

HEALTH COMMUNICATION IN THE BLOGOSPHERE: RETHINKING SOURCE
AND MESSAGE STRATEGIES FOR “HOT COGNITION” PUBLICS

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AND MESSAGE STRATEGIES FOR “HOT COGNITION” PUBLICS

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ABSTRACT

Strategic health communication in the 21st Century is dynamic and complex. The digital communication environment has facilitated convicted, polarized opinions, the validity of science is under scrutiny, “expert” recommendations are questioned, and public trust is at an all-time low. Together, these phenomena have created obstacles for strategic health communicators tasked with developing effective promotional messages to influence positive health attitudes and behaviors. This research sought to understand how health and science beliefs, perceptions of trust, and different source and message strategies influence promotional health message interpretation. A 2 (source: health professional vs. mom blogger) X 2 (message strategy: scientific evidence vs. experiential narrative) online experiment for two health issues (vaccines and dairy milk) examined these questions. Findings suggest that preexisting attitudes, trust in science and health beliefs are strong predictors of health attitudes and behaviors. These variables also work together with different source and message strategies to influence message interpretation. Data strongly supports the use of a layperson source and narrative message style as the most effective strategy for positively influencing attitudes and behaviors of “hot cognition” publics. Results also reflect the need for long-term strategies increasing public trust in scientific endeavors so that health promotion in the future can be as effective and influential as possible.

CHAPTER 1

INTRODUCTION

The online health communication landscape has been a catalyst for intriguing phenomena worthy of academic study: "...power has shifted from doctors to patients, the legitimacy of science is questioned, and expertise is redefined" (Kata, 2012, p. 3778). Concerning the blogosphere specifically, Sundar, Edwards, Hu, & Stra Stavrositu (2007, p. 86) make a strong argument that "blogs epitomize the 'publicness' in public health... it is imperative for us to gain an academic understanding of the blogosphere, especially pertaining to particular health topics." These perspectives served as inspiration for this dissertation.

Online health communication in the 21st Century is an extremely complex and dynamic topic. The public's health attitudes and behaviors are consistently influenced by a plethora of online communication vehicles including websites in general (Glanz, Rimer, & Viswanath, 2008; Hu & Sundar, 2009), blogs (Buis & Carpenter, 2009; Witteman & Zikmund-Fisher, 2012), discussion forums (Burrows, Nettleton, Pleace, Loader, & Muncer, 2000), and social networking sites including Facebook, Twitter and even Pinterest (Evers, Albury, Byron, & Crawford, 2013; Guidry, Carlyle, Messner, & Jin, 2015). While this variety of communication channels poses major opportunities for reaching audiences using health communication strategies, it also places more demand on health communicators and educators (Glanz et al., 2008). With so many communication tools at their disposal it can be difficult to understand which are most efficient and effective for influencing positive health behaviors.

The abundance of online communication tools available to the everyday person has also contributed to a growth in user-generated content being published online, often in the form of blogs (Miller & Pole, 2010). Thus, instead of medical doctors serving as the primary source of health information, highly influential bloggers—coined as “the internet’s new storytellers” (Lenhart & Fox, 2006, title page)—who publish opinions about health-related topics on their blogs, have also become popular sources of health information. Additionally, the functionality of two-way communication online has allowed groups of like-minded people to convene and share ideas and opinions pertaining to specific health topics, potentially contributing to stronger divides in public opinion concerning which health practices are best (Witteman & Zikmund-Fisher, 2012). Complicating health communicators’ efforts even more, expert recommendations and scientific evidence is consistently under question (Kata, 2012) as public trust in health organizations (Gross, 2009; Quinn et al., 2013) and perhaps science overall, continues to erode.

Kahan, Jenkins-Smith and Braman (2011) pose the question, “Why do members of the public disagree—sharply and persistently—about facts on which expert scientists largely agree?” (p. 147). This question is central to health educators and communicators who promote products and services to influence public perceptions. Those in health communication must understand the art of influencing public perceptions in today’s complex, digitally-driven communication landscape where consumers have limitless access to health information (Dutta-Bergman, 2004). However, what makes perception management so difficult is the increasing divide in public opinion pertaining to health issues and the continuous rejection by public groups of sound scientific evidence that

shows support for certain health behaviors, such as getting a flu vaccine. This polarization may become even more intense when scientific evidence is used to communicate health advice, sometimes even causing a boomerang effect and increasing public divide (Hart & Nisbet, 2011). Additionally, the publics' increasing reliance on the internet to make sense of complex health information has been deemed both an advantage in that it allows for a cost-efficient way for professionals to disseminate information, but also a disadvantage in that it allows for the spread of information—and even misinformation—from non-expert and non-credible sources (Wright, Sparks, & O'Hair, 2013; Galarce, Ramanadhan, & Viswanath, 2011; Dutta-Bergman, 2004).

Despite these obvious trends in the online health communication context involving blogs, bloggers, and strong opinions that can negatively impact health communication strategies, there is a huge gap in the academic literature examining how public perceptions and blog communication strategies work together to influence health attitudes and behaviors (Jones et al., 2015; Nussbaum, 2013; Sundar et al., 2007).

Determining the source of a strategic message has long been a strategy of great concern for public relations professionals, especially in the context of health (Knobloch-Westerwick, Johnson, & Westerwick, 2013; Hu & Sundar, 2009). There has also been considerable attention given to the effect of different sources on different audiences in the health communication context; not all audiences will react to health sources in the same ways. Beyond the source of the message, developing a message strategy is also an important decision for strategic health communicators. Message framing that increases the relevance of risk messages and makes complex concepts more familiar to audiences can positively impact public perceptions of issues (Nisbet, 2009; Myers et al., 2012).

Health messages that are crafted in a narrative format and tell a story can enhance affective reactions (Kopfman, Smith, Ah Yun, & Hodges, 1998) when compared to non-narrative formats. However, these effects may be context and situation specific (Allen & Preiss, 1997; Baesler & Burgoon, 1994; Greene & Brinn, 2003).

Individual differences such as preexisting attitudes and beliefs about a health issue also impact the effectiveness of health messages. For example, dominant beliefs within one's social and cultural groups can enhance or constrain the extent to which a person processes messages about scientific issues (Kahan, 2012). One's perceived threat and perceived benefits of a health behavior are considered to be motivations that help a person decide to engage in a health behavior (Rosenstock, 1977; Champion & Skinner, 2008). These perceptions, along with cues to action such as online health messages, work together to influence health attitudes and behaviors (Armitage & Conner, 2000).

There are obviously many factors that influence publics' perceptions of health issues. Despite these complex dynamics that influence public perceptions, how do strategic health communicators develop strategies and craft messaging to persuade these publics with strong opinions to engage in healthy behaviors? Considering public trust continues to decline, which source and message strategies work best to influence trust in the source and the message? These are just a few questions this study sought to understand.

Purpose of the Study

The purpose of this study was to explore how individual differences work together with health messages to influence health attitudes and behaviors, with the overarching goal to determine the most effective source and message strategy for particular audiences. More

specifically, this study was designed to understand how one's preexisting attitudes about an issue, their trust in science, and their perceptions of the benefits and threats of health behaviors might interact with a cue to action (e.g., health blog message) to influence post-message attitudes, trust in the information source and message, as well as behavioral intentions. Cues to action that differ in terms of information source (health professional vs. layperson) and message strategy (scientific evidence vs. experiential narrative) were also explored to understand which is a more positive approach for influencing health behaviors.

CHAPTER 2

LITERATURE REVIEW

Never before has the health communication environment been as expansive and complex as it is today (Dutta-Bergman, 2004). Today's health information consumers have practically limitless access to health information (Dutta, 2009). While this presents many exciting opportunities, it also creates many challenges as digital communication channels are growing and changing so quickly, it can be difficult for health communicators to become efficient and effective with their efforts (Glanz, Rimer, & Viswanath, 2008; Parker & Thorson, 2009).

Conflicting Health Information and Layperson “Influencers”

The health communication landscape has changed immensely in the past two decades, “where power has shifted from doctors to patients, the legitimacy of science is questioned, and expertise is redefined” (Kata, 2012, p. 3778). In the past, health communication occurred through interpersonal interactions, mainly among patients and healthcare providers; however, the “digital revolution” (Duffy & Thorson, 2009, p. 93) has completely changed that.

Oftentimes when browsing the internet, consumers are exposed to conflicting health advice. A person might browse Facebook and be led to a message that reads, “Today we need to talk about WHY milk is bad for you and your bones” (n.d., FullyRaw by Kristina). The source of this message is Kristina, a nutrition blogger and a leading visionary in the raw food movement. Although she is not a registered dietician or licensed health professional, she has an extremely large social media following (603k+ likes on Facebook and 989k followers on Instagram) and boasts a high-quality,

professional website that is updated frequently. These credentials could lead the everyday consumer to perceive this source as an expert. Later on that same day, this same consumer might be browsing Instagram and be exposed to health advice about dairy milk that reads, “Milk stays local... and provides your body with nine essential nutrients” (n.d., Dairy Carrie). This health advice about dairy milk contradicts the message this consumer was exposed to earlier, making it difficult for him or her to make an informed decision about this health behavior. The source of this message is Carrie, author of the blog “Dairy Carrie”, a mother and a wife of a dairy farmer. Carrie could be perceived as an expert source of health advice as well due to the professional appearance of her online communications and large social media following (almost 46k likes on Facebook and 10.5k followers on Instagram). It is apparent that ‘expert’ sources of health information have been redefined in today’s health communication landscape (Kata, 2012; Galarce et al., 2011). Additionally, these sources of health information have earned influence online by communicating messages that affect and influence online community groups (Uzunoğlu & Kip, 2014). When these influencers communicate health information, it is often valued among their followers (Hansen, Schneiderman, & Smith, 2011), consequently influencing their attitudes and intentions toward specific behaviors (Evers, Albury, Byron, & Crawford, 2013; Namkoong, Nah, Record, & Van Stee, 2016; Rodgers, Chen, Duffy, & Fleming, 2007).

Health blogs and health bloggers. Those seeking expert opinions and advice to aid in their health decisions and behaviors are increasingly accessing websites and blogs (Crutzen et al., 2009; Witteman & Zikmund-Fisher, 2012). The online environment is a rich context for user-generated content, which has accelerated published health content

on the internet (Miller & Pole, 2010). Online, user-generated content often comes in the form of blogs.

According to a Pew Research study, 33% of internet users reported reading blogs and 11% reported doing so regularly (Smith, 2008). Additionally, about 12 million American adults author and keep a blog (Lenhart & Fox, 2006). Although recent statistics concerning health blogs, specifically, have not yet been established, a content analysis revealed that 951 of regularly updated health blogs, written in the English language, are in existence online (Miller & Pole, 2010). Of these blogs, approximately half of the bloggers were employed in the health field, two-thirds of bloggers posted at least once per week, and 56.8% of bloggers were women. Thus the health blog landscape is vast and it is essential that the behavioral effects of consuming health information via blogs are explored. Even when individuals aren't intentionally seeking out health information, those who are scanning information online via blogs might be influenced unintentionally. This "incidental exposure" (Shim, Kelly, & Hornik, 2006, p. 158) can then impact later health decisions (Shapiro, 1999). Therefore, it is important to understand which types of health information are more influential in impacting health attitudes and behaviors, whether people arrive at this information intentionally or not. While health blogging is on the rise, there is a lack of research in the area, which inspired Sundar et al. (2007) to issue a call to stimulate health communication research in the direction of health blogs and health bloggers.

The term blog is short for a web log that is updated frequently where dated posts are displayed in reverse chronological order (Blood, 2002). What distinguishes blogs from other forms of mass media is their ability to "involve the reading public in an

integral way” (Sundar et al., 2007, p. 83). There are many web hosting platforms that are free and easy to use resulting in an abundance of blogs created by everyday people (Herring, Scheidt, Bonus, & Wright, 2005). While doctors and medical physicians actively engage with patients using blogs (e.g., “Seattle Mama Doc: A blog by Dr. Wendy Sue Swanson”), everyday people who aren’t medical professionals also keep blogs to engage with like-minded readers (e.g., “FullyRaw by Kristina”).

According to Tuckett, Boulson, Olson, and Williams (1985) there are two main types of source expertise in the health arena: professional expertise, such as a health institution or a doctor, and patient expertise, where patient expertise is grounded in laypersons’ subjective health experiences. While individuals might turn to professional sources for health information, blogs authored by laypersons that deliver content in a more relatable and familiar way than corporate blogs are also a common source of health information (Kata, 2012). Many people today prefer using blogs to discuss personal health experiences with others because it allows for reciprocal interaction among people in similar health situations, demonstrating health “connectivity behaviors” (Duffy & Thorson, 2009, p. 103) among people in similar health situations. In fact, a healthcare organization used a similar strategy by launching a health blog of content created by moms (i.e., sources of experiential expertise) to actively engage with health consumers in familiar and relatable ways (Coppess, 2013).

In terms of health blogs specifically, a quantitative content analysis of 398 health blog posts revealed that while these blogs highlighted medical issues found in media outside of the blog itself (television, websites, magazines, etc.), only 16% of the posts contained actual health information (Buis & Carpenter, 2009). Despite this finding, a

study by Johnson and Kaye (2004) found that 73.5% of participants perceived blogs to be moderately to very credible. People also take an active role in creating their own health content and advice in the online space. In fact, 8% of U.S. adult internet users keep a blog and 39% read blogs (Lenhart & Fallows, 2006). Given the increasing reliance of online blogs for health information, this study will use blog posts as the platform for studying effects of promotional health messages.

Those individuals who aren't medical professionals but are devoted to documenting their health journeys on the blogs they keep often refer to themselves as health bloggers. Health bloggers use blogs to express their identities as health-conscious individuals, putting themselves in a position of "self-importance as content creator[s]...result[ing] in cognitive engagement with the[ir] blogs" (Sundar et al., 2007, p. 85). Health bloggers use the internet as a way to influence publics' health attitudes, beliefs and behaviors (Kareklas et al., 2015). Different health consumers perceive health information sources and the content from these sources in different ways (Hu & Sundar, 2009). To some, medical professional bloggers might be a more credible source of health information while to others, health bloggers who are everyday people, such as patients or moms, are perceived as more credible.

Although the primary goal of health communication on the internet is to initiate positive behavior changes (Ahern, Kreslake, & Phalen, 2006), there are still many questions left unanswered about the impact of health information sources via blog content on consumers' health attitudes and behaviors. Despite the popularity of blogs as a source of health information, blogs and health bloggers as forms of health promotion is a relatively unexplored phenomenon; there is also a lack of understanding if the type of

health blogger impacts perceptions of health blog content (Buis & Carpenter, 2009), which is a primary question this study sought to answer.

Health Promotion: Source and Message Strategy

Health promotion is the practice of influencing positive health behaviors with the goal of changing or enhancing health attitudes and behaviors (Bettinghaus, 1986). Health promotion is often accomplished through the use of health campaigns that are developed with the intention to generate specific outcomes in a large number of people through organized communication activities (Noar, 2006). In order for these organized communications to be effective, influential source messengers for message delivery, as well as certain message types comprised of evidence to support claims, are strategic communication components that require considerable thought and planning (Silk, Atkin, & Salmon, 2011).

Source. Scholars have defined message source in a variety of ways. Some have conceptualized source as the originator of communication (Severin & Tankard, 1988) while others have explained it as the perceived image of the communicator (Sargent, 1965). Nonetheless, sources of information can impact the effectiveness and persuasiveness of a message (Ohanian, 1990; Petty & Capciocco, 1986; Portikapan, 2004). Moving toward more modern conceptualizations of source, it is apparent that Web 2.0 has contributed to the ambiguity of the information source construct and thus Sundar and Nass (2001) created a typology of communication sources: Visible sources are those seen by an audience as being the originator of a message, such as television news anchors; technological source is the communication vehicle, medium, or channel that delivers information, such as a blog (on a smaller level) and the internet in general (larger

level); finally, an example of a receiver source is an online support group where the receiver of information chooses to be involved and engaged in the content. This research focused specifically on the individual, visible source typology. For example, the author of a blog post about vaccinations is considered an individual, visible source because the originator of the message is a single person whose profile and even short biography is featured as a component of the message.

According to the popular elaboration likelihood model by Petty and Cacioppo (1984; 1986), people use snippets of information about the message source—such as a short biography or profile picture—as cues to determine how they will evaluate the message. A cue is “a piece of information provided by a medium that allows for evaluation of that medium, possibly triggering heuristics” (Sundar, Xu, & Oeldorf-Hirsch, 2009, p. 4233). Heuristics serve as shortcuts when processing information, which creates generalizations of knowledge and impacts how a message is perceived. Thus health message source is an extremely important factor to consider when developing promotional health messages.

Source: Health professional versus layperson source effects on attitudes and behaviors. Previous research suggests that different health information message sources can have different effects on people’s message perceptions (Buis & Carpenter, 2009; Kareklas et al., 2015). People rely on and attend to different sources for a variety of reasons. These reasons include accessibility, familiarity, and attractiveness (Galarce et al., 2011), as well as expertise and trustworthiness (Pornpitakpan, 2004; Sundar et al., 2007). Thus it is expected that there will be differences in how messages from a health professional source and messages from a layperson source are perceived. Within the

health communication context specifically, Sundar (2008) explained that a health professional triggers perceptions of expertise, which in turn makes people believe that the message from this source is more credible than messages from other sources. However, Flanagin and Metzger (2008) point out that, despite their lack of official authority, laypersons creating their own content online could generate perceptions of expertise due to their firsthand knowledge with a specific situation, and might be perceived by others as having “experiential credibility” (Flanagin & Metzger, 2013, p. 1627). Timely research on health message sources has been conducted to evaluate source effects within the online environment; although findings are informative and interesting, there are mixed conclusions.

Hu and Sundar (2009) found a three-way interaction effect of a health message, original source (professional vs. layperson) and selecting source (homepage, blog, internet in general) on message credibility. The layperson source enhanced the credibility of a health message about milk on a home page in comparison to a professional source. In a study about online comments on a vaccination PSA, Kareklas et al. (2015) found that comments from a medical doctor had a greater impact on attitudes towards being vaccinated in comparison to a lobbyist’s comments. Twitter has also become an influential source of health information online. Lee and Sundar (2013) compared credibility effects between a high authority source (i.e., medical doctor) tweeting health information and a low authority source (i.e., layperson) tweeting health information. They found that content from the high authority source was perceived as significantly more credible than the low authority source when the source had many Twitter followers. The authors concluded that interface cues on Twitter interact with other content to

influence perceptions of health messages. Thus the message source alone doesn't impact message perceptions; there are many other factors that work together to develop health message perceptions.

Although strides have been made to understand information source effects within the digital health communication landscape, there are still no strong findings regarding which type of health information sources individuals perceive as being most trustworthy and influential in impacting attitudes and behaviors. Little is known about the direct influences different health sources have on health attitudes and behaviors in the format of a blog message. Considering Tuckett et al.'s (1985) classification of two main types of message sources in the health information environment—expert (professional) source and patient (layperson) source—the two source types of interest in this study were health professionals and health laypersons. Web 2.0 and online media has given powerful voices to non-expert, layperson sources (Sunstein, 2007), however the effects of layperson sources within the Web 2.0 health context is relatively understudied. Within the health blogosphere specifically, an expert source is considered to be a health professional that blogs on behalf of a health organization whereas a health layperson is someone that authors his or her personal health blog and doesn't belong to a specific health profession or organization.

It has been argued that if a message originates from an expert person (e.g., a health professional) that the message should influence beliefs more than the same message from a non-expert source (e.g., layperson) (Slater & Rouner, 1996). However, the review of literature did not reveal research that examined the different effects of

health messages from health professional sources compared to layperson sources on health attitudes and behaviors. Thus the first research questions is:

RQ1: How will source type (professional vs. layperson) influence a) attitudes, and b) behavioral intent?

Message strategy. Beyond choosing a health information source, successful health promotion is also dependent upon how a promotional health message is crafted. If crafted in an appropriate and strategic manner, health messages have the potential to influence health attitudes and facilitate health behavior change. Health messages can also increase one's involvement with their health decisions (Jensen, King, Carcioppolo, & Davis, 2012) and encourage health information seeking behaviors (Kelly & Hornik, 2016). However in a negative sense, health messages can also make individuals feel threatened and attacked (Knobloch-Westerwick et al., 2013). Thus it is important for health communicators to understand which types of message strategies are most appropriate for health promotion as some messages could create negative outcomes.

Recently, researchers have noticed a gap in the literature regarding message effects research within the health communication context. More research should be conducted where findings can inform the actual content of health messages, as this is a research area that is lacking within the discipline (Nussbaum, 2013). Additionally, experimental message effects research focusing on health communication is rare as the majority of health communication studies rely on surveys (Nazione, Pace, Russell, & Silk, 2013) instead of experiments where message effects can be unearthed. As suggested by Burrows et al. (2000), research should examine the differences in message effects of personal experience and expert knowledge, a primary goal of this research. Health and

science communication research has only scratched the surface when it comes to exploring of the effects of different message approaches on health attitudes and behaviors.

Promotional health message approaches vary from giving personal perspectives and testimonies to offering hard facts backed by science to providing health advice through storytelling. According to Hyden (1997) experiential expertise involves a layperson's knowledge integrated with health advice within lay networks. Layperson's experiential perspectives do have important value in health promotion (Korp, 2006) as these perspectives engage audiences through narrative forms of persuasion subsequently influencing behavior change and attitudes (Green, 2006).

However, there is mixed support for which type of health message strategy—scientific evidence or experiential narrative—is most persuasive and effective (Kopfman, Smith, Ah Yun, & Hodges, 1998). These two types of health message strategies were chosen for this study to provide more knowledge explaining this discrepancy.

Message strategy: Scientific evidence versus experiential narrative effects on attitudes and behaviors. One of the most common message strategies for health communication is testimonials, where individuals share their personal experiences regarding a health product or behavior (Braverman, 2008). Another common technique for crafting health messages involves providing statistical evidence to support claims (Allen & Preiss, 1997). However, health message research commonly focuses on evaluating the effectiveness of statistical evidence and hard facts, whereas today's health communicators widely use testimonials and personal stories as a primary message strategy (Slater, 2002). Applying narrative message strategies to health-behavior research

has been limited (Hinyard & Kreuter, 2006). To fill this gap in the research, this study evaluated different outcomes of scientific evidence and experiential narrative health message strategies.

A narrative is, “any cohesive and coherent story with an identifiable beginning, middle, and end that provides information about scene, characters, and conflict; raises unanswered questions or unresolved conflict; and provides resolution,” (Hinyard & Kreuter, 2006, p. 2). In a study about using narratives for cancer communications, a narrative was defined as, “a representation of connected events and characters that has an identifiable structure, is bounded in space and time, and contains implicit or explicit messages about the topic being addressed” (Kreuter et al., 2007, p. 222). Characteristics of narrative messages can vary in terms of providing factual or fictional information and whether they are told in the first or third person (Hinyard & Kreuter, 2006). Narratives have also been described to have testimonial evidence that supports a particular conclusion (Allen & Preiss, 1997), vivid and provoking stories (Baesler & Burgoon, 1994), as well as being told from characters that message receivers perceive as relatable (Murphy, Frank, Chatterjee, & Baezconde-Garbanati, 2013). According to Hinyard and Kreuter (2006), a narrative approach to health communication has emerged as a promising strategy for influencing health behavior change.

Another approach to promoting healthy behaviors is by using scientific evidence to support claims made in messages. Mazor and colleagues (2007) distinguish narratives from statistical messages by explaining that narratives are usually more familiar and concrete, whereas statistical messages almost always contain uncertainty (e.g., 10% risk of an outcome). Statistical evidence messages tend to make strong claims that are

supported by empirical statistics and facts (Allen & Preiss, 1997). Although there have been many studies comparing the effectiveness of narrative messages and scientific evidence-based messages, results of these studies are ambiguous as some found narratives to be more effective while others found scientific, evidence-based messages to be more effective (Kopfman et al., 1998). Thus, the question of which approach is more effective in influencing health attitudes and behaviors is still unresolved (Braverman, 2008).

In an experiment comparing statistical evidence messages and narrative messages about organ donation, Kopfman et al. (1998) found that the narrative message had a greater influence on respondents' affective reactions compared to the evidence message. Dunlop, Wakefield and Kashima (2008) found that narrative health messages elicited emotional responses and these emotional responses encouraged discussion with one's family and friends about the message. However, Baesler and Burgoon (1994) found a statistical evidence message to be more persuasive than a narrative evidence message, but also recommended that the most persuasive statistical evidence messages are those that also include vivid, emotive components. Additionally, Mazor et al. (2007) did not find significant differences between narrative, statistical evidence, and combination messages on health behavioral intent. In a study comparing different health messages promoting the use of the MMR vaccine, Nyhan et al. (2014) found that a dramatic narrative message led to most favorable attitudes towards the MMR vaccine, in comparison to the other message conditions (a vivid imagery message and a textual information message).

Because results from previous studies were ambiguous in regards to which message strategies are most effective in influencing attitudes and behavioral intent, the following research questions were posited:

RQ2: How will message type (scientific evidence vs. experiential narrative) influence a) attitudes, and b) behavioral intent?

There is also evidence that source effects are dependent upon other heuristic cues, such as the message platform (Lee & Sundar, 2013), but the literature review did not reveal if source and message type work together to influence attitudes and behaviors. The third research question was:

RQ3: Will source and message type interact to influence a) attitudes, and b) behavioral intent?

Trust as a Message Outcome

Trust is essential for developing strong relationships between organizations and publics (Ledingham & Brunig, 1998). Building trust among publics—especially during times of uncertainty when health issues are involved—is a common goal of public relations strategies (Liu, Bartz, & Duke, 2016) and should also be applied to the fields of health and science communication. Some science communication scholars (Priest, 1995; Robbins, 2001) argue that establishing public trust can be more important and impactful than cultivating beliefs in a product or behavior. In fact, public distrust can prevent cooperation with public health recommendations (Freimuth et al., 2013). Thus understanding which information sources and messages are effective in generating trust is necessary to increase the effectiveness of health promotion.

Through an interdisciplinary review of trust, Rousseau, Sitkin, Burt, and Cramer (1998) proposed this widely accepted definition: “Trust is a psychological state comprising the intention to accept vulnerability based upon positive expectations of the intentions or behavior of another” (p. 395). Trust has also been described as an understanding between two or more parties to perform a set of agreed-upon activities (Shore, 2003). One’s perceived trust is based on shared values, a “judgment of similarity between one person and another (or between a person and an entity)” (Siegrist, Earle & Gutscher, 2003, p. 706).

Within the context of health, Gilles et al. (2011) found that public trust in medical organizations and officials are crucial determinants of vaccination behavior. Trust research also suggests that trust in the source of health information and trust in the message together positively influence vaccination behavior (Freimuth, Musa, Hilyard, Quinn, & Kim, 2013; Quinn, Parmer, Freimuth, Kim, 2013). Thus trust is a variable that must be built among publics in order for health promotional materials to be successful. Given that this particular research uses trust within the context of health communication, it is conceptualized as ‘public trust’ (e.g., social trust; Siegrist et al., 2003), meaning that the public determines how much it can trust sources or messages to provide health advice and recommendations to positively influence the public. This conceptualization is drawn from the risk management literature, where studies deal with public uncertainty that is often high. This uncertainty also leads to skepticism (Siegrist et al., 2003); therefore as public skepticism increases, oftentimes trust decreases.

However, trust in health and governmental organizations is eroding (Shore, 2003) and therefore it is necessary to understand which types of health messages are most

effective in developing trust in the information source, as well as trust in the message itself. Despite this necessity, there is a gap in the literature evaluating which types of health sources and health messages are most effective in generating trust in the source and the message.

Trust in the information source. Much of the communication literature conceptualizes trust in the information source as source credibility. Source credibility studies have examined how different source characteristics affect message processing (Kiosis, 2001). Two key attributes of source credibility are trustworthiness and expertise (O’Keefe, 1990; Ohanian, 1990; Pornpitakpan, 2004). Buis and Carpenter (2009) differentiate expertise from trustworthiness by explaining that expertise is a communicator’s *ability* to provide accurate information, whereas trustworthiness involves one’s *intent* to provide accurate information. Although it is often assumed that source expertise might lead to trustworthiness, it’s important to note that one’s perception of source expertise is not necessarily correlated with trust in the source. For example, although a health professional representing the CDC might be perceived as an expert source, this does not mean that an individual trusts the source for health advice. Health communication research has reported on overall trust in medical professionals and organizations (Gilles et al., 2011; Freimuth et al., 2013), but the review of literature did not reveal any research evaluating trust in the source as an outcome of a source cues featured on a blog post. The following research question is posed:

RQ4: Which source type creates higher trust in the source?

In a different perspective, Slater and Rouner (1996) proposed that the characteristics and actual content of messages influence perceptions of source credibility.

Specifically, a message that contained convincing examples and data had a direct relationship with higher assessments of credibility of the message source in comparison to messages without supporting evidence (Slater & Rouner, 1996). Additionally, Lee and Sundar (2013) found that message cues influenced perceptions of source credibility. This information leads to the first hypothesis:

H1: Trust in the source will be greater for the scientific evidence message compared to the experiential narrative message.

Trust in the message. Trust in the message has also been conceptualized in communication research as message credibility. Message credibility refers to one's evaluations of aspects of the message itself, which includes information quality and accuracy (Hu & Sundar, 2009; Metzger et al., 2003). Again, it is important to note that the perceived quality of a message is nowhere near identical to trust in the message (Korp, 2006). A scientific and/or health professional's evaluations of what might be quality health information, compared to what might be 'quack' information is very different from a layperson's perspective (Korp, 2006); yet, it is the everyday person being exposed to blog health messages online and still there is little research exploring trust outcomes when comparing different health message types.

Per the review of literature, trust as a variable that is dependent upon message type has not yet been explored. The following research questions were posited:

RQ5: Which message type creates higher trust in the message?

Previous research has also explored the interaction effects of source and message credibility on belief change (Slater & Rouner, 1996). Luchok and McCroskey (1978) found that evidence-based messages communicated from a perceived highly credible

source resulted in positive attitude change. However this study did not measure perceptions of the message directly and is more than two decades old. Current health communication research has not yet explored the interaction effects of source and message type on trust in the source and message. The following research question was:

RQ6: Will source and message type interact to influence a) trust in the source, and b) trust in the message?

Trust in Science

The concept of source and message credibility is given considerable attention by PR scholars, and recently in the health communication literature. Usually, source and message credibility is positively associated with message acceptance; however, there are additional, individual characteristics that affect message acceptance. A newly popular area of science and health communication research has emerged as scholars (Taber & Lodge, 2006; Rodriquez, 2007; Druckman & Bolsen, 2011; Kahan et al., 2011) have begun examining the effects of individual's perceptions of the science field on their interpretations of science and health messages.

The trust in science concept is derived from Siegrist et al.'s (2003) and Earle's (2010) conceptualization of trust in risk management. There are two dimensions of trust: value similarities and similarities of intentions. Regarding similarities of intentions, Earle (2010) explains, "if one knows that the other's intentions are congruent or in line with, or the same as, one's own, then the other would be judged worthy of trust" (p. 543). There is a strong relationship between value similarities and trustworthiness, which subsequently leads to cooperation (Earle, 2010). Siegrist et al. (2003) explained that high levels of trust

in an entity's (e.g., Department of Energy) risk management is positively associated with perceived benefits of the entity's efforts and negatively associated with perceived risk.

Building on the source and message effects literature and combining it with trust in science, research has also suggested that message characteristics and trust work together to influence post-message perceptions. Nisbet (2009) suggested that science messages that make a controversial issue more personally relevant produce more desirable outcomes among audiences. He found that message characteristics serve as "interpretive shortcuts" (Nisbet, 2009, p. 17) and these shortcuts work together with individual characteristics and perceptions to influence message acceptance. In a study about communicating benefits of the MMR vaccine, Druckman and Bolsen (2011) concluded that factual information does not have a greater impact on message interpretation in comparison to individual background factors, such as values and trust in science. Given these conclusions, it is predicted that:

H2: Trust in science, source type and message type will interact to influence a) trust in the source and b) trust in the message.

It is a common practice for public health communicators to include scientific and statistical evidence in promotional messages in order to enhance their persuasiveness among the public. This message approach might be appropriate for those who support science efforts. For example, Druckman and Bolsen (2011) found that those who perceive science as being more credible offer greater support for issues such as genetically modified (GMO) foods. However, the opposite might be true for those individuals that are against scientific technologies and advancements. In fact, those who do not trust scientific efforts might reject anything science-related altogether. Lewandowsky et al.

(2013) referred to this as the “motivated rejection of science”; in a study exploring this concept, those who had a strong conviction that NASA faked the moon landing were also motivated to believe that other science-related evidence is false.

Druckman and Bolsen (2011) examined how one’s trust in science and science experts effects their views of emergent technologies and found that it wasn’t the facts presented in messages about emergent technologies that influenced attitudes—it was individuals’ trust in science that was more highly associated with attitudes. Those who had a higher trust in science were more likely to be supportive of emergent technology. These findings fall in line with Kahan’s (2012) conclusion that expert opinion does not correct for public opinion.

It is evident that trust in science has implications for science and health communicators as one’s trust in science influences the ways in which scientific evidence messages are interpreted. Based on these findings regarding trust in science and attitudes, the following hypotheses are:

H3: Trust in science will be positively associated with a) attitudes and b) behaviors.

The Health Belief Model

The Health Belief Model (HBM; Rosenstock, 1977, 1988) is one of the most popular theoretical frameworks for understanding individual beliefs that influence preventive health behaviors (Champion & Skinner, 2008). Development of the HBM began in the 1950’s when the premise of the public health practice was focused on preventive measures in an effort to reduce the costs of treating those who had already contracted a disease or illness. However, there was a widespread failure of the public engaging in

preventive health behaviors such as getting vaccinations or cancer screening tests, for example. At this point in time social psychologists and public health professionals and researchers came together to develop a framework—the Health Belief Model—for understanding factors that prevented or enabled a person to engage in a preventive health behavior (Rosenstock, 1974).

These researchers looked to other theories that could serve as a strong foundation for developing the HBM variables. Thus, they drew on Watson’s (1925) stimulus response theory that explains people’s behavior is often a result of events and situations they experience that drives a particular response. They also drew on work from Lewin (1950) who claimed that it is not the consequences of one’s environment that influences behavior, but their *perceptions* of their environment that becomes one’s reality and guides them toward specific behaviors. Thus different people have different perceptions of the world around them for a variety of reasons. Therefore, understanding these perceptions and beliefs about health behaviors would help the social psychology and public health researchers effectively influence these perceptions to drive positive health behaviors.

The researchers who developed the HBM used focus groups and interviews to evaluate the factors that are most influential in determining preventive health behavior, such as flu vaccination uptake. They determined that the following variables were effective predictors of preventive health behaviors (Rosenstock, 1974; Champion & Skinner, 2008): Perceived susceptibility, one should believe that he or she is susceptible to a disease or illness in order to be willing to engage in a behavior preventing that disease or illness; perceived severity, one should believe that the consequences of not

engaging in a preventing health behavior would severely affect one's health in a negative manner; perceived benefits, one should believe that engaging in the behavior has health benefits; and perceived barriers, one should believe that he or she could easily engage in the behavior and that obstacles to take action are minimal.

Thus, the HBM posits that those who perceive themselves to be highly susceptible to a disease and that contracting a disease will have severe affects, and who perceive many benefits from engaging in the behavior to prevent the disease and that there are few barriers to behavior engagement, will likely perform the preventive health behavior of interest.

In a thorough overview of the research progress made using the HBM since its development, Janz & Becker (1984) found that approximately 20 studies effectively used HBM variables to predict vaccination and cancer screening behaviors, as well as exercise and nutrition behaviors. Health beliefs examined through measurement of HBM variables have been effective in the development of successful health interventions and health mass communications. Additionally, Glanz and Bishop (2010) pointed out that HBM variables are essential factors to consider in the strategic planning phase of health communications. In a health intervention program called WiseWoman, Champion et al. (2004) used HBM research to develop communication materials recruiting elderly women to be involved in the program. Key messages as part of their communication materials addressed the challenges of barriers of transportation to community centers, as well as the benefits of socializing with like-minded women in a supportive and positive environment. The communication materials were successful in getting women involved in the program.

The HBM variables have evolved over time. For example, it was found in multiple studies that perceived severity and perceived susceptibility were often not significant predictors of behavior. Thus, Champion and Skinner (2008) explained that the variables could be effectively combined into a new variable called perceived threat. Later studies demonstrated that perceived threat was a significant predictor of behaviors (Carpenter, 2010). In a meta-analysis examining the HBM's individual variables' effectiveness of predicting behavior, Carpenter (2010) concluded that the strongest predictor of behaviors was perceived barriers, followed by perceived benefits and perceived threat. Because the main focal point of this study is to understand extremist perspectives of specific health actions, perceived barriers will not be measured. More specifically, this variable is omitted from the study because these extremist perspectives are often driven by myths and misperceptions (Kata, 2012) and once these negative perceptions are formed, whether or not one has access to these products (often a question measuring perceived barriers), for example, is irrelevant.

Perceived threat. Perceived threat is a construct that weighs heavily in health-related decisions (Champion & Skinner, 2008). The presence of activist websites and their group influence has grown immensely, contributing to the spread of threat-related information concerning certain health behaviors. The popularity of Web 2.0 and its ease of use, in combination with growing polarized perceptions with regards to health behaviors, is a great opportunity to make the HBM relevant to health communication in the 21st Century. In fact, new 'theories' as to why health behaviors, such as vaccines, could be a threat to one's health appear in public forums before the scientific community can develop a plan to respond (Kata, 2012), propelling perceived threats of health

behaviors. Nan and Kim (2014), in a study predicting H1N1 vaccine uptake, found that moms in particular had concerns about vaccine safety. Yang (2015) used variables from the HBM to predict intentions to get the H1N1 vaccine and found that potential side effects and adverse reactions of the vaccine were key factors influencing behavioral intent. With these insights in mind, the following hypothesis is:

H4: Perceived threat will be negatively associated with a) attitudes and b) behavioral intent.

Perceived benefits. The HBM is an example of a value-expectancy theory (Rosenstock, Strecher, & Becker, 1988). If one perceives that engaging in a health behavior is valuable and beneficial, one will be more likely to engage in that behavior. For example, when promoting a health intervention program called WiseWoman, outlining key program benefits, such as interacting socially with like-minded women, increased program attendance (Glanz & Bishop, 2010). Additionally, perceived benefits is one of the strongest predictors of behavior out of all HBM variables (Carpenter, 2010; Janz & Becker, 1984). With this in mind, the following hypothesis is:

H5: Perceived benefits will be positively associated with a) attitudes and b) behavioral intent.

The HBM and Cues to Action. Health beliefs examined through measurement of HBM variables have been effective in the development of successful health communications campaign materials. Glanz and Bishop (2010) pointed out that HBM variables are essential factors to consider in the strategic planning phase of health communications in order to develop promotional materials that are more influential in encouraging health behaviors. Within the HBM context, these promotional materials are referred to as cues

to action. Cues to action are defined as, “strategies to create readiness” (Champion & Skinner, 2008, p. 48). However, cues to action is one of the most underdeveloped variables of the HBM (Carpenter, 2010; Yang, 2015) and has not been systematically studied (Champion & Skinner, 2008). Additionally, little research has examined how HBM constructs influence processing of external cues to action, such as mass media messages promoting health behaviors. In response to this, Jones et al. (2014) took a process-oriented approach to a vaccination behavior study guided by the HBM to understand the relationship between HBM constructs. They found that exposure to vaccination campaign materials did influence behavior and, more specifically, there was an indirect effect of campaign exposure on behaviors through perceived barriers. Additionally, a serial mediation model was significant; those with greater campaign exposure perceived fewer barriers, which created the perception of greater benefits, which was positively associated with vaccination behavior.

However, Jones et al. (2014) measured HBM variables as outcomes of campaign exposure. What the current study sought to understand is how peoples’ predispositions of perceived threats and benefits influenced how promotional messages are interpreted, something that has not yet been examined in HBM studies. Thus, the following research questions were posited:

RQ7: Will perceived threat, source type and message type interact to influence a) attitudes and b) behavioral intent?

RQ8: Will perceived benefits, source type and message type interact to influence a) attitudes and b) behavioral intent?

Motivated Reasoning and Scientific Evidence

Kahan et al. (2011) pose the question, “Why do members of the public disagree—sharply and persistently—about facts on which expert scientists largely agree on?” (p. 147). Limitless access to information via the internet has allowed the public to pick and choose which information and topics they want to further explore. Thus, public groups in agreement on a specific issue (for example, believers of the anti-vaxx movement) are able to gather online via blogs and in discussion forums creating a reality for themselves that vaccinations are harmful to our society. Examples such as this one have created considerable public polarization over scientific and political issues (Kahan et al., 2012). Additionally, people might take a stance on a scientific issue as a way to represent their political affiliations (Taber & Lodge, 2006) and cultural beliefs and values (Kahan, 2012). These strong convictions pose a threat and challenge to strategic communicators in a position of promoting science-related health behaviors such as getting vaccinated. One way to understand how public opinion is formed around controversial issues is through the concept of motivated reasoning, which provides an appropriate umbrella for understanding this phenomena. Motivated reasoning occurs when a person processes information about an issue and is motivated to arrive at a particular conclusion that is consistent with his or her preexisting beliefs and attitudes (Kunda, 1990). Motivation is “any wish, desire or preference that concerns the outcome of a given reasoning task” (Kunda, 1990, p. 480).

A poignant case study by Hastorf and Cantril (1954) was one of the first impactful illustrations that diverse perspectives of the same event or issue exist. Researchers interviewed and surveyed fans of both Dartmouth and Princeton football teams regarding their recollections of a game that involved both teams. Although all subjects involved in

the study watched the exact same game, they had very diverse perceptions of what happened. These perceptions were shaped by which team fans were loyal to. For example, Princeton fans perceived that there were too many calls against the Princeton team and not enough calls against the Dartmouth team. This perception was shaped by their positive attitudes toward Princeton football players. In light of this phenomenon, the researchers explained that the Dartmouth versus Princeton football game was not just one game, but many games. Although there were many interesting findings as a result of this study, Hastorf and Cantril (1954) made the relevant conclusion that, “we behave toward an issue according to what we bring to the occasion” (p. 133). When people are exposed to a controversial issue they are predisposed with prior experiences and cultural values that shape their interpretations of the issue.

Vallone, Ross and Lepper (1985) drew similar conclusions as Hastorf and Cantril in their examination of public reactions to media representations of the Beirut Massacre. Individuals—some who were pro-Arab and some who were pro-Israeli (two conflicting groups with diverse beliefs and values)—were asked about their perceptions of media coverage of the event. Although both groups watched the same exact clip of media coverage, both groups claimed that the media was being biased against their side. Vallone, Ross and Lepper coined this phenomenon as a “hostile media environment.” The two groups of individuals used their group standing and cultural values to interpret the media coverage, thus resulting in biased information processing.

In 1990, Kunda published one of the most popular motivated reasoning articles, making the case for motivated reasoning. She explained that there are two different categories of motivations to engage in cognitive reasoning: 1) the motivation to arrive at

an accurate conclusion, and 2) the motivation to arrive at a directional, desired conclusion. Prior to the 1970's, the assumption was that people were motivated to be accurate. However, accuracy motivated reasoning came under scrutiny in the 1980's; Kunda made the point that researchers were not investigating the underlying reasoning mechanisms to determine if subjects were accuracy motivated or directionally motivated. Thus it was made clear—through Kunda's conceptualization of the two motivations for reasoning—that the accuracy motivated assumption was not necessarily correct. In fact, she argued that people can engage in thoughtful processing of an issue and still be biased and also asserts that those more highly involved in an issue are often directionally motivated.

Although some groups of publics might engage in effortful processing about facts and accounts of controversial issues, oftentimes they will form strong opinions even when they have little information on the matter (Druckman & Bolsen, 2011). People also tend to engage in selective exposure of information that is consistent with their current beliefs and values while ignoring information that contradicts their current attitudes (Kahan et al., 2012; Dieckmann et al., 2017).

The effect of scientific evidence on motivated beliefs. It's a common principle that including sound scientific evidence in promotional health messages will make them more persuasive and believable among publics. However, results from recent studies suggest that this isn't necessarily the case (Hart & Nisbet, 2011; Lewandowsky, Oberauer, & Gignac, 2013). Regarding the present study, those who have negative attitudes toward a health issue, even when presented with strong and convincing scientific evidence that supports specific health behaviors, might still reject the message

containing this information because it goes against their preexisting beliefs. Some might contest that one's ability to interpret statistical information, often referred to as science numeracy, is a primary driver of the tendency for people to not be affected by scientific evidence; still, one's numeracy level is a weaker predictor of public opinion while preexisting attitudes and beliefs is a stronger one (Kahan et al., 2012). Given the strong support for the occurrence of motivated reasoning, regardless of source and message cues, the following hypothesis is posited:

H6: There will be a significant effect of preexisting attitudes on a) post-message attitudes and b) behavioral intent, regardless of source and message type.

Implications of motivated reasoning, source and message types on message interpretation. In an effort to combat motivated reasoning, there has been abundant research on how message frames impact information processing. How a message is framed simply implies how an issue or event is shaped and portrayed when communicated to the public. Nisbet (2009) identified that people use message frames as “interpretive shortcuts” (p. 16). He also explained that message frames make an issue personally relevant for the public. To be more specific, Nisbet (2009) tested the effects of different message frames about climate change on subjects' attitudes about climate change mitigation. One message about climate change was related to economic development, explaining that climate change could create the need for more jobs. The other message was a public health frame that explained how climate change could increase infectious diseases and be harmful to many people. Results suggested that the public health frame made the issue of climate change more personally relevant and increased positive attitudes toward climate change mitigation efforts. How a message

about a scientific issue is framed and presented to audiences could certainly have a larger effect on perceptions than the consideration of scientific evidence alone.

Myers et al. (2012) conducted a similar experiment about climate change but instead examined the affective responses frames might create. They found that the public health frame created the most favorable attitudes toward climate change mitigation and also found that the public health frame was associated with the positive emotion of hope. Myers et al. (2013) also explored how perceived personal experience and belief certainty influenced message processing. Study results suggest that subjects who felt they personally experienced the effects of global warming had a higher belief certainty that global warming was occurring, and consequently engaged in motivated reasoning of climate change messages to confirm their belief in climate change.

Another context in which message strategies and motivated reasoning have been studied is within vaccine promotion. Nyhan et al. (2014) examined the effectiveness of promotional MMR vaccination messages. There were four between-subjects message conditions: 1) vaccine-autism link correction, 2) diseases that could be prevented by the MMR vaccine, 3) images of children who contracted diseases that can be prevented by the MMR vaccine, and 4) a dramatic narrative of an infant who suffered from MMR as a result of not getting vaccinated. Results indicated that none of the messages were effective in changing mothers' negative attitudes toward vaccines. Some of the messages actually had a negative effect. The messages containing images of children with diseases that can be prevented with the MMR vaccine increased perceptions of the vaccine-autism link. The dramatic narrative about the infant increased perceptions of severe negative side

effects of vaccinations. These findings demonstrate a boomerang effect (Hart & Nisbet, 2011) that can occur in science communications such as these.

However, what has received little exploration in the realm of motivated reasoning is the effect of experiential narrative messages and source type on post-message attitudes and behaviors. Thus, the following, final research question was posited:

RQ9: Will preexisting attitudes, source type and message type interact to influence a) post-message attitudes and b) behavioral intent?

Study Context

Since the early 1990's, the gap in public agreement on issues such as climate change has widened significantly, resulting in a polarization of attitudes that is worse than ever (Roberts, 2016). This polarization is often a result of individuals' motivations to keep their issue interpretations consistent with their cultural philosophies (Kahan et al., 2011), providing an interesting and rich context for research involving health issues which also often accelerate attitude polarization. Thus two specific health issues—one that has received significant scholarly attention and one that has been relatively unexplored—were chosen to explore source and message effects on health attitudes and behaviors.

A Public Divide: Two Health Issues

Specifically, the two issues of vaccines and dairy milk were chosen because there are influential public groups formed for and against each issue, posing huge opportunities and also threats for the health promotion of both products to support better health. The internet has also provided a way for these groups of like-minded people to come together to uncritically and easily interact (Gerstenfeld, Grant, & Chiang, 2003), making the scientifically-backed benefits of vaccines and dairy milk even more vague to health

consumers that might discover the groups' discussions online. It is essential to understand both pro-and-anti groups' perspectives of blog messages promoting these products to provide health communicators with sound recommendations for moving forward with communication strategies.

Vaccines. Attitudes and behaviors toward vaccines has been widely studied among academics (Gross, 2009; Gilles et al., 2011; Kata, 2012; Betsch, 2012; Nyhan et al., 2014; Jones et al., 2015). Websites opposing vaccinations are abundant and the internet has created a platform for anti-vaccine activists to spread their messages (Kata, 2012). Activist messages are often highly persuasive and influential; however their messages are conflicting with evidence-based advice from qualified experts (Gross, 2009). This type of content can certainly create the perception that vaccines are useless or even dangerous (Kata, 2012), and thus, public divides over issues such as this one tend to get larger and larger (Taber & Lodge, 2006). Currently there is a large divide among adults on their beliefs about whether vaccines are harmful or beneficial (HealthDay, 2011), especially among mothers concerning their vaccine hesitancy in regards to their children (Benin et al., 2006). These different forms of communications can influence whether people choose to vaccinate their children (Kata, 2012). Sixteen percent of online health information seekers reported searching for vaccine information and 70% of those individuals said that what they found online influenced their treatment decisions (Pew Internet & American Life Project, 2000), certainly making the issue of vaccines an important one to study from the perspective of health promotion.

Dairy milk. The same is true regarding the issue of dairy milk and its impact on health. Despite decades of scientific evidence that show the health benefits dairy milk has

to offer when consumed in accordance with dietary recommendations (Dairy Council of California, 2013), activist groups such as Peta and Free From Harm publish online content strongly opposing the production and consumption of dairy milk. Their efforts could be making an impact, as sales of dairy milk decreased by 7% (\$17.8 billion) in 2015 and are expected to drop another 15% by 2020 (Intel, 2016). Some claim that generations are getting used to not drinking one of the dairy industry's signature product (Berr, 2014).

Organizations such as the Midwest Dairy Association and the Milk Processors Education Program (MPEP) have devoted entire communications strategies to combat, myths, threatening messages about dairy milk and its declining sales. In 2014, MPEP revamped its famous "Got Milk" campaign, coining the phrase "Milk Life" to tout dairy milk's nutritional benefits (Berr, 2014; Luckerson, 2014). However, per the review of literature, academic studies exploring health communication message effects within the context of dairy milk promotion are lacking, despite evidence that consumer perceptions about dairy milk are undoubtedly changing.

CHAPTER 3

METHOD

A 2 (source: health professional vs. layperson) X 2 (message strategy: scientific evidence vs. experiential narrative) between-subject online experiment for two health issues (vaccines and dairy milk) explored the effects of the independent variables on post-message attitudes, trust in the source and message, and behavioral intentions. Preexisting attitudes toward the issue, trust in science and health beliefs served as moderators.

Independent Variables

Operationalization of information source. Two different types of information sources were tested: a health professional and a layperson. A health professional triggers perceptions of expertise (Sundar, 2008) because there is visible information (Sundar & Nass, 2001) about the source identifying him/her as someone communicating on behalf of a health organization.

A layperson source lacks official authority but generates perceptions of expertise due to their firsthand knowledge (Flanagin & Metzger, 2008). For this study, a layperson source was characterized as a mom blogger because there is an abundance of everyday people who keep their own blogs (Herring et al., 2005), and the majority of health bloggers are women (Miller & Pole, 2010).

Operationalization of message strategy. Two message strategies were tested: scientific evidence and experiential narrative. Scientific evidence messages make strong claims that are supported by empirical statistics and facts (Allen & Preiss, 1997).

An experiential narrative message is “a representation of connected events and characters” (Kreuter et al., 2007, p. 222) that has testimonial evidence that supports a particular conclusion (Allen & Preiss, 1997).

Experimental Manipulation

Eight separate stimuli were created by a professional graphic designer to resemble real blog posts promoting two health products: vaccines and dairy milk. The stimuli satisfied each of the four experimental conditions (health professional source/scientific evidence message; health professional source/experiential narrative message; layperson source/scientific evidence message; layperson source/experiential narrative message) and this was repeated so that four blog posts represented vaccine promotion and four represented dairy milk promotion. The content in the messages was derived from the Center for Disease Control and Prevention, the National Dairy Council, the Milk Processors Education Program, and the World Health Organization blogs to ensure the content was similar to other professional health promotional content. Stimuli were created with essential components of quality experimental design kept in mind: All messages were written in first-person (a common characteristic of blog-style writing), were presented in a blog post format with identical coloring and layout, and each stimuli was similar in message length (200-210 total word count) in order to avoid confounding factors (Grabe & Westley, 2003; Thorson, Wicks, & Leshner, 2012).

Source manipulations were evident in the brief “about the author” section that was a feature on each stimuli. The health professional sources used for this study were an assistant director of infectious diseases for the CDC (for the vaccine issue) and assistant director of health and nutrition for the National Dairy Council (NDC; for the dairy milk

issue). Each brief biography also included a welcome to the reader that read, “I’ve devoted the past 10 years to working for the CDC[NDC] with the goal of raising awareness of the positive impacts vaccinations have on our society[how dairy positively impacts your health]”. For the layperson manipulation, mom blogger cues were also featured in a brief biography: “Welcome! I’m Sarah, author of Healthy Family Matters. I’m a wife and mother of two on a mission to share my passion and advice for healthy, happy living.” Source biographies also included a headshot of the authors to ensure the stimuli looked similar to that of blog posts participants would see in real life. Both sources had similar physical appearances in order to control for any confounding factors, which is essential for quality experimental design (Grabe & Westley, 2003; Thorson, Wicks, & Leshner, 2012).

Message strategies were manipulated by varying the message content. The scientific evidence messages cited studies by the Institute of Medicine (for the vaccine message) and Journal of American Dietetics (dairy milk message). Scientific messages also included statistical evidence concerning the benefits of both health products (e.g., “vaccine-preventable diseases have decreased by 98% compared to the pre-vaccine era”). The experiential narrative messages contained no hard facts, as observations were derived from the blogger’s personal experiences and told a brief story to illustrate why the author arrived at her personal opinions of the health topic under discussion.

Manipulation check. Undergraduate students at a large Midwestern university (N = 221) participated in the manipulation check (part of a larger study) in compensation for extra course credit. Twenty-one percent (n = 47) of participants were male and 78.7% (n = 174) were female. For ethnicity, 84% (n = 186) were white, 7% (n = 16) African-

American, 2.7% (n = 6) Hispanic/Latino, 5.4% (n = 12) were Asian/Pacific Islander, and just one respondent identified as “other.” First, it was necessary to evaluate if the stimuli were similar to blog posts participants might see in real life. The stimuli received an average rating of 4.6 ($SD = 1.2$) (1 = doesn’t look at all like a blog post I’d see in real life, 6 = looks very much like a blog post I’d see in real life), thus confirming that the stimuli were representative of real blog posts. Next, source effects were tested (1 = not at all an expert; 7 = very much so an expert) and a one-way ANOVA revealed significant differences between the professional source ($M = 5.1$; $SD = 1.4$) and the layperson source ($M = 3.3$; $SD = 1.7$), ($F(1, 219) = 64.9, p < .001$) for the vaccine stimuli. For the dairy milk stimuli, a one-way ANOVA also revealed significant differences between the professional source ($M = 5.4$; $SD = 1.6$) and the layperson source ($M = 3.2$; $SD = 1.8$), ($F(1, 219) = 92.9, p < .001$). To examine manipulation of the message strategy, participants were asked to evaluate the level of scientific evidence/factual information the message contained (1 = no evidence; 7 = a lot of evidence). For the vaccine stimuli, there were significant differences between the scientific evidence message ($M = 4.76$; $SD = 1.4$) and experiential narrative message ($M = 2.4$; $SD = 1.3$), ($F(1, 214) = 163.7, p < .001$). And for the milk stimuli, there were significant differences between the scientific evidence message ($M = 4.5$; $SD = 1.7$) and experiential narrative message ($M = 2.8$; $SD = 1.7$), ($F(1, 205) = 84.4, p < .001$). These results confirm that the stimuli were manipulated in the intended way for this study.

Moderators

Preexisting attitudes toward vaccines and milk. Attitude is a “summary evaluation of a psychological object captured in such attribute dimensions as good-bad

and harmful-beneficial” (Ajzen, 2001, p. 28). For the purposes of this study, preexisting attitudes toward vaccines and dairy milk was conceptualized as one’s overall perception of favorability or unfavorability toward the use of vaccinations or dairy milk to support the health of one’s children, prior to exposure of promotional messages. Six items measured on a 7-point Likert scale (Ajzen, 1988) were used for the attitude measure with the lead-in to the questions revised to reflect health product-specific attitudes: “The use of vaccinations [dairy milk] to support your child(ren)’s overall health is” bad/good; useless/useful; harmful/beneficial; negative/positive; unfavorable/favorable; not needed/needed (averaged scale, vaccines: $M = 5.88$; $SD = 1.9$; $\alpha = 0.985$; averaged scale, dairy milk: $M = 4.7$; $SD = 1.7$; $\alpha = 0.965$).

Trust in science. Trust in science is conceptualized as the extent to which individuals believe that science and scientists are concerned about and conduct research on behalf of what is best for the public and advancing public knowledge (Druckman & Bolsen, 2011). Because one’s perceived trust is also based on shared values, an additional dimension of trust, value similarity, was also measured and combined with the overall trust in science measure (Siegrist et al., 2003). Items were derived from Siegrist et al.’s (2003) trust in risk management scale and included a total of seven items measured on a 5-point Likert scale of do not agree at all-absolute agreement. Value similarity items were, “Scientists value profit more highly than I do”; “Scientists see the risks associated with certain health behaviors differently than I do”; and “Public health is not very important to those in the science field”. The value similarity items were reverse coded to reflect that 5 = high trust in science. Social trust items were, “Science communicates honestly about possible health effects of certain health behaviors”; “Should it turn out

that vaccinations[dairy milk] are a health threat for humans, the science field would openly and honestly inform the public” (there were separate questions for vaccinations and dairy milk); and “I trust the science field to take the public’s wellbeing into account when communicating health advice” (averaged scale: $M = 3.73$; $SD = 1.04$; $\alpha = 0.92$).

Perceived threat. Perceived threat is conceptualized as the extent to which people believe they are susceptible to negative side effects as a result in engaging in specific health behaviors (e.g., getting vaccinated) and that these side effects could potentially be severe (Champion & Skinner, 2008). Four items measured perceived threat (Champion & Skinner, 2008; Yang, 2015) of vaccinations and dairy milk separately (four questions for perceived threat of vaccinations and four for dairy milk). Items were measured on a 7-point scale of strongly disagree to strongly agree. An example question is, “I feel vaccinations [dairy milk] could cause complications to my child(ren)’s health sometime during their lives” (averaged scale for vaccines: $M = 2.74$; $SD = 1.88$; $\alpha = 0.936$; averaged scale for dairy milk: $M = 2.89$; $SD = 1.7$; $\alpha = 0.936$).

Perceived benefit. Perceived benefit is conceptualized as one’s belief that a particular health behavior would lead to positive health outcomes (Champion & Skinner, 2008). Three items measured perceived threat of vaccinations and dairy milk separately on a 7-point scale of strongly disagree to strongly agree. An example question is, “For my children, there are many positive aspects about getting vaccinated [consuming dairy milk]” (averaged scale for vaccines: $M = 5.81$; $SD = 1.87$; $\alpha = 0.97$; averaged scale for dairy milk: $M = 4.62$; $SD = 1.9$; $\alpha = 0.96$).

Dependent Variables

Trust in the information source. Trust in the information source is similar to source credibility, which is one's perceived expertise of and trust in a communicator (Pornpitakpan, 2004; Hu & Sundar, 2009). For the purposes of this study, it was conceptualized as one's perception that the individual communicating the message is committed to distributing dependable and reliable information that is in the best interest of the public. Seven items were adapted from Ohanian (1990) and measured on a 7-point Likert scale (strongly disagree-strongly agree). Three of the items were, "The author of this message is: untrustworthy/trustworthy, unreliable/reliable, and dishonest/honest. Additional questions included, the author "has the expertise necessary to make a competent judgment about vaccines[dairy milk]", "will do what is right for society regarding vaccines[dairy milk]", "will tell the truth about vaccines[dairy milk]", and "is a useful source of information about vaccines[dairy milk]" (averaged scale for vaccines: $M = 4.25$; $SD = 1.67$; $\alpha = 0.95$; averaged scale for dairy milk: $M = 3.64$; $SD = 1.45$; $\alpha = 0.93$).

Trust in the message. The trust in message concept is similar to message credibility (Ohanian, 1990). It was conceptualized as one's perception that a particular message contains dependable and reliable information. It was measured using six items (Gaziano & McGrath, 1986) measured on a 7-point Likert scale (strongly disagree-strongly agree): "The message about vaccinations[dairy milk] is unfair/fair, untrustworthy/trustworthy, inaccurate/accurate, biased/unbiased, does not tell the whole story/tells the whole story, does not cover the public's interests/does cover the public's interests" (averaged scale for vaccines: $M = 4.47$; $SD = 1.9$; $\alpha = 0.95$; averaged scale for dairy milk: $M = 3.62$; $SD = 1.46$; $\alpha = 0.93$).

Post-message attitudes toward vaccines and milk. The same questions measuring preexisting attitudes were asked post-message exposure. (averaged scale for vaccines: $M = 5.8$; $SD = 1.9$; averaged scale for dairy milk: $M = 4.8$; $SD = 1.8$).

Behavioral Intentions. This study used a multidimensional approach to assess behavioral intentions characteristic of consuming information online (Wang, Walther, Pingree, & Hawkins, 2008; Rodgers et al., under review). The first dimension, consisting of seven items and measured on a 5-point Likert scale (strongly disagree-strongly agree), was behavioral intent toward the message, which concerns one's intention to elicit additional behaviors toward the message including reading additional information, referring a friend or family member to the message, "clicking" for more information about the topic, and asking the author for more information about the topic if given the opportunity (averaged scale for vaccines: $M = 2.9$; $SD = 0.96$; $\alpha = 0.85$; averaged scale for milk: $M = 2.54$; $SD = 1$; $\alpha = 0.9$).

The second behavioral intent dimension was intentions to engage in the health behavior in the future (Champion & Skinner, 2008), measured using two items on a 7-point Likert scale (strongly disagree-strongly agree) and included "I plan to vaccinate[serve] my child(ren) [dairy milk] within the next year [month]" and "If given the opportunity to vaccinate [serve my] child(ren) [dairy milk] I would" (averaged scale for vaccines: $M = 5.8$; $SD = 2.15$; $\alpha = 0.98$; averaged scale for milk: $M = 5$; $SD = 2.34$; $\alpha = 0.93$).

Demographics. Typical demographic variables were measured including age, ethnicity, level of education, region of current residence, and political ideology.

Experimental Procedure

Because a main goal of this study was to understand perspectives of people with polarized attitudes and strong opinions toward health issues, a purposive sample was used; a purposive sample is appropriate for efficiently exploring theoretical relationships (Shapiro, 2002). To ensure strong opinions were collected, participants (moms living in the U.S. with children under the age of 18 within their care) were recruited from Facebook groups where moms were actively communicating about naturalistic approaches to health care. After IRB approval was obtained, a link to the online questionnaire was posted along with a message explaining the purpose of the research. Participants were compensated with a \$5 Amazon gift card; after 300 participants completed the questionnaire, the remaining participants were not compensated and a message indicating this was presented before the start of the questionnaire.

The questionnaire began with two screeners to ensure that respondents were U.S. residents and mothers of at least one child under the age of 18 within their care. Once they passed the screeners, participants were presented with questions measuring their general attitude towards vaccines and their perceived threat and benefit of vaccines. This was then repeated for dairy milk. Next, participants answered questions regarding their trust in science. Then, participants were randomly exposed to one of the following vaccine messages: health professional source/scientific evidence message; health professional source/experiential narrative message; mom blogger source/scientific evidence message; and mom blogger source/experiential narrative message. Following message exposure, participants answered questions measuring trust in source, trust in the message, behavior intent toward the message, post-message attitudes and behavioral

intent toward vaccines. The same procedure was repeated for the dairy milk message. Finally, the last set of questions measured demographics.

Sample

After data was cleaned and incomplete (less than 75% complete) responses were eliminated, the total sample was 441. Most participants (48.3%, n = 213) were aged 25-34, 41.7% (n = 184) were 35-44, 4.3% (n = 19) were 45-54, 3.6% (n = 16) were 18-24, and 1% (n = 4) were 55-64. Eighty-seven percent (n = 384) of participants were white, 1% (n = 5) African American, 3% (n = 14) Hispanic/Latino, 0.7% (n = 3) Native American, 4% (n = 17) Asian/Pacific Islander, and 3.2% (n = 14) other. For level of education, the majority of participants (62.4%, n = 275) had a postgraduate degree, 20% (n = 88) were college graduates, 7.7% (n = 34) had some college, 5.7% (n = 25) had some postgrad work, 1.6% (n = 7) had vocational/technical training, and 1.8% (n = 8) were high school graduates. The majority of participants (34.5%, n = 152) resided in the Midwest, followed by 28% (n = 123) in the West region, 23.8% (n = 105) in the South, and 13% (n = 57) in the Northeast. For political ideology, the majority of participants (35.8%, n = 158) were liberal, 28% (n = 123) were very liberal, 22% (n = 97) were moderate, 11% (n = 49) were conservative, and 2.5% (n = 11) were very conservative. See table 1 for demographic details.

CHAPTER 4

RESULTS

Effects of Source and Message Type on Attitudes and Behaviors

Research questions 1-3 asked how the source and message type would impact attitude and behavioral intent for participants to vaccinate their children [serve their children dairy milk]. To answer them, two two-way ANCOVAs were conducted with source type (professional vs. layperson) and message type (scientific vs. narrative) as the independent variables, age, education, ethnicity, and political ideology as covariates, and attitudes toward vaccines [dairy milk] as the dependent variable. For the vaccine issue, education and political ideology were the only covariates that were significant so the final model included only these variables as controls, and for the dairy milk issue, education was the only significant covariate. Another two-way ANCOVA was conducted with source type and message type as the between subjects factor and behavioral intent as the outcome variable, with education and political ideology [education as the only covariate for the dairy milk issue] as controls.

Vaccine issue. RQ1 asked the main effect of source on attitude and behavioral intent. There was not a significant main effect for source type on attitudes toward vaccines ($F(1, 424) = 2.4, p > .05$). There was a significant effect of source on behaviors ($F(1, 433) = 4.55, p < .05, \eta^2 = .01$); behavioral intent was significantly lower when the source was a professional ($M = 5.6, SE = .12$), compared to when the source was a layperson ($M = 6, SE = .13$). RQ2 asked the main effect of message on attitude and behavioral intent. The effect of message type on attitude was not significant ($F(1, 424) = .05, p > .05$). The main effect of message type on behaviors was also not

significant ($F(1, 433) = .06, p > .05$). RQ3: There was no significant interaction effect of source and message type on attitudes toward vaccines ($F(1, 424) = 0.3, p > .05$).

However, there was a significant interaction effect of source and message type for the narrative message condition ($F(1, 428) = 5.7, p < .05, \eta^2 = .01$). When the message type was a narrative, behavioral intent was significantly lower for the professional source ($M = 5.5, SE = .18$), in comparison to the layperson source ($M = 6.1, SE = .16$). See figure 1 illustrating this effect. See table 2.

Dairy milk issue. There was not a significant main effect for source on attitudes ($F(1, 423) = 0.1, p > .05$) or behavioral intent ($F(1, 435) = 0.45, p > .05$). There were also no significant effects of message type on attitudes ($F(1, 423) = 0.001, p > .05$) or behaviors ($F(1, 435) = 0, p > .05$). Additionally, the interaction effect of source and message type was not significant for attitudes ($F(1, 423) = 0.2, p < .05$) or behaviors ($F(1, 435) = .09, p < .05$). For the milk issue, source type or message type had no significant effects on attitudes or behaviors. See table 2.

Effects of Source and Message Type on Trust in the Source and Message

Two two-way factorial ANCOVAs were conducted with source type and message type as the between-subjects factor, trust in the source as the outcome variable, and education and political ideology (education only for the milk issue) as the covariates. The same ANCOVA was run again, but with trust in the message as the outcome variable.

Vaccine issue. RQ4 asked, which source type creates higher trust in the source? There was a significant main effect for source type ($F(1, 422) = 72.7, p < .001, \eta^2 = .13$) on trust in the source; the professional source was more trusted ($M = 4.9, SE = .1$) than the layperson source ($M = 3.7, SE = .1$). There was also a significant main effect for

source type ($F(1, 427) = 7.38, p < .01, \eta^2 = .01$) on trust in the message; the professional source created more trust in the message ($M = 4.72, SE = .1$) than the layperson source ($M = 4.3, SE = .11$). Additionally, H1 predicted that trust in the source would be greater for the scientific evidence message compared to the experiential narrative message. There was a significant effect for message type ($F(1, 422) = 10.67, p < .001, \eta^2 = .02$) on trust in the source; the scientific message created higher trust in the source ($M = 4.5, SE = .1$) than the narrative message ($M = 4, SE = .1$). H1 is supported. RQ5 asked, which message type creates higher trust in the message? There was also a significant main effect for message type ($F(1, 427) = 17, p < .001, \eta^2 = .03$) on trust in the message; the scientific message created higher trust in the message ($M = 4.84, SE = .1$) than the narrative message ($M = 4.2, SE = .1$). RQ6 asked, will source and message type interact to influence a) trust in the source and b) trust in the message? The interaction effect of source type and message type on trust in the source was not significant ($F(1, 435) = .09, p > .05$). Additionally, the interaction effect of source type and message type on trust in the message was not significant ($F(1, 427) = .44, p > .05$). To summarize, the professional source and the scientific message both created significantly higher trust in the source and trust in the message for the vaccine issue. See table 3.

Dairy milk issue. There was a significant main effect for source type ($F(1, 426) = 26.15, p < .001, \eta^2 = .06$) on trust in the source; the professional source was more trusted ($M = 4, SE = .1$) than the layperson source ($M = 3.27, SE = .09$). H1 predicted that trust in the source would be greater for the scientific evidence message compared to the experiential narrative message. However, there were no significant effects of message type on trust in the source ($F(1, 422) = 2.4, p > .05$), and thus H1 was not supported for

the dairy milk issue. There was a significant effect of message type on trust in the message ($F(1, 430) = 5.2, p < .05, \eta^2 = .01$). The scientific message ($M = 3.8, SE = .1$) was trusted more than the narrative message ($M = 3.4, SE = .1$). The interaction effect of source type and message type on trust in the source was not significant ($F(1, 426) = 6.1, p > .05$). However, the interaction of source type was significant for the scientific message condition ($F(1, 422) = 32.6, p < .001, \eta^2 = .08$). When the dairy milk message was scientific, the professional source was viewed as more trustworthy ($M = 4.25, SE = .12$) than the layperson source ($M = 3.2, SE = .13$). See figure 2 illustrating this effect. The interaction effect of source type and message type on trust in the message was not significant ($F(1, 430) = .32, p > .05$). See table 3.

Effects of Trust in Science, Source Type and Message Type on Trust in the Source and Message

To examine the effects of trust in science on the dependent variables, two groups were created—high trust in science and low trust in science—by evaluating the histogram of the trust in science data. The data was skewed ($M = 3.73, SD = 1$) so the median (4) was used as the cutoff point, where 4+ indicated high trust and anything lower than 4 was low trust. See figure 3.

Hypothesis 2 predicted that trust in science, source type and message type would interact to influence a) trust in the source and b) trust in the message. Two three-way ANCOVAs were conducted with trust in science, source, and message as the between-subjects factor, education and political ideology as covariates (education was the only covariate for the milk issue), and trust in the source as the outcome variable. The second three-way ANCOVA was run with trust in the message as the outcome variable.

Vaccine issue. There was not a significant three-way interaction of the three independent variables on trust in the source ($F(1, 416) = 0.6, p > .05$). However, the two-way interaction of trust in science and source type on trust in the source was significant ($F(1, 416) = 23.4, p < .001, \eta^2 = .03$). When trust in science was high, trust in the layperson source was significantly lower ($M = 4, SE = .12$) than trust in the professional source ($M = 35.8, SE = .13, p < .001$). When trust in science was low, trust in the layperson source was significantly lower ($M = 3.3, SE = .15$) than trust in the professional source ($M = 3.8, SE = .13, p < .01$). However, the mean difference of the trust in source scores between the layperson and professional sources for the low trust in science group was smaller (mean difference = 0.57) than the high trust in science group (mean difference = 1.8). See figure 4 illustrating these effects.

There was also a significant two-way interaction of high trust in science and message type on trust in the source ($F(1, 416) = 8.7, p < .01, \eta^2 = .01$). Those with high trust in science had more trust in the source when the message was scientific ($M = 5.3, SE = .13$) compared to when the message was narrative ($M = 4.5, SE = .12, p < .001$). See figure 5 illustrating these effects. However, the interaction effect of trust in science and message type on trust in the source was not significant for the low trust in science group ($F(1, 407) = 0.002, p < .05$). Finally, the main effect of trust in science on trust in the source was significant ($F(1, 416) = 83.9, p < .001, \eta^2 = .12$). Those with high trust in science had much higher trust in the source ($M = 4.9, SE = .09$) than those with low trust in science ($M = 3.56, SE = .1, p < .001$).

When trust in the message was the dependent variable, there was not a significant three-way interaction effect of trust in science, source type and message type ($F(1, 421) =$

3.6, $p > .05$). There was a significant two-way interaction effect of trust in science and message type on trust in the message ($F(1, 421) = 15.3, p < .001, \eta^2 = .02$). When trust in science was high, trust in the message was significantly higher for the scientific message ($M = 6, SE = .15$) than the narrative message ($M = 4.7, SE = .13, p < .001$). When trust in science was low, the interaction effect was not significant ($F(1, 412) = 1, p > .05$). See figure 6 illustrating this effect. The main effect of trust in science on trust in the message was significant ($F(1, 421) = 111.5, p < .001, \eta^2 = .16$). Those with high trust in science had much higher trust in the message ($M = 5.3, SE = .1$) than those with low trust in science ($M = 3.6, SE = .1, p < .001$). See table 3.

Dairy milk issue. The three-way interaction effect of trust in science, source type and message type on trust in the source was not significant ($F(1, 420) = 0.63, p > .05$). Additionally, the two-way interaction of trust in science and source type on trust in the source was not significant ($F(1, 421) = 1.5, p > .05$) and the interaction of trust in science and message type was not significant ($F(1, 421) = 0.02, p > .05$). However, the main effect of trust in science on trust in the dairy milk source was significant ($F(1, 420) = 26.8, p < .001, \eta^2 = .05$). Those with high trust in science had much higher trust in the source ($M = 4, SE = 1.4$) than those with low trust in science ($M = 3.25, SE = 1.4, p < .001$).

However, when trust in message was the dependent variable, the three-way interaction was significant ($F(1, 424) = 4.2, p < .05, \eta^2 = .01$). For the high trust in science group, the three-way interaction was significant for the layperson source ($F(1, 416) = 13, p < .01, \eta^2 = .02$), but not the professional source ($F(1, 421) = 0.5, p > .05$). When trust in science was high and the source was a layperson, trust in the message was

significantly higher for the scientific message ($M = 4.7, SE = .19$) than the narrative message ($M = 3.57, SE = .14, p < .01$). See figures 7 and 8. Additionally, the main effect of trust in science on trust in the message was significant ($F(1, 424) = 41.5, p < .001, \eta^2 = .1$). Those with high trust in science had much higher trust in the message ($M = 4.4, SE = 1.4$) than those with low trust in science ($M = 3.1, SE = 1.4, p < .001$). H2 was partially supported for the dairy milk issue. See table 3.

Prediction of Attitudes and Behavioral Intent from Trust in Science

Hypothesis 3 predicted that trust in science would be positively associated with a) attitudes and b) behaviors. To test H3, three simple linear regression analyses were conducted with trust in science as the predictor variable, education and political ideology as covariates (education was the only covariate for the milk issue) and attitude toward vaccinations [dairy milk] as the outcome variable; behavior toward the message was the outcome variable in the second analysis and behavioral intent toward vaccines [dairy milk] was the outcome in the third.

Vaccine issue. Results indicated that trust in science explained 62% of variance in attitudes toward vaccines ($R^2 = .62, \beta = .71, F(3, 218) = 229.7, p < .001$). For every unit increase in trust in science, attitudes toward vaccines became more positive by nearly a unit. Trust in science accounted for 2.6% of variance in behavioral intentions toward the message ($R^2 = .026, \beta = .22, F(3, 427) = 4.8, p < .01$) For every unit increase in trust in science, behavioral intent toward the message increase by about a fourth of a unit. The third regression analysis indicated that trust in science explained 53% of variance in intentions for participants to vaccinate their children ($R^2 = .53, \beta = .65, F(3, 429) = 163.7,$

$p < .001$). For every unit increase in trust in science, behavioral intent increased by more than half a unit. See table 4.

Dairy milk issue. Results indicated that trust in science explained 26% of variance in attitudes toward milk ($R^2 = .26$, $\beta = 0.5$, $F(2, 423) = 76$, $p < .001$). For every unit increase in trust in science, attitudes toward milk became more positive by half a unit. Trust in science explained 2.6% of variance in behavioral intentions toward the message ($R^2 = .026$, $\beta = .17$, $F(2, 423) = 5.9$, $p < .01$). Finally, trust in science explained 20% of variance in intentions for participants to serve their children dairy milk ($R^2 = .2$, $\beta = .45$, $F(2, 423) = 53.4$, $p < .001$). For every unit increase of trust in science, behavioral intent towards milk increased by about half a unit. Thus, H3 is supported for both vaccine and dairy milk issues. See table 4.

Prediction of Attitudes and Behavioral Intent from Perceived Threat

Hypothesis 4 predicted that perceived threat would be negatively associated with a) attitudes and b) behavioral intent. To test H4, three simple linear regression analyses were conducted with perceived threat of vaccines [dairy milk] as the predictor variable, age, ethnicity, education, and political ideology as a covariates, and attitude toward vaccinations as the outcome variable. Education and political ideology (education only for the dairy milk issue) were the only significant covariates, so the model was rerun with only those variables as controls. In the second analysis, behavioral intent toward the message was the outcome variable, and in the third, behavioral intent toward vaccinations [dairy milk] was the outcome.

Vaccine issue. Results indicated that perceived threat explained 85% of variance in attitudes toward vaccines ($R^2 = .85$, $\beta = -0.89$, $F(3, 433) = 807.6$, $p < .001$). For every

unit increase in perceived threat, attitudes toward vaccines became more negative by nearly one unit. Perceived threat also explained 2% of variance in behavioral intentions toward the message ($R^2 = .021$, $\beta = -0.18$, $F(3, 433) = 4$, $p < .01$). The third regression analysis indicated that perceived threat explained 78% of variance in intentions for participants to vaccinate their children ($R^2 = .78$, $\beta = -0.84$, $F(3, 433) = 504.8$, $p < .001$). For every unit increase in perceived threat, intentions to vaccinate decreased by nearly one unit. See table 4.

Dairy milk issue. For the dairy milk issue, perceived threat explained 58% of variance in attitudes toward dairy milk ($R^2 = .58$, $\beta = -0.75$, $F(2, 425) = 294.4$, $p < .001$). For every unit increase in perceived threat, attitudes toward milk became more negative by nearly one unit. Perceived threat explained 2% of variance in behavioral intentions toward the message ($R^2 = .02$, $\beta = -0.15$, $F(2, 427) = 5.3$, $p < .01$). The third regression analysis indicated that perceived threat explained 45% of variance in intentions for participants to serve their children dairy milk ($R^2 = .45$, $\beta = -0.67$, $F(2, 431) = 175$, $p < .001$). For every unit increase in perceived threat, behavioral intent toward milk decreased by about half a unit. See table 4.

H4 is supported for both health issues.

Prediction of Attitudes and Behavioral Intent from Perceived Benefits

Hypothesis 5 predicted that perceived benefits would be positively associated with a) attitudes and b) behavioral intent. To test H5, three simple linear regression analyses were conducted with perceived benefit of vaccines [dairy milk] as the predictor variable, age, ethnicity, education, and political ideology as a covariates, and attitude toward vaccinations [dairy milk] as the outcome variable. Again, education and political

ideology were the only significant covariates, so the model was rerun with only those variables as controls. For the model for the milk issue, education was the only significant covariate so only that variable was included as a control. The second analysis had behavioral intent toward the message as the DV, and the third had behavioral intent toward vaccinations [dairy milk] as the DV.

Vaccine issue. Results indicated that perceived benefit explained 90% of variance in attitudes toward vaccines ($R^2 = .843$, $\beta = .94$, $F(3, 421) = 1319.6$, $p < .001$). For every unit increase in perceived benefit, attitudes toward vaccines became more positive by nearly one unit. Perceived benefit explained 3.5% of variance in behavioral intentions toward the message ($R^2 = .035$, $\beta = 0.23$, $F(3, 430) = 6.1$, $p < .001$). The third regression analysis indicated that perceived benefit explained 84% of variance in intentions for participants to vaccinate their children ($R^2 = .84$, $\beta = .9$, $F(3, 430) = 732.1$, $p < .001$). For every unit increase in perceived benefit, intentions to vaccinate increased by nearly one unit. See table 4.

Dairy milk issue. Perceived benefit explained 83% of variance in attitudes toward milk ($R^2 = .827$, $\beta = .91$, $F(2, 424) = 1014$, $p < .001$). For every unit increase in perceived benefit, attitudes toward milk became more positive by nearly one unit. Perceived benefit explained 6% of variance in behavioral intentions toward the message ($R^2 = .06$, $\beta = 0.26$, $F(2, 426) = 14.6$, $p < .001$). The third regression analysis indicated that perceived benefit explained 67% of variance in intentions for participants to serve their children dairy milk ($R^2 = .67$, $\beta = .82$, $F(2, 430) = 439.5$, $p < .001$). For every unit increase in perceived benefit, intentions toward dairy milk increased by nearly one unit.

H5 is supported for both health issues.

Effect of Perceived Threat and Cues to Action on Attitudes and Behavioral Intent

Research question 7 asked, will perceived threat, source type and message type interact to influence a) attitudes and b) behavioral intent? To answer it, two groups were created for the vaccine issue, high perceived threat of vaccines and low perceived threat, by evaluating the histogram of the perceived threat of vaccines data. The data was skewed ($M = 2.74, SD = 1.89$) so the median (2) was used as the cutoff point, where 2+ indicated high perceived threat and anything lower than 2 was low perceived threat. See figure 9. Two groups were also created for the dairy milk issue by examining the histogram: the data was skewed ($M = 2.89, SD = 1.7$) so the median (2.3) was used as the cutoff point, where 2.3+ indicated high perceived threat and anything 2.3 and lower was low perceived threat. See figure 10.

Two three-way ANCOVAs were conducted to examine the effects of perceived threat of vaccines [dairy milk], source type, and message type on attitudes, with education and political ideology as covariates (education was the only significant covariate for the dairy milk issue). The second three-way ANCOVA included behavioral intent toward vaccinations [dairy milk] as the outcome variable.

Vaccine issue. There was a significant three-way interaction effect of perceived threat, source type and message type on attitudes toward vaccines ($F(1, 424) = 5.06, p < .05, \eta^2 = 0.01$). However, the effect was only significant for the high perceived threat and narrative message condition. More specifically, when perceived threat was high and the message was a narrative, attitudes were significantly more negative for the professional source condition ($M = 4.3, SE = .21$) in comparison to the layperson source condition ($M = 5.2, SD = .19, p < .01$). Additionally, when perceived threat was high and the source

was a professional, attitudes were significantly more negative for the narrative message ($M = 4.3$, $SE = 2.2$) in comparison to the scientific message ($M = 5$, $SE = .18$, $p < .01$). Overall, when perceived threat was high, the layperson source and narrative message condition produced the most favorable attitude outcomes. See figures 11 and 12.

There was also a significant three-way interaction effect of perceived threat, source type and message type on behavior ($F(1, 433) = 5.5$, $p < .05$, $\eta^2 = 0.01$). However, the effect was only significant for the high threat and professional source condition ($F(1, 424) = 5.1$, $p < .001$), where those with high perceived threat and the professional source had much higher behavioral intent when the message was scientific ($M = 5$, $SE = .2$) compared to when the message was a narrative ($M = 4$, $SE = .2$). Source effects when perceived threat was high and the message was a narrative were also significant ($F(1, 424) = 14.4$, $p < .001$). When perceived threat was high and the message was a narrative, behavioral intent was significantly more negative for the professional source condition ($M = 4.1$, $SE = .2$) in comparison to the layperson source condition ($M = 5.3$, $SD = .2$). Overall, when perceived threat was high, the layperson source and narrative message condition produced the most favorable behavioral intent outcomes. See figures 13 and 14. See table 7 for all means.

Dairy milk issue. There was not a significant three-way interaction effects of perceived threat, source type and message type on attitudes toward dairy milk ($F(1, 425) = 2.2$, $p > .05$). The two-way interaction of perceived threat and source type on attitudes was not significant ($F(1, 425) = .48$, $p > .05$), and neither was the interaction effect of perceived threat and message type on attitudes ($F(1, 425) = .06$, $p < .05$). Again, there was not a significant three-way interaction effect of perceived threat, source type and

message type on behavioral intent toward dairy milk ($F(1, 431) = 1.1, p > .05$). The two-way interaction of perceived threat and source type on behavioral intent was not significant ($F(1, 431) = .6, p > .05$), and neither was the interaction effect of perceived threat and message type on behavioral intent ($F(1, 431) = 0, p > .05$). See table 7 for all means.

Effect of Perceived Benefit and Cues to Action on Attitudes and Behavioral Intent

Research question 8 asked, will perceived benefits, source type and message type interact to influence a) attitudes and b) behavioral intent? To answer it, two groups were created for the vaccine issue, high perceived benefit of vaccines and low perceived benefit, by evaluating the histogram of the perceived benefit of vaccines data. The data was skewed ($M = 5.8, SD = 1.86$) so the median (6.7) was used as the cutoff point, where 6.7+ indicated high perceived benefit 6.6 and under was low perceived benefit. See figure 15. Two groups were also created for the dairy milk issue by examining the histogram. The data was skewed ($M = 4.6, SD = 1.9$) so the median (5) was used as the cutoff point, where 5+ indicated high perceived benefit and 4.9 and lower was low perceived benefit. See figure 16.

Two three-way ANCOVAs were conducted for each issue, with perceived benefit of vaccines [dairy milk], source type, and message type as the independent variables, education and political ideology as covariates (education was the only covariate used for the dairy milk issue), and attitudes toward vaccines [dairy milk] as the dependent variable. In the second ANCOVA, behavioral intent toward vaccines [dairy milk] was the dependent variable.

Vaccine issue. The three-way interaction effect of perceived benefit, source type and message type on post-message attitudes toward vaccines was not significant ($F(1, 421) = 1.9, p > .05$). The two-way interaction effect of perceived benefit and source type on attitudes was not significant as well ($F(1, 421) = .05, p > .05$). And, the interaction effect of perceived benefit and message type was not significant ($F(1, 421) = .3, p > .05$). The three-way interaction effect of perceived benefit, source type and message type on behavioral intent toward vaccines was not significant ($F(1, 430) = .56, p > .05$). The two-way interaction effect of perceived benefit and source type on behavioral intent was not significant as well ($F(1, 430) = .66, p > .05$). And, the interaction effect of perceived benefit and message type was not significant ($F(1, 430) = 1.1, p > .05$). See table 7 for all means.

Dairy milk issue. The three-way interaction of perceived benefit of milk, source type, and message type on post-message attitudes toward milk was significant ($F(1, 424) = 4.3, p < .05, \eta^2 = 0.004$), although the effect was very small. The three-way interaction was only significant for the low benefit, professional source condition ($F(1, 416) = 6.5, p < .05$). Those with low perceived benefit who also saw the message from the professional source had significantly more positive attitudes toward dairy milk when the message was scientific ($M = 3.5, SE = .16$) compared to when the message was a narrative ($M = 2.8, SE = .2$). See figures 17 and 18. Overall, when perceived benefit was low, the scientific message from the professional source produced most favorable attitudes toward milk, whereas when perceived benefit was high, the scientific message from the layperson produced most favorable attitudes toward milk. The three-way interaction of perceived benefit of milk, source type, and message type on behavioral intent was not significant

($F(1, 430) = 0.6, p > .05$). Additionally, the two-way interaction of perceived benefit and source type on behavioral intent was not significant ($F(1, 430) = 0.73, p > .05$), nor was the two-way interaction of perceived benefit and message type ($F(1, 416) = 0.08, p > .05$). See table 7 for all means.

Effect of Preexisting Attitudes, Message Type and Source Type on Post-message Attitudes and Behavioral Intent

Hypothesis 6 predicted that there would be a significant effect of preexisting attitudes on post-message attitudes and behavioral intent, regardless of source and message type.

Additionally, RQ9 asked if preexisting attitudes, source type and message type would interact to influence a) post-message attitudes and b) behavioral intent. To test the hypothesis and answer the research question, two groups were created for each issue: positive and negative preexisting attitudes. These two groups were created by dropping neutral attitude participants from the analysis. The positive attitude group ($n = 315$) consisted of participants with attitude scores of 6-7; the negative attitude group ($n = 59$) had attitude scores of 1-3. See figure 19. Two groups were also created for preexisting attitudes toward dairy milk. The positive attitude group ($n = 172$) had attitude scores of 5.5-7 and the negative attitude group ($n = 59$) had attitude scores of 1-2.5. Two 2 (source type) X 2 (message type) X 2 (pre-attitude) ANCOVAs were conducted to examine the effects of preexisting attitudes, message type and source type on post-message attitudes, with education and political ideology as covariates (education was the only covariate for the dairy milk issue). The second ANCOVA had behavioral intent as the dependent variable.

Vaccine issue. The main effect of preexisting attitudes on post-message attitudes was extremely large ($F(1, 365) = 3175.2, p < .001, \eta^2 = 0.6$), as to be expected. Those with negative preexisting attitudes had much more negative post-message attitudes ($M = 1.8, SD = .9$) compared to those with positive preexisting attitudes ($M = 6.8, SD = .4$). Additionally, the main effect of preexisting attitudes on behavioral intent was extremely large ($F(1, 365) = 2147.3, p < .001, \eta^2 = 0.56$). Those with negative preexisting attitudes had much lower behavioral intent ($M = 1.3, SD = .9$) compared to those with positive preexisting attitudes ($M = 6.86, SD = .6$). H6 was supported.

Regarding RQ9, preexisting attitudes, source type and message type did not interact to influence post-message attitudes ($F(1, 365) = 1.7, p > .05$). Additionally, these variables did not interact to influence behavioral intent ($F(1, 366) = 1.6, p > .05$). However, there was a significant two-way interaction effect of preexisting attitudes and source type on behavioral intent ($F(1, 366) = 7.2, p < .01, \eta^2 = 0.002$), although the effect was small. When preexisting attitudes were negative, the layperson source was associated with higher behavioral intent ($M = 1.8, SE = .15$) than the professional source ($M = 1.2, SE = .12, p < .01$). See figure 21. The main effect of preexisting attitudes on post-message attitudes was extremely large ($F(1, 365) = 3175.2, p < .001, \eta^2 = 0.6$), as to be expected. Those with negative preexisting attitudes had much more negative post-message attitudes ($M = 1.8, SD = .9$) compared to those with positive preexisting attitudes ($M = 6.8, SD = .4$). See table 8.

Dairy milk issue. The main effect of preexisting attitudes on post-message attitudes was extremely large for the milk issue as well ($F(1, 226) = 1378.8, p < .001, \eta^2 = 0.78$). Those with negative preexisting attitudes had much more negative post-message

attitudes ($M = 1.9, SD = .9$) compared to those with positive preexisting attitudes ($M = 6.3, SD = .67$). The main effect of preexisting attitudes on behavioral intent was extremely large ($F(1, 226) = 865.9, p < .001, \eta^2 = 0.73$), as to be expected. Those with negative preexisting attitudes had much lower behavioral intent ($M = 1.5, SD = 1$) compared to those with positive preexisting attitudes ($M = 6.6, SD = 1$).

The interaction effect of preexisting attitudes, source type and message type on post-message attitudes was not significant ($F(1, 226) = .4, p > .05$). When behavioral intent was the outcome variable, the three-way interaction still was not significant ($F(1, 226) = .1, p > .05$). Additionally, the interaction of preexisting attitudes and source type on behavioral intent was not significant ($F(1, 226) = .001, p > .05$), and neither was the interaction of preexisting attitudes and message type ($F(1, 226) = 3, p > .05$).

CHAPTER 5

DISCUSSION

The primary goal of this research was to understand how different source types and message types influence trust, attitudes and behaviors toward the two health issues of vaccinations and dairy milk. Also of interest to this research was how one's perceptions—including attitudes toward health issues, trust in science and health beliefs—work together with different source and message types to influence health message interpretation. This research is extremely relevant today due to the increase in health blogs as sources of health information (Miller & Pole, 2010; Pew Internet & American Life Project, 2000), public polarization over issues (Hart & Nisbet, 2011; Roberts, 2016), the increasing skepticism of science experts (Kata, 2012) and the erosion of public trust in health organizations (Freimuth et al., 2014; Quinn et al., 2013). Given these complicated issues, influencing public perceptions of health products and behaviors in today's dynamic, digital communication landscape is a daunting task for health educators (Galarce et al., 2011). This research sought to provide more knowledge on the most effective health communication strategies via blog messages for promoting health products such as vaccinations and dairy milk, responding to Sundar et al.'s (2007) call for more research on health topics and the blogosphere.

The first research question (**RQ1**) asked if source type would influence attitudes and behavioral intent. For the vaccine issue, although source type (professional vs. layperson) did not significantly influence attitudes, source type did influence behavioral intentions (moms' intentions to have their children vaccinated). The layperson source was associated with higher behavioral intentions compared to the professional source. This

finding is somewhat contradictory to past health communication research that suggests that expert sources are more influential (Flanagin & Metzger, 2013; Hu & Sundar, 2009). What is also interesting is that for the milk issue, source type did not affect attitudes or behaviors, suggesting that source effects for health communication are issue-specific. There could have been characteristics of the layperson source—which for this research was a mommy blogger—that contributed to participants’ perceptions of similarities between themselves and the source that consequently impacted behavioral intent, but this was not a focus of this particular study and warrants investigation in future research.

The influence of message type on attitudes and behaviors (**RQ2**) was also explored, however the different blog messages (scientific evidence vs. experiential narrative) did not influence attitudes and behaviors for both the vaccine and milk issues. Results from past research exploring similar message-type effects have been ambiguous and thus there is still no clear recommendation for a most effective message approach for health promotion. However, what did become apparent through this research is that message effects are dependent upon source type (**RQ3**), at least where vaccine promotion is concerned. This study found that when the message type was a narrative, moms’ intentions to vaccinate their children were strongest when the message came from a layperson (mommy blogger) in comparison to the professional source. This makes sense from an empirical and practical standpoint; an experiential story about vaccinations could very well be more persuasive when the story comes from an everyday mom compared to when the story comes from a health expert that could be perceived as being less relatable. Again, relatability and perceived similarity were not focused on in this study but these

findings definitely demonstrate a need for further investigation of these variables within the health blogosphere and different types of health bloggers.

The next set of research questions and first hypothesis were about trust as a message outcome. For both the vaccine and dairy milk issues, the professional source was trusted more than the layperson source (**RQ4**). For the vaccine issue, when the message was scientific trust in the source was greater in comparison to when the message was a narrative (**H1**), which is consistent with prior research (Slater & Rouner, 1996). This further validates Lee and Sundar's (2013) conclusion that people use many different types of cues when assessing whether or not a source can be trusted or is credible. The interactive nature of digital communications has certainly convoluted—in a sense—Petty & Cacioppo's (1986) elaboration likelihood model of persuasion; the effect of cues on message interpretation is much more complex in the digital environment compared to when the model was first created. Today, there are many different things that people use as cues to assess source and message credibility—from the number of followers a source has to a profile picture to the design of a blog site—all of which have contributed to the necessity of further exploration of source effects in the digital landscape (Kareklas et al., 2015; Sundar et al., 2007).

RQ5 asked if message type would influence trust in the message. For both vaccine and milk issues, the scientific message was trusted more than the narrative message. And finally, **RQ6** asked if source and message type would interact to influence trust in the source and trust in the message. Results for this question were intriguing because results were different for the vaccine and dairy milk issues; the interaction effect was not significant for the vaccine issue but it was for the dairy milk issue and only for

the scientific evidence message. When the dairy milk message was scientific, the professional source was trusted more than the layperson source. These findings echo the source and message interaction effects on behavioral intent for the vaccine message; from an empirical perspective, a scientific message from a professional makes more sense than a scientific message from a layperson. This also underscores the importance of health educators focusing on the congruencies between sources of health information and the content of the messages those sources are relaying.

The second hypothesis (**H2**) brought trust in science into focus and predicted that trust in science, source type and message type would interact to influence trust in the source and trust in the message. Although H2 was not supported, there were still intriguing findings that were different between the two health issues. For the vaccine issue, the effect of source type on trust in the source was greater when trust in science was included as a moderator; those who had high trust in science also had very high trust in the professional source whereas those with low trust in science had minimal trust in the professional source. What is also interesting is that trust in science barely impacted perceived trustworthiness of the layperson source, meaning that there weren't large differences between the high trust and low trust in science groups on their trust in the layperson source. This substantiates prior research concerning individuals who are skeptical of science (Frewer et al., 2003; Lewandowsky et al., 2013) in that source type is not a primary concern for these individuals; if the topic is science-related at all, trust as an outcome simply isn't there. The same was found regarding trust in the message and message type: those who had low trust in science also had low trust in the message,

regardless of whether the message was scientific or narrative. However, those with high trust in science trusted the scientific message much more than the narrative message.

H3 predicted that trust in science would be positively associated with attitudes and behaviors, and this was strongly supported for both issues. Trust in science also predicted one's behavioral intent toward the message (e.g., refer a friend to the message, "click" for more information, etc.). Trust in science was a stronger predictor of attitudes and behavioral intent toward vaccinations compared to dairy milk, again underscoring the important contributions research on specific health issues make to the field.

The next set of research questions and hypotheses explored the role of health beliefs in predicting attitudes and behaviors, as well as how health beliefs might moderate the effects of source and message type on attitudes and behaviors. Consistent with past HBM research (Carpenter, 2010; Champion & Skinner, 2008; Yang, 2015), and consistent across both vaccine and dairy milk issues, perceived threat was negatively associated with attitudes and behaviors (**H4**) and perceived benefits was positively associated with attitudes and behaviors (**H5**). While past HBM research claimed that perceived benefit is a stronger predictor of attitudes and behaviors than perceived threat (Carpenter, 2010; Janz & Becker, 1984), this study found that both were equally strong predictors and thus both remain strong components of the HBM framework. However, it's important to note that perceived threat was conceptualized differently than typical HBM research. While most HBM research considers perceived threat as how harmful a disease or health complication might be if one doesn't engage in a health behavior, this study used perceived threat from the perspective of "threatened" publics, meaning that it accounted for perceptions of how harmful the health behaviors of vaccinations or

consuming dairy milk could be. Given the increasing skepticism of government-recommended health behaviors, studying perceived threat in this manner is useful for understanding health beliefs today.

In terms of cues to action, past HBM research has not evaluated how health beliefs influence one's willingness to act on a health message, as most HBM research focuses on health beliefs as message outcomes versus beliefs they hold prior to message exposure. Behavioral intent toward the message (Rodgers et al., in press) is especially relevant today given the increasing reliance on digital media and its interactivity for health information (Duffy & Thorson, 2009; Galarce et al., 2007; Sundar et al., 2007). It was also especially relevant to this study as the format for the stimuli were blog posts, and in a real-life setting blog posts provide opportunities for these blog messages to be shared with others, "clicked" on for more information, and other forms of interaction online. Although the effect was small to moderate, perceived benefits and perceived threat were significant predictors of behavioral intent toward the message, where perceived benefits was a positive relationship and perceived threat was a negative relationship.

RQ7 asked if perceived threat, source type and message type would interact to influence a) attitudes and b) behavioral intent. It was very evident that source and message effects on attitudes and behavioral intent were more conditional for those with high perceived threat compared to those with low perceived threat. For those who felt vaccinations posed a high threat for their children, post-message attitudes *and* behaviors were most positive (by an entire unit) for the layperson source narrative message, whereas attitudes were least positive for the professional source narrative message. Two-

way and three-way interaction effects were not significant for the dairy milk issue. This could potentially be the case because publics do not yet hold strong convictions toward this health issue in comparison to vaccinations. The attitudes toward dairy milk and perceived threat of dairy milk data did not reveal a strong divide in opinions about this specific health issue, although there was evidence that some moms do perceive milk as being a threat to their children's health.

RQ8 asked if perceived benefits, source type and message type would interact to influence a) attitudes and b) behavioral intent. For the vaccine issue, perceived benefits did not work at all with source or message type to influence attitudes and behaviors. For dairy milk, however, source and message effects were conditional for those with low perceived benefits of milk. Moms who thought dairy milk was not very beneficial to their children's health had much more positive post-message attitudes (a one-unit difference) toward milk when the message was scientific and from a professional compared to when the message was narrative and from a professional. This makes sense from an empirical perspective because those who perceive milk as not being beneficial might have gained a more concrete understanding of milk's benefits from the scientific message compared to the narrative message, resulting in more favorable attitudes. However, this is an empirical observation that could only be validated through further research among those who do not have a strong grasp on the nutritional offerings of dairy milk.

Reflecting on both perceived threats and perceived benefits from the HBM and how they interact with health messages (cues to action) it is evident that perceived threat of a health product/behavior is much more influential for message interpretation compared to perceived benefits, warranting further investigation in future research.

The last hypothesis and research question sought to determine how motivated reasoning might play a role in perceptions and message interpretations of vaccine and dairy milk promotion. **H6** predicted that there would be a significant effect of preexisting attitudes on post-message attitudes and behaviors, regardless of source and message type. Findings suggested that motivated reasoning—the interpretation of issues and messages to arrive at a conclusion consistent with one’s preexisting attitudes (Kunda, 1990)—occurred when participants were exposed to messages, as negative preexisting attitudes were still very negative after message exposure for both issues. Behavioral intent was also very low for those with negative preexisting attitudes. Also interesting, although past studies on motivated reasoning concluded that preexisting attitudes is one of the strongest predictors of post-message attitudes and behaviors (Nyhan et al., 2014; Taber & Lodge, 2006), is that perceived threat and perceived benefits were much stronger predictors for both issues than preexisting attitudes, and trust in science was a comparable predictor to preexisting attitudes. These findings make a significant contribution to the fields of health communication and social psychology because this demonstrates that an interdisciplinary approach to future health communication research, that combines insights from both fields, is essential for an in-depth understanding of individuals’ health perceptions.

RQ9 asked if preexisting attitudes, source type and message type would interact to influence post-message attitudes and behaviors. Although the three-way interaction was not significant for both issues, for the vaccine issue and for those with negative preexisting attitudes, the layperson source was associated with higher behavioral intent than the professional source, revealing again that a layperson source strategy could potentially produce most favorable outcomes for those that have negative perceptions of

vaccines. Again, this corroborates past research on source effects claiming that expert sources are more influential and persuasive than non-expert sources (Pornpitakpan, 2004) on attitudes and behaviors. These findings also highlight that source strategies should be different depending on the characteristics and beliefs of the target audience, especially when controversial health issues are involved.

Practical Implications

This research revealed many insights that are informative for health educators and communicators. First, it is clear that the success of source and message strategies is dependent upon people's beliefs and perceptions about health issues. Thus a 'one size fits all' strategy is not the best health communication approach. Health communicators should carefully and thoughtfully craft messages targeted toward negative and threatened publics. Mothers whom were negative towards vaccines and dairy milk, and thought that these health products and behaviors could threaten their children's health, appeared to be more critical and wary of promotional messages of these products. However, a specific source and message strategy stood out as producing the most favorable outcomes: It is suggested that—when communicating with negative and threatened publics—health communicators should implement a layperson source communicating a narrative-style message. This source and message strategy was associated with the most positive post-message attitudes and behaviors in comparison to the professional source and scientific message.

Second, it is also apparent that trust plays a critical role in individual's evaluations of health communication. Results from this study suggest that those individuals that have high trust in science and might appreciate scientific advancements appeared to be just as

critical of health promotional messages as those with negative preexisting attitudes and high perceived threat, meaning that source and message effects were different among these two groups. For health promotion targeted at groups with high trust in science, it is essential that a professional source and scientific message approach is used, as outcomes of the layperson source and narrative message for this group were particularly negative. Additionally, those with low trust in science did not evaluate professional and layperson sources or scientific and narrative messages differently: their trust in the source and message remained low even after message exposure. This suggests that if health communicators hope to increase the persuasiveness and effectiveness of their communication efforts for groups who are distrusting of science and skeptical of health advice and recommendations, large efforts should be made to build and increase trust. This is a tall and daunting task as trust is established over time and is not typically influenced through health messages alone.

Finally, source and message strategies should be health topic-specific. For example, strategies that are successful for vaccine promotion are not the same strategies that would be successful for dairy milk promotion. It appears that moms' minds are made up concerning their attitudes and perceptions of vaccines; however, moms' perceptions of dairy milk are very diverse. This provides opportunities for health communicators to educate moms on the nutritional benefits of dairy milk before opinions become divided and polarized as they have with vaccinations.

Limitations and Suggestion for Future Research

As is the case with all research, there are limitations to this study. First, attitudes, perceived benefits and perceived threats were evaluated for vaccine and dairy milk as

individual, broad health topics. However, there are specific issues within each of these health topics that provide concern for the public and each of these health issues is complex. For example, there are some who might be negative toward vaccines being mandated by the government (Kata, 2012), but still perceive vaccines as being very beneficial for our society. Assessing attitudes toward vaccines overall doesn't necessarily reveal their true 'stance' toward the issue. Additionally, people might agree that dairy milk has nutritional benefits, but still have negative attitudes toward milk because of their concern for hormones in milk or their skepticism of how animals are treated throughout the milk production process (Sullivan Higdon & Sink FoodThink, 2014). During the recruitment process for this study, moms were recruited via private Facebook groups and commented on the recruitment post saying that they believe in serving their children dairy milk, but only in unpasteurized forms or they would only buy milk from a local farmer instead of from chain grocery stores. These aspects of the dairy milk health issue were not explored for this study. However, these comments warrant further, in-depth exploration of health beliefs regarding more specific concerns about vaccines and dairy milk.

Specific perceptions of source characteristics were also not measured for this study. For example, incorporating concepts from the parasocial identification and relationship literature (Giles, 2002) could reveal perceptions of similarity or relatability (Brown, Basil, & Bocarnea, 2003) of sources that might help explain why some sources are trusted more than others. This study also only used blog messages as the platform for health issue promotion; however, in everyday life, it is typical for individuals to be exposed to many health messages from many different types of online platforms such as

Instagram and Pinterest (Guidry et al., 2015). Thus health attitudes and behaviors are typically influenced in multiple ways over time instead of through just one exposure to a message.

Similar to perceptions of vaccine and dairy milk issues, trust in science—although a tried and true measure—was evaluated as an overarching concept and was not issue- or organization-specific. Future research could explore trust within the context of health-topic-specific communication. For example, trust in vaccine communications or trust in dairy milk communications might reveal even more interesting effects, in addition to the trust in science measure. Additionally, the dairy milk issue is related to the agriculture industry whereas the vaccination issue is more associated with the science/medical field. The agriculture industry has recently come under scrutiny (Sullivan Higdon & Sink FoodThink, 2014) and thus examining the effects of trust in agriculture specifically might be more informative of milk attitudes and behaviors than trust in science. Past research found trust in health and governmental organizations to be very strong predictors of compliance with government health recommendations (Quinn et al., 2013); however, this study did not measure trust in specific organizations. The professional source messages for this study came from sources depicted as working for the Center for Disease Control and Prevention (CDC) and National Dairy Council (NDC); trust in these organizations specifically was not a focus of this study but would be interesting to explore in future research.

CHAPTER 6

CONCLUSION

Perhaps the most significant contribution this study makes to the fields of health communication and social psychology is that it examines message interpretation within the context of the health blogs and health bloggers, answering the call from Sundar et al. (2007) for more research in this area, while taking individual differences into account—a research approach that has not yet been used. More specifically, the data strongly supports the use of a layperson source and narrative message style as the most effective strategy for positively influencing attitudes and behaviors of “hot cognition” (Taber & Lodge, 2006, p. 757) publics. Results from this study also demonstrate a need for more research using health beliefs as message moderators—not just message outcomes—in order to understand the best message approach for communicating with different types of people that have different perceptions of health products and behaviors. Also intriguing was the strong influence trust in science had on trust in the source and message, as well as attitudes and behaviors. A focus on earning trust and influence from those skeptical of scientific endeavors would be a beneficial, long-term strategy for health communicators.

Overall, making an effort to understand the drivers of hot cognition publics—from a social psychological perspective by focusing on attitudes, trust and health beliefs—is a worthy endeavor for informing effective and efficient health communication strategies.

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TABLES

Table 1.
Description of the sample (N = 421)

Characteristic	N	%	
Gender	Female	421	100
Age	18-24	16	36
	25-34	213	48.3
	35-44	184	41.7
	45-54	19	4.3
	55-64	4	1
Ethnicity	White	384	87
	African-American	5	1
	Hispanic	14	3
	Native American	3	0.7
	Asian/Pacific Islander	17	4
	Other	14	3.2
Education	High school grad	8	1.8
	Some college	34	7.7
	Vocational training	7	1.6
	College grad	88	20
	Post-grad work	25	5.7
	Post-grad degree	275	62.4
Region of Residence	Northeast	57	13
	Midwest	152	34.5
	South	105	23.8
	West	123	28
Political Ideology	Very liberal	123	28
	Liberal	158	35.8
	Moderate	97	22
	Conservative	49	11
	Very conservative	11	2.5

Table 2.

Means and standard deviation for the effect of source and message type on attitudes and behaviors

IV	Health Issue <u>Vaccine</u>		Health Issue <u>Dairy Milk</u>	
	DV		DV	
	<u>Attitudes</u>	<u>Behaviors</u>	<u>Attitudes</u>	<u>Behaviors</u>
	<i>M(SD)</i>	<i>M(SD)</i>	<i>M(SD)</i>	<i>M(SD)</i>
Source: Professional	5.6(2)	5.6 ^a (2.3)	4.9(1.7)	5.1(2.3)
Source: Layperson	6(1.8)	6 ^a (1.9)	4.6(1.8)	4.9(2.3)
Message: Scientific	5.8(1.9)	5.8(2.1)	4.9(1.7)	5(2.3)
Message: Narrative	5.8(1.9)	5.8(2.1)	4.7(1.8)	5(2.4)
Source: Pro*Msg: Sci	5.7(1.9)	5.7(2.2)	5(1.6)	5.2(2.2)
Source: Pro*Msg: Narr	5.5(2.1)	5.4 ^a (2.4)	4.7(1.9)	5(2.5)
Source: Lay*Msg: Sci	5.9(1.9)	5.9(2.1)	4.7(1.9)	4.9(2.3)
Source: Lay*Msg: Narr	6.1(1.8)	6.2 ^a (1.7)	4.6(1.8)	5(2.4)

Note. (1) ^a indicates mean difference between source/message is significant at ($p < .05$), ^b($p < .01$), ^c($p < .001$). (2) Education and political ideology were controls for the vaccine issue; education for milk issue. (3) Attitudes and behaviors were measured on a 1-7 Likert scale (1 = negative attitudes, low behavioral intent; 7 = positive attitudes, high behavioral intent)

Table 3.

Means and standard deviation for the effect of trust in science, source type and message type on trust in the source and trust in the message

IV	Health Issue Vaccine		Health Issue Dairy Milk	
	DV		DV	
	<u>Tru: Source</u> <i>M(SD)</i>	<u>Tru: Msg</u> <i>M(SD)</i>	<u>Tru: Source</u> <i>M(SD)</i>	<u>Tru: Msg</u> <i>M(SD)</i>
TS: High	4.9 ^c (1.5)	5.4 ^c (1.4)	4 ^c (1.4)	4.1 ^c (1.4)
TS: Low	3.5 ^c (1.6)	3.4 ^c (1.7)	3.3 ^c (1.4)	3.1 ^c (1.4)
Source: Professional	4.8 ^c (1.9)	4.7 ^b (2)	4 ^c (1.6)	3.8(1.5)
Source: Layperson	3.6 ^c (1.2)	4.3 ^b (1.7)	3.3 ^c (1.2)	3.5(1.4)
Message: Scientific	4.6 ^b (1.8)	4.9 ^c (2)	3.8(1.5)	3.8 ^a (1.5)
Message: Narrative	4 ^b (1.5)	4.2 ^c (1.7)	3.5(1.3)	3.4 ^a (1.4)
TS: High*Source: Pro	5.9 ^c (1.1)	5.9 ^c (1.1)	4.4 ^c (1.5)	4.2(1.3)
TS: Low*Source: Pro	3.7 ^b (1.8)	3.4(1.8)	3.6 ^b (1.6)	3.2(1.5)
TS: High*Source: Lay	4 ^c (1.1)	4.9 ^c (1.5)	3.5 ^c (1.1)	3.9(1.4)
TS: Low*Source: Lay	3.2 ^b (1.1)	3.3(1.5)	3 ^b (1.2)	3.1(1.3)
TS: High*Msg: Sci	5.5 ^c (1.3)	6 ^c (1)	4.2(1.5)	4.3 ^a (1.4)
TS: Low*Msg: Sci	3.5(1.7)	3.4(1.8)	3.3(1.5)	3.2(1.4)
TS: High*Msg: Narr	4.4 ^c (1.4)	4.8 ^c (1.5)	3.8(1.3)	3.8 ^a (1.2)
TS: Low*Msg: Narr	3.5(1.4)	3.4(1.6)	3.2(1.3)	3(1.4)
Source: Pro*Msg: Sci	5.1(1.9)	5(2)	4.3 ^c (1.6)	3.9(1.5)
Source: Pro*Msg: Narr	4.6(1.7)	3.4(1.7)	3.8 ^a (1.5)	3.6(1.5)
Source: Lay*Msg: Sci	3.9(1.3)	3.3(1.5)	3.2 ^c (1.2)	3.6(1.5)
Source: Lay*Msg: Narr	3.5(1)	4(1.5)	3.3 ^a (1.1)	3.3(1.2)

Note. (1) ^a indicates mean difference is significant at ($p < .05$), ^b($p < .01$), ^c($p < .001$). (2) Education and political ideology were control for the vaccine issue; Education for milk issue. (3) Trust was measured on a 1-7 Likert scale (1=low trust, 7=high)

Table 4.
Results of regression analyses

Independent variables	Dependent Variables	
	Attitudes	Behavioral Intent
<u>Vaccine Issue</u>		
<u>Covariates</u>		
Education	.35 ^c	.31 ^c
Political Ideology	-.26 ^c	-.28 ^c
<u>Predictors</u>		
Trust in Science	.71 ^c	.65 ^c
Perceived Threat	-.89 ^c	-.84 ^c
Perceived Benefit	.94 ^c	.9 ^c
<u>Milk Issue</u>		
<u>Covariate</u>		
Education	.22 ^c	.21 ^c
<u>Predictors</u>		
Trust in Science	.52 ^c	.45 ^c
Perceived Threat	-.75 ^c	-.67 ^c
Perceived Benefit	.91 ^c	.82 ^c

Note. (1) Numbers in cells refer to standardized regression coefficients.
 (2) ^a indicates significant at ($p < .05$), ^b($p < .01$), ^c($p < .001$).

Table 5.

Vaccine Issue: Means and standard deviation for the two-way effect and three-way effects of perceived threat, source type and message type on attitudes and behavior

IV	Perceived Threat <u>High</u>		Perceived Threat <u>Low</u>	
	DV		DV	
	<u>Attitudes</u> <i>M(SD)</i>	<u>Behaviors</u> <i>M(SD)</i>	<u>Attitudes</u> <i>M(SD)</i>	<u>Behaviors</u> <i>M(SD)</i>
Source: Professional	4.4(2.2)	4.3 ^a (2.6)	6.9(.35)	6.9(.6)
Source: Layperson	4.8(2.2)	4.8 ^a (2.4)	6.9(.26)	7(.2)
Message: Scientific	4.7(2.2)	4.7(2.6)	6.9(.35)	7(.2)
Message: Narrative	4.5(2.2)	4.4(2.5)	6.9(.27)	6.9(.6)
Source: Pro*Msg: Sci	4.8 ^a (2.1)	4.8 ^b (2.6)	6.8(.4)	6.9(.25)
Source: Pro*Msg: Narr	3.9 ^a (2.2)	3.7 ^b (2.6)	6.9(.3)	6.8(.8)
Source: Lay*Msg: Sci	4.4(2.3)	4.5(2.6)	6.9(.3)	7(0)
Source: Lay*Msg: Narr	5(2.1)	5.1 ^c (2.3)	6.9(.2)	6.9(.3)

Note. (1) ^a indicates mean difference between source/message type is significant at ($p < .05$), ^b($p < .01$), ^c($p < .001$). (2) Education and political ideology were used as controls. (3) Attitudes and behaviors were measured on a 1-7 Likert scale (1 = negative attitudes, low behavioral intent; 7 = positive attitudes, high behavioral intent)

Table 6.

Dairy Milk Issue: Means and standard deviation for the two-way effect and three-way effects of perceived threat, source type and message type on attitudes and behavior

IV	Perceived Threat		Perceived Threat	
	<u>High</u>		<u>Low</u>	
	<u>DV</u>	<u>DV</u>	<u>DV</u>	<u>DV</u>
	<u>Attitudes</u>	<u>Behaviors</u>	<u>Attitudes</u>	<u>Behaviors</u>
	<u>M(SD)</u>	<u>M(SD)</u>	<u>M(SD)</u>	<u>M(SD)</u>
Source: Professional	3.75(1.7)	3.7(2.4)	5.8(1)	6.2(1.5)
Source: Layperson	3.5(1.7)	3.5(2.2)	5.9(1.1)	6.3(1.3)
Message: Scientific	3.6(1.6)	3.5(2.3)	5.8(1.1)	6.2(1.4)
Message: Narrative	3.6(1.8)	3.7(2.4)	5.8(1)	6.4(1.4)
Source: Pro*Msg: Sci	3.9(1.7)	3.8(2.5)	5.7(1.1)	6.1(1.5)
Source: Pro*Msg: Narr	3.5(1.9)	3.7(2.5)	5.9(1)	6.5(1.4)
Source: Lay*Msg: Sci	3.4(1.6)	3.2(2)	5.9(1.2)	6.3(1.3)
Source: Lay*Msg: Narr	3.6(1.7)	3.7(2.4)	5.8(1)	6.4(1.4)

Note. (1) ^a indicates mean difference between source/message type is significant at ($p < .05$), ^b($p < .01$), ^c($p < .001$). (2) Education was used as a control. (3) Attitudes and behaviors were measured on a 1-7 Likert scale (1 = negative attitudes, low behavioral intent; 7 = positive attitudes, high behavioral intent)

Table 7.

Vaccine Issue: Means and standard deviation for the two-way effect and three-way effects of perceived benefit, source type and message type on attitudes and behavior

IV	Perceived Benefit <u>High</u>		Perceived Benefit <u>Low</u>	
	DV		DV	
	<u>Attitudes</u>	<u>Behaviors</u>	<u>Attitudes</u>	<u>Behaviors</u>
	<u>M(SD)</u>	<u>M(SD)</u>	<u>M(SD)</u>	<u>M(SD)</u>
Source: Professional	6.9(.4)	6.9(.6)	4.3(2.1)	4.2(2.6)
Source: Layperson	6.8(.3)	6.9(.25)	4.6(2.3)	4.7(2.5)
Message: Scientific	6.8(.4)	7(.1)	4.5(2.2)	4.5(2.6)
Message: Narrative	6.9(.3)	6.9(.6)	4.4(2.2)	4.4(2.5)
Source: Pro*Msg: Sci	6.8(.45)	7(.07)	4.5(2.1)	4.4(2.6)
Source: Pro*Msg: Narr	6.9(.2)	6.8(.9)	4.1(2.2)	4(2.6)
Source: Lay*Msg: Sci	6.9(.3)	6.9(.16)	4.4(2.3)	4.5(2.6)
Source: Lay*Msg: Narr	6.8(.35)	6.9(.3)	4.7(2.3)	4.8(2.3)

Note. (1) ^a indicates mean difference between source/message type is significant at ($p < .05$), ^b($p < .01$), ^c($p < .001$). (2) Education and political ideology were used as controls. (3) Attitudes and behaviors were measured on a 1-7 Likert scale (1 = negative attitudes, low behavioral intent; 7 = positive attitudes, high behavioral intent)

Table 8.

Dairy Milk Issue: Means and standard deviation for the two-way effect and three-way effects of perceived benefit, source type and message type on attitudes and behavior

IV	Perceived Benefit		Perceived Benefit	
	<u>High</u>		<u>Low</u>	
	<u>DV</u>	<u>DV</u>	<u>DV</u>	<u>DV</u>
	<u>Attitudes</u>	<u>Behaviors</u>	<u>Attitudes</u>	<u>Behaviors</u>
	<u>M(SD)</u>	<u>M(SD)</u>	<u>M(SD)</u>	<u>M(SD)</u>
Source: Professional	6(.9)	6.5(1)	3.3(1.4)	3.1(2.2)
Source: Layperson	6.1(1)	6.4(1.2)	3.2(1.4)	3.3(2.1)
Message: Scientific	6.1(.9)	6.4(1)	3.3(1.3)	3.3(2.1)
Message: Narrative	5.9(.9)	6.5(1.2)	3.1(1.4)	3.2(2.2)
Source: Pro*Msg: Sci	6(.9)	6.5(1)	3.5 ^a (1.3)	3.2(2.2)
Source: Pro*Msg: Narr	6(.9)	6.5(1.2)	2.9 ^a (1.4)	2.9(2.2)
Source: Lay*Msg: Sci	6.2(.9)	6.4(1.2)	3.2(1.3)	3.2(2)
Source: Lay*Msg: Narr	6(.9)	6.5(1.3)	3.2(1.4)	3.4(2.2)

Note. (1) ^a indicates mean difference between source/message type is significant at ($p < .05$), ^b($p < .01$), ^c($p < .001$). (2) Education was used as a control. (3) Attitudes and behaviors were measured on a 1-7 Likert scale (1 = negative attitudes, low behavioral intent; 7 = positive attitudes, high behavioral intent)

Table 9.

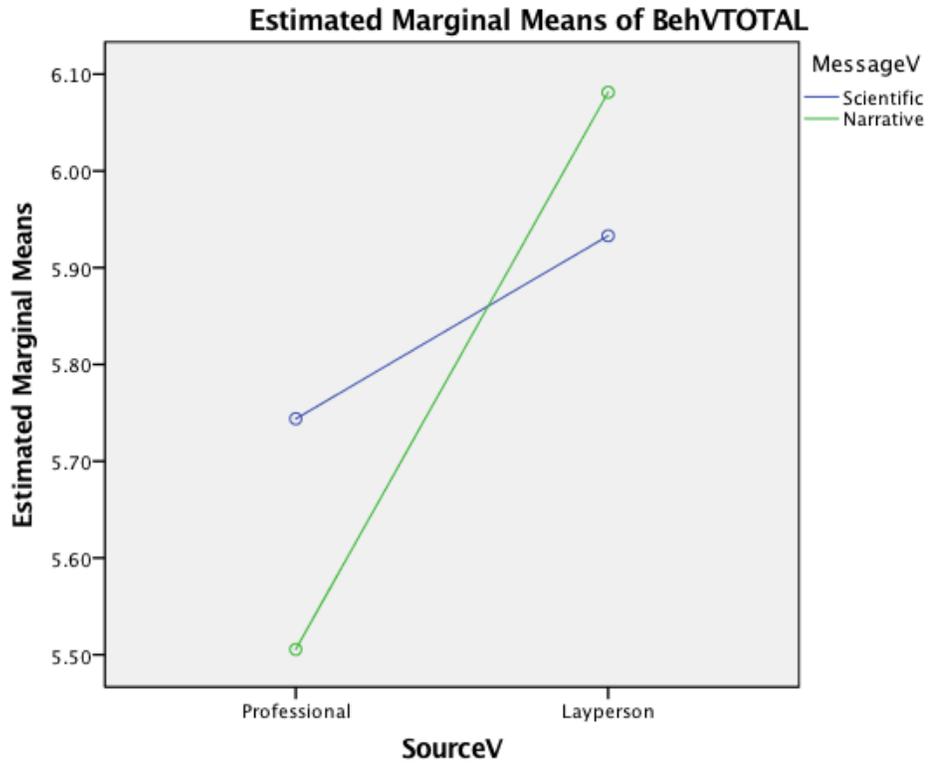
Means and standard deviation for the two-way effect of preexisting attitudes, source type, and message type on post-message attitudes and behavioral intent

IV	Health Issue Vaccine		Health Issue Dairy Milk	
	DV		DV	
	<u>Attitudes</u> <i>M(SD)</i>	<u>Behaviors</u> <i>M(SD)</i>	<u>Attitudes</u> <i>M(SD)</i>	<u>Behaviors</u> <i>M(SD)</i>
Att: Pos*Source: Pro	6.8(.5)	6.9(.6)	6.4(.6)	6.6(1)
Att: Neg*Source: Pro	1.8(.9)	1.1 ^b (.3)	2(1)	1.5(1.1)
Att: Pos*Source: Lay	6.8(.4)	6.8(.6)	6.3(.7)	6.5(1.1)
Att: Neg*Source: Lay	1.6(.8)	1.8 ^b (1.5)	1.8(.9)	1.5(.9)
Att: Pos*Msg: Sci	6.8(.45)	6.9(.2)	6.4(.6)	6.5(1)
Att: Neg*Msg: Sci	1.7(.8)	1.2(.7)	2.1 ^a (1)	1.7(1.3)
Att: Pos*Msg: Narr	6.8(.4)	6.8(.8)	6.3(.7)	6.6(1.1)
Att: Neg*Msg:Narr	1.8(.8)	1.4(1)	1.7 ^a (.9)	1.2(.4)

Note. (1) ^a indicates mean difference is significant at ($p < .05$), ^b($p < .01$), ^c($p < .001$). (2) Education and political ideology were controls for the vaccine issue; Education for milk issue. (3) Attitudes and behaviors were measured on a 1-7 Likert scale (1 = negative attitudes, low behavioral intent; 7 = positive attitudes, high behavioral intent)

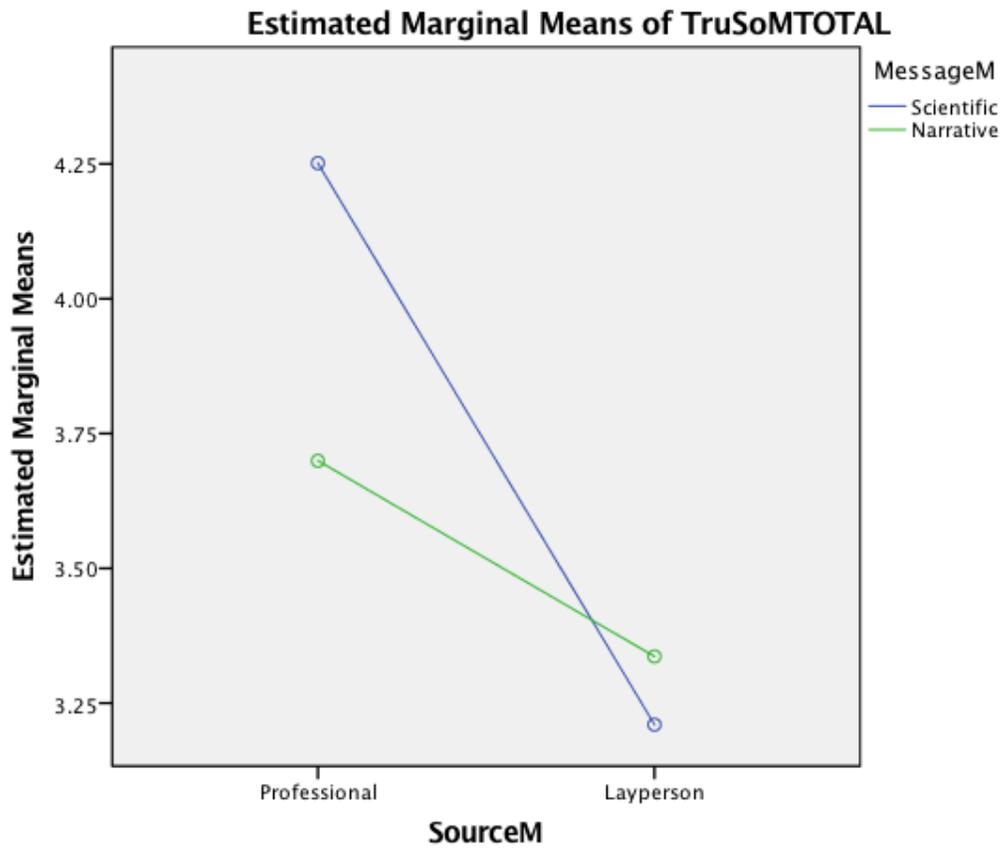
FIGURES

Figure 1. Vaccine issue: Effect of source and message type on behavioral intent



Covariates appearing in the model are evaluated at the following values: Edu = 6.08, PolIdeo = 2.24

Figure 2. Dairy milk issue: Effect of source and message type on trust in the source



Covariates appearing in the model are evaluated at the following values: Edu = 6.11

Figure 3. Histogram of trust in science

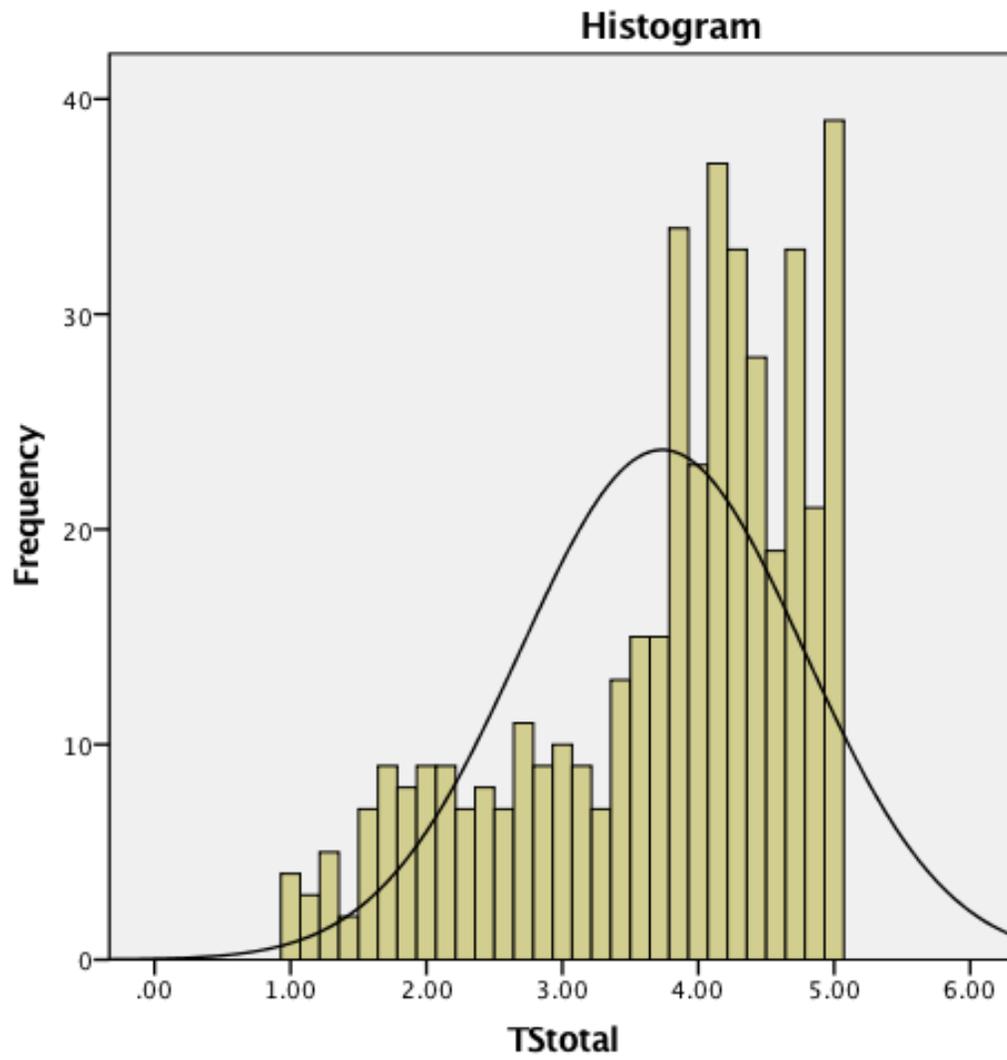
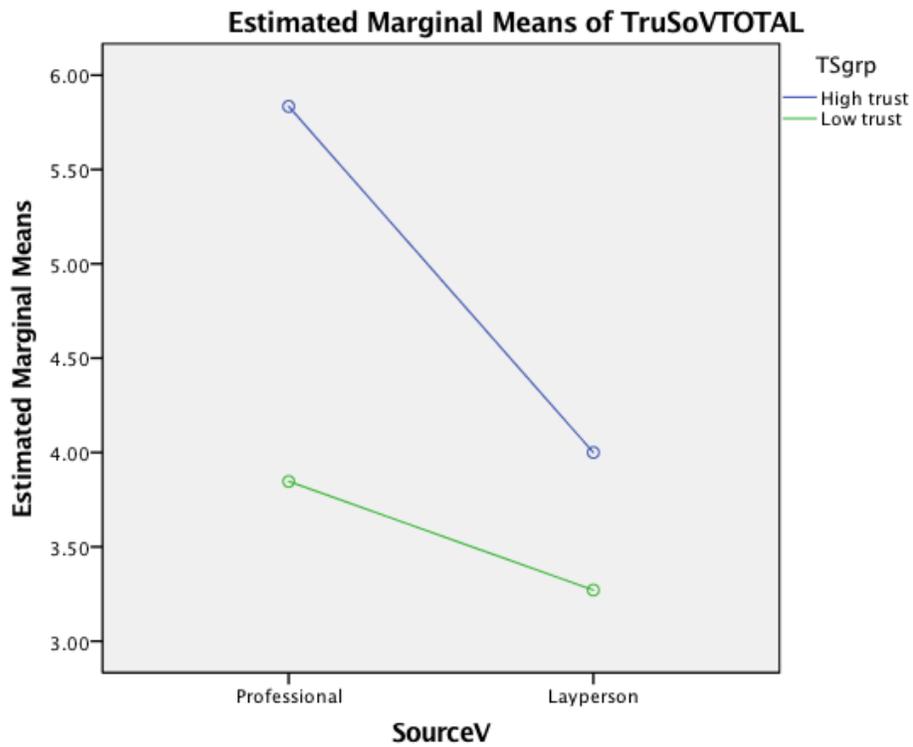
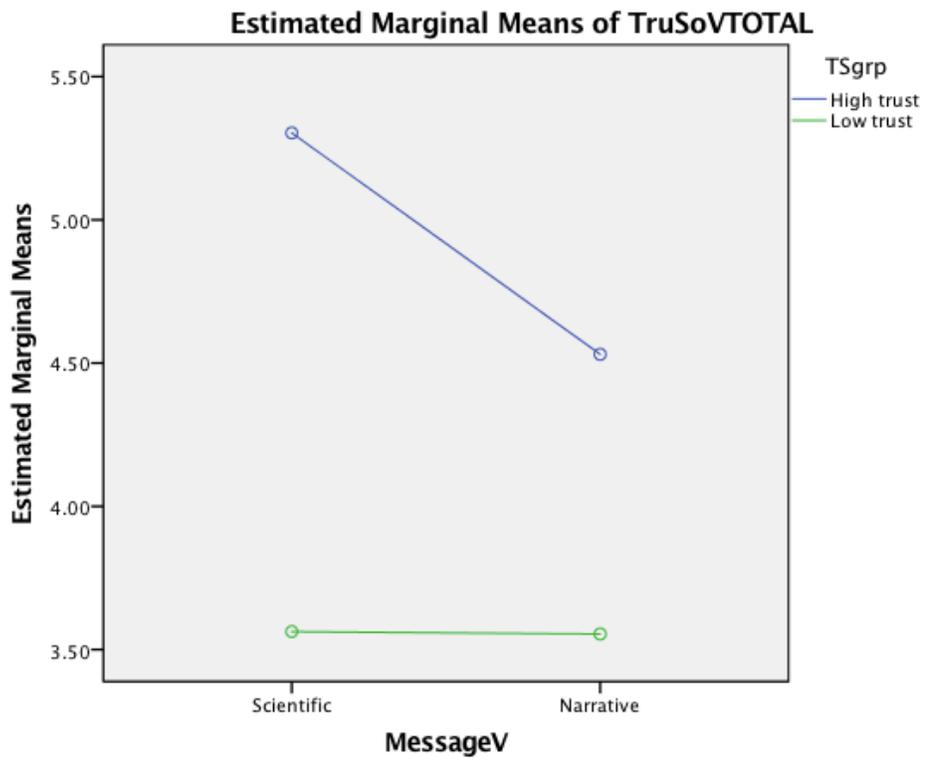


Figure 4. Vaccine issue: Effect of trust in science and source type on trust in the source



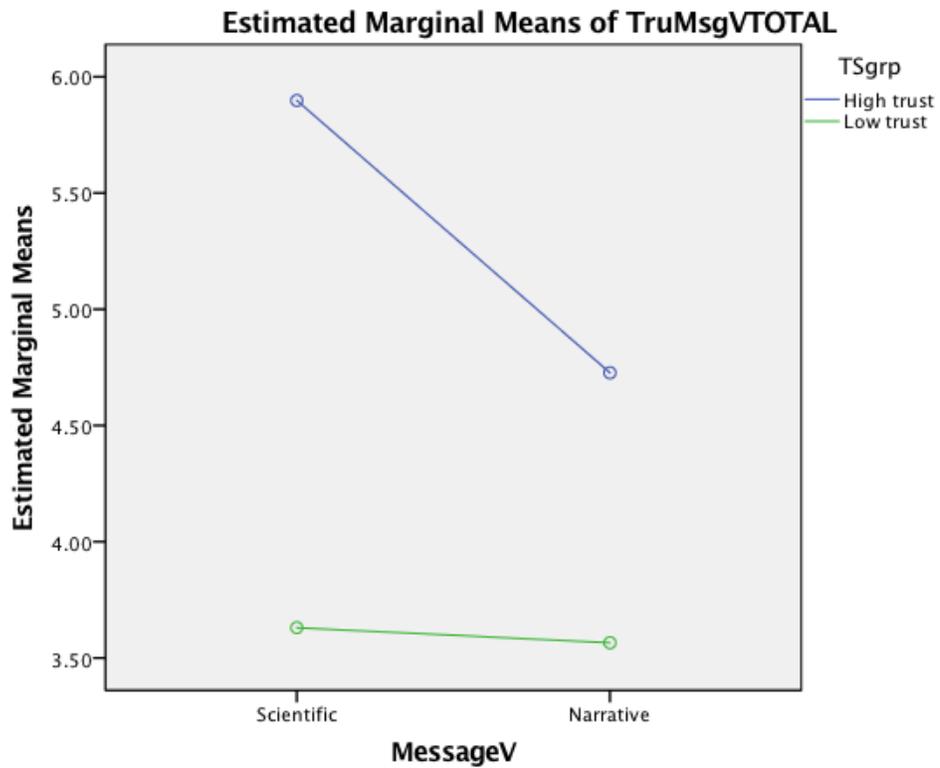
Covariates appearing in the model are evaluated at the following values: Edu = 6.11, PolIdeo = 2.22

Figure 5. Vaccine issue: Effect of trust in science and message type on trust in the source



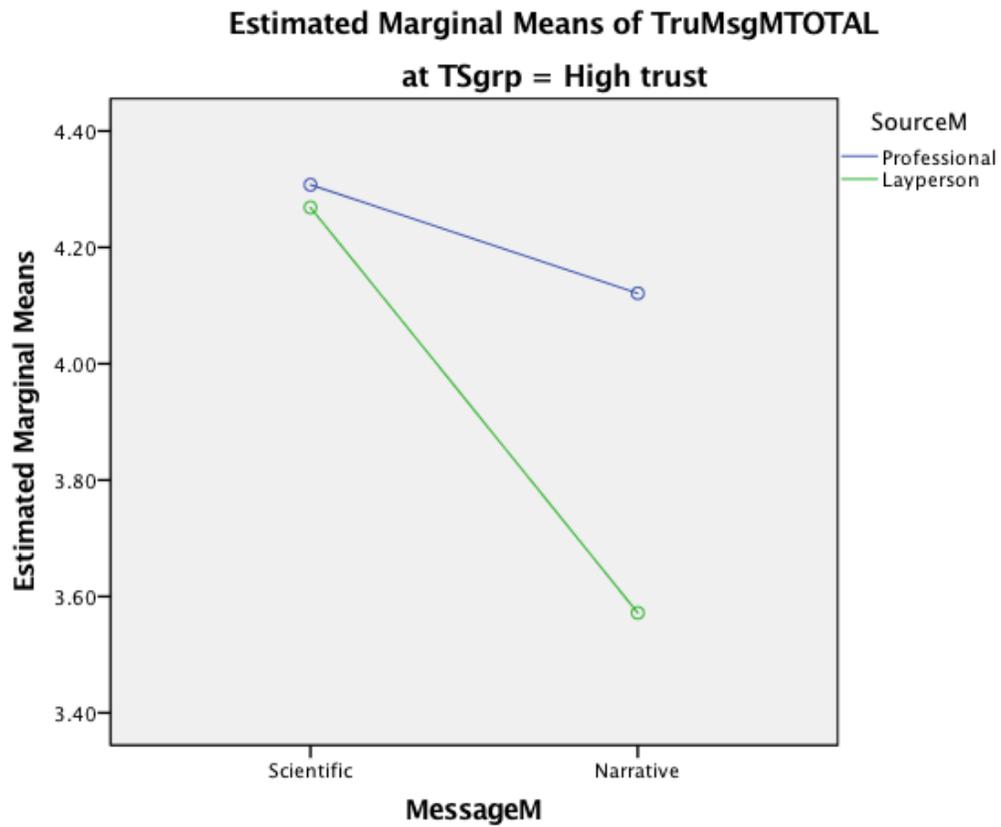
Covariates appearing in the model are evaluated at the following values: Edu = 6.11, PolIdeo = 2.22

Figure 6. Vaccine issue: Effect of trust in science and message type on trust in the message



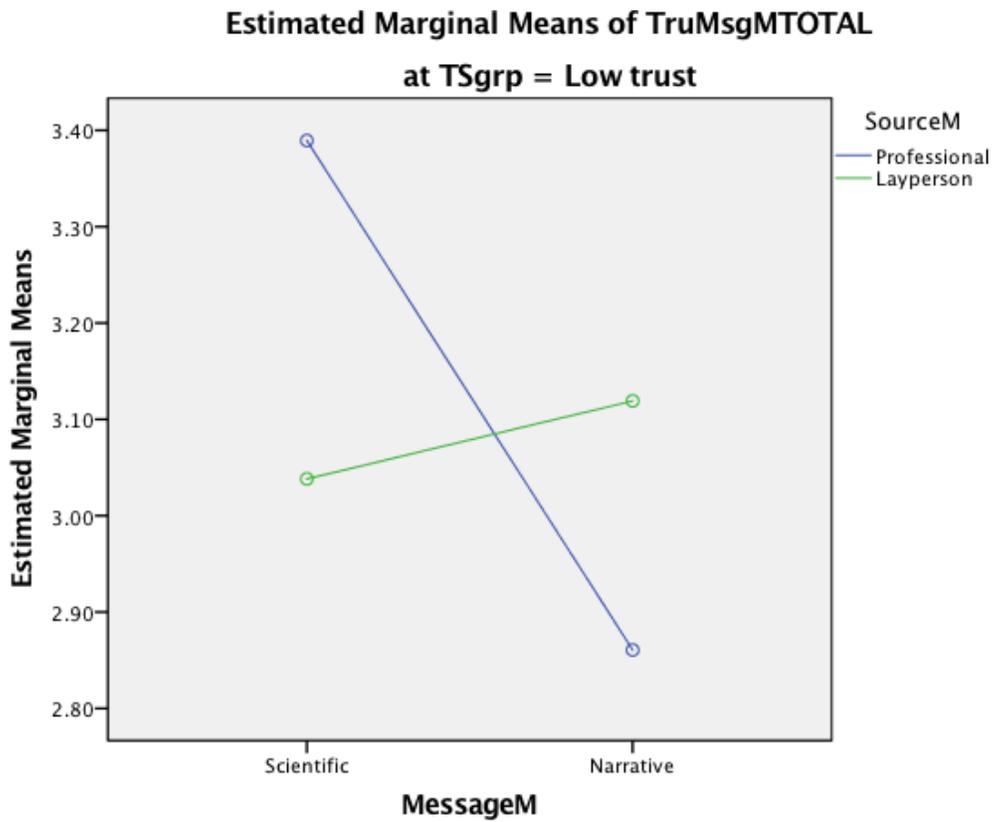
Covariates appearing in the model are evaluated at the following values: Edu = 6.09, PolIdeo = 2.22

Figure 7. Dairy milk issue: Effect of high trust in science, source type and message type on trust in the message



Covariates appearing in the model are evaluated at the following values: Edu = 6.10

Figure 8. Dairy milk issue: Effect of low trust in science, source type and message type on trust in the message



Covariates appearing in the model are evaluated at the following values: Edu = 6.10

Figure 9. Histogram of perceived threat of vaccines

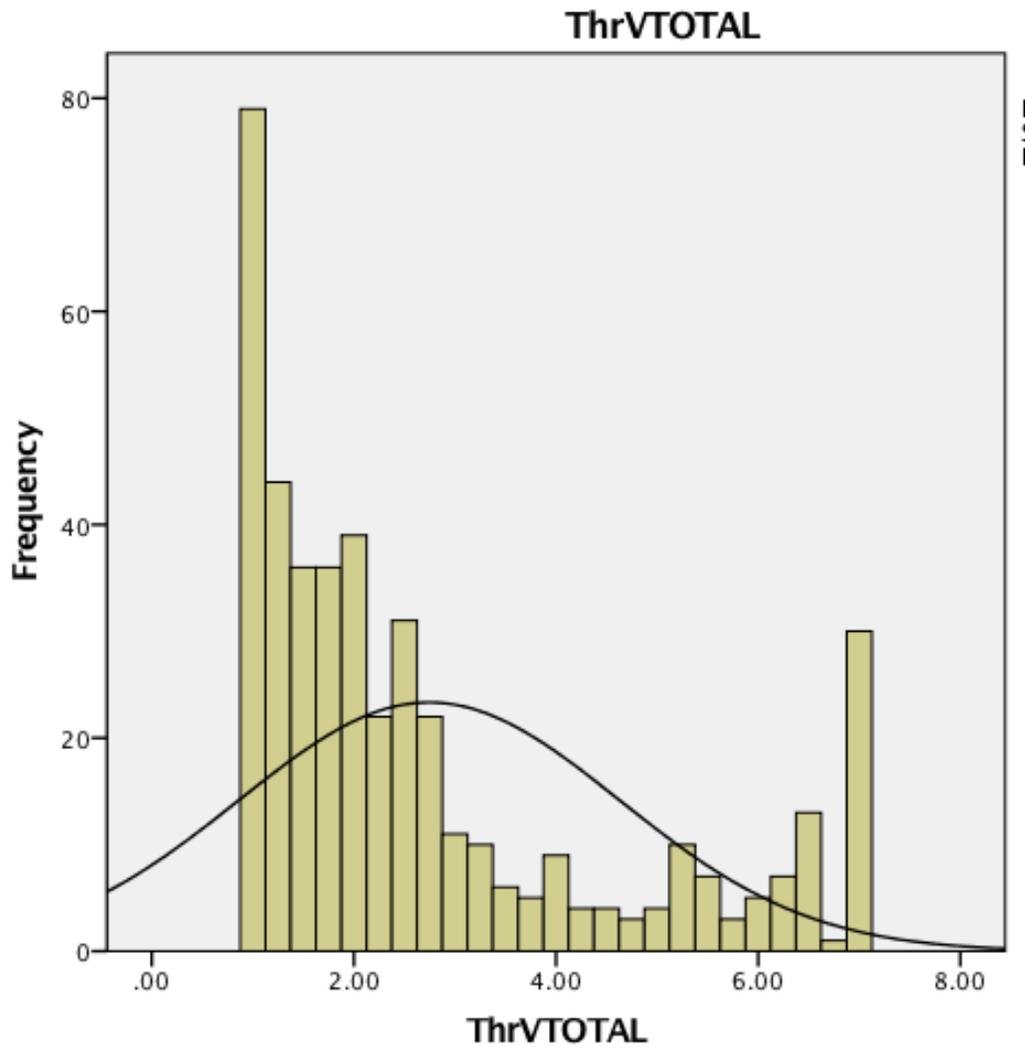


Figure 10. Histogram of perceived threat of dairy milk

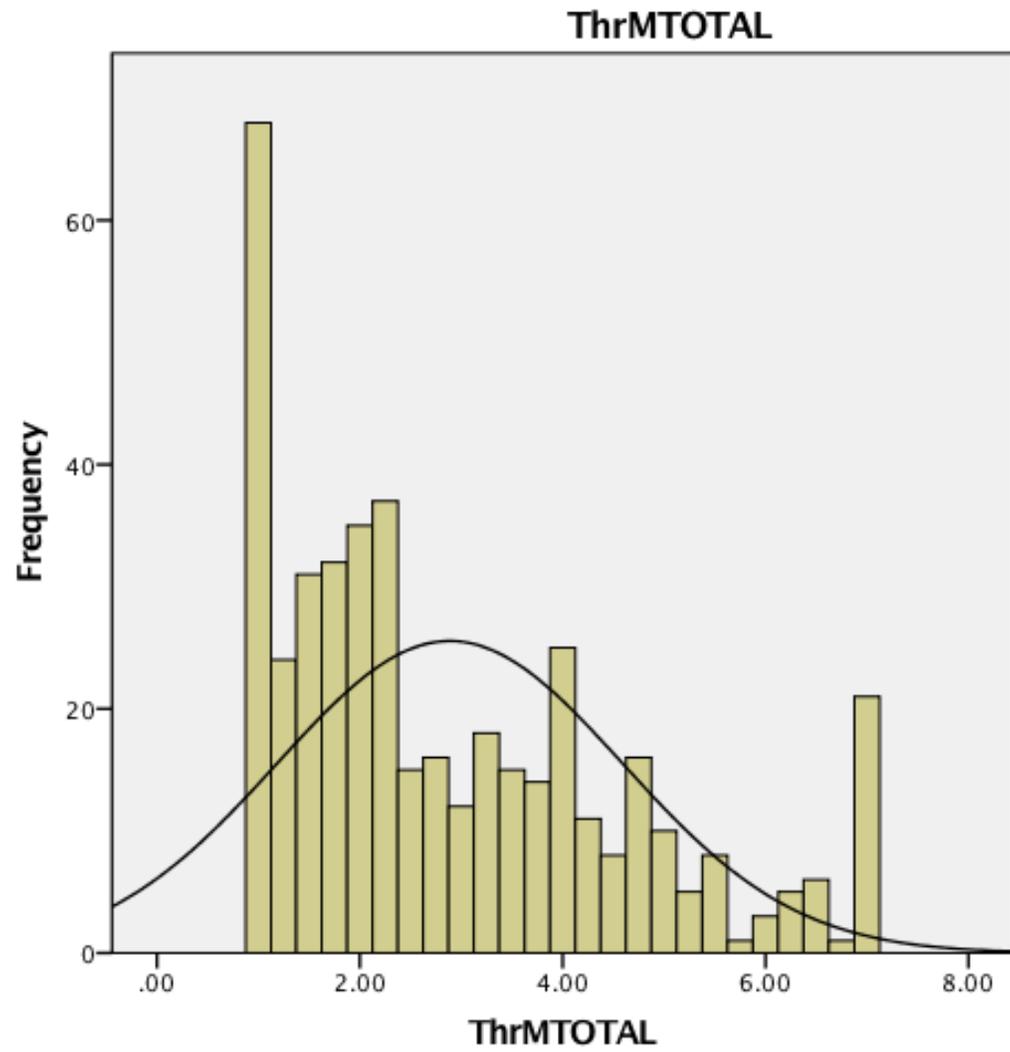
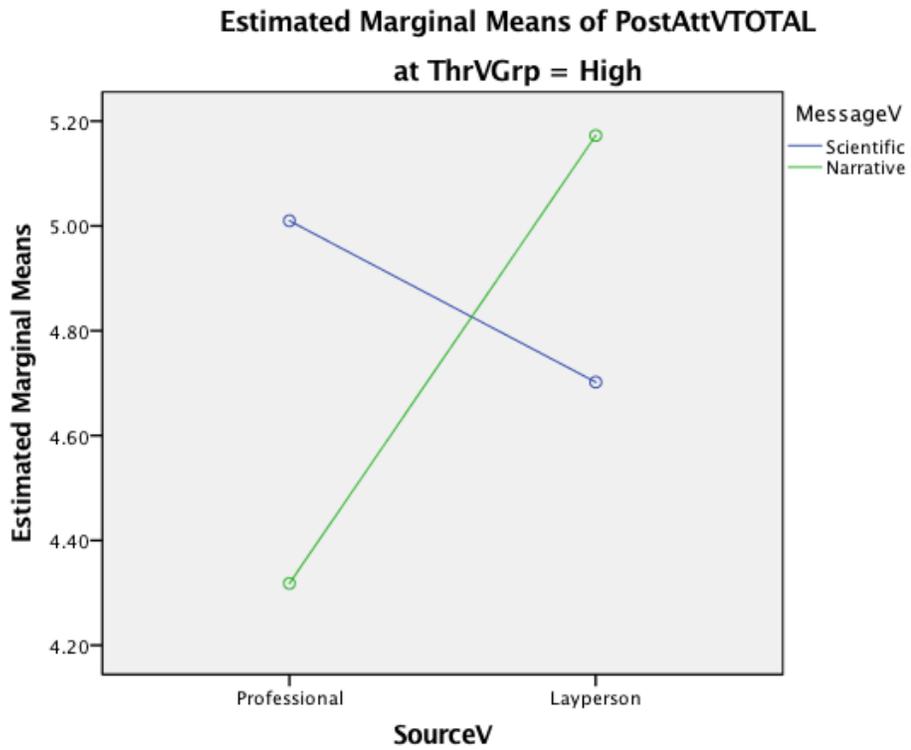
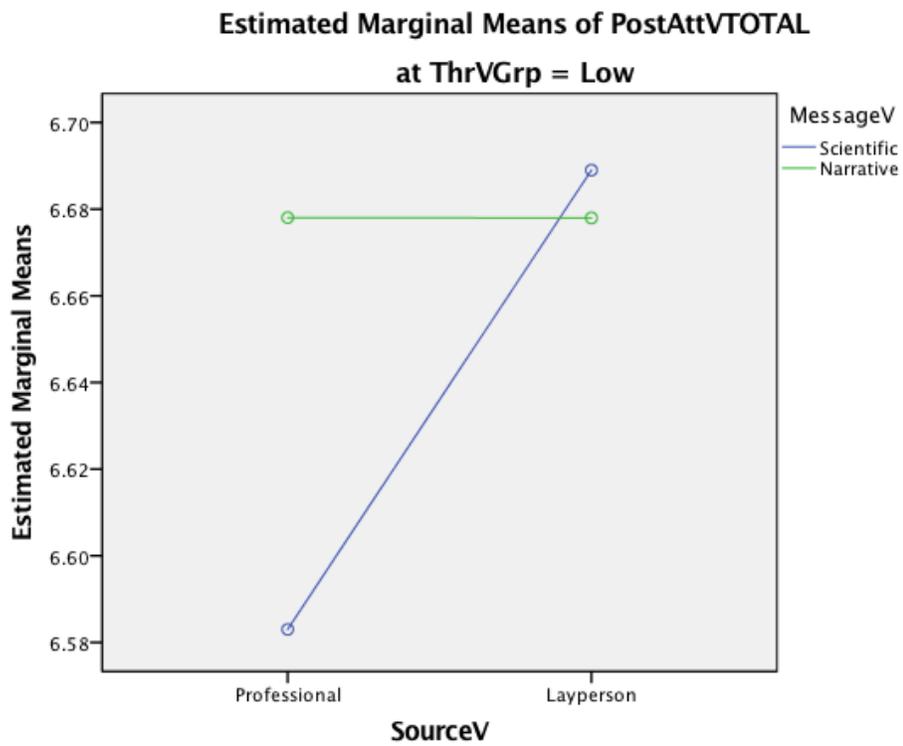


Figure 11. Vaccine issue: Effect of high perceived threat of vaccines, source type and message type on attitudes



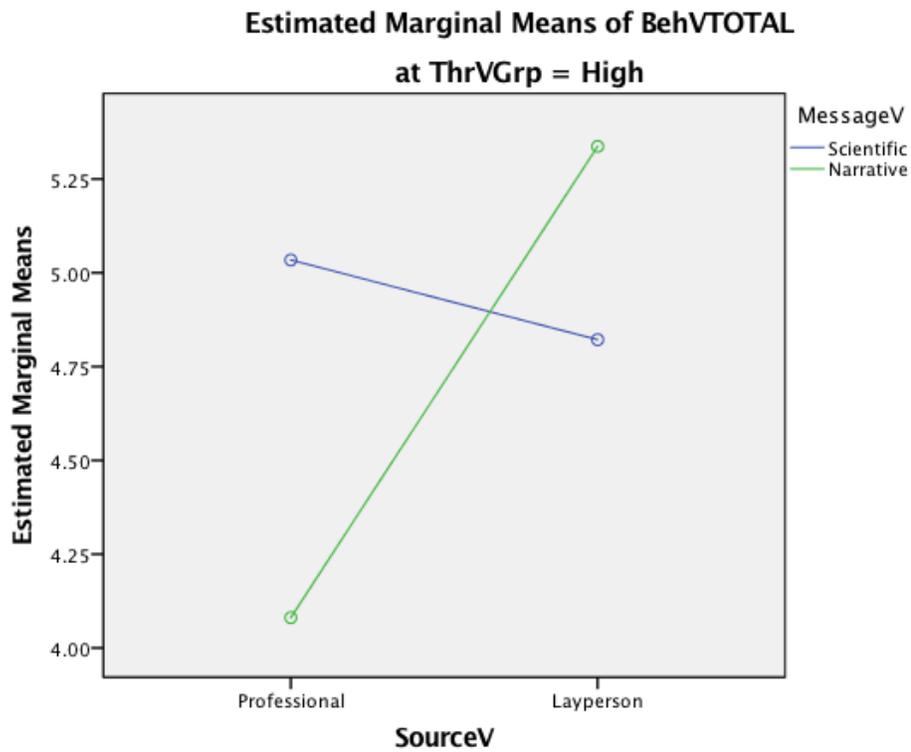
Covariates appearing in the model are evaluated at the following values: Edu = 6.11, PolIdeo = 2.22

Figure 12. Vaccine issue: Effects of low perceived threat of vaccines, source type and message type on attitudes



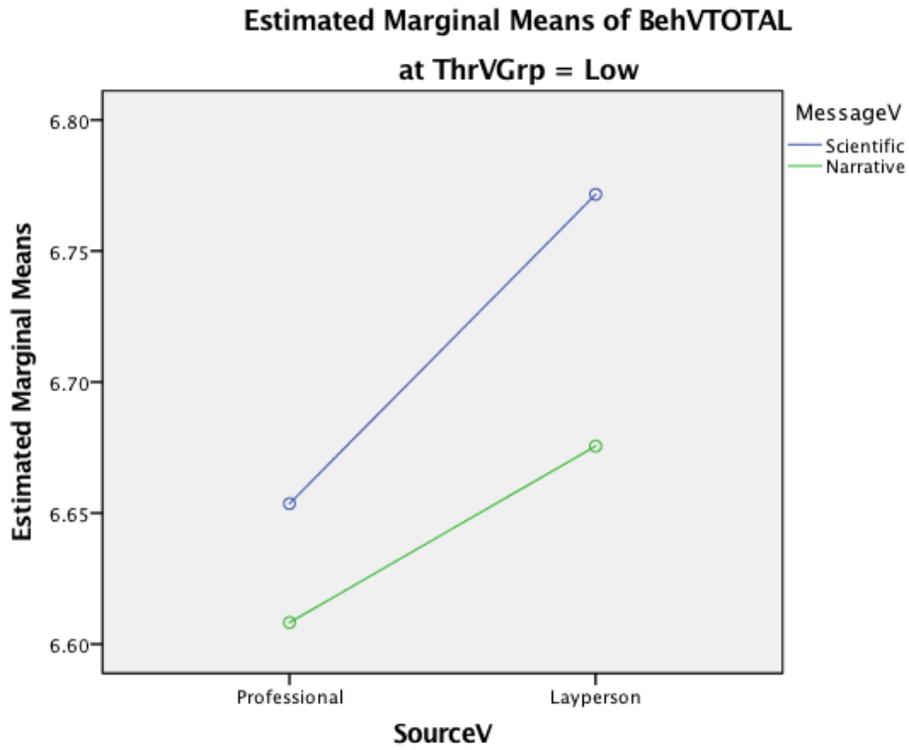
Covariates appearing in the model are evaluated at the following values: Edu = 6.11, PolIdeo = 2.22

Figure 13. Vaccine issue: Effect of high perceived threat, source type and message type on behaviors



Covariates appearing in the model are evaluated at the following values: Edu = 6.08, PolIdeo = 2.24

Figure 14. Vaccine issue: Effect of low perceived threat of vaccines, source type and message type on behavioral intent toward vaccinations



Covariates appearing in the model are evaluated at the following values: Edu = 6.08, PolIdeo = 2.24

Figure 15. Histogram of perceived benefit of vaccines

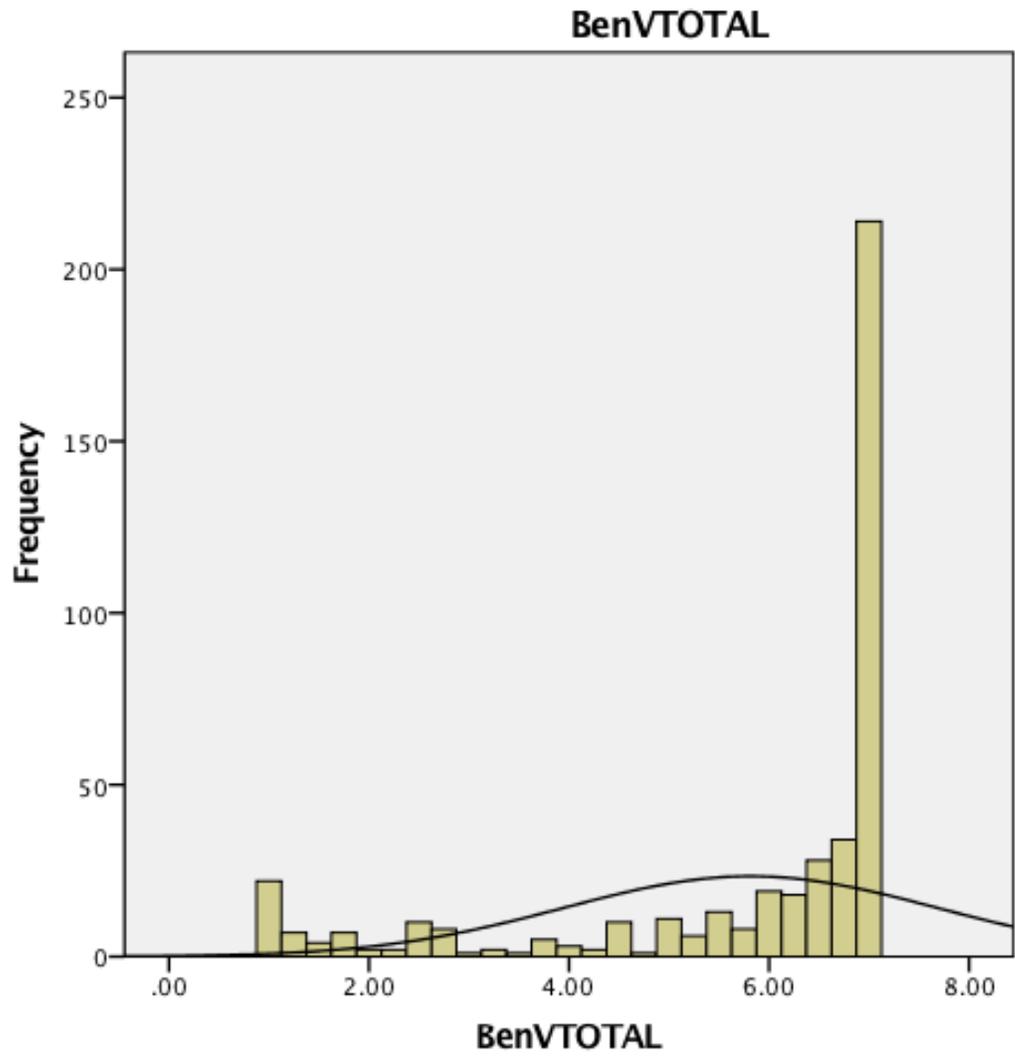


Figure 16. Histogram of perceived benefits of dairy milk

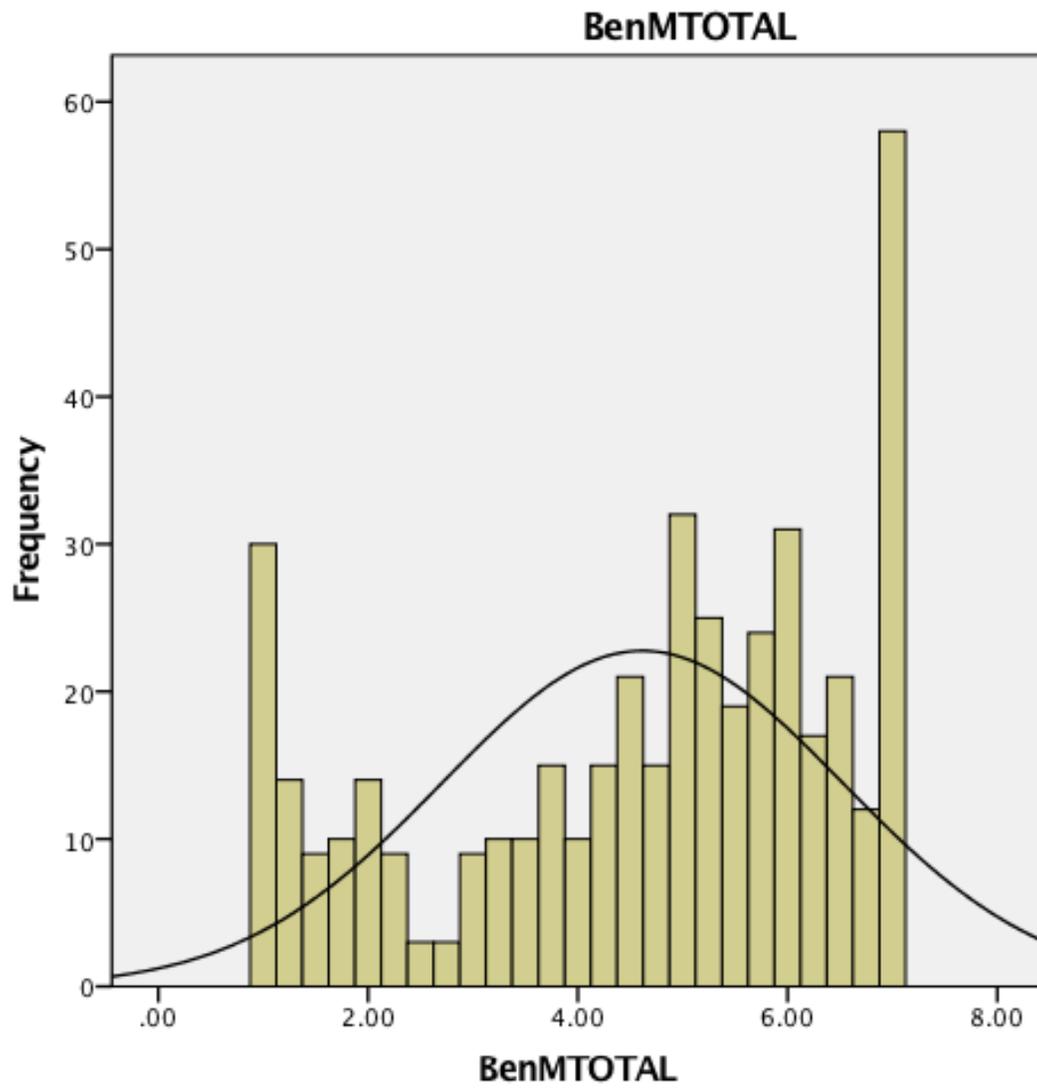
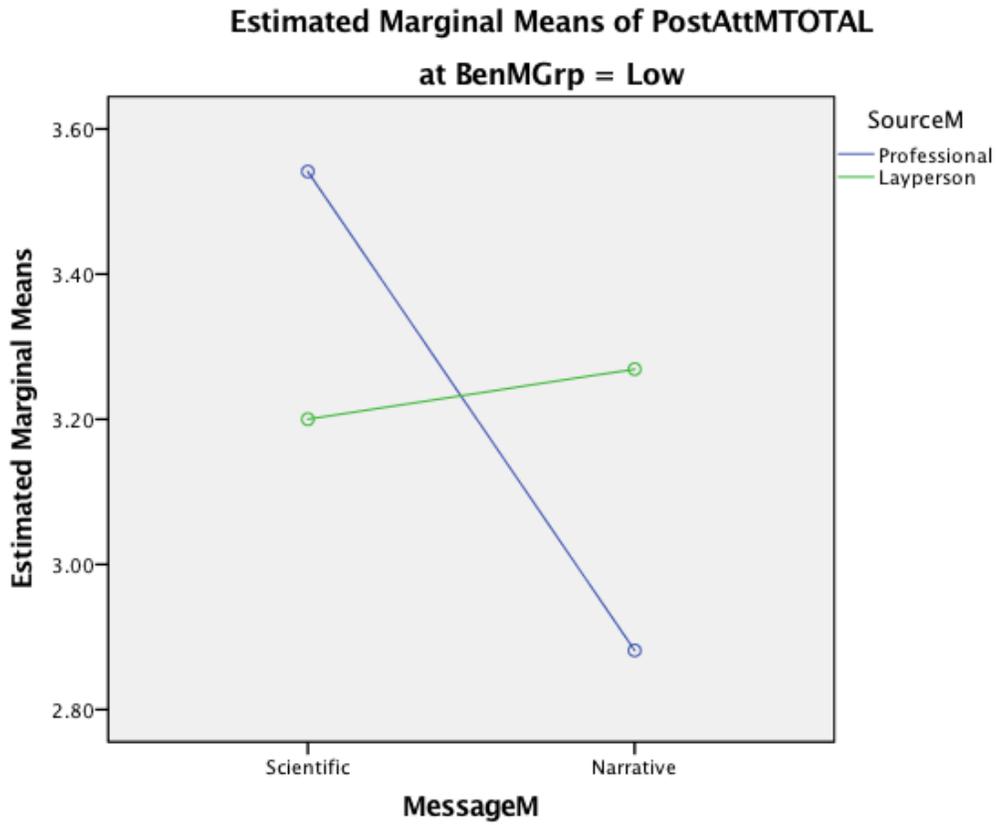
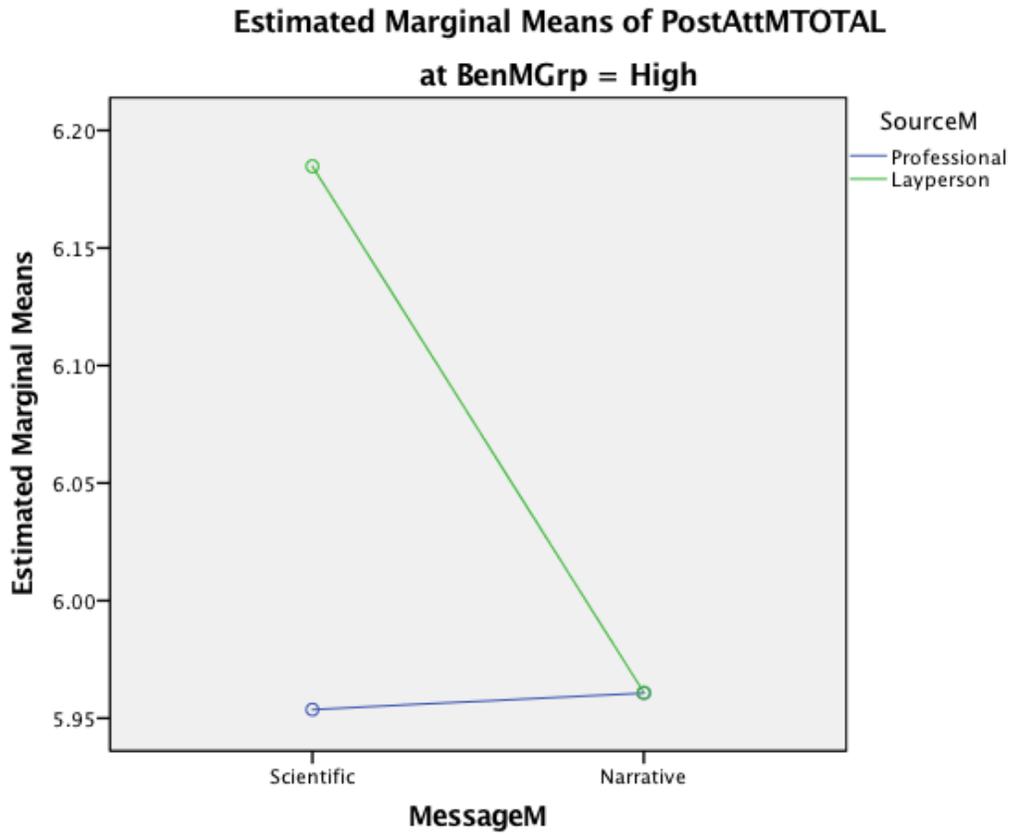


Figure 17. Dairy milk issue: Effect of low perceived benefit of dairy milk, source type and message type on attitudes



Covariates appearing in the model are evaluated at the following values: Edu = 6.10

Figure 18. Dairy milk issue: Effect of high perceived benefit of dairy milk, source type and message type on attitudes toward dairy milk



Covariates appearing in the model are evaluated at the following values: Edu = 6.10

Figure 19. Histogram of preexisting attitudes toward vaccines

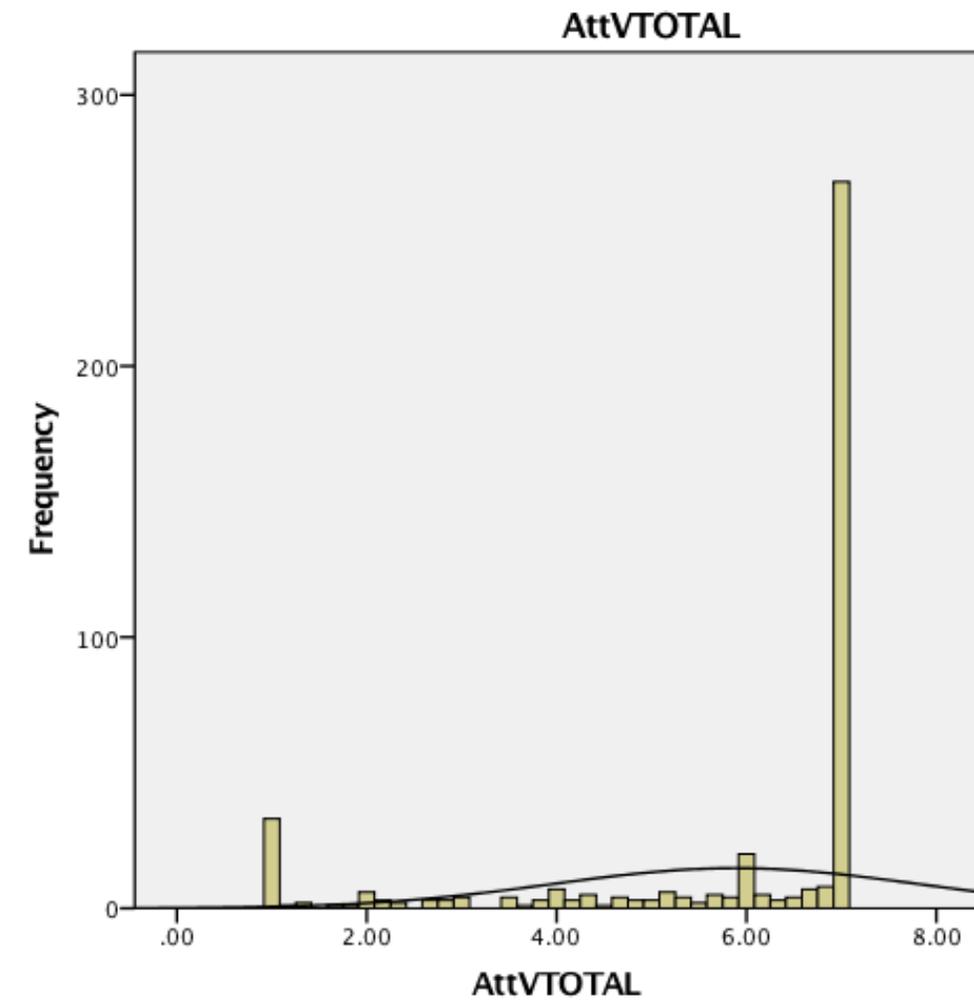


Figure 20. Histogram of preexisting attitudes toward dairy milk

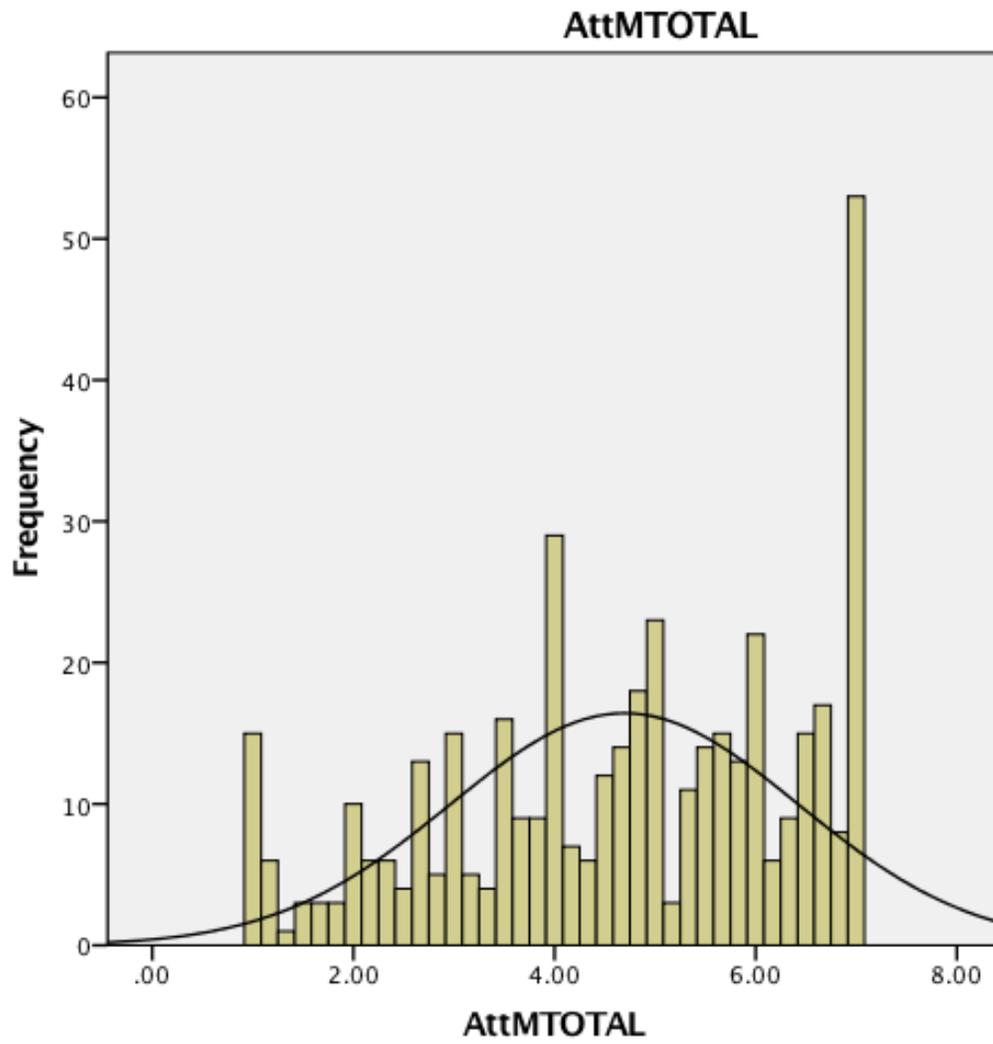
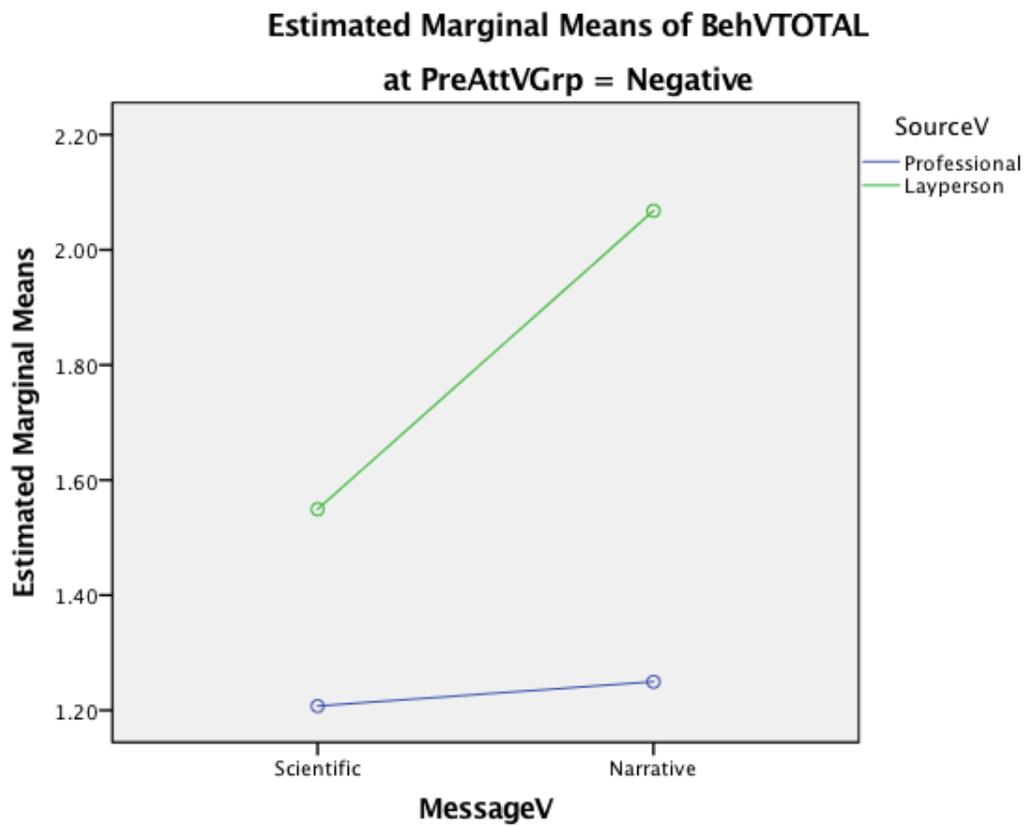


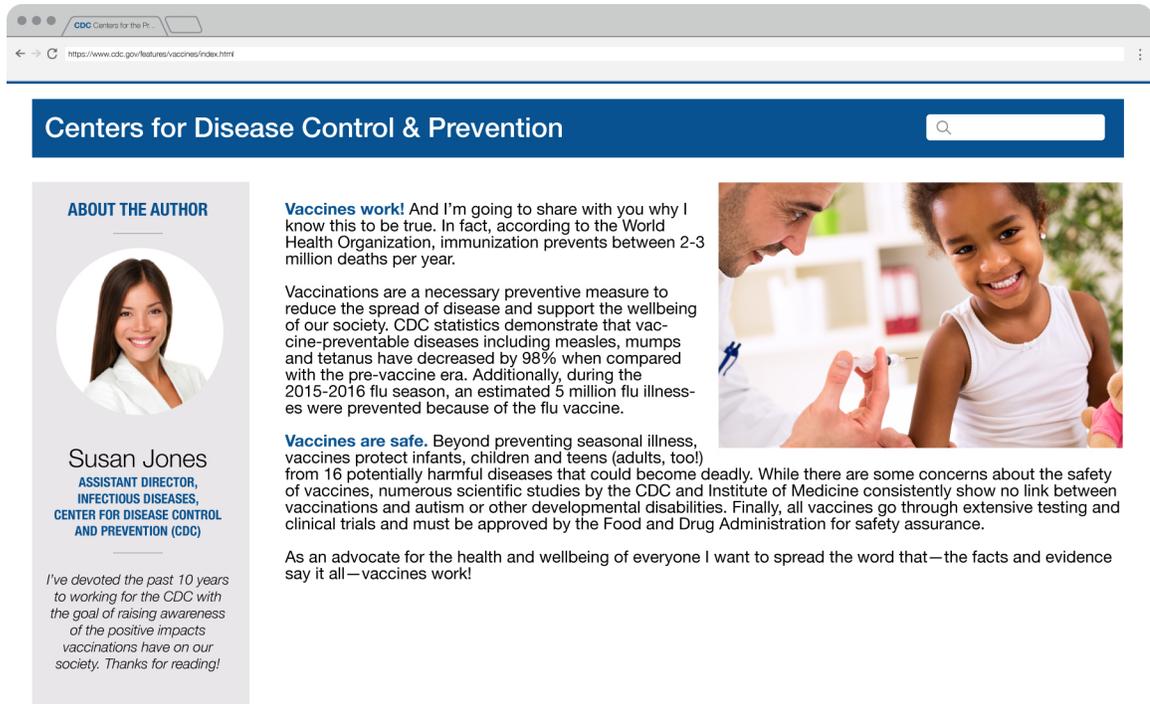
Figure 21. Vaccine issue: Effect of negative preexisting attitudes toward vaccines, source type and message type on behavioral intent



Covariates appearing in the model are evaluated at the following values: Edu = 6.23, PolIdeo = 2.14

APPENDIX 1: STIMULI

A. Vaccine / Health professional source / Scientific message



The screenshot shows the CDC website with a blue header containing the text "Centers for Disease Control & Prevention" and a search bar. The main content area is divided into three columns. The left column features a circular portrait of Susan Jones, Assistant Director of Infectious Diseases at the CDC, with a bio and a quote: "I've devoted the past 10 years to working for the CDC with the goal of raising awareness of the positive impacts vaccinations have on our society. Thanks for reading!". The middle column contains a scientific message starting with "Vaccines work! And I'm going to share with you why I know this to be true. In fact, according to the World Health Organization, immunization prevents between 2-3 million deaths per year." It continues with statistics on vaccine-preventable diseases and the 2015-2016 flu season. The right column features a photograph of a doctor examining a young girl's arm. Below the photo is a section titled "Vaccines are safe" discussing safety concerns and the approval process by the FDA.

Centers for Disease Control & Prevention

ABOUT THE AUTHOR



Susan Jones
ASSISTANT DIRECTOR,
INFECTIOUS DISEASES,
CENTER FOR DISEASE CONTROL
AND PREVENTION (CDC)

I've devoted the past 10 years to working for the CDC with the goal of raising awareness of the positive impacts vaccinations have on our society. Thanks for reading!

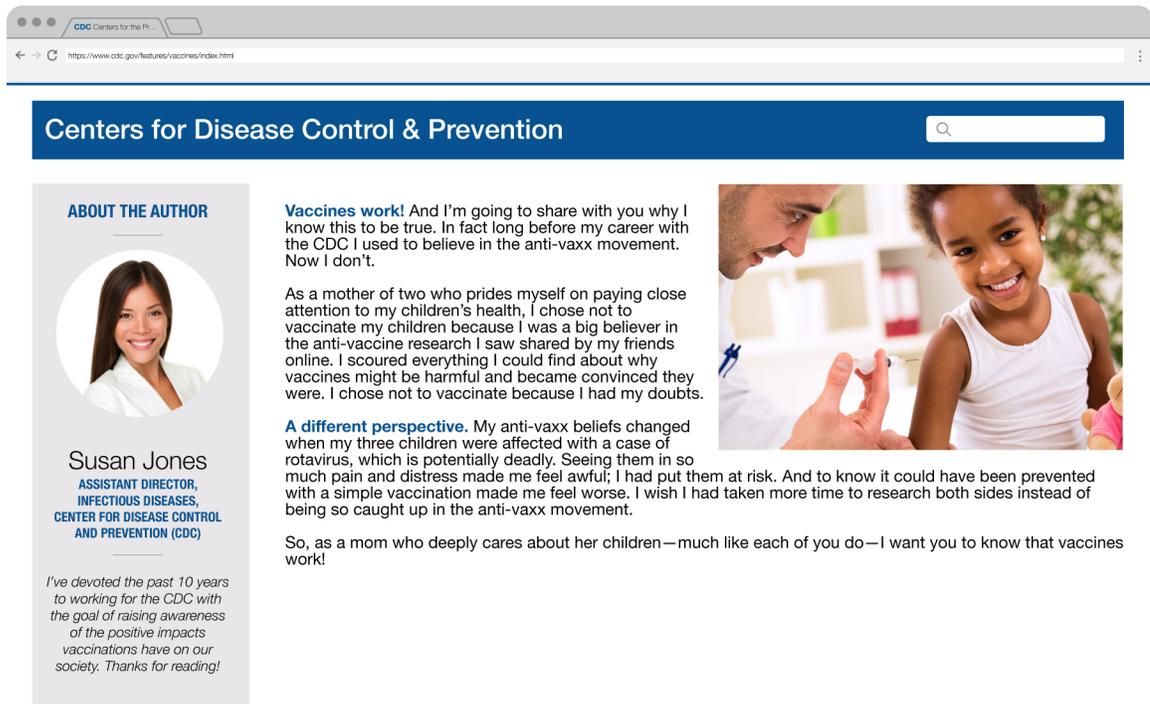
Vaccines work! And I'm going to share with you why I know this to be true. In fact, according to the World Health Organization, immunization prevents between 2-3 million deaths per year.

Vaccinations are a necessary preventive measure to reduce the spread of disease and support the wellbeing of our society. CDC statistics demonstrate that vaccine-preventable diseases including measles, mumps and tetanus have decreased by 98% when compared with the pre-vaccine era. Additionally, during the 2015-2016 flu season, an estimated 5 million flu illnesses were prevented because of the flu vaccine.

Vaccines are safe. Beyond preventing seasonal illness, vaccines protect infants, children and teens (adults, too!) from 16 potentially harmful diseases that could become deadly. While there are some concerns about the safety of vaccines, numerous scientific studies by the CDC and Institute of Medicine consistently show no link between vaccinations and autism or other developmental disabilities. Finally, all vaccines go through extensive testing and clinical trials and must be approved by the Food and Drug Administration for safety assurance.

As an advocate for the health and wellbeing of everyone I want to spread the word that—the facts and evidence say it all—vaccines work!

B. Vaccine / Health professional source / Narrative message



The screenshot shows the CDC website with a blue header containing the text "Centers for Disease Control & Prevention" and a search bar. The main content area is divided into three columns. The left column features a circular portrait of Susan Jones, Assistant Director of Infectious Diseases at the CDC, with a bio and a quote: "I've devoted the past 10 years to working for the CDC with the goal of raising awareness of the positive impacts vaccinations have on our society. Thanks for reading!". The middle column contains a narrative message starting with "Vaccines work! And I'm going to share with you why I know this to be true. In fact long before my career with the CDC I used to believe in the anti-vaxx movement. Now I don't." It continues with a personal story about her children's health and her initial beliefs. The right column features a photograph of a doctor examining a young girl's arm. Below the photo is a section titled "A different perspective" discussing her change in beliefs after her children were affected by rotavirus.

Centers for Disease Control & Prevention

ABOUT THE AUTHOR



Susan Jones
ASSISTANT DIRECTOR,
INFECTIOUS DISEASES,
CENTER FOR DISEASE CONTROL
AND PREVENTION (CDC)

I've devoted the past 10 years to working for the CDC with the goal of raising awareness of the positive impacts vaccinations have on our society. Thanks for reading!

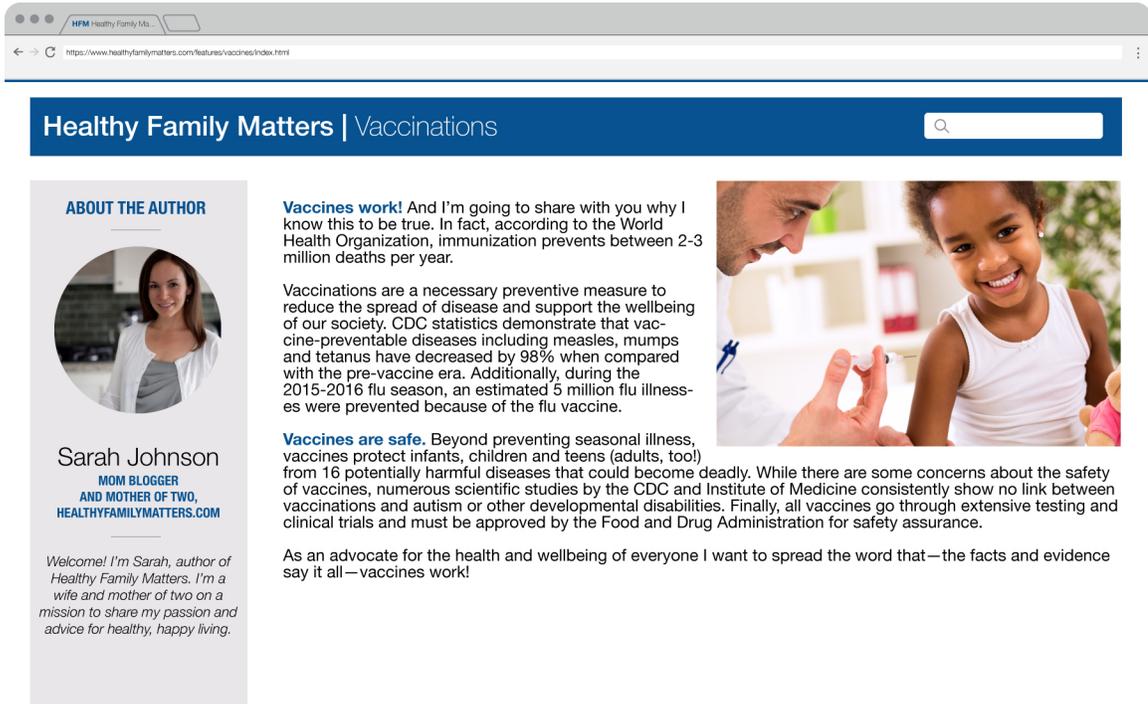
Vaccines work! And I'm going to share with you why I know this to be true. In fact long before my career with the CDC I used to believe in the anti-vaxx movement. Now I don't.

As a mother of two who prides myself on paying close attention to my children's health, I chose not to vaccinate my children because I was a big believer in the anti-vaccine research I saw shared by my friends online. I scoured everything I could find about why vaccines might be harmful and became convinced they were. I chose not to vaccinate because I had my doubts.

A different perspective. My anti-vaxx beliefs changed when my three children were affected with a case of rotavirus, which is potentially deadly. Seeing them in so much pain and distress made me feel awful; I had put them at risk. And to know it could have been prevented with a simple vaccination made me feel worse. I wish I had taken more time to research both sides instead of being so caught up in the anti-vaxx movement.

So, as a mom who deeply cares about her children—much like each of you do—I want you to know that vaccines work!

C. Vaccine / Layperson source / Scientific message



Healthy Family Matters | Vaccinations

ABOUT THE AUTHOR



Sarah Johnson
MOM BLOGGER
AND MOTHER OF TWO,
HEALTHYFAMILYMATTERS.COM

Welcome! I'm Sarah, author of Healthy Family Matters. I'm a wife and mother of two on a mission to share my passion and advice for healthy, happy living.

Vaccines work! And I'm going to share with you why I know this to be true. In fact, according to the World Health Organization, immunization prevents between 2-3 million deaths per year.

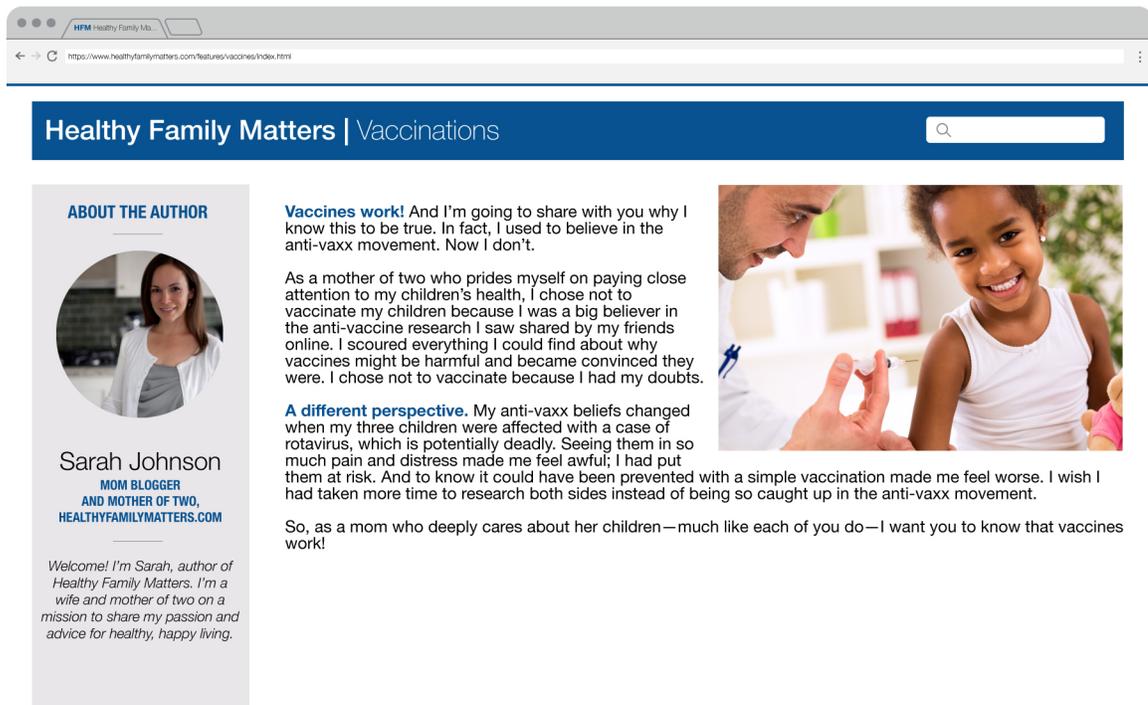
Vaccinations are a necessary preventive measure to reduce the spread of disease and support the wellbeing of our society. CDC statistics demonstrate that vaccine-preventable diseases including measles, mumps and tetanus have decreased by 98% when compared with the pre-vaccine era. Additionally, during the 2015-2016 flu season, an estimated 5 million flu illnesses were prevented because of the flu vaccine.

Vaccines are safe. Beyond preventing seasonal illness, vaccines protect infants, children and teens (adults, too!) from 16 potentially harmful diseases that could become deadly. While there are some concerns about the safety of vaccines, numerous scientific studies by the CDC and Institute of Medicine consistently show no link between vaccinations and autism or other developmental disabilities. Finally, all vaccines go through extensive testing and clinical trials and must be approved by the Food and Drug Administration for safety assurance.

As an advocate for the health and wellbeing of everyone I want to spread the word that—the facts and evidence say it all—vaccines work!



D. Vaccine / Layperson source / Narrative message



Healthy Family Matters | Vaccinations

ABOUT THE AUTHOR



Sarah Johnson
MOM BLOGGER
AND MOTHER OF TWO,
HEALTHYFAMILYMATTERS.COM

Welcome! I'm Sarah, author of Healthy Family Matters. I'm a wife and mother of two on a mission to share my passion and advice for healthy, happy living.

Vaccines work! And I'm going to share with you why I know this to be true. In fact, I used to believe in the anti-vaxx movement. Now I don't.

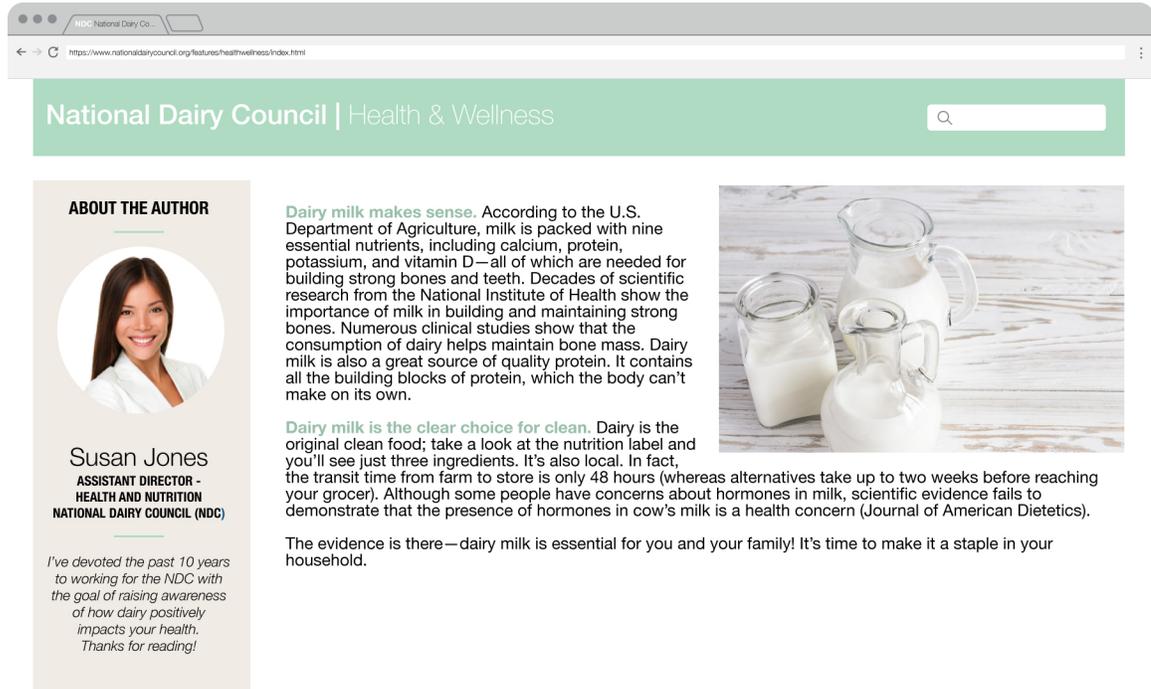
As a mother of two who prides myself on paying close attention to my children's health, I chose not to vaccinate my children because I was a big believer in the anti-vaccine research I saw shared by my friends online. I scoured everything I could find about why vaccines might be harmful and became convinced they were. I chose not to vaccinate because I had my doubts.

A different perspective. My anti-vaxx beliefs changed when my three children were affected with a case of rotavirus, which is potentially deadly. Seeing them in so much pain and distress made me feel awful; I had put them at risk. And to know it could have been prevented with a simple vaccination made me feel worse. I wish I had taken more time to research both sides instead of being so caught up in the anti-vaxx movement.

So, as a mom who deeply cares about her children—much like each of you do—I want you to know that vaccines work!



E. Dairy milk / Professional source / Scientific message



The screenshot shows a web browser window with the URL <https://www.nationaldairycouncil.org/features/healthwellness/index.html>. The page header is "National Dairy Council | Health & Wellness" with a search bar. The main content is divided into three columns. The left column is titled "ABOUT THE AUTHOR" and features a circular portrait of Susan Jones, Assistant Director - Health and Nutrition at the National Dairy Council (NDC). Below her name is a quote: "I've devoted the past 10 years to working for the NDC with the goal of raising awareness of how dairy positively impacts your health. Thanks for reading!". The middle column contains two paragraphs of text. The first paragraph, titled "Dairy milk makes sense," states that according to the U.S. Department of Agriculture, milk is packed with nine essential nutrients (calcium, protein, potassium, and vitamin D) and cites scientific research from the National Institute of Health regarding bone health. The second paragraph, titled "Dairy milk is the clear choice for clean," describes dairy as an original clean food with a short transit time from farm to store (48 hours) and mentions concerns about hormones in milk. The right column features a photograph of three glass pitchers and jars filled with milk on a wooden surface.

ABOUT THE AUTHOR



Susan Jones
ASSISTANT DIRECTOR -
HEALTH AND NUTRITION
NATIONAL DAIRY COUNCIL (NDC)

I've devoted the past 10 years to working for the NDC with the goal of raising awareness of how dairy positively impacts your health. Thanks for reading!

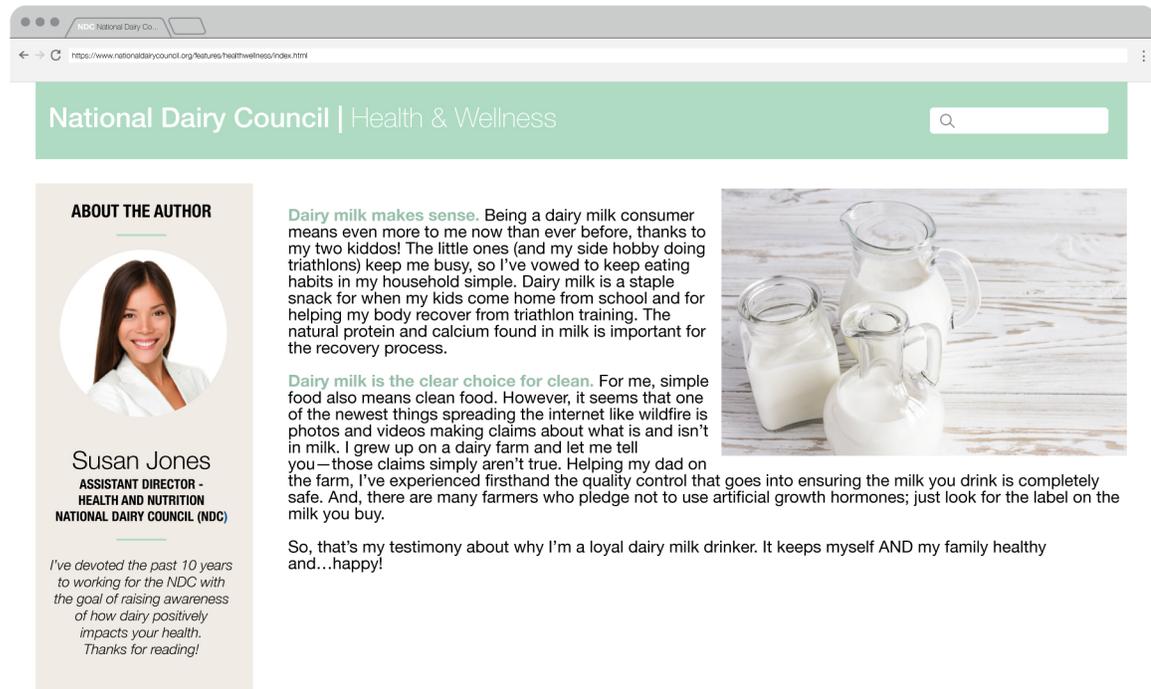
Dairy milk makes sense. According to the U.S. Department of Agriculture, milk is packed with nine essential nutrients, including calcium, protein, potassium, and vitamin D—all of which are needed for building strong bones and teeth. Decades of scientific research from the National Institute of Health show the importance of milk in building and maintaining strong bones. Numerous clinical studies show that the consumption of dairy helps maintain bone mass. Dairy milk is also a great source of quality protein. It contains all the building blocks of protein, which the body can't make on its own.

Dairy milk is the clear choice for clean. Dairy is the original clean food; take a look at the nutrition label and you'll see just three ingredients. It's also local. In fact, the transit time from farm to store is only 48 hours (whereas alternatives take up to two weeks before reaching your grocer). Although some people have concerns about hormones in milk, scientific evidence fails to demonstrate that the presence of hormones in cow's milk is a health concern (Journal of American Dietetics).

The evidence is there—dairy milk is essential for you and your family! It's time to make it a staple in your household.



F. Dairy milk / Professional source / Narrative message



The screenshot shows the same web browser window as in section E. The page header is "National Dairy Council | Health & Wellness" with a search bar. The main content is divided into three columns. The left column is titled "ABOUT THE AUTHOR" and features a circular portrait of Susan Jones, Assistant Director - Health and Nutrition at the National Dairy Council (NDC). Below her name is a quote: "I've devoted the past 10 years to working for the NDC with the goal of raising awareness of how dairy positively impacts your health. Thanks for reading!". The middle column contains two paragraphs of text. The first paragraph, titled "Dairy milk makes sense," describes how being a dairy milk consumer is important to the author due to her busy lifestyle as a triathlete and mother of two children. The second paragraph, titled "Dairy milk is the clear choice for clean," shares the author's personal experience with quality control on a dairy farm and her concerns about artificial growth hormones. The right column features a photograph of three glass pitchers and jars filled with milk on a wooden surface.

ABOUT THE AUTHOR



Susan Jones
ASSISTANT DIRECTOR -
HEALTH AND NUTRITION
NATIONAL DAIRY COUNCIL (NDC)

I've devoted the past 10 years to working for the NDC with the goal of raising awareness of how dairy positively impacts your health. Thanks for reading!

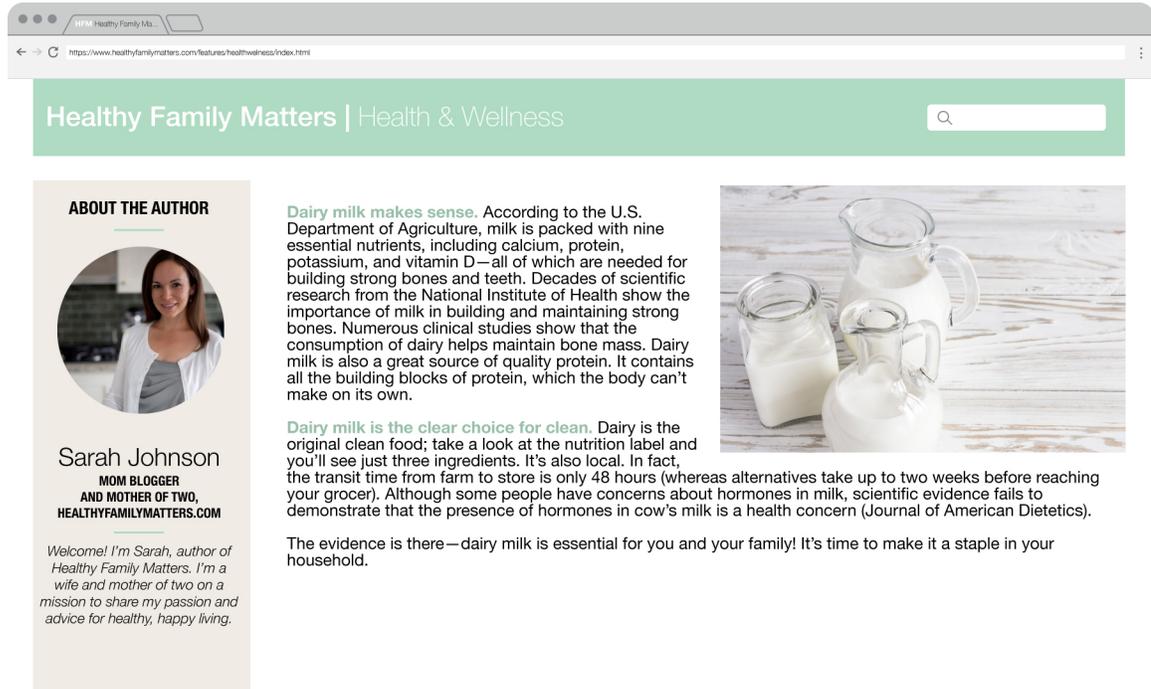
Dairy milk makes sense. Being a dairy milk consumer means even more to me now than ever before, thanks to my two kiddos! The little ones (and my side hobby doing triathlons) keep me busy, so I've vowed to keep eating habits in my household simple. Dairy milk is a staple snack for when my kids come home from school and for helping my body recover from triathlon training. The natural protein and calcium found in milk is important for the recovery process.

Dairy milk is the clear choice for clean. For me, simple food also means clean food. However, it seems that one of the newest things spreading the internet like wildfire is photos and videos making claims about what is and isn't in milk. I grew up on a dairy farm and let me tell you—those claims simply aren't true. Helping my dad on the farm, I've experienced firsthand the quality control that goes into ensuring the milk you drink is completely safe. And, there are many farmers who pledge not to use artificial growth hormones; just look for the label on the milk you buy.

So, that's my testimony about why I'm a loyal dairy milk drinker. It keeps myself AND my family healthy and...happy!



G. Dairy milk / Layperson source / Scientific message



Healthy Family Matters | Health & Wellness

ABOUT THE AUTHOR



Sarah Johnson
MOM BLOGGER
AND MOTHER OF TWO,
HEALTHYFAMILYMATTERS.COM

Welcome! I'm Sarah, author of Healthy Family Matters. I'm a wife and mother of two on a mission to share my passion and advice for healthy, happy living.

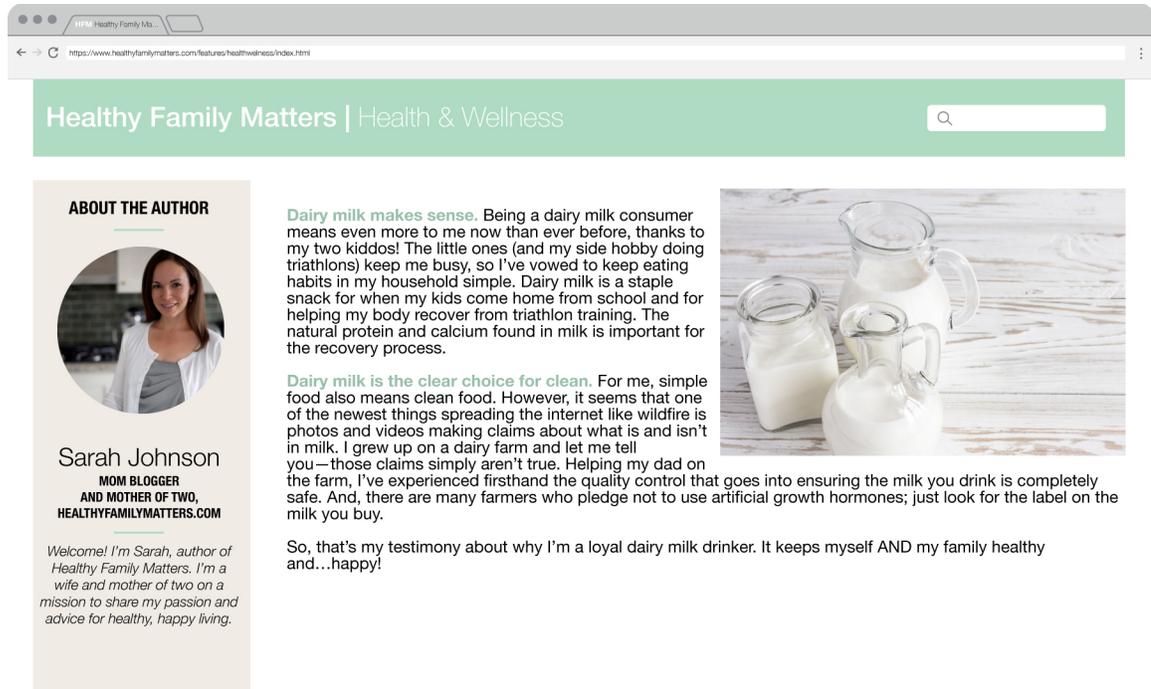
Dairy milk makes sense. According to the U.S. Department of Agriculture, milk is packed with nine essential nutrients, including calcium, protein, potassium, and vitamin D—all of which are needed for building strong bones and teeth. Decades of scientific research from the National Institute of Health show the importance of milk in building and maintaining strong bones. Numerous clinical studies show that the consumption of dairy helps maintain bone mass. Dairy milk is also a great source of quality protein. It contains all the building blocks of protein, which the body can't make on its own.



Dairy milk is the clear choice for clean. Dairy is the original clean food; take a look at the nutrition label and you'll see just three ingredients. It's also local. In fact, the transit time from farm to store is only 48 hours (whereas alternatives take up to two weeks before reaching your grocer). Although some people have concerns about hormones in milk, scientific evidence fails to demonstrate that the presence of hormones in cow's milk is a health concern (Journal of American Dietetics).

The evidence is there—dairy milk is essential for you and your family! It's time to make it a staple in your household.

H. Dairy milk / Layperson source / Narrative message



Healthy Family Matters | Health & Wellness

ABOUT THE AUTHOR



Sarah Johnson
MOM BLOGGER
AND MOTHER OF TWO,
HEALTHYFAMILYMATTERS.COM

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Dairy milk makes sense. Being a dairy milk consumer means even more to me now than ever before, thanks to my two kiddos! The little ones (and my side hobby doing triathlons) keep me busy, so I've vowed to keep eating habits in my household simple. Dairy milk is a staple snack for when my kids come home from school and for helping my body recover from triathlon training. The natural protein and calcium found in milk is important for the recovery process.



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So, that's my testimony about why I'm a loyal dairy milk drinker. It keeps myself AND my family healthy and...happy!

APPENDIX 2: MAIN STUDY INSTRUMENT

Communicating Health Issues Campus IRB #2008237 C

Thank you for agreeing to participate in this research project about communication of health issues.

What it involves: If you decide to participate, you will answer questions about your perception of two different health issues. You will also read two different blog posts about the issues and respond to follow-up questions. It will take about 15 minutes to complete this survey.

Limitations: You must be at least 18 years of age and a resident of the U.S. in order to participate. You must also be the mother or primary caregiver of at least one child under the age of 18.

Benefits and Risks: The risks to participating in this study are expected to be no greater than those encountered in ordinary, everyday life. The benefits are the opportunity to take part in an academic study that furthers knowledge in the area of health communication.

Compensation: You will receive a \$5 Amazon card, distributed via email, in compensation for completion of this survey. In order to receive the gift card you must complete the entire survey and click on the link at the end of the survey that prompts you to provide your name and email address. Your name and email address will be used only to send you the gift card.

Reporting of data/Anonymity: Your personal information, including your email address, will not be linked to your survey responses.

Voluntary study: This is a voluntary study, meaning you will be able to exit the study at any time without any consequence. You also have the right to refuse to answer any specific question.

Contact: If you have any questions about the study, please contact Danielle Myers at danielle.myers@mail.missouri.edu, 236 Walter Williams, Missouri School of Journalism, Columbia, MO 65211; (phone 573-882-2813). Or you may also contact the research advisor, Dr. Glen Cameron, camerong@missouri.edu.

If you have any questions about your right as a study participant, or are dissatisfied at any time with any aspect of the study, you may contact, anonymously if you wish, the Campus Institutional Review Board, 483 McReynolds, University of Missouri, Columbia, MO 65211 or by phone at 573-882-9585.

If you have read the above information and would like to participate in the study, please click the “Next” button. **Clicking the “Next” button also indicates that you are 18 years of age or older.**

<NEXT>

PART ONE (text in brackets will not appear on the actual survey)

[SCREENER]

Are you a mother with at least one child under the age of 18 within your care?

Yes

No

Do you currently reside in the U.S.?

Yes

No

(If “Yes” to both, proceed to survey, If “No” to one or both, prompted with message, “Thank you for your interest but you do not meet the criteria necessary to be a participant of this study.”)

During this survey you will read two messages about two different health issues, vaccinations and dairy milk, and will respond to some questions following each message.

First, we’d like to get a better understanding of your perceptions of two health issues. Our first set of questions is about vaccinations and how they relate to your child(ren)’s health. Please read the statements on the next page and indicate your responses accordingly.

[preexisting attitudes, vaccinations: 6 items]

The use of vaccinations to support your child(ren)’s overall health is:

good 1 – 2 – 3 – 4 – 5 – 6 – 7 bad

favorable 1 – 2 – 3 – 4 – 5 – 6 – 7 unfavorable

harmful 1 – 2 – 3 – 4 – 5 – 6 – 7 beneficial

positive 1 – 2 – 3 – 4 – 5 – 6 – 7 negative

useful 1 – 2 – 3 – 4 – 5 – 6 – 7 useless

needed 1 – 2 – 3 – 4 – 5 – 6 – 7 not needed

[perceived benefits, vaccinations: 4 items]

1. Getting vaccinated will decrease my child(ren)’s chances of becoming ill.

strongly agree 1 – 2 – 3 – 4 – 5 – 6 – 7 strongly disagree

2. Vaccinations are effective in preventing diseases.

strongly agree 1 – 2 – 3 – 4 – 5 – 6 – 7 strongly disagree

3. For my child(ren), there are many positive aspects about getting vaccinated.
strongly disagree 1 – 2 – 3 – 4 – 5 – 6 – 7 strongly agree
 4. My child(ren) will benefit from getting vaccinated.
strongly agree 1 – 2 – 3 – 4 – 5 – 6 – 7 strongly disagree
- [perceived threat, vaccinations: 4 items]
5. It is likely that getting vaccinated will negatively impact my child(ren)'s health.
strongly agree 1 – 2 – 3 – 4 – 5 – 6 – 7 strongly disagree
 6. I feel vaccinations could cause complications to my child(ren)'s health sometime during their lives.
strongly agree 1 – 2 – 3 – 4 – 5 – 6 – 7 strongly disagree
 7. My child(ren)'s chances of experiencing negative outcomes as a result of getting vaccinated are great.
strongly agree 1 – 2 – 3 – 4 – 5 – 6 – 7 strongly disagree
 8. Negative health outcomes as a result of my child(ren) getting vaccinated could be severe.
strongly agree 1 – 2 – 3 – 4 – 5 – 6 – 7 strongly disagree

Now we'd like to understand your perceptions about dairy milk and how it relates to your child(ren)'s health. Please read the statements below and select your responses accordingly.

[preexisting attitudes, dairy milk: 6 items]

The use of dairy milk to support your child(ren)'s overall health is:

- good 1 – 2 – 3 – 4 – 5 – 6 – 7 bad
- favorable 1 – 2 – 3 – 4 – 5 – 6 – 7 unfavorable
- harmful 1 – 2 – 3 – 4 – 5 – 6 – 7 beneficial
- positive 1 – 2 – 3 – 4 – 5 – 6 – 7 negative
- useful 1 – 2 – 3 – 4 – 5 – 6 – 7 useless
- needed 1 – 2 – 3 – 4 – 5 – 6 – 7 not needed

[perceived benefit, milk: 4 items]

9. For my child(ren), consuming dairy milk will decrease their chances of having calcium deficits.
strongly agree 1 – 2 – 3 – 4 – 5 – 6 – 7 strongly disagree
10. For my child(ren), consuming dairy milk is an effective way to ensure they get the nutrients they need.
strongly agree 1 – 2 – 3 – 4 – 5 – 6 – 7 strongly disagree

11. There are many positive aspects about my child(ren) consuming dairy milk.
strongly disagree 1 – 2 – 3 – 4 – 5 – 6 – 7 strongly agree
12. My child(ren) will benefit from consuming dairy milk.
strongly agree 1 – 2 – 3 – 4 – 5 – 6 – 7 strongly disagree
- [perceived threat, milk: 3 items]
13. It is likely that drinking dairy milk will negatively impact my child(ren)'s health.
strongly agree 1 – 2 – 3 – 4 – 5 – 6 – 7 strongly disagree
14. I feel drinking dairy milk could cause complications to my child(ren)'s health
sometime during their lives.
strongly agree 1 – 2 – 3 – 4 – 5 – 6 – 7 strongly disagree
15. My child(ren)'s chances of experiencing negative outcomes as a result of drinking
dairy milk are great.
strongly agree 1 – 2 – 3 – 4 – 5 – 6 – 7 strongly disagree
16. Negative health outcomes as a result of my child(ren) drinking dairy milk could be
severe.
strongly agree 1 – 2 – 3 – 4 – 5 – 6 – 7 strongly disagree

Now we're going to ask you a few questions concerning your opinion about science and scientists. We'd like for you to think of "science" as being a general endeavor to advance knowledge.

- [trust in science: 6 items]
[value similarity dimension]
17. Scientists value profit more highly than I do.
do not agree at all 1 – 2 – 3 – 4 – 5 absolute agreement
18. Scientists see the risks associated with certain health behaviors differently than I do.
do not agree at all 1 – 2 – 3 – 4 – 5 absolute agreement
19. Public health is not very important to those in the science field.
do not agree at all 1 – 2 – 3 – 4 – 5 absolute agreement
- [social trust dimension]
20. Science communicates honestly about possible health effects of certain health
behaviors.
do not agree at all 1 – 2 – 3 – 4 – 5 absolute agreement
21. Should it turn out that vaccinations and/or dairy milk is a health threat for humans,
the science field would openly and honestly inform the public.
do not agree at all 1 – 2 – 3 – 4 – 5 absolute agreement

22. I trust science to take public health into account when communicating health advice.
do not agree at all 1 – 2 – 3 – 4 – 5 absolute agreement

Next we'd like to understand the extent to which you might enjoy mental activities.

Please answer the questions below.

[need for cognition; 8 items; save analysis for post-dissertation]

23. I really enjoy a task that involves coming up with new solutions to problems.
very strong agreement 1 – 2 – 3 – 4 – 5 – 6 – 7 very strong disagreement

24. I am usually tempted to put more thought into a task than the job minimally requires.
very strong agreement 1 – 2 – 3 – 4 – 5 – 6 – 7 very strong disagreement

25. Learning new ways to think doesn't excite me very much.
very strong agreement 1 – 2 – 3 – 4 – 5 – 6 – 7 very strong disagreement

26. I usually end up deliberating about issues even when they don't affect me personally.
very strong agreement 1 – 2 – 3 – 4 – 5 – 6 – 7 very strong disagreement

27. I prefer to let things happen rather than try to understand why they turned out that way.
very strong agreement 1 – 2 – 3 – 4 – 5 – 6 – 7 very strong disagreement

28. I only think as hard as I have to.
very strong agreement 1 – 2 – 3 – 4 – 5 – 6 – 7 very strong disagreement

29. It's enough for me that something gets the job done. I don't care how or why it works.
very strong agreement 1 – 2 – 3 – 4 – 5 – 6 – 7 very strong disagreement

30. I enjoy thinking about an issue even when the results of my thought will have no effect on the outcome of the issue.
very strong agreement 1 – 2 – 3 – 4 – 5 – 6 – 7 very strong disagreement

PART TWO

Now you will receive a message about vaccinations. Please read the message carefully and answer the questions that follow.

[subjects will be randomly assigned ONE of the following four message conditions: 1) health official / scientific; 2) health official / narrative; 3) mom blogger / scientific; 4) mom blogger / narrative]

First, we'd like to learn about your perceptions of the message source (the author of the message), as well as the information presented in the message.

[trust in the information source; 7 items]

The **author** of this message is:

1. trustworthy 1 ----- 7 untrustworthy

2. reliable 1 ----- 7 unreliable
3. honest 1 ----- 7 dishonest
4. The **author** has the expertise to make a competent judgment about vaccines.
strongly agree 1 – 2 – 3 – 4 – 5 – 6 – 7 strongly disagree
5. The **author** is a useful source of information about vaccines.
strongly agree 1 – 2 – 3 – 4 – 5 – 6 – 7 strongly disagree
6. The **author** will do what is right for society regarding vaccines.
strongly agree 1 – 2 – 3 – 4 – 5 – 6 – 7 strongly disagree
7. The **author** will tell the truth about vaccines.
strongly agree 1 – 2 – 3 – 4 – 5 – 6 – 7 strongly disagree

[trust in the message; 6 items]

The **message** about vaccinations is:

8. Fair 1 ----- 7 Unfair
9. Unbiased 1 ----- 7 Biased
10. Accurate 1 ----- 7 Inaccurate
11. Trustworthy 1 ----- 7 Untrustworthy
12. Tells the whole story 1 ----- 7 Doesn't tell the whole story
13. Does cover the public's interests 1 ----- 7 Does not cover the public's interests

Take into consideration the message you just read as you answer these questions:

[behavioral intent toward the message; 7 items]

1. I would be interested in reading more information about this topic.
strongly disagree 1 – 2 – 3 – 4 – 5 strongly agree
2. I would be interested in learning more about this topic.
strongly disagree 1 – 2 – 3 – 4 – 5 strongly agree
3. I would seek out additional information about this topic.
strongly disagree 1 – 2 – 3 – 4 – 5 strongly agree
4. I would refer a friend or family member to this blog post if they had questions about the topic.
strongly disagree 1 – 2 – 3 – 4 – 5 strongly agree
5. I would post a link to this blog post on my social media page.
strongly disagree 1 – 2 – 3 – 4 – 5 strongly agree
6. I would “click” for more information on this topic if given the opportunity.
strongly disagree 1 – 2 – 3 – 4 – 5 strongly agree

7. I would like to ask the author more information on her topic if given the opportunity.
strongly disagree 1 – 2 – 3 – 4 – 5 strongly agree

Please answer the following questions about your perceptions of vaccinations.

[post-message attitudes, vaccinations: 6 items]

The use of vaccinations to support your child(ren)'s overall health is:

- good 1 – 2 – 3 – 4 – 5 – 6 – 7 bad
favorable 1 – 2 – 3 – 4 – 5 – 6 – 7 unfavorable
harmful 1 – 2 – 3 – 4 – 5 – 6 – 7 beneficial
positive 1 – 2 – 3 – 4 – 5 – 6 – 7 negative
useful 1 – 2 – 3 – 4 – 5 – 6 – 7 useless
needed 1 – 2 – 3 – 4 – 5 – 6 – 7 not needed

[behavioral intent toward vaccines; 2 items]

14. I plan to get vaccinated within the next year.
strongly agree 1 – 2 – 3 – 4 – 5 – 6 – 7 strongly disagree
15. If given the opportunity to get vaccinated I would.
strongly agree 1 – 2 – 3 – 4 – 5 – 6 – 7 strongly disagree

PART THREE

Now you will receive a message about dairy milk. Please read the message carefully and answer the questions that follow.

[subjects' random assignment to message condition will be determined at the start of the survey]

[message with be presented here]

We'd like to learn about your perceptions of the message source (the author of the message), as well as the information presented in the message.

[trust in the information source; 7 items]

The **author** of this message is:

16. trustworthy 1 ----- 7 untrustworthy
17. reliable 1 ----- 7 unreliable
18. honest 1 ----- 7 dishonest
19. The **author** has the expertise to make a competent judgment about dairy milk.
strongly agree 1 – 2 – 3 – 4 – 5 – 6 – 7 strongly disagree
20. The **author** is a useful source of information about dairy milk.
strongly agree 1 – 2 – 3 – 4 – 5 – 6 – 7 strongly disagree

21. The **author** will do what is right for society regarding dairy milk.
strongly agree 1 – 2 – 3 – 4 – 5 – 6 – 7 strongly disagree

22. The **author** will tell the truth about dairy milk.
strongly agree 1 – 2 – 3 – 4 – 5 – 6 – 7 strongly disagree

[trust in the message; 6 items]

The **message** about dairy milk is:

23. Fair 1 ----- 7 Unfair

24. Unbiased 1 ----- 7 Biased

25. Accurate 1 ----- 7 Inaccurate

26. Trustworthy 1 ----- 7 Untrustworthy

27. Tells the whole story 1 ----- 7 Doesn't tell the whole story

28. Does cover the public's interests 1 ----- 7 Does not cover the public's interests

Take into consideration the message you just read as you answer these questions:

[behavioral intent toward the message; 7 items]

8. I would be interested in reading more information about this topic.
strongly disagree 1 – 2 – 3 – 4 – 5 strongly agree

9. I would be interested in learning more about this topic.
strongly disagree 1 – 2 – 3 – 4 – 5 strongly agree

10. I would seek out additional information about this topic.
strongly disagree 1 – 2 – 3 – 4 – 5 strongly agree

11. I would refer a friend or family member to this blog post if they had questions about the topic.
strongly disagree 1 – 2 – 3 – 4 – 5 strongly agree

12. I would post a link to this blog post on my social media page.
strongly disagree 1 – 2 – 3 – 4 – 5 strongly agree

13. I would "click" for more information on this topic if given the opportunity.
strongly disagree 1 – 2 – 3 – 4 – 5 strongly agree

14. I would like to ask the author more information on her topic if given the opportunity.
strongly disagree 1 – 2 – 3 – 4 – 5 strongly agree

Please answer the following questions about your perceptions of dairy milk.

[post-message attitudes, vaccinations: 6 items]

The use of dairy milk to support your child(ren)'s overall health is:

good 1 – 2 – 3 – 4 – 5 – 6 – 7 bad

favorable 1 – 2 – 3 – 4 – 5 – 6 – 7 unfavorable

harmful 1 – 2 – 3 – 4 – 5 – 6 – 7 beneficial

positive 1 – 2 – 3 – 4 – 5 – 6 – 7 negative

useful 1 – 2 – 3 – 4 – 5 – 6 – 7 useless
needed 1 – 2 – 3 – 4 – 5 – 6 – 7 not needed

[behavioral intent toward dairy milk; 2 items]

29. I plan to consume dairy milk within the next month.
strongly agree 1 – 2 – 3 – 4 – 5 – 6 – 7 strongly disagree
30. If given the opportunity to drink dairy milk I would.
strongly agree 1 – 2 – 3 – 4 – 5 – 6 – 7 strongly disagree

PART FOUR

Lastly, we'll ask you just a few more questions about yourself.

1. What is your age? (please type the number below in years)

2. Please specify your ethnicity:
 - a. White
 - b. African American
 - c. Hispanic/Latino
 - d. Native American
 - e. Asian/Pacific Islander
 - f. Other
3. What is the highest level of education you have completed?
 - a. some high school
 - b. high school graduate
 - c. some college
 - d. trade/technical/vocational training
 - e. college graduate
 - f. some postgraduate work
 - g. post graduate degree
4. Which of the following best describes the area **where you grew up**?
 - a. urban
 - b. suburban
 - c. rural
5. Which of the following best describes the area **where you currently live**?
 - a. urban
 - b. suburban
 - c. rural
6. Which of the following regions of the U.S. best describes **where you currently live**?

- a. Northeast
(Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island, Pennsylvania, Vermont)
 - b. Midwest
(Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Nebraska, North Dakota, Ohio, South Dakota, Wisconsin)
 - c. South
(Alabama, Arkansas, Delaware, Florida, Georgia, Kentucky, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, Virginia, District of Columbia, West Virginia)
 - d. West
(Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, Wyoming)
7. Please indicate below which best describes your political ideology.
very liberal – liberal – moderate – conservative – very conservative
8. Which political party do you best identify with?
- a. Strong Democrat
 - b. Democrat
 - c. Independent lean Democrat
 - d. Independent
 - e. Independent lean Republican
 - f. Republican
 - g. Strong Republican

We greatly appreciate your time spent taking this survey!

In order to receive the \$5 Amazon gift card, you must provide your email address by clicking below. (Remember: No identifying information will be linked to your survey responses. Your email address will be used solely to award you the gift card.)

Please **CLICK HERE**. You will be directed to a quick, separate form where you will fill in your name and email address.

VITA

Danielle will join the A.Q. Miller School of Journalism and Mass Communications at Kansas State University as assistant professor in the public relations sequence in August 2017. She will teach the following courses during her first year: principles of public relations, strategic communication research methods and public relations case studies. She plans to continue her research in health and agricultural communication in hopes to understand the most effective communication strategies to help consumers “enjoy” food and not “fear” it.

Before beginning her Ph.D. at the Missouri School of Journalism she was a digital marketing coordinator for a national direct-selling fashion brand. She trained and conducted webinars for brand representatives on developing relationships in the digital space, and also managed the brand’s social media channels and campaigns. She also previously worked for Crossroads Real. Communication. (a Barkley partner company) as new business assistant and at Bernstein-Rein Advertising as public relations manager where she was responsible for internal and external communications for the agency.

Danielle graduated with a Bachelor of Science in Public Relations and Master of Arts in Mass Communication from the University of Central Missouri. During her time as a master’s student she managed the university’s student-led public relations firm where she oversaw students’ campaign production and execution for clients and managed the firm’s relationships with clients.