Each survey was assigned a number specific to that person to allow for anonymity. Attached to the surveys were four tickets with same participant number on it in addition to a tray number. This number combination was used to mark each tray so that it could be linked back to the participant’s information. The
participants were told that additional tickets would be given if they wanted additional trays after the fourth.

Attached to each survey was also an additional questionnaire that related to the group activity. Data was not collected from any of these. The treatment group’s questionnaire served the purpose of reinforcing mindful eating principles and encouraging them to think about the senses and how they relate to the food item (Appendix B). The control group’s questionnaire focused on items not related to mindful eating; this allowed the control group to participate in a brief 15 minute activity before data collection (Appendix C).

**Photography.** Food selection, serving sizes and plate waste was measured using a digital photography method. This digital photography method is considered to be accurate in measuring food amounts in comparison to weighing foods on a scale and allowed for the line to move more quickly (Williamson et al., 2007). A camera was placed at a fixed angle and distance that was consistent for all studies (Figure 1). Photographs were taken before and after the consumption of each tray. Figure 2 shows an example of a photographed tray.
Figure 1. Digital Photography Method Set-Up

Figure 2. Sample Tray

Materials

Snacks were provided based on Pierna’s and Popkins (2010) finding that the top five foods that contributed to the most kilocalories were desserts, salty snacks, other snacks, sweetened beverages, and juice. Healthier options were available as well to see if mindful eating would affect the snack foods chosen for the movie. Foods available were fruits, vegetables, high fat dips, low fat dips, candy, popcorn, chips and pretzels, sugar sweetened beverages, artificially sweetened beverages, and water.
Foods were labeled with their name and set out so that portions will be self-selected by the participants (Figures 3 and 4). There were no single serve items. Large containers and serving utensils were used so that they did not feel limited to taking a certain amount. These container sizes were similar in size for all of the like items. Foods and beverages offered were the same for all groups and were filled at that start of each study. Extra were available in case refills were needed. Chilled beverages were served in two liter bottles so that the participants poured their selected amounts into their 20 ounce glasses (Figure 3). No ice was used to avoid measurement errors. All plates, cups, bowls, serving utensils and eating utensils were consistent between the groups to avoid influencing portion sizes.

*Figure 3. Display of Foods and Beverages*
The movie chosen was a popular newer release. The theme was not food oriented. The genre was comedy to avoid any negative emotions that may influence eating. The same movie was played for all groups.

**Data Analysis**

Plate consumption was measured using a digital photography method (Williamson et al., 2007). Two people analyzed the amounts of food on 20 randomly chosen photographs to determine estimated amounts and compare for accuracy. Accuracy in estimates of food amounts was measured using Cronbach’s SPSS. The remaining photographs were analyzed by one of the two people. The consumption amount for each item was determined by subtracting the unconsumed amount on plate from the initial amount taken. Then, a nutrient analysis was conducted to calculate total fat, saturated fat, trans fat, kilocalories, percent kilocalories from fat, percent kilocalories from saturated fat, protein, carbohydrates, fiber and sodium consumed using Food Processor SQL. The amounts consumed for each grouping of food were estimated as
well to determine the servings consumed. Groupings were fruit, vegetables, high fat dip, low fat dip, chips and pretzels, popcorn, candy, sugar sweetened beverages, artificially sweetened beverages, and water.

Data was analyzed using SPSS software. An independent t-test was used to compare each variable for significance. Significant data was required to have a $p$ value of $\leq 0.05$. Variables included amounts in determined categories of food and each specific nutrient selected.

**Results**

Table 1 shows the demographics of the population of students sampled. A total of 29 students participated in the study, but only 28 were recorded due to incomplete data on one of the participants. The mean age of participants was 28 years with a standard deviation of 5.18. The mean BMI of participants was 27 with a standard deviation of 6.88. Comparison in food consumption between genders had no significant difference in results. Therefore, the male and female participant data was pooled into either the treatment or control group. The male participants were divided between the groups; two male participants were in the treatment group and three male participants were in the control group. Overall, the treatment group had 15 participants and the control group had 13 participants.
Table 1

*Demographics of College Students Participating in Mindful Eating Study (n=28)*

<table>
<thead>
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<th>Demographic Variable</th>
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<td><strong>Ethnicity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Caucasian</td>
<td>14</td>
<td>50.0</td>
</tr>
<tr>
<td>African American</td>
<td>7</td>
<td>25.0</td>
</tr>
<tr>
<td>Hispanic</td>
<td>1</td>
<td>3.6</td>
</tr>
<tr>
<td>Asian</td>
<td>6</td>
<td>21.4</td>
</tr>
<tr>
<td><strong>Major College</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>College of Arts</td>
<td>7</td>
<td>25.0</td>
</tr>
<tr>
<td>College of Arts/Sciences</td>
<td>9</td>
<td>32.1</td>
</tr>
<tr>
<td>College of Communication &amp; Information</td>
<td>2</td>
<td>7.1</td>
</tr>
<tr>
<td>College of Education, Health, and Human Services</td>
<td>6</td>
<td>21.4</td>
</tr>
<tr>
<td>College of Business Administration</td>
<td>3</td>
<td>10.7</td>
</tr>
<tr>
<td>Undecided</td>
<td>1</td>
<td>3.6</td>
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<tr>
<td><strong>Class Standing</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Freshman</td>
<td>13</td>
<td>46.4</td>
</tr>
<tr>
<td>Sophomore</td>
<td>6</td>
<td>21.4</td>
</tr>
<tr>
<td>Junior</td>
<td>2</td>
<td>7.1</td>
</tr>
<tr>
<td>Senior</td>
<td>5</td>
<td>17.9</td>
</tr>
<tr>
<td>Graduate</td>
<td>2</td>
<td>7.1</td>
</tr>
</tbody>
</table>
Table 2 shows the comparison of the mean consumption of macronutrients and sodium between groups. The treatment group consumed significantly ($p \leq 0.05$) lower amounts of kilocalories, protein, carbohydrates, fat, and saturated fat compared to the control group. There was no significant difference ($p > 0.05$) in fiber, sodium, trans fat, percent kilocalories from fat, and percent kilocalories from saturated fat.

Table 2

*Macronutrients and Sodium Intake Means (and SD) Based on Snack Foods Consumption during Mindful Eating Study, Mindful Eating Group (Treatment) vs. Control Group (Control)*

<table>
<thead>
<tr>
<th>Variables</th>
<th>$\bar{x}$ ± SD Treatment (N=15)</th>
<th>$\bar{x}$ ± SD Control (N=13)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kilocalories</td>
<td>781.93 ± 308.99</td>
<td>1290.81 ± 458.71</td>
<td>0.002*</td>
</tr>
<tr>
<td>Protein (g)</td>
<td>8.67 ± 3.97</td>
<td>13.55 ± 5.93</td>
<td>0.016*</td>
</tr>
<tr>
<td>Carbohydrates (g)</td>
<td>126.00 ± 57.94</td>
<td>214.42 ± 78.77</td>
<td>0.002*</td>
</tr>
<tr>
<td>Fiber (g)</td>
<td>7.04 ± 4.66</td>
<td>10.17 ± 4.09</td>
<td>0.072</td>
</tr>
<tr>
<td>Total Fat (g)</td>
<td>28.91 ± 12.16</td>
<td>46.38 ± 21.60</td>
<td>0.012*</td>
</tr>
<tr>
<td>Saturated Fat (g)</td>
<td>10.53 ± 5.14</td>
<td>16.02 ± 8.15</td>
<td>0.040*</td>
</tr>
<tr>
<td>Trans Fat (g)</td>
<td>0.0513 ± 0.503</td>
<td>0.0546 ± 0.0608</td>
<td>0.877</td>
</tr>
<tr>
<td>Sodium (mg)</td>
<td>988.91 ± 736.48</td>
<td>1643.72 ± 1042.53</td>
<td>0.063</td>
</tr>
<tr>
<td>Percent Kilocalories from Fat</td>
<td>33.73 ± 8.07</td>
<td>31.77 ± 6.74</td>
<td>0.495</td>
</tr>
<tr>
<td>Percent Kilocalories from Saturated Fat</td>
<td>12.07 ± 4.08</td>
<td>10.77 ± 3.09</td>
<td>0.357</td>
</tr>
</tbody>
</table>

*p ≤ 0.05 demonstrates significant difference between the treatment and control group
Table 3 shows the difference in between the types of food chosen between groups. The treatment group consumed significantly \((p \leq 0.05)\) less high fat dip, pretzels and chips, and sugar sweetened beverages. The treatment group also consumed significantly \((p \leq 0.05)\) more artificially sweetened beverages.

Table 3

**Snack Grouping Consumption Means (and SD) during Mindful Eating Study, Mindful Eating Group (Treatment) vs. Control Group (Control)**

<table>
<thead>
<tr>
<th>Snack Grouping</th>
<th>(\bar{x} \pm SD) Treatment (N=15)</th>
<th>(\bar{x} \pm SD) Control (N=13)</th>
<th>(P)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fruit(^1) (cup)</td>
<td>0.567 ± 0.630</td>
<td>0.909 ± 0.836</td>
<td>0.426</td>
</tr>
<tr>
<td>Vegetable(^2) (cup)</td>
<td>0.204 ± 0.378</td>
<td>0.353 ± 0.450</td>
<td>0.546</td>
</tr>
<tr>
<td>Healthy Dip(^3) (tbsp)</td>
<td>2.80 ± 4.71</td>
<td>3.54 ± 3.45</td>
<td>0.795</td>
</tr>
<tr>
<td>High Fat Dip(^4) (tbsp)</td>
<td>2.37 ± 2.46</td>
<td>5.42 ± 5.05</td>
<td>0.048*</td>
</tr>
<tr>
<td>Candy(^5) (cup)</td>
<td>0.386 ± 0.289</td>
<td>0.597 ± 0.347</td>
<td>0.080</td>
</tr>
<tr>
<td>Popcorn(^6) (cup)</td>
<td>1.20 ± 1.10</td>
<td>1.13 ± 0.929</td>
<td>0.849</td>
</tr>
<tr>
<td>Pretzels and Chips(^7) (ounce)</td>
<td>2.64 ± 2.36</td>
<td>4.67 ± 2.81</td>
<td>0.048*</td>
</tr>
<tr>
<td>Sugar Sweetened Beverages(^8) (fluid ounce)</td>
<td>7.60 ± 9.44</td>
<td>21.5 ± 10.6</td>
<td>0.001*</td>
</tr>
<tr>
<td>Artificially Sweetened Beverages(^9) (fluid ounce)</td>
<td>3.53 ± 5.45</td>
<td>0.00 ± 0.00</td>
<td>0.028*</td>
</tr>
<tr>
<td>Water (fluid ounce)</td>
<td>4.60 ± 7.30</td>
<td>6.70 ± 9.78</td>
<td>0.814</td>
</tr>
</tbody>
</table>

* \(p \leq 0.05\) demonstrates significant difference between the control and treatment group
Qualitatively the data showed that the control group tended to take more trays and continue to drink full glasses of sugar sweetened beverages. The higher amounts of saturated fat and total fat in the control group were contributed to the greater servings of high fat dip and chips. Fruits, vegetables, and healthy dip were relatively equal between groups. From this it is concluded that the control group was more likely to consume higher amount of energy dense foods, with the exception of candy in which there was no difference.

**Discussion**

The results of the study confirm that the college students who participated in the mindful eating group intervention consumed significantly different serving sizes as well as significantly different macronutrient consumption; therefore, both research hypotheses were accepted. The control group, who did not participate in the mindful eating activity,
ate significantly more food than the treatment group. The sample population was diverse in ethnicity, age, area of study, gender, and BMI.

**Macronutrients**

Mindful eating may have an immediate impact on food intake. One of the beliefs as to why is that eating consciously may allow for more direct feedback on signaling that the body is full and satisfied. The intervention may have helped for participants to move away from “auto-pilot” eating and translated into a difference in their food selection. The mindful eating group (treatment group) ate significantly less kilocalories, protein, carbohydrates, total fat and saturated fat.

The mean difference in caloric intake was 509 kilocalories between the two groups. If an average adult is consuming 2,000 kilocalories a day, than this difference is about 25 percent of daily calories (USDA, 2010). There was a 17.5 gram mean difference in fat between the two groups and a 5.5 gram mean difference in saturated fat. This reduction is important because Americans often tend to over consume these nutrients. These results are consistent with past research that shows mindful eating reduces both caloric and fat intake (Timmerman & Brown, 2012); they are unique in that it measures the acute outcome of mindful eating and shows that participants may be immediately impacted to decrease consumption of food. Looking at the acute outcome also helped to overcome the challenges in the methodology related to errors in long term self tracking of food consumption (Vettese, Toneatto, Stea, Nguyen, & Wang, 2009).
The methodology of this study can easily be applicable in different settings. Using chocolate in an activity that utilizes all of the senses is a classic tool in mindful eating education and creates a positive experience for those participating in the activity (Albers, 2012; Rott, Seaborn, Schidt, Tafalla, Pejsa, & Evers, 2008). This activity does not mention limiting foods, choosing healthier options, or any other direct form of nutrition education. This activity instead focuses on enjoying the food and being aware of the five senses while eating, which is one principle of mindful eating. Another principle mentioned was being aware that outside distractions can often make it difficult to use all of the senses while eating. By having participants eat intuitively, the treatment group consumed significantly less; this is consistent with the goal of many nutrition interventions that exist.

**Food Groupings**

One concept of mindful eating is being able to better control portion sizes and not continue to consume food after the body signals that it is full (Wansink, 2010). Mindful eating does not eliminate foods but rather focuses on being aware while eating those foods (Albers, 2012). This was demonstrated in food selection between the groups. The mindful eating group (treatment) selected the same food choices as the control group and did not eliminate any food choices based on the intervention. However, the difference in nutrient intake between the groups was a result of the portions selected and consumed, specifically related to energy dense foods. Mindful eating focuses on not limiting foods but rather on portion control of those foods which results in a decrease of caloric intake.
and fat intake (Albers, 2012). This shows that mindful eating is accepting of fitting all foods into a healthy diet; this may help in reducing cravings and binge eating of foods that are often perceived as “bad”.

The control group consumed higher energy dense foods which explain why the macronutrient findings were significantly different in fat, saturated fat, and kilocalories between the groups. The treatment group consumed 2.37 tablespoons of high fat dip on average and control group consumed on average 5.42 tablespoons. The high fat dips offered, which were cheese sauce and French onion dip, contain high amounts of saturated fat which classifies them as empty kilocalories according to MyPlate; empty kilocalorie foods should be kept to a minimum (USDA, 2011). Sugar sweetened beverages, such as soda are also under the category of empty kilocalories.

According to USDA’s MyPlate (2011), a standard serving of soda is 12 fluid ounces and a standard serving of chips or pretzels is 1 ounce. The control group’s mean consumption amount of sugar sweetened beverages was 21.5 fluid ounces which is over the standard serving. The treatment group, however, consumed less than the standard serving size with the mean consumption at 7.60 fluid ounces. The treatment group also consumed artificially sweetened soda, while the control group did not. This also explains the treatment groups significantly less amount of kilocalories and carbohydrates. Both groups consumed more than one serving of chips and pretzels per participant on average; however, the control group ate significantly more servings per participant than the treatment group. This is consistent with studies that have shown that the population
struggles with portion distortion and tends to consume too large of quantities of food at one sitting (Bryant & Dundes, 2005; Marchiori, Waroquier, & Klein, 2011; Schwartz & Byrd-Bredbenner, 2006).

Mindful eating helps combat external environmental influences that often lead to overconsumption and portion control. External influences are often out of participants’ control. The setting of this study took place in an atmosphere where participants were watching a movie while they were eating, which often distracts from the food. Distraction while eating has been shown to lead to overconsumption and portion control (Gore, Foster, DiLillo, Kirtk, & Smith, 2003; Thomson, Spence, Raine, & Lating, 2008). Also, participants were required to select their portion sizes themselves, and were not given recommendations on amounts of items or what items to choose from. The mindful eating group was able to select more appropriate portion sizes despite the environmental factors such as distraction from the movie and self selection of foods. The environment of the study was created to reflect challenges that are faced daily, and the mindful eating group was able to manage these challenges better by decreasing their portion sizes of energy dense foods. Mindful eating also helps to control different influences that can lead to overconsumption and portion control. This shows that mindful eating is a tool that can help consumers manage the outside environmental influences. As healthcare practitioners, there is a need to help give the population both the knowledge and tools needed to combat the challenges they face daily with nutrition related behaviors.
**Limitations**

Limitations existed in this study due to research recently emerging in the area of mindful eating as an intervention used in nutrition counseling. Therefore, the methodology was based off of nutrition studies unrelated to mindful eating. The sample size of this study was low at 28 participants. This shows that there is a need for more studies that are similar to this but on a larger scale. Also, this study focused on the acute outcomes. Long-term studies would be beneficial to determine whether or not this behavior change is retained for longer periods of time.

**Strengths**

The strengths of this study were that it was blinded and the environment was the same for both groups aside from the intervention prior to the experiment. Having the focus of the study on “evaluating movie theater foods” instead of nutrition allowed for participants to be more likely to choose foods based on their usual consumption. It also attracted a wider variety of participants, including those who may be uninterested in nutrition or weight loss in relation to health. By being able to keep outside variables such as food choices, serving utensils, time of day, day of the week, and movie showing consistent between groups it helps to confirm that the difference was a result of the mindful eating intervention. The methodology used in this study addressed past methodology issues such as incomplete data in daily diaries, lack of practice compliance data, and lack of being able to quantify data (Vettese, Toneatto, Stea, Nguyen, & Wang, 2009).
Applications

This style of intervention can be used to reach college students in a variety of ways because it is quick, easily used in a group setting, and effective. Campuses can impact incoming students by incorporating the ideas of health promotion through the use of mindfulness in all activities of daily life, including eating. This brief intervention can be done in dorm presentations, first year experience classes, general healthy lifestyle classes, and even meditation classes at campus wellness centers. It can be taught by a dietitian or a dietitian could train other instructors to promote it.

Dietitians can easily incorporate mindful eating principles outside of the office setting as a way to promote public health. It can be subtly taught and reminded to groups in many different settings. For example, dining halls on campus could display posters with mindful eating messages. TV commercials or internet advertisements could be developed as a form of a public service announcement. Recreation and wellness centers on campus can promote general mindfulness as a way to improve health and, university websites could post brief mindfulness reminders. Mindful eating education is a tool that dietitians can use not only to help in counseling but also a way to subtly impact larger populations.

Education can be provided on mindful eating in different styles. It can be taught directly in individual or group nutrition counseling. It can also be applied in settings as a brief reminder. The message can be short and bring mindfulness principles to the reader’s attention. It could discuss eliminating distractions, focusing on the body’s
hunger cues, recognizing emotional hunger from physical hunger, and paying careful attention to all of the senses while eating food. This style of intervention and education is a positive way to promote behavior changes. It is not about restricting items but rather paying closer attention to the enjoyment from them. Dietitians should be using this tool in practice. There are a large amount of opportunities for research on mindful eating to be conducted in different settings and using different methods.

Future research should build upon this pilot study methodology. There would be benefits to testing the effectiveness of mindfulness on a larger population and for an extended period of time. This study specifically looked at this form of intervention in a college university setting. However, more studies should be done in other settings to see if mindful eating can help overcome portion distortion in a wider population. This mindful eating study focused on the principles of utilizing all of the senses and eliminating distractions while eating. Future studies applying other principles of mindful eating may be beneficial as well.

**Conclusion**

Mindful eating interventions appear to create an acute outcome of decreasing serving sizes of energy dense foods in college students. Mindful eating is a flexible intervention strategy and may be successful in achieving short term outcomes in reduced portion sizes as well as healthier food choices.
APPENDIX A

STUDY QUESTIONNAIRE
APPENDIX A

STUDY QUESTIONNAIRE

Instructions: Please fill out the following information below. All answers will be anonymous and are voluntary.

Date of Birth________________________________________

Major_______________________________________________

Class Standing (Circle One)

Freshman    Sophomore    Junior    Senior    Graduate

Gender (Circle One)

Male    Female

Ethnicity (Circle One)

Caucasian    African-American    Hispanic    Asian    Other___________

Height (Your best estimate)-_____________________________________

Current Weight (Your best estimate)__________________________________

Group #    Participant #
APPENDIX B

TREATMENT GROUP QUESTIONNAIRE
APPENDIX B

TREATMENT GROUP QUESTIONNAIRE

Movie Theater Product Development Survey

*Please answer the following questions after the walk through of tasting the sample product.*

1. How did the product taste to you?

2. Did the product smell the way that you expected it to?

3. Was there anything that you liked about the packaging? (Think about the noise as well as the look)

4. Describe the texture of the product. Did it change as you ate it?

5. What did you like about the product?

6. If sold in a movie theater, how many pieces should be placed in a single serve box that you would feel like you had an adequate amount?
APPENDIX C

CONTROL GROUP QUESTIONNAIRE
APPENDIX C

CONTROL GROUP QUESTIONNAIRE

Movie Theater Product Development Survey

Please answer the following questions based on the product displayed on the screen.

1. What is a reasonable price range to pay for this item?

2. What is your initial reaction to the packaging of this item?

3. What would you change about the packaging?

4. How often do you go to the movies?

5. Would you purchase this item at the movies? (Please give your reason of why or why not)

6. What are your overall feelings about this product?
APPENDIX D

CONTROL GROUP INTERVENTION PRESENTATION
Marketing of Foods

• Please read the instructions and complete the front page of the survey packet
• Once complete, wait for further instructions before starting the second page of the survey
• After the entire survey is completed, we will start the movie and you will be able to select snacks
• Please bring the tickets provided with you when you select your snacks

Please Evaluate the Following Product:

Ben & Jerry’s Single-Serve Chocolate Ice Cream Cup

• Movie theaters are looking to expand products being sold.
• Ice cream is one product that is starting to emerge in the market of movie theater food.
APPENDIX E

TREATMENT GROUP INTERVENTION PRESENTATION
APPENDIX E

TREATMENT GROUP INTERVENTION PRESENTATION

Marketing of Foods

• Please read the instructions and complete the front page of the survey packet
• Once complete, wait for further instructions before starting the second page of the survey
• After the entire survey is completed, we will start the movie and you will be able to select snacks
• Please bring the tickets provided with you when you select your snacks

Movie Theater Snack Quality

Dark Chocolate:
• Hold the piece of candy in the wrapper.
• Pay attention to the shape and the way it looks
• Unwrap the candy, paying attention to the noise of the wrapper
• Before you place the candy in your mouth, notice the aroma if the chocolate as you unwrap it
• When you are ready, let the piece of candy sit on your tongue
• Take your time
• Pay attention to the texture and the way it tastes the entire time that it dissolves in your mouth
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