EXAMINING THE PERSUASIVE EFFECTS OF EFFICACY IN FEAR APPEALS AND HOPE APPEALS: DO UNCERTAINTY AVOIDANCE AND EFFICACY SPECIFICITY MODERATE THE EFFECTS?

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ABSTRACT

When confronted with uncertainty, some people are more accepting of uncertainty, while others are more avoidant. Individuals high in uncertainty avoidance tend to rely on specific and detailed information to avoid threats, whereas those low in uncertainty avoidance are more tolerant of ambiguity. Messages that employ fear appeals or hope appeals evoke fear and/or hope, both of which are uncertainty-based emotions. Also, emotional appeals include efficacy messages, which are essential to the success of persuasion. This study tested the appraisal processes of the Extended Parallel Processing Model and Theory of Persuasive Hope and investigated the association between efficacy specificity and uncertainty avoidance level within the two appeal types and how such variables interact to be more or less persuasive as well as behavioral intentions following exposure to fear or hope appeal messages. Individuals with low/high uncertainty avoidance participated in this study's online experiment and surveys. People high in UA had higher behavioral intentions with fear appeals, and hope appeals were more effective than fear for people with low UA. High UA people saw any type of messages assigned to them as highly persuasive while the appeal type and the degree of efficacy specificity mattered to or brought greater effects on low UA people. The interactions of UA, emotional appeal type, and perceived efficacy specificity showed that, overall, hope appeals with specific efficacy messages were the most persuasive regardless of individuals' uncertainty avoidance levels.

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TABLE OF CONTENTS

INTRODUCTION

Emotional appeals have been extensively employed in both commercial and public advertisements and campaigns (Chou & Budenz, 2020; Nabi, 2015; Tao et al., 2023; Turner, 2007). Among many emotional appeal types, messages that harness fear have been frequently used as a powerful persuasive tool to promote improved health outcomes, enhance purchase behaviors, safety behaviors, and reduce risk taking (Addo et al., 2020; Johnston & Warkentin, 2010; Laroche et al., 2001; Ruiter et al., 2014; Witte & Allen, 2000). Appraisal theories propose that fear is caused by high levels of uncertainty and goal incongruency (i.e., negativity). That said, another emotion is also caused by uncertainty—though paired with goal congruency (i.e., positivity), such as hope (Smith & Ellsworth, 1985). Persuasive hope appeals have also been shown to have positive impacts on persuasive outcomes such as attention and perceived message effectiveness (Chadwick, 2010; 2015).

Given that both fear and hope are connected with feelings of uncertainty, it makes sense that individual differences like uncertainty avoidance might affect their influence. This commonality in uncertainty prompts the consideration that fear appeals and hope appeals may exert different persuasive effects on individuals based on their tolerance for uncertainty. Since fear appeals and hope appeals have rarely been explored in the context of the dimension of uncertainty avoidance (Hofstede, 1980), it will be meaningful to examine how fear and hope appeal messages can be designed to enhance persuasiveness, considering individual differences between high and low uncertainty avoidance. In addition, efficacy specificity, that is, how specific and clear efficacy information the message conveys to the receiver, may play a role in the persuasive outcome with people having different levels of uncertainty avoidance, thus influencing their intention and behaviors.

This paper begins with an overview of fear appeal and hope appeal models with a discussion of their findings and other individual/cultural variables that may affect the effectiveness of persuasion. It then compares the emotions of fear and hope and explores their linkage to the cultural factor of uncertainty avoidance. Depending on their level of uncertainty avoidance, individuals may be influenced by emotional appeal messages with varying degrees of efficacy specificity, that is, the degree to which efficacy messages are perceived as specific and detailed by the viewers. The focus of this study is on the relationship between efficacy specificity within the two emotional appeals, uncertainty avoidance levels, and behavioral intention to prevent or take control of type 2 diabetes.

LITERATURE REVIEW

Fear Appeals

Fear is a strong negative emotion triggered by an imminent threat, which is perceived to be important and personally relevant but obstructive to one's own goals (Smith & Lazarus, 1993; Scherer, 2001; Witte, 1992). Witte (1992) specified that this threat is comprised of perceiving the threat to be severe and that one is susceptible to its severe outcomes. Similarly, according to appraisal theory, emotions are caused by a person's interpretation or appraisal of a given situation (Frijda 1987; Roseman 1991; Smith & Ellsworth 1985). Fear is elicited when the threat is appraised as having high goal relevance, low goal congruence (or goal incongruence), low coping potential, and low certainty (Lerner & Keltner, 2000; Smith & Ellsworth, 1985). Fear is often associated with anxiety (Smith & Lazarus, 1993) and accompanies physiological signs such as pupil dilation, increased heartbeat, and goosebumps (Dillard & Shen, 2013, pp. 185; Leuchs et al., 2017; Mewborn & Rogers, 1979).

Fear appeals are persuasive messages intended to evoke fear by forewarning impending danger, uncertainty, and harm that individuals would experience if they failed to heed the message's recommendations (Maddux & Rogers, 1983; Tannenbaum et al., 2015). That is, fear appeals strategically frame the message in terms of these appraisals.

The Extended Parallel Processing Model (EPPM; Witte, 1992) which was informed by Protection Motivation Theory (Rogers, 1975, 1983; Maddux & Rogers, 1983), highlights both the cognitive and affective processes of fear appeals and under what conditions fear appeals are optimally effective. Witte explained, upon receiving a fear appeal, individuals tend to engage in a sequence of appraisals: perceived threat appraisal and perceived efficacy (or coping) appraisal (Rogers, 1975, 1983; Witte, 1992). As noted earlier, *perceived threat* appraisal consists of two

dimensions – severity, signifying the seriousness of the threat, and susceptibility, indicating the likelihood of experiencing the threat (Rogers, 1983; Witte, 1992). *Perceived efficacy* appraisal is comprised of response efficacy, which reflects whether the recommended response or solution is effective in mitigating or preventing the threat, and self-efficacy, which is the degree to which individuals are confident about their ability to practice the recommended course of action (Maddux & Rogers, 1983; Witte, 1992).

According to the EPPM, an adequate level of fear combined with efficacy in messages can lead to behavioral change (Nabi & Myrick, 2019; Witte, 1992). Prior research has shown that low or no threat conditions are less motivating for message processing than moderate or high levels of fear conditions (Boster & Mongeau, 1984; Witte & Allen, 2000). The more intense the fear triggered by a fear-based appeal, the greater its motivational power (Boster & Mongeau, 1984; Witte & Allen, 2000). However, when the fear level is too high, the motivation is more likely to be counterproductive (Higbee, 1969; Tannenbaum et al., 2015; Witte, 1994). Thus, although the inducement of enough fear from the threat appraisal is needed for persuasion (Milne et al., 2000; Witte, 1992), the effectiveness of fear appeals is contingent on the presence of efficacy information. In conditions where the threat is high and efficacy is low, or where the threat level is exceedingly high, it increases fear so high that people initiate fear control, an emotional processes where they try to reduce their fear by taking defensive actions such as avoiding the message or even derogate the message Meta-analyses of fear appeals have shown that fear appeal messages that lack efficacy information have weaker effects than those involving efficacy information (Milne et al., 2000; Witte & Allen, 2000). If there is no provision of efficacy of the recommended response, individuals may fall back on past experiences and preexisting beliefs to determine perceived efficacy (Witte & Allen, 2000). Because individuals' experiences,

characteristics, and beliefs vary, such individualistic factors affect their appraisals and control processes (Witte, 1992) and thus can weaken the effectiveness of fear appeal. However, when both threat and efficacy levels are high, and importantly, with the perceived efficacy being greater than the perceived threat, people are more likely to believe in their ability to feasibly and effectively avert the threat they sense (1992). This urges them to move to danger control, a cognitive process where they take protective action to control the danger by accepting the message, thereby yielding the greatest attitude or behavioral change among the four high/low threat-efficacy conditions by the EPPM (1994). Statements that strengthen response efficacy and self-efficacy increase one's confidence to control danger (Witte, 1992). Hence, efficacy information plays a pivotal role in maintaining a consistent and enduring appeal for desirable outcomes.

Despite its wide application in research and communication campaigns, the interactions and dynamics of each component of the EPPM have had mixed support and some propositions have not yet been tested (Popova, 2012; Witte & Allen, 2000). Numerous studies have supported or partially supported the proposition that cognitions about the threat and efficacy are correlated with changes in attitude, intention, or behavior changes (Allahverdipour et al., 2007; Popova, 2012; Witte, 1994). Also, it was supported that people accept fear appeal messages when efficacy information exists otherwise they will fall into fear control processes (Gore & Bracken, 2005). The EPPM argues that the level of perceived efficacy determines whether one goes through fear or danger control (Popova, 2012). However, McKay et al. (2004)'s study showed that whether messages are high or low in efficacy, both groups indicated more danger control responses than fear control. Thus, the EPPM's propositions regarding the role of perceived efficacy have not yet been firmly validated. Moreover, the model has still other internal inconsistencies and hence

requires more empirical research to test the predictions, investigating more detailed operationalization of constructs and other variables, and refining the model (Maloney et al., 2011; Popova, 2012). Particularly, the traits of the message receiver needs to be considered. Factors such as their awareness of the threat, fear-control engagement, the level of tension and sensitivity, being scared but aware of a possible solution, and others can strengthen or weaken the effectiveness of the fear appeal (Nabi et al., 2008; Roskos-Ewoldsen et al., 2004; Witte & Morrison, 2000). Thus, there can be other variables, mediating and moderating effects, and individual difference factors that affect the theoretical model.

Along with fear appeals, this paper examines hope appeals and compares the two types of emotional appeals. Just as fear appeals, hope appeals are utilized as powerful means to motivate people and change their behaviors. Interestingly, both fear and hope are emotions whose attributes are based on uncertainty, and individual message receivers have varying tolerance to uncertainty. This directs the research towards the further examination of hope appeals as follows.

Hope Appeals

Hope is a positive (or goal congruent) emotion. Hope occurs when people perceive a possible future where there is an opportunity to achieve a desired outcome (Chadwick, 2010; Lazarus, 1999, pp. 665). This pleasant and inspiring feeling is evoked by appraisals of opportunity that are in harmony with personal goals, possible but uncertain, important, and present a better future expectation (Ellsworth & Smith, 1988; Lazarus, 1999; Roseman, 1991). It often accompanies physiological changes such as open facial expressions, increased heart rate, and eager attention and focus (Chadwick, 2010). Hope is distinct from fear in that hope is more future-oriented and concerned with goal-congruent future outcomes. While fear is focused on

present or imminent danger (Tannenbaum et al., 2015), hope anticipates positive prospects that lie ahead (Chadwick, 2015). In addition, the concept of hope is distinct from that of optimism. Hope is an affective variable rooted in trust experiences, influenced by external or situational control, and has to do with personally relevant, uncertain, and even less likely outcomes (Averill et al., 1990; Bruininks & Malle, 2005; Roseman, 1991; Scioli et al., 1997). However, optimism is a generalized belief in positive results grounded in rationality and one's internal control (Scheier & Carver, 1987) and requires higher certainty about outcomes than hope does (Chadwick, 2015). In this study, the construct of hope is considered an emotional state universal to human feelings rather than a trait or dispositional concept.

Hope appeals are persuasive messages designed to instill hope by creating opportunity and unveiling the way to take it (Chadwick, 2015). In the Theory of Persuasive Hope (TPH), Chadwick (2015) conceptualized a hope appeal model and explicated its components: (a) *perceived opportunity* through message appraisals of goal congruence, importance, possibility, and positive future expectation and (b) *perceived efficacy* or behavior information to achieve a desired outcome. The first part of the hope appeal message involves the four appraisal components that evoke hope. Hope arises when the appraisal of a future outcome is *goal-congruent*, that is, whether the outcome is consistent with a person's goals or motives (Chadwick, 2015), which is the opposite of fear. The intensity of hope is linked to the degrees of goal congruity and also *importance* (MacInnis & De Mello, 2005), that is, the evaluation of how relevant the outcome is to an individual (Chadwick, 2015). In other words, the more important the goal-congruent outcome is perceived by a person, the greater the intensity of hope the person feels (MacInnis & De Mello, 2005). Furthermore, the feeling of hope is based on the appraisals of *possibility*, a subjective assessment of the likelihood of the future outcome rather than

probability or predictability (Chadwick, 2015). Hope can be experienced when the outcome is possible but not certain. The above four appraisals of future outcome constitute an individual's subjective feelings of hope. The second part of the message component presents recommended actions to respond (i.e. response-efficacy) and an individual's ability to carry them out (i.e. self-efficacy) to encourage a person to take advantage of the opportunity. (Chadwick, 2010, 2015). Such hope appeal messages influence an individual's appraisals of future outcomes and perception of opportunity, leading to feelings of hope (Chadwick, 2015).

Chadwick examined how different message components of the hope appeal are directly related to or mediated by the appraisals of future outcome, feelings of hope, and thus affecting persuasion outcomes. Message components that were designed to cause the appraisal of goal congruence led to greater appraisals of importance and the appraisal of possibility led to stronger appraisals of possibility (Chadwick, 2015). Among the four appraisal processes of hope evocation, the appraisal of future expectation was the most significant predictor of feelings of hope (Chadwick, 2015). The messages also directly induced subjective feelings of hope. The stronger goal congruence and the stronger possibility message people had, the greater hope they experienced (Chadwick, 2015). On receiving the messages, people in strong goal gruence condition, strong future expectation condition, and strong possibility condition perceived the message to be more effective than those who had weak messages. One recent study applied some of the TPH components to the health misinformation context, examining how appraisals of future expectation and possibility can reduce misperception of the information and correct misbelief (Tao et al., 2023). However, to this point, the persuasive hope appeal model has only had partial support with regards to the message components and the four appraisals and has not been empirically tested by many other researchers. Also, Chadwick did not incorporate efficacy cues

or any portion of the recommended action component of her theory (Chadwick, 2015). As Chadwick pointed out, various message manipulations, comparisons with other emotional appeal strategies, and individual characteristics need to be further investigated to evaluate the effectiveness of hope appeals.

Fear, Hope and Uncertainty Avoidance

Comparison of fear and hope

As two oppositely valenced emotions, fear and hope have distinct attributes, but they also share commonalities (see Table 1). First, as all emotions are, fear and hope are evoked by the stimuli that are related to people's goals and bear significant importance to those people. Fear is aroused by highly goal-incongruent stimuli and hope is aroused by highly goal-congruent stimuli. Fear is felt when a threat is presented and the severity and susceptibility of the threat is high (Witte, 1994) whereas hope is felt when an opportunity is presented and the positive his high (Chadwick, 2010; 2015). Such stimuli are highly important, thus perceived importance being a key factor in capturing attention and arousing emotions (Smith & Ellsworth, 1985). Second, both fear and hope involve the perception of possibility such that fear perceives negative outcomes and hope perceives positive outcomes (Chadwick, 2015; Witte, 1992). When it comes to the possibility of something positive as explained in TPH, hope motivates individuals to take action with the outcome perceived to be very possible. However, fear does not expect the possibility of anything positive. Likewise, positive future expectation is low or none in fear while it is high in hope. Another important shared characteristic of fear and hope, which is the focus of this paper, is that they are evoked by uncertainty. Indeed, fear and hope are distinguished from other emotions by their common attribute of uncertainty (Ben-Ze'ev, 2000, pp.146; Smith & Ellsworth, 1985). The state of being afraid of something is associated with feeling high levels of

uncertainty (Smith & Ellsworth, 1985). As the EPPM explains, how an individual is vulnerable or susceptible to a threat is associated with uncertainty (Witte, 1992). When it comes to hope, although hope believes in the realization of a favorable future outcome, it is not fully certain about what, when, or how things will unfold (Lazarus, 1999, pp.655). Hence, uncertainty is a fundamental dimension of both fear and hope. When it comes to the degree of uncertainty, there is a difference between the two. Fear is a state of high uncertainty about a situation – being frightened and feeling insecure about whether one will be able to escape or avoid an unpleasant outcome or not (Smith & Ellsworth, 1985). Hope is characterized by moderate uncertainty – not knowing or being quite uncertain about the occurrence of a desired outcome (Smith & Ellsworth, 1985). While uncertainty differs in degree or intensity, the common ground between fear and hope is that they both emanate from uncertain states. Therefore, this study discusses both fear appeals and hope appeals in connection with uncertainty.

Table 1

Comparison of Fear and Hope

	Valence	Uncertainty	Threat	Goal congruence	Issue importance	Possibility (positive)	Future Expectation (positive)
Fear	negative	high	high	high incongruence	high	low	low
Hope	positive	moderate	low	high congruence	high	high	high

Both fear appeals and hope appeals concern an issue that makes individuals to experience strong appraisals of goal (in)congruence and importance. Unlike hope appeals, however, fear appeals like the EPPM involve fearsome messages that arouse the appraisal of threat. The greater the perception of threat, the more intense fear people would feel. What is

unique to hope appeals – based on TPH – is that positive messages make individuals to go through the appraisals of possibility and future expectation. The greater the perception of possibility and future expectation of something positive, the more intense hope people would feel. Comparing the two emotional appeals and their appraisal processes leads to testing the following hypotheses:

H1: Fear appeals lead to a higher threat appraisal (severity and susceptibility) than hope appeals.

H2: Hope appeals lead to **(a)** a higher positive possibility appraisal and **(b)** a higher positive future expectation appraisal than fear appeals.

H3: As threat appraisals (product of severity and susceptibility) increase so do feelings of fear.

H4: As **(a)** positive possibility appraisals and **(b)** positive future expectations appraisals increase so do feelings of hope.

H5: The presence of efficacy cues leads to a higher efficacy appraisal (product of self and response efficacy) relative to messages with no efficacy cues.

As mentioned earlier, findings in support of both the EPPM and TPH have been mixed and reveal the need for additional examination from an individual-differences perspective (Chadwick, 2015; Maloney et al., 2011; Popova, 2012; Witte & Morrison, 2000). For example, one study showed that the effects of fear appeals differed depending on other factors such as one's individualistic-collectivist cultural orientation (Murray-Johnson et al., 2001). Considering the shared value but different degrees of uncertainty in fear and hope, fear appeals and hope appeals are likely to have varied effects depending on how message receivers cope with uncertainty. Currently, for both types of emotional appeal, there is a lack of accounting for

individual differences such as uncertainty avoidance. Therefore, it will be worthwhile to explore how the tolerance to uncertainty or the level of uncertainty avoidance is related to the message receivers' response to the fear appeal and hope appeal messages.

Uncertainty Avoidance

People adjust to uncertainty in different ways (Hofstede, 1980, pp.111). Hofstede (1980) conceptualized uncertainty avoidance to be a cultural dimension that would capture national cultural attributes. According to Hofstede, uncertainty avoidance (UA) is the degree to which people feel threatened by uncertain or unknown situations (Hofstede, 2001, pp.161). That is, the extent to which individuals feel uncomfortable with unpredictability and ambiguity (De Meulenaer et al., 2015). In his research, Hofstede compared low and high uncertainty avoidance and how societal norms differ according to the degree of uncertainty avoidance (Hofstede, 1980, pp.112). Cultures that score high in uncertainty avoidance desire to minimize uncertainty because the uncertainty inherent in life is viewed as a continuous threat that must be fought (Hofstede, 2001, pp.161). High UA is characterized by the following: higher levels of stress, acceptance of aggressive behavior of self and others, less tolerance of unclear situations, strong need for consensus and structure. Furthermore, there is a strong belief in expertise and knowledge for problem solving, and accuracy is rewarded; there is a strong need for and adherence to rules and regulations to make behavior predictable. Conversely, low UA cultures are less concerned with uncertainty and relatively easily embrace the uncertainty inherent in life (Hofstede, 2001, pp.161). Low UA demonstrates the following characteristics: lower stress levels, aggressive behavior being frowned upon, and greater tolerance of uncertain situations and diversity. Moreover, there is a strong belief in general approaches to problem solving; innovative approaches are rewarded; rules are more flexible and adaptive; there is willingness to take

unknown risks. While Hofstede's theory about uncertainty avoidance is at a cultural/national level (Hofstede, 1980; Altuncu et al., 2012), it is also important to note that the degree of uncertainty avoidance can vary greatly within one culture or at an individual level (Jung, 2002).

Hullet and Witte (2001) applied the EPPM to the anxiety/uncertainty management (AUM) theory developed by Gudykunst and Hammer to explain how uncertainty and anxiety influence individuals' adaptive behaviors (Hullet & Witte, 2001). Just as individuals high in efficacy experience danger control and are more likely to take recommended actions, people high in attributional confidence enter the uncertainty control stage and are more likely to take action (adaptive behavior) (Hullet & Witte, 2001). Attributional confidence, similar to perceived efficacy, indicates one's perceived ability to predict what will happen if certain actions are performed and how well one thinks one can perform the actions for the desired outcome (Witte, 1993). Individuals are motivated to control or reduce their uncertainty when they believe they can predict what is coming and do not feel excessively anxious about it (Witte, 1993). Thus, for both the EPPM and its application to AUM, messages that provide efficacy and increase confidence in their ability to predict play a pivotal role in enhancing motivation to follow the recommended action (Hullet & Witte, 2001; Witte, 1993).

Considering the theoretical explanations of uncertainty avoidance and uncertainty reduction, it is likely that people with high UA require more detailed efficacy information and are more likely to actively look for ways to reduce uncertainty. It can be posited that the presence and type of efficacy information serve as a determining factor that affects persuasive outcomes.

Efficacy Specificity

Both fear appeals and hope appeals should include efficacy messages which are indispensable for inducing the intended persuasive outcome. Efficacy motivates individuals to

comply with messages given, such that more perceived efficacy leads to more positive attitudes and beliefs in the recommended behavior and message acceptance (De Meulenaer et al., 2015; Roskos-Ewoldsen, 2004). As discussed earlier, fear appeals and hope appeals are more effective when stronger efficacy messages are presented (Chadwick, 2015; Witte & Allen, 2000). Fear appeals create high uncertainty surrounding the threat but create certainty concerning the coping mechanism or when containing efficacy information (Boss et al., 2015). Compared to perceived threat and evoked fear, perceived efficacy plays a more critical role in persuasion and has a determining impact on behavior and intention (Ruiter et al., 2001). Efficacy-based messages can be constructed considering various factors. For example, past research has shown that self-efficacy can be determined by different factors or components such as the source of efficacy message, one's cognitive, motivation, and action capabilities to perform recommended behaviors (Prestin & Nabi, 2012). In this study's context, efficacy messages can be enhanced considering individuals' uncertainty avoidance levels. It is notable that when an individual faces highly uncertain decisions, they are motivated to increase information processing (Nabi, 2002; Tiedens & Linton, 2001). Thus, providing more specific efficacy information should lead to persuasive outcomes more so than general information, especially if people are high in uncertainty. In fact, Leventhal's classic fear appeal experiment varied specific relative to general recommended action plans, finding that individuals who received a strong fear appeal were more persuaded by specific action plans than general ones more likely to follow the recommended action (Leventhal et al., 1965). Likewise, Webb and Eves examined messages that that provided either specific consequences of stair use or general information showing that specific messages were more effective at increasing motivation (Webb & Eves, 2007). Of great import, Leventhal et al. included action plans such as directions to the inoculation clinic, but did not include efficacy

information (i.e., that inoculation is effective or that one can be confidence in their ability). Webb and Eves did provide information similar to response efficacy, but did not consider self-efficacy.

Here, efficacy specificity is defined as the degree to which efficacy messages convey details and concrete information rather than general (Feldman et al., 2006; Leventhal et al., 1965). The perception of efficacy specificity refers to the extent to which efficacy messages are perceived to contain detailed and clear information about what message receivers can do and how following it is effective for attaining the desired outcome. The level of message specificity or information specificity is a crucial factor in persuasive ad messages and their effectiveness (Feldman et al., 2006). Vague and abstract information is more likely to inhibit the message receiver's ability to envision a solution to a threat and make the claim less believable (Feldman et al., 2006). Considering the role of efficacy in emotional appeals, how specific efficacy messages are to the receiver can affect persuasive outcomes. In this research, the effectiveness of fear and hope appeals will be examined by measuring perceived message effectiveness and behavioral intention, since efficacy information of emotional appeals, particularly self-efficacy, is closely associated with intention and behavior (Bandura, 1997; Maddux & Rogers, 1983; Milne et al., 2000; Nabi & Myrick, 2019). Perceived message effectiveness is an estimate of the degree to which a persuasive message will be favorably evaluated by recipients of that message (Dillard & Peck, 2000; Dillard & Ye, 2008). Therefore, the following can be hypothesized.

H6: Specific efficacy cues in messages cause greater perceptions of efficacy specificity relative to general efficacy messages.

H7: Perceived efficacy specificity is positively correlated to **(a)** perceived message effectiveness (PME) and **(b)** behavioral intention.

Moreover, it can be inferred that depending on the level of individuals' uncertainty

avoidance, the effectiveness of fear appeals and hope appeals may differ by specific or general efficacy conditions. Extant research assists in hypothesizing about the relationships between uncertainty avoidance, message types, and efficacy specificity. First, high UA individuals seek greater assurance and are motivated to process more information (Nabi, 2002; Reardon et al., 2006; Tiedens & Linton, 2001). They are prone to more anxiety from uncertainty and are likely to feel greater fear when faced with a fear-inducing message compared to low UA individuals (Hofstede, 2001). Since fear represents a high degree of uncertainty, high UA individuals are inclined to look for more certainty and avoid risky conditions warned by the messages (De Meulenaer et al., 2015). They rely more on credible knowledge and require clarity and predictability (Hofstede, 2001; Vincent & Dubinsky, 2005). Without verbal specificity, individuals with high UA can hardly feel secure in their beliefs (Joost, 1952). Hence, high UA individuals will be more receptive to fear appeal messages that include concrete efficacy messages than low UA individuals. However, low UA individuals are more tolerant to ambiguity and risks, and thus how specific the efficacy messages are will be relatively less important to low UA individuals than to those with high UA.

H8: Uncertainty avoidance and perceived efficacy specificity will interact such that those high in UA will **(a)** perceive the message to be more effective (higher PME) and **(b)** have stronger behavioral intention when the message has specific efficacy messages relative to general efficacy messages. And, for those low in UA, there will be less difference in **(c)** PME and **(d)** behavioral intention based on the perceived specificity of messaging compared to those high in UA.

Reardon et al. (2006) revealed that for high UA individuals, negatively valenced advertisements showing a threat were more effective than positive ads. For low UA individuals,

positively valenced messages including a benefit were more effective than negative ads. In fact, in low UA cultures, people are more responsive to potential benefits than to threats (De Mooij, 2021; Reardon et al., 2006), they are more comfortable with uncertainty, open to change, and more innovative than high UA individuals (Hofstede, 2001, pp.161; Shane, 1995). Thus, they may be more likely to be responsive to hope messages that empower them to move forward and shape their own futures whether the specificity of efficacy message is high or low. However, in cultures with high UA where people seek stability and predictability (Hofstede, 2001), the vague and uncertain emotion of hope may not be as effective as with low UA people unless it provides concrete efficacy messages. Here, we examine UA as an individual difference variable and are not examining multiple nations or cultures. For high UA individuals, the uncertainty from the emotion of hope can be reduced through efficacy messages with high specificity. Considering the above, fear appeals and hope appeals, hinging on efficacy specificity, will have different persuasive effects (in terms of behavioral intention) on the message receivers with high UA or low UA. Therefore, the following hypotheses can be established:

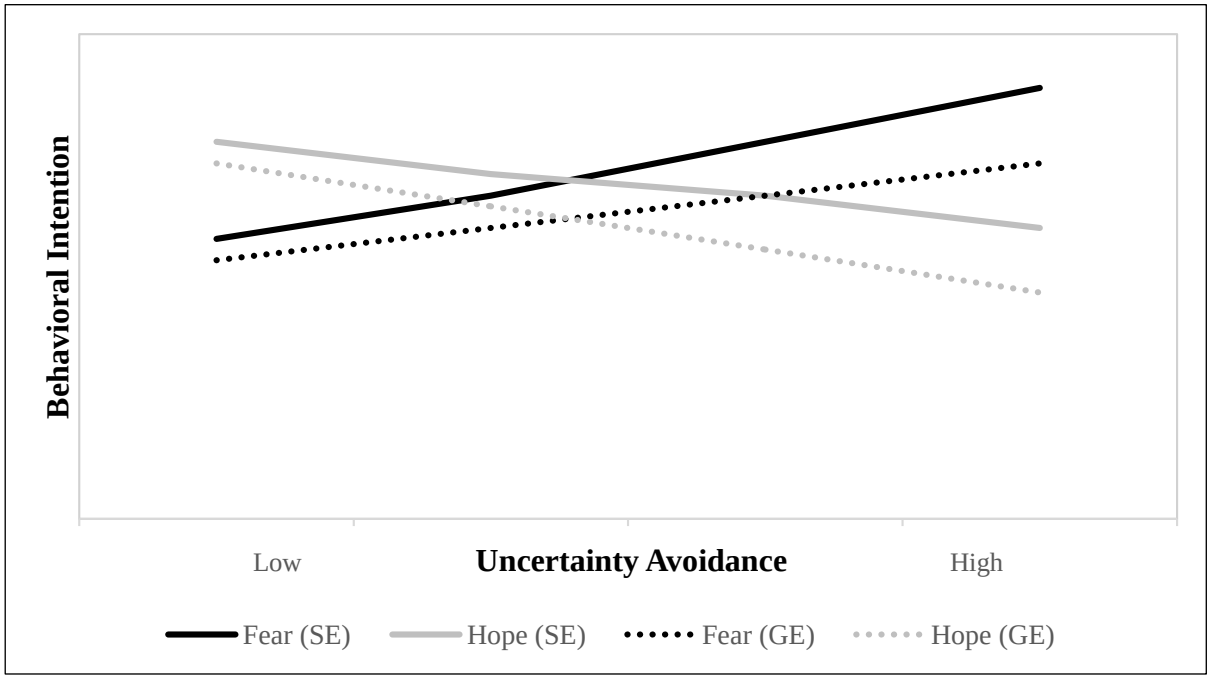
H9: Uncertainty avoidance and emotional appeal type will interact such that those high in UA will have higher **(a)** PME and **(b)** behavioral intention when they receive fear appeals relative to hope appeals. When participants are low in UA, they will have higher **(c)** PME and **(d)** behavioral intention when they receive a hope appeal relative to a fear appeal.

RQ1: Do uncertainty avoidance, perceived efficacy specificity, and emotional appeal type interact to affect **(a)** PME and **(b)** behavioral intention? Although no past research has examined such an interaction, we question whether (see Figure 1): When uncertainty avoidance is high and the message is perceived to be highly specific, will fear appeals will be more effective than hope appeals? When uncertainty avoidance is high and the message contains

general efficacy, will fear appeals be more effective than hope appeals? When uncertainty avoidance is low and the message contains specific efficacy, will hope appeals be more effective than fear appeals? When uncertainty avoidance is low does message specificity affect PME and intentions differently?

Figure 1

Hypotheses



Note: Fear = Fear appeal; Hope = Hope appeal; SE = Specific efficacy; GE = General efficacy.

METHOD

This experimental study looked at message receivers' responses to health-related posters that encourage people to take action to prevent or control type 2 diabetes. The study used a between-groups, randomized, factorial design with two experimentally induced variables and one measured independent variable: 2 (appeal type: fear, hope) X 2 (efficacy type: general, specific) X 2 (uncertainty avoidance: high, low). The participants were shown health posters embedded in an online survey and instructed to answer questions measuring the outcome variables. Prior to the main study, messages were pilot-tested for effectiveness in creating emotion and efficacy.

PILOT TEST 1

Participants

Adults in the United States who had been diagnosed with prediabetes or type 2 diabetes or had been told by a medical provider that they were at risk for type 2 diabetes were eligible to participate in the online experiment (N = 1,600). The participants were collected using Amazon Mechanical Turk (MTurk) for the survey called "A survey on health messages" and each of them was paid $1.50. Although 1,600 participants were collected, a total of 334 participants remained for analysis after the data cleaning process that eliminated bots and fraudulent or duplicate participants, specifically: those who (1) did not pass a bot-screening question (5% of 1,600), (2) failed an attention check (8%), (3) answered an open-ended question with out-of-context or random answers that showed the participant was not paying due attention, (4) answered the open-ended question exact (replicate) wording as other submissions, (5) participated in the survey two or more times repeatedly with the same MTurk IDs (3, 4, and 5 combined: 63%), and (6) completed the survey in too short (less than 4 minutes for the entire survey) or too long a time (more than 10 minutes to look at 1 poster) (4%). Some of the participants' IP addresses and location information indicated that they were outside the U.S. such as India and Russia. All such ineligible, low-quality, and suspicious submissions were cleared from the data. The participants in the final data set (N = 334) were composed of males (62%) and females (38%) and their average age was 33.22 years (SD = 9.15).

Procedures and Design

Pilot test 1 was conducted to determine whether the intended design and message of the health posters served their purpose and whether the scales had internal consistency. The participants were first shown informed consent and instructed to answer a pre-message item –

uncertainty avoidance. Then, they each were shown a poster that encouraged people to take action to prevent or control type 2 diabetes. We created 16 posters: 8 fear messages and 8 hope messages. The posters were created in the following steps. First, four types of posters were designed (nicknamed Middlename, Diabetes, Asianman, and Paragraphs) that feature varied pictures and messages. With each of the four types of posters, two appeal-type conditions (Fear and Hope) and two different efficacy-type conditions (General Efficacy and Specific Efficacy) were developed. After viewing a poster, participants answered post-message questionnaires regarding emotions, appraisals, and perceived message effectiveness as a dependent variable.

Measures

Uncertainty avoidance

UA was measured at individual levels and then the demographic questions asked about their cultural backgrounds. While Hofstede's scale is designed to examine the aggregate level of UA, individuals from the same country of origin may have a significantly varying degree of UA. Within a culture, some people can be highly uncertainty-avoidant or have certainty orientation, while others can be relatively low uncertainty-avoidant or have uncertainty orientation (Brouwers & Sorrentino, 1993). Therefore, UA at an individual level needed to be considered as well. Uncertainty avoidance was operationalized using a slightly modified version of Jung's (2002) six-item uncertainty avoidance scale on 7-point scales (Cronbach's α = .87, M = 5.31, SD = .99). An example of the six items is "I don't like to go into a situation without knowing what I can expect from it" (1 = strongly disagree, 7 = strongly agree). Throughout this paper, the reliability of each measure is reported with Cronbach's alpha (α).

Fear and hope

Chadwick's (2010) four-item scale was used for *fear* (α = .91, M = 4.98, SD = 1.37),

asking how much the message made them feel "fearful," "worried," and items on 7-point scales (1 = strongly disagree, 7 = strongly agree) and *hope* was also measured using Chadwick's (2010) four-item scale (α = .85, M = 5.59, SD = 1.03) that includes "positive" and "hopeful."

Threat

Threat appraisal was operationalized using Witte's (1996) six-item perceived threat scale (α = .81, M = 5.53, SD = .80). It included three *perceived severity* items (α = .72, M = 5.54, SD = 0.86) such as "I believe that diabetes is serious" and three *perceived susceptibility* items (α = .75, M = 5.54, SD = .95) including "I am at risk for getting diabetes" assessed on 7-point scales (1 = strongly disagree, 7 = strongly agree).

Efficacy specificity

To determine that participants viewed the posters and were attentive to the recommendations, participants were asked during the survey to answer an open-ended question asking what recommendations were presented on the poster. This question was used to see whether the participants were paying attention to the posters and what efficacy messages they remembered from viewing them. Perceived efficacy specificity was operationalized using a five-item measurement by Connors et al. (2017) and Pérez et al. (2020) (α = .69, M = 5.93, SD = .62) on 7-point scales. The examples are "Would you say the messages about recommended actions were abstract/concrete," "ambiguous/clear," and "not vivid/vivid."

Efficacy

Efficacy appraisal was measured using Witte's (1996) six-item perceived efficacy scale (α = .64, M = 5.63, SD = .66) on 7-point scales (1 = strongly disagree, 7 = strongly agree). Three *perceived self-efficacy* items (α = .48, M = 5.61, SD = 0.69) for example "I am able to follow the recommended behaviors to prevent or take control of (pre)diabetes" and three *perceived response*

efficacy items (α = .33, M = 5.60, SD = .72) including "Following the recommended behaviors works in preventing or taking control of (pre)diabetes" were assessed.

Goal congruence

From Chadwick's (2010) goal congruence measure, four items were used to assess appraisal of goal congruence (α = .64, M = 5.93, SD = .59). The examples are "Preventing or taking control of (pre)diabetes is consistent with my ideals" and "Preventing or taking control of (pre)diabetes is important to meeting my goals" which were assessed on a 7-point scale (1 = strongly disagree, 7 = strongly agree).

Importance

The appraisal of importance was measured using four items from Chadwick's (2010) importance scale (α = .68, M = 6.12, SD = .66). The items include "Preventing or taking control of (pre)diabetes is unimportant/important" and "of no concern/much of concern" on 7-point scales.

Possibility

The appraisal of possibility was measured using four items from Chadwick's (2010) appraisal of possibility scale (α = .70, M = 6.08, SD = .69). An example is "Preventing or taking control of (pre)diabetes is impossible/possible" and "improbable/probable" on 7-point scales.

Future expectation

The appraisal of future expectation was measured using four items from Chadwick's (2010) appraisal of future expectation scale (α = .73, M = 5.18, SD = .71). The items include "Preventing or taking control of (pre)diabetes will make the future wonderful" and "Preventing or taking control of (pre)diabetes creates a much better future" on 7-point scales (1 = strongly disagree, 7 = strongly agree).

Results

In the result sections of this paper, 1-tailed tests are reported throughout. When examining *fear* as a function of the emotional appeal type, there was no significant difference in felt fear based on exposure to the emotional appeal type (F (1, 318) = 1.22, p = .14). An examination of the means showed that those who were shown a fear appeal did experience slightly more fear (M = 5.20, SD = 1.24) than those who were shown the hope appeal (M = 5.00, SD = 1.35), but the difference did not reach significance. There was a near-significant main effect of poster type on felt fear (F (3, 318) = 1.99, p = .06). The Middlename poster (M = 5.08, SD = 1.27), Diabetes (M = 4.98, SD = 1.41), Asianman (M = 5.07, SD = 1.24), and Paragraphs (M = 5.11, SD = 1.29); showing the Paragraphs poster evoked the most fear. The ANOVA did not show any other main effects (for efficacy type) but did indicate a marginally significant (1-tailed) interaction effect of poster type by efficacy type on felt fear (F (3, 318) = 2.12, p = .05). As Table 2 shows, for the diabetes PSA, the specific efficacy increased fear more than the general efficacy PSA.

When examining *hope* as a function of the emotional appeal type, there was a significant difference in felt hope based on the exposure to the emotional appeal type (F (1, 318) = 4.56, p = .02). An examination of the means did reveal that people felt more hope when shown the hope appeal (M = 5.70, SD = 0.92) than when shown the fear appeal (M = 5.51, SD = 1.11). Also, the analysis showed a significant main effect for efficacy type (F (1, 318) = 5.37, p = .01). Specific efficacy (M = 5.63, SD = 0.99), relative to general efficacy (M = 5.55, SD = 1.04), induced more hope. There were no significant main effects with other variables or interaction effects of the types. As Table 1 shows, for the diabetes PSA, the hope appeal increased hope more than the fear appeal, and the specific efficacy message increased hope more than the general efficacy PSA.

When examining the appraisal of *threat*, there were no significant main effects or interaction effects in terms of efficacy type, emotional appeal type, and/or poster type.

When examining the function of *efficacy specificity* in connection with the efficacy type or emotional appeal type, there were no effects. Examining the other independent variables, there were still no main effects or interactions.

When examining the function of *efficacy* in connection with other variables, there was a significant main effect of poster type on efficacy (F (3, 318) = 2.21, p = .04). The Middlename ad (M = 5.58, SD = .59), Diabetes (M = 5.55, SD = .74), Asianman (M = 5.59, SD = .69), and Paragraphs (M = 5.77, SD = .61); showing that the Paragraphs resulted in the most efficacy. In addition, the analysis showed a significant interaction effect of emotional appeal type by efficacy type (F (1, 318) = 4.21, p = .02). See Table 1 for more information. There was no significant main effect with efficacy type.

When examining the appraisal of *goal congruence* with other variables, there was a significant effect of emotional appeal type on goal congruence (F (1, 318) = 2.72, p = .05). Also, there were significant interaction effects of efficacy type by emotional appeal type (F (1, 318) = 2.65, p = .05).

When examining the appraisal of *importance* with other variables, there were no significant main effects. However, there were significant interaction effects of efficacy type by emotional appeal type on importance (F (1, 318) = 3.12, p = .04) and of efficacy type by emotional appeal type by poster type (F (3, 318) = 3.08, p = .01).

When examining the appraisal of *possibility* in connection with the efficacy type or emotional appeal type, there were no effects. When including the other independent variables, there were still no main effects or interactions. However, there was a near-significant interaction

effect of poster type by efficacy type on efficacy (F (3, 313) = 2.02, p = .06). In addition, there was another near-significant interaction effect of emotional appeal type by efficacy type on efficacy (F (1, 313) = 2.2, p = .07).

When examining the appraisal of *future expectancy* in connection with the efficacy type or emotional appeal type, there were no effects. When including the other independent variables, there were still no main effects or interactions.

Uncertainty avoidance scores showed wide variance, ranging from very low to very high, from 1.67 to 6.67. Despite the existence of some low UA individuals, a large number clustered on and above the midpoint and was left-skewed with skewness of -1.12 and kurtosis of 1.31. In the analysis, two clusters – high and low – of UA were used.

Table 2

Pilot 1: Descriptive Statistics

		Fear Appeal		Hope Appeal	
Efficacy Type		General	Specific	General	Specific
Poster Type		M (SD)	M (SD)	M (SD)	M (SD)
Middlename	Fear	5.10 (1.40)	4.78 (1.30)	4.88 (1.48)	5.51 (1.09)
	Hope	5.30 (1.33)	5.67 (.61)	5.72 (.62)	5.70 (.83)
	Efficacy Specificity	5.93 (.50)	5.65 (.67)	5.74 (.59)	5.88 (.46)
	Efficacy	5.68 (.52)	5.29 (.48)	5.56 (.76)	5.61 (.54)
	Possibility	6.14 (.50)	5.86 (.49)	5.90 (.77)	6.07 (.48)
	Future Expectation	5.02 (.50)	4.86 (.44)	5.13 (.71)	5.23 (.62)
Diabetes	Fear	4.37 (1.79)	5.15 (.58)	4.22 (1.52)	5.19 (1.62)
	Hope	5.51 (1.23)	5.50 (.76)	5.41 (.87)	5.90 (.85)
	Efficacy Specificity	5.82 (.77)	5.88 (.53)	5.88 (.69)	6.03 (.70)
	Efficacy	5.38 (.91)	5.52 (.41)	5.47 (.70)	5.82 (.75)
	Possibility	5.76 (1.10)	5.96 (.63)	5.90 (.77)	6.32 (.70)
	Future Expectation	5.26 (.72)	4.98 (.62)	5.14 (.83)	5.38 (.91)
Asianman	Fear	5.09 (1.44)	5.25 (1.04)	4.77 (1.76)	4.61 (1.50)
	Hope	5.21 (1.66)	5.43 (1.15)	5.30 (1.24)	5.84 (.83)
	Efficacy Specificity	5.95 (.73)	5.94 (.72)	5.82 (.82)	5.96 (.60)
	Efficacy	5.78 (.59)	5.44 (.78)	5.42 (.77)	5.74 (.53)
	Possibility	6.34 (.62)	5,94 (.84)	6.06 (.73)	6.07 (.59)
	Future Expectation	5.33 (.80)	5.05 (.80)	5.06 (.88)	5.15 (.63)
Paragraphs	Fear	5.38 (.81)	5.29 (1.15)	5.13 (1.36)	5.16 (1.48)
	Hope	5.43 (1.03)	5.52 (1.20)	5.55 (.85)	6.11 (.63)

Table 2 (cont'd)

		Fear Appeal		Hope Appeal	
Efficacy Type		General	Specific	General	Specific
Poster Type		M (SD)	M (SD)	M (SD)	M (SD)
	Efficacy Specificity	5.83 (.50)	6.22 (.58)	5.99 (.53)	6.01 (.59)
	Efficacy	5.60 (.64)	5.83 (.77)	5.73 (.51)	5.90 (.50)
	Possibility	6.04 (.57)	6.29 (.62)	6.15 (.54)	6.25 (.69)
	Future Expectation	5.10 (.69)	5.31 (.72)	5.36 (.69)	5.27 (.61)

Discussion

Regardless of appeal type or poster type, all posters cause some degree of both fear and hope. This could be because fear appeal posters include efficacy messages that induce hope, and hope appeal posters inevitably induce some fear due to the topic of diabetes. However, fear appeal posters caused more fear in the viewers than hope appeal posters did, and hope appeal posters caused more hope than fear appeal posters did, which means the design of the two appeal types is effective. Also, in most cases, the posters with specific efficacy messages versus general efficacy messages led to greater felt hope in both fear appeals and hope appeals. When comparing the posters by efficacy types and their perceived efficacy, the specific efficacy messages induced greater efficacy than general efficacy messages did in both Diabetes and Paragraphs posters. However, it was very slightly so with Asianman posters and the opposite was true with the Middlename, which means that differential levels of efficacy specificity did not work well with those two poster types. Along with that, the analysis of posters and efficacy specificity also showed that the mean differences between the specificity of general efficacy and that of specific efficacy were minimal, signifying that the participants could not perceive general

messages to be general or specific messages to be specific. This could be because each individual has their own perspective or criteria of what is specific or general without any reference point. Therefore, the need to test the efficacy specificity of the messages arose. Also, a more balanced number of low-UA and high-UA individuals needed to be included in the study. In the second pilot test, the Diabetes and Paragraph posters were used with additional types of posters and the adjusted measures.

PILOT TEST 2

Participants

The participants of pilot 2 were collected on Prolific (N = 600) for an online experiment and survey called "A study about health communication." The eligibility of the participants was the same as in the first pilot test – people in the U.S. who had been diagnosed with prediabetes or type 2 diabetes or had been told by a medical provider that they were at risk for type 2 diabetes. The data cleaning was conducted in a similar process as in the first pilot test. Each participant recruited through Prolific was paid $1.50. Out of 600 initial participants, a large number were ineligible on the basis of not having prediabetes, diabetes, or being at risk (22% of 600) and failed an attention check (19%). Additionally, those who completed the survey in too short or too long a time were removed from the data (2%) and those who did not pass a bot-screening question (1%) were removed from the data. The participants in the final data set (N = 332) were composed of male (36%), female (63%), and prefer not to say (1%) with an average age of 40.71 years (SD = 13.36).

Procedures and Design

The purpose of pilot test 2 was to ensure effective design of the efficacy messages and emotion. The general efficacy posters were made to be even more general than in pilot 1 and specific efficacy posters were redesigned to have more detailed and specific messages that could increase efficacy. Also, new or additional features such as recommended behavior types and different color themes were included in the posters. A total of 16 posters were created based on a 2 (fear, hope) x 2 (general efficacy, specific efficacy) x 4 (poster [design] type). It was determined that assessing specificity of efficacy messages is best done when particpants can directly compare a specific message with a general message. Thus, message exposure was

designed as an A-B test. Each individual was randomly assigned to simultaneously examine a set of two posters – one general efficacy poster (Poster A) and one specific efficacy poster (Poster B) – side by side on the screen. For example, a person was shown two "Bluecard_Weight_Fear" posters, one with GE and the other with SE. Then, the person was asked to answer which poster had the most specific information about the recommendations encouraged and rate the efficacy specificity of each poster. The remainder of the procedures were the same as pilot 1. Other post-message questionnaires include emotions, appraisals, PME, and demographics.

Measures

The same measures in pilot 1 were used with an adjustment to the efficacy specificity scale. *Uncertainty avoidance* was operationalized using Jung's (2002) six-item uncertainty avoidance scale (α = .92, M = 5.41, SD = 1.11). *Fear* was measured using Chadwick's (2010) four-item scale (α = .96, M = 3.59, SD = 1.71), and *hope* was measured on the four-item scale (α = .95, M = 4.47, SD = 1.42). *Threat* was assessed with Witte's (1996) six-item perceived threat scale (α = .81, M = 5.81, SD = .68) that includes perceived severity (α = .81) and perceived susceptibility (α = .79). *Efficacy* was assessed using Witte's (1996) six-item perceived efficacy scale (α = .79, M = 5.41, SD = .81). Perceived self-efficacy was measured with three items (α = .79, M = 5.01, SD = 1.12) and perceived response-efficacy with the other three items (α = .89, M = 5.80, SD = .84). *Efficacy specificity* was assessed with the same five-item measurement by Connors et al. (2017) and Pérez et al. (2020) (α = .79, M = 7.56, SD = 1.27) but 11-point scales, from 0 to 10, were used to have a wider variance in efficacy specificity between general and specific. Poster A (general efficacy) (α = .94, M = 5.48, SD = 2.23) and Poster B (specific efficacy) (α = .89, M = 9.65, SD = 1.32) were each measured. As in pilot test 1, the same items from Chadwick's (2010) scales were used for measuring the appraisals of *goal congruence* (α

= .91, *M* = 5.96, *SD* = .84), *importance* (α = .90, *M* = 6.47, *SD* = .76), *possibility* (α = .92, *M* = 6.11, *SD* = .91), and *future expectation* (α = .90, *M* = 5.59, *SD* = .90). *PME* was operationalized using a four-item scale by Dillard & Peck (2000) and Dillard & Ye (2008) (α = .84, *M* = 5.16, *SD* = .89). PME of Poster A (α = .95, *M* = 4.30, *SD* = 1.36) and PME of Poster B (α = .93, *M* = 6.02, *SD* = .98) were each measured.

Results

When examining *fear* as a function of the emotional appeal type, there was a significance in felt fear based on exposure to the emotional appeal type (F (1, 324) = 56.05, p < .001). An examination of the means showed that those who were shown fear appeals experienced greater fear (*M* = 4.20, *SD* = 1.65) than those who were shown hope appeals (*M* = 2.92, *SD* = 1.50) did. Also, there was a significance in felt fear depending on the poster type (F (2, 324) = 4.73, p = .005). The comparison of means showed that among all four poster types, the "Green" posters (*M* = 3.54, *SD* = 1.65) caused the least fear relative to the other posters – Bluecard (*M* = 4.42, *SD* = 1.63), Yellowcard (*M* = 4.44, *SD* = 1.66), and Paragraphs (*M* = 4.46, *SD* = 1.54). Therefore, the Green posters would be eliminated in the main study since they do not cause enough fear. Importantly the hope appeals also caused fear, and this could be because diabetes itself is a risky health issue that causes at least some degree of fear. There were no other significant main effects or interaction effects.

When examining *hope* as a function of the emotional appeal type, there was a significance in felt hope based on exposure to the emotional appeal type (F (1, 324) = 22.47, p < .001). This means appeal type makes a difference in causing hope. The comparison of the means showed that those who were shown hope appeals experienced slightly more hope (*M* = 4.85, *SD* = 1.37) than those who were shown fear appeals (*M* = 4.13, *SD* = 1.39) did. The

ANOVA did not show any other main effects (for poster type). All four types of posters scored almost the same degree of felt hope, with the "Bluecard" posters evoking the most hope (M = 5.02, SD = .93). Both fear appeals and hope appeals showed felt hope, which is likely because both appeal types involve efficacy messages that induce feelings of hope. There were no significant interaction effects as well.

In the analysis of perceived *threat* with other variables, no significant main effects or interaction effects were observed.

When examining perceived *efficacy* with poster type and appeal type, there were no significant main effects or interaction effects on efficacy (combination of self and response efficacy) and on self-efficacy. However, there was a significant effect of appeal type on response efficacy (F (1, 324) = 2.59, p = .05).

For analyzing perceived *efficacy specificity* of each poster with PME, a paired-samples T-test was used. Poster B with specific efficacy (M = 9.67, SD = 1.29) scored much higher efficacy specificity than Poster A with general efficacy messages (M = 5.48, SD = 2.23).

Both appeal types are *goal congruent* and nothing was expected to be significant. As expected, the result showed that there were no significant main effects. The interaction of appeal type and poster type has shown a significant effect (F (3, 323) = 1.82, p = .07).

Both fear appeals and hope appeals bear messages of high *importance* to the viewers. The analysis showed there were no significant main effects or interaction effects.

Both fear and hope are emotions characterized by high *possibility*. Hope appeals, in particular, work through the appraisal of possibility. The result showed there was no significance in appeal type, which means both fear appeals and hope appeals cause perceptions of possibility. That could be because efficacy causes possibility as well and there was no condition without any

efficacy message. Thus, in the next study, another control group with no efficacy message should be included. There were no significant main effects or interaction effects.

When examining the appraisal of *future expectation* in connection with emotional appeal type or poster type, there were no effects. Future expectation was nearly the same for both fear appeals ($M = 5.58$, $SD = .89$) and hope appeals ($M = 5.61$, $SD = .90$). This also could be because efficacy messages create possibility and future expectation. Here, hope is not caused through the appraisals. When the effects of general efficacy (Poster A) and specific efficacy (Poster B) on future expectation were analyzed, specific efficacy showed a significant effect (F (1, 321) = 22.79, $p < .001$) while general efficacy had no significant effect.

Uncertainty avoidance scores showed wider variance, ranging from 1 to 7 with skewness of - .91 and kurtosis of .89. In the analysis, two clusters – high and low – of UA were used.

PME was analyzed with paired-samples T-test for Poster A and Poster B respectively. Poster B with specific efficacy ($M = 6.02$, $SD = .98$) scored much higher PME than Poster A with general efficacy messages ($M = 4.30$, $SD = 1.36$).

Discussion

People perceived specific efficacy posters to be more specific than general, and general efficacy posters to be more general than specific. Each poster by emotional appeal type induced corresponding emotions as intended. In this pilot test 2, it turned out that the behavior type did not matter significantly to anything. The “Bluecard,” “Yellowcard,” and “Paragraphs” were selected to continue to be used in the main study. Also, it was concluded that a “no efficacy” (NO) condition, in addition to GE and SE conditions, would be needed in order to gain a clearer understanding of the effects of efficacy and the appraisal processes in hope appeals. UA levels

were still generally high, which is understandable because it is normal for humans to want to avoid uncertainty. It could also be partly because the scale items could have greatly affected the high means of UA variable. Thus, the measurement and scales of UA would need further adjustment in the main study.

MAIN STUDY

Participants

Participants (N = 900) were recruited through Prolific for an online experiment and survey called “A study about prediabetes/type 2 diabetes communication” which paid each person $1.50. Adults in the US who had been diagnosed with prediabetes or type 2 diabetes or had been told by a medical provider that they were at risk for type 2 diabetes were eligible. During the data cleaning process, those who answered an open-ended question with out-of-context or random answers that showed the participant was not paying due attention (3% of 900), failed an attention check (3%), and were ineligible on the basis of not having prediabetes, diabetes, or being at risk (2%) were removed from the data. Many more participants were retained in this final study than in pilot tests because the quality and commitment of the participants were overall better than in pilot tests and also because people who left the open-ended question with blank were included considering that its purpose was not to test their ability to memorize and they were not required to answer it for the completion of the survey. The participants in the final data set (N = 834) were composed of males (42%) and females (57%) with the average age of 44.04 years (SD = 13.36). The demographic information of the main study participants is shown in Table 3.

Table 3

Main Study: Participant Demographics

Item		n (%)	M (SD)
Birth Sex	Male	354 (42.4)	
	Female	475 (57)	
	Intersex	1 (.1)	
	Prefer not to say	3 (.4)	
Age		834	44.04 (13.36)
Body Mass Index (BMI)		829	31.54 (15.28)
Marital Status	Married	393 (47.1)	
	Not Married	441 (52.9)	
Education	Less than high school	7 (.8)	
	Completed high school	89 (10.7)	
	In college	23 (2.8)	
	Completed college	134 (16.1)	
	Associate degree	110 (13.2)	
	Bachelor's degree	312 (37.4)	
	Competed postgraduate	11 (1.3)	
	Master's degree	120 (14.4)	
	PhD/JD/MD	25 (3)	
	Other advanced degree	3 (.4)	
Country of Origin (oneself)	US	772 (92.6)	
	Outside the US	62 (7.4)	
Country of Origin (one's parents)	US	684 (82)	
	Outside the US	150 (18)	

Procedures and Design

A randomized, between-subjects experiment was employed based on a 2 (fear, hope) x 3 (no efficacy cues, general efficacy, specific efficacy) design. Similar to the previous pilot tests, participants were first instructed to answer pre-message questionnaires – personal relevance to

the issue and uncertainty avoidance levels. Then, they were exposed to manipulated messages. Finally, they answered post-message questionnaires about their feelings (emotions), efficacy specificity, appraisals (threat, efficacy, goal congruence, importance, possibility, and future expectation), dependent variables (PME and behavioral intention), and demographics.

During the message exposure, each group saw three different posters that are same appeal type and same efficacy type. This was intended to enhance the induction and realism of posters. For example, a participant assigned to fear appeals with general efficacy group viewed three posters one after another, all three of which had fear appeal and general efficacy messages but with variations in wording and background graphics. Another participant assigned to fear appeal with specific efficacy group viewed three posters, all of which had fear appeal and specific efficacy messages but with the same variations in wording and backgraound graphics as in other groups. *Fear appeals with no efficacy* group saw three posters showing fear-arousing messages that stress the severity and susceptibility of type 2 diabetes and recommended behaviors like "lower your body weight and exercise more." *Fear appeals with general efficacy* group were shown the same three posters as in no efficacy group, but with a general degree of efficacy messages added such as "many people are doing little things like moving more to increase their activity. They find it simple and doable. You can do this!" *Fear appeals with specific efficacy* group was presented with the same three posters as in no efficacy group, but with the addition of specific efficacy messages, for example, "people just like you are doing simple activities like parking farther away, taking the stairs, using a standing desk, or exercising with friends. They find it easy, free of cost, and doable. You can do this!" and "people who lost 5-7% of their weight and added just 20 minutes of exercise per day cut their risk of type 2 diabetes by up to 60-70%." *Hope appeals with no efficacy* group saw three posters showing

hope-instilling messages that highlight positive future expectation and possibility and include recommended behaviors like “lower your body weight and exercise more.” *Hope appeals with general efficacy* group were shown the same three posters as in no efficacy group, but that included general degree of efficacy messages such as “many people are doing little things like moving more to increase their activity. They find it simple and doable. You can do this!” *Hope appeals with specific efficacy* group was presented with the same three posters as in no efficacy group, but with the addition of specific efficacy messages, for example, “people just like you are doing simple activities like parking farther away, taking the stairs, using a standing desk, or exercising with friends. They find it easy, free of cost, and doable. You can do this!” and “people who lost 5-7% of their weight and added just 20 minutes of exercise per day cut their risk of type 2 diabetes by up to 60-70%.” (See Appendix A for the poster content.)

Measures

Confirmatory factor analysis was conducted with each scale to determine unidimensionality. Items were removed based on this analysis, as reported below (see Table 4). A covariate is personal relevance, dependent variables are uncertainty avoidance, fear, hope, and all the appraisals including efficacy specificity, and independent variables are perceived message effectiveness and behavioral intentions.

Personal relevance

Prior to viewing the posters, participants rated personal relevance of pre- or type 2 diabetes issues with four items from Nabi & Myrick (2019) assessed on 7-point Likert scales (1 = Strongly Disagree, 7 = Strongly Agree). This variable is used as a covariate in the analysis. The in-depth statistical analysis showed that the first two items of the four and the last two items were conceptually slightly different [CFI = .80, $RMSEA$ = .54, $SRMR$ = .14]. Therefore, only the

first two items were used in the analysis (α = .87, M = 6.31, SD = .86) which include "Prediabetes or diabetes issue is relevant to me" and "Prediabetes or diabetes issue is important to me."

Uncertainty avoidance

After the personal relevance questions, UA levels were measured at individual levels with 11 items from Altuncu et al. (2012), Jung (2002), and Quintal et al. (2010) on 0-100 slider scales (0 = Completely Disagree, and 100 = Completely Agree). The statistics showed that some of the items needed to be excluded [CFI = .80, $RMSEA$ = .16, $SRMR$ = .09]. The refined scale of 6 items showed more improved validity [CFI = .98, $RMSEA$ = .09, $SRMR$ = .04] (α = .89, M = 76.70, SD = 16.84). UA was classified into three groups – low UA, moderate UA, and high UA. The analysis focused mainly on low UA and high UA groups to make sure distinct variances between the low and high levels. The examples of the six items include "I dislike unpredictable situations" and "It is important to have instructions spelled out in detail so that I always know what to do." The summary of the reliability and validity of each variable is presented in Table 3.

Fear and hope

After message exposure, emotions were measured using Chadwick (2010)'s scales. For fear, 4 items were used that include "fearful" and "afraid" on 7-point scales [CFI = .97, $RMSEA$ = .29, $SRMR$ = .02] (α = .96, M = 3.98, SD = 1.92). Hope was measured with 4 items that include "positive" and "hopeful" on 7-point scales [CFI = 1, $RMSEA$ = 0, $SRMR$ = 0] (α = .96, M = 4.45, SD = 1.81). Additionally, other four emotional items such as "angry" and "sad" were included in the survey. The emotion scales serve as a manipulation check for emotional appeal type.

Threat

Perceived threat was operationalized using the measurement developed by Witte (1996),

6 items in total [*CFI* = .68, *RMSEA* = .33, *SRMR* = .19] (α = .77, *M* = 6.10, *SD* = .74). The analysis showed that severity appraisal items and susceptibility appraisal items needed to be separated and handled as separate constructs. The three *perceived severity* items ("I believe that diabetes is serious") (α = .90, *M* = 6.50, *SD* = .69) and three *perceived susceptibility* items ("I will likely get diabetes") (α = .80, *M* = 5.70, *SD* = 1.13) were assessed on 7-point scales. The multiplicative index of the two concepts, severity and susceptibility, was used in the analysis (a minimum of 0 and maximum of 49).

Efficacy specificity

To determine that participants viewed the posters and were attentive to the recommendations, participants were asked during the survey to answer an open-ended question about what recommendations were presented on the set of posters. This question was used to see whether the participants were paying attention to the posters and what efficacy messages they remembered from viewing them. 14% of the entire participants responded that they do not remember or left the answer box blank and the majority of participants recalled the recommendations. Perceived efficacy specificity was assessed with a modified version of the five-item measurement by Connors et al. (2017), Pérez et al. (2020), and Witte et al. (1996) ("Would you say the messages about the recommended actions were abstract/concrete") on 1-10 scales between the two ends. [*CFI* = .96, *RMSEA* = .04, *SRMR* = .24] (α = .92, *M* = 8.20, *SD* = 1.83). These serve as a manipulation check for efficacy specificity type.

Efficacy

Using the measure developed by Witte (1996), perceived efficacy was assessed on a 7-point scale with 6 items total [*CFI* = .70, *RMSEA* = .38, *SRMR* = .18] (α = .87, *M* = 5.61, *SD* = .96). The analysis showed that self-efficacy appraisal items and response efficacy appraisal

items needed to be separated and handled as separate constructs. The three *perceived self-efficacy* items ("I am able to follow the recommended behaviors to prevent or take control of (pre)diabetes.") (α = .88, M = 5.27, SD = 1.26) and three *perceived response efficacy* items ("Following the recommended behaviors works in preventing or taking control of (pre)diabetes.") (α = .93, M = 5.94, SD = .98) were assessed. The multiplicative index of the two concepts, self-efficacy and response efficacy, was used in the analysis (a minimum of 0 and a maximum of 49).

Goal congruence

From Chadwick's (2010) measure, four items were used to assess the appraisal of goal congruence ("Preventing or taking control of (pre)diabetes is consistent with my ideals") on 7-point scales [CFI = .93, $RMSEA$ = .33, $SRMR$ = .04] (α = .92, M = 6.25, SD = .79).

Importance

From Chadwick's (2010) measure, four items were used to assess the appraisal of importance ("Preventing or taking control of (pre)diabetes is unimportant/is important") on 7-point scales [CFI = 1, $RMSEA$ = .06, $SRMR$ = .01] (α = .90, M = 6.56, SD = .76).

Possibility

From Chadwick's (2010) measure, four items were used to assess the appraisal of possibility ("Preventing or taking control of (pre)diabetes is impossible/possible") on 7-point scales [CFI = 1, $RMSEA$ = .08, $SRMR$ = .01] (α = .94, M = 6.19, SD = .99).

Future expectation

From Chadwick's (2010) measure, four items were used to assess the appraisal of future expectation ("Preventing or taking control of (pre)diabetes will make the future wonderful") on 7-point scales [CFI = .99, $RMSEA$ = .15, $SRMR$ = .02] (α = .92, M = 6.15, SD = .85).

Perceived message effectiveness

PME, a dependent variable, was assessed with the five-item measurement by Dillard & Peck (2000) and Dillard & Ye (2008) ("Overall, the group of posters I saw were not persuasive/persuasive") on 7-point scales [*CFI* = 1, *RMSEA* = 0, *SRMR* = 0] (α = .95, *M* = 5.76, *SD* = 1.31).

Behavioral intention

Behavioral intention, a dependent variable, was measured using scales from Ajzen et al. (2011), Ajzen (2015), and Lapinski et al. (2007) with 11 items total [*CFI* = .63, *RMSEA* = .33, *SRMR* = .16] (α = .94, *M* = 5.73, *SD* = 1.03). The posters encouraged three different types of behaviors that engage in preventing or taking control of type 2 diabetes in this study: (1) increasing physical activities (2) having more fruits and vegetables and (3) losing weight. Therefore, the items were grouped into three according to each behavior type. The four *BI_Physical Activity* items ("I intend to do more physical activity") [*CFI* = 1, *RMSEA* = .11, *SRMR* = .01] (α = .96, *M* = 5.77, *SD* = 1.14), four *BI_Physical Activity* items ("I am planning to add more vegetables and fruit to my diet") [*CFI* = .99, *RMSEA* = .12, *SRMR* = .01] (α = .97, *M* = 5.80, *SD* = 1.22), and three *BI_Physical Activity* items ("I plan to lose some weight") (α = .87, *M* = 5.56, *SD* = 1.36) were assessed, all on 7-point scales. CFA was not conducted for measures that have three items or less.

Table 4

Main Study: Reliability and Validity of Variables

	Cronbach's α	M (SD)	CFI	RMSEA	SRMR
Relevance	.87	6.31 (.86)			
UA	.89	76.70 (16.84)	.98	.09	.04
Fear	.96	3.98 (1.92)	.97	.29	.02
Hope	.96	4.45 (1.81)	1	0	0
Efficacy specificity	.92	8.20 (1.83)	.96	.04	.24
Severity	.90	6.50 (.69)			
Susceptibility	.80	5.70 (1.13)			
Self-efficacy	.88	5.27 (1.26)			
Response efficacy	.93	5.94 (.98)			
Goal congruence	.92	6.25 (.79)	.93	.33	.04
Importance	.90	6.56 (.76)	1	.06	.01
Possibility	.94	6.19 (.99)	1	.08	.01
Future expectation	.92	6.15 (.85)	.99	.15	.02
PME	.95	5.76 (1.31)	1	0	0
BI (combined)	.94	5.73 (1.03)	.63	.33	.16
BI1_Physical Activity	.96	5.77 (1.14)	1	.11	.01
BI2_Fruits and Veggies	.97	5.80 (1.22)	.99	.12	.01
BI3_Losing Weight	.87	5.56 (1.36)			

Note. No reverse-coded items are included.

RESULTS

H1: Fear appeals lead to a higher threat appraisal (severity and susceptibility) than hope appeals.

To investigate the appraisal processes in the two emotional appeals, the mean differences in each appeal type were compared. The ANOVA showed that appeal type did not have a main effect on threat appraisals (product of severity and susceptibility). Both fear appeals (n = 419, M = 37.41, SD = 9.09) and hope appeals (n = 414, M = 37.10, SD = 8.99) caused the same level of threat. Thus, H1 was not supported.

H2: Hope appeals lead to (a) a higher positive possibility appraisal and (b) a higher positive future expectation appraisal than fear appeals.

For H2, only the "no efficacy" group was considered analyzed as the efficacy cues could cause these appraisals. The ANOVA showed no significant main effects of appeal type on goal congruence, importance, possibility, and future expectation appraisals. Also, the independent T-test showed no significant difference in means by the appeal type as seen in Table 5. The appraisals were statistically the same for both fear appeals and hope appeals when efficacy was at zero. The participants reported very high scores for all of the four appraisals regardless of the appeal type. Therefore, both H2 (a) and (b) were not supported.

Table 5

Main Study: Group Statistics for Appraisals

	Appeal Type	n	M (SD)
Theat (severity*susceptibility)	Fear appeal	140	37.56 (9.17)
	Hope appeal	139	37.06 (8.86)
Goal congruence	Fear appeal	140	6.09 (.88)
	Hope appeal	139	6.22 (.80)
Importance	Fear appeal	140	6.53 (.71)
	Hope appeal	139	6.50 (.84)
Possibility	Fear appeal	138	6.07 (1.04)
	Hope appeal	138	6.22 (1.07)
Future expectation	Fear appeal	140	6.04 (.95)
	Hope appeal	139	6.13 (.81)

Note. This table concerns only "no efficacy" groups.

H3: As threat appraisals (product of severity and susceptibility) increase so do feelings of fear.

An ANOVA showed that appeal type had a significant main effect on felt fear (F (1, 831) = 572.72, $p < .001$). For ANOVA, personal relevance was controlled for throughout. As intended, the feeling of fear was greater in fear appeals (M = 5.20, SD = 1.44) than in hope appeals (M = 2.75, SD = 1.52). Notably, threat appraisals (product of severity and susceptibility) and fear were positively correlated, r (831) = .10, p = .002, as shown in Table 6. Thus, as threat appraisals increase feelings of fear increase, which supports H3. It is possible that the messages caused fear and fear increased the appraisals.

H4: As (a) positive possibility appraisals and (b) positive future expectations appraisals increase so do feelings of hope.

Appeal type had a significant main effect on hope (F (1, 831) = 307.76, $p < .001$). As

expected, the feeling of hope was greater in hope appeals (M = 5.39, SD = 1.37) than in fear appeals (M = 3.52, SD = 1.71). Possibility appraisals and hope were positively correlated, r (825) = .27, p < .001 (see Table 6 for correlation). Future expectation appraisals and hope were also positively correlated, r (832) = .23, p < .001. Thus, as possibility appraisals and future expectation appraisals increase feelings of hope also increase, which supports H4 (a) and H4 (b). Again, it might be that the messages caused hope and feelings of hope increase appraisals.

H5: The presence of efficacy cues leads to a higher efficacy appraisal (product of self and response efficacy) relative to no efficacy cues in the message.

The examination of the means showed that the more efficacy cues, the higher the efficacy appraisal. The group that received specific messages reported the highest efficacy (M = 33.11, SD = 10.84), followed by the general group (M = 31.95, SD = 10.25), which then followed by the no efficacy group (M = 30.67, SD = 10.23). The ANOVA showed that efficacy type had a significant main effect on efficacy (product of self-efficacy and response efficacy) (F (2, 831) = 3.81, p = .01). Thus, H5 was supported.

H6: Specific efficacy cues in messages cause greater perceptions of efficacy specificity relative to general efficacy messages.

As predicted, efficacy type causes perceptions that the message is specific. The group receiving specific messages was higher in perceived efficacy specificity (M = 8.60, SD = 1.56) relative to the general group (M = 8.00, SD = 1.92) and the no efficacy group (M = 8.00, SD = 1.92). The efficacy type had a significant main effect on the perception of efficacy specificity (F (2, 831) = 10.12, p < .001). This supported H6.

H7: Perceived efficacy specificity is positively correlated to (a) perceived message effectiveness (PME) and (b) behavioral intention.

The more specific the message was perceived to be, the more effective the message was perceived to be. The correlation shows as perceived efficacy specificity increases, PME increases ($r = .49$, $p < .001$) (see Table 6). Behavioral intention was examined with three different behaviors – physical activity, more fruits and vegetables, and weight loss. As expected, as perceived efficacy specificity increases, so do physical activity ($r = .25$, $p < .001$), fruits and vegetables ($r = .22$, $p < .001$), and losing weight ($r = .24$, $p < .001$). In the case of the combined variable of the three behaviors, as perceived efficacy specificity increases, combined behavioral intentions also increases ($r = .28$, $p < .001$). Interestingly, although the messages did not directly cause intentions, there are positive correlations between perceived efficacy specificity and all three behavioral intentions showing an association between the perception variables. As PME increases, BI increases ($r = .55$, $p < .001$). It is likely that the relationship between efficacy specificity messages and intentions is mediated by perception of efficacy specificity (see Figure 2). Thus, H7 (a) and (b) were supported.

Table 6

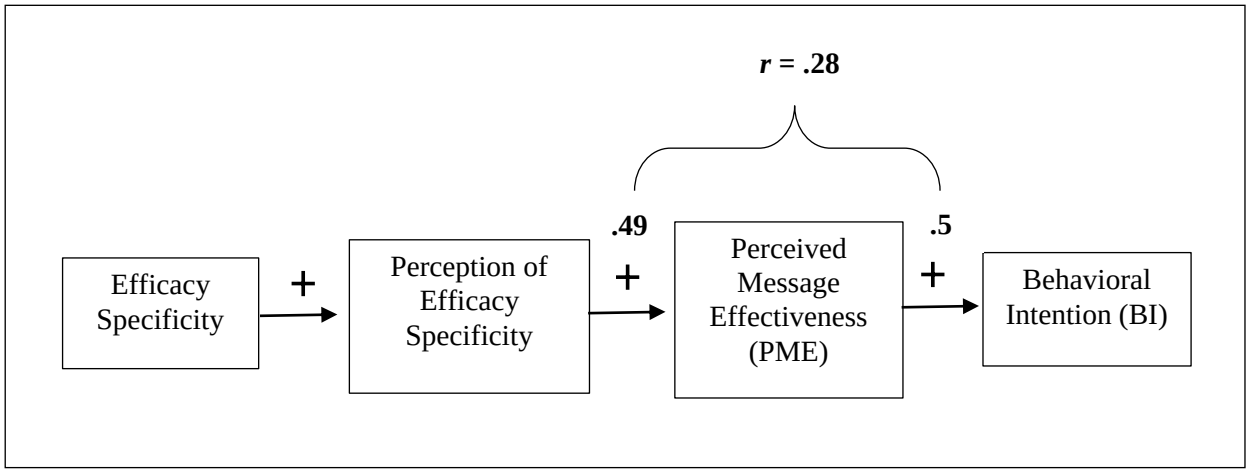
Main Study: Correlations

		Efficacy Specificity	Efficacy	PME	BI (1) (physical activities)	BI (2) (fruits/ vegetables)	BI (3) (losing weight)
Efficacy Specificity	Pearson Correlation	--					
Efficacy	Pearson Correlation	.333**	--				
	Sig.	<.001					
PME	Pearson Correlation	.492**	.401**	--			
	Sig.	<.001	<.001				
BI (1) (physical activities)	Pearson Correlation	.246**	.549**	.515**	--		
	Sig.	<.001	<.001	<.001			
BI (2) (fruits/ vegetables)	Pearson Correlation	.224**	.483**	.497**	.662**	--	
	Sig.	<.001	<.001	<.001	<.001		
BI (3) (losing weight)	Pearson Correlation	.238**	.304**	.364**	.477**	.492**	--
	Sig.	<.001	<.001	<.001	<.001	<.001	

Note. Correlation is significant at the 0.01 level (1-tailed). Efficacy is a multiplication of self-efficacy and response efficacy. PME refers to perceived message effectiveness. BI refers to behavioral intention.

Figure 2

Mediation of Perception of Efficacy Specificity



H8: Uncertainty avoidance and perceived efficacy specificity will interact such that those high in UA will (a) perceive the message to be more effective (higher PME) and (b) have stronger behavioral intention when the message has specific efficacy messages relative to general efficacy messages. And, for those low in UA, there will be less difference in (c) PME or (d) behavioral intention based on the specificity of messaging compared to those high in UA.

To create a low and high UA groups, a k-means cluster analysis was conducted. This analysis allows us to examine groups that are truly distinctive in UA and not randomly separated by a mean or median. We inserted UA as the clustering variable and asked to create 3 groups. This was to ensure that high and low UA were not inclusive of moderate UAs. The clusters converged in 10 iterations (F (2) = 2001.85, $p < .001$). The low UA group had a mean of 41.72 (n = 88), the moderate was 69.60 (n = 335) and the high UA (n = 411) had a mean of 89.89.

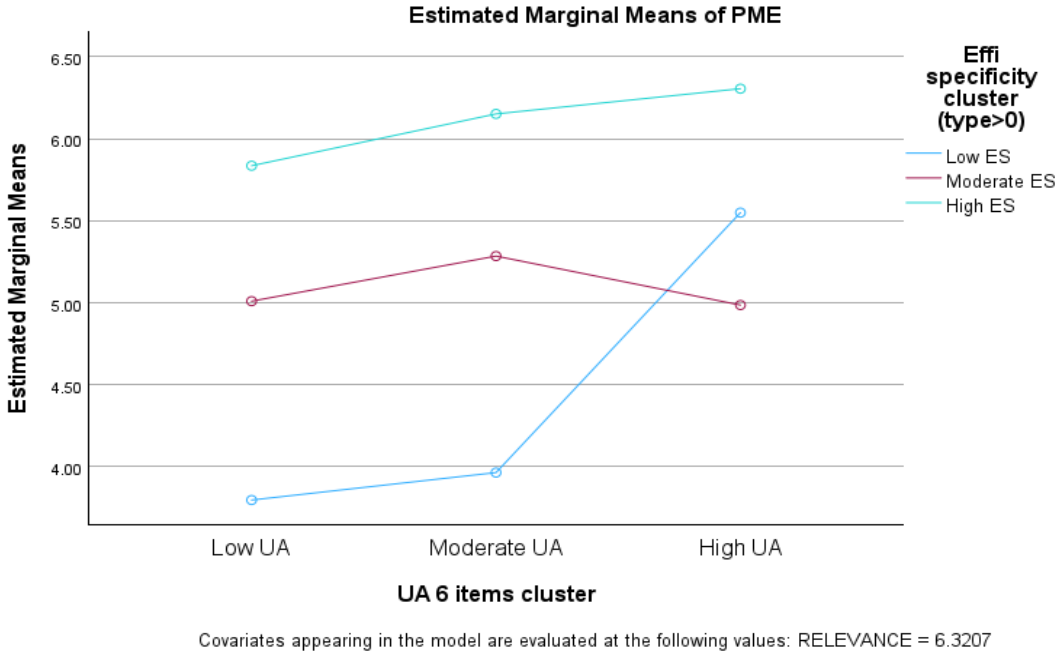
Since the hypotheses pertain to general and specific efficacy, we also created perceived specificity clusters using the same k-means procedures. The no efficacy group was not included in this analysis. The clusters converged in 6 iterations (F (2) = 2086.06, $p < .001$). The low

efficacy specificity group had a mean of 3.37 (n = 53), the moderate was 6.99 (n = 274) and the high efficacy specificity (n = 507) had a mean of 9.36. These clustered variables were entered as the independent variables in the ANOVAs that follow.

An ANOVA showed that the UA cluster had a significant main effect on *PME* (F (2, 545) = 5.23, p = .01) such that high UAs had higher PME (M = 5.96, SD = 1.28) relative to moderate (M = 5.66, SD = 1.25) and low (M = 5.41, SD = 1.54) UAs. Also, the efficacy specificity cluster had a significant main effect on PME (F (2, 545) = 40.65, p < .001). High efficacy specificity had higher PME (M = 6.22, SD = 1.09) relative to moderate (M = 5.09, SD = 1.22) and low (M = 4.64, SD = 1.82) perceived efficacy specificity. However, these main effects are superseded by a significant interaction effect of the UA cluster by efficacy specificity cluster on PME (F (4, 545) = 3.82, p = .002). Highly specific efficacy messages worked the best for everyone regardless of their UA levels. For people with high UA, messages with high efficacy specificity worked the best (M = 6.34, SD = 1.04) followed by low efficacy specificity (M = 5.61, SD = 1.28) and moderate efficacy specificity (M = 4.96, SD = 1.33). For people with low UA, messages with high efficacy specificity worked the best (M = 5.83, SD = 1.52) followed by moderate efficacy specificity (M = 4.97, SD = 1.15) and low efficacy specificity (M = 3.58, SD = 2.63) (see Figure 3). The above results support H8 (a) and do not support H8 (c).

Figure 3

The Effects of UA and Perceived Efficacy Specificity on PME



When examining the effects on the *intention to increase physical activities* (see Figure 4), the UA cluster had a significant main effect on the intention to increase physical activities (F (2, 545) = 3.43, p = .02) such that high UAs had higher intention (M = 5.88, SD = 1.12) relative to moderate (M = 5.75, SD = 1.02 and low (M = 5.61, SD = 1.38) UAs. The efficacy specificity cluster also had a significant main effect on the intention (F (2, 545) = 11.21, p < .001). High efficacy specificity had higher intention (M = 5.98, SD = 1.09) relative to moderate (M = 5.48, SD = 1.07) and low (M = 5.60, SD = 1.22) perceived efficacy specificity. In addition, there was a near significant interaction effect of the UA cluster by efficacy specificity cluster on the intention (F (4, 545) = 1.82, p = .06). For high UA people, messages with high efficacy specificity worked the best (M = 5.99, SD = 1.13) followed by low efficacy specificity (M = 5.61, SD = 1.32) and moderate efficacy specificity (M = 5.60, SD = 1). For people with low UA, messages with high

efficacy specificity worked the best (M = 5.99, SD = 1.19) followed by moderate efficacy specificity (M = 5.19, SD = 1.41) and low efficacy specificity (M = 4.08, SD = 1.89). When it comes to the *intention to have more fruits and vegetables* (see Figure 5), the UA cluster had a significant main effect on the intention to have more fruit and vegetables (F (2, 545) = 8.11, p < .001) such that high UAs had higher intention (M = 5.98, SD = 1.19) relative to moderate (M = 5.79, SD = 1.02 and low (M = 5.14, SD = 1.77) UAs. Also, the efficacy specificity cluster had a significant main effect on the intention to eat more fruits and vegetables (F (2, 545) = 8.35, p < .001). High efficacy specificity had higher intention (M = 5.98, SD = 1.19) relative to moderate (M = 5.55, SD = 1.21) and low (M = 5.31, SD = 1.57) perceived efficacy specificity. There was no significant interaction effect. For high UA people, messages with high efficacy specificity worked the best (M = 6.10, SD = 1.19) followed by low efficacy specificity (M = 5.86, SD = 1.38) and moderate efficacy specificity (M = 5.65, SD = 1.13). For people with low UA, messages with high efficacy specificity worked the best as well (M = 5.47, SD = 1.56) followed by moderate efficacy specificity (M = 4.81, SD = 1.90) and low efficacy specificity (M = 3.58, SD = 2.63). Examining the effects on the *intention to lose weight* (see Figure 6), the UA cluster had a moderately significant main effect on the intention to lose weight (F (2, 545) = 2.31, p = .05) such that high UAs had higher intention (M = 5.70, SD = 1.40) relative to moderate (M = 5.51, SD = 1.28) and low (M = 5.13, SD = 1.63) UAs. The efficacy specificity cluster also had a significant main effect on the intention to lose weight (F (2, 545) = 4.87, p = .004). High efficacy specificity had higher intention (M = 5.74, SD = 1.35) relative to moderate (M = 5.30, SD = 1.35) and low (M = 4.93, SD = 1.77) perceived efficacy specificity. There was no significant interaction effect. For high UA people, messages with high efficacy specificity worked the best (M = 5.88, SD = 1.28) followed by low efficacy specificity (M = 5.30, SD = 1.58) and moderate

efficacy specificity (*M* = 5.24, *SD* = 1.58). For people with low UA, messages with high efficacy specificity worked the best as well (*M* = 5.28, *SD* = 1.60) followed by moderate efficacy specificity (*M* = 5.10, *SD* = 1.47) and low efficacy specificity (*M* = 3.50, *SD* = 2.78). The overall results support H8 (b) and do not support (d).

Figure 4

The Effects of UA and Perceived Efficacy Specificity on BI (1) Physical Activities

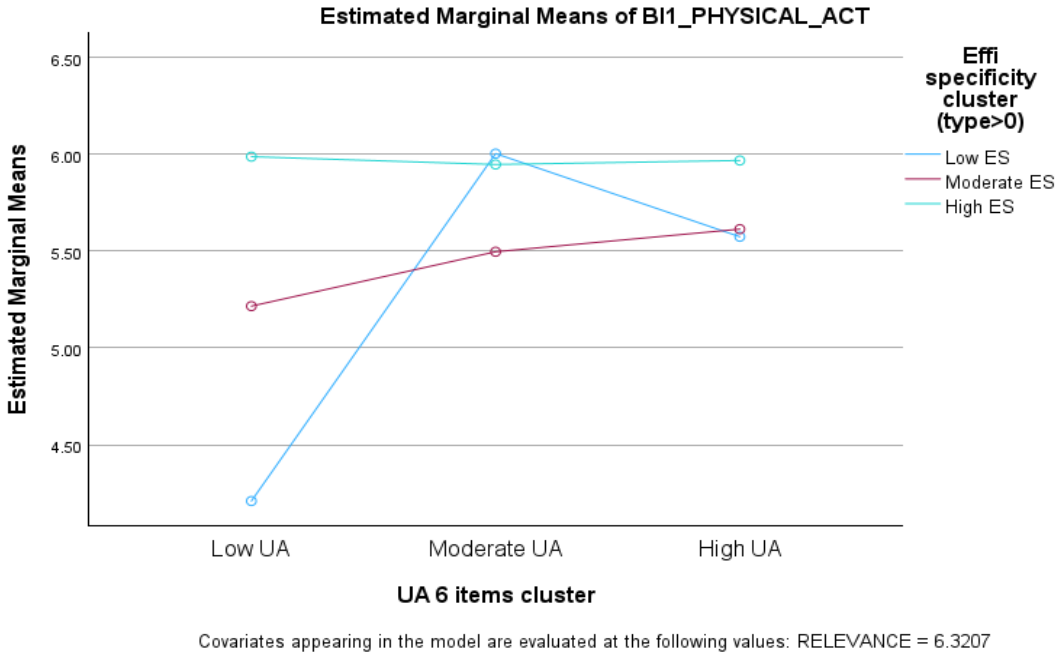


Figure 5

The Effects of UA and Perceived Efficacy Specificity on BI (2) Fruits/Vegetables

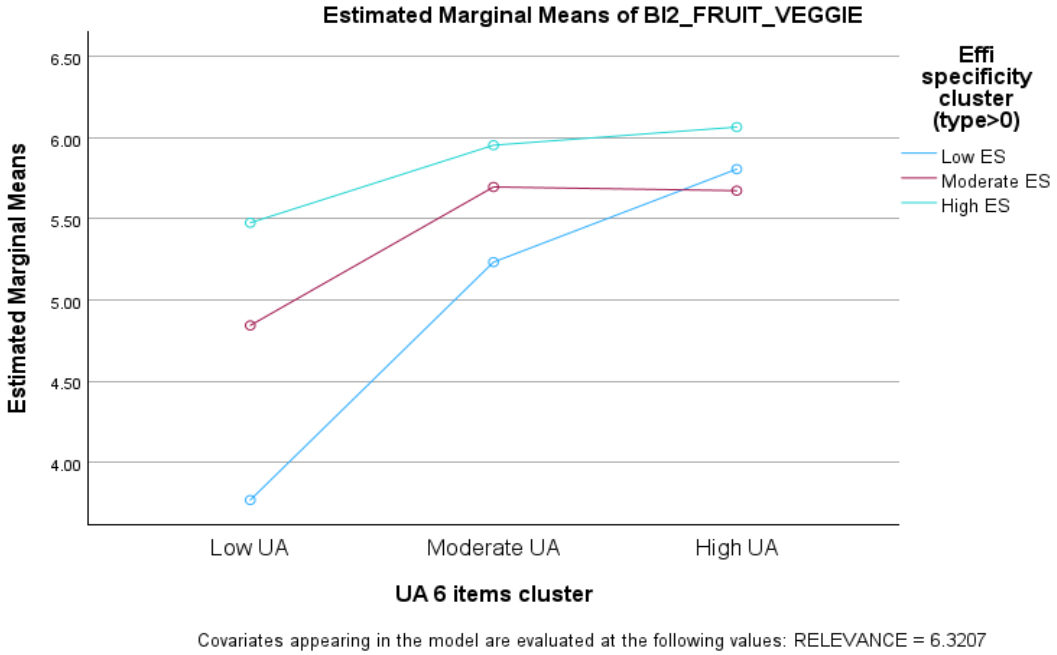
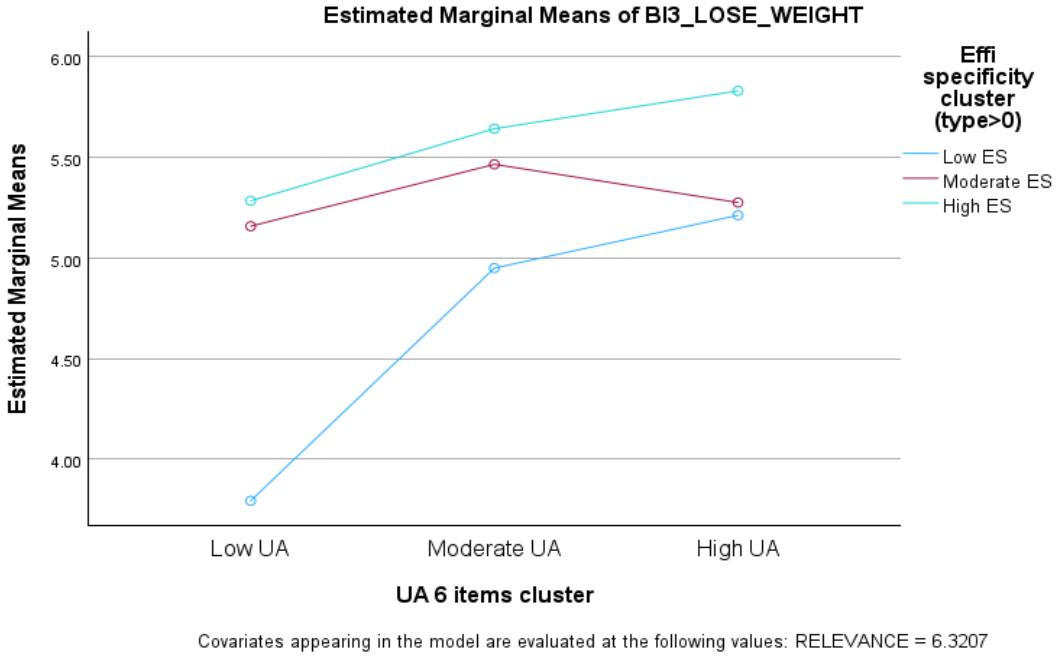


Figure 6

The Effects of UA and Perceived Efficacy Specificity on BI (3) Losing Weight

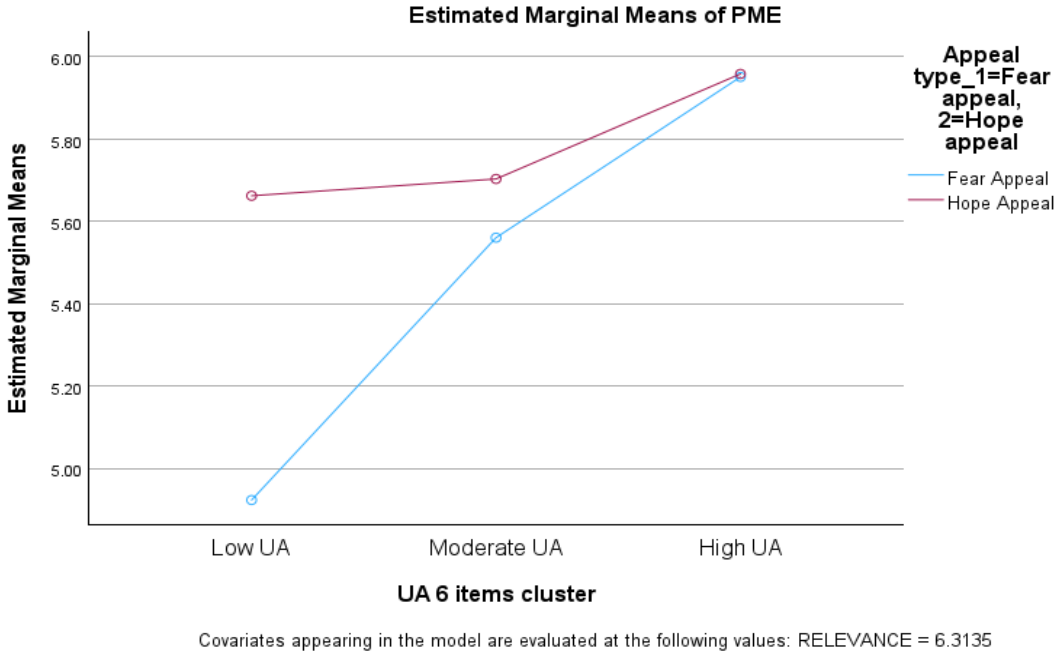


H9: Uncertainty avoidance and emotional appeal type will interact such that those high in UA will have higher (a) PME and (b) behavioral intention when they receive fear appeals relative to hope appeals. When participants are low in UA, they will have higher (c) PME and (d) behavioral intention when they receive a hope appeal relative to a fear appeal.

As noted previously, the analysis showed that the UA cluster had a significant main effect on *PME* (F (2, 827) = 12.01, $p < .001$) such that high UAs had higher intention (M = 5.99, SD = 1.25) relative to moderate (M = 5.59, SD = 1.27 and low (M = 5.33, SD = 1.57) UAs. It also showed that emotional appeal type had a significant main effect on PME (F (1, 827) = 7.13, p = .004). Hope appeals (M = 5.82, SD = 1.25) caused more PME than fear appeals (M = 5.70, SD = 1.37). Importantly, there was a significant interaction effect of the UA cluster by efficacy appeal type on PME (F (2, 827) = 2.92, p = .03). For people with high UA, both hope appeals and fear appeals caused statistically equivalent levels of PME, with hope appeals (M = 6.02, SD = 1.23) slightly higher than fear appeals (M = 5.96, SD = 1.28) in PME. For people with low UA, hope appeals (M = 5.62, SD = 1.18) were perceived to be more effective than fear appeals (M = 4.92, SD = 1.94) (see Figure 7). Thus, H9 (a) was not supported and H9 (c) was supported.

Figure 7

The Effects of UA and Appeal Type on PME



When examining the effects on the *intention to engage in more physical activities* (see Figure 8), the UA cluster had a significant main effect on physical activity intention (F (2, 827) = 3.75, p = .01) such that high UAs had higher intention (M = 5.91, SD = 1.09) relative to moderate (M = 5.65, SD = 1.11) and low (M = 5.60, SD = 1.37) UAs. Appeal type had a near significant effect on the intention (F (1, 827) = 2.07, p = .08). There were no other significant main effects or interaction effects. For high UA people, both fear appeals (M = 5.91, SD = 1.08) and hope appeals (M = 5.90, SD = 1.11) were nearly equally persuasive for them to do more physical activities. For people with low UA, hope appeals (M = 5.72, SD = 1.19) were more persuasive than fear appeals (M = 5.43, SD = 1.57). When it comes to the *intention to have more fruits and vegetables* (see Figure 9), the UA cluster had a significant main effect on the intention to have more fruit and vegetables (F (2, 827) = 12.22, p < .001). High UAs had higher intention (M =

5.97, *SD* = 1.16) relative to moderate (*M* = 5.75, *SD* = 1.11) and low (*M* = 5.25, *SD* = 1.67) UAs. There were no other significant main or interaction effects. People with high UA were slightly more persuaded by fear appeals (*M* = 6.01, *SD* = 1.09) than hope appeals (*M* = 5.93, *SD* = 1.23) to have fruits and vegetables. People with low UA were more persuaded by hope appeals (*M* = 5.40, *SD* = 1.54) than fear appeals (*M* = 5.06, *SD* = 1.84) about having fruits and vegetables. Regarding the *intention to lose weight* (see Figure 10), the UA cluster had a significant main effect on the intention to lose weight (*F* (2, 827) = 3.96, *p* = .01). High UAs had higher intention (*M* = 5.71, *SD* = 1.38) relative to moderate (*M* = 5.45, *SD* = 1.27) and low (*M* = 5.24, *SD* = 1.54) UAs. There were no other significant main or interaction effects. People with high UA were slightly more persuaded by fear appeals (*M* = 5.75, *SD* = 1.42) than hope appeals (*M* = 5.68, *SD* = 1.35) to lose weight. People with low UA were more persuaded by hope appeals (*M* = 5.32, *SD* = 1.48) than fear appeals (*M* = 5.13, *SD* = 1.63). The above results support H9 (b) and (d).

Figure 8

The Effects of UA and Appeal Type on BI (1) Physical Activities

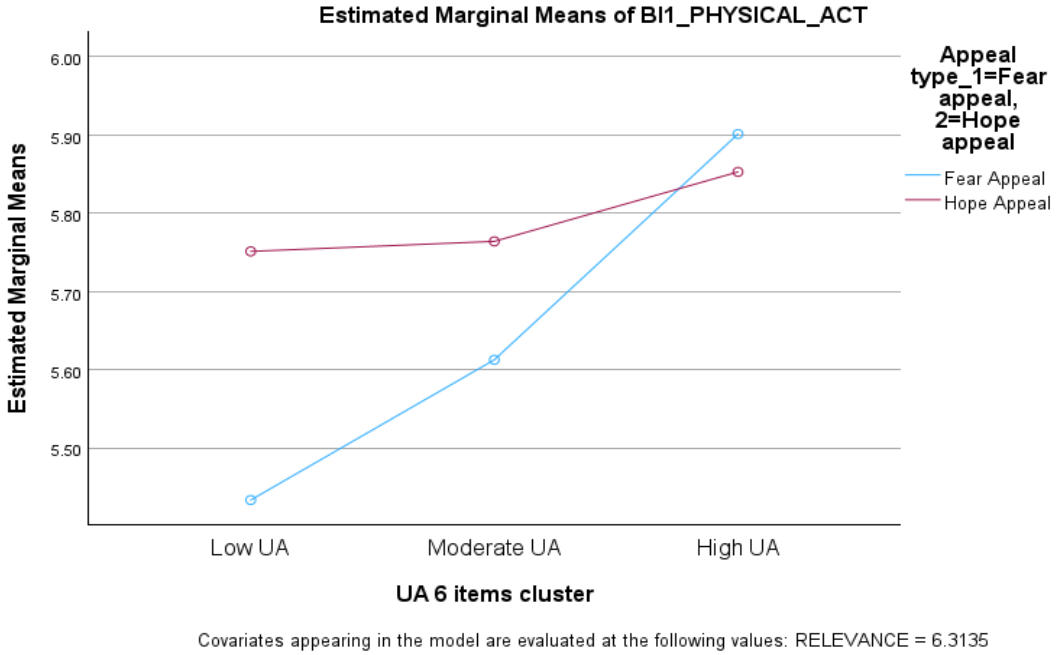


Figure 9

The Effects of UA and Appeal Type on BI (2) Fruits/Vegetables

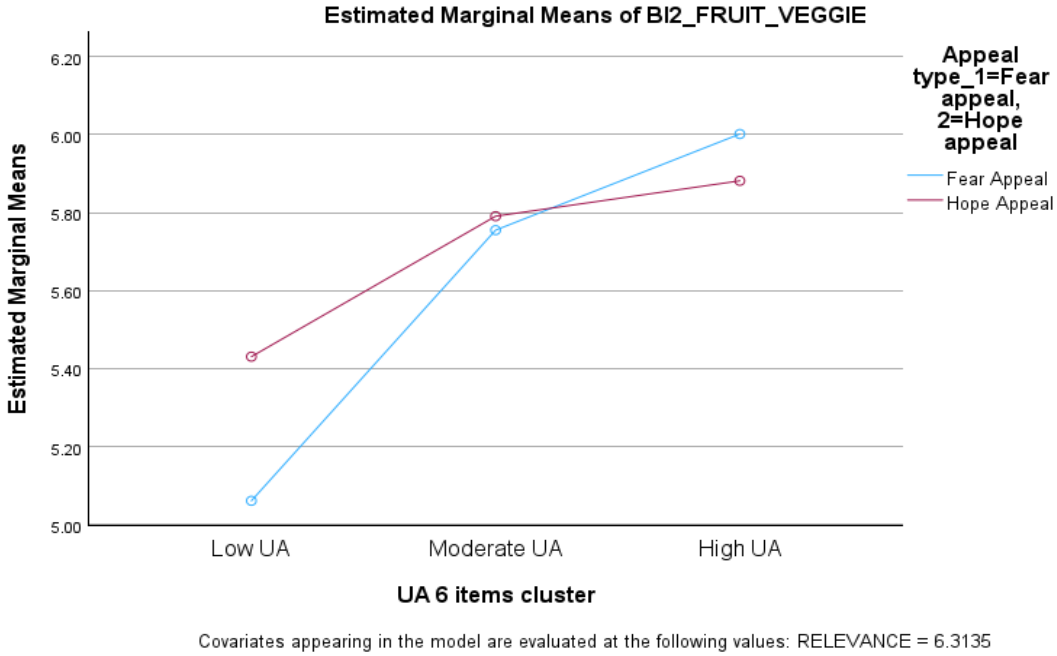
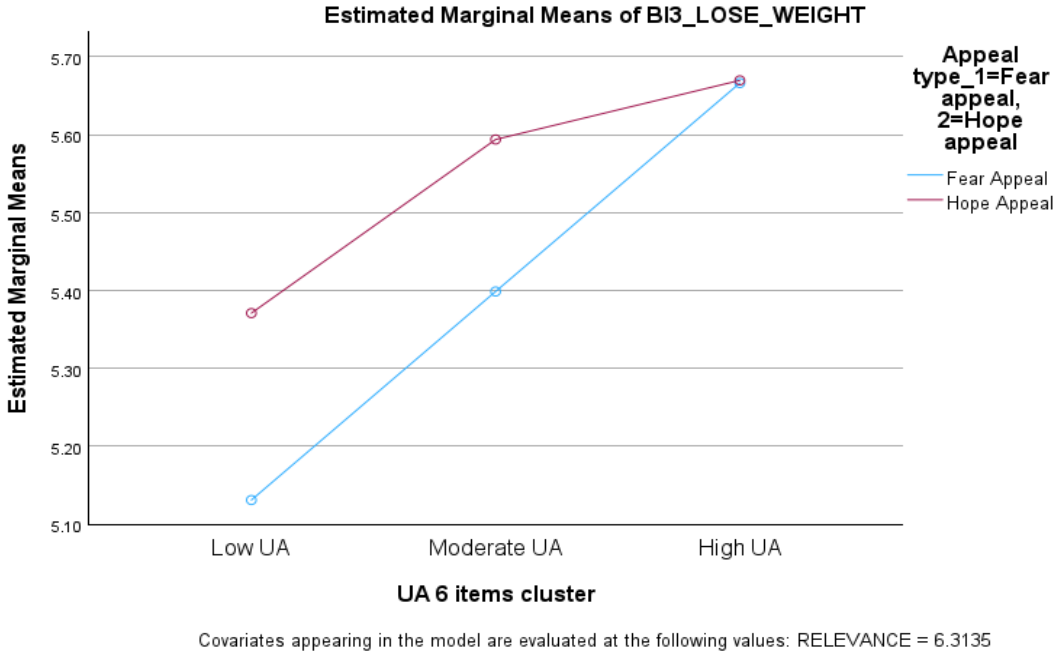


Figure 10

The Effects of UA and Appeal Type on BI (3) Losing Weight



RQ1: Do uncertainty avoidance, perceived efficacy specificity, and emotional appeal type interact to affect (a) PME and (b) behavioral intention? Although no past research has examined such an interaction, we question whether (see Figure 1): When uncertainty avoidance is high and the message is perceived to be highly specific, will fear appeals be more effective than hope appeals? When uncertainty avoidance is high and the message contains general efficacy, will fear appeals be more effective than hope appeals? When uncertainty avoidance is low and the message contains specific efficacy, will hope appeals will be more effective than fear appeals? When uncertainty avoidance is low does message specificity affect PME and intentions differently?

As already noted, there are significant main effects of UA cluster on *PME* (F (2, 536) = 6.30, p = .001), the appeal type on PME (F (1, 536) = 5.22, p = .01), and efficacy specificity cluster on PME (F (2, 536) = 39.14, p < .001). These are all superseded by a significant interaction effect of UA cluster by appeal type on PME (F (2, 536) = 6.79, p = .001), UA cluster by efficacy specificity cluster on PME (F (4, 536) = 3.92, p = .002), and appeal type by efficacy specificity cluster on PME (F (2, 536) = 3.28, p = .02). Importantly, there was a significant interaction effect of UA cluster by appeal type by efficacy specificity cluster on PME (F (4, 536) = 2.84, p = .01). Therefore, the answer for RQ (a) is that high/low UA, perceived efficacy specificity and emotional appeal type interact to affect PME significantly. The means are reported in Table 7 (see also Figure 11).

Table 7

Main Study: Descriptive Statistics

Dependent Variable: PME

UA cluster	Appeal Type	Efficacy Specificity cluster	M	SD	N
Low UA	**Fear Appeal**	**Low ES**	**1.00**	**.**	**1**
		Moderate ES	**5.00**	**1.44**	**7**
		High ES	**5.12**	**1.95**	**16**
		Total	**4.91**	**1.92**	**24**
	Hope Appeal	**Low ES**	**4.88**	**1.94**	**2**
		Moderate ES	**4.95**	**1.05**	**16**
		High ES	**6.38**	**.76**	**21**
		Total	**5.72**	**1.17**	**39**
	Total	**Low ES**	**3.58**	**2.63**	**3**
		Moderate ES	**4.97**	**1.15**	**23**
		High ES	**5.83**	**1.52**	**37**
		Total	**5.41**	**1.54**	**63**
Moderate UA	Fear Appeal	Low ES	4.67	1.42	3
		Moderate ES	5.20	1.12	47
		High ES	6.05	1.09	60
		Total	5.65	1.18	110
	Hope Appeal	Low ES	3.69	1.86	8
		Moderate ES	5.27	1.19	42
		High ES	6.26	.88	57
		Total	5.68	1.32	107
	Total	Low ES	3.95	1.75	11
		Moderate ES	5.23	1.15	89
		High ES	6.15	.99	117
		Total	5.66	1.25	217
High UA	**Fear Appeal**	**Low ES**	**5.88**	**1.53**	**6**
		Moderate ES	**4.99**	**1.40**	**41**
		High ES	**6.26**	**1.21**	**98**
		Total	**5.89**	**1.39**	**145**

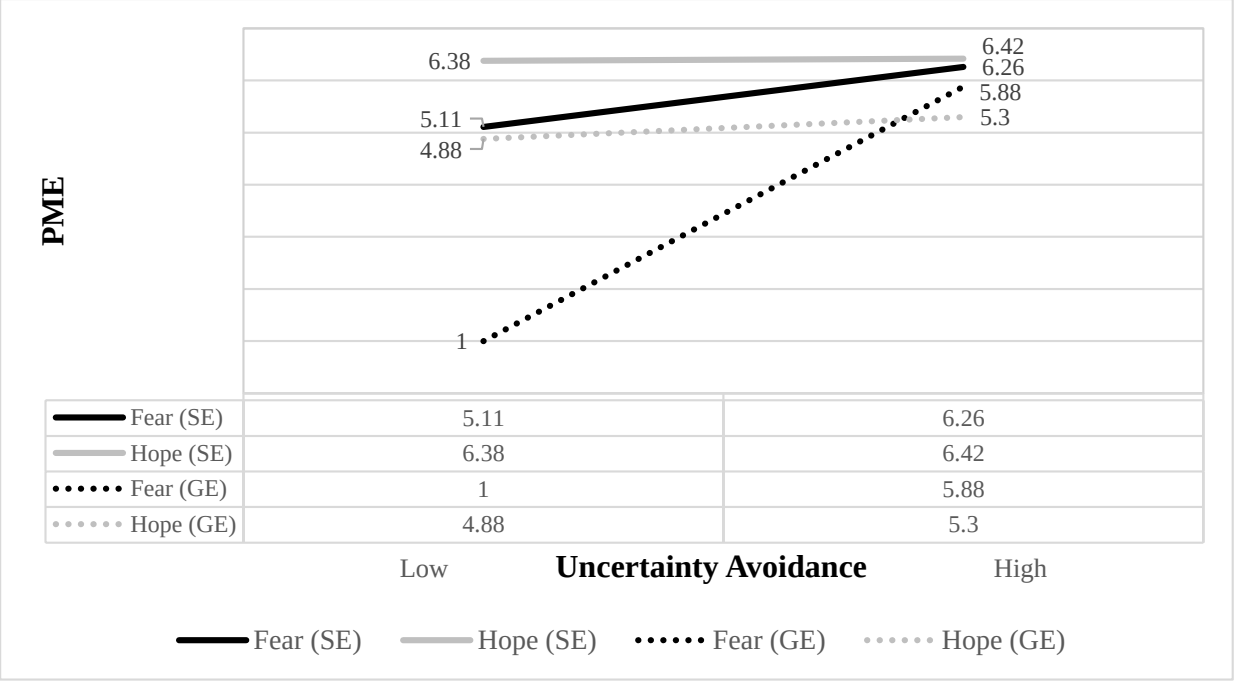
Table 7 (cont'd)

UA cluster	Appeal Type	Efficacy Specificity cluster	M	SD	N
	Hope Appeal	**Low ES**	**5.30**	**.97**	**5**
		Moderate ES	**4.91**	**1.26**	**29**
		High ES	**6.42**	**.83**	**96**
		Total	**6.04**	**1.14**	**130**
	Total	**Low ES**	**5.61**	**1.28**	**11**
		Moderate ES	**4.96**	**1.33**	**70**
		High ES	**6.34**	**1.04**	**194**
		Total	**5.96**	**1.28**	**275**
Total	Fear Appeal	Low ES	5.03	2.02	10
		Moderate ES	5.09	1.26	95
		High ES	6.08	1.29	174
		Total	5.71	1.39	279
	Hope Appeal	Low ES	4.38	1.70	15
		Moderate ES	5.09	1.19	87
		High ES	6.37	.84	174
		Total	5.86	1.22	276
	Total	Low ES	4.64	1.82	25
		Moderate ES	5.09	1.22	182
		High ES	6.22	1.09	348
		Total	5.78	1.31	555

Note. Only low and high UA (bolded) are included in the analysis.

Figure 11

The Effects of UA, Appeal Type, and Perceived Efficacy Specificity on PME



When examining the effects on the *intention to increase physical activities*, there were significant main effects of the UA cluster on the intention to increase physical activities (F (2, 536) = 5.30, p = .003), appeal type on the intention (F (1, 536) = 7.07, p = .004), and efficacy specificity cluster on the intention (F (2, 536) = 13.91, p < .001). There were significant interaction effects of UA cluster by efficacy specificity cluster on the intention (F (4, 536) = 2.54, p = .02) and a marginally significant effect of appeal type by efficacy specificity cluster on the intention (F (2, 536) = 1.95, p = .07). Moreover, there found a significant effect of UA cluster by appeal type by efficacy specificity cluster on the intention (F (4, 536) = 2.01, p = .05). Therefore, high/low UA, perceived efficacy specificity, and emotional appeal type interact to affect the intention to do more physical activities significantly. The means are reported in Table 8 (see also Figure 12).

Table 8

Main Study: Descriptive Statistics

Dependent Variable: BI (1) Physical Activities

UA cluster	Appeal Type	Efficacy Specificity cluster	M	SD	N
Low UA	**Fear Appeal**	**Low ES**	**2.75**	**.**	**1**
		Moderate ES	**4.35**	**1.41**	**7**
		High ES	**5.97**	**1.54**	**16**
		Total	**5.36**	**1.71**	**24**
	Hope Appeal	**Low ES**	**4.75**	**2.12**	**2**
		Moderate ES	**5.56**	**1.29**	**16**
		High ES	**6.00**	**.89**	**21**
		Total	**5.76**	**1.14**	**39**
	Total	**Low ES**	**4.08**	**1.89**	**3**
		Moderate ES	**5.19**	**1.41**	**23**
		High ES	**5.99**	**1.19**	**37**
		Total	**5.61**	**1.38**	**63**
Moderate UA	Fear Appeal	Low ES	6.08	.80	3
		Moderate ES	5.30	1.06	47
		High ES	5.85	1.05	60
		Total	5.63	1.08	110
	Hope Appeal	Low ES	5.97	.43	8
		Moderate ES	5.65	.94	42
		High ES	6.05	.95	57
		Total	5.89	.93	107
	Total	Low ES	6.00	.51	11
		Moderate ES	5.47	1.02	89
		High ES	5.95	1.00	117
		Total	5.75	1.02	217
High UA	**Fear Appeal**	**Low ES**	**5.13**	**1.67**	**6**
		Moderate ES	**5.71**	**1.04**	**41**
		High ES	**5.95**	**1.16**	**98**
		Total	**5.85**	**1.16**	**145**

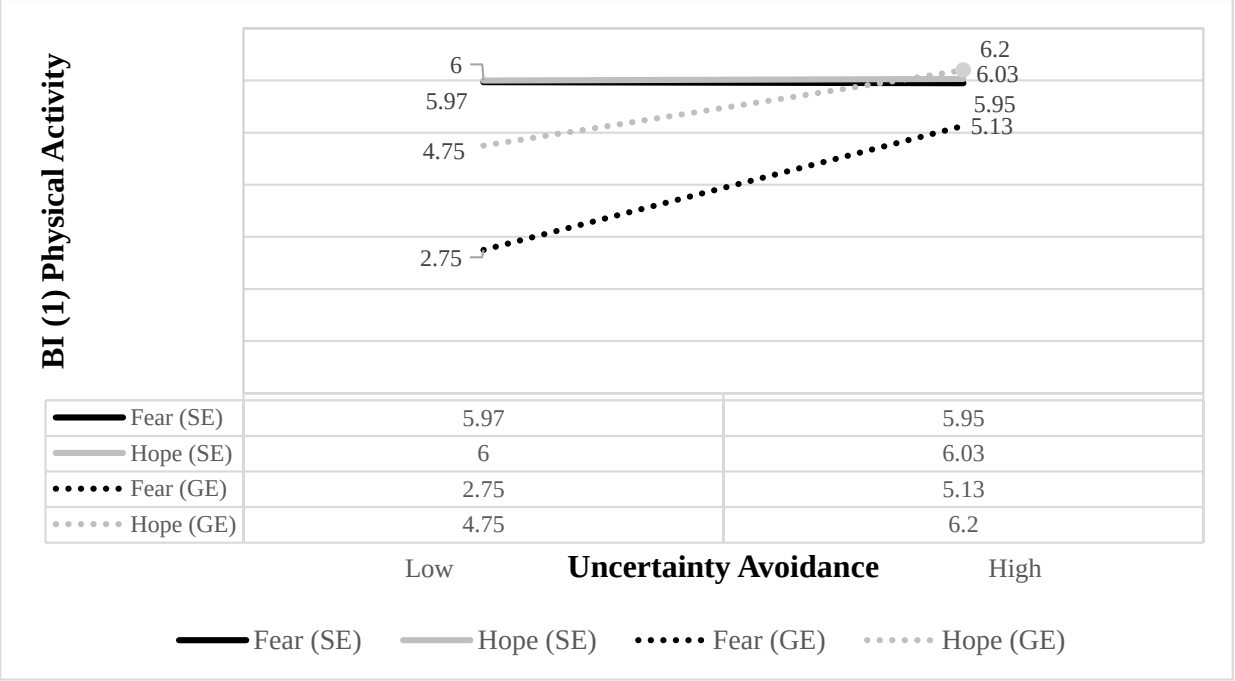
Table 8 (cont'd)

UA cluster	Appeal Type	Efficacy Specificity cluster	M	SD	N
	Hope Appeal	**Low ES**	**6.20**	**.33**	**5**
		Moderate ES	**5.44**	**.93**	**29**
		High ES	**6.03**	**1.10**	**96**
		Total	**5.91**	**1.07**	**130**
	Total	**Low ES**	**5.61**	**1.32**	**11**
		Moderate ES	**5.60**	**1.00**	**70**
		High ES	**5.99**	**1.13**	**194**
		Total	**5.88**	**1.12**	**275**
Total	Fear Appeal	Low ES	5.18	1.62	10
		Moderate ES	5.41	1.13	95
		High ES	5.92	1.16	174
		Total	5.72	1.19	279
	Hope Appeal	Low ES	5.88	.82	15
		Moderate ES	5.56	1.00	87
		High ES	6.03	1.03	174
		Total	5.88	1.03	276
	Total	Low ES	5.60	1.22	25
		Moderate ES	5.48	1.07	182
		High ES	5.98	1.09	348
		Total	5.80	1.11	555

Note. Only low and high UA (bolded) are included in the analysis.

Figure 12

The Effects of UA, Appeal Type, and Perceived Efficacy Specificity on BI (1) Physical Activities



When it comes to the *intention to have more fruits and vegetables*, the analysis showed the significant main effects of UA cluster on the intention to have more fruits and vegetables (F (2, 536) = 11.70, $p < .001$), appeal type on the intention (F (1, 536) = 7.85, $p = .002$), and efficacy specificity cluster on the intention (F (2, 536) = 10.36, $p < .001$). Also, there were significant interaction effects of UA cluster by appeal type on the intention (F (2, 536) = 4.39, $p = .007$), UA cluster by efficacy specificity cluster on the intention (F (4, 536) = 2.01, $p = .05$), and appeal type by efficacy specificity cluster on the intention (F (2, 536) = 3.06, $p = .02$). In addition, UA cluster by appeal type by efficacy specificity cluster had a significant interaction effect on the intention (F (4, 536) = 2.07, $p = .04$). Hence, high/low UA, perceived efficacy specificity, and emotional appeal type interact to affect the intention to have more fruits and vegetables significantly. The means are reported in Table 9 (see also Figure 13).

Table 9

Main Study: Descriptive Statistics

Dependent Variable: BI (2) Fruits/Vegetables

UA cluster	Appeal Type	Efficacy Specificity cluster	M	SD	N
Low UA	**Fear Appeal**	**Low**	**1.00**	**.**	**1**
		Moderate	**4.23**	**2.17**	**7**
		High	**5.39**	**1.79**	**16**
		Total	**4.87**	**2.07**	**24**
	Hope Appeal	**Low**	**4.88**	**1.94**	**2**
		Moderate	**5.06**	**1.78**	**16**
		High	**5.54**	**1.40**	**21**
		Total	**5.31**	**1.56**	**39**
	Total	**Low**	**3.58**	**2.63**	**3**
		Moderate	**4.81**	**1.90**	**23**
		High	**5.47**	**1.56**	**37**
		Total	**5.14**	**1.77**	**63**
Moderate UA	Fear Appeal	Low	5.58	.52	3
		Moderate	5.57	.93	47
		High	5.88	1.04	60
		Total	5.74	.99	110
	Hope Appeal	Low	5.09	1.35	8
		Moderate	5.74	1.04	42
		High	6.04	.99	57
		Total	5.85	1.06	107
	Total	Low	5.23	1.18	11
		Moderate	5.65	.98	89
		High ES	5.96	1.01	117
		Total	5.79	1.02	217
High UA	**Fear Appeal**	**Low**	**5.46**	**1.75**	**6**
		Moderate	**5.75**	**1.12**	**41**
		High	**6.19**	**1.03**	**98**
		Total	**6.04**	**1.11**	**145**

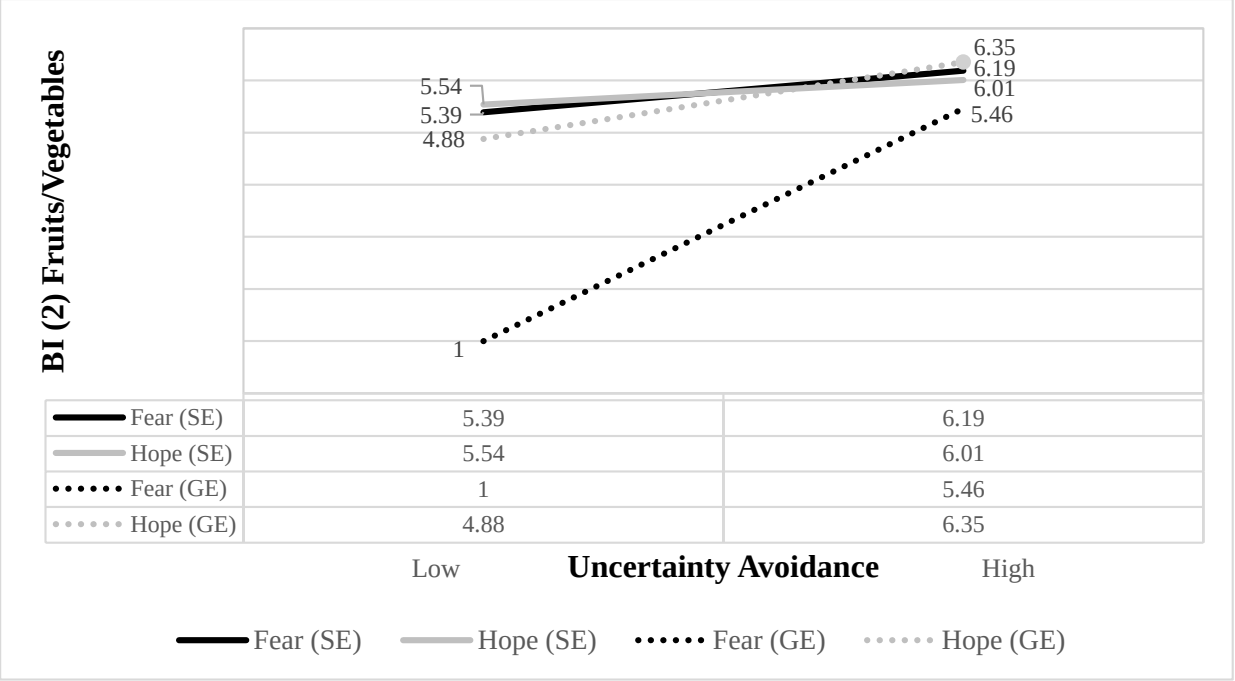
Table 9 (cont'd)

UA cluster	Appeal Type	Efficacy Specificity cluster	M	SD	N
	Hope Appeal	**Low**	**6.35**	**.60**	**5**
		Moderate	**5.51**	**1.14**	**29**
		High	**6.01**	**1.33**	**96**
		Total	**5.91**	**1.28**	**130**
	Total	**Low**	**5.86**	**1.38**	**11**
		Moderate	**5.65**	**1.13**	**70**
		High	**6.10**	**1.19**	**194**
		Total	**5.98**	**1.19**	**275**
Total	Fear Appeal	Low	5.05	1.95	10
		Moderate	5.55	1.18	95
		High	6.01	1.14	174
		Total	5.82	1.21	279
	Hope Appeal	Low	5.48	1.30	15
		Moderate	5.54	1.25	87
		High	5.96	1.24	174
		Total	5.80	1.26	276
	Total	Low	5.31	1.57	25
		Moderate	5.55	1.21	182
		High	5.98	1.19	348
		Total	5.81	1.23	555

Note. Only low and high UA (bolded) are included in the analysis.

Figure 13

The Effects of UA, Appeal Type, and Perceived Efficacy Specificity on BI (2) Fruits/Vegetables



Regarding the *intention to lose weight*, the analysis showed the significant main effects of UA cluster on the intention to lose weight (F (2, 536) = 3.99, p = .01), the appeal type on the intention (F (1, 536) = 6.44, p = .01), and efficacy specificity cluster on the intention (F (2, 536) = 6.38, p = .001). Also, there were significant interaction effects of UA cluster by appeal type on the intention (F (2, 536) = 2.58, p = .04), and a marginally significant effect of appeal type by efficacy specificity cluster on the intention (F (2, 536) = 2.12, p = .06). The interaction of UA cluster by appeal type by efficacy specificity cluster had a marginally significant effect on the intention (F (4, 536) = 1.68, p = .08). Thus, high/low UA, perceived efficacy specificity, and emotional appeal type interacted to affect the intention to have more fruits and vegetables to some degree. The means are reported in Table 10 (see also Figure 14).

Table 10

Main Study: Descriptive Statistics

Dependent Variable: BI (3) Losing Weight

UA cluster	Appeal Type	Efficacy Specificity cluster	M	SD	N
Low UA	**Fear Appeal**	**Low**	**1.00**	**.**	**1**
		Moderate	**4.76**	**1.72**	**7**
		High	**5.25**	**1.46**	**16**
		Total	**4.93**	**1.71**	**24**
	Hope Appeal	**Low**	**4.75**	**2.47**	**2**
		Moderate	**5.25**	**1.38**	**16**
		High	**5.30**	**1.74**	**21**
		Total	**5.25**	**1.59**	**39**
	Total	**Low**	**3.50**	**2.78**	**3**
		Moderate	**5.10**	**1.47**	**23**
		High	**5.28**	**1.60**	**37**
		Total	**5.13**	**1.63**	**63**
Moderate UA	Fear Appeal	Low	5.00	2.03	3
		Moderate	5.35	1.08	47
		High	5.41	1.60	60
		Total	5.37	1.40	110
	Hope Appeal	Low	4.92	1.64	8
		Moderate	5.44	1.15	42
		High	5.89	1.00	57
		Total	5.64	1.14	107
	Total	Low	4.94	1.65	11
		Moderate	5.39	1.11	89
		High	5.64	1.36	117
		Total	5.51	1.28	217
High UA	**Fear Appeal**	**Low**	**5.11**	**1.93**	**6**
		Moderate	**5.23**	**1.58**	**41**
		High	**5.94**	**1.11**	**98**
		Total	**5.71**	**1.33**	**145**

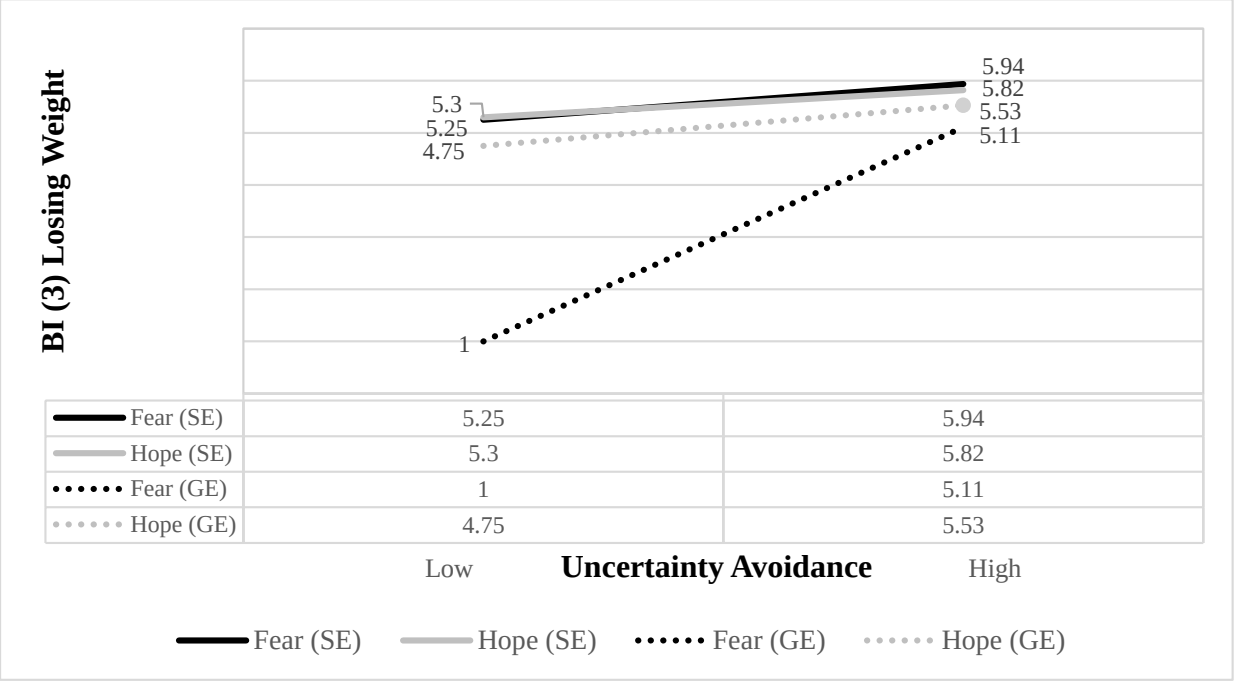
Table 10 (cont'd)

UA cluster	Appeal Type	Efficacy Specificity cluster	M	SD	N
	Hope Appeal	**Low**	**5.53**	**1.22**	**5**
		Moderate	**5.26**	**1.60**	**29**
		High	**5.82**	**1.44**	**96**
		Total	**5.69**	**1.47**	**130**
	Total	**Low**	**5.30**	**1.58**	**11**
		Moderate	**5.24**	**1.58**	**70**
		High	**5.88**	**1.28**	**194**
		Total	**5.70**	**1.40**	**275**
Total	Fear Appeal	Low	4.67	2.15	10
		Moderate	5.25	1.36	95
		High	5.69	1.35	174
		Total	5.51	1.41	279
	Hope Appeal	Low	5.10	1.52	15
		Moderate	5.35	1.34	87
		High	5.78	1.35	174
		Total	5.61	1.37	276
	Total	Low	4.93	1.77	25
		Moderate	5.30	1.35	182
		High	5.74	1.35	348
		Total	5.56	1.39	555

Note. Only low and high UA (bolded) are included in the analysis.

Figure 14

The Effects of UA, Appeal Type, and Perceived Efficacy Specificity on BI (3) Losing Weight



DISCUSSION

This study was informed by appraisal-based theories such as the Appraisal Tendency Framework, EPPM, and TPH. On that basis, I predicted that emotional appeals would cause particular appraisal processes and that those processes would trigger emotion. However, the appraisal processes that were predicted to be unique to fear appeals and hope appeals did not turn out to be as unique to each appeal type, rejecting H1 and H2. Participants who received fear appeals and those who received hope appeals both experienced high levels of threat appraisals, with both appeal types indicating nearly the same means. This could be partly because the topic itself presents risks and negativity in any group. The posters are about the serious health concern of diabetes, it is possible that the topic caused some degree of threat to all participants. Positive possibility and positive future expectation appraisals are major constructs in hope appeals (Chadwick, 2015), but people perceived positive possibility and future expectation in both fear and hope appeals even under no efficacy condition. One of the reasons could be because the presence of the recommended actions in no efficacy condition may have caused some degree of positive feelings in viewers. It could also be because some people might be positive-minded or have positive personality traits and resilience even when facing fearsome messages. Other people might have a degree of emotional instability which is a predictor of increased fear arousal (Mowen et al., 2004).

The appraisal processes operated in harmony with the specific emotion, supporting H3 and H4. Threat appraisals were closely associated with the arousal of fear, and positive possibility and future expectation appraisals were correlated to the arousal of hope. It is important that this study showed that emotional appeals caused self-reported hope and fear in the predictable direction. And, those feelings were correlated with the associated appraisals in a

predictable manner. Although this order of appraisals and felt emotions are opposite to what other appraisal theories suggest, we still find that appraisals and emotions are related. The data supported H5, showing that efficacy cues in messages cause higher efficacy appraisal; underscoring the importance of the presence of efficacy cues in persuasive messages. Also, when more specific efficacy cues are presented, the audience will perceive it to be highly specific, supporting H6. People's perception of efficacy specificity in messages is correlated to a higher perception of message effectiveness and their intention to follow behavioral recommendations, supporting H7.

The effectiveness of hope and fear appeals also depends on how efficacy is specifically presented considering individuals' uncertainty avoidance levels. For both high and low UA groups, efficacy messages that are more specific (relative to general) led to higher perceived message effectiveness and behavioral intention. Thus, H8 (a) and (b) about individuals high in UA were supported while H8 (c) and (d) about individuals low in UA were rejected. The most persuaded group by specific efficacy information was mostly high UA individuals. However, it is interesting to note that efficacy specificity mattered more to (or differences in persuasive effects of low versus high specificity were greater with) low UA individuals than high UA individuals. For high UA individuals, they tend to be greatly persuaded by the messages both high or low in efficacy specificity, compared to low UA individuals. Participants high in UA thought both fear and hope appeals were highly persuasive (in terms of PME) but hope worked slightly better than fear, which rejects H9 (a). For people with low UA, hope appeals were far more effective than fear appeals for people with low UA (in terms of PME), supporting H9 (c). When it comes to behavioral intention as a dependent variable, fear appeals work better than hope for those high in UA, and hope appeals are more effective than fear for people with low UA, which supports H9

(b) and (d). As discussed, individuals with high UA are more easily stimulated by negatively valenced messages and look for more detailed and specified instructions (Reardon et al., 2006). Thus, they are likely to be more influenced by fear appeals and find efficacy messages that are specific more effective than those general. People with low UA also see highly specific efficacy messages as effective but they are different in that hope works better for them.

Lastly, a research question asked how UA, emotional appeal type, and perceived efficacy specificity would interact to affect PME and behavioral intention. The interactions of the three variables showed that, in general, hope appeals with specific efficacy messages is the most persuasive regardless of individuals' uncertainty avoidance levels. Fear appeals tend to be least effective especially when the efficacy message is perceived to be rather general than specific for both people with high UA and those with low UA. Also, appeal type and efficacy specificity matter more for low UA than high UA individuals. High UA people saw any type of messages assigned as highly persuasive than low UA people did, which indicates that high UA people are more likely to be persuadable. These patterns show that emotional appeal types and the degree of efficacy specificity can be adjusted to be more persuasive considering individuals' uncertainty avoidance level or even at country levels according to Hofstede's dimension of uncertainty avoidance.

Limitations

Appraisal theories predict that appraisals of an event cause emotion. However, the data of this study is more consistent with the emotion causing appraisals. This reverse process should be investigated further by future studies. Also, other appraisals such as uncertainty appraisals and others need to be examined. Another limitation is that the number of people with low UA was far fewer than that of people with high UA. In the future study, having greater variances in UA with

a larger number of low UA individuals is recommended. Collecting a large number of participants with low UA levels can help obtain more widely applicable results. In addition, examining not only the U.S. sample but also samples from other countries and conducting cross-cultural studies may show further interesting results.

CONCLUSION

Fear appeals and hope appeals are commonly used in advertisements and campaigns; so it is critical that we understand when and why they can be effective. Fear appeals and hope appeals can be more or less effective depending on individuals' tolerance to uncertainty and their need for specific information that increases their efficacy. The examination of the appraisal processes of the EPPM and TPH and the effects of specificity in efficacy messages on the receivers' response provides meaningful insight into how emotional appeals can be designed successfully and how their effects can be maximized.

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APPENDIX A: POSTER MESSAGES

Below are the posters used in the main study (6 groups: 3 posters in each group).

Figure 15

Fear Appeal Messages (With No Efficacy)

Figure 16

Hope Appeal Messages (With No Efficacy)

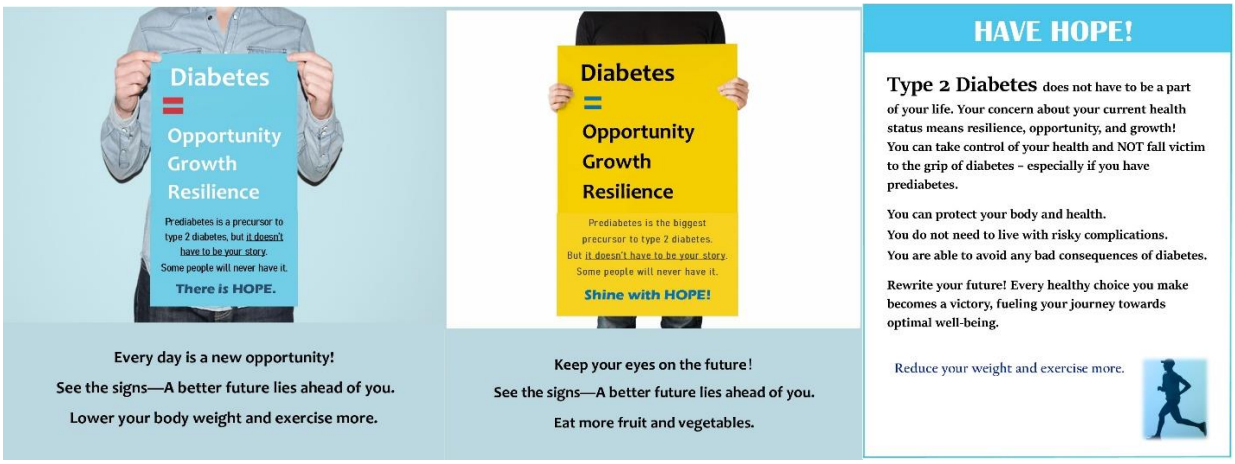

Figure 17

Fear Appeal Messages (With General Efficacy)

Figure 18

Hope Appeal Messages (With General Efficacy)

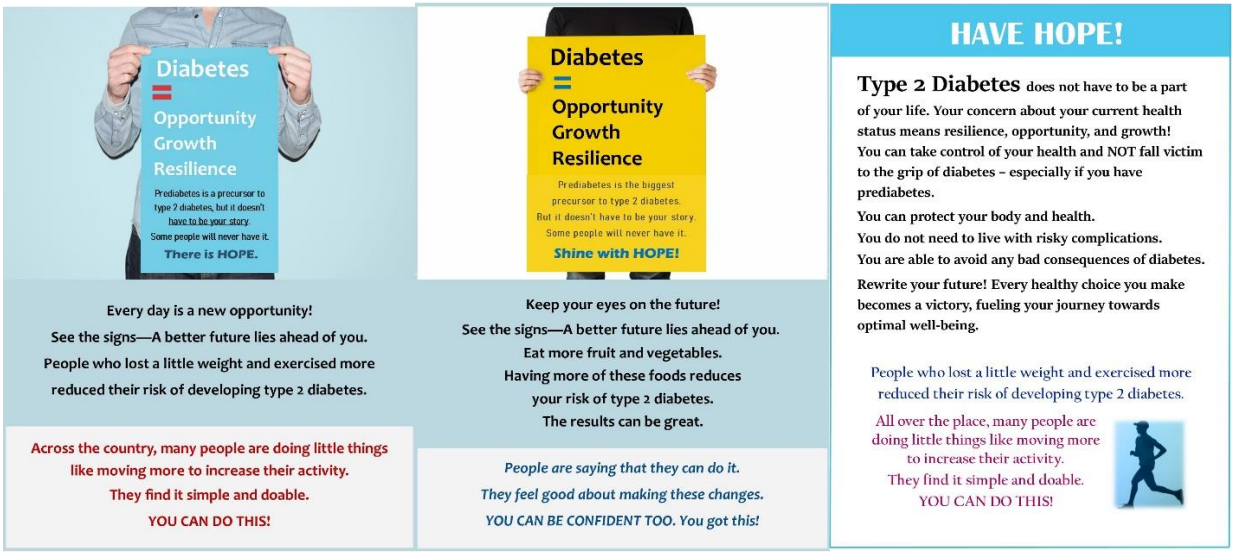

Figure 19

Fear Appeal Messages (With Specific Efficacy)

Figure 20

Hope Appeal Messages (With Specific Efficacy)

APPENDIX B: MEASURES

Table 11

Main Study: List of Measures

Measure	Source
Personal relevance	Nabi & Myrick (2019)
Uncertainty avoidance	Altuncu et al. (2012); Jung (2002); Quintal et al. (2010)
Fear (emotion)	Chadwick (2010)
Hope (emotion)	Chadwick (2010); Prestin (2013)
Severity	Witte et al. (1996)
Susceptibility	Witte et al. (1996)
Self-efficacy	Witte et al. (1996)
Response efficacy	Witte et al. (1996)
Importance	Chadwick (2010)
Goal congruence	Chadwick (2010)
Future expectation	Chadwick (2010)
Possibility	Chadwick (2010)
Efficacy specificity	Connors et al. (2017); Pérez et al. (2020); Witte et al. (1996)
Perceived message effectiveness	Dillard & Peck (2000); Dillard & Ye (2008)
Behavioral intention	Ajzen et al. (2011); Ajzen (2015); Lapinski et al. (2007)

Scales and Examples

Relevance

- Source: Nabi & Myrick (2019)
- Items: 2 items

  Prediabetes or diabetes issue is...

  "relevant to me."

  "important to me."
- Scale: 7-point Likert-type scale (1 = Strongly Disagree, 2 = Disagree, 3 = Somewhat Disagree, 4 = Neither Agree or Disagree, 5 = Somewhat Agree, 6 = Agree, 7 = Strongly Agree)

Uncertainty avoidance

- Source: Altuncu et al. (2012); Jung (2002); Quintal et al. (2010)
- Items: 6 items

When thinking about, or describing yourself, how much do you agree with the following statements? Remember, 0 = completely disagree and 100 = completely (100%) agree.

"I dislike unpredictable situations."

"I dislike it when a person's statement could mean many different things."

"I don't like to go into a situation without knowing what I can expect from it."
"I don't like situations that are uncertain."
"It is important to have instructions spelled out in detail so that I always know what to do."
"Rules and regulations are important because they tell me what is expected of me."

- Scale: 0-100 (%) slider scales

Fear

- Source: Chadwick (2010)
- Items: 4 items
  Looking at this message made me feel...
  "fearful," "afraid," "worried," "anxious"
- Scale: 7-point Likert-type scale (1 = Strongly Disagree, 2 = Disagree, 3 = Somewhat Disagree, 4 = Neither Agree or Disagree, 5 = Somewhat Agree, 6 = Agree, 7 = Strongly Agree)

Hope

- Source: Chadwick (2010)
- Items: 4 items
  Looking at this message made me feel...
  "positive," "hopeful," "optimistic," "encouraged"
- Scale: 7-point Likert-type scale (1 = Strongly Disagree, 2 = Disagree, 3 = Somewhat Disagree, 4 = Neither Agree or Disagree, 5 = Somewhat Agree, 6 = Agree, 7 = Strongly Agree)

Severity (Threat)

- Source: Witte et al. (1996)
- Items: 3 items
  Please tell us how you think about diabetes by answering the questions below.
  "I believe that diabetes is severe."
  "I believe that diabetes is serious."
  "I believe that diabetes can lead to negative consequences."
- Scale: 7-point Likert-type scale (1 = Strongly Disagree, 2 = Disagree, 3 = Somewhat Disagree, 4 = Neither Agree or Disagree, 5 = Somewhat Agree, 6 = Agree, 7 = Strongly Agree)

Susceptibility (Threat)

- Source: Witte et al. (1996)
- Items: 3 items
  Please tell us how you think about diabetes by answering the questions below.
  "I am at risk for getting diabetes."
  "It is likely that I will get diabetes."
  "It is possible that I will get diabetes."
- Scale: 7-point Likert-type scale (1 = Strongly Disagree, 2 = Disagree, 3 = Somewhat Disagree, 4 = Neither Agree or Disagree, 5 = Somewhat Agree, 6 = Agree, 7 = Strongly Agree)

Efficacy specificity

- Attention check:

  Sometimes, health-related posters provide information about behavioral recommendations that would help them avoid health problems. Did this poster do that?

  "Yes/No"
- Source: Connors et al. (2017); Pérez et al. (2020); Witte et al. (1996)
- Items: 5 items

  Would you say the messages about the recommended actions were...

  "abstract/concrete," "ambiguous/clear," "not descriptive/descriptive,"

  "not vivid/vivid," "not easy to imagine/easy to imagine"
- Scale: 1-10 scales between the two ends

Self-efficacy

- Source: Witte et al. (1996)
- Items: 3 items

  Please rate the following items with how viewing the poster made you feel.

  "I am able to follow the recommended behaviors to prevent or take control of (pre)diabetes."

  "Following the recommended behaviors is easy to do to prevent or take control of (pre)diabetes."

  "Following the recommended behaviors to prevent or take control of (pre)diabetes is convenient."
- Scale: 7-point Likert-type scale (1 = Strongly Disagree, 2 = Disagree, 3 = Somewhat Disagree, 4 = Neither Agree or Disagree, 5 = Somewhat Agree, 6 = Agree, 7 = Strongly Agree)

Response efficacy

- Source: Witte et al. (1996)
- Items: 3 items

  Please rate the following items with how viewing the poster made you feel.

  "Following the recommended behaviors works in preventing or taking control of (pre)diabetes."

  "Following the recommended behaviors is effective in preventing or taking control of (pre)diabetes."

  "If I follow the recommended behaviors, I am less likely to prevent or take control of (pre)diabetes."
- Scale: 7-point Likert-type scale (1 = Strongly Disagree, 2 = Disagree, 3 = Somewhat Disagree, 4 = Neither Agree or Disagree, 5 = Somewhat Agree, 6 = Agree, 7 = Strongly Agree)

Goal congruence

- Source: Chadwick (2010)
- Items: 4 items

  Preventing or taking control of (pre)diabetes…

  "is consistent with my ideals."

  "fits with my personal values."

  "is relevant to my personal goals."

  "is important to meeting my goals."

- Scale: 7-point Likert-type scale (1 = Strongly Disagree, 2 = Disagree, 3 = Somewhat Disagree, 4 = Neither Agree or Disagree, 5 = Somewhat Agree, 6 = Agree, 7 = Strongly Agree)

Importance
- Source: Chadwick (2010)
- Items: 4 items
  Preventing or taking control of (pre)diabetes…
  "is unimportant/is important."
  "is of no concern/is much of concern."
  "means nothing/means a lot."
  "is not needed/is needed."
- Scale: 7-point Likert-type scale (1 = Strongly Disagree, 2 = Disagree, 3 = Somewhat Disagree, 4 = Neither Agree or Disagree, 5 = Somewhat Agree, 6 = Agree, 7 = Strongly Agree)

Possibility
- Source: Chadwick (2010)
- Items: 4 items
  Preventing or taking control of (pre)diabetes is…
  "impossible/possible," "improbable/probable,"
  "unachievable/achievable," "not feasible/feasible"
- Scale: 7-point Likert-type scale (1 = Strongly Disagree, 2 = Disagree, 3 = Somewhat Disagree, 4 = Neither Agree or Disagree, 5 = Somewhat Agree, 6 = Agree, 7 = Strongly Agree)

Future expectation
- Source: Chadwick (2010)
- Items: 4 items
  Please rate the following items with how viewing the poster made you feel.
  "Preventing or taking control of (pre)diabetes will make the future wonderful."
  "If I prevent or take control of (pre)diabetes, I can create a bright future."
  "Preventing or taking control of (pre)diabetes creates a much better future."
  "Preventing or taking control of (pre)diabetes will bring a positive future."
- Scale: 7-point Likert-type scale (1 = Strongly Disagree, 2 = Disagree, 3 = Somewhat Disagree, 4 = Neither Agree or Disagree, 5 = Somewhat Agree, 6 = Agree, 7 = Strongly Agree)

PME
- Source: Dillard & Peck (2000); Dillard & Ye (2008)
- Items: 5 items
  Overall, the group of posters I saw were…
  "not persuasive/persuasive," "ineffective/effective,"
  "not convincing/convincing," "not compelling/compelling"
- Scale: 7-point Likert-type scale (1 = Strongly Disagree, 2 = Disagree, 3 = Somewhat Disagree, 4 = Neither Agree or Disagree, 5 = Somewhat Agree, 6 = Agree, 7 = Strongly Agree)

Behavioral Intention

- Source: Ajzen et al. (2011); Ajzen (2015); Lapinski et al. (2007)
- Items: 11 items

  Please rate the following items with how viewing the poster made you feel.

  "Preventing or taking control of (pre)diabetes will make the future wonderful."
  "I intend to do more physical activity."
  "I am likely to do more physical activity."
  "I intend to engage in more physical activity."
  "I am planning to add more vegetables and fruit to my diet."
  "I will make a plan to add more vegetables and fruit to my diet."
  "I am likely to add more vegetables and fruit in my diet."
  "I will add more vegetables and fruit to my diet."
  "I plan to lose some weight."
  "I will talk to my doctor about losing weight."
  "I intend to drop some weight."
- Scale: 7-point Likert-type scale (1 = Strongly Disagree, 2 = Disagree, 3 = Somewhat Disagree, 4 = Neither Agree or Disagree, 5 = Somewhat Agree, 6 = Agree, 7 = Strongly Agree)