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# The relationship between sleep and nutrition in message framing among college students

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**THE RELATIONSHIP BETWEEN SLEEP AND NUTRITION  
IN MESSAGE FRAMING AMONG  
COLLEGE STUDENTS**

by

Abbey G. White, B.A., M.A.

A Dissertation Presented in Partial Fulfillment  
of the Requirements for the Degree  
Doctor of Philosophy

COLLEGE OF EDUCATION  
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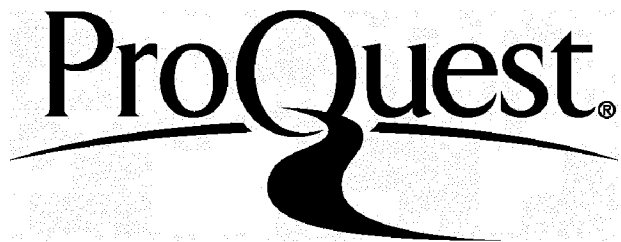
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Date

We hereby recommend that the dissertation prepared under our supervision  
by Abbey G. White

entitled The Relationship Between Sleep and Nutrition in Message Framing Among  
College Students

be accepted in partial fulfillment of the requirements for the Degree of  
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## **ABSTRACT**

The college years are often depicted as a time of immense change, specifically in relation to college students' level of nutrition and sleep quality. However, these health concerns not only impact college students' health but also their academic performance, mood, and as a result their future. The primary purpose of this study was to determine whether technologically enhanced health messages are more effective than the traditional text format for creating healthy behavioral changes amongst college students. Secondly, the study provides the opportunity to examine previous research involving message framing, specifically, regulatory focus theory and self-efficacy, in order to provide further evidence in relation to the most effective way to frame sleep hygiene and nutrition laden information. The "frame" of a health message refers to whether the message emphasizes the benefits of performing a behavior (gain frame) or the costs of not engaging in a specific behavior (loss frame). After reading two framed messages, one related to sleep hygiene and another related to nutrition, participants rated the extent to which they agreed with the messages as well as how persuasive they found the messages to be. Results indicated no significant findings, however, clinical and theoretical implications are discussed, as well as considerations for future research.

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Author Albey White  
Date 7/13/15

## **DEDICATION**

**This dissertation is dedicated to my parents, David and Donna White.**

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## **CHAPTER ONE**

### **INTRODUCTION**

As television sets have become a staple in America's homes, obesity has become a rising health issue. According to Callahan (2013), a link exists between obesity and television viewing. Food and beverage industries and marketing have joined forces and taken advantage of the captivated, sedentary audience at their disposal, spending nearly \$2 billion each year marketing sugary, unhealthy foods (Callahan, 2013). Many of these companies specifically market their unhealthy products to the adolescent population. While "Do the Dew" has become a well-known phrase amongst many Americans, it was specifically designed as a marketing tactic with the teenager in mind (Nelson, Story, Larson, Neumark-Sztainer, & Lytle, 2008). Although health organizations have been slow to create effective advertising campaigns in support of healthy behaviors, the food and beverage industry has quickly seized the opportunity to tantalize teenagers with compelling campaigns in favor of unhealthy behaviors such as "Doing the Dew". While it is easy to point one's finger at the food and beverage industry or perhaps the television network for the growing trend of childhood and adolescent obesity, such accusations neglect the responsibility of the parents, many of whom are suffering from sedentary lifestyles and unhealthy food and beverage consumption (Callahan, 2013). Often, lifelong habits are formed during the childhood and adolescent years (Bandura, 2004). In an effort to create more health awareness in American families, First Lady Michelle



Obama launched a health campaign in 2010 titled “Let’s Move” to address the familial and generational obesity epidemic that threatens the lives of many Americans (Stephenson & Taylor, 2012). Human health and well-being are no longer viewed in isolation or as an individual matter, but rather a social matter that develops early on and requires a community effort (Bandura, 2004).

College students are no exception to the obesity epidemic as obesity continues to thrive on college campuses. The “Freshmen 15” is often considered to be a hallmark statement on many college campuses. This legendary statement refers to the idea that within the first year of college, the typical freshman gains approximately 15 pounds (Holm-Denoma, Joiner, Vohs, & Heatherton, 2008). Levitsky, Halbmaier, & Mrdjenovic (2004) stated that when freshmen in college gain weight, it typically is well above the national average for individuals their age. In a follow-up study, Holm-Denoma and colleagues (2008) provided evidence to support the idea that incoming college students are at risk of gaining weight. Unhealthy diets, lack of exercise, and weight gain are common amongst freshmen and sophomores in college (Racette, Deusinger, Strube, Highstein, & Deusinger, 2005). In addition to sacrificing a healthy diet and exercise, college students also fail to achieve quality sleep, suggesting that college students are in great need of proper health education.

Holm-Denoma and colleagues (2008) found that the average incoming college student will gain, roughly, twice the weight that is expected based on national adult weight gain averages. This substantial weight gain does not generalize to all individuals of that age group; rather, it applies specifically to the college population (Levitsky et al., 2004). Anderson, Shapiro, and Lundgren (2003) found that the majority of this weight

gain occurs within the first semester of college. What is it about the first semester in college that contributes to weight gain? A variety of reasons have been suggested. One reason may be the college environment itself is not conducive to maintaining one's weight. "All you can eat" dining halls have become an alluring staple among college campuses, as they provide students an assortment of food products with just a swipe of a card. Researchers suggest that having easy access to unlimited food may contribute to weight gain (Levitsky et al., 2004). College students are also no longer subjected to a curfew or rules that correlate with proper sleep hygiene such as no television watching while in bed, no eating in bed, no late night eating, or limited caffeine consumption.

Problems arise when it becomes apparent that health information is being distributed to students throughout college campuses, doctor offices, and health forums, yet even with increased knowledge, the unhealthy behaviors remain as continue to struggle with obesity and lack of quality sleep. In order to rectify this growing problem, researchers have begun to explore the relationship between college students' health behaviors and message framing. Proposed as a way of maximizing individuals' intentions to perform a specific behavior, such as maintaining a healthy diet and achieving ample sleep time; message framing has developed into a hot topic within the field of social psychology, marketing, and medicine. Professionals and researchers alike are asking the question, "How can we get people to engage in healthy behaviors?"

The theory of message framing has attained a vast amount of attention in a variety of areas as advertisers are trying to win over consumers and doctors are trying to create compliant patients. Traditionally deemed a social psychological concept, message framing is now gaining recognition within the various fields of psychology including

health psychology and clinical and counseling psychology. Due to its versatility and applicability, message framing has relevance to marketing research. As health concerns and ailments persist, health psychologists seek ways of improving the health of our society. Nonetheless, such an undertaking is often met with opposition due to the fact that unhealthy behaviors often possess reinforcing aspects such as the enjoyment one experiences when consuming sugary foods or the immediate improvement in one's complexion after leaving the tanning bed. Therefore, convincing members of society to exchange unhealthy behaviors for healthy behaviors can be a tedious and daunting task.

### **Statement of the Problem**

Sleep difficulties and weight gain are two problems frequently associated with college students. Previous efforts to improve sleep quality and nutrition among college students have resulted in limited success, thus researchers are now considering other avenues for improving the health of college students. Therefore, it is of utmost importance that researchers learn how to effectively communicate with college students in a way that college students understand and appreciate.

In a broad sense, message framing is now being researched and applied to the college population in order to create behavioral changes that lead to proper physical and mental health among young adults. Considering the relationship that exists between one's physical and mental health and the surge of psychological disorders among college age individuals, it is of value to discover ways of increasing healthy behaviors and decreasing unhealthy behaviors. Specifically, more research is needed on ways to improve nutrition and sleep quality and decrease obesity and sleep disorders in college students.

The financial and health-related consequences of unhealthy eating and substantial weight gain have created a society that is in great need of effective health-promotion interventions. However, creating interventions that lead to healthy changes of behavior is no easy task. Although health professionals have been deemed the experts of what individuals *should* do in order to improve their health, a gap exists between what members of society *should* do and what individuals *actually* do (Marcus, Owen, Forsyth, Cavill, & Fridinger, 1998). The crux of effective health-promotion interventions is that they are designed in a way that leads to the acquisition of healthy behaviors and the avoidance of unhealthy behaviors. Health campaigns are designed with this very purpose in mind. Television, radio, Internet, and smart phones health interventions are no longer limited to direct contact with a health provider (Marcus et al., 1998). Media allows a message to reach a large segment of society at a fraction of the cost accompanying face-to-face services (Marcus et al., 1998). However, mere exposure does not necessarily lead to changes in behavior (Randolph & Viswanath, 2004). While some health campaigns are created to reduce unhealthy behaviors, such as smoking, other health campaigns are designed to encourage healthy behaviors, such as healthy eating.

When creating a health campaign, agencies try to deliver the message so that it will reach the majority of society and lead to behavioral change (Wakefield, Loken, & Hornik, 2010). However, obvious individual differences cannot be ignored. For example, individuals who are visually impaired would benefit from an auditory message, whereas hearing impaired individuals would require a visual presentation. Messages presented in text must be written at a reading level that is appropriate to the targeted audience (Marcus et al., 1998). Health care providers, including physicians, nurses, and therapists should

be sensitive to the extensive dilemma of low literacy among patients and consumers of healthcare, thereby presenting so that advanced reading skills are not required (Pignone, DeWalt, Sheridan, Berkman, & Lohr, 2005). For instance, low-income smokers continue to light up at an alarming rate despite cigarette warning labels and public health announcements (Sindelar & O'Malley, 2014). Research shows that when targeting low-income smokers, financial messages are more effective than health messages concerning smoking. When considering smoking, why do financial laden messages hit home in a way that health messages do not? One possible explanation is the immediacy and certainty associated with financial gains as opposed to health gains (Sindelar & O'Malley, 2014).

While low-income smokers prefer the immediate gratification of nicotine above long-term health benefits of not smoking, appearance also takes precedence over long-term consequences. The emphasis an individual places on one's own appearance impacts health behaviors (Hevey et al., 2010). The media constantly bombards society with pictures of photo-shopped models on the covers of popular magazines with tips on how to lose body fat quickly; thus, it should come as no surprise that we have become a more self-conscious society rather than a health-conscious society. Individuals will at times place their long-term health at risk in order to attain a more beautiful/handsome appearance (Hevey et al., 2010). Specifically, individuals put themselves at greater risk of developing skin cancer by tanning (Hevey et al., 2010). Long-term health is being placed on the back burner as individuals strive to have a darker complexion. Suntans are often related to feeling more attractive, confident, and healthy. While this association is strong, it can be detrimental to those who hold such beliefs (Hevey et al., 2010). Skin

cancer is a growing concern as exposure to UV rays becomes more common (Hevey et al., 2010). Researchers have found that electronic SMS text messages are better received by individuals when the sun protection messages focus on the short-term problems such as sunburn and signs of aging, rather than the long-term effects of sun exposure (Mair et al., 2012).

Enhancing one's physical appearance may seem harmless, perhaps even healthy at times, yet body image contributes to an ultimately unhealthy lifestyle. The Public Body Consciousness scale assesses the degree to which one's appearance is of importance; this variable has been identified as a moderator of message framing in the area of health (Hevey et al., 2010). Body image has emerged as a strong motivating factor in many of the studies investigating weight management and eating disorders, suggesting that our society tends to favor immediate gratification over long-term success. Participants between the ages of 16 and 26 acknowledge the severity of skin cancer, but not hold a worrisome attitude toward developing the disease, believing that they likely would never develop this form of cancer (Hevey et al., 2010). While adolescents and young adults may be able to disregard the possibility of developing skin cancer via a written message, other research suggests that multimedia components may be more effective. Thus, the integration of digital UV photos or pictures depicting sunspots may be advantageous when trying to advocate for skin care protection amongst individuals concerned with appearance (Mair et al., 2012).

While healthy living can influence longevity and quality of life, individuals who engage in this lifestyle may do so for many reasons. Individuals may choose a healthy diet or have a consistent exercise regimen in order to feel healthy and keep the doctor

away. Others may choose healthy activities in order to increase their self-esteem (Latimer, Brawley, & Bassett, 2010). In regards to intention to engage in skin protective behaviors, appearance motivated individuals responded better to messages highlighting the benefits of using sunscreen than messages accentuating the costs of not using sunscreen (Hevey et al., 2010).

### **Justification**

While college professors, news reporters, physicians, counselors, and other professionals continue to devote time, energy, and resources into improving healthy practices among college students, the need for effectively communicating such information becomes more apparent. It is essential that such messages be transmitted in a way that matters to the targeted audience; thus, messages need to be delivered with technology in mind, as such communication is becoming a preferred method for information delivery (Paul, 2012). As modes of communication have evolved over time, the need to effectively communicate health related information has increased leading to the continued development of message framing research. The vast majority of research on message framing has centered on one specific behavior, whether it be sunscreen use, engaging in flossing, or getting screened for STD's (Rothman, Bartels, Wlaschin, & Salovey, 2006). Although such health-related behaviors are of great importance considering our modern society is comprised of individuals with a vast array of health concerns, college students are a specific population in need of targeting. College students are confronted with two main health-related hurdles of college life: poor nutrition and poor sleep habits. As the trendsetters for future generations, it seems intuitive that the college population would serve as the population of focus within the field of health

promoting research. Therefore, it also seems logical to assess the framing effects for nutrition and sleep habits among college students.

Research has demonstrated that many college students suffer from some type of sleep disturbance (Buboltz, Brown, & Soper, 2001) and college freshmen, specifically, gain weight at a rate that is significantly greater than the general public (Levitsky et al., 2004). Experiencing a lack of quality sleep is of great concern considering that reduced sleep length and quality may negatively impact cognitive functioning, general health, and feelings of wellbeing (Brown, Buboltz, & Soper, 2002). On the other hand, students who achieve a normal night's sleep perform better academically (Carskadon, 1990).

In addition to a great need for the prevention of sleep disturbances, there also exists within our society a great need to prevent obesity. Matvienko, Lewis, & Schafer (2001) found that the female freshmen who participated in their study exhibited low baseline knowledge of the basics of healthy eating, such as nutrient energy contents, food labels and the Food Guide Pyramid. These female freshmen also knew very little about energy metabolism. The results of this study demonstrated that a weight-prevention intervention, specifically a nutrition course for college students, was effective for students with a higher body mass index (BMI). Such results suggest that targeted education can reduce unhealthy weight gain in at risk populations (Matvienko et al., 2001). Using message framing in order to educate society and reduce obesity is an area of growing interest. However, it is essential that such messages be scrutinized carefully in terms of potential negative consequences that may unintentionally be created. Pretesting health messages prior to initiating a public health campaign serves to reduce stigmatized a group (Gollust, Niederdeppe, & Barry, 2013).



While researchers have examined how message framing can influence behaviors related to healthy eating (Latimer, Williams-Piehota, Katulak, Cox, Mowad, Higgins, & Salovey, 2008), they have neglected to examine framing effects for sleeping behaviors; thus, sleep is a health behavior that is in great need of research in regards to message framing. Perhaps through the use of proper sleep hygiene education, development of poor sleep habits can be prevented, thereby eradicating many of the sleep-related issues that so many college students experience. The questions that must be asked is whether individuals would respond better to sleep hygiene recommendations that are framed in terms of gains or in terms of losses and how personal and situational factors influence those outcomes? The acquisition of such knowledge is important in its potential application to help college populations. Universities may be able to design mandatory courses in which freshmen are provided with effective evidence-based nutrition and sleep hygiene interventions. The development of effective health-promotion interventions for college students may have implications that exceed the bounds of college campuses. Such far-reaching effects also may lead to reductions of obesity and obesity related diseases amongst the general public.

In addition to gaining knowledge useful for reducing the epidemic of obesity, this study may also provide college campuses and the general public with a more effective tactic for positively influencing quality of sleep without the use of habit-forming drugs and can leave individuals feeling groggy the following day. Increasing the quality of one's sleep prevents the vicious cycle of sedative and energy drink usage that is such a common occurrence on many college campuses. In a study surveying 500 college students, results revealed that over half of the students consumed at least one energy

drink each month throughout the semester (Malinauskas, Aeby, Overton, Carpenter-Aeby, & Barber-Heidal, 2007). The most common reasons given were insufficient sleep (67%), and to counteract fatigue (65%) both of which are reinforced by consuming energy drinks (Malinauskas et al., 2007). Energy drinks are advertised as a way of acquiring the energy needed to accomplish activities that would otherwise be nearly impossible. The vicious cycle of feeling energized and then exhausted from not being able to sleep is one aspect that energy drink corporations do not market. Energy drink corporations certainly profit from the detriment of the individuals consuming their product, as these consumers become dependent on a diet rich in taurine, glucose, carbohydrates, herbal extracts, B vitamins, and large doses of caffeine (Stasio, Curry, Wagener, & Glassman, 2011). As energy drink consumption increases, experiences of anxiety and sleep disturbances also increase substantially, thereby creating this vicious cycle and other related problems (Stasio et al., 2011).

## **Literature Review**

### **History of Message Framing**

When delivering a health message, it is essential that to address the primary concerns of the individual; however, this is not enough (Rothman et al., 2006). The health-related information must be conveyed in such a way that it not only impacts one's thoughts and emotions, but also one's behaviors (Rothman et al., 2006). As health-related issues continue to make headlines, it is critical that when society members are confronted with health information that they either initiate or maintain healthy behavioral practices (Rothman et al., 2006). Message framing and health-related behaviors have become such a widely researched area due to a degree of cognitive dissonance that exists;

on one hand, we may enjoy eating certain foods or engaging in certain behaviors, but on the other hand, health professionals warn us against some of the foods and behaviors that we find ourselves enjoying (Rothman et al., 2006). Thus, our society must somehow reconcile these differences. Research has shown that effective health appeals hinge on the manner in which the message is structured, specifically, how the message is framed (Bartels, Kelly, & Rothman, 2010).

Health messages can be framed in terms of the derived benefits of engaging in a particular behavior or in terms of the associated costs of choosing not to engage in the suggested behavior (Sherman, Mann, & Updegraff, 2006). Gain-framed messages emphasize the benefits of engaging in a health promoting behavior, whereas loss-framed messages depict the losses one experiences when they engage in risky behavior or fail to partake in health-promoting behaviors (Sherman et al., 2006). Choosing whether to comply with a health campaign, an advertisement, or a simple medical pamphlet that emphasizes the benefits or the losses associated with a particular behavior should not be a trivial decision.

According to Garcia-Retamero and Cokely (2011), two varying perspectives have shaped the current research within the field of message framing and health-related behaviors. The first perspective entails whether the function of the health-related behavior moderates the effect of the framed messages (Rothman & Salovey, 1997 as cited in Garcia-Retamero & Cokely, 2011). The second perspective suggests that individual differences moderate the effectiveness of framed messages (Mann, Sherman, & Updegraff, 2004).

The idea of the function of a behavior as a moderator of the effectiveness of framed appeals was founded on Prospect Theory (Kahneman & Tversky, 1979 as cited in Garcia-Retamero & Cokely, 2011). According to Prospect Theory (Tversky & Kahneman, 1981), individuals tend to be risk averse when potential gains are made salient. On the other hand, individuals tend to be more willing to take risks when possible risks are made evident (Tversky & Kahneman, 1981). Prospect Theory has defined risk as “the probability that a particular outcome might occur” (Rothman et al., 2006). Thus, individuals are forced to choose between two options. With the first option, the individual is presented with a certain outcome, whereas with the second option, the outcome is uncertain (Rothman et al., 2006). An example of how one would investigate the function of the behavior as the moderator is exemplified in studies in which participants are asked to make public health decisions in the form of choosing between treatment protocols that either offer a certain option or a risky, uncertain option (Rothman & Salovey, 1997).

While Prospect Theory has provided a foundation on which health-related messages conceptually can be built upon, this foundation has shortcomings when it comes to presenting health messages and actual health interventions. Whereas Prospect Theory forces individuals to choose between two alternatives, health promotion messages are designed in such a way that they do not address choices between two different behavioral options (Rothman et al., 2006). Rather, health promotion messages typically are constructed so that individuals are compelled to either engage or to not engage in a specified behavior (Rothman et al., 2006). According to Rothman and Salovey (1997), contextual factors are more likely to influence an individual’s response to information in

regards to associated gains and losses. Rothman and Salovey (1997) suggest that Prospect Theory has implications for health-related behavioral research, but that the assumptions of the theory should be applied carefully while considering the context in which specific health concerns are made.

The second approach to studying the influence of message framing in relation to health behaviors entails applying message framing to personal health decisions (Rothman & Salovey, 1997). By it, individuals are presented with either a gain- or loss-framed message as health recommendations, thereby focusing on the individual's acceptance of the message and intentions to follow the recommendations (Rothman & Salovey, 1997).

Regardless of the health message, information can easily be presented in terms of gains or losses. For example, a message encouraging individuals to engage in physical activity could be presented as a gain-frame stating, "Regular exercise can supply you with an energized feeling and improve your physical health" or the same information could be presented as a loss-framed message stating, "Failing to engage in regular exercise can leave you feeling lethargic and impair your physical health" (Gerend, Shepherd, & Monday, 2008). Gain-framed appeals are considered to be more effective when promoting behaviors that provoke a promotion-oriented mindset, whereas loss-framed appeals are believed to be more effective when promoting behaviors that yield a prevention-oriented mindset (Rothman et al., 2006).

Rothman and Salovey (1997) describe the three basic functions of health behaviors: Health behaviors can (a) prevent, (b) detect or (c) cure/treat a health problem. Condom use, for example, prevents the proliferation of sexually transmitted diseases (Rothman & Salovey, 1997). Mammography, on the other hand, can detect whether an

individual has a tumor that could possibly be cancerous (Rothman & Salovey, 1997). Finally, curing or treating an ongoing health problem may entail undergoing extensive chemotherapy in order to shrink an existing form of cancer (Rothman & Salovey, 1997). Some health behaviors meet the criteria for more than one category (Rothman & Salovey, 1997). Exercising, for example may be classified as a preventative behavior or a way of treating a health condition (Berry & Carson, 2010). However, these categories serve as a framework for the primary functions of various health behaviors (Rothman & Salovey, 1997). Typically, detection behaviors are viewed as risky in that the individual performing the behavior may discover an actual health problem, such as cancer (Rothman & Salovey, 1997). Previous research has demonstrated that when promoting detection behaviors, loss framed messages are more advantageous than gain-framed messages (Rothman & Salovey, 1997). Therefore, when trying to encourage individuals to engage in detection behaviors such as mammography or Pap testing, loss framed messages are considered the most beneficial (Detweiler, Bedell, Salovey, Pronin, & Rothman, 1999). One study investigating the relationship between mammography and message frames found that females presented with a loss-framed message were about 1.7 times more likely to obtain a mammogram than women who were given the gain-framed message (Banks et al., 1995).

In contrast, executing a prevention behavior is considered a relatively safe task in that it maintains one's healthy state of being (Rothman & Salovey, 1997). Thus, when encouraging individuals to perform a prevention behavior, such as applying sunscreen, messages are deemed more effective when framed in a way that potential gains of performing the recommended behavior are highlighted (Rothman, Salovey, Antone,

Keough, Martin, 1993). Although findings are mixed, typically gain framed messages are deemed most effective when framed in accordance with the following prevention behaviors: skin cancer prevention, smoking cessation, physical activity, and safe sex (Gallagher & Updegraff, 2012). A meta-analysis of prevention behaviors indicated that, with the exception of dental hygiene, no other prevention behaviors were significantly enhanced as a result of gain-framed appeals (O'Keefe & Jensen, 2007). Furthermore, diet and vaccination gain-framed messages demonstrated a weak advantage over loss-framed versions of the messages (Gallagher & Updegraff, 2012).

An exception to the rule of framing effects can be found with the frequency with which the behavior is being prescribed (Gerend et al., 2008). Rothman and Salovey (1997) suggest that a one-time preventative behavior such as a vaccine are viewed differently than a preventative behavior that requires frequent performances of the behavior such as sunscreen use. Therefore, framing a message in terms of the associated losses of not performing the requested behavior may be a more effective mode of promoting vaccines (Rothman & Salovey, 1997). Gerend and colleagues (2008) found that one-time or low frequency behaviors are typically associated with greater feelings of uncertainty compared to behaviors that consist of repetition. The loss-frame advantage for vaccines vanished once the behavior was described as entailing six shots rather than the traditional single shot (Gerend et al., 2008). Although the effectiveness of framing a vaccination message in terms of losses diminished as the frequency of shots increased from one to six, no gain-frame advantage was observed (Gerend et al., 2008). Instead, individuals' intentions were found to be equivalent regardless of the message frame (Gerend et al., 2008).

Detweiler and colleagues (1999) focused on sunscreen use as a preventive behavior. Participants consisted of previously recruited beach-goers between the ages of 18 and 79 years old. Of the 217, approximately 90% agreed to participate in the study. Participants were given a brochure titled "Beach Survey 1996" that was comprised of instructions, pre-manipulation questions, and a framing manipulation along with general information regarding skin cancer. Participants received one of four possible frames highlighting either (a) the benefits gained by protecting oneself from the sun, (b) the undesirable outcomes that are avoided by engaging in sun-protective behaviors, (c) the benefits that are forfeited by engaging in unsafe sun exposure, or (d) the undesirable outcomes gained by engaging in unsafe sun exposure. The following are examples of each type of frame: (a) "Protect yourself from the sun and you will help yourself stay healthy" (b) "Don't expose yourself to the sun and you won't risk becoming sick" (c) "Don't protect yourself from the sun and you won't help yourself stay healthy" (d) "Expose yourself to the sun and you will risk becoming sick."

After reading the general, unframed information regarding skin cancer, participants then were required to break a seal in order to finish the survey. Upon breaking the seal, they were then exposed to post-manipulation questions and instructions reminding them to return their questionnaire in order to redeem their free lottery ticket. As participants did so, they also received a coupon for a free sample of SPF 15 sunscreen. Participants were then instructed to go to a different table in approximately 30 minutes in order to redeem their free sample. To assess which condition requested the sample of sunscreen, identification numbers of the participants were copied from the questionnaires onto the coupons prior to their distribution in order that the experimenters could clearly



identify which participants requested their free sample of sunscreen. The results revealed that regardless of sex, individuals that received gain-framed messages were more likely to request a sample of sunscreen as well as report that they would apply the sunscreen repeatedly throughout the course of the day.

Detweiler and colleagues' (1999) sunscreen study is a first of its kind in that it actually targeted the specific population of concern, beachgoers. Individuals' intentions to use adequate sunscreen, as well as reapply the sunscreen throughout the course of the day, also bolsters previous research findings (Detweiler et al., 1999). Detweiler and colleagues (1999) suggest that by targeting beachgoers, they may have acquired a "highly involved" sample. According to Wegener, Petty, and Klein (1994), an individual's involvement or interest in a particular issue fosters systematic processing of messages. In addition, such individuals are believed to experience sensitivity to the framing of the message, whereas individuals who do not undergo systematic processing of the message lack this sensitivity (Wegener et al., as cited in Detweiler et al., 1999). Findings also suggest that individuals who were not planning to use sunscreen were more likely to experience either an attitude change or increased sensitivity to the distinction between gain and loss framed messages, revealing that these particular individuals were powerfully influenced by the gain-framed messages (Detweiler et al., 1999). Another study found that for osteoporosis prevention, memorable, attention-grabbing gain-framed messages result in greatest recall perhaps as a result of cognitive processing (O'Malley & Latimer-Cheung, 2012).

Garcia-Retamero and Cokely (2011) examined how framed messages impact the prevention and detection of STDs. This particular study serves as a guidepost for the

present study in that it specifically targets a health issue in which college students are considered the most at-risk population (Garcia-Retamero & Cokely, 2011). Researchers examined affective reactions to the health messages, individuals' perceptions of risk of contracting STDs, attitudes toward the suggested behavior, and behavioral intentions (Garcia-Retamero & Cokely, 2011). It was hypothesized that attitudes and behavioral intentions would mediate the effect of the framed message (Garcia-Retamero & Cokely, 2011). In addition to examining message framing in regards to pertinent subject matter within the health field, the manner with which the message was presented was manipulated (Garcia-Retamero & Cokely, 2011). Specifically, Garcia-Retamero and Cokely (2011) presented the STD information via written text, written text and numbers (including statistics), and written text and graphs (including a visual aid). Results indicated equivalent effectiveness of gain- and loss-framed messages in relation to both promotion of condom use and prevention of STDs via screening when a visual aid was paired with the message; thus, demonstrating the value of visual aids adjunct to a written text (Garcia-Retamero & Cokely, 2011).

While many health-related behaviors seem to fit neatly into one of two categories, promotion or prevention behaviors, some behaviors are not as easily differentiated. Rather, such behaviors are ambiguous in orientation (Rothman et al., 2006). In such instances, researchers believe that an individual's chronic regulatory focus may override the characteristics associated with particular behaviors (Rothman et al., 2006). Therefore, it is important that researchers examine health-related behaviors in the context of one's chronic regulatory focus.

The benefits of using gain-framed over loss-framed messages in regards to certain behaviors have been investigated in the hopes of positively changing individuals' behavioral intentions and actual behaviors; however, there are times in which the health promotion mission may backfire. Related to the theory of psychological reactance, the boomerang effect has been found when an individual does the opposite of the suggested or intended behavior (Burgoon, Alvaro, Grandpre, & Voulodakis, 2002). One study found that when the audience has their freedom limited, they are more likely to demonstrate reactance toward the message and ignore the recommendations, perhaps engaging in the opposite behavior (Rains & Turner, 2007). Rains and Turner (2007) also found that reactance increased as the magnitude of the request increased, suggesting that larger requests may pose greater threats to one's time, energy and/or finances. In addition, researchers also suggest that message designers incorporate tactics that would induce positive emotions such as enthusiasm (Rains & Turner, 2007).

### **Format of the Message**

Many studies exploring message framing and health behaviors have used printed text. Recently, more emphasis has been placed on the content of the message and less on the format of the message. However, researchers are now exploring the interplay of subtle formatting cues and the effects of the message. One study in particular examined the collaborative effects of message framing and color priming on intentions to have an HPV vaccine, hypothesizing that red paper would function as an indirect threat cue (Gerend & Sias, 2009). Specifically, individuals in the loss-frame condition who were presented the message in combination with the color red were predicted to express greater intentions to have the vaccine (Gerend & Sias, 2009). Results confirmed that

loss-framed messages led to greater intentions of vaccination, but only when primed with the color red, demonstrating an interactive effect between framing and color priming (Gerend & Sias, 2009). This study shows that even when weighing options and making a health-related decision, peripheral cues such as color, may impact one's ultimate behavior (Gerend & Sias, 2009). If the color can impact the effectiveness of a framed message, perhaps presenting the message through formatting methods other than written text may also be effective. Audio and visual media such as recordings and PowerPoint are formatting methods that have become widely popular within the context of work and school, becoming the gold standard as our society becomes more technologically advanced. Thus, multimedia is an area worthy of exploration within the research realm of message framing.

As technology continues to become integrated within our society, there is a pressing need to explore the potential for technology to impact health and, therefore, the quality of life. Presently, outcomes are varied in regards to technology use and one's health. Media use is not universally harmful to the health of adolescents and other members of society (Casiano, Kinley, Katz, Chartier, & Sareen, 2012). Adolescents who used technology for informational purposes actually fared better in terms of overall health compared to their peers who use technology for entertainment (Koivusilta, Lintonen, & Rimpela, 2007). Businesses are permanently closing the doors to their file cabinets and turning to laptops and Ipads to conduct business affairs. Many classrooms are doing away with the traditional chalk or dry-erase board in exchange for smart classrooms. While this may be a drastic shift from former generations, it has become the norm for younger generations. As avid consumers of communication technologies primarily

through the use of the Internet, text messaging, gaming, and social media, health information would most likely benefit teens and young adults if presented in their preferred media: technology (Paul, 2012).

In regards to enhancing sexual health education among teenagers, researchers found that adolescents desired to receive such information through technology while simultaneously preserving personal communication. Yet, adolescents were adamant about wanting to conceal their identity and preserve safety as they interact with other individuals via technology. When making decisions regarding health, confidentiality is of great concern for teenagers and simply discussing the boundaries of confidentiality with the adolescent improves the relationship between the teenage healthcare consumer and the healthcare provider (Grant, Elliott, Di Meglio, Lane, & Norris, 2008). It has been suggested that health information be presented in an informative manner in which the teenagers' health is promoted, creating a more inviting atmosphere and making teens feel less judged than when information is presented in a value promotion manner (Grant et al., 2008). Teenagers' self-disclosure of sensitive information has been found to increase when the interactions occur between the teenager and virtual instructional avatars, which are computer-generated visual representations of media users, rather than real-life healthcare providers (Jin, 2011). Research suggests that adolescents would like to use text messaging as a tool for not only communicating with friends, but also as a way of accessing valuable sexual health information (Selkie, Benson, & Moreno, 2011). One study found that while some teenagers believe that it is annoying to receive advertisements via text, individuals also recognized that such tactics are useful because "everyone has a mobile phone" and "everyone texts" (Wilkins & Mak, 2007).

Mair, Soyer, Youl, Hurst, Marshall, and Janda (2012) explored the viability of delivering health messages via text message amongst individuals between the ages of 18 and 40 years old. The researchers reported that 95% of the 141 participants reported owning a mobile phone and 79% reported that they used their device for text messaging several times a week (Mair et al., 2012). Despite the fact that technology has advanced, health concerns related to the future leaders of society and society at large continue to remain a growing problem. It is perplexing to think that a society can be extremely advanced in one area yet remain dormant in other areas related to health, thereby highlighting the need for the health field to catch up with technology. Healthcare providers would be doing young individuals a disservice by ignoring their native language and neglecting to embrace the culture of technology speaks to teenagers.

One potential way of propelling society's health issues in a new, positive direction is through the use of technology. YouTube, in particular, has been seriously considered as a potentially effective modality for delivering health information on the grounds of its extraordinary popularity amongst young people. Young people are at risk for a variety of health conditions and issues such as obesity, sleep disorders, and sexually transmitted diseases. In a recent study, individuals between the ages of 18 to 24 years old were chosen as the population under investigation on the basis that individuals within this age group are considered highly vulnerable to sexually transmitted diseases (Prybutok, 2013). Participants were presented with both pre- and post-test measures in which knowledge of safe sex practices and STD prevention were assessed (Prybutok, 2013). STD messages were presented in either a factual manner or entertaining way via YouTube (Prybutok, 2013). Regardless of whether the message was presented factually

or entertainingly, the YouTube messages resulted in statistically significant improvement in knowledge of safe sex practices and STD prevention amongst all participants (Prybutok, 2013).

While teenagers and young adults are clearly the targeted audience for the use of health communication technologies, other populations may also benefit from health messages presented via in this format. Although not as tech savvy as their younger constituents, it has been determined that the majority of American adults peruse the Internet for health information (Paul, 2012). Unfortunately, much more research has been conducted in relation to adults' usage of the Internet than the primary users of mobile phones, Internet, and social media – youth and adolescents (Paul, 2012). Thus, these findings affirm the need for further research on the form of YouTube and other technological mechanisms that most effectively deliver health information (Prybutok, 2013). One study investigating the plausibility of using mobile phone short message service (SMS) text messaging as a health delivery system following a weight loss program found such an approach to be effective for development and delivery of the message (Shaw et al., 2013).

Health recommendations are often presented as written text perhaps through a handout or pamphlet. In addition, research in message framing has primarily consisted of exploring attitudinal change and behavioral intentions after having read a written text of a promotion or prevention framed health message. There currently exists a scarce amount of research exploring the format with which the message frame is presented. Thus, there is need for further exploration.

Carnaghi, Cadinu, Castelli, Kiesner, and Bragantini (2007) examined the relationship among message framing, need for cognition, and format of the message through use of written text versus a comic strip presentation. Need for cognition exists on a continuum, from low need for cognition to high need for cognition. According to the Need for Cognition Scale (Cacioppo, Petty, & Kao, 1984) high need for cognition individuals enjoy cognitively challenging tasks and choose to engage in deeper level processing whenever possible. Low need for cognition individuals tend to evaluate ideas and concepts in a more concrete way, accepting information at face value; thus, the illustrative comic strip message was hypothesized to be well suited for low need for cognition individuals (Carnaghi et al., 2007). Individuals were presented with either a text only pamphlet regarding safe sex or with a pamphlet containing the same information but presented in the form of a comic strip. Individuals high in need for cognition were predicted to respond better to the text only format than the low need for cognition individuals, who were predicted to display a preference for the comic strip presentation. As predicted, low need for cognition individuals who were presented the safer-sex message via comic strip demonstrated a greater level of knowledge of consequences regarding unsafe sex as greater motivation to engage in safe sex than their high need for cognition peers who were presented with the message as a comic strip (Carnaghi et al., 2007). Conversely, high need for cognition individuals who were presented with the written text of the message displayed a greater understanding of the consequences associated with unsafe sex than the low need for cognition individuals who were also presented with the written text format of the message, indicating that individuals who enjoy thinking and deeply processing information show a greater



response to the written framed message versus the comic strip format (Carnaghi et al., 2007). Technology is a promising way to deliver health messages, however, the question of whether technology can be used to successfully create large scale, cost-effective changes remains unanswered (Marcus et al., 1998).

Perrin (2011) examined the interaction between message framing, message modality, and emotional arousal on behavioral intentions. Results revealed that individuals who were in the video group responded with a significantly higher environmentally responsible behavioral intention than individuals in the text-only group regardless of whether the message was presented in loss-frame or gain-frame (Perrin, 2011). Health care providers have been distributing interactive, role-playing video games have been distributed for children with various health conditions (Bandura, 2004). *Packy and Marlon* are the names of two diabetic mammals that children with diabetes learn to care for in order to attain points, the greater knowledge and care the children demonstrate, the more points they earn (Satava, Morgan, & Sieburg, 1995). Other video games have been developed for children with asthma and cystic fibrosis (Bandura, 2004).

### **Delivery of the Message**

While the framing and the format with which a message is presented impacts the intentions and behaviors of those who receive the message, research has also shown that the effectiveness of the message also hinges on the credibility of the messages (Latimer et al., 2010). Source credibility tends to impact low need for cognition individuals more than high need for cognition individuals (Zhang & Buda, 1999). Regardless of the message frame, messages delivered by a highly credible source were found to be effective in regards to intentions and behaviors (Latimer et al., 2010). Thus, a highly

credible source is essential when communicating a message (Arora, Stoner, & Arora, 2006).

In 1985, Minnesota became the first state to initiate a legislatively funded health campaign against smoking (Daly, Lund, Harty & Ersted, 1993). As a result of Minnesota's campaign initiative, other states have discovered different ways of attacking the tobacco industry. Depicting the tobacco industry as being comprised of greedy companies that seek to manipulate and deceive the younger generations in order to recruit a league of addicted, life-long customers was found to be the most effective deterrent against smoking amongst the young population of Massachusetts (Goldman & Glantz, 1998). The state of California has implemented several different campaigns against smoking including, "Industry Spokesman," "Nicotine Soundbites," and "Hooked", all of which were considered effective campaigns (Goldman & Glantz, 1998). Researchers found that through unprompted responses, 6.7% of the 417 former Californian smokers (those who had quit during the California first wave of the anti-smoking campaign between 1990 and 1991) cited the anti-smoking advertisement as an influence in their decision to quit smoking (Popham et al., 1993).

Clearly, advertising impacts what the receivers of a message choose to do with the information that they are given. In the case of antidrug campaigns that create discussion among a group of adolescents, the campaign may unintentionally lead to deleterious effects such as ignoring the information and thus adolescents continuing to engage in drug use (David, Cappella, Fishbein, 2006). According to Popham and colleagues (1993), an anti-smoking message influenced smokers enough that 6.7% changed their behavior in a positive way. Such research has prompted other researchers to investigate

what it is about certain messages that lead to behavioral change. Socioeconomic status and one's ethnicity are two variables that are considered of great importance when designing exercise interventions due to the additional challenges that some ethnic minorities and individuals of low SES tend to face, such as means of transportation, living environments, language proficiency, and lack of childcare (Marcus et al., 1998).

When encouraging members of society to exchange one behavior for another, it is of importance that it be an exchange of equivalence. For example, although TV watching is considered a sedentary activity that Americans are highly invested in, it is also an affordable form of entertainment. Exercise, on the other hand, is of great value in terms of its health benefits but such benefits are often accompanied by the feeling of intimidation, monetary expense, and perhaps low entertainment value compared to TV viewing (Basil & Witte, 2012). While computers continue to grow in popularity among the public, it is of importance to remember that interventions requiring access to computers are not practical when targeting financially disadvantaged populations. One's SES and ethnicity may affect behaviors requiring the use of computerized interventions (Marcus et al., 1998).

Although mass-media health campaigns that incorporate technology are able to reach a multitude of individuals, not every member of society will receive or at least understand the message. Health campaigns are wise in considering as many potential barriers as possible when designing a particular intervention.

### **Individual Factors**

Various individual factors have been examined in relation to message framing including: personality dimensions, self-efficacy, regulatory focus, need for cognition, and

credibility of the message. Regulatory focus theory states that an individual's regulatory focus, their typical view toward situations or events, guides their decision-making and behavior (Higgins, 2000). Accordingly, individuals can be classified by their chronic regulatory focus as being either promotion-focused or prevention-focused (Latimer et al., 2007). Individuals who hold a promotion-focused view of the world tend to perceive situations and events in terms of possible gains, whereas prevention-focused individuals are more apt to approach situations and events with potential losses in mind (Spiegel, Grant-Pillow, & Higgins, 2004).

Those who are promotion-focused generally think in terms of advancement, what they wish to accomplish, and who they aspire to be (Spiegel et al., 2004). Such individuals may be referred to as the "go-getters"; these individuals are motivated to reach their goals and fulfill their dreams. For instance, a promotion-focused individual may have a dream of opening her own business so she learns what is needed and then choose to pursue this goal despite possible obstacles. As previously mentioned, prevention-focused individuals consider the potential losses when they approach a situation. Individuals who are prevention-focused are concerned with minimizing negative outcomes as they seek to fulfill their obligations and responsibilities (Spiegel et al., 2004). Prevention-focused individuals may be concerned with ensuring financial security and safety rather than seeking career advancement through a newly established company.

While an individual may present as having a dominant regulatory focus, either promotion focused or prevention focused, it does not mean that the two domains cannot

coexist. An individual may hold a promotion and prevention orientation simultaneously; there is not always a clear distinction (Higgins, 2000).

According to Higgins (2000), individuals experience regulatory fit when their means of pursuing a goal matches their chronic regulatory focus (their view of the world) whether promotion-focused or prevention-focused. Higgins (2000) also suggests that having a “regulatory fit” increases the value that individuals experience in what they are doing. When decisions are made on the basis of a higher regulatory fit, individuals actually deem their decision to be better, thus regulatory fit contributes to the degree of value an individual attaches to their decision-making (Higgins, 2000). Higgins created the Regulatory Focus Questionnaire (RFQ; Higgins, 1996) to identify promotion-focused individuals and prevention-focused individuals. Given a promotion-focused message encouraging physical activity, individuals holding a promotion-focused view actually outperformed their prevention-focused counterparts in regards to physical activity (Latimer et al., 2008).

Pennington & Roese (2003) found that individuals’ regulatory focus might undergo change over time. For example, when goals are viewed at a distance, both temporally and spatially, individuals tend to endorse a promotion-focused motivation (Pennington & Roese, 2003). Kim (2006) presents various practices that can be used to measure and prompt regulatory focus. Priming an individual at the onset of the efficacy appeal is one manner with which regulatory focus can be induced. The following is an example of the previously described priming: “Imagine radiant unblemished skin” versus “You are responsible for the welfare of your skin” (Kim, 2006). One study found that adolescents who were randomly assigned to the promotion-primed condition rated the

promotion-focused message as more persuasive than the prevention-focused message. In conjunction, adolescents in the prevention-primed condition considered the prevention-focused message to be more persuasive than the promotion-focused message (Kim, 2006). An individual's regulatory focus, regardless if it is chronic or induced, assists in determining whether people seek beneficial changes or remain in their current situation (Lieberman et al., 1999).

### **Other Individual Factors**

Tailoring messages is one way of creating regulatory fit that has been found to create behavioral changes (Latimer et al., 2008). A meta-analysis revealed that tailoring health messages to the targeted audience is indeed a valuable tactic (Keller & Lehmann, 2008), for instance, according to individuals' current stage of change, based on the transtheoretical model's stages of change or through the inclusion of personal information such as the individual's name, age, etc. (Latimer, Katulak, Mowad, & Salovey, 2005). Another method for tailoring (messages) consists of matching messages to particular psychological characteristics (Latimer et al., 2005). In a 2005 study, Latimer and colleagues tailored health messages to individuals' need for cognition, coping style, health locus of control, and regulatory focus.

Context is another variable that can optimize the effectiveness of a message (Webb & Eves, 2007). Messages designed to increase a positive behavior or reduce a negative behavior may be effective for certain populations and not others (Webb & Eves, 2007). Need for cognition, the amount of pleasure one attains when thinking, is a moderator in the case of message framing (Zhang & Buda, 1999). However, this characteristic is not a practical variable of manipulation for message framing in the area

of advertisement, due to the elusive nature of need for cognition (Zhang & Buda, 1999). One's current emotional state has also been identified as a moderator of message framing (Gerend & Maner, 2011). While it may not be feasible to target narrow groups of individuals or specific individual differences, it is possible to reach the broad categories of individuals such as gender and ethnicity. Men, women, and various ethnic groups have been identified as "at risk" populations for various diseases. Thus, for particular health concerns, it may be crucial to target a specific sex or race.

Keller and Lehmann (2008) revealed that messages presented in a vivid format containing personal consequences are best suited for white audiences, whereas non-vivid messages emphasizing social consequences of a behavior have more influence among non-white audiences. Messages that play on emotions are more effective when the audience consists of women rather than men (Keller & Lehmann, 2008). Being male or female, black, white, or any other ethnicity represents direct examples of external, enduring, and stable characteristics; one's dispositional characteristics are also stable and should be considered when tailoring messages (Latimer et al., 2010). Tailoring messages can be extremely specific, pertaining to one person or to a group of individuals such as when designing a health campaign that would increase physical activities.

Although messages can be tailored to fit a specific individual, this approach can be cumbersome in areas such as advertisement in which a company or campaign is attempting to reach a vast portion of the population at once. Thus, the method for creating effective health campaigns and thereby, healthy living, would be to tailor messages to traits and qualities that are not constantly in flux. Matching messages in accordance with individuals' need for cognition, coping style, health locus of control, and

regulatory focus was deemed an effective strategy for increasing mammography use and fruit and vegetable consumption (Latimer et al., 2005). Considering that the vast majority of Americans live sedentary lives, creating a message that targets the sedentary population can be an effective means for increasing physical exercise (Parrott, Tennant, Olejnik, & Poudevigne, 2008). When tailoring messages to sedentary individuals, Parrott and colleagues (2008) found that gain-framed messages resulted in an increase of physical activity compared to individuals in the no message control condition as well as to loss-framed condition individuals who also had loss base-line physical activity.

### **Self-efficacy**

In shape, health-conscious individuals may find it perplexing when individuals with health problems such as obesity, heart disease, diabetes, etc. engage in the very activities or behaviors that contribute to their current situation. How is it that someone who has been told that ingesting fried foods and sugary sweets will likely lead to a progression of their type 2 Diabetes continues to engage in this self-destructive behavior? Doctors may become irritated with such patients, but as health psychology and social psychology research continues to explore this conundrum, it has become increasingly clear that self-efficacy plays a role in whether or not individuals change their health behavior (Becker, Stuijbergen, Oh, & Hall, 1993). The concept of self-efficacy stems from Bandura's (1986) social cognitive theory and refers to people's belief that they have the ability to perform a certain action (van't Riet, Ruiter, Werrij, & Vries, 2010). Bandura (1986) asserts that it is one's perceived capabilities rather than actual capabilities that most influence behavior.



Bandura's theory of self-efficacy is tied not only to the beliefs one has in their own abilities, but also to their emotions and feelings of self-worth. Individuals with low self-efficacy may present as depressed and anxious individuals with low self-esteem, and perhaps even a sense of learned helplessness (Schwarzer, Mueller, & Greenglass, 1999). On the other hand, individuals with high self-efficacy set goals and intend to reach such goals. High self-efficacious individuals display greater persistence as they stick to a task longer than their low self-efficacious counterparts (Schwarzer et al., 1999).

Self-efficacy enhancement is typically accomplished when information is presented in such a way that the task seems manageable and the target of the message feels empowered to conduct the prescribed behavior. In the area of health behaviors, enhancing one's self-efficacy is of utmost importance because individuals often agree that initiating certain behaviors would improve one's health. Unfortunately, behavioral changes can sometimes feel overwhelming, thus leading individuals to doubt their abilities to make recommended changes (Becker et al., 1993). Meyerowitz and Chaiken (1987) found that health communications encourage acceptance and implementation of healthful practices to the degree that they increase beliefs in personal efficacy. In another study, participants who believed in their own abilities to use condoms properly were likely to actually do so (Dilorio, Dudley, Soet, Watkins, & Maibach, 2000).

The relationship between self-efficacy and health behaviors was also examined in the context of message framing. Individuals primed with a promotion focused message report greater intention to engage in recommended health behavior when they feel that the behavior can be accomplished with ease, whereas individuals primed with a prevention focused message report greater intentions to engage in a behavior that is sure

to produce positive results, regardless of the ease with which such results are attained (Keller, 2008). Another study sought to replicate two previous studies that found an interaction between framing and self-efficacy using anti-smoking messages and breast self-examination messages; however, unlike the previous studies, researchers used a self-efficacy manipulation rather than a simple self-efficacy assessment (Van't Riet, Ruiter, Smerecnik, & De Vries, 2010). In this study, Van't Riet and colleagues (2010) hypothesized that individuals with high self-efficacy who were given a loss-framed message would be more influenced by the message than the other participants. Furthermore, the researchers predicted that the individuals with low self-efficacy, who were presented with a loss-framed message, may perhaps react defensively to the message due to low coping perceptions. Thus, loss-framed messages were hypothesized to have no advantage over gain-framed messages when low self-efficacy was included (Van't Riet et al., 2010). Van't Riet and colleagues (2010) demonstrated partial support of this hypothesis. At the three-week follow-up, researchers found that the individuals who were presented with self-efficacy enhancing information in addition to receiving loss-framed messages decreased their salt intake (Van't Riet et al., 2010). However, counter to their previous prediction, researchers found that the presentation of loss-framed information did not induce reactions that were anymore defensive than gain-framed appeals (Van't Riet et al., 2010). Van't Riet and colleagues (2010) found that neither the acceptance of the presented information nor the intention to perform the recommended behavior were mediators of the effects of framing and self-efficacy on behavior. Such findings suggest that perhaps the framing of the message may have a subtle effect on the participant's self-report immediately following the reception of the

frame, but a more stable effect on actual behavior when measured at the three week follow-up (Van't Riet et al., 2010).

A similar study examining self-efficacy as a moderator of the effectiveness of framed health messages found that for individuals with high self-efficacy, a gain-framed message had more influence than a loss-framed message encouraging individuals to consume ecological meat (Werrij, Ruiter, Van't Riet, & Vries, 2010). The threat of developing resistance toward antibiotics is reduced by consuming ecological meat, since it is processed without using an exorbitant amount of antibiotics (Werrij et al., 2010). While this particular topic may potentially develop into a well-researched and highly popularized health-related topic, currently the health benefits associated with consuming ecological meat remains rather novel within our society (Werrij et al., 2010). The majority of members of society are largely unaware of the possible implications of eating meat laden with antibiotics (Werrij et al., 2010). Werrij and colleagues (2010) hypothesized that individuals having high self-efficacy in regards to buying ecological meat will endorse attitudes and intentions inclined toward buying and consuming ecological meat. They also hypothesized that individuals who received a loss-framed message would eat a greater amount of ecological meat than individuals who received a gain-framed message. In addition, loss-framed messages were not predicted to be more influential than gain-framed messages when the individuals had a low self-efficacy toward buying ecological meat (Werrij et al., 2010). Werrij and colleagues (2010) also predicted that individuals with low self-efficacy would engage in a greater degree of defensive processing than individuals with high self-efficacy. Specifically, individuals

having low self-efficacy were predicted to respond more defensively to loss-framed messages compared to gain-framed messages (Werrij et al., 2010).

Results of this study revealed that individuals with high self-efficacy actually consumed a greater amount of ecological meat after reading a gain-framed message rather than a loss-framed message (Werrij et al., 2010). While the interaction existing between message framing and self-efficacy clearly has an influence on behavior, no interaction was found in relation to attitudes and intentions toward ecological meat consumption (Werrij et al., 2010). Werrij and colleagues (2010) found support for their hypothesis that individuals with low self-efficacy would engage in a greater degree of defensive processing than individuals with high self-efficacy. However, results revealed that the individuals who received a gain-framed message, in addition to having low self-efficacy actually processed the message more defensively than their counterparts with high self-efficacy (Werrij et al., 2010). Findings suggest that in order to prevent defensive reactions toward health promotion messages, health care providers may want to ensure that the recipient of the message has a high degree of self-efficacy (Werrij et al., 2010). In other words, the health care providers would be wise to present health related suggestions in such a way that the patients feel confident that they are capable of performing the requested behavior(s).

In conjunction with self-efficacy, one's level of motivation may also impact adherence to a health campaign. Webb and Eves (2007) found that participants' perceptions of the stair-climbing message exceeded that of their motivation ratings. Participants believed the message, but were not motivated to begin climbing stairs (Webb & Eves, 2007). With respect to nutrition, simply educating college students as to what

foods they should consume is insufficient; rather, individuals need to demonstrate high motivation to begin making healthy dietary choices (Gittelsohn & Lee, 2013). Specifically, a college student may be coached to eat egg whites for breakfast, a green salad, apple, and carrots for lunch, followed by a grilled chicken breast served with broccoli and cauliflower, but if the motivation to follow such instructions is not present and the college student is surrounded by fast food joints, then healthy dietary changes are not likely to occur (Gittelsohn & Lee, 2013). In other words, just because a message sounds good does not mean the message will evoke change or lead to healthy living. An individual may believe they can carry out a suggested task, but if they are not personally motivated to follow a “doctor’s orders”, they may refrain from doing so, thus tailoring messages according to the targeted audiences’ level of motivation is of concern (Marcus et al., 1998). An individual’s level of motivation may be a stable dispositional state in which tailoring messages accordingly could be of great value; however, an individual’s level of motivation could be tied to their belief in their ability to do a task. If an individual does not feel that they will succeed in performing a particular behavior, they may resort to not trying at all. Self-efficacy enhancement is likely to play a pivotal role when health behaviors are believed to lead to a positive outcome (Strecher, DeVillis, Becker, & Rosenstock, 1986).

One’s current life style has emerged as an area of interest when aiming to increase physical activity (Arora et al., 2006). Prior to engaging in an activity, health conscious individuals often ask the question, “How will this impact my health?” Health conscious individuals who live healthy lives understand that good health is not effortless. On the contrary, they practice diligence while striving for good health. However, in order to

continue striving for good health day in and day out, individuals need to believe that they can continue this endeavor even when the going gets rough. Demonstrating a personal sense of control over one's environment, believing that it is possible to master challenging demands and develop solutions to problems, leads not only to increased self-efficacy and change in behavior, but also commitment to a decision (Schwarzer & Fuchs, 1996). Establishing personal incentives and enlisting social support are two ways of encouraging sustained effort (Bandura, 2004). In addition, efficacy increases when similarities exist between the targeted individuals and the individual portrayed in the message (Arora et al., 2006). Individuals who are able to relate to the source of the message may have increased faith in their abilities after witnessing (reading, hearing, viewing) the account of another like-minded individual. Therefore, vicarious modeling serves to increase self-efficacy, thereby increasing intention to exercise (Arora et al., 2006). When examining stair climbing as a form of physical exercise, affirming the validity of the message has been found to increase individuals' level of motivation to perform the suggested behavior (Webb & Eves, 2007). Presenting information via a credible source serves as a means of validating the message (Webb & Eves, 2007).

Self-efficacy exists on a gradient, in which some individuals hold drastically low levels of self-efficacy in many areas or perhaps specific areas, whereas others possess globally high levels or high levels in certain domains. Thus, the concept of self-efficacy is not always a simple and straight forward amongst individuals. Also, self-efficacy should not be confused with similar concepts that may influence or result from self-efficacy. Self-esteem, health locus of control, and coping may be related to self-efficacy: however, by definition these concepts are significantly dissimilar from self-efficacy and

such terms cannot be used interchangeably (Strecher et al., 1986). While self-efficacy accounts for one of the many individual differences that impact message framing and is one strategy used to increase behavioral compliance of health recommendations, the format of the message has recently become a variable of concern in the area of message framing (Garcia-Retamero & Cokely, 2011). If an individual's self-efficacy can be enhanced through specific health-related recommendations, perhaps the format of the message may also bolster self-efficacy, leading to greater compliance and improvements in one's lifestyle. Presenting health messages in a clear step-by-step manner may be one way for improving adherence to health recommendations. Nevertheless, self-efficacy is not a be-all and end-all in regards to implementing health behaviors; rather, it is merely a stepping-stone (Schwarzer & Fuchs, 1996). Research has shown that ease of imagination and the ability to envision one's self experiencing the symptoms of the message, may influence the effectiveness of a health message (Berry & Carson, 2010). Most importantly, motivating individuals to change is not beneficial if they are not provided with the resources that are needed in order for such changes to occur, thus it is imperative that resources are within reach (Bandura, 2004).

### **Sleep**

Sleep complaints continue to plague the nation but in increasing numbers, specifically in regards to the college population. Sleep complaints have risen among college students from 24% in 1978 to an alarming 71% as of the year 2000 (Voelker, 2004). Attaining adequate sleep is considered a critical factor for the wellbeing of adolescents. Researchers define adequate sleep for adolescents as 6 -8 hours of sleep per night occurring more than four weeknights per week (Chen, Wang, & Jeng, 2006).

However, it has also been proposed that adolescents in general need about 9 hours of sleep each night in order to maintain full alertness and academic performance (Foster, 2013). Inadequate sleep, on the other hand, is defined as attaining 6 to 8 hours of sleep per night less than three weeknights per week (Chen et al., 2006).

College is considered a time of great transition as former high school students adjust to the demands of professors, college requirements, social demands, and the stress of living within one's financial means. Thus, it is of no surprise that sleep has become an issue of concern among college students. Researchers determined that 70% of the non-depressed college students achieved such poor quality sleep that it was considered clinical in nature (Gilbert & Weaver, 2010). A more recent study deemed 75% of college students as having poor sleep quality (Orsal, Orsal, Alparslan, & Unsal, 2012). Although college campuses are notorious for harboring sleep-deprived individuals, the sad reality is that society has openly accepted and even embraced this as an inevitable part of life (Carskadon, 1990).

Research shows that adolescents of parents who enforce bedtimes around 10:00 pm or earlier, attained more sleep and experienced less residual symptoms due to lack of sleep such as daytime sleepiness (Carskadon, 2011). Adolescents whose parents enforced a bedtime of midnight or later not only acquired less sleep but also were more apt to suffer from depression and suicidal ideation (Carskadon, 2011). However, simply enforcing an earlier bedtime does not necessarily improve one's sleep quality due to the comprehensive nature of sleep quality. Sleep quality is best defined as the efficiency with which someone is able to sleep, which is comprised of several components including: the quality of sleep one believes they received, how long the individual slept,



sleep disturbances, the use of sleep medications, and daytime fatigue (Orsal et al., 2012). Poor sleep quality is synonymous with non-restorative sleep (Gilbert & Weaver, 2010). When individuals do not achieve a good night's rest, they are likely to feel tired the next day - 86% of college students reported waking up tired, to some degree (Gaultney, 2010).

In addition to experiencing a general sense of tiredness, quality of sleep may impact several areas of one's life. Sleepiness is most problematic during episodes of low stimulation such as reading, driving, monotonous classroom instruction, or repetitive activities (Dawson, 2005). Automobile accidents ascribed to falling asleep at the wheel are most common among young drivers (Carskadon, Acebo, & Jenni, 2004). Simply attaining six to seven hours of sleep versus 8 hours of sleep places drivers at 1.8 times greater risk of being involved in sleep-related crash (Millman, 2005). This is of great concern considering that car accidents are a leading cause of death among adolescents (Tikotzky & Sadeh, 2012). Such sleep-deprived individuals may experience micro-sleeps, which consist of a sleep episode lasting approximately three to 15 seconds prior to an abrupt awakening (Hirshkowitz, Moore, & Minhoto, 1997). When individuals experience micro-sleeps, they are in jeopardy of impaired responsiveness to the environment, creating concern for individuals sharing the road with sleep deprived drivers.

Operating on poor levels of sleep quality has become the norm rather than the exception for adolescents (Telzer, Fuligni, Lieberman, & Galván, 2013). According to Telzer and colleagues (2013), adolescents with normative levels of poor sleep quality, rather than just adolescents who had experienced extreme sleep deprivation, demonstrate a greater orientation towards rewards than those who attain better quality sleep.

Individuals who are oriented toward rewards are also more inclined to take risks and demonstrate impaired decision making abilities (Telzer et al., 2013). This finding is of great importance considering how common poor sleep quality has become amongst adolescents. Adolescents, as a whole, are not attaining a healthy degree of quality sleep and are therefore at risk for disruption in brain functioning and decision-making (Telzer et al., 2013).

Academic functioning is influenced by the quality of sleep that an individual attains; as a result, researchers have now begun exploring the relationship between poor sleep quality and lower academic performance (Gilbert & Weaver, 2010). Students who describe themselves as struggling in school report less sleep acquisition, later bedtimes, and more erratic sleep/wake schedules than their peers who report better grades (Wolfson & Carskadon, 1998). Additionally, researchers have found that quality sleep contributes to academic success amongst college students, thus, the better students sleep, the better they do in college (Gilbert & Weaver, 2010). Therefore, improving sleep quality may lead to academic improvement (Forquer, Camden, Gabriela, & Johnson, 2008).

Experiencing symptoms of depression is also related to the quality of sleep attained; therefore, many teenagers across the nation are suffering academically and emotionally as a result of losing sleep (Carskadon et al., 2004). Adolescents labeled E-types (the chronotype indicative of later bedtimes and difficulties waking up in the morning) exhibit greater emotional instability and vulnerability compared to their counterparts, M-types, who find it difficult to stay awake past a certain time at night and prefer to rise early in the morning (Giannotti, Cortesi, Sebastiani, & Ottaviano, 2002). While inadequate sleep may lead to symptoms of depression, the reverse has also been

indicated. Depression and anxiety are strong predictors of poor sleep, thus creating a vicious mood/sleep cycle (Shochat, Cohen-Zion, & Tzischinsky, 2014). One study found a relationship between depression and brain wave activity during ultradian sleep rhythms, the 90-minute cycles of REM and non-REM sleep (Voelker, 2004). Unmedicated, depressed individuals demonstrated a lack of “coherence” which is defined as the synchronization of brain wave activity between the left and right hemispheres during sleep stages (Voelker, 2004).

In addition to sleep deprivation, the years of adolescence and emerging adulthood are also characterized as a time of skin ailments such as acne. According to researchers, sleep deprivation and sleep apnea may intensify underlying skin conditions (Gupta & Gupta, 2013). Poor sleep quality is also associated with high blood pressure amongst adolescents (Javaheri, Storfer-Isser, Rosen, & Redline, 2008). Adolescents who experience sleep disturbances are at greater risk for developing cardiovascular problems as their cholesterol levels, BMI, and hypertension increase (Narang, Manihot, Davies-Shaw, Gibson, Chahal, Stearne, Fisher, Dobbin, & McCrindle, 2012). Sleep disturbances and delayed sleep patterns have been associated with indicators of obesity such as greater adiposity and body composition (Jarrin, McGrath, & Drake, 2013). Sleep disturbance, substance use, and social and mental health problems have been found to interact (Bootzin & Stevens, 2005).

While college counseling centers specialize in helping students navigate through college life specifically related to academia and emotional functioning, researchers propose that college counseling centers may be failing to properly identify what is really contributing to these problems - poor sleep quality (Gilbert & Weaver, 2010). It is

imperative that counseling centers and medical practices be able to screen for sleep deviancies related to poor sleep hygiene versus sleep difficulties related to an actual sleep disorder (Buboltz, Soper, Brown, & Jenkins, 2002). Sleep hygiene education is the most universal and widely recommended treatment for insomnia (Buysse, 1997). If an individual suffers from a sleep disorder then a preventative sleep education program would not be a substantial form of treatment; alternatively, such individuals must be recognized and referred to appropriate professionals for further treatment (Gruber, 2013). Gilbert and Weaver (2010) indicate that interventions such as cognitive, behavioral or insight-oriented therapies are not as effective with individuals who have poor sleep quality.

Increasing one's perceived behavioral control is a significant component of interventions to improve sleep (Knowlden, Sharma, & Bernard, 2012). Goal setting is one method that may be used to increase perceived behavioral control to implement strategies that will improve sleep (Knowlden et al., 2012). Researchers report that goal setting combined with feedback produces spontaneous competition among individuals (Locke, Shaw, Saari, & Latham, 1981). Ultimately, if individuals do not have the ability to achieve or even approach their specified goals, no amount of goal setting will improve performance if advancement is outside the scope of the individual (Locke et al., 1981). In addition, the instillation of assertiveness training can be used to help improve college students' sleep (Knowlden et al., 2012). Social pressure commonly occurs in adjunct with many aversive and maladaptive behaviors that occur on college campuses. Pushing the limits of one's need for sleep is no exception. Communicating one's need for 7-8

hours of sleep each night to significant others is considered an essential element in regards to attaining sufficient sleep (Knowlden et al., 2012).

In conjunction with assertiveness training, research suggests that training individuals to be more cognitively flexible may also improve sleep hygiene and in doing so, likely improve sleep quality (Todd & Mullan, 2012). Cognitive flexibility is an aspect of executive functioning in the brain that is linked to one's ability to self-regulate (Todd & Mullan, 2012). According to researchers, developing cognitive flexibility would aid individuals in areas related to goal directed behaviors such as maintaining a bed time, resisting the temptation to stay out late with friends or the lure of watching late night television (Todd & Mullan, 2012). Making a plan for how one will achieve quality sleep before a difficult period arrives and then developing a contingency plan in the event that plans fall through and a backup plan then becomes necessary (Dement, 1999). Developing cognitive flexibility becomes necessary when back up plans are needed, thus increased cognitive flexibility would serve to equip individuals in order to problem solve certain situations such as when loud noise becomes unavoidable; one strategy may include having a noise machine and or ear plugs available (Todd & Mullan, 2012). With the high prevalence of sleep problems amongst college students, counseling centers should routinely screen all clients for sleep disturbances while assessing individual sleep habits. Once such information is attained, counseling centers can then educate clients about proper sleep hygiene (Gilbert & Weaver, 2010).

Poor sleep hygiene is associated with decreased work engagement, suggesting that individuals who do not practice good sleep hygiene feel more depleted and are less likely to exert energy (Barber, Grawitch, & Munz, 2013). Although individuals can

engage in behaviors that are antithetical to good sleep hygiene, such as drinking alcohol and smoking close to bedtime and napping during the day, many do so with the belief that such behaviors will actually aid them in their quest for sleep (Jefferson, Drake, Scofield, Myers, McClure, Roehrs, & Roth, 2005). Thus, researchers have determined that poor sleep hygiene is related to poor sleep quality (Cho, Kim, Lee, 2013).

Adolescents with good sleep hygiene attain approximately 30 more minutes of sleep than their peers who practice poor sleep hygiene (Storfer-Isser, Lebourgeois, Harsh, Tompsett, & Redline, 2013).

While college students clearly experience an array of difficulties in relation to sleep, there seems to be some disconnect between research and college students. According to Orzech, Salafsky, and Hamilton (2011), college students report a desire to learn more about sleep. Thus, counseling centers may utilize this opening for dialogue in regards to other pressing issues that college students face such as alcohol and drug consumption, sexual activity, and interpersonal relationships.

In addition to identifying a relationship between sleep quality and academic functioning, researchers have linked poor sleep quality to family income and alcohol use (Orsal et al., 2012). Specifically, college students who are from families of high incomes have poor sleep quality (Orsal et al., 2012). Compared to peers who do not engage in alcohol consumption, college students who do consume alcohol receive poorer quality sleep (Orsal, et al., 2012). Such findings support the notion that sleep loss impacts neurological functioning (Horne, 2002). The prefrontal cortex is a region of the brain that is largely responsible for higher order functioning, which impacts one's ability to consider consequences prior to engaging in behaviors such as skipping class or drinking

excessive amounts of alcohol (Horne, 2002). Researchers found that adolescents who attain poor quality sleep report a greater likelihood of engaging in risky behaviors (Telzer et al., 2013). During hours of wakefulness, the prefrontal cortex operates diligently at a steadfast pace; thus, this region is particularly vulnerable to the effects of sleep loss (Horne, 2002).

In regards to physiological mechanisms, the parasympathetic nervous system is active during sleep (Jarrin et al., 2013). Often referred to as the body's arousal system, the sympathetic nervous system becomes immediately activated in the case of exposure to threatening stimuli. The parasympathetic system complements the sympathetic system once the "coast is clear" by assisting individuals in experiencing a sense of relaxation. Often synonymous with relaxation, sleep is considered an essential time for the individual to attain rest throughout the entire body. During sleep the sympathetic nervous system activity gradually decreases as exogenous factors such as noise and light diminish (van Eekelen, Varkevisser, & Kerkhof, 2003). When an individual undergoes nocturnal awakenings, the sympathetic nervous system is being activated as a result (Jarrin et al., 2013). Sleep deprivation, accumulated sleep debt, and frequent activation of the sympathetic nervous system places individuals at risk of developing type II diabetes as a result of disruptions in glucose regulation (Hanlon & Van Cauter, 2011).

The majority of college age students describe themselves as "night-owls" which could be explained by changes in sleep patterns (Gaultney, 2010). Developmental changes in sleep/wake cycle become evident as children enter puberty and emerge as adolescents typified by delayed sleep phase in addition to an established preference for later bedtimes (Gruber, 2013). While developmental changes may lead to a shift in

circadian sleep cycles, sleep habits in general also contribute to this forward shift (Buckelew, DeGood, Taylor, Cunningham, Thornton, & MacKewn, 2013). Early college classes and other necessities do not allow college students to sleep late in order to compensate for late bedtimes; thus, many college students attempt to compensate for lack of sleep by “catching up” on the weekends (Gaultney, 2010). The reverse is also true in that “early birds” sacrifice traditional bedtimes in order to participate in evening social activities offered on college campuses (Lau, Wong, Ng, Hui, Cheung, & Mok, 2013).

Many early-to-rise individuals choose to participate in late-night campus activities to avoid exclusion and social alienation at the expense of “social jetlag”, the concept of adjusting one’s sleep schedule in order to accommodate college events (Lau et al., 2013). While early birds often choose not to compensate for lack of sleep to get the “A” - neither night owls nor early birds seem to have their ducks in a row. College students who participate in evening-time activities on campus while maintaining the early morning regimen of attending class and studying may be best suited for the college lifestyle. However, research shows that such students often experience compromised daytime functioning, which results in discontinuing an on-campus residence (Lau et al., 2013).

In theory, compensating for lack of sleep seems helpful; however, research reveals that such a practice actually facilitates the development of further sleep problems (Gaultney, 2010). Changes in adolescents’ biological sleep processes are a phenomenon not limited by culture or nation as similarities have been demonstrated across cultures (Gruber, 2013). Regardless of one’s socioeconomic status, alcohol use, or late night behaviors, students function better when attaining quality sleep. Thus, regardless of the biological mechanisms and environmental factors that contribute to one’s sleep quality,



sleep patterns are capable of undergoing modification (Gruber, 2013). Retiring and waking the same times each day to stabilize the circadian rhythm is one way of enhancing sleep quality (Forquer et al., 2008). Following additional sleep hygiene recommendations such as using the bed strictly for sleeping and maintaining a comfortable bedroom environment also enhance sleep quality (Forquer et al., 2008). Simply getting in bed at a time that *allows* for the opportunity to achieve a full eight hours of sleep is not enough. In addition, it is essential that individuals actually sleep well rather. Young adults who are healthy and good sleepers attain efficient sleep during which 95% of the total time in bed is spent sleeping, leaving only 5% of total time awake (Hirshkowitz, 2004).

“How did you sleep?” is a common question asked whether staying at a bed and breakfast, Motel 8, or a relative’s home. Whether answering politely or honestly, individuals tend to not give an accurate rating of their sleep quality. According to researchers, individuals typically estimate sleep on the basis of whether they feel refreshed and the inability to recall information throughout the duration between going to bed and waking (Hirshkowitz et al., 1997). Simply allowing for 8 ½ hours of sleep by remaining in the bed from midnight to 8:30 am does not ensure that an individual acquires a quality night’s rest. Sleep quality is defined as the sleep efficiency ratio of time spent asleep to the amount of time spent in bed). Thus, several factors must be taken into account when determining sleep quality. One’s subjective view of sleep quality, actual sleep disturbances, frequency of bad dreams, use of sleeping medications, and daytime fatigue all impact sleep quality (Orsal et al., 2012). However, fatigue is not always resolved via more sleep (Buysse, Grunstein, Horne, & Lavie, 2010). An

individual's age, surrounding environment, social, health and economic circumstances may also impact sleep quality (Orsal et al., 2012). Researchers also found that the subjective perception of inadequate sleep among individuals with insomnia may actually perpetuate the feeling of impaired daytime functioning (Huang, Zhou, Li, Lei, & Tang, 2012).

Although one's eyes are usually closed during sleep, by no means does the brain "shut off" as an individual drifts off to sleep. Sleep is comprised of much more than just resting one's eyes, cat napping, or drifting off to wonderland. Instead it consists of two basic states of sleep: rapid eye movement (REM) and non-rapid eye movement (NREM), non-rapid eye movement, which is further comprised of four stages of sleep (Purves et al., 2001). Research has demonstrated that REM sleep has an explicit positive effect on the degree to which individuals can recall emotional recognition memories (Groch, Wilhelm, Diekelmann, & Born, 2013).

Sleep is a brain process that is best measured through the use of electrical activity brain recordings (Hirshkowitz et al., 1997). These recordings are measured via electroencephalographs (EEGs), which are machines that graphically produce a depiction of brain waves (Dement, 1999). These graphic representations are divided into four specific categories: delta, theta, alpha, and beta (Hirshkowitz et al., 1997). Beta waves are depicted as rapid, low-voltage waves and are typically apparent as an individual enters a state of calm wakefulness (Dement, 1999). Alpha waves are followed by lower-frequency waves referred as theta waves.

Sleep onset begins with a cycling through the NREM stages (Orsal et al., 2012). This transition is known as stage 1 sleep and is considered "light sleep" (Dement, 1999).

Stage 2 sleep is recognized on the basis of the presence of two brain waves that are unique to sleep: K-complexes and sleep spindles (Dement, 1999). Stage 3 sleep is considered the first stage of deep sleep, which is followed up by Stage 4 sleep and then a return to Stage 3 sleep (Dement, 1999). The next stage is typically REM sleep, which is comprised of rapid eye movements, loss of voluntary muscle tone, and a temporary paralysis of the body (Orsal et al., 2012). This temporary paralysis is the result of nerve signals for movement being intercepted and blocked along the spinal cord (Dement, 1999).

According to research, there are three mechanisms for regulating sleep: autonomic nervous system balance, homeostatic sleep drive, and circadian rhythms. Each of these mechanisms maintains a refined equilibrium between sleep and wakefulness in adjunct to sudden transitions of sleep times and duration (Hirshkowitz, 2004). The activation of the sympathetic nervous system, often leading to disruption of sleep, forms the basis of the autonomic nervous system's involvement in the regulation of sleep (Hirshkowitz, 2004). Once activated, whether by endogenous causes, such as fear, anxiety, muscle tension, or chronic pain or exogenous sources, such as stimulants, extreme heat, or startling noises, return to autonomic balance may be delayed due to the long refractory period that exists following sympathetic activation (Hirshkowitz, 2004). Circadian rhythms are the 24-hour biological rhythms present in the sleep/wake cycle (Hasler, Smith, Cousins, Bootzin, 2012). Lack of synchrony between this biological rhythm and scheduled bedtime can impair sleep (Hirshkowitz, et al., 1997). Adolescents undergo changes in circadian preferences that are most apparent between 12 and 14 years of age (Randler, 2011). This shift from morning-ness to evening-ness may be due to

changes in the HPA axis, specifically cortisol (Randler, 2011). Such an alteration in one's sleep structure does not go unnoticed by the sleep deprived.

A recent study found a relationship between sleep onset and dysfunctional thoughts; the majority of adolescents diagnosed with delayed sleep-phase disorder (DSPD) reported catastrophising thoughts related to school performance, interpersonal relationships, and the effects of sleep on one's health (Hiller, Lovato, Gradisar, Oliver, & Slater, 2014). Delayed sleep-phase disorder is classified as a circadian rhythm disorder in which individuals are unable to fall asleep at the desired bedtime due to the biology of their sleep rhythm, thus promoting sleep during a later time that does not fit with the desired sleep schedule (Stepanski, 2003). Perhaps 7% of adolescents are affected by this disorder (Dawson, 2005). Unfortunately, young people continue to suffer as a result of this natural epidemic. School bells ring at earlier times than ever before despite the association between early school start times and significant sleep deprivation (Carskadon, Wolfson, Acebo, Tzischinsky, & Seifer, 1998).

Nutrition is believed to impact healthy sleep, but researchers have yet to determine what, if any, particular foods promote better sleep (Dement, 1999). One study found a correlation between low- fat and low- cholesterol diets and less daytime sleepiness (Grandner, Jackson, Gerstner, & Knutson, 2014). Instilling a healthy diet is no easy task, and in a fast-paced society comprised of deadlines and due dates, it is not surprising that many young adults turn to caffeine for alertness. According to the National Sleep Foundation Sleep and Teens Task Force 2000, 75% of Americans adolescents ingest caffeine to stay alert (Vallido, Peters, O'Brien, & Jackson, 2009). Drinking energy drinks and caffeinated beverages may provide immediate relief, but it

also propels a negative loop of sleep dysfunction; whereas, subtle long-term changes in one's diet may help individuals attain healthy sleep. Maintaining a calcium enriched diet may be helpful in regards to sleep considering that calcium intake is associated with decreased difficulty falling asleep and non-restorative sleep (Grandner et al., 2014). Difficulty falling asleep is associated with a reduction of selenium, a micronutrient found in many types of meat, seafood, and grains (Grandner et al., 2014). However, sleep problems affect one's health and contribute to further weight problems (Dement, 1999).

Weight problems such as obesity can also increase one's chance of developing sleep apnea, which is known to affect sleep quality (Dement, 1999). Beginning at an early age, children sleeping less are more likely to experience obesity years later as their BMI increases (Magee, Caputi, & Iverson, 2014). One study found that children who continuously attain less sleep than other children are more likely to eat as a result of external sensory influences, sight and smell (Burt, Dube, Thibault, & Gruber, 2014). Just as cognitions shape one's mental health, thinking in terms of dietary restrictions are related to one's physical health, linking dietary restrictive thinking to overeating, obesity, and dysfunction in circadian sleep mechanisms (Burt et al., 2014). Therefore, sleep and nutrition, though separate realms of health, do impact one another to some degree.

### **Nutrition**

Obesity is a chronic health condition related to an excess amount of body fat (Turco, Bobbio, Reimão, Rossini, Pereira, & Barros Filho, 2012). Excess weight is often associated with a whole host of health problems including high blood pressure, high blood cholesterol, type 2 diabetes, and coronary heart disease. Insulin-dependent type 1 diabetes was considered far more common than type 2 diabetes among younger

generations until the 1990's when obesity rates began to sky rocket among children and adolescents, placing type 2 diabetes at the forefront of health concerns (Tamborlane & Klingensmith, 2013).

Due to the multifactorial nature of obesity, it is not an easy condition to treat. In addition to the multitude of health concerns created as a result of obesity, social and psychological difficulties are also involved. Obese children and adolescents are often faced with teasing, bullying, and peer rejection, which may lead to low self-esteem (Stephenson & Taylor, 2012). Statistics from the third National Health and Nutrition Examination Survey (1998) reveal that 97 million Americans are overweight or obese. Supply and demand help sustain obesity as individuals' eating behaviors are influenced not only by what food choices they desire, but also by the availability of food choices. Some members of society do not have access to healthy food choices (Gittelsohn & Lee, 2013). Obesity and accompanying diseases not only create a cost at the expense of one's health, but also financial costs. According to the 1998 National Institute of Health Evidence Report, the United States alone spends close to \$100 billion annually for obesity-related diseases. Thus, while unhealthy foods may be affordable and thus appealing to low-income families, the long-term effects of unhealthy eating are expensive and far outweigh the savings on the front end.

Once considered the time of optimal health, the transition between adolescence and young adulthood is now regarded as a critical time for developing life-long habits. Unfortunately, research demonstrates that for this generation's adolescents, unhealthy habits such as increasing body weight and unhealthy eating, both of which may lead to obesity and other health conditions, are developing rapidly (Nelson et al., 2008). For

many late adolescents and emerging adults, this period of development is a time of leaving the comfort of one's home in order to pursue an individual identity through the institution of college or the workforce. Individuals who pursue a college degree face many changes. Physical exercise and healthy eating are much more prevalent amongst high school students than college students, for whom a drastic decline occurs (Strong, Parks, Anderson, Winett, & Davy, 2008). Areas that once went undetected, such as the importance of maintaining proper nutrition, become an area of struggle and difficulty as individuals transition from their previous familial environment to the independent lifestyle associated with college (LaFountaine, Neisen, & Larsen, 2007). According to the American College Health Association, over one-third of college students meet the criteria for overweight or obese (Sander, 2012). Taste, cost, nutrition, convenience, and concern with one's weight affect decision-making with respect to food consumption (Glanz, Basil, Maibach, Goldberg, & Snyder, 1998).

Pedersen and Ketcham (2009) investigated the insights and attitudes of student health care providers toward obesity and found that direct care providers agreed that the prevalence of overweight and obese students as well as students presenting with concerns related to blood pressure and blood glucose levels are on the rise. Approximately 70% of college students gain approximately nine pounds during the first two years of their college experience (Racette, Deusinger, Strube, Highstein, & Deusinger, 2005). In a study designed to evaluate the effectiveness of a nutrition module for freshmen in college, some students reported that prior to the study, they were oblivious to the vast amount of calories and fat that existed in fast food and snacks (Kicklighter, Koonce, Rosenbloom, & Commander, 2010).

In another study, college students cited “I am now more aware of healthy food choices in the dining hall” as their reason for making dietary changes following an intervention designed to increase healthy eating habits on college campuses (Peterson, Duncan, Null, Roth, & Gill, 2010). Not only must college students adjust to increased independence, they must also learn to navigate what becomes a chaotic and fast-paced schedule. When hurried, college students tend to resort to eating fast food, typically several times per week (Strong et al., 2008). Another study found that underclassmen and upperclassmen in college frequented fast-food restaurants nearly the same amount, with 95.1% of underclassmen and 91.9% of upperclassmen consuming fast food an average of six to eight times per week (Driskell, Kim, & Goebel, 2005).

While college campuses offer an array of fast food and ready to go meals in the cafeterias and dining halls, the range of the food is narrow (Haberman & Luffey, 1998). Therefore, health decisions are often constrained by one’s environment (Gittelsohn & Lee, 2013). Some college students’ eating arrangements consist of all- you- can- eat dining halls that allow students to overeat, whereas other campuses are comprised of several fast food restaurants such as Burger King and Chick-Fil-A. According to Burger, Kern, & Coleman (2007), when college students are allowed to choose their own portion size such as in an all you can eat dining room setting, students who have a higher BMI are likely to choose more than the suggested amount of food (Burger et al., 2007). In an effort to curb appetites, some colleges have removed trays from dining halls (Sander, 2012). Burger and colleagues (2007) suggest that these individuals do not view their portions as disproportionately larger than what is recommended, but rather they view the portion size as “typical”. In order to attain the recommended variety of foods, including



fruits and vegetables, students may end up having to navigate through several different food station lines, thus forfeiting precious time (Strong, et al., 2008). As a result, students who are rushing between classes or have a deadline to meet are faced with the dilemma of sacrificing valuable time in exchange for a healthy diet or foregoing a healthy diet in order to have adequate time to meet the demands of a hectic college schedule (Strong, et al., 2008). It is also important to note that grocery stores are a scarcity in some, thereby decreasing opportunities for students to avoid fast food lines and snack machines.

College students who live at least 1.76 miles from the local grocery store have a larger BMI than college students who live within a closer proximity to the grocery store (Inagami, Cohen, Finch, & Asch, 2006). Not only are college students who living away from grocery stores likely to have a greater BMI, as the amount of grocery stores within college towns increases, obesity is less prevalent (Bordor, Rice, Farley, Swalm, & Rose, 2010). Researchers have also found that obese children and adolescents are four times more likely to report impaired academic function compared to healthy peers (Schwimmer, Burwinkle, & Varni, 2003). This finding is of significance considering that obese adolescents are at risk of entering college with academic deficiencies and psychosocial impairment as measured by self-reports and parent proxy reports (Schwimmer et al., 2003).

Although obesity rates are creating a stir amongst college campuses, not all campuses experience the same result of unhealthy eating. Haberman & Luffey (1998) investigated the health behaviors at a large urban university and while obesity rates were not alarming, the percentage of students who believed they were overweight was of

concern. Approximately 50% of participants believed they were overweight when in reality their BMI stated otherwise (Haberman & Luffey, 1998). Therefore, researchers should consider the entire spectrum of healthy eating by accentuating the inherent value of proper nutrition versus merely highlighting obesity. Simply reducing one's BMI to an appropriate level does not extinguish unhealthy body image concerns, nor does it eradicate unhealthy eating; rather, students may focus on controlling their BMI via unhealthy methods that could potentially result in further health complications later in life.

While some college students participate in intramurals or sports teams, the vast majority do neither. Rather, they are more concerned with the educational and social aspects of college life. College campuses are comprised of a variety of students, from traditional college student who enroll immediately following high school graduation to nontraditional students who return to college after years in the work force. Most college students are between the ages of 19 and 30 according to the United States Department of Agriculture (USDA); sedentary males within this age group should consume 2400 calories per day, whereas sedentary females of the same age require 2000 calories each day (Normand & Osborne, 2010). In addition, the USDA states that the consumption of fat should be restricted to 25 to 30% of the total required daily caloric intake (Normand & Osborne, 2010). On average, college students consume well below the recommended daily intake of fruits, vegetables, and whole grains (Strong et al., 2008).

College students prefer "bad" carbohydrates to nutrient enriched foods. Hamburgers, ham and cheese sandwiches, and pizza are the most popular selections (Driskell, Meckna, & Scales, 2006). Eating the same type of foods repeatedly rather than

consuming a variety of healthy foods is a common pattern amongst college students. Approximately 76% of college students engage in this behavior, thus illuminating the presence of nutritional deficits (Haberman & Luffey, 1998). Prior to attending college, many late adolescents likely consumed food that was provided by parents without pondering dietary guidelines suggesting college students never actually acquired a healthy knowledge of nutrition.

Interested in improving college students' dietary habits, researchers investigated the relationship between college students' eating behaviors and the extent of their dietary guideline knowledge, finding that college students with a greater knowledge of the dietary guidelines actually chose to eat healthier foods (Kolodinsky, Harvey-Berino, Berlin, Johnson, & Reynolds, 2007). Advancing understanding of the factors that propel college students toward unhealthy eating that may lead to obesity and other health problems may help policy makers and health professionals to create more effective health campaigns against obesity. Instead of college years being synonymous with the development of unhealthy habits, these years may be a foundation for healthy changes, presenting fresh opportunities for the introduction of new habits that may lead to both short and long-term health benefits (Sander, 2012).

### **The Present Study**

This study examined the effects of individual factors, such as self-efficacy, on motivating college students to take a more proactive approach in regards to their health and wellbeing in an era of ample access to technology. The present study provided many of the experimental aspects of the previously mentioned message-framing studies, yet this

study is unique in that it examined two types of health-related behaviors that are considered areas related to health concerns for college students: nutrition and sleep.

One goal of this study is to see if the way nutritional and sleep hygiene information is framed affects college students' acceptance of the message, intention to perform the recommended behavior, and actual performance of the behavior. In addition, it is important to take into account that immediate post-message good intentions may not translate into enduring behavioral change (Meyerowitz & Chaiken, 1987). Considering how challenging it can be to change learned or long-standing behaviors related to nutrition and sleep, having a strong belief in one's abilities to make appropriate changes, such as improving one's diet or practicing good sleep hygiene techniques, should facilitate actual behavioral changes. Thus, it is predicted that college students with high self-efficacy (belief they can carry out the recommended behaviors) are more likely to perform the requested behaviors than low self-efficacious individuals who do not feel capable of successfully performing the behaviors. In addition, high self-efficacy individuals who receive nutritional and sleep hygiene messages that are framed in congruence with their chronic regulatory focus are more likely to follow the specified recommendations than students who receive messages that are incongruent with their chronic regulatory focus and who have low self-efficacy. Furthermore, individuals who are presented with a technologically enhanced from a credible source will report greater agreement with promotion-framed messages than individuals who receive a message from a non-credible source in the traditional paper-pencil format, regardless of the message frame.

The present study aimed to learn whether the format of the message (traditional paper-pencil, technologically enhanced) also influenced behavioral intentions and actual behaviors. Considering that today's college students have been reared in various technological environments, it seems reasonable that they would be more responsive to health recommendations presented in a clear, easily accessible manner. Perhaps reading health recommendations presented in the traditional paper-pencil format actually impedes one's feelings of self-efficacy. Thus, it may be time to reconsider the way we try to "reach" the public to create healthy changes.

The information gained from this study assists health education specialists and policy makers in designing effective health care recommendations that not only increase one's self-efficacy, but also take into account individual factors including self-efficacy, presentation of the message, and one's chronic regulatory focus.

Each of the hypotheses below include the two previously mentioned health domains, nutrition and sleep hygiene, thereby focusing on the two most significant issues pertaining to the health of the college population: obesity and sleep deprivation.

#### **Hypothesis 1A**

Individuals presented with a technologically based health message will demonstrate significantly greater behavioral intentions, find the message more persuasive, and actual behavior will be significantly greater than individuals in the traditional paper-pencil health message group for both sleep and nutrition.

#### **Hypothesis 1B**

Individuals presented with a technologically based gain-framed health message will demonstrate significantly greater behavioral intentions, find the message more

persuasive, and actual behavior will be significantly greater than individuals receiving the traditional paper-pencil gain-framed message for both sleep and nutrition.

### **Hypothesis 1C**

Individuals presented with a technologically based loss-framed health message will demonstrate significantly greater behavioral intentions, find the message more persuasive, and actual behavior will be significantly greater than individuals receiving the traditional paper-pencil loss-framed message for both sleep and nutrition.

### **Justification for Hypothesis One (1A, 1B, 1C)**

Little research exists concerning technology and message framing; however, with the up rise of technology, this is an important area for exploration in the area of behavioral health. Prybutok (2013) found that messages presented in the form of YouTube resulted in statistically significant improvement in knowledge of safe sex practices and STD prevention amongst 18 to 24 year-old participants. Therefore, it is plausible that college students will show greater behavioral intentions and actual changes in behaviors when provided with a technologically enhanced health message versus a message via traditional paper and pencil format. Considering that healthy eating and sleep hygiene are considered preventative behaviors rather than detection behaviors, it is predicted that individuals will engage in these healthy behaviors when messages are presented in the form of gain-frames rather than loss-frames. However, regardless of whether the presented messages accentuate the positives of engaging in the suggested behavior or the negatives of neglecting to engage in the health promoting behaviors, it is hypothesized that college students will rate technologically presented messages as more

persuasive and demonstrate greater behavioral intentions and actual behavioral change than messages presented in the traditional format.

### **Hypothesis 2A**

Individuals presented with a technologically based gain-framed health message will demonstrate significantly greater behavioral intentions, find the message more persuasive, and actual behavior will be significantly greater than individuals receiving the technologically based loss-framed message for both sleep and nutrition.

### **Hypothesis 2B**

Individuals presented with a traditional paper-pencil gain-framed message will demonstrate significantly greater behavioral intentions, find the message more persuasive, and actual behavior will be significantly greater than individuals receiving the traditional paper-pencil loss-framed message for both sleep and nutrition.

### **Justification for Hypothesis Two (2A, 2B)**

According to Rothman and Salovey (1997), prevention-oriented behaviors such as applying sunscreen in order to prevent skin cancer involve little risk to the individual and therefore will be more positively received via gain-framed messages in which the positives of performing the behavior are accentuated versus the negative of not performing the behavior (loss-frames). Thus, nutrition and sleep hygiene will both be considered prevention-oriented behaviors rather than detection-oriented behaviors (i.e., breast exams); therefore, using gain-framed messages in which the benefits of healthy eating and proper sleep hygiene are highlighted will result in greater receptivity of the message for both sleep and nutrition.

**Hypothesis 3A**

Individuals who have a chronic promotion regulatory focus and are presented with a technologically based gain-framed message will demonstrate significantly greater behavioral intentions, find the message more persuasive, and actual behavior will be significantly greater than chronic prevention regulatory focused individuals presented with a technologically based gain-framed message for both sleep and nutrition.

**Hypothesis 3B**

Chronic promotion regulatory focused individuals who are presented with a technologically based loss-framed message will demonstrate significantly greater behavioral intentions, find the message more persuasive, and actual behavior will be significantly greater than chronic prevention regulatory focused individuals presented with a traditional paper-pencil loss framed message for both sleep and nutrition.

**Hypothesis 3C**

Individuals with a chronic promotion regulatory focus will show significantly greater behavioral intentions, find the message more persuasive and actual behavior would be significantly greater when presented with a technologically based gain-framed message than chronic promotion regulatory focused individuals presented with a technologically based loss-framed message for both sleep and nutrition.

**Hypothesis 3D**

Individuals with a chronic prevention regulatory focus will show significantly greater behavioral intentions, find the message more persuasive, and actual behavior will be significantly greater when presented with a technologically based loss-framed message



than chronic prevention regulatory focused individuals presented with a technologically based gain-framed message for both sleep and nutrition.

#### **Justification for Hypothesis Three (3A, 3B, 3C, 3D)**

According to Higgins (2000), individuals are more committed to healthy behavioral changes when their chronic regulatory focus matches the frame of the message that they receive, thus producing a chronic regulatory fit. Given a promotion-focused message encouraging physical activity, individuals holding a promotion-focused view actually outperformed their prevention-focused counterparts in regards to physical activity (Latimer et al., 2008).

#### **Hypothesis 4A**

Individuals with higher self-efficacy will show significantly greater behavioral intentions, find the message more persuasive, and actual behavior will be significantly greater than it would be for individuals with low self-efficacy regardless of the frame they receive, for both sleep and nutrition.

#### **Hypothesis 4B**

Individuals with high self-efficacy who are presented with a gain-framed message will demonstrate significantly greater behavioral intentions, find the message more persuasive, and actual behavior would be significantly greater than it will be for individuals with low self-efficacy who are presented with a gain-framed message for both sleep and nutrition.

#### **Hypothesis 4C**

Individuals with high self-efficacy who are presented with a loss-framed message will demonstrate significantly greater behavioral intentions, find the message more

persuasive, and actual behavior would be significantly greater than it will be for individuals with low self-efficacy who are presented with a loss-framed message for both sleep and nutrition.

#### **Hypothesis 4D**

Individuals with high self-efficacy who are presented with a technologically based gain-framed message will demonstrate significantly greater behavioral intentions, find the message more persuasive, and actual behavior would be significantly greater than it will be for individuals with low self-efficacy who are presented with a technologically based gain-framed message for both sleep and nutrition.

#### **Hypothesis 4E**

Individuals with high self-efficacy who are presented with a technologically based loss-framed message will demonstrate significantly greater behavioral intentions, find the message more persuasive, and actual behavior would be significantly greater than it will be for individuals with low self-efficacy who are presented with a technologically based loss-framed message for both sleep and nutrition.

#### **Hypothesis 4F**

Individuals with high self-efficacy who are presented with a technologically based gain-framed message will demonstrate significantly greater behavioral intentions, find the message more persuasive, and actual behavior will be significantly greater than it would be for individuals with low self-efficacy who are presented with a traditional paper-pencil based gain-framed message for both sleep and nutrition.

**Justification for Hypothesis Four (4A, 4B, 4C, 4D, 4E, 4F)**

Werrij, Ruiter, Van't Riet, and Vries (2010) examined self-efficacy as a moderator of the effectiveness of framed health messages and found that gain-framed messages are more influential than loss-framed messages when encouraging self-efficacious individuals to engage in healthy behaviors. Becker et al., (1993) found that high self-efficacious individuals will respond consistently regardless of frame because they will see a task as a manageable challenge that can be accomplished and will persist and endure longer than low self-efficacious individuals. One study found that when a message matches an individual's long-standing disposition the result is greater self-efficacy, producing stronger intentions to perform the suggested behavior as well as actual behavior change (Sherman, Mann, & Updegraff, 2006). One researcher found that regulatory-efficacy fit enhances the effectiveness of health messages (Kim, 2006).

## **CHAPTER TWO**

### **METHOD**

#### **Participants**

There were 151 students enrolled at a university in Northern Arkansas who participated in this study in exchange for an opportunity to win one of four \$50.00 gift cards. However, as a result of outliers, the final sample size consisted of 137 participants. Efforts were made to recruit a balanced sample in regards to gender and racial/ethnic diversity. The sample was representative of both female and male participants (51.8% female, 48.2% male). Most participants were unmarried/single (94.9%), around 20 years in age ( $M = 19.85$ ,  $SD = 2.22$ ), and had been at the university for approximately 2 years ( $M = 2.15$ ,  $SD = 1.18$ ). The ethnic identity of the sample was predominantly Caucasian (84.6%).

#### **Design**

A 2 (Format: technologically-based or traditional paper-pencil) x 2 (Self-Efficacy: low or high) x 2 (Message Frame: gain or loss) x 2 (Chronic Regulatory Focus: promotion or prevention) between-subjects design was implemented.

#### **Measures and Materials**

Demographic and Education Questions were included as a tool for assessing demographic data of the sample. The demographics questionnaire consisted of general

questions regarding the participant's academic rank, relationship status, age, gender, and ethnicity (see Appendix B).

Nutrition Management and Sleep Hygiene Health Information consisted of both gain framed and loss framed health information messages presented in the traditional paper-pencil format or the technologically enhanced format. Regardless of format, two domains were covered in separate messages, which included nutrition management and sleep hygiene. Gain frames and loss-frames were manipulated by wording possible outcomes in terms of potential gains or losses. Both the gain-framed and loss-framed presentations attended to issues related to nutrition and sleep deprivation among college students. Each presentation included risk factors, recommended behaviors, the importance of adherence, facts about nutrition and sleep hygiene, and the importance of healthy eating and sleep hygiene behaviors amongst college students. Each presentation was approximately 10 minutes in duration. PowerPoint slides and written text were identical in the factual information conveyed, differing only in manner in which the messages were framed and presented (see Appendix C).

General Regulatory Focus Measure (GRFM, Lockwood, Jordan, & Kunda, 2002) is an 18-item scale measuring individuals' orientation toward their goals. This determination is reached on the basis of which of two possible end-states is employed in goal regulation. Comprised of two subscales, the GRFM distinguishes individuals' orientations as either a promotion or prevention focus. The promotion subscale consists of 9 items (items 3, 5, 6, 8, 12, 14, 16, 17, 18) and the prevention subscale consists of 9 items (items 1, 2, 4, 7, 9, 10, 11, 13, 15). The General Regulatory Focus Measure uses a Likert type response scale ranging from 1 (not at all true of me) to 9 (very true of me).

Scores on the two scales combine to form a single index of motivational orientation by subtracting the prevention mean from the promotion mean. Higher scores on either the promotion or prevention subscale indicate individuals' current attitudes in regards to goal attainment. Promotion focus is defined as regulation fixed on the positive reference point of a "gain" (i.e., a goal to achieve a desirable end-state and avoid the absence of this state), whereas prevention focus is defined as regulation fixed on the negative reference point of a "loss" (i.e., a goal to avoid an undesirable end-state and achieve an absence of this state). A promotion goal is reached when the current state complements the desired state of a gain, whereas a prevention goal is achieved when a state of non-loss has been reached. The promotion scale and the prevention scale both exhibit good internal reliability ( $\alpha = 0.81$  for the promotion scale;  $\alpha = 0.75$  for the prevention scale; Lockwood et al., 2002). Appendix D provides both subscales. Within the current sample, when combining both scales  $\alpha = 0.71$ ; When examining the individual scales within the current sample  $\alpha = 0.59$  for the promotion scale and  $\alpha = 0.81$  for prevention scale.

General Self-Efficacy Scale (GSE; Schwarzer & Jerusalem, 1995) consisted of a 10-item scale measuring general perceived self-efficacy, which closely resembles the concept of "hope" (Luszczynska, Gutierrez-Dona, & Schwarzer, 2005). The GSE measures a variety of beliefs used for managing life's demands such as, "I can solve most problems if I invest the necessary effort." Within the current study, self-efficacy was dichotomized prior to analysis and a median split was done on self-efficacy, scores below the median (a score of 32) reflected 'low' self-efficacy and scores above the median reflected 'high' self-efficacy. Several studies confirmed high reliability, stability, and construct validity for the GSE (Leganger, Kraft, & Røysamb, 2000; Schwarzer et al.,

1997a; Schwarzer & Born, 1997; Schwarzer, Born, Iwawaki, Lee, Saito, & Yue, 1997b; Schwarzer, Mueller, & Greenglass, 1999 as cited in Luszczynska et al., 2005). Originally formulated in the German language, the GSE has been adapted for use in many languages, making it a culturally diverse instrument. In regards to American students, the English version of the GSE was found to have a Cronbach's alpha of .79 (Luszczynska et al., 2005). Self-esteem and optimism positively correlate with the GSE, whereas anxiety and depression negatively correlate with this instrument (Schwarzer et al., 1999). Appendix E provides this scale. Within the current sample,  $\alpha = .80$ .

Persuasiveness of the Message was assessed using a single item in which participants rated the extent to which they agreed with the nutrition informed message and the sleep hygiene informed message using a 9-point scale, from 1 *not at all* to 9 *very much* (See Appendix F).

Behavioral Intentions consisted of a single item that measured participants' likelihood to adhere to healthy eating and sleep hygiene recommendations. Consistent with procedures employed by Rothman et al., (1992), participants indicated responses on a 9-point scale, from 1 *extremely unlikely* to 9 *extremely likely* (See Appendix G).

Actual Behavioral Outcome measured whether the participant demonstrated marked interest in attaining further information regarding healthy eating and sleep habits. Participants' behavioral outcomes were measured in the form of a dichotomous variable as to whether the participant actually attempted to gain more information related to the health messages when presented with the opportunity to do so.

Participants were thanked in writing for their participation in the study. In addition, this page supplied participants with a web address providing the opportunity to

access further information regarding sleep hygiene and healthy eating. Participants were asked to provide their assigned user number in order to access the online information (See Appendix H). Included in the Appendix, the format of the online follow-up served to inform participants of additional healthy eating options, tips for healthy eating, sleep hygiene recommendations, and goal-setting techniques as well as a brief quiz. Participants were required to enter their assigned user number in order to access the additional information.

### **Procedure**

After IRB approval, participants were recruited from a university in Northern Arkansas. They were provided with a brief overview of the study and then presented with a consent form to review (see Appendix A). Participants who agreed to participate did so by signing the consent form for the experiment, verifying that they understood the study as well as the risks and benefits. This form also clarified that participation was voluntary and that all survey responses would remain confidential. Once the consent forms were signed, the study was briefly summarized, including that the experiment would consist of several questionnaires that would take approximately 15 minutes to complete. Participants were also given brief instructions and then were asked if they had any questions. Once all questions were answered, participants were given the survey packet materials containing a self-efficacy baseline measure, the General Regulatory Focus Measure (GRFM), and the General Self-Efficacy Scale. Approximately one half of participants were randomly assigned to the gain-framed condition ( $n = 76$ ) and the other half were randomly assigned to the loss-framed condition ( $n = 74$ ). In addition, approximately half of the participants were randomly assigned to the traditional paper-



pencil format ( $n = 80$ ) while the other half received a technologically enhanced format ( $n = 70$ ). All participants received two individual messages, one concerning sleep hygiene, the other concerning nutrition. Messages consisted of health information related to the importance of developing and maintaining a nutritious diet as well as the consequence of heeding sleep hygiene recommendations. Following the messages, participants received post message assessments. Participants rated the persuasiveness of each individual message. Specifically, participants were asked to specify the degree to which they agreed with the message. In addition, participants' intentions to perform each recommended health behavior were also assessed. Lastly, participants' actual behaviors were assessed. Participants were presented with the opportunity to attain further information regarding sleep hygiene and nutrition following the reception of the messages and the completion of the questionnaires. Participants were provided with an online link to a site containing additional nutrition and sleep hygiene information. Participants were asked to enter their user number in order to access this information. As a result, the researcher had the opportunity to monitor whether participants sought to gain further information regarding healthy eating and sleep hygiene.

### **Data Analysis**

Frequency and percentages were calculated for demographic variables. Means, standard deviations, ranges, and reliabilities for variables in the study were calculated. Data was inspected for skewness, kurtosis, outliers, and other potential problems. The relationships between variables were examined through correlations. The data was examined in terms of the three primary dependent variables: intention to perform behavior, persuasiveness of the message, and actual behavior. A Multivariate analysis of

variance (MANOVA) was conducted in order to explore the relationship between the four independent variables (the format of the message, message frame, chronic regulatory focus, and self-efficacy) and individuals' patterns of response in regards to two dependent variables (intention to perform health behaviors and persuasiveness of the message) for both sleep and nutrition. Thus, participants received two separate health messages, one sleep hygiene message and a nutrition message. For hypotheses related to persuasiveness and behavioral intentions, a MANOVA was conducted. For the hypotheses examining actual behavior, which consisted of a dichotomous variable, a chi-square was employed.

### **Hypotheses 1A – 1C**

When examining the relationship of how framing and message format influenced persuasiveness of the message as well as how it influenced behavioral intentions, a MANOVA was conducted. The independent variables were message frame and format of the message. The dependent variables were persuasiveness of the message and behavioral intentions. For examining the relationship between message frame and actual behavior, a chi-square was employed.

### **Hypothesis 1A**

This hypothesis stated that individuals presented with a technologically based health message would demonstrate significantly greater behavioral intentions, find the message more persuasive, and actual behavior would be significantly greater than individuals in the traditional paper-pencil health message group for both sleep and nutrition.

In particular, individuals presented with technology frames would demonstrate significantly greater behavioral intentions in addition to reporting more message persuasiveness. The relationships between behavioral intentions, persuasiveness of the message, and the frame of the message were examined within the MANOVA.

This hypothesis also stated that individuals presented with a technologically based message would demonstrate significantly greater actual behavior than individuals in the pencil-paper condition as evidenced by an attempt to gain additional information related to the health messages.

### **Hypothesis 1B**

This hypothesis stated that individuals presented with a technologically based gain-framed health message would demonstrate significantly greater behavioral intentions, find the message more persuasive, and actual behavior would be significantly greater than individuals receiving the traditional paper-pencil gain-framed message for both sleep and nutrition.

Within the MANOVA conducted, this hypothesis was examined by exploring gain-framed messages within the frame format (technology versus traditional text format) as the independent variables and behavioral intentions and persuasiveness of the message as the dependent variables.

This hypothesis also stated that individuals presented with a technologically based gain-framed message would demonstrate significantly greater actual behavior than individuals receiving the traditional pencil-paper gain-framed message as evidenced by an attempt to gain additional information related to the health messages. A chi-square

was employed in order to examine the relationship between message frame and actual behavior.

### **Hypothesis 1C**

This hypothesis stated that individuals presented with a technologically based loss-framed health message would demonstrate significantly greater behavioral intentions, find the message more persuasive, and actual behavior would be significantly greater than individuals receiving the traditional paper-pencil loss-framed message for both sleep and nutrition.

In particular, individuals presented with a technology based loss-framed message would demonstrate significantly greater behavioral intentions in addition to reporting more message persuasiveness. The relationships between behavioral intentions, persuasiveness of the message, the format of the message, and the frame of the message were examined within the MANOVA.

This hypothesis also stated that individuals presented with a technologically based loss-framed message would have significantly greater actual behavior than individuals in the traditional pencil-paper loss-framed condition as evidenced by an attempt to gain additional information related to the health messages.

### **Hypotheses 2A and 2B**

When examining how framing and message format influenced how persuasive the message was as well as how it influenced behavioral intentions, a MANOVA was conducted. The independent variables were message frame and format of the message. The dependent variables were persuasiveness of the message and behavioral intentions.

For examining the relationship between message frame and actual behavior, a chi-square was employed.

### **Hypothesis 2A**

This hypothesis stated that individuals presented with a technologically based gain-framed health message would have significantly greater behavioral intentions, find the message more persuasive, and actual behavior would be significantly greater than individuals receiving the technologically based loss-framed message for both sleep and nutrition.

In particular, individuals presented with a technology based gain-framed message would demonstrate significantly greater behavioral intentions and report more message persuasiveness. The relationships between behavioral intentions, persuasiveness of the message, the format of the message, and the frame of the message were examined within the MANOVA.

This hypothesis also stated that individuals presented with a technologically based gain-framed message would demonstrate significantly greater actual behavior than individuals in the technologically based loss-framed condition as evidenced by an attempt to gain additional information related to the health messages.

### **Hypothesis 2B**

The hypothesis stated that individuals presented with a traditional paper-pencil gain-framed message would demonstrate significantly greater behavioral intentions, find the message more persuasive, and actual behavior would be significantly greater than

individuals receiving the traditional paper-pencil loss-framed message for both sleep and nutrition.

In particular, individuals presented with the traditional paper-pencil gain-framed message would demonstrate significantly greater behavioral intentions in addition to reporting more message persuasiveness. The relationships between behavioral intentions, persuasiveness of the message, the format of the message, and the frame of the message were examined within the MANOVA.

This hypothesis also stated that individuals presented with the traditional paper-pencil gain-framed message would demonstrate significantly greater actual behavior than individuals in the traditional paper-pencil loss-framed condition as evidenced by an attempt to gain additional information related to the health messages. A chi-square was employed in order to examine the relationship between message frame and actual behavior.

### **Hypothesis 3A**

The hypothesis stated that individuals who have a chronic promotion regulatory focus and are presented with a technologically based gain-framed message would have significantly greater behavioral intentions, find the message more persuasive, and actual behavior would be significantly greater than chronic prevention regulatory focused individuals presented with a technologically based gain-framed message for both sleep and nutrition.

In particular, individuals with a chronic promotion regulatory focus presented with a technologically based gain-framed message would demonstrate significantly greater behavioral intentions in addition to reporting more message persuasiveness. The

relationships between behavioral intentions, persuasiveness of the message, the format of the message, and the frame of the message, and one's chronic regulatory focus were examined within the MANOVA.

This hypothesis also stated that individuals with a chronic promotion regulatory focus presented with a technologically based gain-framed would demonstrate significantly greater actual behavior than chronic prevention regulatory focused individuals presented with a technologically based gain-framed message. A chi-square was employed in order to examine the relationship between message frame and actual behavior.

### **Hypothesis 3B**

The hypothesis stated that chronic promotion regulatory focused individuals who are presented with a technologically based loss-framed message would have significantly greater behavioral intentions, find the message more persuasive, and actual behavior would be significantly greater than chronic prevention regulatory focused individuals presented with a traditional paper-pencil loss framed group for both sleep and nutrition.

Within the MANOVA conducted, this hypothesis was examined by looking at one's chronic regulatory focus (promotion versus prevention), the format of the message (technology enhanced versus paper-pencil format), and the frame of the message as the independent variables and behavioral intentions and persuasiveness of the message as the dependent variables.

This hypothesis also stated that chronic promotion regulatory focused individuals presented with a technologically based loss-framed message would demonstrate significantly greater actual behavior than chronic prevention regulatory focused

individuals presented with a traditional paper-pencil loss framed group as evidenced by an attempt to gain additional information related to the health messages. A chi-square was employed in order to examine the relationship between message frame and actual behavior.

### **Hypothesis 3C**

The hypothesis stated that chronic promotion regulatory focused individuals would show significantly greater behavioral intentions, find the message more persuasive, and actual behavior would be significantly greater when presented with a technologically based gain-framed message than chronic promotion regulatory focused individuals presented with a technologically based loss-framed message for both sleep and nutrition.

Within the MANOVA conducted, this hypothesis was examined by looking at one's chronic regulatory focus (promotion versus prevention), the format of the message (technology enhanced versus paper-pencil format), and the frame of the message as the independent variables and behavioral intentions and persuasiveness of the message as the dependent variables.

This hypothesis also stated that chronic promotion regulatory focused individuals presented with a technologically based gain-framed message would demonstrate significantly greater actual behavior than chronic prevention regulatory focused individuals presented with a technologically based loss framed group as evidenced by an attempt to gain additional information related to the health messages. A chi-square was employed in order to examine the relationship between message frame and actual behavior.



### **Hypothesis 3D**

The hypothesis stated that individuals with a chronic prevention regulatory focus would show significantly greater behavioral intentions, find the message more persuasive, and actual behavior would be significantly greater when presented with a technologically based loss framed message than chronic prevention regulatory focused individuals presented with a technologically based gain-framed message for both sleep and nutrition.

Within the MANOVA conducted, this hypothesis was examined by looking at one's chronic regulatory focus (promotion versus prevention), the format of the message (technology enhanced versus paper-pencil format), and the frame of the message as the independent variables and behavioral intentions and persuasiveness of the message as the dependent variables.

This hypothesis also stated that chronic prevention regulatory focused individuals presented with a technologically based loss-framed message would demonstrate significantly greater actual behavior than chronic prevention regulatory focused individuals presented with a technologically based gain-framed group as evidenced by more attempts to gain additional information related to the health messages. A chi-square was employed in order to examine the relationship between message frame and actual behavior.

### **Hypothesis 4A**

The hypothesis stated that individuals with higher self-efficacy would show significantly greater behavioral intentions, find the message more persuasive, and actual

behavior would be significantly greater than it would be for individuals with low self-efficacy regardless of the frame they receive for both sleep and nutrition.

In particular, individuals with higher self-efficacy would demonstrate significantly greater behavioral intentions in addition to reporting more message persuasiveness. The relationships between behavioral intentions, persuasiveness of the message, and self-efficacy were examined within the MANOVA.

This hypothesis also stated that individuals with higher self-efficacy would demonstrate significantly greater actual behavior than individuals with low self-efficacy as evidenced by an attempt to gain additional information related to the health messages. A chi-square was employed in order to examine the relationship between message frame and actual behavior.

#### **Hypothesis 4B**

The hypothesis stated that individuals with high self-efficacy who are presented with a gain-framed message would have significantly greater behavioral intentions, find the message more persuasive, and actual behavior would be significantly greater than it would be for individuals with low self-efficacy who are presented with a gain-framed message for both sleep and nutrition.

In particular, individuals with higher self-efficacy who are presented with a gain-framed message would demonstrate significantly greater behavioral intentions in addition to reporting more message persuasiveness. The relationships between behavioral intentions, persuasiveness of the message, the frame of the message, and self-efficacy were examined within the MANOVA.

This hypothesis also stated that individuals with higher self-efficacy who are presented with a gain-framed message would demonstrate significantly greater actual behavior than individuals with low self-efficacy who are presented with a gain-framed message as evidenced by an attempt to gain additional information related to the health messages. A chi-square was employed in order to examine the relationship between message frame and actual behavior.

#### **Hypothesis 4C**

The hypothesis stated that individuals with high self-efficacy who are presented with a loss-framed message would demonstrate significantly greater behavioral intentions, find the message more persuasive, and actual behavior would be significantly greater than it would be for individuals with low self-efficacy who are presented with a loss-framed message for both sleep and nutrition.

In particular, individuals with higher self-efficacy who are presented with a loss-framed message would demonstrate significantly greater behavioral intentions in addition to reporting more message persuasiveness. The relationships between behavioral intentions, persuasiveness of the message, the frame of the message, and self-efficacy were examined within the MANOVA.

This hypothesis also stated that individuals with higher self-efficacy who are presented with a loss-framed message would demonstrate significantly greater actual behavior than individuals with low self-efficacy who are presented with a loss-framed message as evidenced by an attempt to gain additional information related to the health messages. A chi-square was employed in order to examine the relationship between message frame and actual behavior.

#### **Hypothesis 4D**

The hypothesis stated that individuals with high self-efficacy who are presented with a technologically based gain-framed message would show significantly greater behavioral intentions, find the message more persuasive, and actual behavior would be significantly greater than it would be for individuals with low self-efficacy who are presented with a technologically based gain-framed message for both sleep and nutrition.

In particular, individuals with higher self-efficacy who are presented with a technologically based gain-framed message would demonstrate significantly greater behavioral intentions in addition to reporting more message persuasiveness. The relationships between behavioral intentions, persuasiveness of the message, the format of the message (technology enhanced versus paper-pencil format), the frame of the message, and self-efficacy were examined within the MANOVA.

This hypothesis also stated that individuals with higher self-efficacy who are presented with a technologically based gain-framed message would demonstrate significantly greater actual behavior than individuals with low self-efficacy who are presented with a technologically based gain-framed message as evidenced by an attempt to gain additional information related to the health messages. A chi-square was employed in order to examine the relationship between message frame and actual behavior.

#### **Hypothesis 4E**

The hypothesis stated that individuals with high self-efficacy who are presented with a technologically based loss-framed message would have significantly greater behavioral intentions, find the message more persuasive, and actual behavior would be

significantly greater than it would be for individuals with low self-efficacy who are presented with a technologically based loss-framed message for both sleep and nutrition.

In particular, individuals with higher self-efficacy who are presented with a technologically based loss-framed message would demonstrate significantly greater behavioral intentions in addition to reporting more message persuasiveness. The relationships between behavioral intentions, persuasiveness of the message, the format of the message (technology enhanced versus paper-pencil format), the frame of the message, and self-efficacy were examined within the MANOVA.

This hypothesis also stated that individuals with higher self-efficacy who are presented with a technologically based loss-framed message would demonstrate significantly greater actual behavior than individuals with low self-efficacy who are presented with a technologically based loss-framed message as evidenced by an attempt to gain additional information related to the health messages. A chi-square was employed in order to examine the relationship between message frame and actual behavior.

#### **Hypothesis 4F**

The hypothesis stated that individuals with high self-efficacy who are presented with a technologically based gain-framed message would demonstrate significantly greater behavioral intentions, find the message more persuasive, and actual behavior would be significantly greater than it would be for individuals with low self-efficacy who are presented with a traditional paper-pencil based gain-framed message for both sleep and nutrition.

In particular, individuals with higher self-efficacy who are presented with a technologically based gain-framed message would demonstrate significantly greater behavioral intentions in addition to reporting more message persuasiveness. The relationships between behavioral intentions, persuasiveness of the message, the format of the message (technology enhanced versus paper-pencil format), the frame of the message, and self-efficacy were examined within the MANOVA.

This hypothesis also stated that individuals with higher self-efficacy who are presented with a technologically based gain-framed message would demonstrate significantly greater actual behavior than individuals with low self-efficacy who are presented with a traditional paper-pencil based gain-framed message as evidenced by an attempt to gain additional information related to the health messages. A chi-square was employed in order to examine the relationship between message frame and actual behavior.

## CHAPTER THREE

### RESULTS

#### Participants

There were 151 students enrolled at a university in Northern Arkansas who participated in this study in exchange for an opportunity to win one of four \$50.00 gift cards. However, the removal of the outlier cases and ‘normalization’ of the data resulted in a total sample size of 137.

The sample was representative of both female and male participants (51.8% female, 48.2% male). Most participants were unmarried/single (94.9%), around 20 years in age ( $M = 19.85$ ,  $SD = 2.22$ ), and had been at the university for approximately 2 years ( $M = 2.15$ ,  $SD = 1.18$ ). The ethnic identity of the sample was predominantly Caucasian (84.6%). Followed by 6.6% Hispanic/Latino ( $n = 9$ ), 3.6% Bi-racial ( $n = 5$ ), 2.2% African-American ( $n = 3$ ), 2.2% Asian/Pacific Islander ( $n = 3$ ), 0.7% Native-American ( $n = 1$ ), 0.7% Other ( $n = 1$ ). Table 1 provides a summary of the demographic data.

#### Descriptive Statistics, Reliability, and Correlations

Descriptive statistics were computed for all variables in the study. Pearson product moment correlations were also examined to identify the degree of association among variables. Additionally, for all scales used in the study, internal consistency reliability ( $\alpha$ ) was calculated.

Table 1

*Descriptive Statistics for Demographic Data*

Variable	N	%
<b>College Status</b>		
Freshman	56	40.9
Sophomore	35	25.3
Junior	18	13.1
Senior	26	19
<b>Gender</b>		
Female	71	51.8
Male	66	48.2
<b>Ethnicity</b>		
Caucasian	114	83.2
African-American	3	2.2
Asian/Pacific Islander	3	2.2
Hispanic/Latino	9	6.6
Native American	1	.7
Bi-racial	5	3.6
Other	1	.7
<b>Relationship Status</b>		
Single	130	94.9
Married	7	5.1
Variable	Mean	Standard Deviation
Average age of participants:	19.85	2.22



The descriptive statistics, reliability of scales, and correlations are shown in Table 2 and Table 3, respectively. The reliabilities for each scale – self-efficacy and regulatory focus – were above the recommended level for internal consistency ( $\alpha > .70$ ; Bland & Altman, 1997). The SES was significantly positively related to the GRFM ( $r = .24, p < .01$ ) and the GRFM was significantly positively related to Persuasiveness - Sleep Hygiene ( $r = .19, p < .05$ ). Persuasiveness – Sleep Hygiene was also significantly positively related to Intentions – Sleep Hygiene ( $r = .28, p < .01$ ) and Persuasiveness – Nutrition ( $r = .60, p < .01$ ). Persuasiveness – Nutrition ( $r = .24, p < .01$ ) was significantly positively related to Intentions – Nutrition ( $r = .20, p < .05$ ). Intentions – Sleep Hygiene was also significantly positively related to Intentions – Nutrition ( $r = .41, p < .01$ ).

Table 2

*Means, Standard Deviations, Range, and Reliabilities for Entire Sample*

Variables	<i>M</i>	<i>SD</i>	<i>Range</i>	<i>α</i>
SES	31.82	3.49	24-40	.80
GRFM	1.62	1.40	-1.72-4.76	.71
Persuasiveness				
Nutrition	6.28	1.78	2-9	**
Sleep	6.26	1.97	2-9	**
Intentions				
Nutrition	8.15	1.08	6-9	**
Sleep	8.18	1.04	6-9	**

*Note:* SES = Self-Efficacy Scale; GRFM = General Regulatory Focus Measure. \*\*Single scale score; no reliability calculated

Table 3

*Correlation Matrix of Variables*

Variable	1	2	3	4	5	6	7	8	9	10	11
1 Age	-										
2 Gender	-.03	-									
3 Academic Year	.67**	.07	-								
4 Format	-.16*	-.20*	-.19*	-							
5 Frame	-.12	.01	-.17*	.15	-						
6 Persuasiveness (Sleep Hygiene)	.08	.18*	.11	.13	.10	-					
7 Persuasiveness (Nutrition)	.13	.14	.13	.12	-.02	.60**	-				
8 Intentions (Sleep Hygiene)	-.03	.03	.02	-.03	.02	.28**	.15	-			
9 Intentions (Nutrition)	.04	.02	.08	.08	-.02	.10	.20*	.41**	-		
10 SES	.05	-.27**	.02	.08	-.08	.12	-.02	.19**	.16	-	
11 GRFM	-.08	-.06	-.07	-.00	.09	.19*	.11	.12	.09	.24**	-

Note: SES = Self-Efficacy Scale; GRFM = General Regulatory Focus Measure; \*  $p < .05$  two-tailed, \*\*  $p < .01$  two-tailed

### **Test Assumptions**

The assumption of normality was first examined by calculating the skewness and kurtosis of each continuous variable (i.e., the variables to be entered into the MANOVA). An initial review showed several variables to be highly skewed and/or kurtotic. Next, univariate outliers were identified using box plots. Cases that were more than three standard deviations away from the distribution mean for each variable were removed from further analysis (Field, 2009). After this, multivariate outliers were identified by regressing every combination of continuous variables, two at a time onto each other (e.g., self-efficacy regressed onto regulatory focus). Outlier cases were flagged as having scores more than three standard deviations away from their predicted scores based on the relationship between each set of variables; these cases were removed from further analysis. After the removal of outliers, skewness and kurtosis statistics were reexamined for each variable. Skewness and kurtosis were substantially reduced for each variable, though two variables remained significantly negatively skewed (skewness  $> 3$  *SDs*). However, given significant skewness can occur as sample sizes become large, it is also important to visually inspect the distribution of data (Field, 2009). Histograms with normality plots showed the data appeared normally distributed. Further, given the MANOVA is typically robust to small violations of normality (skewness/kurtosis  $< 6$  *SDs*), the analysis was carried out without applying transformations to the data (Tabachnick & Fidell, 2001). In sum, the removal of the outlier cases and ‘normalization’ of the data resulted in a total sample size of 137.

### Statistical Analyses

Independent variables in this study were entered as fixed factors in the analysis – these included the message format (paper/tech-enabled), message frame (gain/loss), individuals' self-efficacy (high/low), and individuals' regulatory focus (promotion/prevention). Two continuous variables were dichotomized prior to analysis, self-efficacy and regulatory focus. A median split was done on self-efficacy, where scores below the median (a score of 32) reflected 'low' self-efficacy and scores above the median reflected 'high' self-efficacy. The average self-efficacy score for the current sample ( $31.82 \pm 3.49$ ) was statistically significantly higher than the average self-efficacy score for the original scale for US -American adult population of 29.48,  $t(136) = 7.865$ ,  $p < .0005$ . Participants in the current study are more self-efficacious than participants in the previous study, and there is less variation within the present study. General Regulatory Focus Measure scores initially reflected the degree to which an individual leaned toward a promotion or prevention focus, where larger scores (in absolute value) indicated a stronger lean. Positive General Regulatory Focus Measure scores represented a promotion-focus, whereas negative scores reflected a prevention-focus; thus, individuals' regulatory foci were categorized this way. The mean promotion score ( $7.04 \pm 1.04$ ) was not statistically significantly different than the original promotion scale score of 6.90,  $t(136) = 1.591$ ,  $p = .114$ . In addition, the mean prevention score ( $5.42 \pm 1.25$ ) was not statistically significantly different from the original promotion scale score of 5.31,  $t(136) = 1.032$ ,  $p = .304$ . Therefore, the General Regulatory Focus Measure mean scores were similar for both studies. The dependent variables were the persuasiveness of the message (both for sleep hygiene and nutrition) and behavioral intentions (both for sleep hygiene

and nutrition). These dependent variables were both continuous and were entered as dependent variables in the analysis. The means and standard deviations for traditional format, frame, self-efficacy, and general regulatory focus by intentions and persuasiveness of the message for nutrition are presented in Table 4. The means and standard deviations for technology format, frame, self-efficacy, and general regulatory focus by intentions and persuasiveness of the message for nutrition are presented in Table 5. The means and standard deviations for traditional format, frame, self-efficacy, and general regulatory focus by intentions and persuasiveness of the message for sleep hygiene are presented in Table 6. The means and standard deviations for technology format, frame, self-efficacy, and general regulatory focus by persuasiveness of the message and intentions to perform the behavior for sleep hygiene are presented in Table 7.

Table 4

*Means and Standard Deviations for Traditional Format, Gain and Loss Frame, High and Low Self-Efficacy, and Promotion and Prevention General Regulatory Focus by Persuasiveness and Intentions of the Nutrition Message*

		Traditional															
		Gain						Loss									
		Promotion		Prevention		Promotion		Prevention		Promotion		Prevention					
		High SES	Low SES	High SES	Low SES	High SES	Low SES	High SES	Low SES	High SES	Low SES	High SES	Low SES				
		M	SD	M	SD	M	SD	M	SD	M	SD	M	SD				
Nutrition	Persuasiveness	8.33	.80	8.00	.97	7.00*	1.00	9.00*	.00	8.18	.75	7.93	.73	8.50*	.71	8.00*	1.00
Nutrition	Intentions	6.76	1.30	5.78	1.48	4.33*	1.53	6.50*	2.12	6.18	1.78	6.36	1.22	7.00*	2.83	4.33*	2.52

*Note:* \* $n < 4$

Table 5  
*Means and Standard Deviations for Technology Format, Gain and Loss Frame, High and Low Self-Efficacy, and Promotion and Prevention General Regulatory Focus by Persuasiveness and Intentions of the Nutrition Message*

	Technology														
	Gain						Loss								
	Promotion		Low SES		High SES		Prevention		Low SES		High SES				
	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD			
Nutrition Persuasiveness	8.14	.95	8.40	.70	9.00*	-	-	8.20	.95	8.31	1.03	7.00*	-	7.75	1.26
Nutrition Intentions	6.71	1.77	6.30	1.16	3.00*	-	-	6.48	1.96	6.31	1.25	7.00	-	5.50	2.89

Note: \* $n < 4$

Table 6

*Means and Standard Deviations for Traditional Format, Gain and Loss Frame, High and Low Self-Efficacy, and Promotion and Prevention General Regulatory Focus by Persuasiveness and Intentions of the Sleep Hygiene Message*

	Traditional															
	Gain						Loss									
	Promotion		Low SES		High SES		Prevention		Low SES		High SES					
	High SES	Low SES	M	SD	High SES	Low SES	M	SD	High SES	Low SES	M	SD				
Sleep Intentions	6.67	1.53	5.83	1.50	5.67*	1.53	6.00*	.00	6.45	1.51	6.86	1.10	7.00*	2.83	5.00*	2.65

*Note:* \* $n < 4$



Table 7

*Means and Standard Deviations for Technology Format, Gain and Loss Frame, High and Low Self-Efficacy, and Promotion and Prevention General Regulatory Focus by Persuasiveness and Intentions of the Sleep Hygiene Message*

		Technology															
		Gain						Loss									
		Promotion		Prevention		Promotion		Prevention		Promotion		Prevention					
		High SES	Low SES	High SES	Low SES	High SES	Low SES	High SES	Low SES	High SES	Low SES	High SES	Low SES				
		M	SD	M	SD	M	SD	M	SD	M	SD	M	SD				
Sleep Intentions		6.43	2.38	6.00	1.89	3.00*	-	-	-	6.70	2.08	5.71	1.42	3.00*	-	5.50	2.65

Note: \* $n < 4$

## Hypotheses Testing

Due to the fact that only one participant pursued additional information regarding the study, actual behavior could not be statistically tested.

### Hypothesis One

Hypothesis One (a) stated that individuals presented with a technologically based health message would demonstrate significantly greater behavioral intentions and find the message more persuasive than individuals in the traditional paper-pencil health message group for both sleep and nutrition. Results of the MANOVA show that individuals presented with technology frames did not demonstrate greater behavioral intentions or report greater persuasiveness of the message for both sleep and nutrition,  $V = .033$ ,  $F(3,120) = 1.35$ , *ns*. Pillae's trace was conducted, as it is the least conservative statistic for measuring significance (see Table 8). Since the result of the MANOVA was not statistically significant, further post-hoc analyses were not warranted (Field, 2009).

Table 8

*MANOVA Results for Hypothesis One (A – C)*

	Pillae's trace	<i>F</i>	<i>df</i>	<i>p</i>	Partial $\eta^2$
Format	.033	1.354	3,120	.260	.033

Hypothesis One (b) stated that individuals presented with a technologically based gain-framed health message would demonstrate significantly greater behavioral intentions and find the message more persuasive than individuals receiving the traditional paper-pencil gain-framed message for both sleep and nutrition. Results of the MANOVA show that individuals who received the technologically based gain-framed message did

not demonstrate greater behavioral intentions or find the message more persuasive than individuals who received the traditional paper-pencil gain-framed message for both sleep and nutrition,  $V = .033$ ,  $F(3,120) = 1.35$ , *ns*. Pillae's trace was conducted, as it is the least conservative statistic for measuring significance (see Table 8). Since the result of the MANOVA was not statistically significant, further post-hoc analyses were not warranted (Field, 2009).

Hypothesis One (c) stated that individuals presented with a technologically based loss-framed health message would demonstrate significantly greater behavioral intentions and find the message more persuasive than individuals receiving the traditional paper-pencil loss-framed message for both sleep and nutrition. Results of the MANOVA show that individuals who received the technologically based loss-framed message did not demonstrate greater behavioral intentions or find the message more persuasive compared to the individuals who received the traditional paper-pencil loss-framed message for both sleep and nutrition,  $V = .033$ ,  $F(3,120) = 1.35$ , *ns*. Pillae's trace was conducted (see Table 8). Since the result of the MANOVA was not statistically significant, further post-hoc analyses were not warranted (Field, 2009). In sum, hypothesis one (a, b, c) were not supported.

### **Hypothesis Two**

Hypothesis Two (a) stated that individuals presented with a technologically based gain-framed health message would demonstrate significantly greater behavioral intentions and find the message more persuasive than individuals receiving the technologically based loss-framed message for both sleep and nutrition. Results of the MANOVA show that individuals who received the technologically based gain-framed

message did not demonstrate greater behavioral intentions or find the message more persuasive than individuals who received the technologically based loss-framed message for both sleep and nutrition,  $V = .031$ ,  $F(3,120) = 1.28$ , ns. Pillae's trace was conducted (see Table 9). Since the result of the MANOVA was not statistically significant, further post-hoc analyses were not warranted (Field, 2009).

Table 9

*MANOVA Results for Hypothesis Two*

	Pillae's trace	<i>F</i>	<i>df</i>	<i>p</i>	Partial $\eta^2$
Format	.033	1.354	3,120	.260	.033
Frame	.031	1.280	3,120	.284	.031
Interaction	.035	1.451	3,120	.231	.035

ypohthesis Two (b) stated that individuals presented with a traditional paper-pencil gain-framed message would demonstrate significantly greater behavioral intentions and find the message more persuasive than individuals receiving the traditional paper-pencil loss framed message for both sleep and nutrition. Results of the MANOVA show that individuals who received the traditional paper-pencil gain framed message did not have greater behavioral intentions or find the message more persuasive than individuals who received the traditional paper-pencil loss-framed message for both sleep and nutrition,  $V = .031$ ,  $F(3,120) = 1.28$ , ns. Pillae's trace was again conducted (see Table 9). Since the result of the MANOVA was not statistically significant, further post-hoc analyses were not warranted (Field, 2009). In sum, hypothesis two (a, b) were not supported.

**Hypothesis Three**

Hypothesis Three (a) stated that individuals who have a chronic promotion regulatory focus and are presented with a technologically based gain-framed message would have significantly greater behavioral intentions and find the message more persuasive than chronic prevention regulatory focused individuals presented with a technologically based gain-framed message for both sleep and nutrition. The results of the MANOVA show that individuals who have a chronic promotion regulatory focus and are presented with a technologically based gain-framed message did not demonstrate greater behavioral intentions or find the message more persuasive than chronic prevention regulatory focused individuals presented with a technologically based gain-framed message for both sleep and nutrition,  $V = .050$ ,  $F(3,120) = 2.12$ , *ns*. Pillae's trace was conducted (see Table 10). Since the result of the MANOVA was not statistically significant, further post-hoc analyses were not warranted (Field, 2009).

Table 10

*MANOVA Results for Hypothesis Three*

	Pillae's trace	<i>F</i>	<i>df</i>	<i>p</i>	Partial $\eta^2$
Format	.033	1.354	3,120	.260	.033
Frame	.031	1.280	3,120	.284	.031
GRFM	.050	2.117	3,120	.102	.050
Interaction	.051	2.165	3,120	.096	.051

*Note:* GRFM = General Regulatory Focus Measure. \*  $p < .05$ .

Hypothesis Three (b) stated that chronic promotion regulatory focused individuals who are presented with a technologically based loss-framed message would have significantly greater behavioral intentions and find the message more persuasive than

chronic prevention regulatory focused individuals presented with a traditional paper-pencil loss framed group for both sleep and nutrition. The results of the MANOVA show that individuals who have a chronic promotion regulatory focus and are presented with a technologically based loss-framed message did not have greater behavioral intentions or find the message more persuasive than chronic prevention regulatory focused individuals presented with a traditional paper-pencil loss-framed message for both sleep and nutrition,  $V = .050$ ,  $F(3,120) = 2.12$ , *ns*. Pillai's trace was again conducted (see Table 10). Since the result of the MANOVA was not statistically significant, further post-hoc analyses were not warranted (Field, 2009).

Hypothesis Three (c) stated that chronic promotion regulatory focused individuals would show significantly greater behavioral intentions and find the message more persuasive when presented with a technologically based gain-framed message than chronic promotion regulatory focused individuals presented with a technologically based loss-framed message for both sleep and nutrition. The results of the MANOVA show that individuals who have a chronic promotion regulatory focus and are presented with a technologically based gain-framed message did not have greater behavioral intentions or find the message more persuasive than chronic promotion regulatory focused individuals presented with a technologically based loss-framed message for both sleep and nutrition,  $V = .050$ ,  $F(3,120) = 2.12$ , *ns*. Pillai's trace was conducted (see Table 10). Since the result of the MANOVA was not statistically significant, further post-hoc analyses were not warranted (Field, 2009).

Hypothesis Three (d) stated that individuals with a chronic prevention regulatory focus would have significantly greater behavioral intentions and find the message more

persuasive when presented with a technologically based gain-framed message than chronic prevention regulatory focused individuals presented with a technologically based gain-framed message for both sleep and nutrition. The results of the MANOVA show that individuals who have a chronic prevention regulatory focus and are presented with a technologically based gain-framed message did not have greater behavioral intentions or find the message more persuasive than chronic prevention regulatory focused individuals presented with a technologically based gain-framed message for both sleep and nutrition,  $V = .050$ ,  $F(3,120) = 2.12$ , *ns*. Pillai's trace was conducted (see Table 10). Since the result of the MANOVA was not statistically significant, further post-hoc analyses were not warranted (Field, 2009). In sum, hypothesis three (a, b, c, d) were not supported.

#### **Hypothesis Four**

Hypothesis Four (a) stated that individuals with higher self-efficacy would show significantly greater behavioral intentions and find the message more persuasive than individuals with low self-efficacy regardless of the frame they receive for both sleep and nutrition. The results of the MANOVA show that individuals with higher self-efficacy did not demonstrate greater behavioral intentions or find the message more persuasive than individuals with low self-efficacy, regardless of the frame they received, for both sleep and nutrition,  $V = .031$ ,  $F(3,120) = 1.29$ , *ns*. Pillai's trace was conducted (see Table 11). Since the result of the MANOVA was not statistically significant, further post-hoc analyses were not warranted (Field, 2009).

Table 11

*MANOVA Results for Hypothesis Four (a)*

	Pillae's trace	<i>F</i>	<i>df</i>	<i>p</i>	Partial $\eta^2$
SES	.031	1.293	3,120	.280	.031

*Note:* SES = Self-Efficacy Scale. \*  $p < .05$ .

Hypothesis Four (b) stated that individuals with high self-efficacy who are presented with a gain-framed message would have significantly greater behavioral intentions and find the message more persuasive than individuals with low self-efficacy who are presented with a gain-framed message for both sleep and nutrition, regardless of whether the message was presented in technologically enhanced or traditional paper-pencil format. The results of the MANOVA show that individuals with high self-efficacy who are presented with a gain-framed message did not demonstrate greater behavioral intentions or find the message more persuasive than individuals with low self-efficacy who were presented with a gain-framed message for both sleep and nutrition, regardless of whether the message was presented in technologically enhanced or traditional paper-pencil format,  $V = .031$ ,  $F(3,120) = 1.29$ , *ns*. Pillae's trace was conducted (see Table 12). Since the result of the MANOVA was not statistically significant, further post-hoc analyses were not warranted (Field, 2009).



Table 12

*MANOVA Results for Hypothesis Four (b)*

	Pillae's trace	<i>F</i>	<i>df</i>	<i>p</i>	Partial $\eta^2$
Frame	.031	1.280	3,120	.284	.031
SES	.031		3,120	.280	.031
Interaction	.052	1.293	3,120	.092	.052
		2.195			

*Note:* SES = Self-Efficacy Scale. \*  $p < .05$ .

Hypothesis Four (c) stated that individuals with high self-efficacy who are presented with a loss-framed message would have significantly greater behavioral intentions and find the message more persuasive than individuals with low self-efficacy who are presented with a loss-framed message for both sleep and nutrition, regardless of whether the message was presented in technologically enhanced or traditional paper-pencil format. The results of the MANOVA show that individuals with high self-efficacy who are presented with a loss framed message did not have greater behavioral intentions or find the message more persuasive than individuals with low self-efficacy who were presented with a loss-framed message for both sleep and nutrition, regardless of whether the message was presented in technologically enhanced or traditional paper-pencil format,  $V = .031$ ,  $F(3,120) = 1.29$ , *ns*. Pillae's trace was again conducted (see Table 12). Since the result of the MANOVA was not statistically significant, further post-hoc analyses were not warranted (Field, 2009).

Hypothesis Four (d) stated that individuals with high self-efficacy who are presented with a technologically based gain-framed message would have significantly

greater behavioral intentions and find the message more persuasive than individuals with low self-efficacy who are presented with a technologically based gain-framed message for both sleep and nutrition. The results of the MANOVA show that individuals with high self-efficacy who are presented with a technologically based gain-framed message did not have greater behavioral intentions or find the message more persuasive than individuals with low self-efficacy who were presented with a technologically based gain-framed message for both sleep and nutrition,  $V = .031$ ,  $F(3,120) = 1.29$ , *ns*. Pillae's trace was conducted (see Table 13). Since the result of the MANOVA was not statistically significant, further post-hoc analyses were not warranted (Field, 2009).

Table 13

*MANOVA Results for Hypothesis Four (d)*

	Pillae's trace	<i>F</i>	<i>df</i>	<i>p</i>	Partial $\eta^2$
Format	.033	1.354	3,120	.260	.033
Frame	.031	1.280	3,120	.284	.031
SES	.031	1.293	3,120	.280	.031
Interaction	.016	.650	3,120	.584	.016

*Note:* SES = Self-Efficacy Scale\*  $p < .05$ .

Hypothesis Four (e) stated that individuals with high self-efficacy who are presented with a technologically based loss-framed message would have significantly greater behavioral intentions and find the message more persuasive than individuals with low self-efficacy who are presented with a technologically based loss-framed message for both sleep and nutrition. The results of the MANOVA show that individuals with high self-efficacy who are presented with a technologically based loss framed message did not

have greater behavioral intentions or find the message more persuasive than individuals with low self-efficacy who were presented with a technologically based loss framed message for both sleep and nutrition,  $V = .031$ ,  $F(3,120) = 1.29$ , *ns*. Pillae's trace was conducted (see Table 13). Since the result of the MANOVA was not statistically significant, further post-hoc analyses were not warranted (Field, 2009).

Hypothesis Four (f) stated that individuals with high self-efficacy who are presented with a technologically based gain-framed message would have significantly greater behavioral intentions and find the message more persuasive than individuals with low self-efficacy who are presented with a traditional paper-pencil based gain-framed message for both sleep and nutrition. The results of the MANOVA show that individuals with high self-efficacy who are presented with a technologically based gain-framed message did not have greater behavioral intentions or find the message more persuasive than individuals with low self-efficacy who were presented with a traditional paper-pencil based gain-framed message for both sleep and nutrition,  $V = .031$ ,  $F(3,120) = 1.29$ , *ns*. Pillae's trace was conducted (see Table 13). Since the result of the MANOVA was not statistically significant, further post-hoc analyses were not warranted (Field, 2009). In sum, hypothesis four (a, b, c, d, e, f) were not supported.

## **CHAPTER FOUR**

### **DISCUSSION**

This chapter will discuss the results of this study. First, the findings of this study will be discussed, followed by implications as well as limitations and suggestions for future research.

#### **General Overview of Results**

Researchers have responded to the dire need for effective health messages that patients, clients, and other members of society will not only “hear” but also respond to in a consistent way that leads to the adoption of healthy behaviors. Previous research has shown that an intention to perform a behavior does not necessarily translate into actual behavior. Therefore, the initial aim of this study was to not only influence intentions of college students, but also change their actual behavior. To pursue this aim, influential factors drawn from previous research were included in the present study. The primary goal of this study was to determine whether the format of a health message, level of self-efficacy of an individual, frame of the message, and general regulatory focus of an individual would influence the behavioral intentions of participants, persuasiveness of the message, and actual behavior. However, as previously mentioned, given that only one participant pursued additional information regarding sleep and nutrition, actual behavior could not be assessed. Therefore, intentions to perform the behavior and persuasiveness

of the message were the only dependent variables that were examined within this study. The overall findings of the study did not show significant main effects for any of the independent variables. Technologically enhanced messages, gain-framed messages, high self-efficacy, and chronic promotion focus did not result in increased persuasiveness of the message or greater intentions to follow sleep hygiene recommendations and nutrition recommendations as originally hypothesized. It is worth noting that the initial sample size, coupled with the reduction in size, which occurred through outlier analysis/removal, may have lowered the observed power to detect effects. For each effect, statistical power was lower than the recommended .80 (Tabachnick & Fidell, 2001). Thus, low statistical power likely contributed to the null findings.

### **Discussion of Findings**

#### **Hypothesis One (A – C)**

Hypothesis One (a) stated that individuals presented with a technologically based health message would have significantly greater behavioral intentions and find the message more persuasive than individuals in the traditional paper-pencil health message group for both sleep and nutrition. Hypothesis One (b) stated that individuals presented with a technologically based gain-framed health message would have significantly greater behavioral intentions and find the message more persuasive than individuals receiving the traditional paper-pencil gain-framed message for both sleep and nutrition. Hypothesis One (c) stated that individuals presented with a technologically based loss-framed health message would have significantly greater behavioral intentions and find the message more persuasive than individuals receiving the traditional paper-pencil loss-framed message for both sleep and nutrition.

The results of the MANOVA did not support these hypotheses and were not consistent with previous research. Rather, the technologically enhanced message did not produce desired effects in this study. Prybutok (2013) found that teenagers and young adults (18 to 24 years old) presented with a safe sex message presented in the form of YouTube video had significant improvement in safe sex and STD prevention knowledge. One possible explanation for the lack of findings is that the PowerPoint condition was not as representative of a technologically enhanced message and did not grab or maintain the attention of the participants. For example, incorporating audio and animation in a video format may have increased the effectiveness of the message. In addition, it is possible that participants did not consider the health messages to be personally relevant or of concern. Lastly, perhaps participants believed that they were already eating healthy and sleeping well.

### **Hypothesis Two (A – B)**

Hypothesis Two (a) stated that individuals presented with a technologically based gain-framed health message would have significantly greater behavioral intentions and find the message more persuasive than individuals receiving the technologically based loss-framed message for both sleep and nutrition. Hypothesis Two (b) stated that individuals presented with a traditional paper-pencil gain-framed message would have significantly greater behavioral intentions and find the message more persuasive than individuals receiving the traditional paper-pencil loss-framed message for both sleep and nutrition.

The results of the MANOVA did not support any of these hypotheses. The results indicate that gain-framed messages did not have an effect on participants' intentions to

perform the health behaviors or the persuasiveness of the message regardless of whether the message was technologically enhanced. Results were inconsistent with previous research. Rothman and Salovey (1997) demonstrated that prevention-oriented behaviors, such as applying sunscreen to prevent skin cancer, were more positively received when framed in terms of gains rather than losses. Although nutrition and sleep hygiene are considered prevention-oriented behaviors, neither of these health behaviors have been extensively examined within the domain of message framing. Specifically, framing effects have not been examined for sleeping behaviors. Previous research has shown mixed results in the area of health behaviors and message framing. According to Gallagher and Updegraff (2012), diet and vaccination gain-framed messages had little advantage over loss-framed messages. In addition, O’Keefe and Jensen (2007) found that no prevention behaviors other than dental hygiene were significantly enhanced as a result of being framed in terms of gains. Thus, as a result of lack of consensus among previous research studies in regards to gain-frames and prevention behaviors (specifically nutrition and sleep hygiene), it is possible that framing effects do not exist in this domain.

### **Hypothesis Three (A – D)**

Hypothesis Three (a) stated that individuals who have a chronic promotion regulatory focus and are presented with a technologically based gain-framed message would have significantly greater behavioral intentions and find the message more persuasive than chronic prevention regulatory focused individuals presented with a technologically based gain-framed message for both sleep and nutrition. Hypothesis Three (b) stated that chronic promotion regulatory focused individuals who are presented with a technologically based loss-framed message would have significantly greater

behavioral intentions and find the message more persuasive than chronic prevention regulatory focused individuals presented with a traditional paper-pencil loss framed group for both sleep and nutrition. Hypothesis Three (c) stated that chronic promotion regulatory focused individuals would show significantly greater behavioral intentions and find the message more persuasive when presented with a technologically based gain-framed message than chronic promotion regulatory focused individuals presented with a technologically based loss-framed message for both sleep and nutrition. Hypothesis Three (d) stated that individuals with a chronic prevention regulatory focus would show significantly greater behavioral intentions and find the message more persuasive when presented with a technologically based gain-framed message than chronic prevention regulatory focused individuals presented with a technologically based gain-framed message for both sleep and nutrition.

The results of the MANOVA did not support any of these hypotheses. The results indicate that technologically enhanced messages did not have an effect on participants' intentions to perform the health behaviors or the persuasiveness of the message regardless of participants' regulatory focus or the frame of the message. These findings are inconsistent with previous research (Higgins, 2000) that found that regulatory fit (matching of one's regulatory focus with the frame of the message) results in greater commitment to healthy behavioral changes. A possible explanation for the lack of replication in this study could be that the frames were not written in persuasive enough language for messages to clearly resonate with individuals' chronic regulatory focus. It is also possible that the participants were already sleeping well and eating healthy and therefore did not consider the messages to be relevant. According to Wegener et al.,



(1994), an individual's interest in a particular issue fosters systematic processing of messages; such individuals are believed to experience sensitivity to the framing of the message, whereas individuals who do not undergo systematic processing of the message lack this sensitivity (Wegener et al., 1994 as cited in Detweiler et al., 1999). Therefore, if participants did not feel that the information applied to them or did not have an interest in the material, it is possible that framing effects were not able to be experienced as result of lack of message processing.

#### **Hypothesis Four (A – F)**

Hypothesis Four (a) stated that individuals with higher self-efficacy would show significantly greater behavioral intentions and find the message more persuasive than individuals with low self-efficacy regardless of the frame they receive for both sleep and nutrition. Hypothesis Four (b) stated that individuals with high self-efficacy who are presented with a gain-framed message would have significantly greater behavioral intentions and find the message more persuasive than individuals with low self-efficacy who are presented with a gain-framed message for both sleep and nutrition. Hypothesis Four (c) stated that individuals with high self-efficacy who are presented with a loss-framed message would have significantly greater behavioral intentions and find the message more persuasive than individuals with low self-efficacy who are presented with a loss-framed message for both sleep and nutrition. Hypothesis Four (d) stated that individuals with high self-efficacy who are presented with a technologically based gain-framed message would have significantly greater behavioral intentions and find the message more persuasive than individuals with low self-efficacy who are presented with a technologically based gain-framed message for both sleep and nutrition. Hypothesis

Four (e) stated that individuals with high self-efficacy who are presented with a technologically based loss-framed message would have significantly greater behavioral intentions and find the message more persuasive than individuals with low self-efficacy who are presented with a technologically based loss-framed message for both sleep and nutrition. Hypothesis Four (f) stated that individuals with high self-efficacy who are presented with a technologically based gain-framed message would have significantly greater behavioral intentions and find the message more persuasive than individuals with low self-efficacy who are presented with a traditional paper-pencil based gain-framed message for both sleep and nutrition.

The results of this study did not support any of the hypotheses. The results indicate that the level of self-efficacy, format of the message and frame of the message did not have an effect on participants' intentions to perform the health related behaviors or the persuasiveness of the message. According to previous research (Becker, et al., 1993), individuals who have a high self-efficacy will see tasks as challenges that are manageable regardless of which frame the messages are presented. Self-efficacious individuals show greater persistence and endurance than individuals with low self-efficacy (Becker et al., 1993). Specifically, individuals with high self-efficacy are more likely to engage in healthy behaviors, maintain these behaviors, and then recover when confronted with unanticipated obstacles such as a relapse (Luszczynska et al., 2005). One possible explanation for the lack of significant results is that participants in this study may have the self-efficacy needed to perform the healthy behaviors; however, they may lack the concern to engage in such behaviors at this particular point in their lives. Regardless of individuals' initial level of self-efficacy, change and success require time

and continual effort. Efficacy is often amplified through a sequence of performance accomplishments, thus encouraging individuals to engage in more difficult tasks (Strecher et al., 1986). It is also possible that there could have been a significant effect if a specific health related self-efficacy measure had been used rather than the General Self-Efficacy Scale. Perhaps self-efficacy at the general level does not influence college students' behavioral intentions and the degree to which they find nutrition and sleep hygiene messages to be persuasive. It would be useful to replicate this study using specific self-efficacy measures related to nutrition and sleep hygiene. Additionally, as previously mentioned, the average self-efficacy score for the current sample ( $31.82 \pm 3.49$ ) was statistically significantly higher than the average self-efficacy score for the original scale for US -American adult population of 29.48,  $t(136) = 7.865, p < .0005$ . Participants in the current study were more self-efficacious than participants in the previous study, and there is less variation within the present study. Therefore, although this difference is of statistical significance, this finding lacks practical implications, as the standard deviation was much greater for the original study than it was for the current study.

### **Implications**

Although the hypotheses were not supported, this study has implications for health professionals, professors, therapists, and other individuals within the helping professions. Also, there are implications for college students who will one day be the leaders of our society. First, the fact that actual behavior had to be removed as only one participant pursued additional health related information reinforces the necessity to create health campaigns that lead to actual behavioral change rather than simply providing at

risk populations with a wealth of information. Marketing, advertisement, and large-scale health initiatives all require financial and temporal investment; therefore, it is crucial that dollars invested are spent in constructive ways. The current study provides evidence that implementing healthy changes among college students is an area of much needed research before large-scale health campaigns can be created that are likely to result in success.

The fact that the technologically enhanced messages did not result in significant effects suggest that emphasis may need to be placed on certain aspects of technology, while other elements may not be necessary. For example, it is possible that including auditory components or animation may have led to a significant difference as a result of increased engagement and interest with the material. The technologically enhanced component of the current study consisted of typed text presented in the form of PowerPoint that required participants to read and click through the slides on their own.

The results also highlight the continued ambiguity in regards to message framing and health related behaviors. It is unclear whether framing a message in terms of gains or losses really matters in relation to sleep hygiene and nutrition among college students. It is possible that other unknown determinants may influence the reception of these particular health messages.

### **Limitations and Suggestions for Future Research**

The current study has several limitations that are worth mentioning as they provide the opportunity for advancements in the research domain of health-related behaviors and message framing.

One potential limitation with this study relates to the lack of diversity among the participants. Although participants were college-aged, the sample consisted only of students attending a private university in Northern Arkansas. Therefore, study results may not be fully representative of college students' health behaviors in general. It would be of value to conduct a similar study with students attending different universities throughout the United States. In addition, the vast majority of participants identified as Caucasian (84%), the second most represented ethnic group was much less prominent; 6% of the participants identified as Hispanic/Latino. Not only would it be of value to recruit more ethnically diverse participants from all over the United States, it would also be valuable to include high school students in the sample. Although previous research shows that college students are the population most likely to struggle with sleep quality and obesity, perhaps high school students would be more receptive to these health messages in regards to persuasiveness, intentions to perform the behavior, and actual behavior. Future research studies would likely benefit from collecting data from a more diverse sample.

As previously stated, sleep quality and obesity are two of the most pressing health concerns for college students. Although these two health domains are critical areas to consider when applying message framing to college students' health behaviors, it is possible that the college students in this population are already sleeping well and eating healthily. Perhaps the sample does not provide an accurate and clear picture of how "most" college students eat and sleep. No pre-test sleep and nutrition information was collected in this study, therefore it is impossible to determine whether college students who participated in this study even experienced poor sleep and poor eating behaviors. It

would be beneficial for future researchers to identify the students who actually struggle with sleeping well and eating healthily because students who already sleep well and eat healthily may not be interested or invested in health issues that do not pertain to them. Specifically, future researchers interested in examining college students' sleep behaviors should include a sleep quality measure such as the Pittsburgh Sleep Quality Index as well as a sleep hygiene measure in order to better assess college students' sleep behaviors as the two are related.

It is possible that constructs included in this study did not capture and convey the necessary distinction that should clearly exist between promotion and prevention message frames. Future studies should include easily distinguishable message frames (loss versus gain) while also using a strong tone within the messages. Although message frames for this study were designed in conjunction with two different health domains, sleep hygiene and nutrition, previous research has primarily focused on examining only one health domain rather than two. Thus, it may be advantageous to examine sleep hygiene and nutrition through separate studies rather than including both domains in one study. Perhaps participants in this study were not as impacted by the frames as a result of having to receive and process two separate messages rather than just one. It is possible that participants may have experienced less involvement and investment in the messages than if they had been exposed to just one of the two issues.

Another limitation of this study involves the decision to include one particular inventory over another. For this study, participants completed the General Regulatory Focus Measure (Lockwood et al., 2002). While this inventory has been used in previous studies and is shown applicable to college students, this inventory may not have been the

best choice for this particular study. The General Regulatory Focus Measure was originally chosen for this study as an inventory tailored to undergraduate students (Summerville & Roese, 2008). The Regulatory Focus Questionnaire (Higgins, 1997) has been shown to predict different outcomes than the General Regulatory Focus Measure. According to Summerville and Roese (2008), the General Regulatory Focus Measure has been used in the examination of role models, whereas the Regulatory Focus Questionnaire predicts emotional, cognitive, and health outcomes. Future studies should continue examining the relationship between message framing, particularly how the format of the message, level of self-efficacy of the participant, and one's regulatory focus impacts intentions to perform the behavior and persuasiveness of the message as well as actual behavior. However, it is recommended that the Regulatory Focus Questionnaire be used in place of the General Regulatory Focus Measure to determine whether the latter is more applicable for this particular type of research.

Also, the General Self-Efficacy Scale was used to measure participants' global self-efficacy. Some individuals may judge themselves efficacious across a wide range of domains or only in certain domains and not others (Bandura, 2006). Given the nature of this study, it may have been beneficial to incorporate self-efficacy measures related specifically to sleep and nutrition. In addition, because the average self-efficacy score for the current sample ( $31.82 \pm 3.49$ ) was statistically significantly higher than the average self-efficacy score for the original scale for US -American adult population of 29.48,  $t(136) = 7.865, p < .0005$ , it is possible that students attending this private university are generally more self-efficacious than other populations. However, as previously stated, it

is important to note that the standard deviation was much greater for the original study than it was for the current study.

In addition, self-report measures were employed in the collection of data. While self-report measures allowed the participant to engage in self-evaluation and offer a subjective response to the items, individuals' personal insight does not always reflect reality, and the accuracy of the responses cannot be confirmed. Perhaps it would be advantageous to include an inventory that measures social desirability. It is possible that participants of the current study answered according to perceived expectations rather than what they really believed. In addition, though participation in the study was voluntary, participants were presented with an opportunity to win a gift card in exchange for their participation. Also, participants may have completed the study in a hasty or inattentive manner in an attempt to win a gift card. Then again, it is also possible that individuals respond relatively accurately to inventories, but perhaps the gap existing between knowledge and actual behavior is wide and still poorly understood.

Although this study offered a relevant and unique examination of the effects that the format of a message might have on college students' intentions to perform the behaviors, persuasiveness of the message, and actual behavior, the lack of distinction between the message formats may have impacted findings. Future research should provide greater distinction between the traditional paper-pencil format and the technologically enhanced format. For example, researchers may wish to include animation and audio in addition to the actual PowerPoint presentation. Perhaps it would be beneficial to have the technologically enhanced format presented in an auditorium much like a student would experience if attending an undergraduate lecture. It would



also be advantageous to explore whether an interactive version of the technologically enhanced message would produce greater intentions to perform the behaviors in addition to participants finding the message more persuasive.

Lastly, statistical power may have threatened the validity of this study. Insufficient power may account for why there were not statistically significant differences. Increasing the sample size could have potentially improved power and permitted the detection of differences among groups.

### **Conclusion**

Health professionals continue to grapple with how to facilitate behavioral changes for clients/patients. The present study investigated the effects of message framing, format of the message, and self-efficacy in creating healthy changes. Periodically, health professionals will evaluate whether clients/patients “buy into” recommendations and suggestions in hopes that behavioral change will follow. However, as health costs continue to rise, concerns with creating actual behavioral change also increase. The present study not only examined individuals’ intentions to perform the behavior and the degree to which they found the message to be persuasive, but also examined actual behavior. The present study failed to find significant effects of message frames, message format, or self-efficacy on persuasiveness, intentions, and actual behavior. As previously mentioned, little research exists within this particular domain of health related behavior, therefore further exploration is needed. Potential limitations include lack of diversity between the sample, the decision to use one inventory over another, and the lack of differentiation between message formats.

Although the findings of the current study were insignificant, this subdomain of health related research is of great importance. From a health and marketing perspective, these findings provide direction for improving the effectiveness of health campaigns and interpersonal communications between health professionals and clients/patients. The question remains, “How can we use technology, knowledge, and laden skills to instill hope and create lasting change in the lives of future policy holders, campaign leaders, and role models for prospective trendsetters?”

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**APPENDIX A**

**HUMAN USE APPROVAL LETTER**





LOUISIANA TECH  
UNIVERSITY

MEMORANDUM

OFFICE OF UNIVERSITY RESEARCH

TO: Ms. Abbey White, Dr. Walter Buboltz, Dr. Walczyk and Dr. Latoya Pierce  
 FROM: Dr. Stan Napper, Vice President Research & Development  
 SUBJECT: HUMAN USE COMMITTEE REVIEW  
 DATE: April 10, 2015

In order to facilitate your project, an EXPEDITED REVIEW has been done for your proposed study entitled:

**"The Relationship between Sleep and Nutrition in Message Framing among College Students"**

**\*HUC 1225 ADD ADDENDUM**

The proposed study's revised procedures were found to provide reasonable and adequate safeguards against possible risks involving human subjects. The information to be collected may be personal in nature or implication. Therefore, diligent care needs to be taken to protect the privacy of the participants and to assure that the data are kept confidential. Informed consent is a critical part of the research process. The subjects must be informed that their participation is voluntary. It is important that consent materials be presented in a language understandable to every participant. If you have participants in your study whose first language is not English, be sure that informed consent materials are adequately explained or translated. Since your reviewed project appears to do no damage to the participants, the Human Use Committee grants approval of the involvement of human subjects as outlined.

Projects should be renewed annually. *This approval was finalized on April 10, 2015 and this project will need to receive a continuation review by the IRB if the project, including data analysis, continues beyond April 10, 2016.* Any discrepancies in procedure or changes that have been made including approved changes should be noted in the review application. Projects involving NIH funds require annual education training to be documented. For more information regarding this, contact the Office of University Research.

You are requested to maintain written records of your procedures, data collected, and subjects involved. These records will need to be available upon request during the conduct of the study and retained by the university for three years after the conclusion of the study. If changes occur in recruiting of subjects, informed consent process or in your research protocol, or if unanticipated problems should arise it is the Researchers responsibility to notify the Office of Research or IRB in writing. The project should be discontinued until modifications can be reviewed and approved.

If you have any questions, please contact Dr. Mary Livingston at 257-2292 or 257-5066.

**\*NOTE: Please be sure to give subjects a copy of the consent form.**

A MEMBER OF THE UNIVERSITY OF LOUISIANA SYSTEM

P.O. BOX 3092 • RUSTON, LA 71272 • TEL: (318) 257-5075 • FAX: (318) 257-5079

AN EQUAL OPPORTUNITY UNIVERSITY



## Institutional Review Board Approval

Proposal Identification Number: 042-2014

Primary Investigator: Abbey White

Title: The relationship between sleep and nutrition in message framing among college Students

I am pleased to inform you that your research proposal has been approved by the JBU Institutional Review Board. It is the Board's opinion that you provided adequate safeguards for the welfare of the participants in this study.

You are authorized to implement this study as of the date of final approval, 9/11/2014, and this authorization is valid for one year, with the option to renew authorization if protocols do not change.

This approval is granted with the understanding that the research will be conducted within the published guidelines of the JBU Institutional Review Board. Any proposed changes to the protocols should be reported to the IRB for approval.

Sincerely,

A handwritten signature in black ink, appearing to read "David E. Johnson".

David E. Johnson, PhD  
Chair

Institutional Review Board  
Phone: 479-524-7164 Fax: 479-238-8563

**APPENDIX B**

**DEMOGRAPHIC FORM**

## Demographic Form

***Please provide the following information by filling in the blank or circling the appropriate answer.***

1. What is your age in years? \_\_\_\_\_
2. What is your gender? \_\_\_ M                      \_\_\_ F
3. What is your relationship status?  
    \_\_\_ Single                                      \_\_\_ Married  
    \_\_\_ Divorced                                \_\_\_ Widowed
4. What is your racial/ethnic heritage?  
    \_\_\_ White/Anglo or European-American                                      \_\_\_ Black/African-American  
    \_\_\_ Asian, Asian American, Pacific Islander                                \_\_\_ Hispanic/Latino  
    \_\_\_ Native-American/American-Indian                                      \_\_\_ Arabic/Middle Eastern  
    \_\_\_ Bi-racial \_\_\_\_\_  
    Other \_\_\_\_\_
5. What year are you in your academic career?  
    \_\_\_ Freshman    \_\_\_ Sophomore            \_\_\_ Junior            \_\_\_ Senior            \_\_\_ Other

## **APPENDIX C**

### **MESSAGE FRAMES**

Gain-framed message

**DID YOU KNOW?!?**

Your entire body benefits from engaging in healthy eating and portion control...

- People who eat on a small plate tend to eat smaller portions of food and are more likely to maintain a healthy weight.
- Adhering to a sugar-free and nutrient enriched diet containing vegetables and lean protein increases the likelihood of having a healthy heart.

If you plan meals ahead of time you are more likely to maintain a healthy lifestyle and more likely to have a healthy heart and a healthy weight.

Loss-framed message

**DID YOU KNOW?!?**

Your entire body suffers from not engaging in healthy eating and portion control...

- People who eat on a large plate tend to eat larger portions of food and are less likely to maintain a healthy weight.
- Consuming a sugary and nutrient depleted diet containing soft drinks and candy increases the likelihood of developing obesity.

If you do not plan meals ahead of time you are less likely to maintain a healthy lifestyle and less likely to have a healthy heart and a healthy weight.

**Gain-framed message****DID YOU KNOW?!?**

Your entire body benefits from engaging in sleep hygiene...

- People who establish a set of regular pre-sleep routines to signal bedtime is approaching actually sleep better.
- Adhering to an established bedtime and wake time helps your body to develop a healthy and consistent sleep schedule.
- Exercising earlier in the day helps you sleep better because your body has time to calm down before bedtime.
- Drinking non-caffeinated beverages such as chamomile tea helps promote quality sleep.

People who practice sleep hygiene attain quality sleep. They demonstrate a faster metabolism and are more likely to keep the weight off.

**Loss-framed message**



### **DID YOU KNOW?!?**

Your entire body suffers from not engaging in sleep hygiene...

- People who do not establish a set of regular pre-sleep routines to signal bedtime is approaching actually sleep worse.
- Not adhering to an established bedtime and wake time causes your body to develop an unhealthy and erratic sleep schedule.
- Exercising right before bedtime over stimulates your body and does not help you sleep better because it does not have time to calm down before bedtime.
- Drinking caffeinated beverages such as soft drinks reduces the amount of quality sleep attained.

People who do not practice sleep hygiene do not attain quality sleep. They demonstrate a slower metabolism and are less likely to keep the weight off.

## HEALTHY EATING

### DID YOU KNOW?!?

Your entire body benefits from engaging in healthy eating and portion control...

People who use a small plate for meals tend to eat smaller portions of food and are more likely to maintain a healthy weight.

### DID YOU KNOW?!?

Your entire body benefits from engaging in healthy eating and portion control...

Adhering to a sugar-free and nutrient enriched diet containing vegetables and lean protein increases the likelihood of having a healthy heart

### DID YOU KNOW?!?

If you plan meals ahead of time, you are more likely to maintain a healthy lifestyle and more likely to have a healthy heart and a healthy weight.

## HEALTHY EATING

### DID YOU KNOW?!?

Your entire body suffers from not engaging in healthy eating and portion control...

People who use a large plate for meals tend to eat larger portions of food and are less likely to maintain a healthy weight.

### DID YOU KNOW?!?

Your entire body suffers from not engaging in healthy eating and portion control...

Consuming a sugary and nutrient depleted diet containing soft drinks and candy increases the likelihood of developing obesity

### DID YOU KNOW?!?

If you do not plan meals ahead of time, you are less likely to maintain a healthy lifestyle and less likely to have a healthy heart and a healthy weight.

## SLEEP HYGIENE

### DID YOU KNOW?!?

Your entire body benefits from engaging in sleep hygiene...

People who establish a set of regular pre-sleep routines tend to sleep better.

### DID YOU KNOW?!?

Your entire body benefits from engaging in sleep hygiene...

Adhering to an established bedtime and wake time helps your body to develop a healthy and consistent sleep schedule.

### DID YOU KNOW?!?

Your entire body benefits from engaging in sleep hygiene...

Exercising earlier in the day helps you sleep better because your body has time to calm down before bedtime.

### DID YOU KNOW?!?

Your entire body benefits from engaging in sleep hygiene...

Drinking non-caffeinated beverages such as chamomile tea helps promote quality sleep.

### DID YOU KNOW?!?

People who practice sleep hygiene attain quality sleep. They demonstrate a faster metabolism and are more likely to keep the weight off.



## SLEEP HYGIENE

### DID YOU KNOW?!?

Your entire body suffers from not engaging in sleep hygiene...

People who do not establish a set of regular pre-sleep routines actually sleep worse than people who do engage in regular pre-sleep habits.

### DID YOU KNOW?!?

Your entire body suffers from not engaging in sleep hygiene...

Not adhering to an established bedtime and wake time causes your body to develop an unhealthy and erratic sleep schedule.

### DID YOU KNOW?!?

Your entire body suffers from not engaging in sleep hygiene...

Exercising right before bedtime overstimulates your body and does not help you sleep better because it does not have time to calm down before bedtime.

### DID YOU KNOW?!?

Your entire body suffers from not engaging in sleep hygiene...

Drinking caffeinated beverages such as soft drinks reduces the amount of quality sleep attained.

### DID YOU KNOW?!?

People who do not practice sleep hygiene do not attain quality sleep. They demonstrate a slower metabolism and are less likely to keep the weight off.

**APPENDIX D**

**GENERAL REGULATORY FOCUS MEASURE**

Using the scale below, please write the appropriate number in the blank beside each item.

1      2      3      4      5      6      7      8      9

Not at all true of me Very true of me

1. \_\_\_In general, I am focused on preventing negative events in my life.
2. \_\_\_I am anxious that I will fall short of my responsibilities and obligations.
3. \_\_\_I frequently imagine how I will achieve my hopes and aspirations.
4. \_\_\_I often think about the person I am afraid I might become in the future.
5. \_\_\_I often think about the person I would ideally like to be in the future.
6. \_\_\_I typically focus on the success I hope to achieve in the future.
7. \_\_\_I often worry that I will fail to accomplish my academic goals.
8. \_\_\_I often think about how I will achieve academic success.
9. \_\_\_I often imagine myself experiencing bad things that I fear might happen to me.
10. \_\_\_I frequently think about how I can prevent failures in my life.
11. \_\_\_I am more oriented toward preventing losses than I am toward achieving gains.
12. \_\_\_My major goal in school right now is to achieve my academic ambitions.
13. \_\_\_My major goal in school right now is to avoid becoming an academic failure.
14. \_\_\_I see myself as someone who is primarily striving to reach my “ideal self”—to fulfill my hopes, wishes, and aspirations.
15. \_\_\_I see myself as someone who is primarily striving to become the self I “ought” to be—to fulfill my duties, responsibilities, and obligations.
16. \_\_\_In general, I am focused on achieving positive outcomes in my life. □
17. \_\_\_I often imagine myself experiencing good things that I hope will happen to me.
18. \_\_\_Overall, I am more oriented toward achieving success than preventing failure.

**APPENDIX E**

**GENERALIZED SELF-EFFICACY SCALE**

Please indicate your opinions about each of the statements below by circling the appropriate number:

1                                      2                                      3                                      4  
 Not at all true                      Hardly true                      Moderately true                      Exactly true

<b>Self-Efficacy Scale Items:</b>		<b>Response Scale</b>			
1.	I can always manage to solve difficult problems if I try hard enough.	1	2	3	4
2.	If someone opposes me, I can find the means and ways to get what I want.	1	2	3	4
3.	I am certain that I can accomplish my goals.	1	2	3	4
4.	I am confident that I could deal efficiently with unexpected events.	1	2	3	4
5.	Thanks to my resourcefulness, I can handle unforeseen situations.	1	2	3	4
6.	I can solve most problems if I invest the necessary effort.	1	2	3	4
7.	I can remain calm when facing difficulties because I can rely on my coping abilities.	1	2	3	4
8.	When I am confronted with a problem, I can find several solutions.	1	2	3	4
9.	If I am in trouble, I can think of a good solution.	1	2	3	4
10.	I can handle whatever comes my way.	1	2	3	4

Schwarzer, R., & Jerusalem, M. (1995). Generalized Self-Efficacy Scale.

**APPENDIX F**  
**PERSUASIVENESS OF THE MESSAGE**



**Please respond to the following questions by rating yourself from 1 to 9 (circle one):**

1. To what extent do you agree with the sleep hygiene recommendations?

**Not at all**

**Very Much**

1      2      3      4      5      6      7      8      9

2. To what extent do you agree with the nutrition recommendations?

**Not at all**

**Very Much**

1      2      3      4      5      6      7      8      9

**APPENDIX G**

**BEHAVIORAL INTENTIONS**

**Please respond to the following questions by rating yourself from 1 to 9 (circle one):**

1. How likely is it that you will follow sleep hygiene recommendations?

**Extremely  
Unlikely**

**Very  
Likely**

1      2      3      4      5      6      7      8      9

2. How likely is it that you will follow dietary recommendations?

**Extremely  
Unlikely**

**Very  
Likely**

1      2      3      4      5      6      7      8      9

**APPENDIX H**

**THANK YOU AND SEMINAR REMINDER**

Thank you for participating in this study.

You are invited to learn more about healthy eating and sleep hygiene by accessing the following link:

<https://www.surveymonkey.com/s/JNG8FWL>

When prompted, please be sure to enter your assigned user number.

Thank you again for your time.

\_\_\_\_\_ = User Number

**APPENDIX I**

**DEBRIEFING**

Debriefing: Explanation of the Experiment

As you recall, we asked you to complete a series of questionnaires.

Findings will hopefully contribute to a better understanding of how some health-related messages might be more persuasive than others and can be used in health, psychology, and marketing related areas in order to help people lead healthier lives.

The results of this study will be kept strictly confidential.

If you have any questions whatsoever, please email the primary investigator for this experiment, Abbey White. She can be reached at [AWhite@jbu.edu](mailto:AWhite@jbu.edu).

We ask that you not share any information with others about the experiment until we conclude data collection at the end of the semester. Thank you again for your time and effort!