EFFECTS OF ATTRIBUTE FRAMING AND GOAL FRAMING ON VACCINATION BEHAVIOR: EXAMINATION OF MESSAGE CONTENT AND ISSUE INVOLVEMENT ON ATTITUDES, INTENTIONS AND INFORMATION SEEKING

by

RUSTAM HAYDAROV

Edmund S. Muskie Fellow

B.S., Tashkent State Institute of Oriental Studies (2002)
M.S., Tashkent State Institute of Oriental Studies (2004)

A THESIS

submitted in partial fulfillment of the requirements for the degree

MASTER OF SCIENCE

A.Q. Miller School of Journalism and Mass Communications
College of Arts and Sciences

KANSAS STATE UNIVERSITY
Manhattan, Kansas

2010

Approved by:

Major Professor
Joye C. Gordon

Copyright

Abstract

This experimental research adopts a typology of frames by Levin, Gaeth, and Schneider (1998) and seeks to a) determine what combination of attribute and goal frames produces the strongest effect on vaccination behavior; b) ascertain to what extent personal relevance of vaccination moderates this framing effect; and c) explore how individual pre-existing characteristics, such as recent vaccination history, vaccine risk perception, vaccine dread, and general attitude toward vaccination influence the persuasive power of framed messages.

The study, designed as field experiment 2 (+/- attribute frame) x 2 (+/- goal frame) x 2 (involvement), recruited 476 adult female participants that were exposed online to four experimental framing manipulations and a control condition. The main effect is consistent with the typology of frames — the combination of the positive attribute and the negative goal frame was the only condition that was significantly more persuasive than the control condition. Participants who had children or were pregnant, for whom vaccination was more relevant and meaningful, have not reacted to message framing differently. However, general pre-existing attitudes towards vaccines, perception of vaccine safety, perception of vaccine efficacy, vaccine dread, and vicarious experience with vaccine side effects, appear to be associated with antecedents of vaccination behavior. Overall, this study has focused on ecological validity, aiming at the applicability of framing theory in the context of health communication.

Table of Contents

List of Figures

List of Tables

Acknowledgements

First and foremost I would like to express my deepest gratitude to my professors that guided me during this scientific endeavor at Kansas State University. It is a great pleasure to thank Dr. Joye C. Gordon for introducing me to the field of risk perception and risk communication. Dr. Gordon's guidance, creativity and openness to new ideas inspired me to design this field experiment.

I especially appreciate the mentorship of Dr. H.S. Jin for originating my passion for quantitative research and experimental design methods. Dr. Jin has continuously challenged me to stretch the limits of my cognition to better understand cause and effect. I am also grateful to Dr. Brenda McDaniel, who advanced my competence in health psychology and health behavior.

I am indebted to many of my friends and colleagues who supported me in marketing my study. Without their help, it would have been impossible to recruit the more than 600 individuals who participated in this research. It is a pleasure to acknowledge the input of numerous parental groups and professional organizations in Kansas that disseminated information about this study among their members.

I would like to thank my family, especially my wife, Lyudmila, my daughter Adriana, my sister and finally my parents, for supporting and encouraging me to pursue this degree. I am also grateful to the Edmund S. Muskie Fellowship program, a program of the Bureau of Educational and Cultural Affairs (ECA) of the United States Department of State, administered by the International Research and Exchange Board (IREX), that in part supported this research. Neither the ECA nor the IREX are responsible for the views expressed herein.

Dedication

I am dedicating this thesis to my loving wife, Lyudmila, who stood by my side and took care of our family all this time. I praise you for moving with me to the United States in the capacity of the student wife. You have sacrificed your professional interests for me, and gave up the comfort of our home and the company of our extended family back in Uzbekistan and Russia. Thank you for being with me and encouraging me when I was in doubt. This degree is truly yours!

Preface

Vaccination against infectious diseases has been one of the most remarkable inventions of humankind. During the 20th century, substantial progress has been achieved in the control of vaccine-preventable diseases (WHO, UNICEF, World Bank, 2009). In the U.S. alone, as the result of routine immunization, morbidity associated with diphtheria, pertussis, tetanus, polio, measles, mumps, and rubella has dramatically decreased. Smallpox, which claimed the lives of 1,500 Americans each year in the beginning of the century, had been completely eradicated by 1977. As a result, no more prevention effort against smallpox is required, including routine vaccination (WHO, UNICEF, World Bank, 2009).

Despite these tangible public health achievements, vaccine criticism has grown over the past decade. Public reputation of immunization has been undermined in part by highly publicized research of Wakefield et al. (1998) that suggested a potential link between the measles, mumps, and rubella (MMR) vaccine and autism. Although repeated studies have found no evidence to support these findings, the public has remained alarmed about the possible link (Clarke, 2008). As the result of this controversy, fueled by the sensational British and the U.S. media coverage, vaccination rates have dropped significantly (Speers, Lewis, 2004; Nabi, Prestin, 2007; Goodyear-Smith, Petousis-Harris, Vanlaar, Turner, Ram, 2007). The under coverage of population with MMR vaccination in the past few years has lead to several fatal measles outbreaks in industrialized countries, claiming the lives of people and costing taxpayers millions of dollars in outbreak control and risk mitigation (Whichmann et al., 2009). Therefore, regaining public trust in immunization remains an important public health priority (Clements, Razan, 2003; Hinman, Randal, 2008; Whichmann et al., 2009). The need for further research on persuading

the public to accept vaccination has been reiterated by several scholars (Gerend, Shepherd, 2007).

Thus, present study focuses exclusively on persuasive effects of health messages on attitudes, beliefs, and intentions to adopt an effective disease-prevention behavior such as vaccination. Specifically, this study aims to explore how presenting health information about immunization in a positive or a negative light, also known in psychology as message framing, alters perception of vaccination risk and behavioral intentions.

Numerous studies have demonstrated that framing health communication messages may significantly increase intentions to perform a health behavior (for review see Levin, Gaeth, Schreiber, and Lauriola, 2002; Rothman and Salovey, 1997;). Nonetheless, to date only six published studies have specifically investigated the effect of message framing on vaccination decisions (Abhyankar, O'Connor, Lawton, R., 2008; Donovan, Jalleh, 2000; Ferguson, Gallagher, 2007; Gerend, Shepherd, 2007; Gerend, Shepherd, Monday, 2008; McCaul, Johnson, Rothman, 2002;). As reviewed further in this document, aforementioned scholars detected substantial evidence for existence of framing effects in respect to vaccination behavior. Building on current knowledge, the present study aims to fill several research gaps. Using the Gaeth, Schneider, and Levin (1998) taxonomy of frames, this study attempts to test whether the persuasive effect is sustained when two typologically different frames are used in a single advocacy context about vaccination. Ultimately, the present research has three overarching objectives: a) to determine what type of message framing and the combination thereof produces the strongest effect on vaccination behavior; b) to ascertain to what extent personal relevance of vaccination moderates this framing effect; and c) to explore how individual pre-existing characteristics, such as previous vaccination decisions and attitudes toward vaccines, influence

the persuasive power of framed messages. Overall, this study expands theoretical knowledge of framing effects. In addition, the outcomes of this research propose practical ways to increase the persuasiveness of messages in advocacy materials about risks and benefits of vaccination.

CHAPTER 1 - Message Framing Effects in Health Communication

This literature review consists of the following three sections: a) first, we discuss the origins of framing effects and Prospect theory, and differentiate three distinct type of frames; b) second, we examine how message framing is used in health communication to promote immunization; and finally c) we attempt to understand the extent to which issue involvement moderates framing effects in the context of advocacy about immunization. In the final part of the review, we summarize definitions and major research findings, paving the way to posit the hypotheses.

Origins and the Typology of Framing Effects

Prior to discussing framing effects, it is important that we establish a common understanding of what the term *framing* signifies. There are multiple definitions of this construct in sociology, psychology, and media studies, as well as political communication. However, in the context of the present research the term, framing refers to its classical definition in psychology, as explained by Prospect theory (Kahneman and Tversky, 1979). Ultimately, message framing is defined as presenting the same critical information with objectively the same outcomes in a positive or a negative light. Prospect theory postulates (Kahneman and Tversky, 1979) that individuals apply different judgment when they are faced with positively (gain) or negatively (loss) phrased outcomes. This frame manipulation affects whether the individual evaluates the outcomes in terms of gains or losses. According to Kahneman and Tversky (1979, 1981), every outcome evaluation may be expressed through an S-shaped subjective value function that is concave in the domain of gains and convex in the domain of losses. Thus, the function represents that individuals are risk averse when they are exposed to a gain frame and risk seeking when

they are exposed to a loss. Because of this difference, i.e., where the slope for the losses is steeper than for the gains, "a loss has a greater subjective effect than an equivalent of gain." (Kahneman and Tversky, 1982). In other words, given even chances, a subjective value of losing $100 is equal to a subjective value of winning $200. Generally speaking, when people face an outcome phrased in terms of losses, they are "risk seeking" and attempt to avoid the loss. Similarly, the same outcome phrased positively does not have the same subjective value and elicits "risk aversion," in which people choose to forego the gain.

This seminal work triggered myriad studies on framing effects in health communication, consumer research, marketing, and other areas. For a detailed review, the reader is referred to Block and Keller, (1995); Levin, Gaeth, and Schneider, (1998); Rothman, A., Martino, S., Bedell, B, Detweiler, J., Salovey, P. (1999); Rothman and Salovey (1997). Although a lot of studies confirmed predictions of the Prospect theory in a variety of contexts, there has also been plenty of evidence for the lack of framing effect; or even, contrary to the theory, superior power of gain framed messages. Tversky and Kahneman were quite cautious of generalizing the framing effects that "are large and systematic, although by no means universal" (1981).

Some researchers attributed inconsistency in research findings to use of different methodology, contexts and behavior types (Levin et al., 1998; Rothman, 1999; Rothman and Salovey, 1997). Others found that elaboration, personal relevance of the message, perception of personal outcome efficacy, perception of risk, personality, and mood moderate framing effects (Bartels and Rothman, 2004; Gerend and Sias, 2009; Maheswaran and Myers-Levy, 1990; O'Keefe and Jensesen, 2008; Shiv, Edell, Britton, and Payne, 2004).

Particularly noteworthy is the work of Levin et al. (1998), which attempted to explain some disagreements in the scientific community about framing effects: "many recent studies of

valence framing effects have deviated greatly from the operational definitions and theoretical concepts used in the original studies, thus stretching the limits of Kahneman and Tversky's initial theoretical accounts" (p.151). Based on the review of numerous studies on framing effects, the researchers synthesized a typology of frames; the later acting as a moderator of framing effects and in part explaining inconsistent results of the previous studies. The suggested taxonomy differentiates frames based on a) what is being framed; b) what the frame affects; and c) how the effect is being measured. According to Levin et al. (1998), three types of framing — *risky choice framing*, *attribute framing*, and *goal framing* — affect how people think about the information and, possibly, act.

Risky choice framing constitutes a traditional framing effect detected by Kahneman and Tversky (1979) by the so called "Asian Disease" problem. Subjects are presented with a hypothetical decision making task that involves two positively or negatively framed prospects: a) a sure riskless option, and b) a two-prong risky, or "all or nothing" option, numerically expressed in terms of probabilities. In the positive frame condition both prospects are expressed in terms of the gains, i.e., "lives saved"; while in the negative frame condition in terms of the losses, i.e., "lives lost." Consistent with Prospect theory, a majority of studies have found that individuals exposed to the gain frame tend to be risk averse; in other words, prefer a sure option. Similarly, the loss frame elicits higher risk seeking preferences.

The term attribute framing, coined by Levin and Gaeth (1988), represents manipulation of an object's quality or characteristics in a positive or a negative way, followed by an evaluation. For example, in their experiment of framing the attribute of ground beef as *"25% fat"* or *"75% lean,"* they found that the latter, positively framed message–resulted in a more positive evaluation of the product and a higher preference. Replicated by other scholars in

multiple contexts, this experimental design supported the finding that positively framed messages elicit greater favorability and preference. Attribute framing is fundamentally different from risky choice framing, as the decision making task involves mere evaluation — favorability or unfavorability of the product.

The last type of framing is known as goal framing. This approach has become very popular in health communication research in the past decade. In goal framing, both negative and positive frames attempt to achieve the same objective: persuade an individual to perform or enhance a health behavior. The frame valence, i.e., whether the message emphasizes positive consequence of performing the act (gain) or negative consequences of not performing the act (loss), has been shown to moderate this framing effect (Levin et al., 1998). In other words, consistent with predictions of Prospect theory, the loss frame that focuses on the negative consequences of not adopting the behavior has a higher persuasive power (Meyrowitz and Chaiken, 1987; Schneider, 2006; for review see also Levin et al., 1998). According to this theoretical account, the message: "*by not vaccinating* you will *fail to protect* yourself from the disease" should produce higher intentions to obtain immunization than the opposite: "*by vaccinating* you *will protect* yourself from the disease." [italics added]

To conclude, this taxonomy of Levin et al. (1998) consisting of a) risk choice framing, b) attribute framing, and c) goal framing, accounts in part for the contradictory findings in framing studies. Once one correctly differentiates the frame type in a study, the findings become consistent with predictions of Levin et al. (1998).

Rothman and Salovey (1997) proposed an alternative explanation to the inconsistency of framing effects in health communication. According to researchers, framing effects in part are contingent upon whether promoted behavior serves as an "illness-detective" or "health-

affirming" function. For example, a behavior that prevents skin cancer, such as the use of sunscreen, is more effectively advocated by the gain frame. Similarly, the detective behavior of performing breast self-examinations to detect breast cancer at an early stage is better advocated by the loss frame (Rothman, Martino, Bedell, Detweiler, and Salovey, 1999; Rothman and Salovey, 1997). It is worth noting that Rothman and Salovey (1997) reviewed only the goal framing approach, speaking in Levin et al. (1998) framing terms. While Rothman and Salovey's (1997) theoretical approach consistently predicted the findings of several framing studies in the context of health behavior (Rothman, Bartels, Wlaschin, and Salovey, 2006; Rothman et al., 1999), the theory failed to work with one of the most essential preventive behaviors — vaccination. As reviewed further, vaccination, although being a preventive behavior, bears some procedural risk. In their later study, Rothman et al. (2006) elaborated on their earlier theory:

> To the extent that people are confident that a prevention behavior will keep them healthy and safe, a gain-framed appeal should be effective. However, if people have reason to question the effectiveness of the behavior, performing the behavior might be considered a risky proposition as people cannot be confident that they will be protected (p 210).

Based on this proposition, a loss-frame message may be more effective for promoting vaccination behavior (Rothman et al, 2006).

Before we begin to answer the question of what type of frame or combination thereof would work best to facilitate higher immunization coverage, it is imperative we summarize the scientific evidence in message framing studies:

a) The risky choice framing is characterized as a choice between two prospects with risky and riskless options. Exposed to the gain-framed message, people

are “risk averse” and eager to forego the gain. Contrarily, the loss-framed message elicits higher risk seeking, and people attempt to avoid the loss.

b) The attribute framing presents a certain characteristic or feature in a positive (gain) or a negative (loss) light. The frame that emphasizes a characteristic in a positive light produces higher evaluations and favorability of the subject.

c) The goal framing promotes a behavior by focusing either on the positive consequences of performing the act, or on the negative consequences of not performing the act. Empirical evidence demonstrates that negatively framed messages result in higher intentions to perform the behavior.

What combination of frames is the most effective for an advocacy message about immunization? To date, no study has specifically answered this question. However, there are two studies that provided empirical support to Levin et al. (1998) typology of frames (Ferguson and Gallagher, 2007; Krishnamurthy, P, Carter, P, Blair, E., 2001), finding significant interactions between the positive attribute and the negative goal frames. Despite the fact that the framing approach in the present study is different, these findings are useful to support our hypotheses. Generally speaking, the methods summarized above are valid only for the main message framing effects. All other moderating variables, excluding issue involvement, lie beyond the scope of the present research. Further, we will review how message framing may be used in promoting immunization behavior.

Use of Message Framing to Promote Vaccination

Vaccination is a very efficient disease preventive strategy (CDC, 1998). However, despite its high efficiency in preventing diseases, vaccination still bears some procedural risk in

the form of side effects, such as fever, swelling, and redness. Although the probability of an adverse reaction such as shock following immunization is extremely low, public perception of vaccine risk is severely heightened (Blume 2006; Clements, Ratzan, 2003).

Several studies have demonstrated that even parents who vaccinated their children experienced feelings of anxiousness, uncertainty, and dread (Gust, Brown, Sheedy, Hibbs, Weaver, Nowak, 2005; Raithatha, Holland, Simon, Harvey, 2003). Therefore, understanding the parental decision making process in regard to vaccination and development of the appropriate persuasive strategies deserves closer examination.

Despite the popularity of framing approach in health communication, as of now, there have been only six published studies that manipulated message framing to increase vaccination intentions. The most recent two studies examined the influence of message framing on acceptance of the *Human papillomavirus* (HPV) vaccine (Gerend, Shepherd, 2007; Gerend, Shepherd, Monday, 2008); the other two studies looked into message framing effects in respect to flu vaccination (McCaul, Johnson, and Rothman, 2002; Ferguson and Gallagher, 2007); one group of scholars researched framing effects in the context of MMR vaccination (Abhyankar, O'Connor, and Lawton, 2008); and, finally, the last and only study (Donovan and Jalleh, 2000) using a hypothetical immunization scenario, manipulated the attribute message framing in respect to vaccine side effects.

Prior to discussing framing effects in the aforementioned research, it is important that we differentiate studies using Levin et al. (1998) taxonomy of message framing to resolve any inconsistency. All but one study utilized the goal framing approach, where individuals were presented with either positive or negative consequences of accepting or refusing immunization.

Contrary to the predictions of Rothman and Salovey (1997), all studies confirmed the higher persuasive power of the loss-frame (Abhyankar et al., 2008; Ferguson and Gallagher, 2007; Gerend and Shepherd, 2007; Gerend et al., 2008). For example, consistent with the previous research (Meyrowitz and Chaiken, 1987; Levin et al., 1998), in the context of vaccination decisions, a phrase like *"By vaccinating you are likely to protect yourself from the highly contagious disease"* is deemed less persuasive than *"By not vaccinating you are likely fail to protect yourself from the highly contagious disease* [italics added].

Vaccination is a preventive health behavior which, according to Rothman and Salovey (1997), is better promoted by the gain-frame. However, in their later study, scholars proposed that perceived outcome efficacy moderates the framing effect as well (Rothman, Bartels, Wlaschin, and Salovey, 2006). Hence, if the promoted behavior is seen as relatively safe, the gain-framed message is more persuasive. Similarly, when the behavior is perceived as risky, the advantage of the loss frame is evident. Therefore in framing studies, the negative (loss) goal framing is consistently found to be superior to increase vaccination intentions.

The major controversy regarding vaccine acceptance concerns vaccine attributes, i.e., procedural risk in the form of side effects. For example, in the case of the MMR vaccine-autism controversy, the lack of public trust in vaccines has emerged from the heavily publicized alleged side effects (Goodyear-Smith et al., 2007; Speers and Lewis, 2004). The public questioned the attributes of immunization, rather than the need for it (Casiday, 2007; Clarke, 2008;). Therefore, the influence of the message framing approach that manipulates vaccine attributes demands closer examination.

To date, there has been only one published study that explored the attribute message framing effect in the context of vaccine risk (Donovan and Jalleh, 2000). Adult women were

presented with a hypothetical immunization scenario in which scientists claimed to have developed a vaccine for young children that protected against bronchitis and pneumonia. The researchers manipulated information about the vaccine safety, and framed it to be either safe in 90% of cases or causing side effects in 10% of cases. Donovan and Jalleh (2000) detected that positive framing elicited higher positive evaluations in terms of attitudes toward the vaccine, intent to immunize, and desire to seek more information, but only among mothers of young children.

To summarize, message framing research in the context of vaccination decisions has been consistent with the predictions of the Levin et al. typology of frames (1998). Specifically, negative goal framing that emphasized undesirable consequences of refusing vaccination was superior to promote vaccination behavior (Abhyankar et al., 2008; Ferguson and Gallagher, 2007; Gerend and Shepherd, 2007; Gerend et al., 2008). Along the same lines, positive attribute framing that accentuated vaccine safety rather than side effects derived higher vaccine acceptance and motivation to vaccinate (Donovan and Jalleh, 2000). Finally, one study designed as a field experiment has not detected any significant framing effects on the actual attainment of flu vaccination (McCaul, Johnos, and Rothman, 2002). To date, no study in the context of immunization has tested whether framing effects are sustained when two typologically different approaches — goal framing and attribute framing — are combined in a unified advocacy context.

Hereinabove we have established a basic understanding of framing effects, as well as reviewed the empirical evidence in the context of immunization. Further, we will inspect how personal relevance of vaccination moderates these effects.

Issue Involvement as a Moderator of Framing Effect

Extensive research in psychology and mass communication suggests that the success of persuasive communication is a determinant of many factors. One of the most cited theories, Elaboration Likelihood Model of persuasion, defines two distinct routes of information processing and attitude change (Petty and Cacioppo, 1981; Petty, Cacioppo, and Goldman, 1981; Petty, Cacioppo, and Shcumann, 1983; Petty and Cacioppo, 1990). One, called the central route, involves careful scrutiny of a message and assessment of the argument merits. Generated thoughts during this elaboration process define direction and magnitude of the attitude change. In other words, favorable thoughts during elaboration will facilitate acceptance of persuasive communication, while negative thoughts will reject it (Petty and Cacioppo, 1981). The second route, also known as the peripheral route, does not involve thorough consideration of pros and cons of the message; rather, the attitude change is dependent upon association of information processing with positive or negative cues. Therefore, when information is being processed by the peripheral route, the acceptance of advocacy may be dependent on factors such as attractiveness of the endorser and even pleasant environment.

Motivation and ability to process the message are known to moderate selection of the information processing route (Petty and Cacioppo, 1981). A plethora of research based on theoretical approach of the Elaboration Likelihood Model of persuasion has demonstrated that a recipient of persuasive communication "forms a reasoned and veridical opinion…and devotes cognitive effort required to evaluate true merits of an issue or product" if the advocated issue is of great personal relevance or involvement (Petty et al., 1983). High involvement is defined as if the issue elicits more personal connections and has significant consequences to the message recipient's life (Petty and Cacioppo, 1979; Petty and Cacioppo, 1983). In other words, if the

advocated issue or product has a great personal meaning to the recipient of a persuasive communication, the more likely the information will be processed through the central route, thus, eliciting higher elaboration. Contrary to this, under low involvement, where the issue evinces less personal associations, the message is processed through peripheral cues that integrate processing thoughts into the overall attitudes (Petty and Cacioppo, 1981).

Prior to looking at how issue involvement moderates framing effects, it is important that we understand the methodological differences in manipulating this variable. A number of correlational studies in social and consumer research investigated groups that differed on the level to which an issue or a product were personally relevant. In other words, researchers looked into how participants' existing involvement state alters message framing effects. For example, one may be more involved with a message about hypertension if they have a relevant medical history; a pregnant woman would be more involved in the message processing of birth defect issues than women who are not pregnant. Similarly, parents that have children of vaccination age would be more involved with the message about risks and benefits of immunization than other parents and non-parents (Donovan and Jalleh, 2000). Defining involvement in the aforementioned way increases external validity. Other scholars, to control for possible confounding variables, prefer to manipulate issue involvement within the message itself, making it either more or less relevant to the recipient (Maheswaran and Myers-Levy, 1990; Petty and Cacioppo, 1983). Although the later approach has higher internal validity due to practical focus of the present study, issue involvement, defined in terms of existing differences among message recipients, is of arguably greater value.

There is substantial evidence that the level of involvement moderates framing effects in health communication (Abhyankar et al., 2008; Donovan and Jalleh, 2000; Maheswaran and

Myers-Levy, 1990; Rothman et al., 2006; Shiv, Eddel, and Payne, 2004). However, does involvement affect two typologically different frames — the attribute frame and the goal frame — in the same way? Apparently not. In their study on preventive cholesterol screening, Maheswaran and Myers-Levy (1990) detected that the negative goal frame had a higher persuasive power for highly involved individuals, while the positive goal frame was more effective for the low-involved group. Participants in high-involvement conditions under extensive elaboration "assigned disproportionate weight to the negatively rather than positively framed information," and were more persuaded by it. Similarly, consistent with Elaboration Likelihood Model, low-involved individuals were not motivated to scrutinize the message, therefore, *"favorableness of the message frame appears to have been a peripheral cue"* for them (Maheswaran and Myers-Levy, 1990).

Issue involvement moderates the attribute framing in a slightly different way. Donovan and Jalleh (2000), examining attribute framing effects in the context of vaccine risk, found no ramification for highly involved individuals. However, the researchers detected that the positive attribute frame was persuasive for the low-involved group only. In other words, *"vaccine is safe in 90% cases"* worked better than *"vaccine has 10% side effects"* [italics added] only for the low-involved group, for whom infant immunization had less personal meaning. Donovan and Jalleh (2002) challenged the Maheswaran and Myers-Levy study (1990), arguing that consistent with Elaboration of Likelihood Model of persuasion, the high-involvement group in their elaborations of *"10% failure"* or *"90% success"* [italics added] would convert rates vice versa, and consider both options in scrutiny, therefore suggesting no effect for the high-involvement group. In accordance with the Gaeth et al. (1998) typology of frames, these two framing manipulations are different. The goal frame was manipulated by Maheswaran and Myers-Levi

(1990), while the attribute frame was used by Donovan and Jalleh (2000). Therefore, involvement and frame type may moderate effects in different ways.

It is necessary to emphasize that Donovan and Jalleh (2000) did not manipulate involvement levels in their experimental method, but investigated framing effect differences between two groups, based on involvement level. Personal relevance of infant immunization was operationalized in accordance with participants' existing demographic characteristics: whether participants had infant children, were pregnant, or had planned to be pregnant. Certainly, the information about the new vaccine for infants was more salient for those who had newborn children or anticipated offspring in near future. Another study, investigating the impact of goal framing on MMR vaccination intentions, found that "offspring status" had no interaction with the framing effect. In other words, high involvement that was defined as "having children of vaccination age" did not affect framing effect (Abhyankar et al., 2008). This inconsistency with the previous research, could arguably be attributed to the caveats of the experimental procedure. In order to make the context more relevant to those participants that didn't have children, researchers asked them to imagine as if they did. This priming of parental status and hypothetical scenario may have increased involvement levels of non-parents, so that the interaction within groups was insignificant.

Nonetheless, on a different measure, the researchers detected that the negative goal frame worked better for those parents that vaccinated their children previously. This variable may be considered as the surrogate measure of involvement, as those parents that had previously vaccinated their children, were arguable more personally concerned or involved.

Several more scholars confirmed that the existing involvement level differences between participants may moderate goal framing effects (Gerend and Shepherd, 2007). Involvement in

the context of HPV vaccination was operationalized in terms of frequency of engaging in risky sexual behavior that amplifies risks of contracting HPV. The negatively framed message, emphasizing undesirable consequences of not vaccinating against HPV, was significantly more persuasive among female students that often engaged in risky sexual behaviors (Gerend and Shepherd, 2007). Hereby, the study contributed to the growing scientific evidence that suggests the superiority of negative goal framing for persuading highly involved individuals.

Review Summary

In this chapter we have established sufficient understanding of framing effects in information processing; reviewed different types of frames; examined existing evidence of framing effects in health communication; investigated how message framing is used in the context of immunization; and lastly, covered the influence of issue involvement on message framing.

To reiterate definitions:

- 1. Framing in the context of this study refers to the classical definition of the message framing in psychology, defined as presenting the information with objectively equivalent outcome in a positive (gain) or a negative (loss) light (Tversky and Kahneman, 1981).
- 2. Levin et al. (1998) typology of frames recognizes three distinct types of message framing a) risky choice framing, b) attribute framing, c) goal framing. For the purpose of the present study we adopt the following two definitions of attribute and goal framing:1) attribute framing presents characteristic of a subject in a positive or a

negative light, followed by an evaluation or a preference; 2) goal framing advocates for a promoted behavior in terms of gains or losses: either presenting desirable consequences of adopting a behavior, or emphasizing negative consequences of failing to act. Goal framing effect is measured by antecedents of behavior — attitudes, beliefs, information seeking, and behavioral intentions.

- 3. Issue involvement is defined as the extent to which the advocated issue or a behavior elicits personal connections and has significant consequences to one's life (Petty and Cacioppo, 1979; Petty and Cacioppo, 1983). High involvement issue has more "personal meaning" to the recipient of the message than the low involvement issue.

Overall, previous research in message framing suggests that the negative goal framing and the positive attribute framing are more persuasive than other types of frames (for review, see Levin et al., 1998).

Specifically, studies examining message framing effects in the advocacy of immunization have confirmed the following general framing effects:

- 1. The negative goal frame message read as "if you don't vaccinate you will fail to protect yourself from the disease" produces higher positive attitudes towards a vaccine, information seeking and behavioral intentions to obtain immunization. (Abhyankar et al., 2008; Ferguson and Gallagher, 2007; Gerend and Shepherd, 2007; Gerend et al., 2008)
- 2. The positive attribute frame message read as *"the vaccine does not have side effects in 90% of cases"* is more persuasive on attitudes and behavioral intentions, than *"the vaccine have side effects in 10% of cases"* (Donovan and Jalleh, 2000).

Finally, the research of issue involvement in the context of message framing and immunization indicates:

- 1. Negatively framed goal messages, emphasizing the undesirable consequences of refusing vaccination, have higher persuasive power for highly involved individuals (Abhyankar et al., 2008). However, mixed findings exist in terms of whether positively goal framed messages are more persuasive for a low-involved group (Gerend and Shepherd, 2007; Maheswaran and Myers-Levy, 1990).
- 2. Positively framed attribute messages have stronger impact on attitudes and behavioral intentions only among low involved individuals (Donovan and Jalleh, 2000).

Despite the breadth of research in message framing, previous scholars: a) have failed to examine whether the attribute and the goal framing effects combined in a unified advocacy are sustained in the context of vaccination; b) whether these effects are consistent with Levin et al. (1998) taxonomy; c) how issue involvement moderates the attribute and the goal framing effects in the immunization context; and, finally d) whether selection of the medium, such as presenting frames through computer mediated communication, impacts message framing in a different way. Several scholars argued that "Internet-based resources have many of the characteristics necessary for persuasive communication," therefore the potential of utilizing the Internet in promotion of health behavior has yet to be explored (Cassel, Jackson, and Cheuvront, 1998). To date, no published studies in message framing of health behavior had used Internet-based frame manipulation.

Therefore, the present research will address aforementioned gaps within a single persuasive communication context of immunization. Specifically, the present study for the first

time will a) examine whether the combined use of the attribute and the goal frame in a single message about vaccination is consistent with the Levin et al. (1998) typology of frames; b) investigate how issue involvement moderates the attribute and the goal framing effects in the message about vaccination; and c) along with the antecedents of immunization behavior, will explore the impact of the attribute and the goal message framing on actual information seeking behavior on the Internet. In Chapter 2 we will define our variables of interest and measures, formulate the hypotheses, and explain quasi-experimental procedure of the present research.

CHAPTER 2 - Methodology

Having established common definitions of framing effects, framing types, and issue involvement, we are able to start answering our two major research questions: a) what combination of frames in a single advocacy context has the highest persuasive power to impact vaccination behavior; and b) how issue involvement, i.e., personal relevance of vaccination, moderates these effects. In this section I propose three hypotheses, operationalize experimental design, develop experimental stimuli, and finally, posit dependent variables and measures.

Hypothesis

To date, research on message framing in the context of vaccination behavior has been largely consistent with predictions of Prospect theory. That is, the negative goal frame, emphasizing undesirable health consequences of refusing vaccination, produced higher positive effect on attitudes about vaccination, information seeking behavior, and behavioral intentions to obtain immunization (Abhyankar et al., 2008; Ferguson and Gallagher, 2007; Gerend and Shepherd, 2007; Gerend et al., 2008). Similarly, the positive attribute frame, accentuating

vaccine success rate rather than side effects, has also proven to impact relevant behavioral intentions (Donovan and Jalleh, 2000).

However, no study has attempted to combine the attribute and the goal frame in a single advocacy. Why is it important to test whether the combination of two frames is effective in a unified persuasive context? The answer is obvious. During vaccination campaign, the public is rarely faced with only one type of immunization message, framed either in terms of the attribute or the goal frame. For a layperson, the vaccination is rather complex construct. Furthermore, it is an unnatural and uncomfortable procedure, involving variety of considerations — disease risks, eligibility for vaccination, side effects and follow-up actions. Therefore, multiple messages are viewed at the audience's discretion in a single advocacy product, either in terms of risky choice, attribute or goal framing. This product may be a webpage, a brochure or a public service announcement. For example, information about the risks of a disease may be presented in the form of the risky choice or the attribute frame as an appeal to obtain immunization; in the form of the goal frame as possible vaccine side effects; in the form of the attribute frame, as vaccine efficiency to prevent the disease; and so on. Therefore, I posit that exploring the framing effect of the attribute and the goal frame in a unified immunization context is imperative for ecological validity.

This study has also theoretical implications. Whether framing effects are sustained when the attribute and the goal frames are used in a single message remains unknown. Ferguson and Gallagher (2007) attempted to manipulate 2 x 2 (attribute/goal frame vs. frame valence) in between group design, and detected statistically significant interaction between the negative goal and the positive attribute frames. Another study, with a similar design but in a different context, has also reported the interaction between the respective frame types (Krishnamurthy et al., 2001).

Acknowledging their findings, I argue that Ferguson and Gallagher (2007) explored persuasiveness of frame type vs. frame valence in two separate messages. Furthermore, researchers used the attribute framing not to present the information about vaccine side effects (procedural risk), but framed the probability of vaccine efficiency to prevent the disease (outcome efficiency). Based on the above it is worthwhile to answer the following research questions:

Will framing effect be consistent with research findings when the attribute and the goal frame messages are used in a single advocacy about immunization and vaccine side effects? Will the negative goal frame and the positive attribute frame combination in a single advocacy be deemed more persuasive to create favorable attitudes, information seeking, and vaccination behavior than other frame combinations?

Based on the previous research findings and the typology of frames the following hypothesis is advanced:

H1: Overall, the combination of the positive attribute (gain-) and the negative goal (loss-) frames in a single advocacy about vaccination will result in higher attitudes towards vaccination; or confidence in the vaccine quality; or information seeking behavior or intentions to obtain immunization, than any other combination of attribute — goal frames or the control group.

In addition to the frame type, the message recipient's level of involvement is known to influence the message impact. Issue involvement, operationalized in terms of personal relevance of vaccination, was found to moderate framing effects (Donovan and Jalleh, 2000; Maheswaran

and Myers-Levy, 1990; Rothman et al., 2006; Shiv, Eddel, and Payne, 2004). However, research findings specifically in issue involvement and vaccination advocacy are somewhat contradictory, unless one recognizes typological differences between frames (attribute vs. goal). Various definitions and manipulation of involvement methods have also added to ambiguity of the findings. These studies examining issue involvement have found that:

a) in the context of MMR vaccination, the negative frame (goal frame) works better for a highly involved group when involvement is defined by the surrogate measure or previous vaccination decisions (Abhyankar et al., 2008);
b) in the context of HPV vaccination, the negative frame (goal frame) is more persuasive for a highly involved group; where involvement is defined by the frequency of risky behavior — multiple sex partners and infrequent use of condoms (Gerend and Sheperd, 2007);
c) in the context of hypothetical immunization scenario, the positive frame (attribute frame) is more efficient for a low-involvement group only (Donovan and Jalleh, 2000), where involvement is defined by demographic characteristic — whether participants has children of vaccination age.

In the scope of this research, definition of high involvement is defined by the participants' offspring status; in other words, whether a participant at the time of the experiment has children ages 0–5, who, according to the hypothetical vaccination scenario, are more at risk and are eligible for vaccination. Participants or their spouses that are pregnant at the time of the study or planned to be pregnant within the next six months are also considered to be highly

involved. This definition of high involvement has demonstrated moderation in the earlier attribute framing study of Donovan and Jalleh (2000).

Based on the existing literature on issue involvement I posit the following predictions regarding personal involvement and moderation of framing effect as the result of the combined use of the attribute and the goal frame in a unified context:

H2: For highly involved participants, a combination of the negative goal and the positive attribute frames in a single advocacy about vaccination will result in higher positive attitudes towards immunization, confidence in vaccine quality, information seeking behavior, and intentions to obtain vaccination than any other combination of the attribute and the goal frames.

H3: For low involved participants, a combination of positive goal and positive attribute frames in a single advocacy about vaccination will result in higher positive attitudes towards immunization, confidence in vaccine quality, information seeking behavior, and intentions to obtain vaccination than any other combination of the attribute and the goal frames.

These three hypotheses are based on the previous research findings of framing effects in the context of immunization. It is worth noting the last two hypotheses differ only on the goal frame. Although Donovan and Jalleh (2000) have found that the positive attribute frame is more persuasive for low-involved participants only, there is no scientific evidence to suggest that the opposite is true. Along the same lines, there is no indication that the negative attribute frame is

better for highly involved individuals. In fact, the attribute framing studies in different context have confirmed the overall superiority of the positive frame (Levin and Gaeth, 1988). Therefore, the positive attribute of the frame valence was set constant, both for high- and low-involved groups.

Procedure

This study is an on-line field experiment conducted in a non-lab setting. More than 600 participants (parents and non-parents) attempted to participate in the study. The majority of participants were recruited through various parental and professional organizations in Kansas, including the K-State Center for Child Development, Parents and Teachers program, Hoeflin Stone House, parent teacher organizations, school districts and professional associations. A personalized e-mail was sent to the relevant coordinators with a request to disseminate information among electronic mailing list members (Appendix G). Other participants were recruited though bulletin boards in Kansas, on-line communities and forums, namely: LiveJournal (public health, psychology, and Atlanta communities); Craigslist (baby and kids section in Manhattan, Wichita, Kansas City, Topeka and Salina, KS); RileyYardSales at Fort Riley, KS, and Facebook pages. The on-line advertising at social media networks exactly matched the recruitment letter that was sent to the electronic mailing list members. listserv.

To satisfy assumptions of the statistical tests, a total number of at least 300 single-gender participants were to be recruited. In two weeks of data collection from March 22 to April 5, 2010, a total number of 637 participants started the experiment, with 584 of them successfully completing it. The prevailing majority of participants were females (N=463). The participants received a link to the K-State Axio Survey system and were asked to complete a short on-line

survey about their health beliefs and health options available to them. The content of the recruitment letter was purposefully made vague and did not mention vaccination, in order to reduce participants' self-select bias. Although presented to the participants in the form of an on-line survey, the study constituted a field experiment with the random assignment of participants across four experimental conditions and one control condition.

First, the participants responded to three general questions about state of their health. Immediately after that, the participants were randomly assigned to one of the five conditions — four combinations of the attribute and the goal frames valence (Appendix A, B, C, D), and one control condition with no framing manipulation (Appendix E). One of the four experimental or a control condition appeared on the participants' screen. After having read health messages, the participants were asked to complete a set of post-experimental dependent measures: perception of message (manipulation check); attitudes towards the vaccine; perceived vaccine quality; vaccine efficacy; and intentions to obtain immunization.

Following the dependent measures, the participants completed a set of additional measures, consisting of control variables: general attitudes towards vaccination; perception of vaccine risk; previous immunization history; and demographics — age, education, income, and gender. To assess information seeking behavior, at the end of the survey the participants were provided with two options: a) a hyperlink leading to the additional information about the vaccine and b) the survey end. The option to acquire more information was used as a direct measure of information seeking behavior. In both cases, participants were thanked, debriefed, and offered an opportunity to win a $50 Best Buy gift certificate.

Conducting this experiment on-line possessed number of limitations. First, there was lack of control for extraneous variables and conditions under which the experiment was conducted. In

other words, the participants may have completed experiment in a different environment, time pace, and so on. Second, the participants were self-selected, which could create some margin of error. Recognizing these limitations, appropriate controls were included into the experimental design to minimize these threats.

First, the experiment was kept very short — on average requiring less than 10 minutes to complete. Participants were asked to complete the survey with minimum distraction, interaction or consultation with others. This message was explicitly presented before the study. Second, the average time to complete the experiment was monitored. Severe outliers — cases where completion time of the experiment felt beyond three times of the inter-quartile range of the average completion time — were excluded from the analysis. All other variability and confounding effects were believed to be randomly distributed across all five groups.

Organizing this experiment in a lab setting would have posed great logistical challenges. First of all, given participants' characteristics, it would have been incredibly difficult to recruit the parents for the lab experiment, especially those with children of age 0–5. Unless some monetary incentive was provided, the lab experiment with parents was an unrealistic option. Furthermore, selecting the participants from a college population was not feasible either, because it would not have produced the required variability in characteristic of interest (having children ages 0–5) for testing hypotheses 2 and 3.

On the other hand, conducting the experiment on-line presented several advantages as well. First of all, until now, there has been no study on framing of health communication messages that used the Internet as a medium. With the increasing popularity of health communication resources on-line, such as WebMD, and the growing presence of the anti-vaccination advocacy groups on the World Wide Web, it was worthwhile to explore how

framing effects operated in an on-line setting. (Cassel, Jackson, and Cheuvron, 1998; Zimmerman, Wolfe, Fox D., Fox, J., Nowalk, Troy, and Sharp; 2005). Second, by calculating the actual click-through rate on the last page, it was possible to measure not only the intention to seek more information, but the actual information seeking behavior. So far, no framing study in the context of vaccination measured the actual behavioral outcome. Abhyankar et al. (2008) recently posited the need for more valid measures to predict vaccination behavior. This may have been the first study in the given context that actually measured information seeking behavior, rather than behavioral antecedents.

Tools

Axio Survey application was used to collect the data for this research. The online software, formerly known as K-State Survey System, is a Web-based research tool that allows administering quantitative surveys through the World Wide Web. Axio Survey accomodates various measurements and question types — multiple choice, ranking, semantic differentials, Likert scales, and short answers. In addition, this system is capable of administering skip sequencing order, also known as question branching, providing a fair amount of flexibility in survey design. However, this application is not designed to accommodate on-line experiments. In other words, the program is not capable of randomizing loaded pages as experimental conditions.

This limitation has posed a great challenge for the present research, the design of which has assumed a random loading of health advocacy messages to the participants. After consultation with Axio Survey system administrators, a randomization solution was found. A question branching tool was used for randomization. The participants were assigned to one of the five conditions depending on their day of birth. All 31 days of the month were split into six

groups. For example, those born on or between 1st and 6th day of the month were assigned to the experimental group 1, those born on or between 7th and 12th day to group 2, and so on. Unlike birth seasonality, throughout the months of the year, no known birth pattern exists for the days of the month. Therefore, this arrangement provided fair randomization and assignment of the participants into groups.

Axio Survey system allows survey administrators to obtain the data in digital format for further processing, thus eliminating data entry errors. The survey report was downloaded from the Web application in an Excel, comma delimited file. Then, the data was transformed into regular Excel worksheet format for cleaning. All incomplete and unfinished cases were removed and the missing values recoded. Lastly, the data was transformed into SPSS and analyzed on the latest version of the PASW18.0 software program, licensed to the Institute for Academic Alliances at Kansas State University.

Stimuli

To exclude any predisposition towards existing infectious disease, a hypothetical immunization scenario, promoting the non-existent *Enzae-B* vaccine was developed as a stimulus. To ensure the ecological validity of the experiment, the *Haemophilus Influenzae type B (Hib)* vaccination scenario was used as a prototype. Factual information from the Centers for Disease Control and Prevention's *Hib* Vaccine Information Statement brochure (CDC, 1998) was used to create a hypothetical scenario for *Enzae-B* virus, which matched the risks and consequences of the *Hib* infection. The vaccine side effects and the probability rates for the attribute framing were also reproduced from the same brochure. The real *Hib* virus is very dangerous and predominantly affects children under the age of 5. *Hib* causes meningitis,

pneumoni,a and epiglotittis. In the U.S., until the introduction of the *Hib* vaccine in 1985, the virus had been infecting 20,000 children annually, resulting in the death of nearly 1,000 children per year (CDC, 1998). As the result of routine immunization with *Hib* vaccine, the infection rate among children had decreased to modest 68 cases per year by 2006 (Immunization Action Coalition, 2010).

Participants did not have prior knowledge about the *Enzae-B* virus or the vaccine before the experiment; nor were the participants able to obtain more information about *Enzae-B*

Figure 2-1: Framing Manipulation - Attribute and Goal Combination

Framing Combinations		**Attribute Framing** Presents characteristic of the vaccine, emphasizing positive "no side effects" (+) or negative "side effects" (-)	
		+	**-**
Goal Framing Promote vaccination behavior emphasizing desirable (+) or undesirable (-) consequences	**+**	Extensive research shows that **90%** of those that vaccinated against Enzae-B **do not develop these side effects**. **By vaccinating** against Enzae-B you will be able to **obtain protection** against this infection and **take advantage** of a safe and lifelong immunity.	Extensive research shows that **10%** of those that vaccinated against Enzae-B **develop these side effects**. **By vaccinating** against Enzae-B you will be able to **obtain protection** against this infection and **take advantage** of a safe and lifelong immunity.
	-	Extensive research shows that **90%** of those that vaccinated against Enzae-B **do not develop these side effects**. By not vaccinating against Enzae-B you will **fail to obtain protection** against this infection and **fail take advantage** of a safe and lifelong immunity.	Extensive research shows that **10%** of those that vaccinated against Enzae-B **develop these side effects**. By not vaccinating against Enzae-B you will **fail to obtain** protection against this infection **and fail take advantage** of a safe and lifelong immunity.

independently over the course of the experiment. The query for the term *Enzae-B* virus or vaccine in Google search engine does not directly disclose the potential association with *Haemophilus Influenzae type B (Hib)*, especially for a layperson. Therefore, masking an existing vaccine under the non-exitent name is ecologically valid, but also does not undermine experimental controls.

Table 2.1 outlines the four possible attribute and the goal frame combinations in a unified context. The attribute frame presents characteristic of the vaccine in a positive or a negative light. The goal frame calls to obtain immunization either presenting desirable consequences of accepting vaccination, or undesirable consequences of refusing it.

Preceding the framing manipulation, all four experimental groups and the control group, were exposed to the identical factual information about Enzae-B bacteria to establish a unified context:

Enzae-B bacteria are one of the leading causes of meningitis in the United States. Some adults and especially young children under the age of 5 are particularly susceptible to contracting Enzae-B. Entering the lungs and blood streams, the bacteria causes severe infection of the covering of the brain and the spinal cord; serious lung and throat disease. The Enzae-B vaccine is the best way of protection against these highly infectious bacteria. The vaccine may soon be available at your local health center. The side effects of the Enzae-B vaccine include swelling, redness or fever over 101°F lasting for several days.

The control group did not have any framing manipulation and included only the aforementioned message. In all four experimental conditions that featured framing manipulation, the order of the advocacy message consisted of: a) the same factual information about the disease for all conditions; b) the manipulated attribute frame that presents characteristic of the vaccine;

and c) the manipulated goal frame that calls for health behavior and presents consequences of performing or not performing the behavior. This is the logical order of presenting health communication information, where one first sensitizes an audience about the disease risks, presents a solution to the problem, and finally, calls for action or behavior.

Measures

The research adapted multiple item 7-point ascending semantic differential scales that demonstrated high reliability in studies by Abhyankar et al., (2008) and Donovan and Jalleh, (2000). Variables were measured by presenting participants with the set of statements and requesting them to indicate their position on the scale continuum.

a) Attitude about vaccination - "Vaccinating against Enzae-B virus is …"

- bad idea – good idea
- foolish-wise
- unimportant – important
- threatening-assuring

b) Attitude about vaccination - Perception of vaccine safety - "Enzae-B vaccine is…"

- risky-safe
- harmful-beneficial
- ineffective-effective

c) Enzae-B vaccine risk perception check – "The health information about Enzae-B vaccine emphasizes that those that vaccinated are…"

- likely to develop side effects – unlikely to develop side effects

d) Intentions to seek more information – "How interested are you to learn more about Enzae-B infection or vaccination?"

- not at all interested – very interested

e) Involvement manipulation check – "The health information about Enzae-B was…"

- not at all interesting – highly interesting
- meaningless to me - meaningful to me
- irrelevant to me – relevant to me

Five point Likert scale was adapted to assess behavioral intentions to obtain vaccination: 1- very unlikely, 2- unlikely, 3-undecided, 4-likely and 5- very likely. Participants were asked to rate the likelihood of performing four behaviors:

a) What is the likelihood of you to consider obtaining Enzae-B vaccination?

b) How likely will you try to obtain Enzae-B vaccination this year?

c) If there was an appointment for Enzae-B vaccination today, how likely would you go?

d) How likely are you to recommend Enzae-B vaccination to other people who have children?

Control variables were introduced to account for any differences that may appear between groups. Thus, several variables measured the level of agreement on a 7-point semantic differential scale with statements on a) previous vaccination history — "I have obtained most of the required vaccination for my age," b) attitude and risk perception of vaccines in general — "I believe vaccines are not effective in protecting me from diseases," c) "I believe vaccines have side effects that are not worth the benefit," and finally, d) "I believe vaccines are scary." Nominal "True-False" measures recorded whether participants knew at least one person in family or among friends who had dramatic side effects after vaccination; whether in the past nine

months participants had obtained a flu shot; and finally, whether vaccination was prohibited by the participant's religion. For a detailed list and the order of measures presented, the reader is referred to Appendix F of this paper.

Information seeking behavior was measured by the actual click-through rate at the webpage that provided links to download additional information about Enzae-B; in other words, number of participants that had visited the webpage containing additional web-links about Enzae-B.

Analysis

Multiple-item measures of dependent variables were standardized into composite mean scores. To test the main hypothesis a 2 (positive/negative attribute) x 2 (positive/negative goal) between group ANOVA test was used to test the means of dependent variables. Further, ANCOVA analysis was conducted to statistically control for confounding effects. A post-hoc Bonnferoni test revealed any significant contrasts between the groups.

The design for testing hypothesis 2 and 3 constituted an eight group 2 (attribute frame) x 2 (goal frame) x 2 (involvement) mixed design with the first two factors between group and the third factor within group. The same ANCOVA statistical tests were used. In addition, the Pearson correlation was conducted to check for the strength of association between the involvement factor and dependent variables.

A chi-square significance test was used to check for any differences of actual information seeking behavior between the groups. The actual number of participants that have followed the link to download more information and those that have not were compared by the means of cross-tabulation.

CHAPTER 3 - Results

Participants

Six hundred and thirty seven participants started the field experiment, and 584 participants successfully completed it. Male participants (N=102) and cases with missing gender information (N=6) were excluded from the analysis, leaving a dataset of 476 female participants. Overall participants' average age was 34 years (St.Dev.= 11.3; range 19 to 76 years). The participants were highly educated. Only 3.2% had finished just high school; 19.1% had some college education; 35.3% had earned or were pursuing a bachelor's degree; 31.3% had been conferred their master's degree, and 10.7% had a doctoral degree. The participants were relatively well-off in terms of income. Associated with more years of schooling, participants' gross household income was distributed as follows: almost 34% earned an annual income of $36,000 or less; 19.2% earned between $36,000 and $58,000; 21% earned between $58,000 and $85,000; 14% ear ed between $85,000 and $115,000; and 11.4% earned an annual income of more than $115,000. The participants believed of themselves to be generally healthy (M=6.03, St.Dev.=1.026, N=474); had rarely fallen ill (M=5.66, St.Dev.=1.521, N=474); and had undergone regular health check-ups (M=5.18, St.Dev.=2.071, N=474). The prevailing majority of participants (90.5%) had health insurance. In the five groups, the distribution of age (F=1.410, p=0.230), education (χ^2=25.828, p=0.172), or availability of health insurance (χ^2=7.756, p=0.101) did not significantly vary.

Dependent Variables

The four dependent variables analyzed in this survey are: a) perception of vaccine safety in the message, consisting of 1-item scale measuring the likelihood of having side effects after Enzae-B vaccination; b) participants' attitude toward Enzae-B vaccine, consisting of the 7-item scale; c) participants' behavioral intentions to obtain Enzae-B vaccination, consisting of the 3-item scale; and d) participants' information seeking behavior, measured by the actual number of participants that have accessed the webpage with additional information about Enzae-B. All four variables are accepted predictors of health behavior and are widely used in health communication context.

The 7-item attitude ("ATT") towards Enzae-B scale has demonstrated high reliability. All seven items had strong significant bivariate correlation, resulting in Chronbach's Alpha of 0.932.

Table 3-1: Correlation Table for 7-Item Dependent Variable "ATT"

Correlations

		Attitude_Idea	Attitutde_ foolish or wis e	Attitude_ importance	Attitude_ threatening	Attitude_risk	Attitude_ benefit	Attitude_ efficiency
Attitude_Idea	Pearson Correlation	1	.881**	.819**	.760**	.597**	.669**	.563**
	Sig. (2-tailed)		.000	.000	.000	.000	.000	.000
	N	575	569	568	567	572	572	568
Attitutde_foolish or wise	Pearson Correlation	.881**	1	.828**	.740**	.588**	.655**	.583**
	Sig. (2-tailed)	.000		.000	.000	.000	.000	.000
	N	569	571	570	569	570	571	570
Attitude_importance	Pearson Correlation	.819**	.828**	1	.757**	.537**	.610**	.505**
	Sig. (2-tailed)	.000	.000		.000	.000	.000	.000
	N	568	570	573	568	571	572	570
Attitude_threatening	Pearson Correlation	.760**	.740**	.757**	1	.596**	.617**	.560**
	Sig. (2-tailed)	.000	.000	.000		.000	.000	.000
	N	567	569	568	571	569	570	568
Attitude_risk	Pearson Correlation	.597**	.588**	.537**	.596**	1	.808**	.628**
	Sig. (2-tailed)	.000	.000	.000	.000		.000	.000
	N	572	570	571	569	576	571	570
Attitude_benefit	Pearson Correlation	.669**	.655**	.610**	.617**	.808**	1	.653**
	Sig. (2-tailed)	.000	.000	.000	.000	.000		.000
	N	572	571	572	570	571	577	571
Attitude_efficiency	Pearson Correlation	.563**	.583**	.505**	.560**	.628**	.653**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	
	N	568	570	570	568	570	571	571

**. Correlation is significant at the 0.01 level (2-tailed).

A 3-item scale measured behavioral intent, i.e., the likelihood of "considering to obtain Enzae-B vaccination"; "obtain Enzae-B this year" and "obtain Enzae-B if had an appointment today." All three items had significant correlation of Pearson r = 0.675 or higher. A reliability check produced relatively high Chronbach's Alpha = 0.882. Therefore, the reliability of the measures adapted from the previous studies was confirmed.

Main Effects – Hypothesis 1

I computed a one-way ANOVA comparing the mean scores of perception of vaccine safety. A significant difference was found among five groups ($F(4,468)=55.643$, $p<0.0001$) — see table 3-2. A post-hoc Bonferroni test (Table 3-3) was used to determine the nature of the differences between the five groups. The analysis revealed that all experimental groups — Group 1 (M=5.85, sd=1.47), Group 2 (M=5.60, sd=1.35), Group 3 (M=6.04, sd=1.25), and Group 4 (M=4.86, sd=1.73) — perceived the message that the Enzae-B vaccine was less likely to cause side effects more often than the control group (M=3.32, sd=1.57). N.B. higher score indicates lower probability. Within the experimental groups, Groups 1, 2, and 3 scored significantly higher than Group 4.

Table 3-2: Perception of Vaccine Safety Group Differences

Perception of Vaccine Safety "Side Effects - Likely/Unlikely"

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Group 1- PA/PG	86	5.85	1.467	.158	5.53	6.16	1	7
Group 2- NA/PG	89	5.60	1.354	.144	5.31	5.88	1	7
Group 3 - PA/NG	101	6.04	1.248	.124	5.79	6.29	1	7
Group 4 - NA/NG	94	4.86	1.739	.179	4.51	5.22	1	7
Control Group	103	3.32	1.567	.154	3.01	3.63	1	7
Total	473	5.10	1.796	.083	4.93	5.26	1	7

In other words, consistent with Donovan and Jalleh (2000), the positive attribute frame "90% of vaccinated do not have side effects" was more powerful and evoked less risk than negatively framed "10% vaccinated do have side effects" in Group 4, as well as in the control group. The negative connotation of the "10% side effect" attribute frame in Group 2 seemed to be alleviated by the positive and encouraging goal frame.

Table 3-3: Post-Hoc between Group Test for Perception of Vaccine Safety

(I) Group	(J) Group	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Group 1- PA/PG	Group 2- NA/PG	.253	.225	1.000	-.38	.89
	Group 3 - PA/NG	-.191	.218	1.000	-.81	.42
	Group 4 - NA/NG	.987*	.222	.000	.36	1.61
	Control Group	2.528*	.217	.000	1.92	3.14
Group 2- NA/PG	Group 1- PA/PG	-.253	.225	1.000	-.89	.38
	Group 3 - PA/NG	-.444	.216	.402	-1.05	.16
	Group 4 - NA/NG	.734*	.220	.009	.11	1.35
	Control Group	2.275*	.215	.000	1.67	2.88
Group 3 - PA/NG	Group 1- PA/PG	.191	.218	1.000	-.42	.81
	Group 2- NA/PG	.444	.216	.402	-.16	1.05
	Group 4 - NA/NG	1.178*	.213	.000	.58	1.78
	Control Group	2.719*	.208	.000	2.13	3.31
Group 4 - NA/NG	Group 1- PA/PG	-.987*	.222	.000	-1.61	-.36
	Group 2- NA/PG	-.734*	.220	.009	-1.35	-.11
	Group 3 - PA/NG	-1.178*	.213	.000	-1.78	-.58
	Control Group	1.541*	.212	.000	.94	2.14
Control Group	Group 1- PA/PG	-2.528*	.217	.000	-3.14	-1.92
	Group 2- NA/PG	-2.275*	.215	.000	-2.88	-1.67
	Group 3 - PA/NG	-2.719*	.208	.000	-3.31	-2.13
	Group 4 - NA/NG	-1.541*	.212	.000	-2.14	-.94

*. The mean difference is significant at the 0.05 level.

Attitude (7-item)

A one-way ANCOVA was calculated to examine the effect of message framing on overall attitude toward vaccination, co-varying out the effects of participants' a) previous

vaccination history, b) general perception of vaccine efficiency, c) perception of vaccine safety, d) vaccine dread, e) vicarious experience with side effects — knowledge of significant other affected by vaccine side effects, and f) recent flu shot vaccination status.

Table 3-4: Descriptive Statistics for Dependent Variables

	Group	Cases			
		Descriptives		Total	
		Mean	St.Dev.	N	Percent
ATT	Group 1- PA/PG	5.45	1.28	87	1.0
	Group 2- NA/PG	5.52	1.08	90	1.0
	Group 3 - PA/NG	5.55	1.11	101	1.0
	Group 4 - NA/NG	5.40	1.01	94	1.0
	Control Group	5.17	1.10	104	1.0
BEH_INT3 item	Group 1- PA/PG	2.86	1.13	87	1.0
	Group 2- NA/PG	2.69	1.04	90	1.0
	Group 3 - PA/NG	2.76	1.12	101	1.0
	Group 4 - NA/NG	2.72	1.06	94	1.0
	Control Group	2.57	1.04	104	1.0

Control and dependent variables were checked for multi-correlation (Table 3-5) to check for assumptions of the statistical test. The main effect of message framing manipulation was

Table 3-5: Correlation Table between Control and Dependent Variables

Correlations

		Ctrl_Vaccin_ Hist	Ctrl_Vaccin_ Effic	Ctrl_Vaccine_ AEFI	Ctrl_Vaccine_ Scary	ATT	BEH_INT3ite m
Ctrl_Vaccin_Hist	Pearson Correlation	1	-.119*	-.305**	-.182**	.236**	.167**
	Sig. (2-tailed)		.011	.000	.000	.000	.000
	N	458	457	457	457	456	458
Ctrl_Vaccin_Effic	Pearson Correlation	-.119*	1	.470**	.302**	-.127**	-.106*
	Sig. (2-tailed)	.011		.000	.000	.006	.022
	N	457	474	474	474	472	474
Ctrl_Vaccine_AEFI	Pearson Correlation	-.305**	.470**	1	.568**	-.371**	-.238**
	Sig. (2-tailed)	.000	.000		.000	.000	.000
	N	457	474	474	474	472	474
Ctrl_Vaccine_Scary	Pearson Correlation	-.182**	.302**	.568**	1	-.342**	-.194**
	Sig. (2-tailed)	.000	.000	.000		.000	.000
	N	457	474	474	474	472	474
ATT	Pearson Correlation	.236**	-.127**	-.371**	-.342**	1	.539**
	Sig. (2-tailed)	.000	.006	.000	.000		.000
	N	456	472	472	472	474	474
BEH_INT3item	Pearson Correlation	.167**	-.106*	-.238**	-.194**	.539**	1
	Sig. (2-tailed)	.000	.022	.000	.000	.000	
	N	458	474	474	474	474	476

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

significant (F(10,444)=12.755, p<0.0001). All aforementioned co-variates are significantly related to overall attitudes formed about the Enzae-B vaccination (refer to Table 3-4 for details).

Table 3-6: Between Subject Effects of Message Framing on Attitude

Dependent Variable:ATT

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	125.409[a]	10	12.541	12.755	.000
Intercept	150.524	1	150.524	153.093	.000
VAC_HISTORY	8.949	1	8.949	9.102	.003
VAC_NOTEFFECT	4.707	1	4.707	4.788	.029
VAC_HAVEAEFI	12.476	1	12.476	12.689	.000
VAC_SCARY	11.700	1	11.700	11.899	.001
KNOW_AEFI	5.762	1	5.762	5.860	.016
FLU_SHOT9M	6.198	1	6.198	6.304	.012
GROUP	13.660	4	3.415	3.473	.008
Error	436.550	444	.983		
Total	13947.431	455			
Corrected Total	561.960	454			

a. R Squared = .223 (Adjusted R Squared = .206)

A post-hoc Bonferroni test indeed revealed that Group 3 (M=5.631, sd=.10), framed as positive attribute and negative goal condition, is the only group out of the four experimental conditions that scored higher overall on the attitudes scale than the control group (M=5.124, sd=.10). Therefore, consistent with the Hypothesis I, positive attribute/negative goal frame demonstrated a higher persuasive power than the control group. However, although participants in this group scored higher than in other experimental conditions, the difference among them was not statistically significant ($0.94 < p < 1$).

Behavioral Intentions (3-item)

I computed a one-way ANCOVA to elucidate the effect of message framing on behavioral intentions to obtain Enzae-B vaccination, accounting for six aforementioned co-variates. Participants' general perception of vaccine safety ($F(1)=5.068$, $p<0.025$) and recent flu immunization history ($F(1)=36.921$, $p<0.0001$) were significantly associated with behavioral intentions. The main effect ofmessage framing manipulation on behavioral intentions was insignificant ($F(4)=0.839$, $p=0.501$), suggesting that message framing has no effect on behavioral intentions to obtain immunization, even after co-varying out the effects of general perception of vaccine safety and recent flu immunization history.

Information Seeking Behavior

The relationship between message framing manipulation and actual information seeking behavior was tested with a chi-square test of independence. No significant relationship was found ($\chi^2(4) = 3.183$, $p=.528$). Actual information seeking behavior in this experiment appears to be independent of framing manipulations.

Table 3-7: Cross-Tabulation for Actual Information Seeking and Groups

			Information Seeking		
			No information seeking	Information seeking	Total
Group	Group 1- PA/PG	Count	49	38	87
		% within Information Seeking	16.9%	20.5%	18.3%
	Group 2- NA/PG	Count	56	34	90
		% within Information Seeking	19.3%	18.4%	18.9%
	Group 3 - PA/NG	Count	66	35	101
		% within Information Seeking	22.8%	18.9%	21.3%
	Group 4 - NA/NG	Count	52	41	93
		% within Information Seeking	17.9%	22.2%	19.6%
	Control Group	Count	67	37	104
		% within Information Seeking	23.1%	20.0%	21.9%
Total		Count	290	185	475
		% within Information Seeking	100.0%	100.0%	100.0%

Framing * Involvement Interaction – Hypotheses 2 and 3

Involvement Manipulation Check (3-item)

In the scope of this research, highly involved participants were defined as a) having children or grandchildren under 5 years of age, and b) being pregnant. To decide whether this definition of involvement was indeed a valid measure, responses of whether the message about Enzae-B was "interesting," "relevant," and "meaningful" were measured on a 3-item, seven point semantic differential scale. All three items were significantly correlated at α=0.01 level, with a Pearson r = .507 and higher. The scale has demonstrated high reliability (Chronbach's Alpha = 0.836). Composite involvement score was computed by averaging the scores of three items, creating a new variable MC_INVOLV_3ITEM.

I calculated a one-way ANOVA comparing the composite involvement scores for those that were involved, and those that were not, i.e., the participants that did not match the aforementioned involvement criteria. A significant difference was found between the two groups ($F(1,473) = 3.821$, $p = 0.051$). Participants who were pregnant, had children or grandchildren of under 5 years of age indeed rated that the health message about Enzae-B vaccination was more "interesting," "meaningful," and "relevant."

Table 3-8: Involvement Manipulation Check

MC_INVOLV_3ITEM

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
Involved	225	5.0533	1.41916	.09461	4.8669	5.2398	1.00	7.00
Not Involved	250	4.8147	1.24179	.07854	4.6600	4.9693	1.00	7.00
Total	475	4.9277	1.33269	.06115	4.8076	5.0479	1.00	7.00

Although the p value is 0.001 above the commonly accepted rounded 0.05 α level, I consider this to be statistically significant difference. Another ANOVA was computed on a reduced 2-item involvement score, eliminating the variable "interesting." The new test produced

a stronger significance level ($F(1,464) = 7.808$, $p = 0.005$). It is logical to assume that one may find a health message interesting, but not necessarily personally relevant or meaningful. Therefore, based on these two ANOVA tests, I posit that the definition of involvement, adapted from Donovan and Jalleh (2000), has high ecological validity in this field experiment.

Effect of Involvement on Dependent Variables

Similar to the testing in Hypothesis 1, I calculated a one-way ANCOVA to examine the effect of message framing and involvement on overall attitude towards vaccination, co-varying out the effects of participants' a) previous vaccination history, b) general perception of vaccine efficiency, c) perception of vaccine safety, d) vaccine dread, e) knowing of a significant other who suffered vaccine side effects, and f) recent flu shot vaccination status.

Table 3-9: Between Subjects Effects of Involvement and Message Framing on Attitudes

Dependent Variable:ATT

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	134.864[a]	15	8.991	9.242	.000
Intercept	144.147	1	144.147	148.165	.000
VAC_HISTORY	8.659	1	8.659	8.900	.003
VAC_NOTEFFECT	4.488	1	4.488	4.614	.032
VAC_HAVEAEFI	13.069	1	13.069	13.433	.000
VAC_SCARY	10.239	1	10.239	10.525	.001
KNOW_AEFI	5.065	1	5.065	5.206	.023
FLU_SHOT9M	8.240	1	8.240	8.470	.004
GROUP	11.149	4	2.787	2.865	.023
INVOLV_AGR	4.012	1	4.012	4.124	.043
GROUP * INVOLV_AGR	5.626	4	1.407	1.446	.218
Error	427.096	439	.973		
Total	13947.431	455			
Corrected Total	561.960	454			

a. R Squared = .240 (Adjusted R Squared = .214)

In this general linear model, the main effects of involvement ($F(1,455) = 4.124$, $p=0.043$) and framing manipulation ($F(4,455) = 2.865$, $p = 0.023$) were significant. As in the test of Hypothesis 1, all aforementioned co-variates were significantly related to overall attitudes formed about the Enzae-B vaccination. A post-hoc Bonferroni analysis revealed that even after introducing involvement as a fixed factor into the model, Group 3, which received a message framed as positive attribute / negative goal condition, was the only group that scored higher on attitude scale than the control group. Overall, in all five groups those that were highly involved had lower attitudes toward Enzae-B vaccination ($F(1,455) = 3.863$, $p = 0.05$). As posited by Donovan and Jalleh (2000), the involved group was more cautious about making judgments about the vaccine.

However, the interaction of framing manipulation and involvement was found to be

Table 3-10: Descriptive Statistics for Framing and Involvement

Dependent Variable:ATT

Group	INVOLV_AGR	Mean	Std. Deviation	N
Group 1- PA/PG	Involved	5.4053	1.55462	43
	Not Involved	5.4721	.96268	41
	Total	5.4379	1.29257	84
Group 2- NA/PG	Involved	5.2990	1.34403	43
	Not Involved	5.7907	.70494	43
	Total	5.5449	1.09512	86
Group 3 - PA/NG	Involved	5.3684	1.09385	38
	Not Involved	5.7643	.94168	60
	Total	5.6108	1.01654	98
Group 4 - NA/NG	Involved	5.3950	.97587	51
	Not Involved	5.4482	1.06721	40
	Total	5.4184	1.01159	91
Control Group	Involved	5.2146	1.04638	43
	Not Involved	5.0391	1.14856	53
	Total	5.1177	1.10175	96
Total	Involved	5.3379	1.20744	218
	Not Involved	5.5030	1.01367	237
	Total	5.4239	1.11256	455

insignificant (F(4,455) = 1.446, p = 0.218). In other words, there was no difference between how highly involved and not involved participants reacted to framed messages (refer to Table 3-10).

A similar ANCOVA model was tested, co-varying for participants' general health status and substituting the dependent variable "attitude -ATT" with the dependent variable "behavioral intent — BEH_INT3item." Although the model was significant, there were no significant effects for framing manipulation (F(4,457)=0.751, p=0.558). The main effect for involvement approached significance level (F(1,457)=3.268, p=0.071). Again, framing manipulation * involvement interaction was found to be insignificant (F(4,457)=.382, p=.822).

A chi-square test for independence was conducted to test the relationship between involvement and actual information seeking behavior. Participant's involvement state was entered as a layer in the analysis. Overall, across all five groups, more involved participants were more likely to download more information about the Enzae-B vaccine (χ^2 (1) = 6.937, p = 0.008). The actual information seeking behavior appears to be dependent on participants' state of involvement, i.e., whether they considered a message more personally relevant.

Table 3-11: Cross-Tabulation for Actual Information Seeking and Involvement

			Information Seeking		
			No information seeking	Information seeking	Total
INVOLV_AGR	Involved	Count	124	102	226
		% within Information Seeking	42.8%	55.1%	47.6%
	Not Involved	Count	166	83	249
		% within Information Seeking	57.2%	44.9%	52.4%
Total		Count	290	185	475
		% within Information Seeking	100.0%	100.0%	100.0%

However, there was no statistically significant difference between involved participants and not involved participants within groups. When the involvement variable was substituted for framing manipulation, and added as a layer in the chi-square test for independence, the framing manipulation and information seeking behavior appear to be independent of each other (χ^2 (4) = 4.178, p = 0.382).

Other Findings

Three dependent variables — attitude towards Enzae-B vaccination, behavioral intentions, and information seeking — were significantly correlated. As suggested by numerous health communication theories, attitude is a strong predictor of health behavior. Indeed, those that formed favorable attitudes about the new vaccine were more likely to consider obtaining vaccination (r = 0.539, p < 0.001), and seek more additional information (r = 0.265, p < 0.001).

Consistent with the Risk Perception and Social Amplification of Risk theory (Kasperson and Kasperson, 1996; Slovic, 1989), knowing a significant other who was negatively affected by a vaccine side effect, heightened the risk perceptions of vaccines. I computed a one-way ANOVA comparing answers to the three statements between those have had vicarious experience of vaccine side effects, and those that had not ("vaccines have side effects that are not worth the benefit," "vaccines are not effective in protecting me from diseases," and "vaccines are scary"; with a scale of 1-disagree; 7-agree). A significant difference was found among these two groups of participants for each of the three variables respectively: Ctrl_Vaccine_AEFI (F(1,471) = 43.287, p<0.001), Ctrl_Vaccin_Effic (F(1,471) = 9.176, p<0.003), and Ctrl_Vaccine_Scary (F(1,471) = 38.636, p < 0.001). Those that had a significant other who

suffered side effects from immunization had more negative overall perception of vaccine safety, vaccine efficiency to prevent diseases, and vaccine dread.

Table 3-12: ANOVA Table for Vaccine Risk Amplification

Descriptives

		N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
						Lower Bound	Upper Bound		
Ctrl_Vaccine_AEFI	No	379	2.16	1.404	.072	2.02	2.30	1	7
	Yes	94	3.31	1.895	.195	2.92	3.70	1	7
	Total	473	2.39	1.580	.073	2.25	2.53	1	7
Ctrl_Vaccin_Effic	No	379	2.36	1.977	.102	2.16	2.56	1	7
	Yes	94	3.05	2.039	.210	2.64	3.47	1	7
	Total	473	2.50	2.006	.092	2.32	2.68	1	7
Ctrl_Vaccine_Scary	No	379	2.57	1.739	.089	2.40	2.75	1	7
	Yes	94	3.86	2.030	.209	3.45	4.28	1	7
	Total	473	2.83	1.870	.086	2.66	3.00	1	7

CHAPTER 4 - Discussion

The purpose of this field experiment was to: a) determine what type of message framing and the combination of thereof produces the strongest effect on vaccination behavior; b) ascertain to what extent personal relevance of vaccination moderates this framing effect; and c) explore how individual pre-existing characteristics, such as previous vaccination decisions, vaccine risk perception, and general attitudes toward vaccines influence the persuasive power of framed messages.

The Effects of Framing Combination

To date, no study examining message framing effects have combined attribute framing and goal framing in a single message about vaccination. This study has attempted to test whether the combined framing effects would sustain persuasion in a real health communication advocacy setting. Previous research suggested that the positive attribute and the negative goal frame combination would result in higher attitudes toward vaccination or behavioral intentions to obtain immunization (Abhyankar, O'Connor, and Lawton, 2008; Donovan and Jalleh, 2000; Ferguson and Gallagher, 2007; Gerend and Shepherd, 2007; Gerend, Shepherd, and Monday, 2008;). Based on this previous research, I predicted in Hypothesis 1 that the combination of the positive attribute and the negative goal frame would have the strongest effect on attitudes and behavioral intentions to obtain immunization. The observed results support this hypothesis for the attitude toward the promoted immunization only. Indeed, Group 3, which was exposed to the message, "90% of those that vaccinated do not develop side effects" as positive attribute frame in combination with the negative goal frame, "by not vaccinating you will fail to obtain protection,"

was the only experimental group out of the four conditions that produced significantly more positive attitudes toward the promoted vaccine than the control group.

However, unlike other studies with only one type of frame manipulation in a single message, there was no significant difference between the experimental groups. In other words, although the experiment supported Levin, Gaeth, and Schneider's typology of frames as well as the direction of the framing effect for the attitude, the magnitude of this effect was not substantial enough to statistically confirm the difference among the four possible attribute framing and goal framing combinations. Nonetheless, this combination of the attribute frame and the goal frame was the only one that differed from the control or, "no framing" group. Therefore, it can be suggested that the combination of the positive attribute frame and the negative goal frame in a single advocacy context is likely to be more persuasive in real immunization advocacy context. In other words, if a health communicator needs to promote a vaccine, the result of a favorable opinion would likely be achieved by emphasizing the frequency of vaccinated that had no side effects in combination with the negative consequences of not obtaining immunization. It is worth noting that health communication products often use the opposite technique — presenting the frequency of those that suffered from adverse effects following immunization. The results of this study clearly demonstrate the need for a more theory-driven approach in the design of materials for public health campaigns.

Overall participants' attitude to obtain immunization was strongly correlated with behavioral intentions to obtain immunization, as well as actual information seeking behavior. Along the same lines, while framing manipulation affected attitudes, its effect on actual behavioral intentions or information seeking was found to be insignificant. The legitimate question is: why was there no framing effect on behavioral intentions or the information seeking,

when numerous studies in health communication were able to detect the effect? Review of previous research on framing effects in the context of immunization revealed a common trend. Previous studies have used existing and well-known diseases in their manipulation, the risks and prevalence of which were arguably quite familiar to the participants. For example, Abhyankar et al. (2008) used the measles, mumps, and rubella vaccination with mothers; Ferguson and Gallagher (2007) used the flu vaccination with students, and Gerend and Sheperd (2007) utilized the HPV vaccination vignettes with female students. Only Donovan and Jalleh (2000), similar to this study, have used a hypothetical immunization scenario, but again, for well-known diseases, such as bronchitis and pneumonia.

It was essential for control purposes of this study that a nonexistent vaccine was used for the experimental manipulation. The awareness and risk perception of the nonexistent Enzae-B bacteria was null before the exposure to the experimental message, and the introductory information about this infection in the vignette was the only means to form those cognitions. Although no empirical evidence exists in reference to this fact, meningitis, which was used as a negative consequence in the vignette, is less publicized in the media than the common flu, H1N1, HPV, or even measles. Both may have attenuated the magnitude of the framing effect on actual behavioral intentions. Anecdotal evidence — feedback from several participants — supports this hypothesis. In other words, it may have been naïve to expect that one could possibly be strongly persuaded to obtain immunization against a disease that they have never heard about before, merely after having read a 150 word advocacy message. Furthermore, several studies have not reported actual behavioral intentions as a dependent measure at all (Donovan and Jalleh, 2000), or have used reduced single- or double-item behavioral intentions scales (Abkhyankar et al,

2008). In the end, the founders of the Prospect theory claimed that the effect of message framing "although large and systematic, is not universal" (Kahneman and Tversky, 1981).

One has to acknowledge in this research an innovative and ecologically valid approach to the manipulation of message framing in a unified communication context. This research has demonstrated that a combination of the negative attribute frame, "10% of those vaccinated have side effects" with the positive goal frame, "by vaccinating you will protect yourself," in a single advocacy message may tune the audience to the positive mood, thus alleviating the negative connotation of the 10% risk of side effects. In other words, this message may be as persuasive in forming positive attitudes as the previously suggested positive attribute framing and negative goal framing combination. However, this later frame combination — "90% do not experience side effects" and "by not vaccinating you will fail to protect yourself" — overall has demonstrated stronger effectiveness, and therefore, will be more effective in producing favorable attitudes in health communication materials.

Involvement as a Moderator of Framing Effects

Involvement has previously been found to be integral in the motivation of individuals to perform a health behavior in numerous health communication theories. The present study has also found empirical evidence that those who were highly involved — had children or grandchildren of the vaccination age, or were pregnant — indeed were more likely to obtain immunization and seek more information. However, the issue involvement, i.e., personal relevance of vaccination, had no interaction with framing. In other words, there was no difference between how those that were highly involved and not involved reacted to framed messages.

Previous findings on issue involvement moderating framing effects are less straightforward. While Gerend and Shepherd (2007) have observed framing effects only among highly involved individuals for goal framing, Abkhyandar et al. (2008) have found no moderation, when involvement was defined as having children of vaccination age. On the other hand, Donovan and Jalleh (2000), in their study of attribute framing, have detected framing effect to exist only for the low-involved individuals. They argued that, consistent with the Elaboration of Likelihood Model of persuasion, the highly involved group scrutinized information about vaccine risks to a greater detail, and converted "10% side effects" vs. "90% no side effects" back and forth.

Until now, it has not been clear whether personal relevance of the message moderates framing effects in the combined context of the attribute frame and the goal frame. Therefore, it was important to elucidate whether issue involvement would moderate framing effect in a single advocacy message about vaccination. It must be noted that differences between naturally highly involved and not involved individuals were confirmed by the involvement manipulation check. In other words, those participants that had children or grandchildren under 5 years old, or were pregnant, found the message to be more interesting, relevant, and meaningful. The results of this study clearly demonstrate that involvement, defined by the natural characteristic of the group, does not have any effect on how individuals react to the combination of attribute framed and goal framed messages about immunization. Therefore, the findings of several previous framing experiments have arguably insignificant practical implications in public health campaigns.

Predictors of Vaccination Behavior

In general, pre-existing attitudes towards immunization, as perception of vaccine risks, vaccine dread, perception of vaccine efficacy, and recent immunization history, as well as vicarious experience with vaccine side effects, were found to be significant predictors of behavioral intentions to obtain immunization. Although no major hypothesis was suggested before the experiment, this finding deserves serious attention. These variables, entered as co-variates into the ANCOVA model, were significantly associated with attitude, behavioral intentions, and actual information seeking. Therefore, these variables potentially could be stronger predictors of immunization behavior rather than the manipulation of the advocacy message — an implication for future research.

External Validity

A notable strength of the present study is its external validity as well as the applied nature of the research. To date, there has been only one study in the context of immunization that has attempted to empirically test message framing theory in a real communication environment (McCaul, Johnson, and Rothman, 2002). The present study makes further attempts to increase validity a) by combining different types of frame in a single context — the way most health communication materials are structured; b) by using on-line communication as the medium for health information framing; c) by introducing the control group with no framing manipulation, and d) by adopting the definition of involvement in accordance with the participants' existing characteristics, rather than artificially manipulating the involvement level, as has been done in several other framing studies.

The findings of this field experiment have marked the boundaries of the framing effects in persuading the public to obtain immunization. While the main hypothesis was partially confirmed, supporting the theoretical account of the Prospect theory, the magnitude of the framing effect appeared to be not as substantial as was suggested by some scholars. Therefore, although message framing is useful in the context of promoting vaccination behavior, it should be treated as only one of the strategies to potentially increase the persuasiveness of health communication messages.

Limitations and Future Research

As is the case with any research, this study is prone to some limitations. First of all, as in any experimental design, the results of this study may have been affected by the self-select bias of participants. Although attempts were made not to disclose the real nature of the experiment in the recruitment letter, the experiment may have attracted participants with certain characteristics.

Because this field experiment was conducted on-line, another limitation of the study is the "digital divide" — the disparity between those that have access to information technology and the Internet and those who do not. The participants of this study represent a very educated, economically stable population with access to healthcare services. Although controlling for income, gender, and education in statistical analysis have not affected the results of this study, it may still be worthwhile to examine framing effects among disadvantaged groups that also are more likely to be deprived of preventive health care.

Findings of the present study clearly indicate that the aforementioned factors potentially could be strong predictors of vaccination behavior. Future researchers may attempt to elucidate the role of the pre-existing beliefs and practices about vaccination on immunization behavior.

References

Abhyankar, P., O'Connor, D., & Lawton, R., (2008). The role of message framing in promotion MMR vaccination: Evidence of a loss-frame advantage. *Psychology, Health & Medicine, 13*(1), 1-16.

Bartels R., Elo, L., & Rothman, A. (2004, May). *An analysis of how construal of inoculation interacts with message-based framing appeals.* Paper presented at the annual meeting of the American Psychological Society, Chicago, IL.

Bellaby, P. (2003). Communication and miscommunication of risk: understanding UK parents' attitudes to combined MMR vaccination. *British Medical Journal, 327*, 725-728.

Block, G., & Keller, P., (1995). When to accentuate the negative: The effects of perceived efficacy and message framing on intentions to perform a health-related behavior. *Journal of Marketing Research, 32*, 192-203.

Blume, S. (2006). Anti-vaccination movements and their interpretations. *Social Science & Medicine*, (3), 628-642.

Cassel, M., Jackson, C., & Cheuvron, B., (1998). Health communication on the internet: An effective channel for health behavior change? *Journal of Health Communication, 3,* 71-79.

Casiday, R., (2007). Children's health and the social theory of risk: Insights from the British measles, mumps and rubella (MMR) controversy. *Social Science and Medicine, 65,* 1059-1070.

Clements., C., & Ratzan, S., (2003). Misled and confused? Telling the public about MMR vaccine safety. *Journal of medical ethics 29*(1), 22.

Donovan, J., & Jalleh, G., (2000). Positive versus negative framing of a hypothetical infant immunization: The influence of involvement. *Health Education & Behavior, 27,* 82-95.

Ferguson, E., & Gallagher, L., (2007). Message framing with respect to decisions about vaccination: The roles of frame valence, frame method and perceived risk. *British Journal of Psychology*, *98*, 667-680.

Goodyear-Smith, F., Petousis-Harris, H., Vanlaar , C., Turner, N., & Ram, S., (2007). Immunization in the print media – perspectives presented by press. *Journal of Health Communication, 12*, 759-770.

Gerend, M., & Sias, T., (2009). Message framing and color priming: How subtle threat cues affect persuasion. *Journal of Experimental Psychology, 45*, 999-1002.

Gerend, M., & Shepherd, J., (2007). Using message framing to promote acceptance of the human papillomavirus vaccine. *Health Psychology, 26,* 745-752.

Gerend, M., Shepherd, J., & Monday, K., (2008). Behavioral frequency moderates the effects of message framing on HPV vaccine acceptability. *Annals of Behavioral Medicine, 35,* 221-229.

Gust, D., Brown, C., Sheedy, K., Hibbs, B., Weaver, D., & Nowak, G., (2005). Immunization Attitudes and Beliefs Among Parents: Beyond a Dichotomous Perspective. *American Journal of Health Behavior, 29*(1), 81-92.

Hinman, A., & Randall, L., (2008). Fighting for the Reputation of Vaccines. *Pediatrics, 122*(1), 224 – 225.

Kahneman, D., & Tversky, A., (1979). Prospect theory: an analysis of decision under risk. *Econometrica*, 47, 263-291.

Kahneman, D., & Tversky, A., (1982). The psychology of preferences. *Scientific American*, 246 , 160-173.

Kasperson, E., & Kasperson, J., (1996). The social amplification and attenuation of risk. *New Media & Society, 9* (6), 95-105.

Krishnamurthy, P., Carter, P., & Blair, E., (2001). Attribute framing and goal framing effects in health decisions. *Organizational Behavior and Human Decision Process, 85,* 382-399.

Lambert, S., & Loiselle, C., (2007). Health information – seeking behavior. *Qualitative Health Research, 17,* 1006-1019.

Levin, I., & Gaeth, G., (1988). How consumers are affected by framing of attribute information before and after consuming the product. *Journal of Consumer* Research, 15, 374-378.

Levin, I., Gaeth, G., Schreiber, J., & Lauriola, M., (2002). A new look at framing effects: Distribution of Effect Sizes, Individual Differences, and Independence of Types of Effects. *Organizational Behavior and Human Decision Processes, 88,* 411-429.

Levin, P., Schneider, S., & Gaeth, G., (1998). All frames are not created equal: A typology and critical analysis of framing effects. *Organizational Behavior and Human Decision Processes, 76,* 149-188.

Maheswaran, D., & Myers-Levy,J, (1990). The influence of message framing and issue involvement. *Journal of Marketing Research, 27,* 361-367.

McCaul, K., Johnson, R., & Rothman, A., (2002). The effects of framing and action instruction on whether older adults obtain flu shots. *Health Psychology, 6,* 624-628.

Meyerowitz, B., & Chaiken, S., (1987). The effect of message framing on breast self-examination attitudes, intentions, and behavior. *Journal of Personality and Social Psychology, 3,* 500-510.

O'Keefe, D., & Jensen, J., (2008). Do loss-framed persuasive messages engender greater message processing than do gain-framed messages? A meta-analytic review. *Communication Studies, 59,* 51-67.

Petts, J., & Niemeyer, S., (2004). Health risk communication and amplification: learning from the MMR vaccination controversy. *Health, Risk & Society, 6*(1), 7-23.

Petty, R., & Cacioppo, J., (1979). Issue involvement can increase or decrease persuasion by enhancing message-relevant cognitive responses. *Journal of Personality and Social Psychology, 37,* 1915-1926.

Petty, R., & Cacioppo, J., (1990). Involvement and persuasion: tradition versus integration. *Psychological Bulletin, 107,* 367-374.

Petty, R., Cacioppo, J., & Goldman, R., (1981). Personal involvement as a determinant of argument-based persuasion. *Journal of Personality and Social Psychology, 41,* 847-855.

Petty, R., Cacioppo, J., & Schumann, D., (1983). Central and peripheral routes to advertising effectiveness: the moderating role of involvement. *Journal of Consumer Research, 10,* 135-146.

Raithatha N., Holland R., Simon G., & Harvey I., (2003). A qualitative investigation of vaccine risk perception amongst parents who immunize their children: a matter of public health concern. *Journal of Public Health Medicine, 25*(2), 161.

Rothman A., Bartels, R., Wlaschin, J., & Salovey, P., (2006). The Strategic use of gain- and loss-framed messages to promote healthy behavior: How theory can inform practice. *Journal of Communication, 56,* 202-220.

Rothman, A., & Salovey, P., (1997). Shaping perceptions to motivate healthy behavior: The role of message framing. *Psychological Bulletin,* 121(1), 3-19.

Rothman, A., Martino, S., Bedell, B., Detweiler, J., & Salovey, P., (1999). The systematic influence of gain- and loss-framed messages on interest in and use of different types of health behavior. *Personality and Social Psychology Bulletin, 25,* 1355-1369.

Schneider, T., (2006). Getting the biggest bang for your health education buck. Message framing and reducing health disparities. *American Behavioral Scientist, 49,* 812-822.

Shiv, B., Edell Britton, J., & Payne, J., (2004). Re-Inquiries. Does elaboration increase or decrease the effectiveness of negatively versus positively framed messages? *Journal of Consumer Research, 31,* 2004.

Slovic, P., (1987). Perception of Risk. *Science, 236,* 280-285.

Speers, T., & Lewis, J., (2004). Journalists and jabs: media coverage of the MMR vaccine. *Communication and Medicine, 1*(2), 171-181.

Tversky, A., & Kahneman, D., (1974). Judgment under uncertainty: heuristics and biases. *Science*, 185, 1124-1131.

Tversky, A., & Kahneman, D., (1981). The Framing of decisions and the psychology of choice. *Science, 211,* 453-458.

WHO, UNICEF, World Bank (2009). State of the world's vaccines and immunization, 3rd edition, Geneva, World Health Organization

Wichmann, O., Siedler, A., Sagebiel, D., Hellenbrand, W., Santibanez, S., Mankertz, A., Vogt, G., Van Treeck, U., & Krause, G., (2009). Further efforts needed to achieve measles elimination in Germany: results of an outbreak investigation. *Bulletin of World Health Organization, 87,* 108-115.

Zimmerman, R., Wolfe, R., Fox, D., Fox, J., Nowalk, M., Troy, J., & Sharp, L., (2005, June 29). *Vaccine Criticism on the World Wide Web.* Retrieved November 23, 2008, from http://www.jmir.org/2005/2/e17/HTML

Appendix A - Experimental Stimuli 1

Scenario 1 - Positive Attribute / Positive Goal Frame

Enzae-B bacteria are one of the leading causes of meningitis in the United States. Some adults and especially young children under the age of 5 are particularly susceptible to contracting Enzae-B. Entering the lungs and blood streams, the bacteria causes severe infection of the covering of the brain and the spinal cord; serious lung and throat disease. The Enzae-B vaccine is the best way of protection against these highly infectious bacteria. The vaccine may soon be available at your local health center. The side effects of the Enzae-B vaccine include swelling, redness or fever over 101°F lasting for several days.

Extensive research shows that 90% of those that vaccinated against Enzae-B do not develop these side effects.

By vaccinating against Enzae-B you will be able to obtain protection against this infection and take advantage of a safe and lifelong immunity.

Appendix B - Experimental Stimuli 2

Scenario 2 - Negative Attribute / Positive Goal Frame

Enzae-B bacteria are one of the leading causes of meningitis in the United States. Some adults and especially young children under the age of 5 are particularly susceptible to contracting Enzae-B. Entering the lungs and blood streams, the bacteria causes severe infection of the covering of the brain and the spinal cord; serious lung and throat disease. The Enzae-B vaccine is the best way of protection against these highly infectious bacteria. The vaccine may soon be available at your local health center. The side effects of the Enzae-B vaccine include swelling, redness or fever over 101°F lasting for several days.

Extensive research shows that 10% of those that vaccinated against Enzae-B develop these side effects.

By vaccinating against Enzae-B you will be able to obtain protection against this infection and take advantage of a safe and lifelong immunity.

Appendix C - Experimental Stimuli 3

Scenario 3 - Positive Attribute / Negative Goal Frame

Enzae-B bacteria are one of the leading causes of meningitis in the United States. Some adults and especially young children under the age of 5 are particularly susceptible to contracting Enzae-B. Entering the lungs and blood streams, the bacteria causes severe infection of the covering of the brain and the spinal cord; serious lung and throat disease. The Enzae-B vaccine is the best way of protection against these highly infectious bacteria. The vaccine may soon be available at your local health center. The side effects of the Enzae-B vaccine include swelling, redness or fever over 101°F lasting for several days.

Extensive research shows that 90% of those that vaccinated against Enzae-B do not develop these side effects.

By not vaccinating against Enzae-B you will fail to obtain protection against this infection and fail take advantage of a safe and lifelong immunity.

Appendix D - Experimental Stimuli 4

Scenario 4 - Negative Attribute / Negative Goal Frame

Enzae-B bacteria are one of the leading causes of meningitis in the United States. Some adults and especially young children under the age of 5 are particularly susceptible to contracting Enzae-B. Entering the lungs and blood streams, the bacteria causes severe infection of the covering of the brain and the spinal cord; serious lung and throat disease. The Enzae-B vaccine is the best way of protection against these highly infectious bacteria. The vaccine may soon be available at your local health center. The side effects of the Enzae-B vaccine include swelling, redness or fever over 101°F lasting for several days.

Extensive research shows that 10% of those that vaccinated against Enzae-B develop these side effects.

By not vaccinating against Enzae-B you will fail to obtain protection against this infection and fail take advantage of a safe and lifelong immunity.

Appendix E - Experimental Stimuli 5

Scenario 5 – Control Group

Enzae-B bacteria are one of the leading causes of meningitis in the United States. Some adults and especially young children under the age of 5 are particularly susceptible to contracting Enzae-B. Entering the lungs and blood streams, the bacteria causes severe infection of the covering of the brain and the spinal cord; serious lung and throat disease. The Enzae-B vaccine is the best way of protection against these highly infectious bacteria. The vaccine may soon be available at your local health center. The side effects of the Enzae-B vaccine include swelling, redness or fever over 101°F lasting for several days.

Appendix F - Recruitment Letter

Dear Madame/Sir,

I am a graduate student at Kansas State University conducting research in health communication field. I am currently collecting data for the research that is aimed at helping public health officials to provide transparent and accurate information about health options available to people.

May I kindly request you to consider completing a short 7-10 minute online survey about your health beliefs and health choices. Your response is extremely important to inform the research and me personally.

Please click on the link below or copy it to your browser's address line to participate in the survey https://surveys.ksu.edu/TS?offeringId=159162

As a token of appreciation for your time everyone is offered an opportunity to win a $50 Best Buy gift certificate. The potential winner will be randomly drawn in the presence of the research committee members by April 15, 2010.

Your participation in this study is completely voluntary. No personal or identifying information that may be associated with you is collected for the research purposes. This survey has been cleared by the Kansas State University Institutional Review Board of human subjects' research (IRB#5380). If you have any questions or problems accessing the survey please e-mail to bratcho@ksu.edu or contact by phone 785-317-9815 (no SMS service available).

Thank you for your willingness to participate in this study.

Cordially,

Rustam (Bratcho) Haydarov,
Edmund S. Muskie Fellow
A.Q. Miller School of Journalism and
Mass Communication
K-State University

Appendix G - AXIO Survey Questionnaire

AXIO SURVEY

Preventive Health Behavior Online Survey *

Survey Description:

Dear participant! This survey is about your beliefs concerning vaccines, viruses, infectious diseases and health decisions. Your responses are very important to us! This research will help public health officials to provide transparent and accurate information on health options available to people. Your participation in this survey is completely voluntary. We will not request identifying information that may be associated with you. You may choose not to answer and skip any question that you feel uncomfortable with. You may close the survey at any time.

This survey will take you approximately 10 minutes to complete. Thank you for your willingness to participate. By proceeding further you acknowledge that you are at least 18 years of age. If you have any questions concerns or problems, please contact Dr. Joye Gordon (gordon@ksu.edu), Rustam Haydarov (bratcho@ksu.edu 785-317-9815) or Dr. Rick Scheidt, IRB Chair, 203 Fairchild, KSU, Manhattan, KS 66506 (785-532-3224).

Opening Instructions:

Dear participant! This survey will take only 10 minutes to complete. To the extent possible, please try to devote this time exclusively to the survey, with minimal distraction from others. Understanding your immediate beliefs and feelings is crucial. There are no right or wrong answers in this survey. Therefore, you should not be worried about making mistakes or looking for information on the web. Please give answers that best describe your position.

Next

AXIO SURVEY

Preventive Health Behavior Online Survey *

Page 1

Question 1

In the following three questions please indicate your level of disagreement or agreement with the following statements on the scale

I consider myself to have a good health

disagree ○ ○ ○ ○ ○ ○ ○ agree

Question 2

I am rarely ill

disagree ○ ○ ○ ○ ○ ○ ○ agree

Question 3

I see my physician for regular health check ups

disagree ○ ○ ○ ○ ○ ○ ○ agree

Next

AXIO SURVEY

Preventive Health Behavior Online Survey *

Page 2

Question 4 ** required **

In the following question please select from the relevant multip

RANDOMIZATION -- ASSIGNMENT TO ONE OF THE FOUR EXPERIMENTAL OR THE CONTROL GROUP

On what day of the month were you born?

- 1, 2, 3, 4, 5, or 6
- 7, 8, 9, 10, 11, or 12
- 13, 14, 15, 16, 17, or 18
- 19, 20, 21, 22, 23, or 24
- 25, 26, 27, 28, 29, 30 or 31
- prefer not to answer

On the next page you will read health information about an infectious disease and a new vaccine available to prevent it. Please take as much time as needed to read and comprehend the message.

Vaccines are biological substances that help to protect people from infectious diseases and bacteria. Vaccination is the process of administering a vaccine to a person either through a shot or orally. Once you get vaccinated against a particular disease you are likely to have the immunity against it for the rest of your life. As any medicine, some vaccines have side effects.

Next

AXIO SURVEY

Preventive Health Behavior Online Survey *

MESSAGE FRAMING MANIPULATION -- PARTICIPANTS' BROWSER LOADS ONE OF THE FOUR EXPERIMENTAL OR THE CONTROL SCENARIO ON THIS PAGE RANDOMLY

Page 3

Please take as much time as needed to read and unders

Enzae-B bacteria are one of the leading c ates. Some adults and especially young childre susceptible to contracting Enzae-B. Ente e bacteria causes severe infection of the covering of the brain and the spinal cord; serious lung and throat disease. The Enzae-B vaccine is the best way of protection against these highly infectious bacteria. The vaccine may soon be available at your local health center. The side effects of the Enzae-B vaccine include swelling, redness or fever over 101°F lasting for several days.

Extensive research shows that 90% of those that vaccinated against Enzae-B do not develop these side effects.

By vaccinating against Enzae-B you will be able to obtain protection against this infection and take advantage of a safe and lifelong immunity.

Next

AXIO SURVEY

Preventive Health Behavior Online Survey *

Page 4

Enzae-B bacteria are one of the leading causes of meningitis in the United States. Some adults and especially young children under the age of 5 are particularly susceptible to contracting Enzae-B. Entering the lungs and blood streams, the bacteria causes severe infection of the serious lung and throat disease. The Enzae-B vaccine is the best way bacteria. The vaccine may soon be available at your local health ce ne include swelling, redness or fever over 101°F lasting for several d

MESSAGE FRAMING MANIPULATION -- PARTICIPANTS' BROWSER DISPLAYS THE SCENARIO FROM THE PREVIOUS PAGE

Extensive research shows that 90% of those that vaccina side effects.

By vaccinating against Enzae-B you will be able to obtain protection against this infection and take advantage of a safe and lifelong immunity.

Question 6

In the following three questions please rate on the scale below

The health information about Enzae-B vaccine emphasizes that those that vaccinated are…

likely to develop side effects ○ ○ ○ ○ ○ ○ ○ unlikely to develop side effects

Question 7

The health information about Enzae-B vaccination emphasizes…

the benefits of getting the vaccine ○ ○ ○ ○ ○ ○ ○ the costs of not getting the vaccine

Question 8

The health information about Enzae-B vaccination was…

not at all interesting ○ ○ ○ ○ ○ ○ ○ highly interesting

meaningless to me ○ ○ ○ ○ ○ ○ ○ meaningful to me

irrelevant to me ○ ○ ○ ○ ○ ○ ○ relevant to me

Next

AXIO SURVEY

Preventive Health Behavior Online Survey *

Page 5

Enzae-B bacteria are one of the leading causes of meningitis in the United States. Some adults and especially young children under the age of 5 are particularly susceptible to contracting Enzae-B. Entering the lungs and blood streams, the bacteria causes severe infection of the covering of the brain and the spinal cord; serious lung and throat disease. The Enzae-B vaccine is the best way (bacteria. The vaccine may soon be available at your local health cer ne include swelling, redness or fever over 101°F lasting for several d

MESSAGE FRAMING MANIPULATION -- PARTICIPANTS' BROWSER DISPLAYS THE SCENARIO FROM THE PREVIOUS PAGE

Extensive research shows that 90% of those that vaccinat ide effects.

By vaccinating against Enzae-B you will be able to obtain protection against this infection and take advantage of a safe and lifelong immunity.

Question 9

In the following questions please rate on the scale below

Vaccinating against Enzae-B virus is...

bad idea	○	○	○	○	○	○	○	good idea
foolish	○	○	○	○	○	○	○	wise
unimportant	○	○	○	○	○	○	○	important
threatening	○	○	○	○	○	○	○	assuring

Question 10

Enzae-B vaccine is...

risky	○	○	○	○	○	○	○	safe
harmul	○	○	○	○	○	○	○	beneficial
ineffective	○	○	○	○	○	○	○	effective

Question 11

How interested are you to learn more about the Enzae-B infection or vaccination?

not at all interested	○	○	○	○	○	○	○	very interested

Next

AXIO SURVEY

Preventive Health Behavior Online Survey *

Page 6

Enzae-B bacteria are one of the leading causes of meningitis in the United States. Some adults and especially young children under the age of 5 are particularly susceptible to contracting Enzae-B. Entering the lungs and blood streams, the bacteria causes severe infection of the cov us lung and throat disease. The Enzae-B vaccine is the best way of pr teria. The vaccine may soon be available at your local health center. clude swelling, redness or fever over 101°F lasting for several days.

MESSAGE FRAMING MANIPULATION -- PARTICIPANTS' BROWSER DISPLAYS THE SCENARIO FROM THE PREVIOUS PAGE

Extensive research shows that 90% of those that vaccinated a effects.

By vaccinating against Enzae-B you will be able to obtain protection against this infection and take advantage of a safe and lifelong immunity.

Question 12

Please check relevant answers to the questions below

1 - very unlikely | 2 - unlikely | 3 - undecided | 4 - likely
5 - very likely

	1	2	3	4	5
12.1 What is the likelihood of you to consider obtaining Enzae-B vaccination?	○	○	○	○	○
12.2 How likely will you to try to obtain Enzae-B vaccination this year?	○	○	○	○	○
12.3 If there was an appointment for Enzae-B vaccination today, how likely would you go?	○	○	○	○	○
12.4 How likely are you to recommend Enzae-B vaccination to other people who have children?	○	○	○	○	○

Question 13

Please enter number only

What is the maximum amount that you would be willing to pay for the Enzae-B vaccine (in US dollars)?

Characters Remaining: 4

Next

AXIO SURVEY

Preventive Health Behavior Online Survey *

Page 7

Question 14

In the following three questions please indicate your level of disagreement or agreement with the following statements

I have obtained most of the required vaccination for my age

disagree ○ ○ ○ ○ ○ ○ ○ agree

Question 15

In general I believe vaccines...

1 - disagree | 2 - - | 3 - - | 4 - - | 5 - - | 6 - - | 7 - agree

	1	2	3	4	5	6	7
15.1 are not effective in protecting me from diseases	○	○	○	○	○	○	○
15.2 have side effects that are not worth the benefit	○	○	○	○	○	○	○
15.3 are scary	○	○	○	○	○	○	○

Question 16

In the following question please select from the relevant multiple choice answers

I know of at least one person in my family or among my friends who had dramatic side effects after vaccination

- ○ False
- ○ True

Question 17

In the past 9 months I have obtained vaccination against the flu

- ○ False
- ○ True

Question 18

Vaccination is prohibited by my religion

- ○ False
- ○ True

Next

AXIO SURVEY

Preventive Health Behavior Online Survey *

Page 8

Question 19

In the following questions please select from multiple choice answers

Are you or your spouse is currently pregnant?

- Yes
- No
- I am not currently married or partnered

Question 20 ** required **

How many children do you have?

- One
- Two
- Three
- More than three
- I don't have children
- I prefer not to answer

Next

AXIO SURVEY

Preventive Health Behavior Online Survey *

Page 9

In the following questions please select from the relevant multiple choice answers

Question 21

To the best of your knowledge, have or have not your youngest child obtained vaccination required for their age?

- My youngest child has not been vaccinated at all
- My youngest child has obtained some vaccination required for their age
- My youngest child has obtained most vaccination required for their age
- My youngest child has obtained all vaccination required for their age
- I don't know

Question 22

Please enter number only

How old is your youngest child (in full years)?

Characters Remaining: 2

Question 23

Do you have grandchildren that are under 5 years old?

- Yes
- No
- I don't have grandchildren yet

Next

AXIO SURVEY

Preventive Health Behavior Online Survey *

Page 10

Question 24

Please enter number only

What is your age (in full years)?

Characters Remaining: 2

Question 25

In the following questions please select from the relevant multiple choice answers

What is your highest level of education?

- Less than High School
- High School or Equivalent
- Some College
- Bachelor's degree (including if currently a student)
- Master's degree (including if currently a student)
- Ph.D.

Question 26

Do you have a health insurance?

- No
- Yes

Question 27

What was your gross annual household income in 2009?

- Less than 36,000
- 36,001-58,000
- 58,001-85,000
- 85,001-115,000
- 115,001-150,000
- Above 150,000

Question 28

What is your gender?

- Female
- Male

Next

AXIO SURVEY

Preventive Health Behavior Online Survey *

Page 11

Question 29 ** required **

Dear participant! Now before submitting your survey, would like to learn more about:

- ***whether you or your family are at risk***
- ***where you can get Enzae-B vaccination in your city***
- ***how Enzae-B bacteria spreads***
- ***Enzae-B symptoms***

please select from the relevant options below

- ◯ Thanks, I am not interested
- ◯ Yes, I would like to learn more

Next

AXIO SURVEY

Preventive Health Behavior Online Survey *

Page 12

Dear participant! Thank you for your time to inform the research. We apologize that for the methodological purpose of this research we had to mask the actual Haemophilus Influenza Type (B) or (Hib) virus under the fictitious name Enzae-B. Besides this fact all other information that you have read during this exercise is true and was compiled from CDC materials below.

To learn more please see:

Hib Vaccine Information Statement brochure of the Centers for Disease Control http://www.cdc.gov/vaccines/pubs/vis/downloads/vis-hib.pdf

or

Hib webpage of the Centers for Disease Control website http://www.cdc.gov/vaccines/vpd-vac/hib/default.htm

As a token of appreciation for your time you are offered a chance to win a $50 Best Buy gift certificate. The potential winner will be randomly drawn by April 15, 2010 in presence of the research committee members. The winner shall be notified by e-mail. If you wish to enter the draw, please enter your contact e-mail in the box below. Your contact information will be kept confidential.

Question 30

Please enter your e-mail here, so we may contact you should you become the winner

Characters Remaining: 50

Next

AXIO SURVEY

Preventive Health Behavior Online Survey *

Closing Message

For questions or comments about this research please send your inquiries to Rustam Haydarov (bratcho@ksu.edu). We wish you and your family a good health!

Your survey has been successfully submitted.
Please close your browser to exit.