

2016

# Persuasion in the Health Field: Framing the Message for Attitude Change

Kelley Ogami  
*Scripps College*

---

## Recommended Citation

Ogami, Kelley, "Persuasion in the Health Field: Framing the Message for Attitude Change" (2016). *Scripps Senior Theses*. Paper 837.  
[http://scholarship.claremont.edu/scripps\\_theses/837](http://scholarship.claremont.edu/scripps_theses/837)

This Open Access Senior Thesis is brought to you for free and open access by the Scripps Student Scholarship at Scholarship @ Claremont. It has been accepted for inclusion in Scripps Senior Theses by an authorized administrator of Scholarship @ Claremont. For more information, please contact [scholarship@cuc.claremont.edu](mailto:scholarship@cuc.claremont.edu).

**PERSUASION IN THE HEALTH FIELD: FRAMING THE MESSAGE FOR ATTITUDE CHANGE**

by

**KELLEY OGAMI**

**SUBMITTED TO SCRIPPS COLLEGE IN PARTIAL FULFILLMENT OF THE DEGREE OF  
BACHELOR OF ARTS**

**PROFESSOR SPEZIO  
PROFESSOR MA**

**APRIL 22, 2016**

### Abstract

The process of persuasion, the changing of a person's attitudes, has often been applied to health communications designed to promote healthy behavior. Manipulation of aspects of the persuasive message can influence persuasion and the likelihood of attitude change. For a long time, the existing persuasion research had yet to examine how different types of message framing and intervention targets directly and in interaction with one another act as predictors of health attitude change. Therefore, this thesis addressed this lapse using an online survey to assess participants' attitude towards the health issue of hypertension after reading a health message. This health message was manipulated in how it framed the problems of high blood pressure and how it prescribed changes in behavior to have healthy blood pressure levels. It was hypothesized that negative message framing, the interrogative verb mood and a facilitation target would have greater influence over attitude and behavioral intention compared to their alternatives. The same pattern of results was expected for elaboration save for the hypothesis that an inhibition intervention target would result in greater elaboration than a facilitation target. This thesis may further the field of psychology's understanding of persuasion as well as help create a better informed and healthier society.

### Persuasion in the health field: Framing the message for attitude change

What does it take for a fast food company to roll out a new food mashup like the pizza with hot dog crust or a waffle taco? Since the launch of KFC's Double Down sandwich to Taco Bell's incredibly lucrative Doritos Loco Taco, it would appear that the food industry is creating these mashups left and right (Glass & Chace, 2015). But there is a method to the madness. How does a company evaluate a product's economic viability and decide whether to launch it? You would think that the decision would be based on the taste, but that's a secondary concern. The most important variable is the name. The name is the foundation for creating messages to persuade people to buy that food mashup over and over again.

Persuasion is an influential process and can manifest in many different forms and contexts. Within the domain of social psychology, persuasion is defined as an appeal to change an attitude, or an evaluation, of a given object (Petty & Briñol, 2008). Because the message is the presentation of the appeal's arguments and position, the message can be the most influential factor in changing attitudes. In the aforementioned case, the food industry puts great thought into product names because the message derived from the names can persuade an individual to look beyond an objectively unappetizing concoction of food and instead evaluate it as a pleasing irresistible object. If persuasive messages can coax people to favor unhealthy objects, then persuasive messages should be able to coax people to have healthy attitudes and behavior too.

As it is, persuasion has a considerable and growing relationship with the field of health communication. Health communication has used messages ranging from the 1980s' "Just Say No to Drugs" to today's "Let's Move" campaign in order to target and change specific behaviors to be healthier. As evidenced by these examples, health persuasion is especially concerned with

changing the behavioral component of attitudes. This is because there are many health issues, such as hypertension, that have dire consequences but can be addressed with relatively simple changes in behavior such as a change in diet. The way in which such health recommendations and information is presented can be especially powerful in shaping people's approaches towards these changes in behavior and the health issue itself.

Consequently, much psychological research has investigated what factors of persuasion are most effective in health messages (Salovey & Wegener, 2003). While a sizable amount of research has been dedicated to persuasion as applied to the health context, the framing and verb mood involved in the message presentation along with the intervention target in the message content require study. With an online survey experiment, the purpose of the current research was to examine how message framing, intervention target, and verb mood could be manipulated to both separately and interactively predict persuasion and behavioral intention.

### **Defining Attitudes**

Before venturing into an exploration and study of persuasion, a concrete understanding of attitudes is first required. In a selective review of research and literature on attitudes, researchers Crano and Prislin (2006) defined attitudes as an overall evaluation of a given object. Attitude objects can include anything a person can hold in their mind, ranging in form from abstract ideas to concrete persons and behavior (Bohner & Dickel, 2011). Attitudes are comprised of three distinct components: affect, behavior, and cognition (Cacioppo, Harkins, & Petty, 1981). Affect refers to the general feelings a person has for the attitude object. The behavior component of attitudes is the behavioral responses and tendencies toward the attitude object. The cognition part of attitudes encompasses the beliefs, thoughts, ideas, and associations a person holds for a given attitude

object. Taken together, these three components define and serve as indicators of attitude.

Attitudes are not alone defined by affect, behavior and cognition, however.

In addition to its three components, attitude is also determined by its dimensions (i.e., the continuums on which attitude exists). The two most significant attitudinal dimensions are valence and strength (Crano & Prislin, 2006). Attitude valence is the degree to which an individual finds the attitude object attractive. Generally, valence is interpreted by whether it is positive (e.g., the attitude object is attractive and favorable) or negative (e.g., the attitude object is aversive and unfavorable). The dimension of attitude strength is how resistant the attitude is to change. Therefore, attitude strength can be defined as an indication of stability: the attitude's durability and influence (Krosnick & Petty 1995, as cited in Bohner & Dickel, 2011). With greater attitude strength comes greater accessibility of the attitude, or greater ease for an individual to tap into that attitude (Crano & Prislin, 2006). These dimensions and thus the attitude itself can be expressed through and defined by the aforementioned three attitudinal components.

To understand how these constructs work together to establish an attitude, consider the following example, which illustrates each of these attitudinal components and dimensions. A person feels positive emotions like happiness with regard to hamburgers. This is the affective component of attitude. Additionally, this person has approving thoughts and opinions about hamburgers (e.g., "Hamburgers have an easy to hold shape" and "Given the choice, I would rather eat a hamburger than a hotdog"), which fall under the cognitive component of attitudes. This hamburger attitude is further demonstrated by the person's behavior of eating hamburgers twice a week. The general favorability showcased by these components is indicative of the valence of the attitude, which, in this example, is positive. Also, the person's loyalty towards hamburgers (i.e., their rejection of hot dogs) is characteristic of attitude strength. Given all of this information, it can

be determined that this person has a strong positive attitude for hamburgers. Although in this example the attitude for the given object remained consistent across all three components, attitudes are not necessarily permanent in their valence and strength. Attitudes are subject to change, and there are many ways in which outside forces actively try to change people's attitudes. These catalysts of attitude change are part of persuasion.

### **Defining Persuasion**

Persuasion is an appeal to change a person's attitudes, generally aiming to shift a particular attitude in a specific direction. For example, a persuasive appeal may strive to change a person's initial positive attitude towards an attitude object into a negative attitude. When changing a person's attitude, an initiator of persuasion will present an appeal containing information on the specific attitude object to this person. Therefore, persuasion is comprised of and its success hinges on the source of information, the manner in which the information is presented, and the receiver of that information (Petty & Cacioppo, 1986). In other words, persuasive appeals have three main elements. The first is the source of the persuasive appeal, or who is delivering the appeal. The second is the message, which is the specific content and presentation context of the persuasive appeal. Finally, the third element is the audience, or for whom the persuasive appeal is intended. When these persuasive elements are changed or manipulated, this can change the likelihood of the persuasive appeal having its desired effect. Therefore, psychological research has been devoted to understanding how each of these elements can be manipulated to increase the likelihood of attitude change in the direction of the message's position (Petty & Briñol, 2008).

### **The Contexts for Persuasion**

Persuasive appeals appear in a wide variety of contexts and forms beyond the domain of basic psychological research. One of their most common and recognizable forms is consumer advertising. Various companies and industries capitalize on established persuasive tactics to create sensational and often very effective advertisements. Persuasion in the advertising context is often used to change people's attitudes to favor the purchase of products such as the advertisements for the aforementioned mashup foods. Another common form of persuasive appeals is public service announcements. Such announcements employ persuasive techniques to alter the general public's attitudes towards a social issue. In a similar vein, the domain of health communications often turns to psychological research on persuasion to design influential health campaigns. Although persuasion is often seen as synonymous with calculated and profit-driven advertising, persuasion can be applied to more generous and magnanimous circumstances, such as when it is used in furthering health causes.

**Health communication.** The field of health communication is a context in which persuasive appeals have had a long and evolving role. As defined by Kreps (2014), health communication campaigns supply basic health information, warnings about health risks, and strategies for adopting and upholding healthy behaviors. They are an integral and ubiquitous means of dispensing health care information and promoting general health. Health campaigns are concerned with changing people's attitudes so that they positively view healthy objects and negatively evaluate unhealthy objects. Over the years, persuasive appeals have been used to launch health campaigns to change people's attitudes towards numerous topics, including smoking, exercise, recreational drug use, vegetable intake and alcohol consumption. Unfortunately, health campaigns occasionally fail to have their intended impact on attitudes (Salovey & Wegener, 2003). To avoid such disappointments, especially on a national scale, it is vital to understand how persuasion

functions and then apply this psychological understanding to health communication efforts. Furthering research on health-focused persuasion will aid in educating the general public on health risks and in changing the public's behavior to minimize such risks. Therefore, the purpose of this thesis was to investigate how the persuasion process and factors of persuasion operate within a health based context.

**The message context and effective persuasion.** Because there are a wide range of contexts in which persuasion manifests, the message element of a persuasive appeal can play an important role in predicting the likelihood of attitude change and seeing successful persuasion. The definition of what merits a successful persuasive appeal depends on what the persuasion is being used for. For this thesis, successful persuasion was defined as an appeal resulting in an attitude more in line with the appeal's position compared to before exposure to the appeal. Measurement of the aforementioned components (i.e., affect, cognition and behavior) and dimensions (i.e., valence and strength) can be used to assess attitude change. With this in mind, testing variables of the persuasive message context and content can cultivate a deeper understanding of how such variables affect the persuasion outcome of attitude change. What can be manipulated in the persuasive message to change attitudes?

### **The Cognitive Response Approach to Persuasion**

The presence of a persuasive appeal does not immediately lead to a changed attitude. First, the appeal needs to be cognitively processed. Therefore, cognitive processing and its resulting responses to an appeal are a critical mediating part of persuasion (Cialdini, Petty & Cacioppo, 1981). As a mediator, cognitive processing and responses are the channel through which persuasion works and how a persuasive appeal can influence attitude. At its most basic, the

approach posits that favorable cognitive responses are positively correlated with attitude change. Ranging from tangential to relevant, numerous factors of the persuasive appeal catalyze cognitive reactions. Because cognitive responses are considered to be a significant contributor to persuasion and attitude change, they are defined as distinct from attitudes themselves (Cialdini, Petty & Cacioppo, 1981). Attitudes are general and relatively enduring negative or positive evaluations for a specific object. Contrastingly, cognitive responses are the fairly fleeting products of the mental processing in response to a given object of consideration (Cialdini, Petty & Cacioppo, 1981). In the case of persuasion, the presentation of a persuasive appeal stimulates this cognitive processing, which can take the form of information processing, judging, elaborating, memory recall, etc. Given the complexity of cognitive processing, cognitive responses can also manifest in a variety of ways, including as thoughts, associations, intentions and elaborations (Cacioppo, Harkins, & Petty, 1981). When considering the process of persuasion, however, cognitive responses can be broken down into two straightforward categories. As part of persuasion, cognitive processing may elicit cognitive responses that are pro-arguments (i.e., thoughts in favor) or counterarguments (i.e., thoughts in opposition) to the information and position posited by the persuasive appeal (Cialdini, Petty & Cacioppo, 1981). If the elicited cognitive responses are primarily in favor of the appeal's position, successful persuasion will most likely result. If the cognitive responses are primarily unfavorable toward the appeal's stance, however, resistance to both persuasion and attitude change is more likely.

As part of producing cognitive responses and changing attitudes, people access their existing prior knowledge and attitude schemas. Attitude schemas are cognitive patterns for organizing accumulated knowledge and information surrounding the attitude. Exposure to a persuasive appeal stimulates the cognitive processing of reconciling and evaluating the incoming

appeal information relative to and against the preexisting knowledge and attitude beliefs on the given issue. The cognitive effort involved in the processes of reconciliation, evaluation, and cognitive response formulation can vary. This variation in cognitive effort, therefore, can influence both the type of cognitive processing undertaken and the degree of attitude change.

As cognitive responses are the result of cognitive processing, evaluation of these responses can serve as an indication of the type of processing undertaken. Therefore, when examining the determinants of effective persuasion, it was crucial to take into consideration cognitive responses because of their mediating role in the persuasive process. The consensus is that the more appeal-relevant cognitive responses, the more likely effortful cognitive processing took place. Additionally, collection of cognitive responses can serve to operationalize and assess the type of cognitive process and effort expended to form these responses. Depending on individual differences and the context of the persuasive appeal, a person's ability and motivation to expend cognitive effort may be very high or very low. Therefore, there are two possible routes of cognitive activity for the processing of persuasion.

### **The Elaboration Likelihood Model**

One of the most pervasive theories on attitude change is the Elaboration Likelihood Model (ELM), which thoroughly explains cognitive processing's role in persuasion. Originally presented by Petty and Cacioppo in 1986, ELM succinctly accounts for how cognitive effort, processing and responses can dictate the likelihood of success for a persuasive appeal. The goal of this thesis was to understand what determines the likelihood of persuasion, as applied to health communication. Therefore, as a well established model for explaining how persuasion works, it was important to consider ELM. The model states that there are two possible cognitive routes a person can take

when evaluating persuasive appeals: a central route and a peripheral route. Each route is marked by two distinct types of cognitive processing. Which processing route to persuasion is taken can influence the degree or quality of changes in attitudinal strength and valence and thus how consequential the attitude change is. The distinguishing feature of this processing is the extent to which a person elaborates on a persuasive appeal. A specific kind of effortful cognitive processing, elaboration is the degree to which a person considers issue-relevant arguments contained within the persuasive appeal (Petty & Cacioppo, 1986). Elaboration can also encompass effortful cognitive processing beyond consideration of the specific arguments presented in the message.

### **The Central Route to Persuasion**

The central route is characterized by high levels of elaboration on issue-relevant information in the persuasive appeal. Under the central route to persuasion, an individual is highly motivated and able to scrutinize the appeal's issue-relevant arguments. Individuals evaluate and incorporate the persuasive appeal's new information with their own attitudes and prior knowledge. Repeated access and extensive reevaluation of preexisting attitudes and schemas as well as integration of new information results in attitudes that are more internally accessible, temporally persistent, resistant to counterpersuasion attempts, and consistent with behavior (Petty & Cacioppo, 1986). An increased ease in attitude retrieval and pertinent information derived from central route processing affords people greater ability to report, act on, and defend the attitude over time. Therefore, ELM predicts central route processing and elaboration will result in a strong attitude change in the direction of the message's position.

### **The Peripheral Route to Persuasion**

The peripheral route to persuasion is largely the opposite of the central route. This cognitive processing route involves low expenditure of cognitive effort to elaborate on the persuasive appeal. When processing along the peripheral route, an individual lacks the motivation and/or ability to scrutinize the persuasive appeal's issue-relevant arguments. As the peripheral route involves relatively little cognitive and elaborative effort, the appeal's issue-relevant arguments become less integral to the processing of persuasion. This lets potentially tangential and issue-irrelevant variables wield greater influence over persuasion. For example, variables like the presence of food or an electric shock have nothing to do with the message's position or arguments but can still influence participants' attitudes, especially when participants are not elaborating (Petty & Cacioppo, 1986). Because of its low cognitive effort and elaboration along with high susceptibility to peripheral cues, the peripheral route to persuasion results in attitudes that are more fleeting, less accessible and weaker than their central route counterparts.

Thus, the distinction between the peripheral and central route go beyond their differences in elaboration. Given their differing degrees of elaborative processing, which route, central or peripheral, to persuasion is taken influences the quality and degree of changed attitudes. Although it is arguable that, in the domain of health communication, any attitude change in the stipulated direction of valence is better than no change at all, the degree of attitude change is important. The intent of health persuasion is for the attitude to change and remain changed. It does not do someone much good to develop a positive attitude for a healthy position one day and then change their attitude to completely oppose said position the next day. The people behind health campaigns want changed attitudes to persist so as to continue improving people's health and influencing their behavior in the long run.

### Attitudes and Behavior

When changing attitudes, health campaigns are largely concerned with ensuring that all attitudinal components are consistent in their valence with the change, especially the behavioral component of attitude. Numerous health communication campaigns aim to change attitudes with a special emphasis on behavior. For instance, First Lady Michelle Obama's *Let's Move!* campaign's purpose, as can be intuited from the campaign's name, is to foster attitudes in favor of exercising. The health campaign is primarily concerned with changing the behavioral component of attitude, focusing on increasing the general public's exercise behavior (Let's Move, n.d.). The degree of success of such campaigns is debatable, so it is necessary to examine how exactly attitudes can affect behavior. Can strong and favorable attitudes directly affect behavior?

As denoted by ELM, the degree and type of attitude change can matter. The route to persuasion has serious implications for the persuasive health appeal's real and lasting effects beyond the initial change in attitude. Attitudes based on thoughtful consideration are generally more positively associated with attitude-consistent behavior compared to attitudes formed peripherally (Petty & Cacioppo, 1986). In fact, ELM suggests that attitudes be used to directly and reliably predict behavior. Therefore, given the greater accessibility and easier activation of attitudes from the central route to persuasion, the changed attitudes of the central route are especially desirable outcomes for health persuasion.

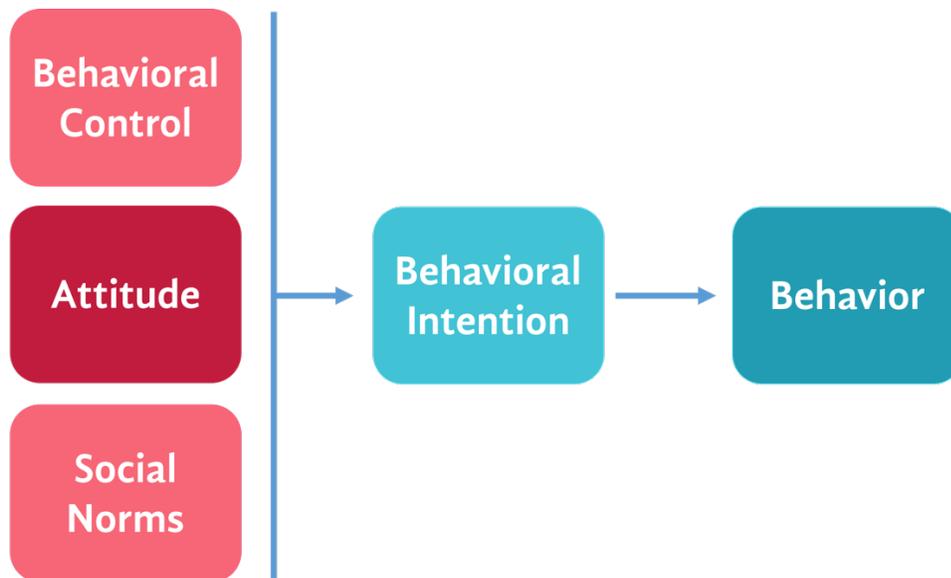
Unfortunately, research suggests that the degree of attitude strength and valence alone are not enough to consistently predict behavior as ELM proposes. ELM primarily discusses attitudes in direct relation to behavior, stating that strong attitudes are reliable predictors of behavior (Petty & Cacioppo, 1986). Numerous studies, however, have shown that attitude strength cannot always accurately predict behavior. For example, a seminal study conducted by LaPiere (1934) on the

relationship between attitudes and behavior showed that the two could be incongruous. Strong attitudes could fail to accurately predict actual behavior. For this study, LaPiere traveled to several hotels and restaurants with an affable Chinese couple. Although there was widespread negative (i.e., bigoted) attitudes towards Asians at the time, LaPiere found, to his surprise, that these establishments would accommodate the couple unhesitatingly. When LaPiere later called the establishments to inquire as to their policy on serving Chinese guests, the hotels and restaurants said they would absolutely refuse service. This study illustrated a dichotomy between reports of attitude and actual behavior: the restaurants' welcoming behavior was inconsistent with their reports of strongly negative attitudes. If strength and valence are not sure guarantees of behavior achievement, when can attitudes influence behavior performance? Although ELM posits that attitude and the cognitive processing route from which the attitude was formed can predict behavior, it does not delve deeper into this predictive relationship or explore other influential factors on attitude's influence on behavior. This uncertainty in predicting behavior from attitude can be addressed with the Theory of Planned Behavior. The theory offers an explanation as to circumstances where attitudes can predict behavior, supplementing ELM's theories on attitudes and behavior relations.

### **Theory of Planned Behavior and Behavioral intention**

The Theory of Planned Behavior is an extension of the Theory of Reasoned Action, addressing the latter model's failure to take volitional control of behavior into account. In keeping with the original theory, the Theory of Planned Behavior (TPB) focuses on behavioral intention, a person's intent to perform a given behavior (Ajzen, 1991). As stated by the theory's originator Ajzen (1991), intentions are meant to encapsulate motivational factors that influence a behavior as well

as to serve as indicators of an individual's willingness to put effort into performing the given behavior. Research has established that there is a positive correlation between intention and behavior (Ajzen, 1991). Therefore, behavioral intentions serve as a better predictor of behavior performance than attitude alone can, and in this thesis, behavioral intention served as an indication of the behavior component of attitudes.



*Figure 1.* The Theory of Planned Behavior

According to the TPB, behavioral intention is determined by three conceptually independent variables. The first, and one of the more important determinants of intention, is the person's attitude towards the given behavior. Thus, behavioral intentions are directly related to and influenced by attitudes regarding the behavior. The two other variables are subjective norms and behavioral control. A subjective norm is perceived social pressure to perform or not to perform the behavior. Because people are social creatures, the degree to which society views the behavior as favorable or unfavorable can influence a person's intent to perform said behavior. Perceived behavioral control refers to a person's idea of how able he/she is to perform the behavior based on past experience and anticipated impediments. In order to intend to perform a behavior, people first

need to be able to control that behavior. Together, these three variables affect an individual's behavioral intention (see Figure 1); although, research suggests that attitude can have a greater impact compared to the other two.

An analysis conducted by Ajzen (1991) on a collection of 16 studies revealed attitudes to largely be the most significant predictors of behavioral intentions. In turn, these behavioral intentions act as reliable predictors of behavior. The general principle is that the more favorable the attitude is, the stronger the intent to perform the behavior is. Given that attitude quality can be influenced by the routes to persuasion, the routes will also influence behavioral intent. The elaborative central route should yield more favorable attitudes and stronger behavioral intentions than the peripheral route. Research conducted by Petty, Cacioppo, and Schuman (1983) found that both attitudes and behavioral intention were more favorably affected by the persuasive appeal when under conditions to foster greater elaboration as opposed to conditions that did not. Additionally, attitudes and behavioral intentions were more positively correlated under elaborative conditions as opposed to peripheral conditions. Therefore, attitudes can predict behavioral intentions, which can then predict behavior performance.

Considering behavioral intention's role as a mediator in the attitude-behavior relationship, this construct refines the persuasive process beginning with the appeal and ending with attitude change and behavior achievement. A health campaign would be especially successful if it yielded attitude change via the central route because of attitude's direct relationship with mediating behavioral intentions. Consequently, manipulating the relationships of cognition, attitude and behavioral intention to test how predictive they are of persuasion can lead to a better understanding of health persuasion.

### **Predictors of Persuasion as Described by ELM**

The ELM offers an idea as to what kind of variables can influence persuasive outcomes and how these variables have this influence. As mentioned earlier, the peripheral and central routes to persuasion involve differing degrees of elaboration. Therefore, each route is influenced by different variables. Because elaboration involves actually affording cognitive effort and considering the actual appeal, the central route and its attitude change should not be so influenced by issue-irrelevant cues. Instead, a person processing along the central route is persuaded by argument content and quality of the appeal. Argument quality refers to how strongly or weakly compelling an argument is and thus can be integral to the success of a persuasive appeal (Petty & Cacioppo, 1986). A persuasive appeal with strong argument quality is highly persuasive when a person is elaborating. If an individual is not elaborating on the appeal, however, then the argument quality does not play such a key role in the attitude change.

Whereas the central route is characterized by elaborative processing, the peripheral route involves relatively less cognitive effort and consideration of the message's arguments. When under the peripheral route, the merits and quality of the appeal's arguments do not greatly affect the persuasive and attitudinal outcome. Instead, seemingly trivial variables can be the key to attitude change because of the relatively limited cognitive effort expended. These issue-irrelevant persuasion factors that influence attitudes in the absence of argument processing are peripheral cues (Petty & Cacioppo, 1986). Peripheral cues often function as heuristics, and they work by becoming directly linked to the message's position despite their irrelevance to the topic at hand. Peripheral cues also hold sway over the persuasive outcome by offering simple, but sometimes inaccurate, proof of the appeal's validity. Considering that these variables are argument-irrelevant, there is a lot of freedom in the form the variables can take. The previously mentioned food and

electric shocks are examples of peripheral cues. Another peripheral cue is argument quantity (Petty & Cacioppo, 1984). Generally, as the number of arguments presented in the message increases, the more persuasive the message is for someone on the peripheral route. In this case, the quantity of arguments influences persuasion's outcome regardless of the actual content or quality of the arguments.

### **Influencing the Degree of Elaboration**

Although under certain conditions message quantity can often act as a peripheral cue, in other circumstances, the number of arguments can influence issue-relevant cognitive processing. As opposed to acting as a heuristic (e.g., a large number of arguments indicates the message's position ought to be true), some research has suggested that a greater number of arguments instead results in greater elaboration and integration of issue-relevant information and beliefs (Chaiken, 1980, as cited in Petty & Cacioppo, 1986). This taps into a slight conundrum in categorizing persuasive message variables in accordance with ELM. There is difficulty in determining whether a variable is a peripheral cue or not because many variables that are superficially tangential to the actual argument or position can still influence persuasion via elaboration. This is the case because these variables do not necessarily influence the elaborative process as it is happening and instead influence the probability of elaboration occurring. For instance, motivational variables can be very effective in manipulating the likelihood and degree of elaboration on an appeal's issue-relevant arguments. Motivation to elaborate is derived from a drive to hold correct attitudes and avoid maintenance of maladaptive and incorrect attitudes (Petty & Cacioppo, 1986). By increasing the audience's motivation to cognitive process a persuasive

appeal's message, the audience finds it increasingly important to form a resolute attitude and thus have high motivation to elaborate on an appeal's arguments.

According to ELM, factors such as motivational variables influence the likelihood that individuals will expend cognitive effort as opposed to directly influencing the cognitive processing (i.e., incorporating or rejecting) on an appeal. A persuasive message can also be used to manipulate the likelihood and extent of cognitive effort and elaboration in addition to predict attitude change. Therefore, the message element of persuasion can be very important in contributing to the likelihood of successful attitude change.

### **Prospect Theory and Message Framing**

One means of manipulating the message element of persuasion is the framing of the message's content. The message frame can be fashioned in numerous ways to achieve successful persuasion. This thesis, however, primarily considered positive and negative framing of the different types of outcomes from a given health topic. Positively framed, or sometimes called gain framed, messages stress the benefits (e.g., gains) associated with the position of the persuasive appeal. In the case of health appeals, positively framed messages present the positive outcomes from maintaining a high level of health as prescribed by the persuasive appeal. For example, "Should you develop heart problems, not having hypertension increases the chances of overcoming these problems" is a positively framed message.

Conversely, negatively framed, also called loss framed, messages accentuate potential costs or losses from disagreeing with the message's position. For health communication specifically, negatively framed messages emphasize the negative outcomes of failing to have the good level of health as prescribed by the appeal. For instance, "Should you develop heart

problems, having hypertension increases the chances of succumbing to these problems” is a negatively framed message. People are attuned to the difference in positive or negative outcome frames, even if the outcomes are objectively equivalent (Tversky & Kahneman, 1981). Consequently, how the outcomes of the message are framed can be very influential in persuasion.

### **Risk Averse and Risk Seeking**

The effects of message framing on attitudes and decision making is grounded in Prospect Theory. Developed by researchers Kahneman and Tversky (1979), Prospect Theory offers a model of decision making under risk. Although Prospect Theory is largely based on problem sets concerning probability and changes in monetary assets, the implications of the theory are not restricted to these topics. The findings can be extended to more abstract issues like health. Also, keep in mind that while Prospect Theory deals with message framing as gain-framed and loss-framed, this study discussed the same form of message framing in terms of positive and negative message frames. Prospect Theory views decision making under risk as a choice between various prospects. A prospect is a compilation of potential outcomes each with a specific utility (i.e., subjective pleasure derived and experienced from the outcome’s occurrence). Additionally, each of these outcomes has a given probability of occurring. If an outcome does not have a 100% certainty of transpiring, the prospect is considered risky. A risky prospect does not have a certain or guaranteed outcome but a probabilistic outcome. For example, consider the weather as a prospect. On a given day, there may be a possible outcome of rain with a 60% probability of occurrence and a possible outcome of a dry day with a 40% chance of occurrence. Together, these two viable outcomes make up a risky prospect. People are described as risk averse if they prefer a certain

prospect over any risky prospect. Conversely, an individual is risk seeking if they select a risky prospect over a certain prospect.

However, people do not always adhere to one decision making strategy. The strategies for and behavior under risk can change depending on the outcomes in question. Tversky and Kahneman (1986) conducted a study to examine when people are risk seeking and when they are risk averse. Participants were presented with two separate sets of prospects and asked to choose which prospect they preferred. The first set asked participants to decide between two positive prospects (i.e., prospects involving monetary gain). One was a prospect of a certain gain of \$240. The other was a risky prospect with a 25% chance to gain \$1000 and a 75% chance to gain nothing. For this set, a large majority of participants selected the certain outcome. They preferred a relatively small certain gain over a relatively large uncertain gain. Therefore, people are risk averse for gains, taking certain outcomes of a definite gain over uncertain outcomes with the potential for bigger gains.

The second set of prospects asked participants to decide between two negative (i.e., monetary loss) prospects. One was prospect of a sure loss of \$750, and the other was a prospect with a 75% chance to lose \$1000 and a 25% chance to lose nothing. Whereas the gain-framed first set saw a dominant behavior of risk aversion, this loss-framed second set saw a large majority of participants select the risky and uncertain prospect over the sure prospect. This behavior is considered risk seeking because of the preference for an uncertain outcome (i.e., there's chance the outcome will be either a very small or a very big loss). Therefore, people demonstrate risk seeking tendencies when faced with the prospect of loss. Individuals will take uncertain outcomes with the potential for minimized loss over a certain moderate loss outcome. Now that it has been established when people demonstrate risk averse or risk seeking behavior, these behavioral

tendencies can be specifically activated to ensure persuasive success with message framing. Depending on the framing of the message, people can have different responses to the issue or appeal position at hand. This is the case even if different frames describe objectively equivalent outcomes.

### **Framing Outcomes Positively or Negatively**

Tversky and Kahneman (1981) illustrated this seemingly incongruous behavior in a study asking participants to make a decision between two possible choices. All participants were presented with the hypothetical situation that the U.S. has to implement one of two alternate programs to combat a terminal disease expected to kill 600 people. Participants were randomly assigned to read one of two different messages on each of the alternate program's potential outcomes. After reading the message, participants chose one of the presented programs to adopt. The first group read a message stating that program A will see 200 out of the expected 600 people be saved, and program B has 0.33 probability that 600 people will be saved and a 0.67 probability no one will be saved. For this condition, a majority of participants chose the program A.

The remaining participants read a different message presentation of the possible outcomes. This message stated that program C will see 400 of the expected 600 people die, and program D has a 0.33 probability that no one will die and a 0.67 probability that 600 people will die. Under this message condition, the majority of the participants chose program D.

The outcomes of programs A and C as well as programs B and D are objectively equivalent. The prospect of 200 out of 600 people surviving is equivalent to 400 out of 600 people dying. Similarly, a 0.33 probability of saving 600 people is the same as none of the 600 people dying; a 0.67 probability of none of the 600 people being saved is equivalent to 600 people dying. Thus,

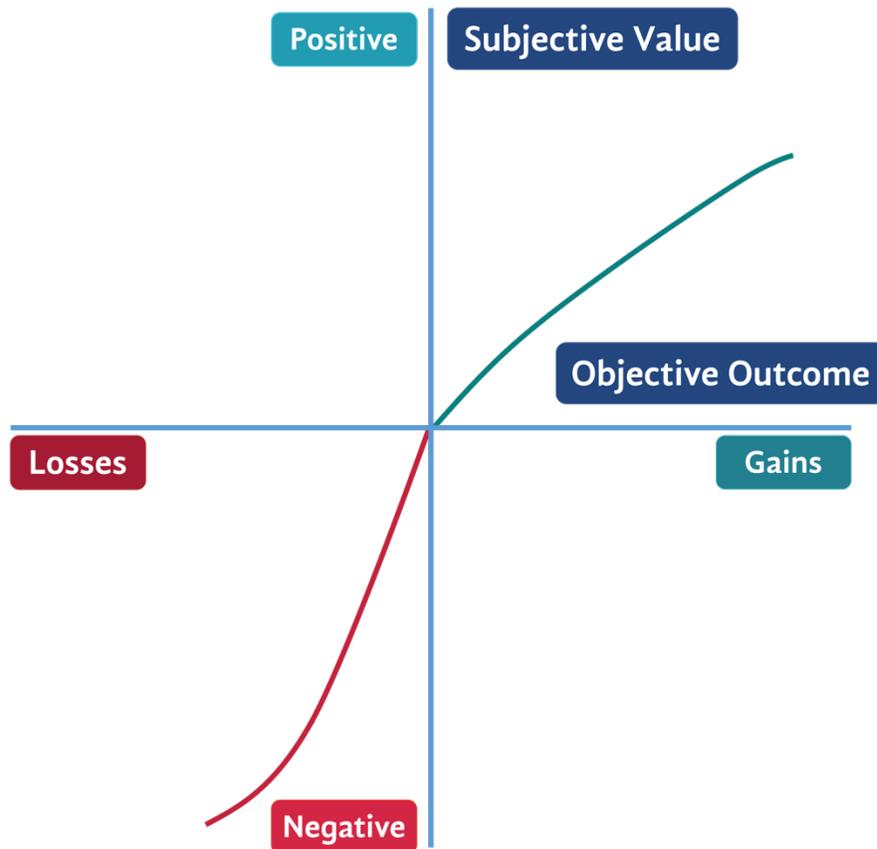
across the two different programs, the objective outcomes are the same. The framing of the information differs, however. The first message focuses on number of lives saved in a gain or positive message frame fashion while the second stresses number of lives lost, which is a loss or negative message frame. Although presented with the same objective outcomes, the majority choice was reversed depending on how the outcomes were framed in the message. Confronted with prospects of positive outcomes (i.e., saving lives), participants demonstrated risk aversion and preferred the safer choice with guaranteed positive objective outcomes. When faced with the prospect of negative consequences (i.e., loss of life), however, participants changed their behavior and were more willing to follow through with a more uncertain and less pleasant outcome.

This seemingly contradictory behavior is not wholly unexpected and in keeping with Prospect Theory's established contexts for risk averse and risk seeking behaviors. The changes in risk preferences based on a mere change in message framing, however, has important ramifications for constructing a persuasive appeal. The fact that a positive or negative message frame can change people's preferences indicates that objective outcomes and their related information are viewed through a filter of a subjective value.

### **The Value Function**

Kahneman and Tversky's (1979) Value Function (see Figure 1) represents and explains the relationship between an objective outcome and its accompanying subjective evaluation. An individual evaluates how their objective state will change with regard to an additional outcome (e.g., how much money will I win or lose; how many lives will be saved or perish). This evaluation involves subjectively valuing the objective outcome (e.g., how good or bad will this make me feel). These changes in objective and subjective states are in relation to a neutral point of reference. This

homeostasis-like point or state is represented at the origin (i.e., where the horizontal and vertical axes intersect). Thus the point at the origin is used as the neutral point of reference when evaluating prospects.



*Figure 2.* The Value Function of Prospect Theory. Adapted from: Kahneman, D., & Tversky, A. (1979). Prospect theory: An analysis of decision under risk.

Together, a value function of losses and a value function of gains make up the entire S-shaped Value Function (Kahneman & Tversky, 1979). The value function for positive outcomes is concave above the reference point whereas the negative outcome value function is convex below the reference point. Additionally, this loss value function is steeper than the gain value function (Kahneman & Tversky, 1979), indicating that losses subjectively feel much worse and more painful than gains subjectively feel pleasurable. The steeper loss value function explains why people are risk averse and risk seeking under different circumstances. People are willing to seek out and

accept risky or unattractive prospects to minimize negative objective outcomes because they are experienced so extremely negatively. While gains are valued positively, they are not experienced as extremely as losses are, so there is less motivation to seek out risk to achieve a gain.

Prospect Theory's Value Function illustrates how message framing can influence people's decisions and choices. Depending on whether messages are framed in a positive or negative light, the frame can affect a person's overall valuing of and attitude toward the options and outcomes delineated in the message. Thus, a manipulation of message frame can influence a person's attitude even if the information being relayed in the message and the objective outcome (e.g., improved health) are objectively equivalent across the different frames. Namely, if the message has a negative-frame (e.g., emphasizes negative consequences and outcomes), the message can persuade people to become more accepting of a risky or subjectively unpleasant outcome that they might not have otherwise selected.

Because message framing appears to influence people's evaluations of prospects and their outcomes, message framing's effects have been examined as one of ELM's factors of persuasion. Research has established that message framing can influence the extent and likelihood of elaboration (Salovey & Wegener, 2003). Specifically, negatively framed messages can be more effective at inciting elaboration and changing attitudes than a positively framed message. One reason for this increased elaboration would be that negative information is more attention grabbing and so receives greater attention than positive information (Smith & Petty, 1996). The attention grabbing nature of a negative frame can be attributed to the Value Function. Negative outcomes are subjectively experienced as terrible. Framing of these painful negative outcomes therefore motivates an individual to elaborate to avoid maintenance of maladaptive attitudes that could incur negative objective and subjective changes and experiences. Therefore, in keeping with

Prospect Theory and ELM, it was predicted that negatively framed messages would increase elaboration relative to positively framed messages. Further, it was expected that negative message framing would yield greater and stronger change in attitudes in the direction of the message's position compared to positively framed messages. Given that negatively framed messages can predict strong attitudes, it was also expected that negatively framed messages would also see stronger behavioral intentions compared to positively framed messages.

### **Message Framing Applied to Health Communication**

Due to message framing's notable effects on decision making and behavior, the variable is frequently employed in health communication. As message framing involves strategic emphasis of certain outcomes and information in the persuasive appeal, it is necessary to consider what is specifically being advocated. Within the health domain, message framing is largely studied to understand how it affects prevention and detection behaviors. Prevention behaviors, as the name indicates, are behaviors to avoid potential health problems. Detection behaviors involve looking for and recognizing the existence of such health problems. Advocacy for and prescription of prevention and detection behaviors are a form of a health intervention aimed at facilitating (i.e., increasing the likelihood) the occurrence of these behaviors. Positive and negative message framings' effects on prevention and detection behaviors is most commonly understood through the concepts of risk and decision making strategies under risk established in Prospect Theory (Salovey & Wegener, 2003). The general consensus is that positively framed messages work best with prevention behavior because prevention has relatively little risk and uncertainty associated with it. Contrastingly, negatively framed messages are most effective when paired with detection behaviors due to the increased sense of risk and uncertainty associated with the search for and

possible discovery of health problems. For example, a well known study conducted by Meyerowitz and Chaiken (1987) examined how message framing could affect breast self-examination (a detection behavior) attitudes, intentions, and behavior. The study showed that messages highlighting the negative consequences of failing to adopt the behavior of self-examinations were more persuasive than messages stressing the positive outcomes of adopting the behavior.

Such research both illustrates that persuasive message framing has relevance for health communication and that Prospect Theory's stipulations can be applied to topics beyond monetary problem sets. The negative message frame can be used to persuade people to find generally negative and unattractive prospects more favorable, especially when adopting unattractive behaviors that are beneficial for a person's health. Although extensive research has been conducted on message framing with prevention and detection behavior interventions, less of the established literature is devoted to behavioral interventions in general. This is important to examine so as to understand how best to maximize the persuasive capacity of the message's presentation of a behavioral intervention.

### **An Intervention Targets Behavior to Change**

Health campaigns are interventions, striving to change and improve a person's state of health through a change in behavior. These health interventions aim to change people's health generally with propositions for changing and improving a specific kind of behavior. Health communications commonly target a behavior and implement one of two distinct types of intervention: facilitation or inhibition.

Facilitation refers to targeting a certain behavior to increase the likelihood of its performance. Inhibition, on the other hand, targets a certain behavior to decrease the likelihood of

its occurrence. Traditionally health campaigns strive to facilitate (i.e., encourage) healthy behaviors and inhibit (i.e., reduce) unhealthy behaviors. Examples of health-related facilitation targets are the previously mentioned prevention and detection behaviors, as well as fruit consumption, exercise, and drinking water. Examples of well known health campaigns targeting the inhibition of behaviors include messages to stop smoking, to say no to drugs, and to sit less.

Despite their prevalence in health communication, behavioral targets of intervention have yet to be thoroughly examined as an experimental construct of persuasion. This thesis addressed this shortcoming in the literature by testing how effective intervention targets of facilitation and inhibition are at changing attitudes relative to one another and in interaction with other persuasive factors in order to determine which and under what circumstances is a more persuasive variable. In order to evaluate these targets' effectiveness of persuasion factors, the variable of intervention targets needed to be operationalized. In the context of this thesis, a successful behavioral intervention involved the formation of favorable and strong attitudes towards the targeted behavior. The degree of persuasive influence an intervention target wielded was gauged with measures of attitude. Additionally, the effectiveness of an intervention target was evaluated based on whether or not the facilitation or inhibition of a given behavior was intended to be realized by participants. Therefore, assessment of the intervention message was assessed with the measurement of behavioral intentions to reduce or increase the occurrence of a targeted behavior.

### **Intervention Targets and Message Framing on Persuasion**

Prior to such testing and assessing, what can be understood about facilitation and inhibition intervention targets from Prospect Theory? Based on the Value Function, it was expected that inhibition targets would be valued more negatively (i.e., a greater negative subjective

outcome) than facilitation targets. The actual inhibition of a behavior is an objective loss outcome because a currently performed behavior's occurrence is being reduced. Facilitation may also be perceived unfavorably. When a persuasive appeal targets an initially sparsely performed behavior in order to increase said behavior's performance, the assumption is that this behavior is not being realized enough. Facilitation targets, however, compared to inhibition targets, were predicted to be more pleasant because inhibition targets are closer to the type of very negatively valued losses discussed by Prospect Theory. Therefore, it was anticipated an individual would evaluate an inhibition target more negatively and as a more unattractive than a facilitation target. Given that, facilitation intervention targets were predicted to be more likely to foster favorable attitudes towards the intervention and unfavorable attitudes towards its underlying health problem compared to inhibition intervention targets. It was expected that facilitation targets, acting as predictors of persuasion, would see greater changes in attitude and stronger behavioral intention than inhibition targets. In this study, intervention targets did not operate in a vacuum, however, as they were a position within and subject to other variables of the persuasive message.

Behavior intervention targets have not been studied substantially as attitude objects, especially within the health domain. Additionally, there is insufficient psychological research examining how negative and positive message frames interact with facilitation and inhibition intervention targets to influence attitude. For the existing research, facilitation and inhibition intervention targets are usually the subject matter of a manipulation in message frame and not considered a variable of their own. Up to this point, much of the research on message framing applied to health interventions had mainly examined how positive and negative message frames influence attitudes towards either a facilitation target or an inhibition target. For example, research has been devoted to studying negative framing as applied to inhibiting smoking behavior

(Kang & Lin, 2015) and positive framing used with facilitating calcium consumption (Gerend & Shepherd, 2013). There had been a shortage of research devoted to studying how facilitation and inhibition intervention targets fare against one another in a persuasion context as well as in association with a message frame manipulation that this thesis aims to remedy.

### **Negatively Framed Inhibition**

For this study, it was anticipated that inhibition behaviors would be evaluated as the more unpleasant intervention target of the two. Therefore, it was expected that inhibition behaviors would yield less attitude change and behavioral intentions than its facilitation counterpart. When paired with negative message framing, however, it was expected that these trends would be reversed. As established by Prospect Theory, stressing negative outcomes can prompt people to exhibit risk seeking behavior and follow through with formerly unattractive prospects.

Additionally, existing research has established that positive message frames work best when framing positive objective outcomes and that negative message frames are most effective when framing negative objective outcomes findings (Salovey & Wegener, 2003). Therefore, it was predicted that facilitation targets would be most influential in yielding attitude change and behavioral intentions when paired with positively framed messages. Given the foundations of ELM, TPB and Prospect Theory, it was expected that the interplay between inhibition and negative message framing, however, would be even more effective than facilitation targets and positive message framing. By researching these anticipated effects, the aim of this thesis was to address the lapse in the current knowledge base on how message framing works with intervention targets as a function of persuasion.

### **Grammatical Verb Mood**

While the framing of a persuasive appeal's issue position as well as the intervention target of the appeal are important predictors of persuasion, the presentation of the intervention itself is also an important factor to consider. The tone in which a persuasive appeal presents its position is particularly important in influencing the attitude change as well as behavioral intention. This should especially be the case for health appeals because of their purpose of targeting and prescribing new forms of behavior to improve health. According to linguistic theory (Kment, 2012), these tones are generally constructed through the choice of verb mood in the message's composition. Verb mood is an indication of modal force, or the degree to which the source of the message believes their proposition to be necessary and to be true. Variation in degree of force can hold implications for behavior potential. As the modal force conveyed by verb mood increases, the message sounds progressively more necessary and true to its audience (Kment, 2012). Because the degree of force can vary, there are several different types of verb mood to reflect the changes in necessity and truth conveyed in the message. The verb mood is an important facet of message construction that goes beyond the positive and negative framing of outcomes. Given this type of message framing's effectiveness at changing decision making and behavioral tendencies, it therefore followed that the composition of a message with a selective verb mood would also influence attitudes and behavioral intentions as well. Two verb moods that should be especially well suited and relevant to health appeals' purpose of changing attitudes and behavior are the interrogative and the imperative moods.

### **The Imperative and Interrogative Moods**

Messages with an imperative mood are marked by great modal force and necessity behind the message's proposition. As it is generally applied, a message with an imperative mood forcefully proposes that an issue at hand should be addressed in the specific way the message prescribes (Stenius, 1967). The imperative mood is recognizable based on its sentence structure. Generally, imperatives concern a second-person subject (i.e., you), but the subject is omitted from and, instead, only strongly implied in the sentence. The implied second-person subject generally precedes a present-tense verb. Additionally, imperatives are an assertive statement as to what a listener should do. For example, "brush your teeth twice daily" is written in the imperative mood with an absent subject and assertive tone. Because imperative messages carry a high degree of force, the imperative commits the source to the truth of their proposition (Wilson & Sperber, 1988). Thus, imperatives function as a means of asserting change within the listener and are commonly employed in prescribing advice and intervention targets. With the imperative mood, a persuasive message asserts what its audience ought to do.

If the imperative mood is characterized by greater modal force, then the interrogative mood is at the opposite end of the force spectrum. The interrogative verb mood conveys less certainty and more curiosity (Stenius, 1967) than the imperative mood. Interrogative messages are not as assertive in their prescriptions as imperative sentences are (Wilson & Sperber, 1988). As opposed to an assertion, an interrogative message is a directive, pointing the audience in the right direction rather than blatantly proclaiming that its position is the right direction. They are directive in presenting information (e.g., a behavioral intervention) and asking for action (e.g., attitude change, behavioral intention formation). Like the imperative mood, the interrogative mood also can be recognized from its sentence structure. In most cases, interrogative sentences involve a second-person subject that is a present rather than implied part of the sentence. Unusual for sentence

structures, the interrogative mood has a helping verb precede the subject. Therefore, the interrogative mood often manifests as a question. Usually these are questions can be responded to with a “yes” or “no”. For example, “will you brush your teeth twice daily” sees the helping verb of “will” precede both the subject of “you” to set the less forceful interrogative mood. The interrogative mood functions to present the issue and its possible solutions to the audience, allowing them to decide what to do largely on their own. Despite their differences, both the imperative and interrogative moods impart a proposition (e.g., for behavioral change) to the audience.

### **Persuasion and Verb Mood**

Generally, verb mood and a comparison between interrogatives and imperatives have been studied in the context of persuasion only to a limited extent. Often such research does not specifically examining the construct of verb mood itself, but a specific type of imperative or interrogative verb mood, such as a declaration or rhetorical question. Further, the manipulation of verb mood has been generally restricted to one sentence. For instance, previous research has suggested that a rhetorical question (a manifestation of the interrogative mood) acting as the ending statement of a message can increase the likelihood of attitudes change in the direction of the message’s position (Petty, Cacioppo & Heesacker, 1981). The research primarily manipulated the verb mood of a single sentence. Specifically, Petty et al. (1981) compared what they defined as a declarative statement (e.g., “Thus, whatever educational value the exams have for graduate students would also benefit undergraduates”) against several variations of a rhetorical question (e.g., “Don’t you agree that...?”). More recent research associated with verb mood, namely the interrogative mood, has looked at tag questions (i.e., short questions tagged onto the end of a

sentence such as “don’t you think?”) as a factor of message processing and persuasion (Blankenship & Craig, 2007). This research primarily examined how rhetorical questions can work in conjunction with personal involvement to influence persuasion in general. Therefore, in the instances that verb mood had been studied, it has only been studied as an iteration of itself rather than its own unadulterated factor of persuasion. It also had yet to be investigated as an experimental factor as applied throughout the entire message. With a greater manipulation of verb mood (i.e., imperative v. interrogative) throughout the whole persuasion message, it was expected there would be a different effect of verb mood on persuasion. This thesis remedied this shortage in the persuasion research by investigating the manipulation of verb mood specifically and as applied to a greater amount of the message content, particularly the intervention target of a health message.

**Health Persuasion and Verb Mood.** Despite the imperative and interrogative moods’ relevance to health persuasion, verb mood had only been a subject of research on persuasion, especially health persuasion, to a limited capacity up until now. The research is dominated by studies to motivate stair use as part of an overarching goal of increasing daily activity and exercise (Suri, Sheppes, Leslie & Gross, 2014). For these particular studies, the manipulation of an interrogative or imperative message was applied to point-of-decision signs. These messages were written to motivate people to take the stairs and placed either immediately at or in the vicinity of stairwells, elevators and escalators. The research found that the imperative outperformed the interrogative in reports of staircase use.

Although the overall goal to increase daily activity through staircase use is a noble one, these studies were severely flawed. The researchers did little to control for or take into account possible confounding variables. It is impossible to know if the signs truly changed the participants’ attitudes and influenced their cognitive processing without measurements of these variables. For

example, without the use of a thought listing task to assess cognitive responses as indicators of processing or any form of attitude measures, it is impossible to confidentially attribute the stair taking behavior to processing of the signs as opposed to some other factor. Additionally, although these point-of-decision appeals may be effective in having small immediate changes in attitude and behavioral intention, the fact that they are presented at a point of quick decision making suggests the participants had limited ability to elaborate. Because the span of time available to make a decision and evaluate the sign in a point-of-decision setting is very limited, this also limits a person's ability to elaborate on a persuasive appeal. Consequently, this suggests that persuasion was achieved through the peripheral route, resulting in weak and less resilient changes attitude. Messages that are not limited to point-of decision contexts should afford the audience greater time and therefore ability to activate the central route and elaborate upon the message and its verb mood, which have a greater, more positive effect attitudes and behavior.

Another flaw of the existing persuasive studies on verb mood is that this research has been predominantly observational in that no attitudes, cognitive responses nor behavioral intentions were measured. Given the many shortcomings of the existing research, there was a need for better research on how imperatives and interrogatives can influence attitude change and behavioral formation outside the context of point-of-decision staircase usage. Therefore, this research attempted to remedy this limitation in the literature by studying how grammatical verb mood can work outside the context of a point-of-decision moment. The study also examined how verb mood as applied to the presentation of a behavior intervention can function as a tactic of persuasion to predict cognitive processing, attitudes and behavioral intention.

### **Verb Mood as a Predictor of Persuasion**

Given their role as an indication of differing degrees of modal force and truth, the imperative and interrogative moods were expected to have different types of influence on persuasion in this research. The imperative mood's conveyance of great modal force could be expected to be effective at influencing attitudes and behavioral intentions for at least a short period of time. For example, research conducted by Soler et al. (2010), as part of the previously mentioned stair-taking research, saw that an imperative sign was better at encouraging participants to walk up the stairs than an interrogative one in the point-of-decision context. Additionally, there has been precedence for health communication messages to adopt the imperative verb mood to impart their intervention information. The American Heart Association's website lists behavior changes and patterns to improve a person's blood pressure with the imperative mood: "Maintain a healthy weight", "manage stress" and "avoid tobacco smoke" (American Heart Association, 2015b). Imperatives have traditionally been connoted with a tendency of compliance and thus an ability to compel action, such as attitudinal and behavioral changes, in individuals (Stenius, 1967). The modal force carried in an imperative message suggests an inevitability of outcome for the message's prescriptions. This provides an explanation as to why the imperative mood is a popular verb mood is popular amongst health communication messages. Health campaigns often use the imperative's modal force as an offering of proof of their own strong conviction in their prescriptions and an assertion that these prescriptions will actually work. When there is a perception that the recommended behavior is certain to result in the desired outcome, there is a higher probability of a person adopting said behavior target (Block & Keller, 1995). As stated by Prospect Theory, under certain circumstances, people prefer certain and inevitable outcomes. This is especially the case when forming decisions and behavioral intentions for positive outcomes.

Also according to the Value Function, however, there are circumstances in which an audience can react negatively to a certain outcome. It was expected that imperative messages would reflect a more certain outcome because of the forceful, commanding quality of greater modal force in such prescriptions. Further, based on the stipulations of ELM, certain conditions and variables were predicted to influence the likelihood of and increase the audience's motivation to invest in elaborative and effortful processing to persuasion. Considering that the imperative mood carries with it high modal force, it is not asking or motivating its audience to cognitively process and scrutinize the message. Additionally, the importance of the message's personal relevance to the audiences suggests that the absence of a written subject in the sentence could reduce this personal relevance, which would then also reduce the likelihood of elaboration and activation of the central route to persuasion.

When considering ELM, persuasion research casts doubt on whether the actual changes in behavior witnessed in the previously mentioned staircase studies can be attributed to elaboration and cognitive processing or even a change in attitude at all. Consequently, the imperative mood may function much like a peripheral cue of the ELM. The imperative mood's conveyance of modal force and conviction in the truth of its statements contributed to the prediction that it would not motivate further elaboration on the persuasive appeal's arguments. Instead, as a peripheral cue, the imperative mood was predicted to be most effective at persuading an individual who only processed along the peripheral route. Without the central route to persuasion and its products of strong changes in attitudes in agreement with the message's position, it is unlikely that behavioral intentions will be strong and lasting, as stipulated by the TPB.

Whereas it was anticipated that the imperative mood would act like a peripheral cue and not motivate greater elaboration, it was expected that the interrogative mood would function in

the opposite direction. Considered under ELM, one source of the interrogative mood's predicted influence may be its sentence structure. This characteristic structure often involves the presence of a subject (i.e., "you"), which should increase the audience's personal relevance of the message. As stated by ELM, the more relevant the message is to the audience, the greater the likelihood of elaboration.

Besides the structure of an interrogative, the interrogative mood's weaker modal force was also anticipated to incite an audience to further process the issue at hand. Greater elaboration was expected because the audience would need to cognitively process and assess the truth of the prescription themselves. The interrogative mood presents the same information and position as the imperative. In contrast to the imperative, however, the interrogative implies, rather than asserts, that its position is correct. This leaves it up to the audience draw their own conclusion, encouraging the audience to elaborate upon and integrate the new information. Consequently, it was predicted that an interrogative message would see greater degrees of elaboration as well as greater attitude in line with the message's position and stronger behavioral intentions. It was also then hypothesized that the imperative mood would yield moderate behavioral intentions to perform the behavior and weak changes in attitudes for the prescribed behavior intervention compared to the interrogative mood. Additionally, it was expected that the imperative mood would also result in low levels of attitude change towards the health issue of the message.

### **Study Overview**

As demonstrated, persuasion is a complex exercise, and the current study endeavored to enrich and diversify psychology's understanding of the persuasion process. The persuasive message predictors under consideration were message framing, grammatical verb mood, and intervention

target. It was predicted that these three variables would influence the likelihood of effective persuasion within the context of health communication. The current thesis primarily aimed to understand how factors of the persuasive message would influence cognitive processing, attitudes and behavioral intentions regarding a given health issue. This research may add much to the existing psychological knowledge base on persuasion in addressing the lapses of the existing body of research on each of these variables of persuasion. Deepening the literature's understanding of how message framing, verb mood and intervention target function as a factor of persuasion independently and interactively to change attitudes within the health communication context can help the health field create more persuasive and effective health messages. Therefore, this thesis may be valuable in serving to better society through fostering a better understanding on how to encourage people to improve their health

The study specifically aimed to elicit attitude change and strong behavioral intentions through the manipulation of persuasive message variables as applied to the health issue of hypertension (i.e., high blood pressure). The study had a 2 (message frame: negative vs. positive) x 2 (grammatical verb mood: interrogative vs. imperative) x 2 (behavioral target of intervention: facilitation vs. inhibition) fully crossed between participants design. As part of an online survey, participants read a message on hypertension and behaviors to abate its associated health risks. This message was manipulated across the three predictor variables. The message framing stressed either the negative outcomes (e.g., increased risk of heart failure) of hypertension or the positive outcomes (e.g., reduced risk of heart failure) of normal blood pressure levels. The intervention aspect of the message targeted dieting behavior to change by either facilitating a behavior (e.g., increased vegetable intake) or inhibiting a behavior (e.g., reduced sodium intake). The prescription

and descriptions of these two intervention targets was written using either the imperative or the interrogative mood.

In order to assess how each of the predictor variables influenced cognitive processing, attitudes and behavioral intentions, these three dependent variables were each measured. The experiment used a thought listing task to operationalize elaboration, or cognitive processing, with a greater quantity of cognitive responses indicating greater elaboration, which was consistent with the existing literature. Scaled items were used to operationalize and assess participants' attitudes and behavioral intentions. Higher scores of attitude items on hypertension indicated greater negative attitudes, and higher scores of attitude items on the intervention targets reflected greater positive attitudes. Similarly, higher behavioral intention scores indicated stronger intentions to perform the behavior.

Before predicting relationships with the predictor variables, there were several predictions relating to the dependent variables' relationships with one other. In keeping with the established theoretical framework, it was expected that elaboration would be positively correlated with attitude as well as behavioral intention. It was also anticipated that attitude would be positively correlated with behavioral intention. Furthermore, based on the role of elaboration in attitude change according to ELM and the impact of attitude on behavioral intention, as proposed by TPB, it was hypothesized that elaboration would mediate the relationship between attitude and behavioral intention. In other words, it was predicted that attitude would have a direct effect on behavioral intention as well as an indirect effect on attitude through the channel of elaboration. Therefore, in acting as a mediator, elaboration would flesh out an explanation as to how attitude would directly be related to behavioral intentions.

In addition to the hypotheses solely focused on the dependent variables' relationships, there were many predictions on how the predictor variables would influence the dependent variables for this current study. The hypotheses on the relationships between the three predictor and three dependent variables were largely grounded in the Elaboration Likelihood Model, the Theory of Planned Behavior, and Prospect Theory. Based on the ELM as well as Prospect Theory's Value Function and decision making strategies, it was hypothesized that that participants would elaborate more on a negatively framed message than a positively framed message. Consideration of Prospect Theory's Value Function also informed predictions regarding the intervention targets' effects on elaboration. Namely, it was expected that participants would be more inclined to elaborate on an inhibition target than a facilitation target. This was expected because the inhibition of an already occurring behavior was possibly a more difficult behavioral change as well as a relatively less attractive prospect than facilitation. Therefore, inhibition might have required more consideration as to whether it is worth it or not. Additionally, it was anticipated that verb mood would have significant influence on cognitive processing based on ELM and linguistic theory. The interrogative mood was predicted to result in higher degrees of elaboration than the imperative mood due to the interrogative mood's relatively low levels of modal force and cognitively motivational nature.

ELM posits that greater elaboration leads to stronger attitudes in agreement with the message's position. This, therefore, served as the basis for hypothesizing that the conditions of the predictor variables anticipated to result in greater elaboration would also result in more attitudes agreeing with the message's position save for intervention target, which was predicted to have the opposite result of elaboration for attitude. Firstly, based on ELM and previous research (Smith & Petty, 1996), it was predicted that a negative frame would result in greater attitude scores for both

hypertension and intervention targets than a positive frame. Secondly, given interrogative's predicted greater influence on elaboration, it followed that the interrogative would also have more influence over attitude formation. Consequently, it was expected for attitudes to be more in line with the message's position when the message had an interrogative mood rather than an imperative mood. Finally, although it was predicted that an inhibition target would result in greater elaboration than facilitation, an inhibition target was not expected to be more effective at attitude change than its facilitation counterpart. This was explained by Prospect Theory's Value Function and decision making tendency, which states that negative outcomes such as inhibition (i.e., reduction in frequency of a behavior) are evaluated negatively and avoided. Therefore, it was hypothesized that significantly more favorable attitude scores would result from a facilitation target than an inhibition target.

The Theory of Planned Behavior informed the study's predictions for how the three predictor variables of message framing, intervention target and verb mood would influence behavioral intention. TPB's stipulates that stronger attitudes are associated with stronger behavioral intentions. Therefore, it was expected that the pattern of findings for behavioral intention would be the same pattern for attitude such that negative framing, facilitation, and the interrogative mood would result in greater behavioral intentions.

Because each of these predictor variables did not operate independently from one another, it was expected that they would interact with one another and qualify each other's main effects on elaboration, attitude and behavioral intention. One anticipated interaction was between message framing and intervention target. This prediction was grounded in previous research and Prospect Theory's Value Function, which explains that people can become more accepting of a previously unattractive prospect if the unattractive prospect is framed in a loss context. It was hypothesized

that negatively framed inhibition messages would have greater attitude and behavioral intention scores than both a positively framed facilitation and a negatively framed facilitation message. Such a result would qualify the predicted influence of intervention target alone because, depending on how the target was paired with a particular verb mood, an inhibition target would not always be more effective than a facilitation target. It was also hypothesized, based on previous research regarding message framing and the Value Function (Salovey & Wegener, 2003), that a positively framed facilitation message should see participants with greater elaboration, attitude, and behavioral intention scores than a negatively framed facilitation message. These hypothesized results would qualify the predicted effects of message frame on the three dependent variables because, based on the type of intervention target the message frame was paired with, negative message frame's predicted greater influence would not always be realized.

There was also an anticipated two-way interaction between message frame and verb mood, which would also show that several of the expected influential levels of the predictor variables would not always be more persuasive than their counterparts. It was hypothesized that a positively framed interrogative mood would result in a greater number of issue-relevant cognitive responses than a negatively framed imperative mood. This would be the reverse of, and therefore qualify, the predicted effects for message frame. The negative message frame would not always incite greater elaboration than the positive frame under these verb mood conditions. Additionally, it was hypothesized that a negatively framed imperative message would have a greater effect than a positively framed interrogative message on attitudes and behavioral intention. This would qualify the main prediction of verb mood because, based on this hypothesis, an interrogative message would not always foster greater attitudes and behavioral intentions than an imperative message.

In addition to the interaction between verb mood and message frame, there was another anticipated two-way interaction between verb mood and now intervention target. It was predicted this two-way interaction's broken down effects would qualify how each of these predictor variables would influence the three dependent variables. Namely, it was hypothesized that participants with an interrogative message with a facilitation target would report greater levels elaboration than an imperative message with an inhibition target. This hypothesis was based on linguistic theory and ELM, in which that the interrogative mood's weaker modal force should motivate a participant to elaborate. This anticipated result would qualify the prediction for intervention target's specific effect on elaboration because, in this case, an inhibition target would not yield greater elaboration than a facilitation target.

## **Method**

### **Participants**

In order to test these hypotheses with an online experiment, the study received approval from the Scripps Internal Review Board for the study's execution. Subsequently, participants were recruited through the crowdsourcing Internet site Amazon Mechanical Turk (MTurk), social media (e.g., Facebook, Reddit, and Tumblr), and other social networking platforms (e.g., email). The target participant population for the research, and thus all sample participants, were legal adults (i.e., persons 18 years of age or older). Other than the legal age requirement, no participants were excluded based on gender, race, or any other information.

All participants were compensated for their time. Participants recruited via MTurk were compensated in accordance with MTurk's rules and regulations, receiving a \$0.15 reward.

Participants recruited through all other outlets were eligible for a raffle to receive one of four \$25 gift cards as compensation for their time.

A total of 585 participants were involved in this study. Of that total, 334 (57.1%) participants identified as female while 245 (41.9%) identified as male. The participants' age ranged from 18 to 78 years with a mean age of 36.48 years old ( $SD = 13.22$  years). A majority of participants reported their ethnicity to be White with 298 (50.9%) of the total participants identifying as such. In descending order, 204 (34.9%) participants identified as Asian, Asian American or Pacific Islander; 31 (5.3%) identified as African American/Black; 29 (5%) identified as Hispanic or Latino/a; eight (1.4%) participants identified as Native American; and eight (1.4%) of participants identified as of mixed race. In addition, participants reported a range of educational levels. Most participants had completed some level of higher education with a majority 237 (40.5%) of total participants reporting they have a Bachelor's degree. Of the remaining participants, 151 (25.8%) participants had completed some level of college, 125 (21.4%) earned some type of advanced degree (i.e., master's, professional, doctorate, etc.), 54 (9.2%) finished high school, 12 (2.1%) completed vocational school, and one participant (0.2%) had a junior high level of education.

This study used a 2 (message frame: negative vs. positive) x 2 (grammatical verb mood: interrogative vs. imperative) x 2 (behavioral target of intervention: facilitation vs. inhibition) fully crossed between participants design, resulting in a total of eight experimental conditions. Participants were randomly assigned to one of these eight conditions and, thus, to one of each of the three dichotomous predictor variables' levels as shown in Figure 3 below.

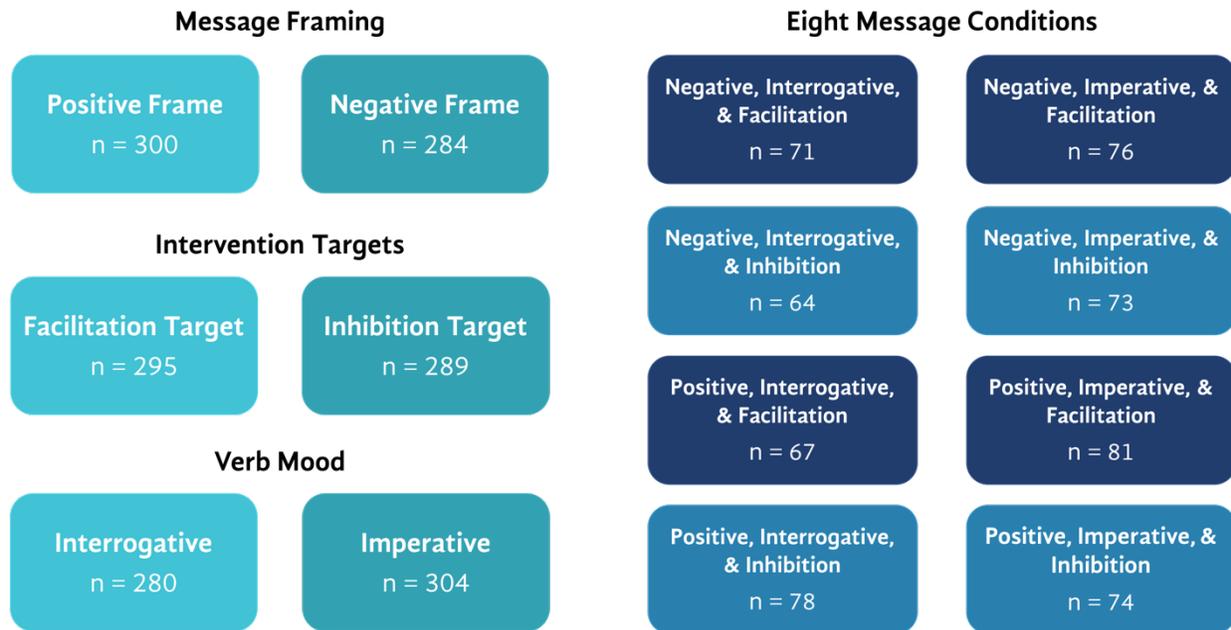


Figure 3. Number of participants randomly assigned to each of the predictor variable levels and message conditions.

## Materials

**Message.** This study involved participants reading a message (i.e., a persuasive appeal) on the health topic hypertension. Given the study design, a total of eight different messages were constructed to satisfy each of the conditions. The following list is the possible combinations of variables in the messages:

1. negative-frame, interrogative mood, and facilitation
2. negative-frame, interrogative mood, and inhibition
3. negative-frame, imperative mood, and facilitation
4. negative-frame, imperative mood, and inhibition
5. positive-frame, interrogative mood, and facilitation
6. positive-frame, interrogative mood, and inhibition
7. positive-frame, imperative mood, and facilitation
8. positive-frame, imperative mood, and inhibition

All materials involved were newly created for the purpose of this particular experiment. For each of the dichotomous variables, pains were taken to ensure that the two conditions for each variable were as comparable and identical as possible other than their manipulation level. While

the messages varied across the levels of each of the predictor variables, they all had the same basic structure and format. The eight messages began with an opening paragraph (see Appendix A for full text) that provided basic information regarding hypertension and its health consequences adapted from the American Heart Association's "About High Blood Pressure" webpage (American Heart Association, 2015a). Following this opening paragraph, the message expounded the risks of hypertension, which was where the manipulation of message framing took place. Participants were assigned to a message that had either a negative or positive frame. After this section on either the health risks of hypertension or the health benefits of normal blood pressure, all message conditions read, "The good news is that you can take steps to have healthy levels of blood pressure and stave off hypertension." Following this statement, the messages prescribed a form of behavioral intervention, targeting a specific type of diet behavior to adopt so as to maintain normal blood pressure and avoid the problems of hypertension. The behavior target varied, so that the message either had a facilitation or inhibition target. The prescription of the behavior intervention was the part of the message in which verb mood was manipulated to be written in either the interrogative or imperative mood.

***Message framing.*** The message had one of two different frames: positive or negative. Message framing manifested in describing the differing outcomes from hypertension or normal blood pressure (see Appendix A to see full message framing text). The positively framed message highlighted the health benefits of normal blood pressure levels, which included reduced risk of developing heart problems and death from such problems. An example of a sentence from the positively framed message is "Normal blood pressure reduces the risk of heart failure." Contrastingly, the negatively framed message emphasized the consequences of hypertension and its related health complications. Such consequences of hypertension included increased risk of

heart problems and death from these problems. An excerpt from the negatively framed message is “Hypertension increases the risk of heart failure.” All statistics regarding hypertension and its related health complications were adapted from Blood Pressure UK’s facts and figures webpage (Blood Pressure UK, n.d.), the American Heart Association’s blog (American Heart Association, 2015c), researcher LeWine’s (2004) article on blood pressure risks, and the research of Antonakoudis, Poulimenos, Kifnidis, Zouras, and Antonakoudis (2004) on the health benefits of blood pressure reduction.

***Behavioral target of intervention.*** After the framing of health consequences of blood pressure levels, all messages transitioned into a prescription of a change in behavior. Across both intervention target conditions, the message prescribed a specific change in diet as a means of controlling blood pressure. The message provided examples of and instructions on how to make these dietary changes (see Appendix A to see full intervention target text). The persuasive appeals and interventions had one of two types of behavioral targets. One behavioral intervention target was a facilitation (i.e., to increase the likelihood of occurrence of a behavior) target. The facilitation condition aimed to increase intake of vegetables to maintain healthy levels of blood pressure and stave off hypertension. An excerpt from a facilitation condition was written as follows: “Eat a healthy diet that is high in fresh vegetables.” The other intervention target was an inhibition (i.e., to decrease the likelihood of occurrence of a behavior) target. Under the inhibition condition, the persuasive appeal aimed to decrease the likelihood of or reduce high sodium intake in order to maintain healthy blood pressure levels. The following is a selection from an inhibition condition: “Eat a healthy diet that is not high in sodium.” The message sections regarding the intervention targets ensured that the targets were comparable and to maintain experimental control, especially with regard to social desirability. Increasing vegetable intake and decreasing sodium intake are

both considered socially desirable behaviors. All dietary change recommendations, both inhibition- and facilitation-wise, were adapted from the Dietary Approaches to Stop Hypertension (DASH) eating plan (National Institute of Heart, Lung and Blood, 2006).

**Grammatical verb mood.** Manipulation of the persuasive appeal's grammatical verb mood manifested in two different forms: interrogative or imperative. The persuasive message's descriptions of the aforementioned dietary interventions heavily incorporated these verb moods into its prescriptions of behavior change (see Appendix A for full intervention text). When manipulating verb mood within the message, the sentences were designed to be as comparable as possible so as to control for possible confounding variables. For instance, the interrogative sentence did not activate any additional cognition in the participant that the imperative sentence did not activate. Also, messages constructed in the one of the two verb moods did not present or omit any information that its counterpart did not. Additionally, sentences in the interrogative mood ending with a question mark saw their imperative counterpart end with an exclamation point in case a question mark was more noticeable than a period. An excerpt of the interrogative mood read as "So can you increase the number of vegetables you eat each day?" for a facilitation condition message. A sample from the imperative mood condition for a facilitation condition message was written as "So increase the number of vegetables you eat each day!".

**Thought listing task.** Participant's degree of elaboration was measured in order to assess the amount of cognitive effort expended and determine which processing route of persuasion was taken. One of the most common means of ascertaining elaboration is by directly asking participants their cognitions, or thoughts, in response to the message (Petty & Cacioppo, 1986). This well-established measure is called a thought listing task. The task involves participants reporting their cognitive responses in writing (i.e., in a list). In this study, participants were asked to

complete the thought listing task after message exposure to determine their extent of cognitive processing in response to the message. The instructions for the task, appearing above a blank box in the survey, read as follows: "What are your thoughts and reactions regarding the health issue of hypertension? Please write anything and everything that comes to mind in the space provided below." The instructions were specifically written so that participants did not feel that they had to limit themselves to only formal thoughts and responses. The purpose of the task was to collect any and all cognitive responses of the participants.

These collected responses provided the basis for evaluating elaboration based on the number of total issue relevant thoughts (e.g., regarding hypertension, vegetables, or sodium) coded from said responses. Within that total, the thought listing task's scoring process involved scoring for how favorable (e.g., agreement that hypertension was a serious health issue, or support the idea to add vegetables to their diet) or unfavorable (e.g., skepticism that sodium reduction will benefit their blood pressure levels) the responses were toward the message's position. Furthermore, the evaluation of elaboration also involved scores for the number of times the participant mentioned a positive or negative framed piece of information and a facilitation or inhibition target intervention. These subtotals of the total issue relevant thoughts were then divided by the issue relevant total to get a percentage so as to compare these percentages across participants.

**Attitude and behavioral intention.** To determine if a persuasive appeal had been effective, participants completed a series of scaled items to ascertain their attitudes towards the health issue of hypertension as well as their attitudes and behavioral intention toward the specific intervention target. The present study used Likert scale items to assess attitude and behavioral intention. Multiple items explicitly asked participants about, for example, their attitudes and intentions (see Appendix B for full attitude and behavioral intentions survey). These constructs are assumed to

exist on continuum that can be captured in quantitative measurements (Gliem & Gliem, 2003). For example, attitudes can vary on a spectrum from *very unfavorable* to *very favorable*. Thus, 6-point Likert scale items use a fixed range of numbers for participants to indicate the degree to which they, for example, agree or disagree with a given statement. The numbers of the scale range were anchored at two opposite ends. The rating scores of the multiple items were averaged for a composite score describing the construct (i.e., attitude) of interest.

The survey presented both attitudes and behavioral intentions items together. The following instructions prefaced all post-message Likert items: "For the following questions and statements, please select the choice that best corresponds with your answer." Because of their joint presentation, the scaled items' presentation order was randomized so as to control for responses biases, including order effects and fatigue effects. Certain items for attitude assessment specifically measured the affective component of attitudes while other items assessed the cognitive component.

Because there were two different intervention targets, the survey included items specifically asking about these each of these interventions. Items asked participants about their attitudes and behavioral intentions specifically for increased vegetable intake and for decreased sodium intake, regardless of which condition the participant was assigned to. The response scales to answer the items remained the same across all conditions. An example item for attitude towards the facilitation target intervention was written as follows: "I feel good about having a diet that's full of fresh vegetables". An example of an item for attitude towards the inhibition target intervention was instead written as "I feel good about having a diet that's low in sodium".

## **Procedure**

In taking part of the study, participants completed an online survey created through SurveyMonkey, a platform for creating and distributing Internet surveys. Before beginning the survey, all participants provided informed consent. After doing so, the first page of the survey asked participants how much they knew about the phenomenon of hypertension by requesting that they indicate their level of knowledge as a way of introducing the topic of the survey. The question read “How much do you know about hypertension?” and participants answered using a 6-point scale (1 – *I know nothing*, 6 – *I know everything*). Upon answering the question, the survey directed participants to a new separate page. This page contained the entire persuasive message regarding hypertension, the potential for heart-related health complications and dietary behavior changes to reduce hypertension. Participants were randomly assigned to one of the possible eight messages.

Once participants finished reading the message, the next page of the survey presented the thought listing task. The presentation order of the thought listing task relative to the other items of the survey was set such that the task always directly followed the persuasive appeal but preceded all other items. The survey adhered to this consistent order so as to ensure the task primarily assessed cognition in response to the message itself, not the other items of the survey. Upon completing the thought listing task, all participants answered items about their attitudes and behavioral intentions regarding the health issue and position presented in the message. After participants finished these items, they supplied basic demographic information such as their gender, age and ethnicity on a new page of the survey (see Appendix C for full demographic survey). Additionally, participants answered manipulation checks (see Appendix D). Completion of the survey approximately took seven minutes.

After finishing the survey, participants were debriefed, thanked, and compensated.

**Ethics**

The current study may add to the knowledge base regarding health communication and psychological persuasion. It considered psychological variables that had previously not been studied either in conjunction with one another or extensively in the context of health communication. Although there has been research on message framing's influence on attitude change, an interaction between message framing and targets of behavioral intervention (i.e., facilitation v. inhibition) had yet to be examined. This study sought to remedy this gap in the literature by examining how positive and negative message frames together with facilitation and inhibition targets affect attitude and behavioral intentions. Additionally, grammatical verb mood had not yet been substantially studied in a psychological context. Nor had it been closely examined to determine how it interacts with message framing and behavioral intervention targets. The present study strove to address this shortage in knowledge by seeking to understand how the grammatical verb mood of a message can influence attitude and behavioral intention. This study may add much to the existing psychological knowledge base on persuasion and also serve to better society through fostering a better understanding of how to encourage people to improve their health. But while the research may be beneficial to the greater society and psychological research, the only direct benefit to participants was the opportunity to be compensated for their time in the form of a raffle or, for MTurk participants, to receive a monetary reward.

While the immediate benefits to participants were not great, the level of risk participants in this research were expected to experience was also minimal. Participants were likely be exposed to similar material in their daily lives. The potential risks of this study were further minimized in that no protected populations were targeted. The study did not involve any deception. Additionally, participants were not asked to provide any sensitive information regarding their personal health or

any other topic. Nor were they asked personally sensitive, debasing, or uncomfortable questions in the survey. Certain experimental conditions had messages containing information about the consequences of poor health practice, so it was possible for some participants to experience some discomfort. The informed consent document notified participants that there was this potential to learn about the consequences of poor health during the survey. This allowed individuals the ability to choose not participate if they did not want to engage with such health information.

In a similar vein, as part of the informed consent process, participation in this research was completely voluntary. Participants were free to withdraw from the survey should they choose to without any consequence, such as the withholding of compensation. Additionally, the compensation was not so great as to influence participants' responses nor their choice to partake in or withdraw from this research. For those individuals who elected to participate in the study, they were provided with contact information for the American Psychological Association counseling referral service and Monsour Counseling Services. This information was present in the informed consent document as well as in the debriefing sheet for participants to use in the unlikely event that the participants found the information of the study troubling.

Finally, potential risk to participants was curtailed by keeping participant responses to the questionnaires secure. Research results could possibly be published in scientific journals and/or presented at conferences. However, no participants were identified with or connected to their data responses at any time during the dissemination of the results. Anonymity of the participants' responses was maintained as participants were not asked for their name nor any identifying information at any point during the actual study. No IP addresses were collected, so as to ensure there was no way to link the participant to any identifying information or responses in the research materials. There would be little to no risk to participants if confidentiality was breached because

all data were collected anonymously. Only once the study had officially ended for the participants did they have the option to provide their contact information (i.e., identifying information) for receiving compensation in an entirely separate survey. Therefore, this contact information was collected separately from the collection of the study data and responses. This was to keep responses anonymous. Taken as a whole, the benefits of this research outweighed the potential risks to participants, and the potential for ethical issues was minimal.

### **Analytical Strategy**

Before starting data analysis, the distribution of the data for attitudes, behavioral intentions and elaboration (i.e., issue relevant thoughts) were tested for normality using the Shapiro-Wilk Test. In the event of oddly distributed data, power or logarithmic transformations would correct for such non-normality. Based on these tests, the data were shown to be normal enough to be used for statistical analysis with  $p > .05$ . In addition to testing for the normality of the data, the measures of attitude and behavioral intention were also tested for their reliability. Reliability for almost all measures of attitude was good with Cronbach's  $\alpha > .74$ ; however, reliability for attitudes towards facilitation specifically were slightly lower at Cronbach's  $\alpha = .66$ . Reliability for all measures of behavioral intention was also good with Cronbach's  $\alpha > .80$ .

After checking for the items' reliability and as part of the data preparation, participants raw survey scores served as the basis for creating composite average scores of the relevant dependent variables. First, attitude and behavioral intention were operationalized using composite average scores from the 6-point Likert scale items such that higher scores indicate greater attitude and behavioral intention. For creating composites of attitudes and behavioral intention towards the intervention targets, both a target composite and non-target composite represented these

attitudes. Although participants were asked about both the facilitation and inhibition interventions, the messages only targeted one of the two interventions. For instance, participants who read the vegetable message received a facilitation target intervention. In this situation, their scores for items regarding vegetables yielded a target attitude composite and a target behavioral intention composite. Items about sodium (i.e., the intervention non-target) helped to create a composite for non-target attitude and a composite for non-target behavioral intention. For participants who read the message concerning the inhibition intervention, their target and non-target interventions and respective attitudes and behavioral intentions were the opposite.

As the second part of data preparation, elaboration was operationalized with the thought listing task such that a larger quantity of issue-relevant cognitive responses indicated a greater degree of elaboration. As was the case with attitude and behavioral intention composites, participants' raw responses to the thought listing task provided scores of elaboration based on the number of issue-relevant thoughts the participants reported. This scoring process created a continuous dependent variable of elaboration. A greater number of issue-relevant cognitive responses indicated greater elaboration, suggesting processing of the message occurred along the central route to persuasion as opposed to the peripheral route. These thought listing responses also served as the input for calculating a favorability index for participants' cognitive responses. The favorability index resulted from subtracting the number of number of unfavorable thoughts from the number of favorable thoughts and then dividing the difference by the total number of issue relevant thoughts. A higher score indicated greater favorability for the message's position. After creating variable composites and scores, the data were fully prepared to be subject to statistical analysis and to test the hypotheses of this study.

Together, the measures representing these three dependent variables acted as the input for Pearson correlation tests to see how these variables related to one another. Additionally, the measures of elaboration, attitude, and behavioral intention served as the input for the multivariate analysis of variance statistical test (MANOVA). This statistical testing helped to determine how these three dependent variables were influenced by the three predictor variables of message frame, intervention target, and verb mood. If the MANOVA revealed any significant interactions between the predictor variables, the interactions required follow up testing to decompose said interaction and find out how the involved predictor variables influenced the dependent variables. For two-way interactions, the MANOVA was followed up with an independent samples t test to decompose and identify the differences in the dependent variables. For the triple interaction found between message frame, intervention target, and verb mood, its significant effects on the dependent variables of behavioral intention were first decomposed using follow up analysis of variance (ANOVA) tests to establish if there were any significant two-way interactions within. If there were such interactions, these were again followed up with further testing. This time these follow up tests took the form of independent samples t-tests to further simplify the significant differences of the dependent variables within each level of the three predictor variables.

### **Results**

After testing for normality and reliability as well as creating dependent variable composites, the more rigorous analysis of the data began. One of the first steps in the data analysis was assessing what the data looked like by calculating descriptive statistics, namely the mean and standard deviation (see Table 1). The values for both attitude and behavioral intention variables ranged from a score of 1 to 6. As shown below, hypertension attitudes were fairly high with

comparatively low variance, indicating strongly negative (i.e., unfavorable) attitudes towards the attitude object of hypertension. Conversely, the attitudes towards the intervention targets tended to be largely positive (i.e., favorable) towards these targets with their relatively high scores.

Furthermore, target attitudes appeared to be slightly more positive than non-target attitudes. Much like the values for the attitude variables, behavioral intention scores tended to be relatively high, indicating strong intentions to follow through and perform the dietary behaviors targeted by the intervention message. Unlike attitude, however, target and non-target behavioral intention scores did not differ by much, suggesting equal intentions to perform dietary changes regardless of the intervention target of the message.

Table 1.

*Descriptive statistics for attitudes and behavioral intentions*

	Mean	SD
Measures of Attitude		
Hypertension Attitude	5.01	.87
Intervention Attitude	4.50	.77
Target Attitude	4.56	.92
Non-Target Attitude	4.48	.92
Measure of Behavioral Intention		
Overall Behavioral Intention	4.44	.94
Target Behavioral Intention	4.46	1.08
Non-Target Behavioral Intention	4.44	1.07

In addition to determining what the data looked like for attitudes and behavioral intentions, the data analysis process also involved looking at the descriptive statistics for elaboration (see Table 2). The total number of thoughts (i.e., responses to the task) ranged from 1

to 15, and the total number of issue relevant thoughts ranged from 0 to 15. As shown in the below table, most participants wrote an average of 3 thoughts in response to the message. Additionally, nearly all of these responses were issue relevant, suggesting that participants were engaging in at least some degree of elaboration. This is also shown by the mean percent of issue relevant thoughts with a high value of 94%, indicating that, on average, almost all thoughts were issue relevant. Along with the high proportion of issue relevant thoughts, the participants also had thoughts that were largely in favor with the message's positions. The favorability index, which ranged in score from -1 to 1, had a mean score of .92, suggesting that participants generally agreed with the message's position.

Table 2.

*Descriptive statistics for elaboration (i.e., thought listing task)*

	Mean	SD
Total Thoughts Number	3.46	2.12
Total Issue Relevant	3.32	2.06
Issue Relevant Percent	.94	.19
Favorability Index	.92	.18

### **Relationships between attitudes, behavioral intentions, and elaboration**

One of the first analyses conducted on the collected data were Pearson correlation tests to determine the relationships between the various dependent variables, attitude, behavioral intention, and elaboration. Unsurprisingly, stronger hypertension attitudes were positively correlated with attitudes towards intervention targets, behavioral intentions, and degrees of elaboration. All correlations with  $r[583] > .172$  were significant at  $p < .01$  such that hypertension attitude was positively correlated with overall intervention attitude, both target and non-target

attitudes, overall behavioral intentions, both target and non-target behavioral intentions, and percent of issue relevant thoughts.

Hypertension attitude was not the only variable to be positively correlated with its fellow dependent variables. The correlation tests revealed positive correlations between target and non-target attitudes with measures of behavioral intention and, to a certain degree, measures of elaboration. As was the case with hypertension attitude, the correlations for target and non-target attitudes were all significant at  $p < .01$  when  $r[583] > .451$ . First off, target and non-target attitude were positively correlated with another. Also, both measures were each positively associated with overall behavioral intention, target behavioral intention, and non-target behavioral intention.

Finally, the favorability of participants' issue relevant thoughts was also positively associated with several other dependent variables. Namely, the favorability index was positively correlated with overall intention attitude,  $r[546] = .083$ ,  $p < .05$ . The favorability index scores were also positively correlated at a significance level of  $p < .01$  with both overall behavioral intention,  $r[546] = .107$ , and the percent of issue relevant thoughts,  $r[546] = .083$ .

Although elaboration, attitude, and behavioral intention were all largely correlated with one another, the hypothesis of elaboration acting as a mediator on attitude and behavioral intention's relationship was not supported by the data. In order to establish if there was a mediation relationship through statistical testing, attitude would first need to significantly predict both behavioral intention and elaboration. Furthermore, to establish its role as a mediator, elaboration would also need to significantly predict behavioral intentions. Attitude's and elaboration's abilities to make these predictions were tested with a series of linear regression tests. The analyses revealed, however, that elaboration (i.e., percentage of issue-relevant thoughts) was not a significant predictor behavioral intentions,  $B = .31$ ,  $F(4, 543) = 104.78$ , *n.s.* Given these results,

there was no way for elaboration to mediate attitude's relationship with behavioral intention if elaboration itself did not have a predictive relationship with behavioral intention. Therefore, the result failed to confirm the hypothesis that elaboration would act as a mediator between attitude and behavioral intention.

### **Message factors' specific effects on elaboration, attitude, and elaboration**

Besides determining the relationships between dependent variables, one of the main purposes of this study was to understand if and how the variables of message framing, intervention target, and grammatical verb mood would affect individuals' elaboration, attitudes and behavioral intentions towards health issues and new healthy behaviors. A MANOVA performed on these variables and data helped to determine their relationships. Message frame, intervention target, and verb mood served as the predictor variables. The composite scores of all attitudes and behavioral intentions, percent of issue relevant thoughts, and favorability index scores served as the dependent variables. More specifically, the MANOVA looked to see whether a predictor variable yielded significant differences in the dependent variables depending on the level of the predictor variable (i.e., a main effect on the dependent variable). The MANOVA revealed there were significant differences in the dependent variables (i.e., main effects) as a function of intervention target with a Wilks'  $\Lambda = .833$ ,  $F(13, 528) = 8.12$ ,  $p < .001$ , partial  $\eta^2 = .167$ . However, there were no significant differences in the dependent variables based on message frame,  $F(13, 528) = 1.19$ , *n.s.*, nor for verb mood,  $F(13, 528) = 1.08$ , *n.s.*

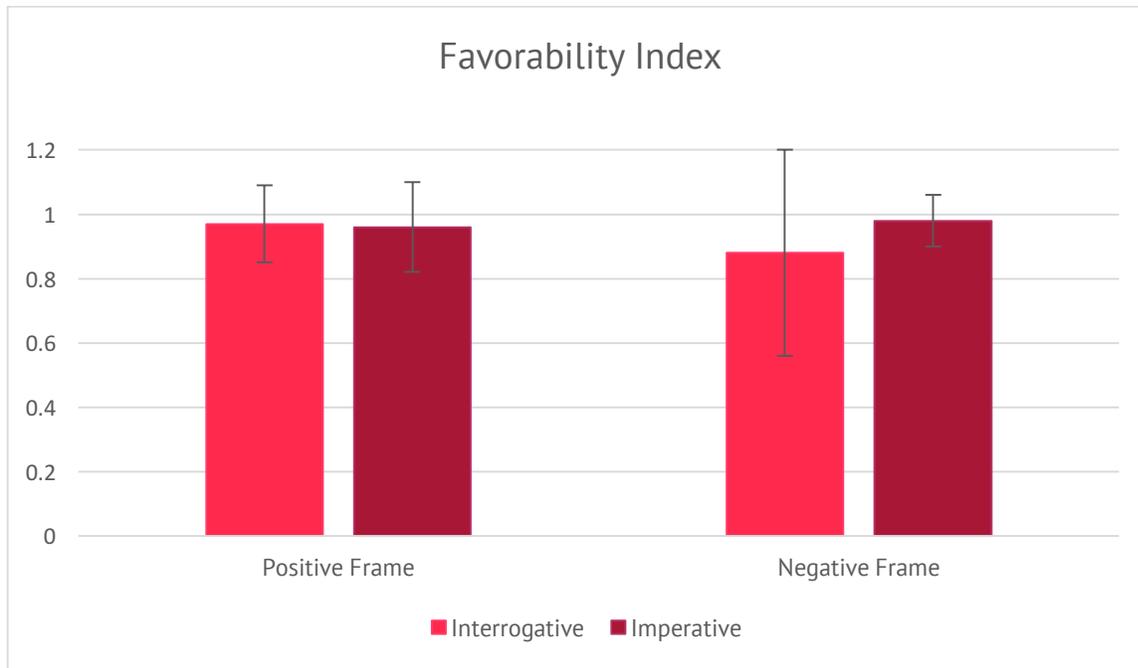


Figure 3. Two-way interaction between message frame and verb mood on favorability index

**Elaboration.** Based on the results the MANOVA, measures of elaboration, most notably the primary measure of elaboration, percentage of issue-relevant thoughts, did not differ significantly based on several of the predictor variables individually. However, the favorability of the issue-relevant thoughts (i.e., scores on the favorability index) differed marginally significantly based on a two-way interaction between message frame and verb mood, Wilks'  $\Lambda = .961$ ,  $F(13, 528) = 1.64$ ,  $p = .069$ , partial  $\eta^2 = .039$ . Follow up tests on this interaction (see above Figure 3 for differences in favorability index scores) revealed that within the negative message frame, verb mood influenced favorability scores such that the imperative message ( $M = .98$ ,  $SD = .08$ ) saw participants with significantly greater scores than the interrogative message ( $M = .88$ ,  $SD = .32$ ),  $t[264] = -3.59$ ,  $p < .001$ ,  $r^2 = .046$ . There were no specific hypotheses about this interaction made at the start of this study because it was expected that, when paired with the negative frame, the hypothesized effect of verb mood (i.e., the interrogative mood would be more effective than the imperative) on elaboration would remain consistent. Therefore, at least, this finding fails to confirm that

hypothesized because, as evidenced by these findings, it is not the case that the interrogative mood is more influential on favorable elaboration compared to the imperative when the two are paired with a negative message frame. There were no significant differences of the favorability index within the positive frame condition,  $t[280] = .789, n.s.$

**Attitude.** Although elaboration did not differ based on any of the three predictor variables individually, the MANOVA had, as previously mentioned, revealed that intervention target on its own had a significant effect on the dependent variables. According to the results of the underlying ANOVA of the MANOVA, reports of target and non-target attitudes each significantly differed as a function of intervention target. These statistical tests were first used to examine the hypothesis that the facilitation (i.e., vegetable) level of the intervention target variable would have greater target attitude scores than the inhibition (i.e., sodium) level. The results showed that the intervention target influenced participants' target attitude such that attitude scores were significant greater for the facilitation condition ( $M = 4.74, SE = .05$ ) than the inhibition condition ( $M = 4.42, SE = .06$ ),  $F(1, 540) = 18.19, p < .001$ , partial  $\eta^2 = .033$ . This result, therefore, confirmed the aforementioned hypothesis.

In a similar vein, intervention condition significantly influenced non-target attitude with the inhibition condition ( $M = 4.72, SE = .06$ ) seeing greater attitude scores than the facilitation condition ( $M = 4.31, SE = .05$ ),  $F(1,540) = 27.22, p < .001$ , partial  $\eta^2 = .048$ . This result failed to confirm the hypothesis that a facilitation intervention target would have greater non-target attitudes than its inhibition target counterpart. Although there were several main effects of intervention target, there were no significant two-way or three-way interactions between any of the predictor variables on attitude.

**Behavioral intention.** While target and non-target attitudes were significantly influenced by intervention target individually, behavioral intention scores did not significantly differ based on intervention target, message frame, or verb mood individually. However, participants' reported behavioral intentions did differ based on a trending toward significant triple interaction between the three said predictor variables with Wilks'  $\Lambda = .960$ ,  $F(13, 528) = 1.70$ ,  $p = .056$ , partial  $\eta^2 = .040$ . Follow up tests decomposed and helped in better understanding this triple interaction's influence over the dependent variables as there were no specific hypotheses for a triple interaction made at the onset of the study.

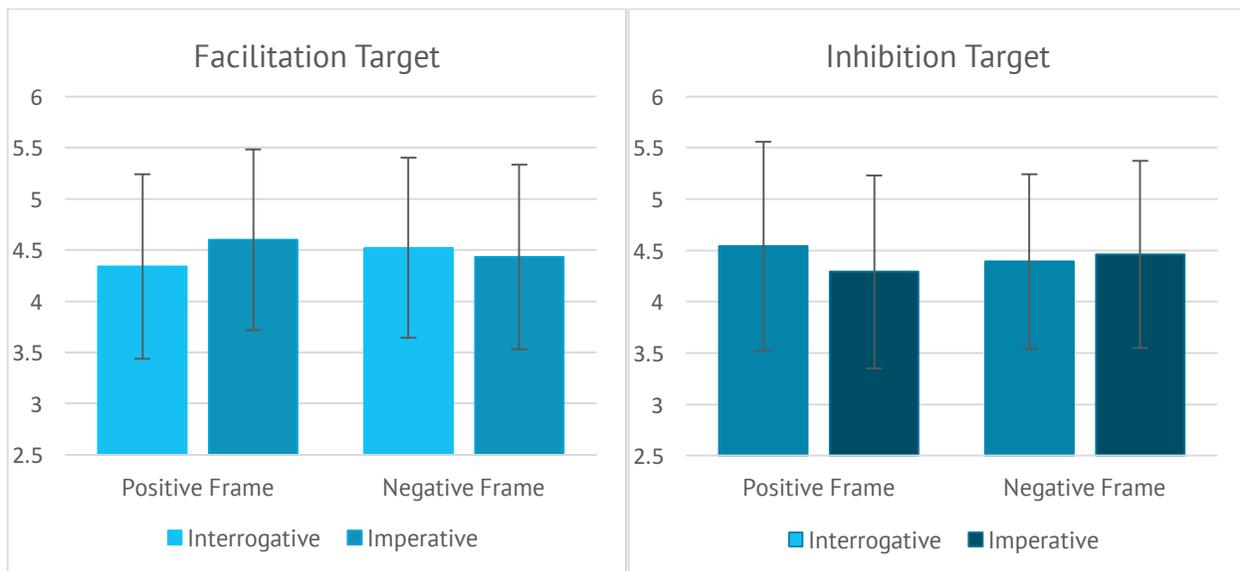


Figure 4. Three-way interaction between intervention, message frame, and verb mood on overall behavioral intention

These follow up tests revealed significant differences for overall behavioral intention (i.e., intention to make sodium and vegetable intake changes regardless of intervention target) for this triple interaction (see Figure 4 for differences in overall behavioral intentions as a function of the interaction). For overall behavioral intention, its value differed based on a significant interaction between intervention target and verb mood within the facilitation condition,  $F(1, 540) = 6.30$ ,  $p = .012$ , partial  $\eta^2 = .012$ . Follow up tests to this interaction illustrated that for a positively framed

facilitation message, participants with the imperative mood ( $M = 4.60$ ,  $SD = .88$ ) had significantly greater overall behavioral intention scores compared to those with the interrogative ( $M = 4.34$ ,  $SD = .90$ ),  $t[146] = -1.78$ ,  $p = .039$ ,  $r^2 = .021$ . For the facilitation target intervention condition, there were no significant effects of the negative message frame,  $t[146] = .56$ , *n.s.*

Also for overall behavioral intention, there were a trending towards significant differences in overall behavioral intention based on message frame and verb mood within the inhibition condition (see above Figure 4). The follow up tests showed that, for a positively framed inhibition message, verb mood yielded significant differences in overall behavioral intention such that the interrogative message ( $M = 4.54$ ,  $SD = 1.02$ ) had marginally greater scores in contrast to the imperative message ( $M = 4.29$ ,  $SD = .94$ ),  $t[150] = 1.56$ ,  $p = .060$ ,  $r^2 = .016$ . There were no significant differences stemming from verb mood within a negatively framed inhibition message, however,  $t[136] = -1.06$ , *n.s.*

In addition to overall behavioral intentions, follow up tests to the triple interaction revealed that participants' target behavioral intention scores were significantly different depending on the interactions between the three predictor variables (see Figure 5 for differences in target behavioral intention scores). This manifested such that, within the inhibition intervention condition, there was a significant interaction between message frame and verb mood,  $F(1, 289) = 6.73$ ,  $p = .010$ , partial  $\eta^2 = .023$ . Further testing of this interaction showed that an inhibition message with a negative frame and imperative mood ( $M = 4.48$ ,  $SD = 1.12$ ) had significantly greater target behavioral intention scores than its interrogative mood counterpart ( $M = 4.10$ ,  $SD = 1.06$ ),  $t[135] = -2.06$ ,  $p = .021$ ,  $r^2 = .030$ . There was also a trending towards significant difference for verb mood within a positively framed inhibition message. The follow up tests revealed that there were marginally greater target behavioral intentions for the interrogative mood ( $M = 4.64$ ,  $SD = 1.06$ )

within this type of message compared to the imperative mood ( $M = 4.36$ ,  $SD = 1.08$ ),  $t[150] = 1.60$ ,  $p = .056$ ,  $r^2 = .016$ . There were no significant differences or interactions within the facilitation target intervention level, all  $F(3, 292) < 1.37$ ,  $n.s.$



Figure 5. Three-way interaction between intervention, message frame, and verb mood on target behavioral intention

Finally, inhibition behavioral intention (i.e., the behavioral intent to inhibit, or reduce, sodium consumption) was significantly influenced by the interaction between the three predictor variables (see Figure 6 for differences in inhibition behavioral intention),  $F(1, 540) = 4.97$ ,  $p = .026$ , partial  $\eta^2 = .009$ . Follow up tests to understand the interaction's effect revealed a significant two-way interaction between message frame and verb mood at the inhibition level of intervention. Within the inhibition intervention target and the negative message frame, the imperative message ( $M = 4.48$ ,  $SD = 1.12$ ) had greater scores of inhibition behavioral intention than the interrogative message ( $M = 4.10$ ,  $SD = 1.06$ ),  $t[135] = -2.06$ ,  $p = .020$ ,  $r^2 = .0304$ . Additionally, there was a trending toward significant difference in inhibition behavioral intention at the inhibition target level and now the positive message frame level. For these kinds of messages, participants reported

marginally greater inhibition behavioral intention for the interrogative mood ( $M = 4.64$ ,  $SD = 1.06$ ) compared to the imperative ( $M = 4.36$ ,  $SD = 1.09$ ),  $t[135] = 1.59$ ,  $p = .056$ ,  $r^2 = .016$ .

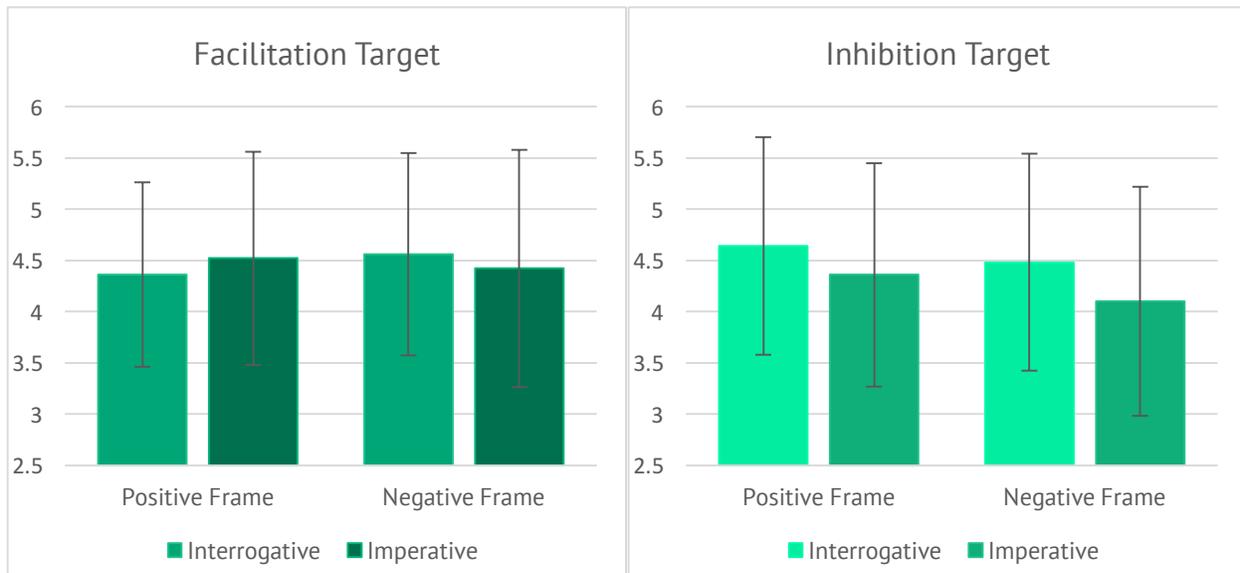


Figure 6. Three-way interaction between intervention, message frame, and verb mood on inhibition behavioral intention

Also within the inhibition target level along with the positive frame, there was a marginal difference of inhibition behavioral intention depending on verb mood (see Figure 6). Follow up tests to decompose the effect showed that a positively framed inhibition message with the interrogative mood ( $M = 4.64$ ,  $SD = 1.06$ ) had moderately greater inhibition behavioral intention scores than those with an imperative mood ( $M = 4.36$ ,  $SD = 1.09$ ),  $t[150] = 1.59$ ,  $p = .056$ ,  $r^2 = .016$ . There were no significant or trending towards significant differences in inhibition target behavioral intentions as a function of the facilitation intervention target condition for this interaction, all  $F(3, 292) < 1.56$ , *n.s.*

## Discussion

The results suggest which of the experimental factors of persuasion can be effective factors of persuasion. First, the findings offer insight into which variables in may be effective at

encouraging favorable elaboration in a persuasive appeal. When paired with the negative message frame, and imperative message elicited greater favorable elaboration than its positive frame counterpart. This failed to confirm the hypothesis that an interrogative message would consistently result in greater favorable elaboration than an imperative message, even when working in conjunction with a negative message frame. This suggests that the relationship between verb mood and message frame, especially the negative message frame, needs further exploration to understand how the two types of message framing can be paired together to create persuasive messages. Furthermore, this finding provides evidence for the kind of messages that will produce favorable, issue relevant thinking and, according to the Elaboration Likelihood Model, can lay the ground work for creating strong attitude changes.

The findings also shed light on how the predictor variable of intervention target individually influenced attitudes. A health message with a facilitation intervention target saw significantly greater positive attitudes compared to an inhibition intervention target. This confirmed the hypothesis that facilitation intervention targets would foster more favorable attitudes than an inhibition target, suggesting that appeals containing a facilitation target can be more effective, and thus more persuasive, than an inhibition target at creating favorable attitudes for a behavioral intervention. Conversely, attitudes were significantly more positive towards an untargeted inhibition intervention compared to an untargeted facilitation intervention. There are a few possible explanations for this result. The first is that a facilitation target was not always a more pleasant (i.e., able to incite positive attitudes) compared to an inhibition target. A second possible explanation is that many participants were already aware of the idea to adding vegetables to their diet as opposed to reducing sodium. This may have created a ceiling effect on their attitudes towards vegetables because they already knew it is a good behavior, so there was not

much room for their attitudes to move in a favorable direction for a vegetable (i.e., facilitation) intervention target. If this was the case, then it would appear, based on the study's findings, that a sodium (i.e., inhibition) target was a new idea to participants and thus their attitudes towards this intervention target would not be constrained by a ceiling effect.

Although there were no hypotheses regarding three-way interactions at the beginning of this study, the data indicated there was indeed a triple interaction between intervention condition, message frame, and verb mood. These three-way interactions primarily influenced participant's reports of behavioral intentions. A different combination of message variables had significant differences for overall behavioral intentions. A positively framed facilitation message with an imperative mood had significantly greater scores for this overall behavioral intention measure compared to a message with the interrogative mood. There was also a marginal difference between a positively framed inhibition message, this time with an interrogative mood, and its interrogative counterpart such that the former message had greater overall behavioral intention scores.

Furthermore, for target behavioral intentions, a negatively framed inhibition message with the imperative mood had participants with significantly greater scores compared to the interrogative mood. Additionally, there was a marginally significant effect such that a positively framed inhibition message with the interrogative mood saw greater target behavioral intention compared to such a message with the imperative mood. These results specifically offer insight into how to most effectively pair message frame and verb mood conditions together so as to yield strong behavioral intentions for a given targeted intervention message. While there were no significant differences for attitudes as a function of any three-way interactions, these findings on overall and target behavioral intentions suggest what type of message combinations can be

constructed to effectively persuade people to form stronger behavioral intentions to change their behavior to be healthy.

Additionally, the results suggest the best type of message variables to include to persuade an individual to intend to follow through with a specific inhibition target intervention. Follow up tests performed on the three-way interaction showed that negatively framed inhibition messages with an imperative mood fostered greater inhibition target behavioral intentions in contrast to such messages but with an interrogative mood. This implies that the negatively framed imperative type of message is best suited for persuasive health appeals advocating for the inhibition of an unhealthy behavior.

The findings of this study, however, failed to confirm the hypotheses regarding how elaboration would mediate attitude's relationship with behavioral intention as well as how message framing and verb mood would individually and significantly influence elaboration, attitude, and behavioral intention. The lack of significant differences based on these two predictor variables can perhaps be attributed to the aforementioned ceiling effect. The information and behavioral interventions contained in this study's messages are arguably largely already known and accepted by the average individual. Therefore, participants' attitude and behavioral intention reports were already high on the scale, so there was little room for message frame and verb mood to move said reports. Along the same lines, such a ceiling effect may also explain elaboration lack of a mediating role between attitude and behavioral intention. As it is, the lack of significant differences in dependent variables as functions of the predictor variables alone and in interaction with one another once again may not be a result of faulty manipulation of the predictor variables but of the aforementioned ceiling effect.

The study's purpose was to understand how persuasion variables can be used to construct influential health messages with the added intent of helping better society. Firstly, the thesis may deepen psychology's understanding of persuasion. The findings illustrate how currently understudied variables operate as factors of persuasion in the context of health communication. Also, these findings may lay the groundwork for further research in understanding how message framing interacts with behavioral targets of intervention in changing attitudes and forming behavioral intentions. The thesis and its findings set precedent for research on how verb mood can be used in a message and function as a variable of persuasion. Secondly, the results of this thesis may be able to help society as a whole. These results may help health campaigns design messages to maximize their likelihood of persuasion and attitude change to contribute to a healthier society. In eliminating the shortcomings of the existing research on persuasion, the intent behind this thesis was to create persuasive messages to help improve the general public's health.

Although the thesis aimed to address the limitations of the existing literature, unfortunately this thesis had some potential limitations of its own. For many of the predictor variables, they had very few or no significant effect on measures of attitude or behavioral intention. This is most likely not a measurement issue. On the face of it, the measures are valid. For example, an item reading "I intend to have a diet comprised of fresh vegetables in the forthcoming month" is clearly asking about a person's behavioral intent to eat vegetables. A more likely explanation for such non-significant results is the previously mentioned ceiling effect on attitudes and behavioral intentions reported. For example, there were no significant results for hypertension attitude, but participants' scored attitudes were already very high (i.e., 5 out of 6) with little variance, suggesting there was very little room for the message to move participants' attitudes up along the scale (i.e., in a more unfavorable direction for hypertension). It is arguably widely known

and accepted that behaviors such as eating vegetables are healthy and good for you and that health issues like hypertension are bad for you. Therefore, participants may have already had strong pre-existing attitudes (i.e., favorable attitudes for the behavioral intervention targets and unfavorable attitudes for hypertension) and pre-existing behavioral intentions. If participants had such pre-existing attitudes and intentions, this would limit the amount that this study's message could have changed these outcomes, effectively putting a ceiling on this message's persuasive influence.

Another issue of the study was a language based one. When reading through participants' thought listing task and manipulation check responses, it was clear there was a language barrier for several participants recruited globally through MTurk. For instance, a manipulation check asked participants, "How are the consequences and likelihood of heart problems affected by the level of your blood pressure?" to which several misinterpreted the general "you" to be a personal "you" and answered as such (e.g., "My blood pressure is fine", or "I have no blood pressure"). Consequently, after 238 participants had been recruited via MTurk, the MTurk HIT was changed to be "U.S. only" so as to avoid further potential language-barrier confounds to participant responses.

Additionally, the results suggest the best type of message variables to include to persuade an individual to intend to follow through with a specific inhibition target intervention. Follow up tests performed on the three-way interaction showed that negatively framed inhibition messages with an imperative mood fostered greater inhibition target behavioral intentions in contrast to such messages but with an interrogative mood. This implies that the negatively framed imperative type of message is best suited for persuasive health appeals advocating for the inhibition of an unhealthy behavior. Overall, the results for behavioral intention suggest that there is no absolute way to create an effective persuasive appeal for behavioral intervention using the message factors

of message frame and verb mood. The most effective combinations of message frame, intervention target, and verb mood each depend on the levels (e.g., positive or negative frame, facilitation or inhibition, etc.) of said variables involved. The effectiveness of a persuasive appeal comprised of a combination of these message factors also depends on what type of behavioral intention the message is looking to create (e.g., overall or target behavioral intentions). For example, based on this study's results, a positively framed facilitation target may be most effective when paired with an imperative mood but only when the persuasive appeal's goal is to foster strong overall behavioral intentions as opposed to solely behavioral intentions for the targeted intervention.

An additional weakness of this thesis was the absence of behavioral measures. As established by past research and behavioral intention's mediating role, attitudes are related to but not certain guarantees of actual behavior. While behavioral intention is indicative of and can serve as a more reliable predictor of behavior than attitudes alone, as stated by the Theory of Planned Behavior, it is not necessarily the same as actually measuring the behavior. Because of limited resources, real behavior was not measured in this study. This limits the findings on how effective the variables of the persuasion message are at influencing not only attitudes and behavioral intention but the actual behavior realization as well. Along the same lines, with the finite resources available, the research was not a longitudinal study. This thesis did not follow up with participants to see if they were still following the appeal's prescriptions across several time intervals after exposure to the appeal.

Furthermore, the thesis's message focused on one health problem (i.e., blood pressure levels) and one type of behavioral intervention target (i.e., change in diet). In addition to this particular issue perhaps creating a ceiling effect, the use of a single topic may restrict the generalizability of the results to other health topics. Blood pressure levels are relatively responsive

to changes in behavior. Therefore, the results may not be applicable to more serious and difficult health issues, such as Type 2 diabetes. In a similar vein, because this thesis primarily investigated relatively simple changes in behavior, the expected findings may not translate to more challenging changes in behavior. For example, Type 2 diabetes can be addressed, to a certain extent, with very extreme behavioral changes such as adopting a 600 calorie diet (Lim et al., 2011). Persuading people to positively evaluate such radical changes in behavior may be difficult to achieve through a single message as in the study. Perhaps then the results will only be generalizable to messages on health issues that can be addressed with relatively simple behavioral interventions. Or, perhaps the findings may only be relevant for messages on blood pressure or behavior intervention involving changes in food consumption.

Additionally, the changes in behavior delineated in this study are relatively well known and generally accepted as healthy by the public. While this may have also contributed to a ceiling effect, this may also limit the thesis's generalizability in a different way. The results from this study are perhaps only applicable to widely known and commonly accepted behaviors. It is possible that the results for relatively unknown and more controversial changes in behavior (e.g., reducing the amount of time you sit) will look different from the results found in this thesis. Consequently, a future step is to determine how generalizable this thesis and its findings are.

While there may have been some shortcomings to the current research, this thesis still holds promise in guiding future research. Given that this was only a study was only the first step in examining the variables in question, the clear next step is replicate as well as address and build on the aforementioned limitations of the study. This would enrich the preliminary findings of this study for what each of the variables actually say about their persuasive ability and their respective theories. Additionally, replicating and building on this study will also help to determine if the

aforementioned potential limitations actually limit the thesis and affect its findings and generalizability.

Although the generalizability of the expected findings could be somewhat restricted, this thesis still provides a sound launching point from which future research on persuasion can take off. Based on this thesis, future research can apply the three predictor variables of message framing, verb mood and intervention target to health issues other than hypertension. Such health issues can include the more difficult to treat afflictions such as Type 2 Diabetes. Future research based on this thesis can also examine to what extent message framing and verb mood as applied to different intervention targets, including the more challenging changes in behavior, are effective factors of health persuasion.

In a similar vein, future research could examine the number of times the audience needs to be exposed to the message for it to be effective. To take it further, such research could also investigate how the message's behavior intervention could become a second nature behavior or a habit. Subsequent research could aim to determine when these variables no longer change attitudes but instead incite resistance to persuasion and backfire. Such research could also examine different verb moods in addition to the imperative and interrogative, such as the indicative mood. Also, another next step would be an examination of whether or not the study's findings will be generalizable to topics outside the realm of health communication.

Another future direction for this thesis, contingent on availability of resources, would be to complement the thought listing task and Likert-type scale items with additional measures. Following studies can use behavioral measures as well as implicit measures of attitude and cognition. Future research can also investigate how far reaching the influence of the predictor variables variables is by incorporating a longitudinal element. For example, future studies can

follow up with participants after days, months, years, etc. to determine whether the persuasion message is still effective at changing their behavior.

With its findings and offerings to future research, this thesis and its results add to a deeper understanding of the complex process of persuasion, illustrating how persuasion can be maximized and used to help better the health of society.

### References

- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50(2), 179-211. doi:10.1016/0749-5978(91)90020-T
- American Heart Association. (2015a, October 22). About high blood pressure. Retrieved from [http://www.heart.org/HEARTORG/Conditions/HighBloodPressure/AboutHighBloodPressure/What-is-High-Blood-Pressure\\_UCM\\_301759\\_Article.jsp](http://www.heart.org/HEARTORG/Conditions/HighBloodPressure/AboutHighBloodPressure/What-is-High-Blood-Pressure_UCM_301759_Article.jsp)
- American Heart Association. (2015b, August 25). Prevention & treatment of high blood pressure. Retrieved from [http://www.heart.org/HEARTORG/Conditions/HighBloodPressure/PreventionTreatmentofHighBloodPressure/Prevention-Treatment-of-High-Blood-Pressure\\_UCM\\_002054\\_Article.jsp](http://www.heart.org/HEARTORG/Conditions/HighBloodPressure/PreventionTreatmentofHighBloodPressure/Prevention-Treatment-of-High-Blood-Pressure_UCM_002054_Article.jsp)
- American Heart Association. (2015c, February 11). Lower systolic blood pressure reduces risk of stroke. Retrieved from <http://blog.heart.org/lower-systolic-blood-pressure-reduces-risk-stroke>
- Antonakoudis, G., Poulimenos, I., Kifnidis, K., Zouras, C., & Antonakoudis, H. (2007). Blood pressure control and cardiovascular risk reduction. *Hippokratia*, 11(3), 114–119.
- Blankenship, K. L., & Craig, T. Y. (2007). Language and persuasion: Tag questions as powerless speech or as interpreted in context. *Journal of Experimental Social Psychology*, 43(1), 112-118. doi:10.1016/j.jesp.2005.12.012
- Block, L. G., & Keller, P. A. (1995). When to accentuate the negative: The effects of perceived efficacy and message framing on intentions to perform a health-related behavior. *Journal of Marketing Research*, 32(2), 192-203. doi:10.2307/3152047
- Blood Pressure UK. (n.d.) High blood pressure: Facts and figures. Retrieved from <http://www.bloodpressureuk.org/microsites/kyn/Home/Media/Factsandfigures>

- Bohner, G. & Dickel, N. (2011). Attitude and attitude change. *Annual Review of Psychology*, 62(1), 391-417. doi: 10.1146/annurev.psych.121208.131609
- Cacioppo, J. T., Harkins, S. G., & Petty, R. E. (1981). The nature of attitudes and cognitive responses and their relationships to behavior. In R. E. Petty, T. M. Ostrom, & T. C. Brock (Eds.), *Cognitive responses in persuasion* (pp. 31-54). Hillsdale, NJ.: Erlbaum.
- Cialdini, R. B., Petty, R. E., & Cacioppo, J. T. (1981). Attitude and attitude change. In M. R. Rosenzweig, & L. W. Porter (Eds.), *Annual Review of Psychology* (Vol. 32, pp. 357-404). Palo Alto, CA: Annual Review Press.
- Crano, W. D., & Prislun, R. (2006). Attitudes and persuasion. *Annual Review of Psychology*, 57, 345-374. doi:10.1146/annurev.psych.57.102904.190034
- Gerend, M. A., & Shepherd, M. A. (2013). Message framing, it does a body good: Effects of message framing and motivational orientation on young women's calcium consumption. *Journal of Health Psychology*, 18(10), 1296-1306. doi:10.1177/1359105312463587
- Glass, I. (Producer) & Chace, Z. (Producer). (2015, October 9). Put a bow on it. *This American Life* [Audio podcast]. Retrieved from <http://www.thisamericanlife.org/radio-archives/episode/569/put-a-bow-on-it>
- Gliem, J. A., & Gliem, R. R. (2003). Calculating, interpreting, and reporting Cronbach's alpha reliability coefficient for Likert-type scales. Presented at the Midwest Research-to-Practice Conference in Adult, Continuing, and Community Education, The Ohio State University. Retrieved from <https://scholarworks.iupui.edu/bitstream/handle/1805/344/Gliem+&+Gliem.pdf?sequence=1>
- Kahneman, D., & Tversky, A. (1979). Prospect theory: An analysis of decision under risk. *Econometrica*, 47(2), 263-91.

- Kang, J., & Lin, C. A. (2015). Effects of message framing and visual-fear appeals on smoker responses to antismoking ads. *Journal of Health Communication, 20*(6), 647-655.  
doi:10.1080/10810730.2015.1012242
- Kment, B. (2012). Varieties of modality. *The Stanford Encyclopedia of Philosophy, Winter 2012 Edition*. Retrieved from <http://plato.stanford.edu/archives/win2012/entries/modality-varieties/>
- Kreps, G. L. (2014). Evaluating health communication programs to enhance health care and health promotion. *Journal of Health Communication, 19*(12), 1449-1459.  
doi:10.1080/10810730.2014.954080
- LaPiere, R. T. (1934). Attitudes vs. actions. *Social Forces, 13*(2), 230-237.
- Let's move. (n.d.) Retrieved from <http://www.letsmove.gov>
- Lewine, H. (2014, March 28). Keeping your blood pressure under control reduces risk of second stroke. Retrieved from <http://www.health.harvard.edu/blog/keeping-blood-pressure-control-reduces-risk-second-stroke-201403287096>
- Lim, E. L., Hollingsworth, K. G., Aribisala, B. S., Chen, M. J., Mathers, J. C., & Taylor, R. (2011). Reversal of type 2 diabetes: Normalisation of beta cell function in association with decreased pancreas and liver triacylglycerol. *Diabetologia, 54*(10), 2506–2514.  
<http://doi.org/10.1007/s00125-011-2204-7>
- Meyerowitz, B. E., & Chaiken, S. (1987). The effect of message framing on breast self-examination attitudes, intentions, and behavior. *Journal of Personality and Social Psychology, 52*(3), 500-510. doi:10.1037/0022-3514.52.3.500
- National Institute of Heart, Lung and Blood. (2006, April). Your guide to lowering blood pressure with DASH. Retrieved from <http://www.nhlbi.nih.gov/health/resources/heart/hbp-dash-index>

- Petty, R. E., & Briñol, P. (2008). Persuasion: From single to multiple to metacognitive processes. *Perspectives on Psychological Science, 3*(2), 137-147. doi:10.1111/j.1745-6916.2008.00071.x
- Petty, R. E., & Cacioppo, J. T. (1984). The effects of involvement on responses to argument quantity and quality: Central and peripheral routes to persuasion. *Journal of Personality and Social Psychology, 46*, 69-81.
- Petty, R. E., & Cacioppo, J. T. (1986). The elaboration likelihood model of persuasion. *Advances in Experimental Social Psychology, 19*, 123-205.
- Petty, R. E., Cacioppo, J. T., & Heesacker, M. (1981). Effects of rhetorical questions in persuasion: A cognitive response analysis. *Journal of Personality and Social Psychology, 40*, 432-440.
- Petty, R. E., Cacioppo, J. T., & Schumann, D. (1983). Central and peripheral routes to advertising effectiveness: The moderating role of involvement. *Journal of Consumer Research, 10*(2), 135-146. doi:10.1086/208954
- Salovey, P. & Wegener, D.T. (2003). Communication about health: Message framing, persuasion, and health behavior. In J. Suls and K. A. Wallston (Eds.), *Social psychological foundations of health and illness*. Blackwell Publishing Ltd. Retrieved from <http://onlinelibrary.wiley.com/store/10.1002/9780470753552.fmatter/asset/fmatter.pdf?v=1&t=ifztg4lu&s=07325f7b701782eb6864c1e87f457ff7de241255>
- Smith, S. M., & Petty, R. E. (1996). Message framing and persuasion: A message processing analysis. *Personality and Social Psychology Bulletin, 22*(3), 257-268. doi:10.1177/0146167296223004
- Soler, R. E., Leeks, K. D., Buchanan, L. R., Brownson, R. C., Heath, G. W., Hopkins, D. H., & Task Force on Community Preventive, S. (2010). Point-of-decision prompts to increase stair use. A systematic review update. *American Journal of Preventive Medicine, 38* (2 Suppl.), S292–300. doi:10.1016/j.amepre.2009.10.028

Stangor, C. (2015). *Research methods for the behavioral sciences* (5<sup>th</sup> ed). Belmont, CA: Wadsworth, Inc.

Stenius, E. (1967). Mood and language-game. *Synthese*, 17(3), 254–274. Retrieved from <http://www.jstor.org/stable/20114558>

Suri, G., Sheppes, G., Leslie, S., & Gross, J. J. (2014). Stairs or escalator? Using theories of persuasion and motivation to facilitate healthy decision making. *Journal of Experimental Psychology: Applied*, 20(4), 295-302. doi:10.1037/xap0000026

Tversky, A., & Kahneman, D. (1981). The framing of decisions and the psychology of choice. *Science*, 211(4481), 453-458. doi:10.1126/science.7455683

Tversky, A., & Kahneman, D. (1986). Rational choice and the framing of decisions. *Journal of Business*, 59(4), S251-78.

Wilson, D., & Sperber, D. (1988). Mood and the analysis of non-declarative sentences. In J. Dancy, J. E. Moravcsik, & C. W. Taylor (Eds.), *Human agency: Language, duty, and value* (pp. 77-101). Palo Alto: Stanford University Press.

## Appendix A

### Persuasion Stimulus Materials

#### Generic Message

Even if you think you know everything about hypertension, there's always an opportunity to learn more and refresh your knowledge.

Hypertension is a disease. It becomes a health problem when the force exerted by blood flow against artery walls remains high for an extended time. This can tear the artery walls and lead to the accumulation of fatty deposits, cutting off efficient blood flow. By damaging blood supply, hypertension hurts many important bodily organs. A particular problem is the injury that hypertension inflicts on the heart. In cutting off the heart's supply of blood and oxygen, hypertension can result in heart failure and heart attacks. On its own, hypertension typically has no visible symptoms. However, if left untreated, it can have deadly consequences. While you remain unaware, it's damaging your heart, arteries and other organs. Therefore, hypertension is often referred to as "the silent killer".

#### Message Framing

##### Negative framing: Hypertension

Hypertension puts you in danger of developing potentially lethal health problems. It heightens the risk of strokes, heart attacks and heart disease. Should you develop any one of these heart problems, having hypertension increases the lethality of these problems.

- Hypertension increases the likelihood of having a stroke. By having hypertension, people have a 50% increased chance of a stroke.

- With increased blood pressure, people see the risk for heart failure approximately doubled.
- Having hypertension triples the chances of developing heart disease and doubles the likelihood of dying from the disease.

**Positive framing: Normal blood pressure**

Normal blood pressure reduces the danger of developing potentially lethal health problems. It decreases the risk of strokes, heart attacks and heart disease. Should you develop any one of these heart problems, not having hypertension increases the chances of overcoming these problems.

- Normal blood pressure decreases the likelihood of having a stroke. By controlling blood pressure levels, people have a 50% reduced chance of a stroke.
- With normalized blood pressure, people see the risk for heart failure cut down by approximately half.
- Reaching a normal blood pressure greatly reduces the chances of developing heart disease and doubles the likelihood of surviving from the disease.

**Grammatical Verb Mood as Applied to Behavioral Intervention Targets****Interrogative mood and facilitation**

To avoid hypertension and have healthy levels of blood pressure, you can change the kinds of foods you eat. Eating vegetables affects blood pressure levels. An increased amount of vegetables can help make a heart-healthy diet.

What is a healthy diet that is high in fresh vegetables? A diet that has lots of fresh vegetables means having around two cups of cooked vegetables or four cups of raw leafy vegetables a day. A

cup of vegetables looks like the size of a fist. Examples of healthy vegetables you can add to your diet are green beans, broccoli, carrots, spinach and collards. So can you increase the number of vegetables you eat each day? Wouldn't it be easy to frequently supplement your sandwich or hamburger with some spinach and cook stir fry with chopped carrots and beans to increase the amount of vegetables in your diet? A diet with lots of vegetables is good for the heart and makes for healthy blood pressure.

Isn't it important to avoid the health complications of hypertension?

### **Imperative mood and facilitation**

To avoid hypertension and have healthy levels of blood pressure, change the kinds of foods you eat. Eating vegetables affects blood pressure levels. An increased amount of vegetables can help make a heart-healthy diet.

Eat a healthy diet that is high in fresh vegetables! A diet that has lots of fresh vegetables means having around two cups of cooked vegetables or four cups of raw leafy vegetables a day. A cup of vegetables looks like the size of a fist. Examples of healthy vegetables to add to your diet are green beans, broccoli, carrots, spinach and collards. So increase the number of vegetables you eat each day! It is easy to frequently supplement your sandwich or hamburger with some spinach and cook stir fry with chopped carrots and beans to increase the amount of vegetables in your diet! A diet with lots of vegetables is good for the heart and makes for healthy blood pressure.

It is important to avoid the health complications of hypertension.

**Interrogative mood and inhibition**

To avoid hypertension and have healthy levels of blood pressure, you can change the kinds of foods you eat. Sodium affects blood pressure levels. A decreased amount of sodium can help make a heart-health diet.

What is an unhealthy diet that is high in sodium? A diet that has high levels of sodium means having around a teaspoon of sodium a day. A teaspoon of sodium looks like the size of a quarter. Examples of high sodium food you can reduce in your diet are packaged foods, butter, cheese, soy sauce, and crackers. So can you decrease the number of high sodium foods you eat each day? Wouldn't it be easy to avoid frequently supplementing your meals with butter or cheese and cook stir fry with less soy sauce and canned meats to lower the amount of sodium in your diet? A diet with reduced of sodium levels is good for the heart and makes for healthy blood pressure.

Isn't it important to avoid the health complications of hypertension?

**Imperative mood and inhibition**

To avoid hypertension and have healthy levels of blood pressure, change the kinds of foods you eat. Sodium affects blood pressure levels. A decreased amount of sodium can help make a heart-health diet.

Eat a healthy diet that is not high in sodium! A diet that has high levels of sodium means having around a teaspoon of sodium a day. A teaspoon of sodium looks like the size of a quarter. Examples of high sodium foods to reduce in your diet packaged foods, butter, cheese, soy sauce, and crackers. So decrease the number of high sodium foods you eat each day! It is easy to avoid frequently supplementing your meals with butter or cheese and cook stir fry with less soy sauce

and canned meats to lower the amount of sodium in your diet! A diet with reduced of sodium levels is good for the heart and makes for healthy blood pressure.

It is important to avoid the health complications of hypertension.

**Appendix B****Attitudes and Behavioral Intentions Survey**

For the following questions and statements, please select the choice that best corresponds with your answer.

1. Hypertension is a serious health problem with grave consequences.  
1 (Strongly Disagree) 2 3 4 5 6 (Strongly Agree)
  
2. Critical heart problems can result from hypertension.  
1 (Extremely Unlikely) 2 3 4 5 6 (Extremely Likely)
  
3. Trying to have healthy blood pressure levels is necessary.  
1 (Definitely True) 2 3 4 5 6 (Definitely False)
  
4. To what extent are the health consequences of hypertension pleasant?  
1 (Very Unpleasant) 2 3 4 5 6 (Very Pleasant)
  
5. The health complications from hypertension are scary.  
1 (Strongly Agree) 2 3 4 5 6 (Strongly Disagree)
  
6. It would be awful to develop hypertension.  
1 (Strongly Disagree) 2 3 4 5 6 (Strongly Agree)
  
7. A healthy diet will help me avoid the problems of hypertension.  
1 (Extremely Unlikely) 2 3 4 5 6 (Extremely Likely)
  
8. Incorporating plenty of vegetables in my diet is good for my blood pressure.  
1 (Strongly Agree) 2 3 4 5 6 (Strongly Disagree)
  
9. Incorporating low levels of sodium in my diet is good for my blood pressure.  
1 (Greatly Disagree) 2 3 4 5 6 (Greatly Agree)

10. To what extent is having a diet high in fresh vegetables beneficial for staving off hypertension and its health consequences?  
1 (Extremely Beneficial) 2 3 4 5 6 (Not Beneficial at All)
11. To what extent is having a diet low in sodium beneficial for staving off hypertension and its health consequences?  
1 (Not Beneficial at All) 2 3 4 5 6 (Super Beneficial)
12. I feel good about having a diet that's full of fresh vegetables.  
1 (Strongly Disagree) 2 3 4 5 6 (Strongly Agree)
13. I feel good about having a diet that's low on sodium levels.  
1 (Definitely Disagree) 2 3 4 5 6 (Definitely Agree)
14. To what extent will increasing the amount of vegetables in your diet be enjoyable?  
1 (Very Unenjoyable) 2 3 4 5 6 (Very Enjoyable)
15. To what extent will decreasing the amount of sodium in your diet be pleasant?  
1 (Very Pleasant) 2 3 4 5 6 (Very Unpleasant)
16. To what degree does the idea of adding vegetables to your diet make you happy?  
1 (Not Happy at All) 2 3 4 5 6 (Very Happy)
17. To what degree does the idea of subtracting sodium from your diet make you happy?  
1 (Extremely Happy) 2 3 4 5 6 (Extremely Unhappy)
18. I intend to make the recommended changes to my diet.  
1 (Absolutely Yes) 2 3 4 5 6 (Absolutely No)
19. I see myself eating more fresh vegetables during my meals tomorrow.  
1 (Firmly Agree) 2 3 4 5 6 (Firmly Disagree)
20. I see myself eating less high sodium foods during my meals tomorrow.

1 (Definitely Agree) 2 3 4 5 6 (Definitely Disagree)

21. To what extent do you now strive to incorporate fresh vegetables in your diet?

1 (Very Determined) 2 3 4 5 6 (Not Determined at All)

22. To what extent do you now strive to incorporate low sodium foods in your diet?

1 (Not Determined at All) 2 3 4 5 6 (Very Determined)

23. I intend to have a diet comprised of fresh vegetables in the forthcoming month.

1 (Adamantly Disagree) 2 3 4 5 6 (Adamantly Agree)

24. I intend to have a diet comprised of low levels of sodium in the forthcoming month.

1 (Adamantly Disagree) 2 3 4 5 6 (Adamantly Agree)

25. I plan to have healthy amounts of vegetables in my diet in the forthcoming week.

1 (Extremely Likely) 2 3 4 5 6 (Extremely Unlikely)

26. I plan to have healthy levels of sodium in my diet in the forthcoming week.

1 (Quite Unlikely) 2 3 4 5 6 (Quite Likely)

**Appendix C**

**Demographics Survey**

1. What gender do you most identify with?

Male

Female

Other (please specify)

2. What is your age?

(specify)

3. What ethnicity do you most identify with?

African American/Black

Asian, Asian American or Pacific Islander

Hispanic or Latino/a

Native American

White

Other (please specify)

4. What is the highest level of education that you have completed?

Junior high school

High school or equivalent

Vocational/ technical school

Some college

Bachelor's degree

Master's, professional, doctoral, or related degree

Other (please specify)

**Appendix D****Manipulation Checks Survey****For Message Framing**

1. How are the consequences and likelihood of heart problems affected by the level of your blood pressure?

**For Behavioral Target**

2. What did the *message* recommend that you do to address hypertension? (Please specify)

**For Grammatical Verb Mood**

3. What was the grammatical structure of the last sentence of the message? (Please choose one)

Question

Statement

Quote

Fragment

Wish

**Other**

4. Have you ever done a study like this one before?

Yes

No

5. If yes to Question 4, then please describe the other study. If no, please leave this Question blank.